Short title:-

BIOLOGY AND ENERGETICS OF <u>PODISUS</u> <u>MACULIVENTRIS</u> (SAY)

MUKERJI

A LABORATORY STUDY OF THE BIOLOGY AND ENERGETICS OF A QUEBEC STRAIN OF THE PREDATOR, *PODISUS MACULIVENTRIS* (SAY) (HEMIPTERA : PENTATOMIDAE)

by

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A THESIS

Submitted to the faculty of Graduate Studies and Research of McGill University in partial fulfilment of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

July 1965

ACKNOWLEDGEMENT

The author wishes to express his grateful appreciation and sincere thanks to Dr. E. J. LeRoux, Associate Professor of Entomology, McGill University, under whose direction this work was carried out, for his continued guidance and encouragement throughout the period of study and to Dr. C. S. Holling of the Canada Department of Forestry, for kind advice and helpful suggestions given on different aspects of the study.

Thanks are extended to all members of Staff, Department of Entomology, Macdonald College, Quebec, for the kindness they have shown to me during the course of this work, in particular, to Miss S. Samarasinghe, graduate student, to whom I express sincere appreciation for help and encouragement and to Messrs. W. Hoek, B. Narstad and D. Casson for technical assistance rendered.

Thanks are also addressed to Dr. L. A. Kelton, Entomology Research Institute, Canada Department of Agriculture, Ottawa, for the identification of P. maculiventris specimens submitted.

Financial help from the Quebec Agricultural Research Council in the form of a grant is gratefully acknowledged.

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I. INTRODUCTION

Recent studies on population ecology in Canada have through the life table approach revealed in part some of the processes responsible for insect outbreaks (Morris, 1963a; LeRoux et al., 1963), and through the components approach (Holling, 1963; 1964) explained in part the operation of some of these processes. These studies, however, are lacking in detailed information on the trophic dynamic aspect (Lindeman, 1942) of the processes and components reported for insects investigated.

LeRoux (1964) from life table studies and Morris (1963b) from components studies showed that the pentatomid predator, Podisus maculiventris (Say), a secondary consumer, is of major importance in the dynamics of certain lepidopterous pests of orchard and forest crops. The species, clearly, is worthy of further investigation along trophic lines and to this end, a quantitative study of food consumption by P. maculiventris was undertaken at Macdonald College in 1964, using larvae of the wax moth Galleria mellonella (L.) as the food source. The object was to determine in the laboratory, at constant temperature and humidity, a) the amount of prey food consumed in relation to the amount supplied; b) the transformation of the energy consumed by the predator; and c) the functional response of P. maculiventris to different sizes of G. mellonella larvae.

A prerequisite to the energy studies was the laboratory rearing during 1963 of P. maculiventris under optimum conditions of food, temperature and humidity, to determine general behaviour of nymphs and adults, as well as egg production and sex ratio, and survival and longevity of all stages of the predator.

This thesis is a report on the results of the above experiments, and on the interpretations and significance of the data obtained.

II. REVIEW OF LITERATURE

Podisus maculiventris (Say) was originally described from Louisiana by Thomas Say in 1832 who named it *Pentatoma maculiventris*. Unfortunately, this description was lost for 67 years since it did not appear in the "complete writings" of Say edited by Leconte (1891). In 1851 Dallas described *Arma spinosa*, and in 1867 Stål transferred Dallas' species *spinosa* to the genus *Podisus* created in 1853 by Herrich-Schaeffer. *Podisus spinosus* (Dallas) was the name used until 1899 when Scudder published Say's lost description of this pentatomid along with an excerpt of a letter from Uhler who pointed out that Say's original description fitted exactly that of *Podisus spinosus*. Van Duzee (1904) agreed with Uhler and in accordance with the laws of priority placed Say's species *maculiventris* in Herrich-Schaeffer's genus *Podisus*. The predator has since been known as *Podisus maculiventris* (Say). Specimens used in the present study were identified by Dr. L. A. Kelton, Entomology Research Institute, Canada Department of Agriculture, Ottawa, as *Podisus maculiventris* (Say).

P. maculiventris is a native North American insect and according to Van Duzee (1917) is present in Vermont, Massachusetts, New York, Pennsylvania, Maryland, North Carolina, Georgia, Florida, Ohio, Wisconsin, Nebraska, Kansas, Oklahoma, Texas, Montana, Colorado, Arizona, California, Quebec, Ontario, Manitoba, Vancouver Island. In Canada and in the United States, Hart (1919) reports this species to be more common east of the Rockies.

Over the past 66 years a number of important studies have been carried out on P. maculiventris and these studies and the area of investigation concerned are itemized in chronological order as follows:

Year of publication	Author	Type of investigation
1897	A. H. Kirkland	Life history and habit.
1906	A. W. Morrill	A few observations on bionomics.
1907	A. A. Girault	On egg parasites.
1910	C. E. Olsen	Notes on breeding.
1916	R. D. Whitmarsh	Notes on life history.
1919	D. Stoner	Notes on biology.
1927	A. D. Baker	Notes on feeding process.
1930	D. Stoner	Notes on rearing on celery-tyer.
1937	B. J. Landis	Notes on hosts and nymphal development.
1938	A. Couturier	Notes on biology.
1938	J. Feytaud	Notes on biology.
1946	C. O. Esselbaugh	Study of egg structure.
1948	C. O. Esselbaugh	Notes on biology.
1960	E. J. LeRoux	Predators of apple.
1962	D. M. DeCoursey and C. O. Esselbaugh	Description of nymphal stages.
1962	H. C. Coppel and P. A. Jones	Notes on bionomics.
1963	E. J. LeRoux and others	Dynamics of Budmoth, Pistol case bearer, and Fruit-tree leaf roller.
1963b	R. F. Morris	Components study.

III. LABORATORY REARING, LIFE HISTORY AND BEHAVIOUR OF P. MACULIVENTRIS

A. ECONOMIC IMPORTANCE

Couturier (1938) was one of the first workers to determine the effectiveness of *P. maculiventris* in the biological control of all stages of the Colorado potato beetle, *Leptinotarsa decemlineata* (Say). Other workers have also reported the species to be of particular importance in the natural control of larvae of the elm leaf beetle *Galerucella luteola* (Müll.), the eastern tent caterpillar *Malacosoma americanum* (Fabr.), the cotton bollworm *Heliothis obsoleta* Fabr. and the cotton leafworm *Alabama argilacea* Hüb. Host records for the period 1906 to 1964 are listed in Table 1.

More recently, a number of workers (LeRoux, 1960; LeRoux *et al.*, 1963; Morris, 1963b) estimated quantitatively the effect of predation by *P. maculiventris* on the population dynamics of some agricultural and forest insect pests. LeRoux (1960) reports that adults of Pentatomid species, including *P. maculiventris*, were very important in Quebec apple orchards during the latter part of May and June, 1953 to 1955, when lepidopterous larvae were numerous, and that nymphal forms of the predator were present in July and August of the same years when mites and aphids were on the increase. In 1955, in particular, *P. maculiventris* and *Podisus modestus* (Dallas) adults were largely responsible for the effective control of a receding larval population of tent caterpillars. Subsequent long term studies (LeRoux *et al.*, 1963), also on

TABLE 1

Host records for *P. maculiventris* obtained by authors during period 1906 to 1964.

Name of host: Scientific	Name of host: Common	Author	Date of publication
COLEOPTERA			
Chrysomelidae			
Chrysomela scripta Fabr.	Poplar leef beetle	R.D. Whitmarsh	1916
Crioceris asparagi (L.)	Asparagus beetle	B.J. Landis	1937
Diabrotica 12-punctata Fabr.	Spotted cucumber beetle	C.A. Hart	1919
Galerucella luteola Müll	Elm leaf beetle	A.W. Morrill	1906
Haltica chalybea Illiger	Grape vine flea beetle	A.W. Morrill	1906
Lema trilineata (Oliv.)	Three-lined potato beetle	B.J. Landis	1937
Leptinotarsa decemlineata (Say)	Colorado potato beetle	A.W. Morrill	1906
Unidentified spp. on weeds	-	M.K. Mukerji	Present study
Coccinelidae			
Anatis quindecempunctata (Oliv.)	Fifteen spotted lady bird	C.O. Esselbaugh	1948
Scarabeidae			
Unidentified spp.	-	C.O. Esselbaugh	1948
DIPTERA			
Anthomyidae			
Hylemyia antiqua Mg.	Onion maggot-fly	A.D. Baker	1927
Muscidae			
Musca domestica L.	Housefly	M.K. Mukerji	Present study
Tachinidae			
Unidentified sp.	-	C.O. Esselbaugh	1948
Trypetidae			
Rhagoletis pomonella (Walsh)	Apple maggot	E.J. LeRoux & M.K. Mukerji	1963
EPHEMERIDA			
Unidentified spp.	-	M.K. Mukerji	Present study

TABLE 1 (cont'd)

Name of host			
Scientific	Common	Author	Date of publication
HEMIPTERA			
Aphididae			
Unidentified spp.	-	C.O. Esselbaugh	1948
Miridae			
Lygus pratensis (L.)	Tarnished plant bug	J.L. Horsfall	*In* Stoner (1919)
Pentatomidae			
Podisus maculiventris (Say)	Spined soldier bug	A.D. Baker	1927
Euschistus tristigmus (Say)	Dusky stink bug	Patch	*In* Kirkcaldy (1909)
HYMENOPTERA			
Diprionidae			
Diprion similis (Htg.)	Pine sawfly	H.C. Coppel & P.A. Jones	1962
Tenthredinidae			
Fenusa pusilla (Lepeletier)	Birch leafminer	M.K. Mukerji	Present study
Pristiphora geniculata (Htg.)	Mountain-ash sawfly	R.S. Forbes & L. Daviault	1964
Pristiphora glossularia Walsh	?	A.W. Morrill	1906
Selandria barda Say	?	Osborne	*In* Kirkaldy (1909)
Vespidae			
Unidentified sp.	-	M.K. Mukerji	Present study
LEPIDOPTERA			
Arctidae			
Hyphantria cunea (Dru.)	Fall webworm	F.A. McDermott	1911
H. textor Fabr.	Fall webworm	C.A. Hart	1919
Citheroniidae			
Anisota virginiensis Drury	Pink striped oakworm	A.W. Morrill	1906
Coleophoridae			
Coleophora serratella (L.)	Pistol casebearer	E.J. LeRoux & C. Reimer	1959
Cossidae			
Cossus cossus L.	?	A. Couturier	1938
Galleriidae			
Galleria mellonella (L.)	Greater wax moth	A. Couturier	1938
Geometridae			
Paleacrita vernata (Peck)	Spring canker worm	E.J. LeRoux	1960

TABLE 1 (Cont'd)

Name of host: Scientific	Common	Author	Date of publication
Gracilariidae			
Gracilaria syringella (Fabr.)	Lilac leafminer	M.K. Mukerji	Present study
Lasiocampidae			
Malacosoma americanum (Fabr.)	Eastern tent caterpillar	A.W. Morrill	1906
Noctuiidae			
Alabama argilacea Hübn.	Cotton leafworm	A.W. Morrill	1906
Autographa brassicae Riley	Cabbage looper	C.O. Esselbaugh	1948
Heliothis obsoleta Fabr.	Cotton bollworm	A.W. Morrill	1906
Lithophane antennata (Wlk.)	Green fruitworm	E.J. LeRoux	1960
Notodontidae			
Datana ministra Drury	Yellow-necked caterpillar	C.A. Hart	1919
Oecophoridae			
Depressaria heracliana de Geer	Parsnip webworm	C.O. Esselbaugh	1948
Olethreutidae			
Spilonota ocellana (D. & S.)	Eye-spotted bud moth	E.J. LeRoux & C. Reimer	1959
Papilionidae			
Papilio polyxenes Fabr.	Black swallow tail	C.O. Esselbaugh	1948
Pieridae			
Pieris rapae (L.)	Cabbage butterfly	C.O. Esselbaugh	1948
Plutellidae			
Plutella maculipennis (Curt.)	Diamondback moth	B.J. Landis	1937
Pyralidae			
Canarsia hammondi Riley	?	C.A. Hart	1919
Ephestia kuehniella Zeller	Mediterranean flour moth	A. Couturier	1938
Ostrinia nubilalis (Hübn.)	European corn borer	M.K. Mukerji	Present study
Tortricidae			
Archips argyrospilus (Wlk.)	Fruit-tree leaf roller	E.J. LeRoux	1960
A. cerasivoranus (Fitch)	Ugly-nest caterpillar	E.J. LeRoux	1960
Argyrotaenia velutinana (Wlk.)	Red-banded leaf roller	E.J. LeRoux	1960
Carpocapsa pomonella (L.)	Codling moth	M.K. Mukerji	Present study
Pandemis lamprosana Rob.	?	M.K. Mukerji	Present study
P. canadana Kht.	?	M.K. Mukerji	Present study

TABLE 1 (Cont'd)

Name of host: Scientific	Common	Author	Date of publication
ORTHOPTERA			
Acrididae			
Melanoplus femur-rubrum (de Geer)	Red-legged grasshopper	C.O. Esselbaugh	1948
Gryllidae			
Gryllus assimilis (Fabr.)	Field cricket (Laboratory culture)	M.K. Mukerji	Present study

apple, revealed that P. maculiventris was a potential "key" factor in the natural control of Coleophora serratella (L.) since egg mortalities of this pest caused by the predator ranged from 12 to 85 per cent over a period of seven years. Coppel and Jones (1962) report that for the pine sawfly, Diprion similis (Htg.) the absence of insect parasites on larvae of this species may be compensated for by the presence of Podisus spp.

B. METHODS OF REARING

Rearing of P. maculiventris was carried out in the laboratory at constant temperatures of 70°F., 75°F., and 80°F., with relative humidities at each temperature ranging from 40 to 45 per cent.

First-instar nymphs were reared in groups of ten in small pyrex petri dishes, each 1.5 cm. deep x 5.5 cm. in diameter. On the inside edge of each dish was placed a cotton plug soaked with water and to this plug was added daily, with a medicine dropper, three to four drops of water. When the nymphs moulted to the second instar they were transferred, four per dish, to larger dishes, each 1.5 cm. deep x 9.5 cm. in diameter. Water was added as before and in similar amounts. Nymphs were kept in these dishes throughout the second, third and fourth stadia. On reaching the fifth instar the nymphs were again transferred three each to glass jars, 8.5 cm. deep x 6.5 cm. in diameter, equipped with screened tops for ventilation (Plate III B). To the wet cotton plug placed at the bottom inner edge of each jar was added daily 10 c.c. of water. When the nymphs reached the adult stage they were sexed, and pairs (one male and one female) placed one per jar in jars similar to those used for 5th instar nymphs. Mating pairs were removed to new rearing jars as soon as eggs were deposited. Eggs were kept in the jars until hatching, at which time newly-emerged first-instar nymphs were transferred to small petri dishes, of the type described above, and the sequence of steps used in the rearing of this species, repeated.

To test the effect of "crowding" on P. maculiventris twelve pairs of the predator were reared together in a single jar, 22.0 cm. deep x 10.5 cm. in diameter. A large water-soaked cotton plug was placed at the bottom inner edge of the jar and to it was added, daily, 30 c.c. of water. Animal food, in the form of 24 fully-grown, live, larvae of A. cerasivoranus, was also added daily to the jar.

The amount of care required in the rearing of P. maculiventris varies with the stage of the insect. Nymphs in the smaller petri dishes required very little care other than the addition of a few drops of water daily. Nymphs in the larger petri dishes and rearing jars developed successfully only when cultures were kept free of mites (undetermined) and fungi. To prevent entry of these organisms, dishes and jars were cleaned thoroughly once every four days and new cotton plugs and fresh food added.

All nymphal stages and adults reared in the presence of water were observed to take up the liquid from the soaked cotton plugs; hence it would appear that metabolic water alone is insufficient to sustain life in P. maculiventris.

Different types of insect larvae and pupae were fed to P. maculiventris during the period June to July, 1963. In June, field-collected tent caterpillars constituted the main diet of the predator while in

July, only field-collected larvae of the ugly-nest caterpillar were fed to the predator. From August, 1963 onwards, P. maculiventris was reared exclusively on larvae (weighing .0521 grams or more) of the greater wax moth, Galleria mellonella (L.).

The original stock source of all P. maculiventris used in the above-mentioned studies came from sixteen pairs of field-collected adults taken from the Macdonald College apple orchard in early June, 1963 (Table 2). Up till March, 1965 the species had been reared continuously in our laboratory for 20 generations without loss in yield or vigour of the predator. During this period the culture yielded over twenty million eggs of which approximately 75 per cent were viable.

C. OVIPOSITION

In the field, the overwintering females of P. maculiventris begin laying eggs during the latter part of May. The eggs, which are laid in masses, are glued individually at the base to the leaf substrate and along the sides to other eggs. Eggs are generally laid on the upper surface of the leaves but some masses are laid on the under surface and on the bark as well. Most of the masses are exposed to sunlight. On the average the number of eggs per mass is 25, with individual masses ranging in number from 18 to 30.

In the laboratory, the first three or four egg masses laid by adult female P. maculiventris were generally laid on the screened tops of the rearing jars. All egg masses laid thereafter were deposited mainly on the bottoms and sides of the jars or on the cotton plugs.

TABLE 2

Number of eggs laid per female and length of life of field-collected overwintered adults of P. maculiventris reared at a constant temperature of 80°F in June 1963.

Pair No.	Sex	Date of collection	No. of eggs laid	Died on	Length of life in days	Place of collection
1	Male	June 3/1963		June 29/1963	26	Macdonald College
	Female	June 3/1963	179	June 29/1963	26	"
2	Male	June 3/1963		June 29/1963	26	"
	Female	June 3/1963	86	June 27/1963	24	"
3	Male	June 3/1963		June 28/1963	25	"
	Female	June 3/1963	131	June 28/1963	25	"
4	Male	June 3/1963		June 26/1963	23	"
	Female	June 3/1963	0	June 26/1963	23	Ile Bizard
5	Male	June 3/1963		June 29/1963	26	Macdonald College
	Female	June 4/1963	175	June 25/1963	21	"
6	Male	June 4/1963		June 25/1963	21	"
	Female	June 4/1963	46	June 23/1963	19	"
7	Male	June 4/1963		June 27/1963	23	"
	Female	June 4/1963	233	June 27/1963	23	"
8	Male	June 4/1963		June 25/1963	21	"
	Female	June 4/1963	192	June 25/1963	21	"
9	Male	June 4/1963		June 17/1963	13	"
	Female	June 4/1963	117	June 24/1963	20	"
10	Male	June 4/1963		June 23/1963	19	"
	Female	June 4/1963	333	June 23/1963	19	"
11	Male	June 5/1963		June 22/1963	17	"
	Female	June 5/1963	115	June 22/1963	17	"
12	Male	June 5/1963		June 28/1963	23	"
	Female	June 5/1963	121	June 28/1963	23	"

(cont'd)

Pair No.	Sex	Date of collection	No. of eggs laid	Died on	Length of life in days	Place of collection
13	Male	June 4/1963		June 10/1963	6	Macdonald College
	Female	June 6/1963	0	June 7/1963	1	"
14	Male	June 13/1963		June 26/1963	13	"
	Female	June 13/1963	0	June 26/1963	13	"
15	Male	June 13/1963		June 24/1963	11	"
	Female	June 13/1963	0	June 17/1963	4	"
16	Male	June 13/1963		June 27/1963	14	"
	Female	June 13/1963	37	June 22/1963	9	"

Mean ($\bar{x}$) longevity of Male - 19.2 ± 1.5; Female - 18.0 ± 1.9

Adults reared in the laboratory had a premating period of two to four days and a preoviposition period of three to 10 days, with the period from adult emergence to first deposition of eggs ranging from five to 14 days and the period between successive depositions of eggs ranging from one to 18 days.

The present laboratory study reveals that if the females are not disturbed the eggs are almost always laid in rows (Plate I A) and that these rows vary in number from two to five. Sometimes the eggs are laid in the form of a circle; other times in the form of a triangle. Eggs may be laid singly (rarely so) or in masses ranging from 22 to 71. Coppel and Jones (1962) similarly report that laboratory-reared P. maculiventris females lay eggs singly or in masses (up to 47 eggs per mass) and that the eggs in these masses are generally arranged in two rows; rarely in the form of a triangle. They make no mention of the circular arrangement of eggs. Esselbaugh (1946), on the other hand, mentions that maximum number of eggs laid by a P. maculiventris is 57 with an average of 25 and states that these eggs are generally arranged in rows of four.

The maximum number of eggs laid by a single female in our studies was 1220 and these were deposited in 46 separate masses. Couturier (1938) records 1097 eggs in 58 masses for a single female, while Coppel and Jones (1962) record 593 eggs in 35 masses.

Couturier (1938) reports that oviposition in P. maculiventris continues until death, providing the female is kept with the male. He also states that death of females may result prematurely, even in the presence of males, from increased ovarian activity particularly at temperatures too low for oviposition. The implication is that the presence of large numbers of eggs inside the female body is the causal factor of death in these cases. Such a phenomenon has been observed for females reared with males at a temperature of 70°F. On dissection it was found that dead or dying females were bloated with eggs. It was also observed that females need not always be in the presence of males for continual egg-laying, and that ovarian activity is not always a cause of reduced longevity. In one case, among others, an unfertilized female laid 1132 eggs and lived for eight months.

D. FECUNDITY OF FEMALES

The mean number of eggs laid per female, in six generations reared at Macdonald College, is recorded in Table 3 . Data given for each generation are (a) the mean number of eggs laid per mass, (b) the mean number of egg masses per female and (c) the period of oviposition. The number of females used in the fecundity experiment was 50 for the first generation and 30 for each of the subsequent remaining generations.

Crowding has considerable effect on oviposition. When 12 pairs of adults were reared in one large rearing jar, of size described in the section on "Methods of Rearing", the total number of eggs laid was 2196 or 183 eggs per female. In comparison, the total number of eggs laid by a similar number of females, each reared separately in the presence of a male, was 5137.2 eggs or 428.1 eggs per female. Results suggest that oviposition for *P. maculiventris* is to some extent density-dependent.

The rate of egg laying for individual females of *P. maculiventris* reared at constant temperatures (70°F - 80°F) and humidities (40 - 45

TABLE 3

Mean ($\bar{x}$) number of eggs and egg masses per female per generation, for six generations of P. *maculiventris*, reared in pairs on ugly-nest caterpillar and wax moth larvae in screen-topped jars at constant temperatures ranging from 70°F to 80°F.

Generation	Mean ($\bar{x}$) per female: Eggs	Egg masses	Eggs per mass	Range in number of egg masses	Egg-laying period	Temperature
First	428.1 ± 43.5	13.5 ± 1.6	31.4 ± 1.8	0 - 46	July 1963 - Jan. 1964	80°F
Second	395.3 ± 42.9	14.8 ± 1.7	26.5 ± 1.4	1 - 40	Aug. 1963 - March 1964	78°F
Third	305.5 ± 33.7	16.2 ± 1.1	18.5 ± 0.85	1 - 41	Sept. 1963 - June 1964	70°F
Fourth	317.9 ± 32.8	16.0 ± 1.1	19.3 ± 0.86	0 - 39	Oct. 1963 - June 1964	70°F
Fifth	370.2 ± 36.7	14.3 ± 1.3	25.4 ± 1.4	0 - 42	Jan. 1964 - July 1964	75°F
Sixth	359.3 ± 30.1	14.2 ± 1.2	24.9 ± 1.1	1 - 40	Feb. 1964 - Aug. 1964	75°F

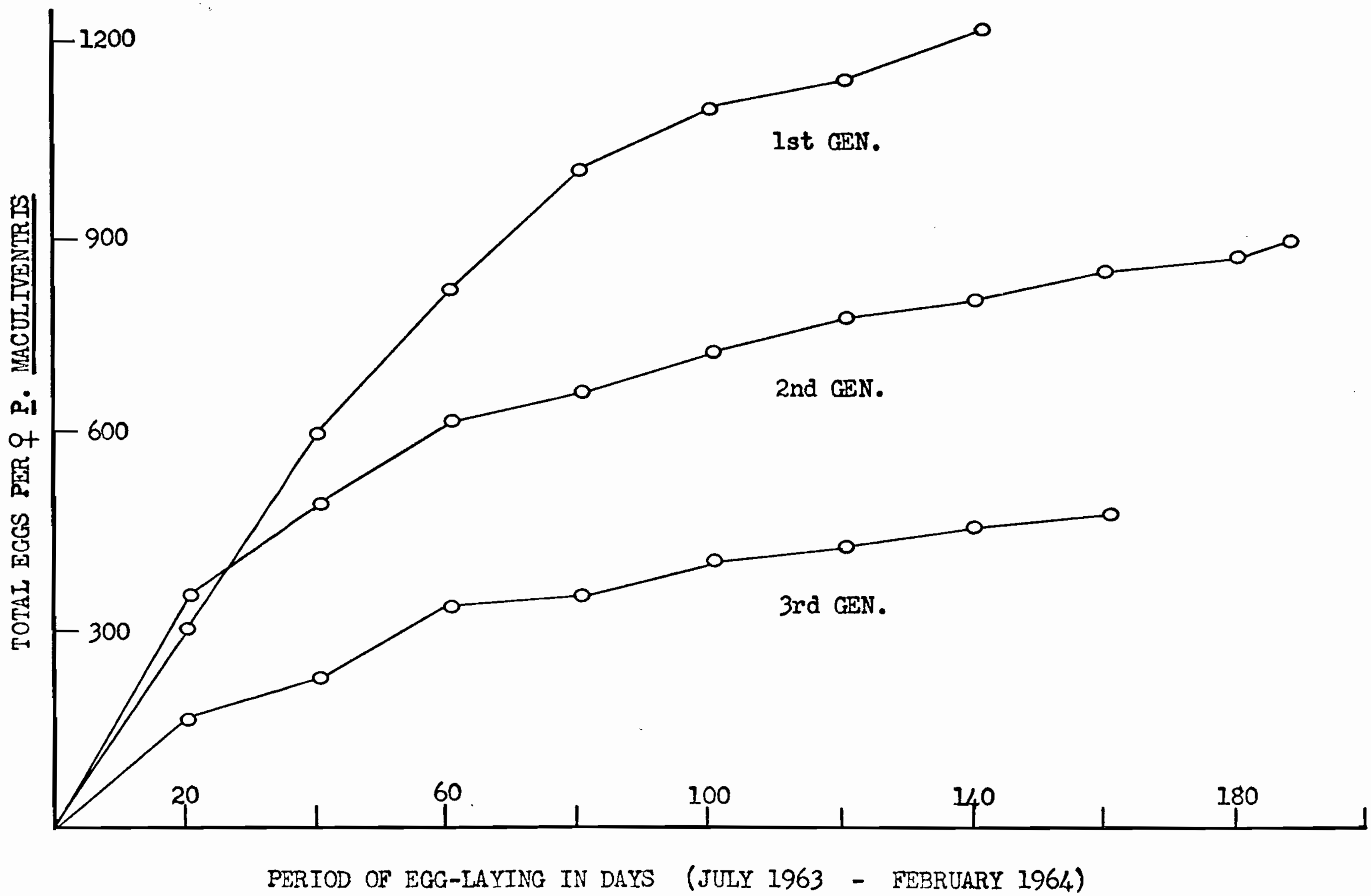

Fig. 1. - Numbers of eggs laid (cumulative) and rates of egg-laying for individual *P. maculiventris* females of the first three generations.

per cent R.H.), during the first 180 days of the first three generations, is graphically illustrated in Figure 1 from cumulative egg totals obtained at 20-day intervals. In each of three generations there was a rapid increase in total eggs during the first 60 days followed by a levelling off of this total for the remainder of the egg-laying period. The difference in numbers of eggs laid from generation to generation was mainly due to the differences in temperatures at which females were reared, i.e., 80°F for the first generation, 78°F for the second generation, 70°F for the third generation.

E. INCUBATION

The period of incubation for eggs of laboratory reared P. maculiventris i.e., the period from egg deposition to emergence of first-instar nymphs, averaged five days and ranged four to seven days (Table 4). Coppel and Jones (1962), for similarly reared P. maculiventris, report an average of 9.6 days and a range of seven to 12 days, and Esselbaugh (1948) reports a range of two to seven days with an average of 4.6 days. Morrill (1906) and Couturier (1938) have suggested that a fluctuating temperature, as opposed to a constant temperature, enhances the speed of development of eggs in P. maculiventris. In the present experiments the rate of egg development did not vary significantly eggs incubated at a constant temperature of 80°F nor for eggs incubated at temperatures varying from 70°F to 80°F.

TABLE 4

Duration of egg stage and percentage of eggs hatched for ten egg masses of P. maculiventris reared at a constant temperature of 80°F.

Egg mass	Date of oviposition	Incubation period	Date of hatching	Number of eggs per mass	Number of eggs hatched	Percentage hatched
1	June 6/1963	5 days	June 11/1963	46	36	78.3%
2	June 8/1963	6 days	June 14/1963	13	13	100%
3	June 10/1963	4 days	June 14/1963	35	33	94.3%
4	June 11/1963	5 days	June 16/1963	44	41	93.2%
5	June 12/1963	5 days	June 17/1963	33	33	100%
6	June 13/1963	4 days	June 17/1963	45	42	93.3%
7	June 14/1963	6 days	June 20/1963	28	26	92.9%
8	June 16/1963	5 days	June 21/1963	23	22	95.7%
9	June 18/1963	6 days	June 24/1963	25	25	100%
10	June 19/1963	7 days	June 26/1963	37	34	91.9%

F. HATCHING

The mature embryo within the egg (Plate I B) lies with its body directed upwards along the long axis of the egg cup and the head is situated immediately below the cover or operculum. The antennae, labium and legs are closely apposed to the venter of the embryo. The egg burster, a T-shaped chitinous structure (Plate I C) consisting of a transverse bar and a median spur (Prebble, 1933) lies freely within the egg shell between the operculum and the face of the embryo. A transparent membrane connects the transverse bar to the apex of the median spur at a point anterior to the face of the embryo, thus forming a triangular-shaped structure positioned parallel to the operculum. The membrane continues posteriorly into a narrow band of tissue which is fused to the edge of the egg cup. At eclosion, the operculum of the egg is first loosened at the periphery, save for a portion of the structure lying adjacent to the mouthparts of the embryo, then forced up by the head of the nymph through a series of pulsating-like movements of the body fluid. First, the forelegs are released, then the second pair of legs, then the antennae, next the hind legs and lastly the abdomen which is released by the hind tibiae. Once emergence is accomplished the operculum falls back in its original position and the egg burster with its membrane considerably shrunken, remains in a protruding position between the operculum and the rim of the egg cup. Soon after emergence the newly-emerged nymph moves to the upper surface of the operculum where it rests until its integument hardens and darkens. Body throbbing movements are generally observed until the integument has become completely sclerotized. In the present studies, eclosion was observed to take approximately 20 to 25 minutes and all nymphs generally emerged as one.

The integument of the newly-emerged nymph is yellow, with the dorsal portions of the abdomen red in colour and very soft. Fully sclerotized newly-emerged nymphs are considerably gregarious in habit.

G. DURATION OF STAGES

The period of nymphal development of P. maculiventris, reared in groups of four at a constant temperature of 80°F and relative humidities of 40 - 45 per cent, ranged from 25 to 31 days. Nymphs of instars[1] two to five were reared on 0.0521 grams of G. mellonella larvae per group of four, with instars two to four being reared in petri dishes and instar five in glass jars. The duration in days per instar per specimen reared is recorded as follows:

Container	Specimen no.	Duration in days: Instar I	Instar II	Instar III	Instar IV	Instar V	Total	Sex
1	1	4	5	4	4	8	25	Male
	2	5	5	5	4	8	27	Male
	3	4	5	5	4	8	26	Male
	4	5	6	5	5	9	30	Male
2	1	6	5	4	4	10	29	Female
	2	5	5	6	4	8	28	Female
	3	6	6	5	5	8	30	Female
	4	6	6	5	5	8	30	Female
3	1	6	6	5	5	9	31	Female
	2	6	6	5	4	10	31	Male
	3	4	5	6	4	10	29	Female
	4	5	6	4	4	11	30	Female

---

1 Instar I is a non-feeding instar.

(Cont'd.)

4	1	4	5	5	4	8	26	Female
	2	5	5	4	5	8	27	Female
	3	4	6	4	5	8	27	Male
	4	4	6	5	4	9	28	Male
5	1	4	4	5	6	9	28	Male
	2	5	5	4	4	9	27	Female
	3	4	7	5	4	9	29	Male
	4	5	4	5	4	8	26	Male
6	1	6	6	6	4	8	30	Male
	2	5	5	4	5	9	28	Female
	3	4	7	5	4	9	29	Female
	4	6	5	5	4	10	30	Male
Mean		4.9	5.4	4.8	4.4	8.9	28.4	Sex ratio
S.E.		0.17	0.15	0.12	0.11	0.20	0.35	12 : 12
Range		4-6	4-7	4-6	4-6	8-11	25-31	

For nymphs two to five individually reared on G. mellonella larvae - ten for each of four diet levels (see section on Feeding Biology) - at a constant temperature of 80°F and a relative humidity of 70 per cent the period of nymphal development including first instar ranged from 20.3 to 30.0 days (Table 10 and Appendix pt. 1, Table IV). It is of interest to note that during the course of rearing fifth-instar nymphs of P. maculiventris were observed to display various colour patterns (Plate IV A, B, C). These differences in colour patterns, whether due to genetic variability or not, need further investigation.

Coppel and Jones (1962) report for similarly reared nymphs at a temperature of 24 ± 7°C, a range of 21 to 32 days and Esselbaugh (1948) at room temperature, a range of 16 to 30 days. According to Landis (1937) the rate of development of laboratory-reared nymphs of P. maculiventris appears to correspond to the rate of development of the hosts on which they feed. Couturier (1938) considers three main factors influence nymphal development, notably, (1) sex, (2) temperature, (3) type of prey. Males he found completed all instars in less time than females, save for the fifth instar which required equal time for both sexes, and temperature, he found, influenced most the speed of development.

H. PROCESS OF MOULTING

Nymphs in all stages stop feeding from a few hours to two days before moulting. During this period they remain quiescent, save for an occasional jerky movement of the body. Coincident with this action, the legs stretch out, the head becomes stooped and the antennae are directed ventrally beneath the thorax. When ecdysis starts the exuviae split first at the head along the "paracephalic" (Prebble, 1933) sutures and at the thorax along the mid-dorsal sulcus. The lateral halves of the tergum are then forced apart by the emerging nymph which exposes, in the process, its thorax in a humped position. By a series of peristalsis-like movements, the nymph then forces the head free of the old skin, then the fore and mid legs, then the antennae and next the hind legs. The abdomen is finally pulled free of the exuviae through the anteriorly directed wave-like motion created by the compression of body fluid. The hind tibiae also help in the freeing of the abdomen.

In newly-emerged adult P. maculiventris, the wings are wrinkled and compact and the distal portion of the scutellum remains bent. Within minutes after emergence, the wings become stretched out, through the patting action of the hind tibiae and the pulsating movements of the body, and soon cover the entire abdomen. The scutellum also becomes stretched flat and parallel to the dorsal body surface. In the male, the genital segments are at first projected out, but later, as hardening of the cuticle takes place, the segments are drawn back within the body. Newly-emerged nymphs and adults are always very soft, pale red or pink in colour, and very unstable in their movements. As hardening of the integument takes place the body colour becomes dark and the insect shows considerably more strength and co-ordination of movements.

P. maculiventris body weights for nymphs reared at the third diet level only (see section of Feeding Biology for explanation of diet level), taken at the end of the feeding period in each stadium, showed a straight line relationship (Fig. 2) with weights of corresponding exuviae. Hence for nymphs individually reared on 0.0129 grams of G. mellonella larvae per day the ratio of body weight increases to exuvial weight increases was almost constant, being 22.5 for the first stadium, 22.3 for the second, 30.4 for the third, 26.6 for the fourth and 22.2 for the fifth. Mean (of 10 replicates) dry body weights of first- to fifth-instar nymphs and corresponding mean (of 10 replicates) dry weights of exuviae, obtained in these rearings, and plotted in Figure 2, are as follows:

Instar	Body weight (Micrograms)	Weight of exuviae (Micrograms)
First	180	8
Second	581	26
Third	2157	71
Fourth	5530	208
Fifth	11902	535

I. SEX RATIO

Sex ratio, based on laboratory rearings and field collections of more than 400 individuals of P. maculiventris was determined approximately to be 50:50. This ratio was to some extent affected by food supply as evidenced by the predominance of adult males (sex ratio 1:3) in cultures of individually reared nymphs fed on 0.0037 grams (i.e.

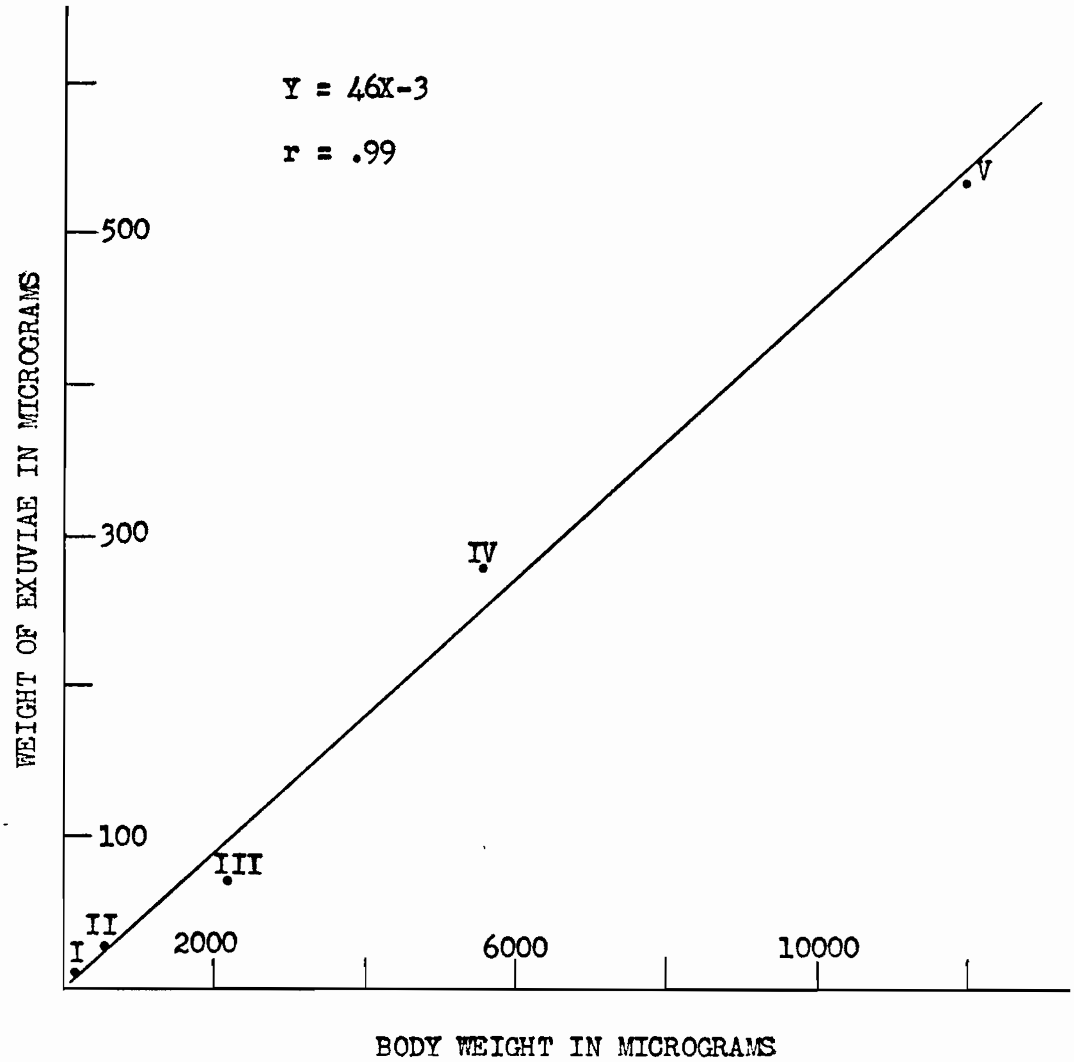

Fig. 2. - Relationship between mean weight of body and exuviae, for nymphal instars one (non-feeding) to five (2 - 5 feeding) of P. maculiventris reared on G. mellonella larvae at diet level three (See section on Feeding Biology for explanation of diet level).

first diet level) of G. mellonella larvae per nymph per day.

Coppel and Jones (1962), for P. maculiventris similarly reared on wax moth larvae, in the laboratory also observed a 50:50 sex ratio for this predator.

J. SPECIAL HABITS OF FIRST-INSTAR NYMPHS

Newly-emerged first-instar nymphs were observed to be highly gregarious and did not require food during the first stadium. On rare occasions during this stage nymphs, two to three days old, were observed to suck fluids from unhatched eggs in the masses from which they emerged. In these instances, the egg shell of the predated egg almost invariably collapsed with the removal of its fluid contents. On emergence from the eggs, nymphs gather on top of the egg mass (Plate I D), where, if not disturbed, they remain for about four days. After this time they separate to moult. During the first two days of their quiescent period they are immobile; during the second two days they move about only slightly, but do not leave the egg mass. If, however, immediately on emergence they are placed in a petri dish with a water-soaked cotton plug, they will gather on the wet plug. In the absence of wet cotton, they will still gather in a group but at no definite point in the dish. Nymphal survival in petri dishes, at high (70 per cent R.H.) or low (40 - 45 per cent) humidities, was high and did not differ significantly.

To test whether or not first-instar nymphs (Plate II A,B) fed on foliage or on prey, 80 newly-emerged nymphs were placed four to a petri dish for a total of 20 dishes. To one series of 10 dishes was added daily, per dish, three fresh and young apple leaves and to the second series was similarly added daily per dish one mature larva of the birch leaf miner, Fenusa pusilla (Lepeletier). At the end of each 24-hour period, while nymphs were in the first-instar stage, leaves and larvae were removed from all the dishes and examined for punctures under the binocular microscope. In no instance were punctures observed either in the leaves or in the prey. Observations on survival of 40 nymphs reared from the first instar onwards, in the presence of water and apple leaves only, are as follows:

Date	Living			Dead		
	Instar I	Instar II	Instar III	Instar I	Instar II	Instar III
July 31/1963......	40	-	-	-	-	-
August 1/1963.....	40	-	-	-	-	-
August 2/1963.....	40	-	-	-	-	-
August 3/1963.....	28	12	-	-	-	-
August 4/1963.....	-	40	-	-	-	-
August 5/1963.....	-	32	-	-	8	-
August 6/1963.....	-	28	-	-	4	-
August 7/1963.....	-	18	-	-	10	-
August 8/1963.....	-	10	1	-	7	-
August 9/1963.....	-	-	4	-	6	1
August 10/1963....	-	-	-	-	-	4

Nymphs reared as above developed to the third instar but were observed, from early in the second instar onwards, to be abnormally small in size and to lack vigour in comparison with nymphs given animal food. This observation is contrary to that made by Coppel and Jones (1962) who reported that nymphs reared on water alone lived from eight to 11 days but did not moult to the second instar. In the present investigation, nymphs reared in the presence of water and apple leaves only reached the third instar without recourse to leaf sap. In no case were first-instar nymphs observed to require food, save possibly when they punctured unhatched eggs in egg masses from which they emerged.

Coppel and Jones (1962) report that nymphs reared without food or moisture died within two to three days; those reared in the presence of water, beans and larvae, or on larvae alone reached the adult stage in 30 to 37 days. The present studies show that all nymphs, from the second instar onward require animal food for successful development. When an adequate supply of such food was made available to them they developed normally to the adult stage in approximately 30 days.

The non-feeding habit of first-instar Podisus nymphs has also been reported by Whitmarsh (1916) and Stoner (1930) for P. maculiventris and by Kirkland (1896) P. serieventris Uhler.

K. METHOD OF ATTACK AND OF FEEDING BY SECOND- TO FIFTH-INSTAR NYMPHS AND BY ADULTS

The predacious habit in P. maculiventris is developed from the second instar onwards. Second-instar nymphs will attack without hesitation large or small prey, though small prey are preferred, and at the moment of attack a considerable struggle between predator and prey may result. The cleaning of the beak and antennae is frequently observed before an attack is made, though this phenomenon may also be observed between attacks. The cleaning process begins with the forelegs grasping the extended beak followed by the pressing and rubbing of the tibiae against the labium as the legs are straightened out. Next, the antennae are cleaned in much the same manner. The act of cleaning the beak and antennae may be repeated a number of times before each attack.

In most cases, prey are detected by P. maculiventris largely by means of the antennae (olfactory senses), although movement of the prey will draw the predator as well. Once in close proximity to the prey, the predator's antennae move up and down rapidly in a line vertical to the prey body, then the beak is extended and contact with the tip of the proboscis is made with the victim's body. The predator will then move back from the prey whether there is movement or not on the part of the victim, go through the cleaning movements once more and then attack again. The point of insertion of the predator's stylets in the prey body varies with each attack. Once the stylets are inserted, there follows, as mentioned above, a struggle between predator and prey. Sometimes the victim escapes by means of vigorous thrashing movements, but in most cases such attempts are futile. On many occasions, *P. maculiventris* was observed to use its forelegs to hold the prey.

Predacious pentatomids have been suspected of secreting poisonous substances by which they immobilize their prey and this phenomenon has been commented upon by Muir and Kershaw (1911), McDermott (1911), Baker (1927), Tothill, Taylor and Paine (1930) and Prebble (1933). In the present investigation thousands of attacks by *P. maculiventris* nymphs and adults have been observed and at each attack, once penetration of the predator's stylets into the prey body was effected, the victim became rapidly immobilized.

P. maculiventris nymphs and adults (Plate II C, D and Plate III A, C, D) were observed to kill prey only when in need of food. Wanton killing of prey was not observed for this predator. From the second-instar stage onwards *P. maculiventris* was observed to resort to cannibalism if larval food was unavailable. Under these conditions nymphs of different instars will prey on each other and on adults, and vice versa.

L. MATING HABIT

Mating begins in the field almost immediately after the adults come out of hibernation. The males are polygamous; females polyandric. The present investigation reveals that the male usually takes the initiative in mating by going first very near the female and vibrating its antennae against those of the female. He then raises the abdomen of the female with his head, quickly climbs on her back and grips her firmly with his three pairs of legs, then he extends his aedeagus and inserts it into the female genital chamber. Once the aedeagus is inserted, male and female turn end to end facing in opposite directions. They remain *in copula* from four to 24 hours, during which period the females move about searching and attacking prey with the male still attached. Coppel and Jones (1962) observed that for *P. maculiventris* the *in copula* period lasts from six to 30 hours and Couturier (1938) reports that adults copulated as soon as the integument became sclerotized after emergence. In the present study, at no time did females mate before two to four days following emergence as adults. Females were observed to mate from seven to 10 times during their three to four months of adult life. Those that mated only once produced fertilized eggs during the first month only; thereafter they produced unfertilized eggs.

M. LENGTH OF ADULT LIFE

Adults of 11 generations of *P. maculiventris* were reared in pairs (non-crowding conditions) in the laboratory from June, 1963 to October, 1964 as per the method described in "Methods of Rearing". Data for the first six generations reveal that longevity of males ranged from 120.5 to 259.2 days at 70°F to 80°F and longevity of females 61.3 to 191.8 days at the same temperature (Table 5). The mean length of life for males of the six generations was 179.8 days; for females 125.3 days. Males lived approximately twice as long as females at constant temperatures of 80°F; one-third longer at 75°F - 78°F; and one-quarter longer at 70°F. Both males and females lived twice as long at 70°F than at 80°F. Reduced longevity in females, at all temperatures, appears to be due mainly to body "wear and tear" resulting from egg production and egg deposition as well as from male cannibalistic activities.

Coppel and Jones (1962) report a longevity of 230 and 243 days, respectively for two P. maculiventris adults (sex, and whether or not specimens were reared singly is not mentioned) reared in their laboratory.

To simulate rearing of P. maculiventris under crowded conditions, twelve pairs of newly-emerged adults were, on emergence, placed in a screen-covered glass jar, 22 cm. deep and 10.5 cm. in diameter, and reared in the laboratory after the method described in an earlier section. The length of life per individual specimens in the jar, ranged from five to 88 days. Females on the average lived only a few days less than the males. Cannibalism was the main factor responsible for the shorter life of P. maculiventris adults under these conditions.

To determine the effect of starvation on longevity of adult P. maculiventris, 25 males and 25 females were reared as per the method described in the section "Methods of Rearing" but without food.

TABLE 5

Mean ($\bar{x}$) length of life of paired adult *P. maculiventris*, per generation, reared for six generations on ugly-nest caterpillar and wax moth larvae in screen-topped jars at constant temperatures ranging from 70°F to 80°F.

Generation	Mean ($\bar{x}$) length of life in days		Period of rearing	Temperature
	Male	Female		
First	120.5 ± 10.8	61.3 ± 7.9	June 1963 - March 1964	80°F
Second	165.2 ± 12.3	113.1 ± 13.6	July 1963 - May 1964	78°F
Third	259.2 ± 10.5	191.8 ± 8.9	Sept. 1963 - Aug. 1964	70°F
Fourth	197.3 ± 11.2	153.4 ± 7.7	Oct. 1963 - Aug. 1964	70°F
Fifth	167.8 ± 11.0	116.9 ± 12.8	Dec. 1963 - Oct. 1964	75°F
Sixth	168.6 ± 10.7	115.0 ± 12.5	Feb. 1964 - Oct. 1964	75°F

Newly-emerged adults were at first kept one pair per rearing jar then, after three or four days to prevent cannibalism, the individuals of each pair were separated and specimens placed one per jar. Although all pairs mated during the first two days they were together, eggs were not laid either prior to or after separation. Results suggest that food plays an important role in oviposition and that fertilized females are incapable of laying eggs when starved.

Effects of non-crowding, crowding and starvation discussed above on longevity and fecundity of laboratory-reared first generation adults of P. maculiventris are recorded below:

Experiment	Sex	Mean ($\bar{x}$) longevity in days	Mean ($\bar{x}$) number of eggs laid per female
Non-crowding	Male	120.5 ± 10.9	
	Female	61.3 ± 7.8	428.1
Crowding	Male	51.8 ± 6.6	
	Female	48.2 ± 5.6	183.0
Starving	Male	58.3 ± 1.5	
	Female	73.5 ± 2.1	0.0

N. NUMBER OF GENERATIONS

Overwintering P. maculiventris adults may be found on apple trees in late May or early June when lepidopterous larvae are present on foliage. Under field conditions, three generations of the predator may be completed each year during the period May - June to September with some overlapping of generations. Adults of the third generation hibernate in October under the bark or in undercover debris etc. Stoner (1919) reports that this species produces two generations annually in

Iowa and Esselbaugh (1948) three generations and a partial fourth in Illinois. At Macdonald College *P. maculiventris* was reared at temperatures of 70°F to 80°F and relative humidities of 40 - 45 and 70 per cent for 20 uninterrupted generations and none of the stages of this species, in any generation, exhibited growth arrest or obligatory diapause.

O. NATURAL ENEMIES

In the present investigation one field-collected egg mass obtained in June 1963 was parasitized by the chalcid *Telenomus podisi* Ashmead. The egg mass turned completely black prior to emergence of the parasite. Acarine predators, undetermined, were found occasionally on egg masses, nymphs, and adults in the laboratory. Girault (1907) reared four hymenopterous parasites from eggs of *P. maculiventris*, namely, *T. podisi* Ashmead, *T. dimmocki* Ashmead, *Trissolcus podisi* Ashmead and *T. thyantae* Ashmead.

IV. STUDIES ON FUNCTIONAL RESPONSE OF P. MACULIVENTRIS

A. INTRODUCTION

To describe and explain the functional response of predators to different prey densities Holling (1959) proposed the "disc" equation and successfully applied it to the data obtained by the following authors: (a) Burnett (1951, 1954) on *Dahlbominus fuliginosus* (Nees) vs. *Neodiprion sertifer* (Geoff.); (b) Burnett (1958) on *D. fuliginosus* vs. *N. lecontei* (Fitch); (c) Ullyett (1949) on *Chelonus texanus* Cress vs. *Anagasta kuhniella* (Zell.) and *Cryptus inornatus* Pratt vs. *Loxostege sticticalis* (L.); (d) Debach and Smith (1941) on *Nasonia vitripennis* (Wlk.) vs. *Musca domestica* L. Morris (1963b) also applied the equation to the predator *P. maculiventris* at different prey densities of *H. cunea* and confirmed its applicability within a certain range of prey density and time. To date, no other worker has, to the writer's knowledge, attempted a further application of the equation.

The object of the present study was to determine the functional response of nymphal and adult stages of *P. maculiventris* to different prey sizes of *G. mellonella*. Under conditions of instantaneous prey discovery and attack, by *P. maculiventris* in a simple and confined universe, the assumption was made that "prey size" could be equated to "prey density". Holling (1964) has pointed out that most predators are responsive to a specific size of prey, usually the optimum size for the species, and are conditioned in their choice by the selective forces that have acted on them during their evolutionary history.

B. METHODS AND MATERIALS

P. maculiventris was reared using the method outlined in Section III, except that all stages of the predator were reared singly in 1/16th gallon (imperial) cylindrical screen-topped glass jars, 8.5 cm. deep X 6.5 cm. in diameter. To allow the predator freedom of action, no foliage was added to the jars. All experiments were carried out at a constant temperature of 80°F and a relative humidity of 70 per cent - optimum conditions for growth and egg-laying of the predator.

Nymphal instars two to five and adult males and females were individually reared on each of four different sized live *G. mellonella* larvae designated hereunder as diet levels one, two, three, and four, as follows:

Stages of *P. maculiventris*	*G. mellonella* larvae - size in grams Size 1 (Diet level 1)	Size 2 (Diet level 2)	Size 3 (Diet level 3)	Size 4 (Diet level 4)
Nymph (Instars 2 to 5)	.0037±.00003	.0073±.00005	.0129±.0001	.0225±.0002
Adult : Male	.0122±.0001	.0218±.0001	.0419±.0002	.0521±.0002
Female	.0125±.0001	.0217±.0001	.0423±.0002	.0518±.0002

At each of the four diet levels, ten nymphs were used for each of instars two to five and four adults for each of the males and females. Specimens of the predator used were taken from the standard culture and were, for nymphs, newly moulted second-instar forms, and for adults, newly-emerged males and females. Experiments using immature stages were terminated when fifth-instar nymphs transformed to adults, and for adults, when males and females died. First-instar nymphs were not used in the experiments as this instar is a non-feeding stage. Variation between replicates in number of prey killed was 10 per cent of the mean or less for all stages of P. maculiventris and approximately 25 per cent for senescent adults.

The size of each prey fed to each stage of the predator was kept constant at each diet level throughout the course of the experiment. Weighings of the prey were taken daily using a Mettler analytical balance type H_{15} (sensitive to .03 gm; Plate V B). To facilitate the handling of G. mellonella larvae each prey was immobilized by anaesthetizing lightly with ether vapour before weighing. Each G. mellonella larva was weighed before being given to the predator and again 24 hours later. Prey larvae were fed daily to P. maculiventris nymphs and adults and, whether attacked or not, were removed from the jars at the end of each 24-hour period. Larvae supplied were made defenseless by clipping them in the region of the thorax with a hair pin. Care was taken not to puncture the integument and larvae accidentally punctured were discarded.

For P. maculiventris adults, functional response was determined per 10-day interval, cumulative, up to 80 days for males and up to 50 days for females. For nymphal stages, the response was determined for the feeding period of each instar, which was 4.3 days or less for all stages save for fifth-instar nymphs which fed from 3.9 to 13.9 days. In the latter case the functional response was calculated on the basis of seven days, the average for this stage.

A series of regression analyses were carried out to determine the relationship between numbers of prey killed at four diet levels as a function of predator age in adult males and females of P. maculiventris, and data plotted per 10-day interval (non-cumulative) for 80 days for males and 50 days for females.

C. PROCEDURE FOR THE APPLICATION OF THE "DISC" EQUATION

To apply the "disc" equation, data obtained (Tables 9 and 10) on "prey size" were transformed to "prey density". It was considered that the assumptions of the equation would not be violated too seriously if these transformations were made since, (a) the predator was reared in a confined, simple universe containing no foliage, (b) prey supplied were defenseless throughout, and (c) discovery was generally instantaneous, with little searching time being required. Under such conditions these observations suggest that a predator can attack and feed on four small larvae each weighing .0122 grams in the same time as it can attack and feed on one large larva weighing .0488 grams.

Although the parameter "rate of searching" was theoretically zero, the predator did spend some time searching prey when G. mellonella larvae were small (diet levels one and two) but no time searching when prey were large (diet levels three and four). The extent of searching was clearly related to the degree of satiation.

The parameters used to describe the functional response by means of the "disc" equation for P. maculiventris nymphs and adults at four "densities" of prey were:

(a) T_t, the total time in days, prey were exposed to the predator. Since all stages of P. maculiventris were observed to feed at night as well as during the day, the total time was taken as the number of

24-hour days.

(b) K, the maximum number of prey attacked at the two highest "densities" combined (mean) where no searching time was involved.

(c) b, the time in the consumption of each prey, based on K, was derived as $b = T_t/K$ and was considered to be constant for all prey "densities". The two components of b measured directly namely, the attacking time c, negligible for defenseless larvae, was taken here to be zero in terms of days, and eating time d, of each predator at the lowest prey "density", measured as 1.5 hours (= .063 days) for both adults and immature forms. Therefore, the interval between the completion of feeding and next attack was calculated as $e = b - d$.

(d) T_s, the time spent searching prey, by the unsatiated predator, at the two lowest prey "densities", was calculated as $T_s = T_t - by$.

(e) a, the rate of discovery was measured as $a = Y/X \div T_s$, the proportion of prey successfully attacked by the predator per unit of searching time in the universe. In the present experiment, this parameter has no meaning at the two highest "densities" where no searching time was involved, but it is meaningful (i.e. one) at the two lowest "densities" where the predator attacked all prey supplied daily.

The "disc" equation $y = (T_t ax)/(1 + abx)$, on the basis of the above parameters, was used to predict the value of y, the number of prey attacked successfully as a function of x, the prey density.

D. RESULTS

Results reveal that for both nymphs (Table 6) and adults (Tables 7 and 8) the number of prey attacked increased as "density" increased,

TABLE 6

Summary of calculations used in predicting the functional response (y_1), for "feeding" nymphs of P. *maculiventris*, instars two to five, at two (1.0 and 2.0) densities of defenseless *G. mellonella* larvae.

Prey density (x)	Prey att'd (y)		Max. y (K)	Days per y (b)	Days all y's (by)	Days searching (T_s)	Attack ratio (y/x)	$y/x\text{-}T_s$ (a)	Predicted prey att'd (y_1)
					2nd instar T_t = 2.4 days				
1.0	2.4				.7	1.7	2.4	1.41	2.5
2.0	4.0				1.1	1.3	2.0	1.54	3.9
3.5	6.7	8.6	8.6	.28	2.4	-	1.8	-	
6.1	10.4								
								1.48	
					3rd instar T_t = 2.7 days				
1.0	2.7				.6	2.1	2.7	1.29	2.9
2.0	4.8				1.1	1.6	2.4	1.50	4.7
3.5	8.8	12.1	12.1	.22	2.7	-	2.5	-	
6.1	15.3								
								1.40	

2nd instar: $y = a(T_t - by)x = 1.48(2.4 - .28y)x$

3rd instar: $y = a(T_t - by)x = 1.40(2.7 - .22y)x$

TABLE 6 (cont'd)

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
					4th instar T_t = 4.3 days				
1.0	4.3				1.5	2.8	4.3	1.54	4.3
2.0	6.2				2.2	2.1	3.1	1.46	7.5
3.5	9.5	11.8	11.8	.36	4.3	-	2.5	-	
6.1	14.0								
								1.50	
					5th instar T_t = 7.0 days				
1.0	7.0				2.4	4.6	7.0	1.52	7.4
2.0	11.4				3.9	3.1	5.7	1.84	10.7
3.5	17.2	20.5	20.5	.34	7.0	-	4.4	-	
6.1	23.8								
								1.68	

4th instar: $$y = a(T_t - by)x = 1.50(4.3 - .36y)x$$

5th instar: $$y = a(T_t - by)x = 1.68(7.0 - .34y)x$$

TABLE 7

Summary of calculations used in predicting the functional response (y_1), per ten-day interval (cumulative), for male P. maculiventris at two (1.0 and 1.7) densities of defenseless G. mellonella larvae.

Prey density (x)	Prey att'd (y)		Max. y (k)	Days per y (b)	Days all y's (by)	Days searching (T_s)	Attack ratio (y/x)	$y/x \div T_s$ (a)	Predicted prey att'd (y_1)
					T_t = 10 days				
1.0	8.8				2.6	7.4	8.8	1.19	10.2
1.7	15.3				4.6	5.4	9.0	1.67	14.3
3.4	29.9	33.0	33.0	.30	10.0	-	8.8	-	
4.1	36.1								
								1.43	

$$y = a(T_t - by)x = 1.43(10 - .30y)x$$

Prey density (x)	Prey att'd (y)		Max. y (k)	Days per y (b)	Days all y's (by)	Days searching (T_s)	Attack ratio (y/x)	$y/x \div T_s$ (a)	Predicted prey att'd (y_1)
					T_t = 20 days				
1.0	18.3				6.2	13.8	18.3	1.33	20.0
1.7	28.9				9.8	10.2	17.0	1.67	26.8
3.4	56.1	58.4	58.4	.34	20.0	-	15.7	-	
4.1	60.7								
								1.50	

$$y = a(T_t - by)x = 1.50(20 - .34y)x$$

TABLE 7 (cont'd)

(x)	(y)		(k)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
				T_t = 30 days					
1.0	28.0				9.8	20.2	28.0	1.39	30.9
1.7	45.6				16.0	14.0	26.8	1.91	42.1
3.4	80.9	85.6	85.6	.35	30.0	-	22.9	-	
4.1	90.2								
								1.65	

$$y = a(T_t - by)x = 1.65(30 - .35y)x$$

(x)	(y)		(k)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
				T_t = 40 days					
1.0	36.8				13.6	26.4	36.8	1.39	41.8
1.7	59.5				22.0	18.0	35.0	1.94	56.8
3.4	105.5	109.2	109.2	.37	40.0	-	29.3	-	
4.1	112.8								
								1.67	

$$y = a(T_t - by)x = 1.67(40 - .37y)x$$

TABLE 7 (cont'd)

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
					T_t = 50 days				
1.0	44.8				17.9	32.1	44.8	1.40	50.6
1.7	69.4				27.8	22.2	40.8	1.84	68.9
3.4	121.7	125.0	125.0	.40	50.0	-	33.6	-	
4.1	128.3								
								1.62	

$$y = a(T_t - by)x = 1.62(50 - .40y)x$$

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
					T_t = 60 days				
1.0	53.3				22.4	37.6	53.3	1.42	55.1
1.7	78.2				32.8	27.2	46.0	1.69	72.3
3.4	143.8	143.7	143.7	.42	60.0	-	38.7	-	
4.1	143.5								
								1.56	

$$y = a(T_t - by)x = 1.56(60 - .42y)x$$

TABLE 7 (cont'd)

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
					T_t = 70 days				
1.0	61.0				28.7	41.3	61.0	1.48	67.3
1.7	91.3				42.9	27.1	53.7	1.98	85.8
3.4	148.6	148.7	148.7	.47	70.0	-	40.0	-	
4.1	148.8								
								1.73	

$$y = a(T_t - by)x = 1.73(70 - .47y)x$$

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
					T_t = 80 days				
1.0	70.3				35.2	44.8	70.3	1.57	76.6
1.7	102.0				51.0	29.0	60.0	2.07	99.2
3.4	157.4	159.3	159.3	.50	80.0	-	42.8	-	
4.0	161.1								
								1.82	

$$y = a(T_t - by)x = 1.82(80 - .50y)x$$

TABLE 8

Summary of calculations used in predicting the functional response (y_1), per ten-day interval (cumulative), for female *P. maculiventris* at two (1.0 and 1.8) densities of defenseless *G. mellonella* larvae.

Prey density (x)	Prey att'd (y)		Max. y (K)	Days per y (b)	Days all y's (by)	Days searching (T_s)	Attack ratio (y/x)	$y/x \div T_s$ (a)	Predicted prey att'd (y_1)
					T_t = 10 days				
1.0	8.5				2.6	7.4	8.5	1.15	9.9
1.8	15.3				4.7	5.3	8.5	1.60	14.6
3.4	28.9	32.3	32.3	.31	10.0	-	8.4	-	
4.3	35.7								
								1.38	
					T_t = 20 days				
1.0	16.8				5.5	14.5	16.8	1.16	18.3
1.8	27.5				9.1	10.9	15.3	1.40	27.1
3.4	53.7	60.2	60.2	.33	20.0	-	15.7	-	
4.3	66.7								
								1.28	

T_t = 10 days: $y = a(T_t - by)x = 1.38(10 - .31y)x$

T_t = 20 days: $y = a(T_t - by)x = 1.28(20 - .33y)x$

TABLE 8 (cont'd)

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
				T_t = 30 days					
1.0	25.6				9.0	21.0	25.6	1.22	28.4
1.8	43.2				15.1	14.9	24.0	1.61	40.4
3.4	78.2	84.9	84.9	.35	30.0	-	22.2	-	
4.3	91.6								
								1.42	

$$y = a(T_t - by)x = 1.42(30 - .35y)x$$

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
				T_t = 40 days					
1.0	34.6				12.5	27.5	34.6	1.26	38.9
1.8	57.6				20.7	19.3	32.0	1.66	55.3
3.4	102.0	111.2	111.2	.36	40.0	-	29.0	-	
4.3	120.4								
								1.46	

$$y = a(T_t - by)x = 1.46(40 - .36y)x$$

TABLE 8 (cont'd)

(x)	(y)		(K)	(b)	(by)	(T_s)	(y/x)	(a)	(y_1)
				T_t = 50 days					
1.0	44.4				17.3	32.7	44.4	1.36	48.8
1.8	70.7				27.6	22.4	39.3	1.75	66.9
3.4	123.4	126.9	126.9	.39	50.0	-	33.3	-	
4.3	130.3								
								1.56	

$$y = a(T_t - by)x = 1.56(50 - .39y)x$$

with an upper asymptote level being reached at the highest "density". However, the percentage of prey attacked decreased as "density" of prey increased. The value of y was predicted at the two lowest prey "densities" but not at the two highest "densities" where searching time could not be calculated.

Functional response on the basis of untransformed data (Tables 9 and 10) of second- to fifth-instar nymphs and adults of P. maculiventris to four sizes of G. mellonella larvae showed that the rate of predator attack increased as prey size decreased and hunger stress increased. For predators supplied large-sized prey, the rate of attack decreased with satiation as predators abstained from feeding for longer periods (Fig. 3).

Results of regression analyses (Fig. 4) revealed that the relationship between predator age and number of prey killed at the first diet level was inversely proportional for males and directly proportional for females, and at the second to fourth diet levels inversely proportional for both males and females. Correlation analyses did not reveal these relationships to be significant at the first diet level but showed them to be significant at the second (save the relationship for female) to fourth diet level. Morris (1963b) also found that predator age on rate of attack for P. maculiventris was inversely proportional.

From the above results it is concluded that prey size is an important component of the predation process for all stages of P. maculiventris. The implication is that under natural conditions in the field, P. maculiventris attacking a nest of lepidopterous larvae will kill less large-sized prey and more small-sized ones. The effect of prey

TABLE 9

Mean number of G. mellonella larvae[1] killed per 10-day interval (cumulative) per diet level, by adult[2] male and female P. maculiventris, and mean total prey killed during adult life[3] of the predator at each diet level.

P. maculiventris adult	Diet level	G. mellonella larvae $\bar{x}$ killed per 10-day interval (cumulative) 10	20	30	40	50	60	70	80	$\bar{x}$ total killed
Male	1	8.8 ± 0.90	18.3 ± 1.02	28.0 ± 1.15	36.8 ± 1.10	44.8 ± 0.63	53.3 ± 1.02	61.0 ± 1.35	70.3 ± 1.10	97.5 ± 12.69
	2	9.0 ± 0.58	17.0 ± 1.92	26.8 ± 1.98	35.0 ± 1.74	40.8 ± 1.10	46.0 ± 1.83	53.7 ± 3.48	60.0 ± 4.93	73.0 ± 18.83
	3	8.8 ± 0.13	16.5 ± 0.91	23.8 ± 1.10	31.0 ± 1.24	35.8 ± 2.18	42.3 ± 3.25	43.7 ± 4.84	46.3 ± 6.33	50.0 ± 6.98
	4	8.8 ± 0.63	14.8 ± 0.75	22.0 ± 1.47	27.5 ± 3.35	31.3 ± 4.07	35.0 ± 5.50	36.3 ± 7.53	39.3 ± 9.06	52.8 ± 10.59
Female	1	8.5 ± 0.65	16.8 ± 0.85	25.6 ± 1.56	34.6 ± 2.02	44.4 ± 2.13	-	-	-	79.5 ± 9.13
	2	8.5 ± 0.41	15.3 ± 1.70	24.0 ± 2.62	32.0 ± 3.35	39.3 ± 4.70	-	-	-	55.0 ± 14.92
	3	8.5 ± 0.65	15.8 ± 1.38	23.0 ± 2.35	30.0 ± 3.63	36.3 ± 5.55	-	-	-	47.8 ± 3.96
	4	8.3 ± 0.63	15.5 ± 1.85	21.3 ± 2.40	28.0 ± 2.49	30.3 ± 1.89	-	-	-	31.3 ± 1.55

1 One G. mellonella larva given per male and female P. maculiventris per day.

2 Mean of four adult male and female P. maculiventris.

3 For mean life periods of adult male and female P. maculiventris at each diet level see Table 11.

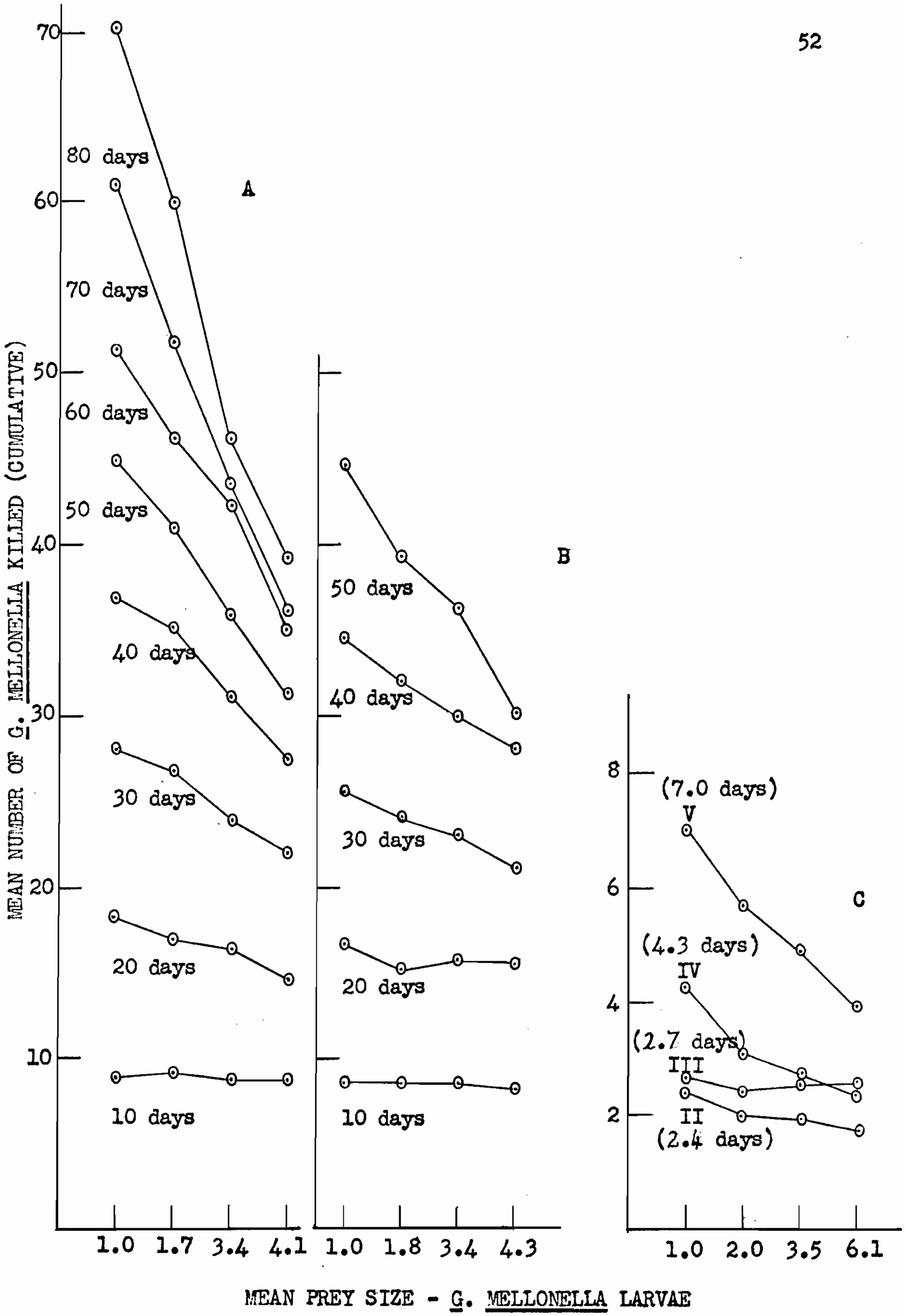

Fig. 3. - Functional response curves (untransformed) for different stages of P. maculiventris feeding on four sizes of G. mellonella (prey) larvae: (A) adult male; (B) adult female; (C) nymphs, two to five.

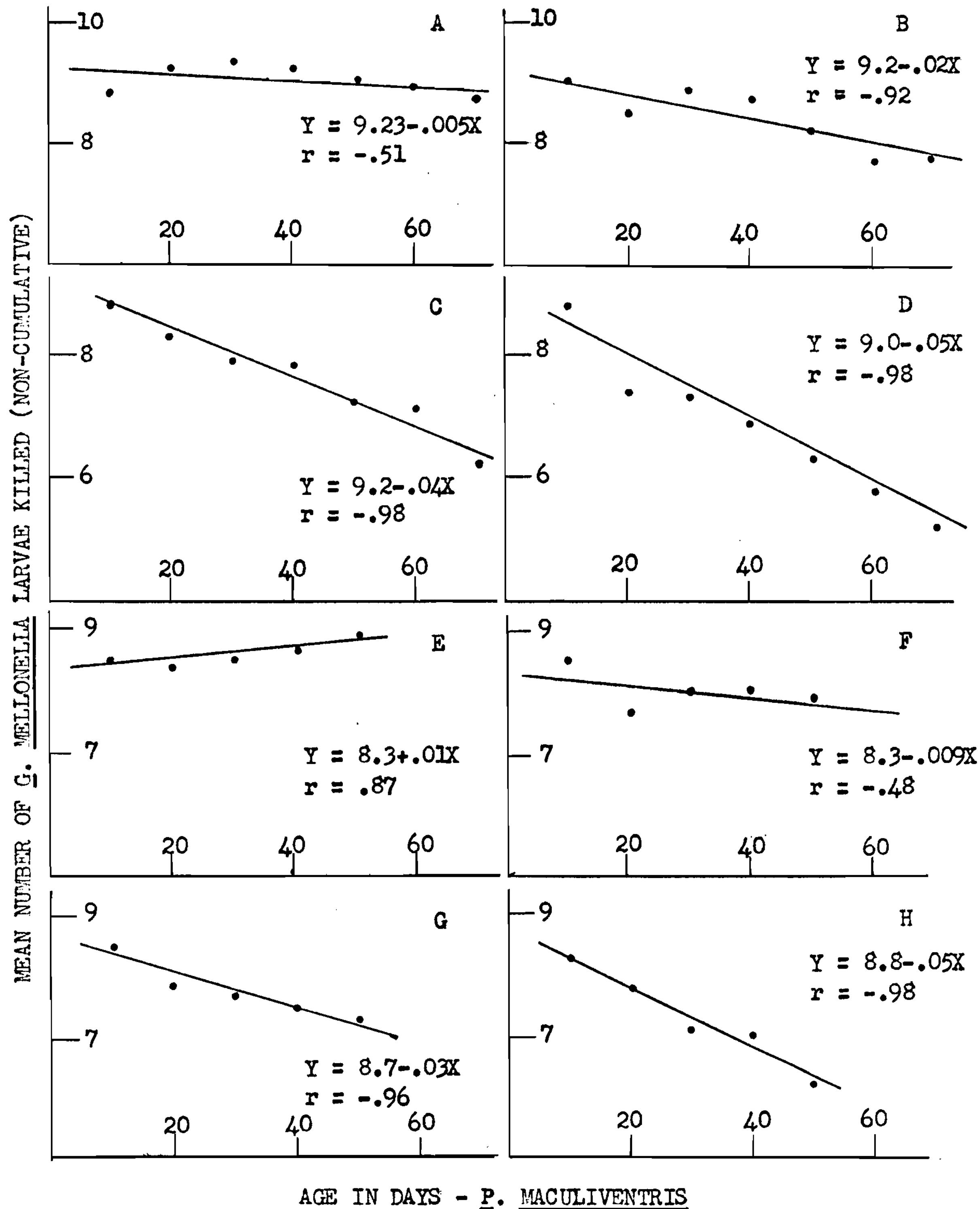

Fig. 4. - Relationship between age of P. maculiventris and mean number of G. mellonella larvae killed per 10-day interval (non-cumulative) at four diet levels: Male (A-D) - (A) diet level 1, (B) diet level 2, (C) diet level 3, (D) diet level 4; Female (E-H) - (E) diet level 1, (F) diet level 2, (G) diet level 3, (H) diet level 4.

defense on functional response of the predator under natural conditions will also be greater in larger prey larvae than in smaller ones.

V. STUDIES ON THE FEEDING BIOLOGY OF P. MACULIVENTRIS

A. INTRODUCTION

Although _P. maculiventris_ has long been considered an important predator of lepidopterous pests of crops (Section III) no quantitative work has been carried out to date of the feeding biology of this species. For this reason, data were collected on food consumption for each of the nymphal and adult stages reared on diets of four different levels (four prey sizes - Section IV), and on relationships between food intake, growth, longevity and fecundity.

B. METHODS AND MATERIALS

The methods used in the rearing of _P. maculiventris_ stages for feeding biology purposes are slightly modified from those described in Sections III and IV, as follows:

(a) the daily change in body weight of individual predators of all stages was determined by subtracting body weight before feeding, from that obtained at the end of each 24 hour period.

(b) the daily weight loss of individual prey larvae - the amount of prey food consumed by the predator - was determined by subtracting the weight of the prey obtained at the end of 24 hours from that obtained at the beginning of this period prior to being fed upon by the predator.

(c) the daily weight loss of individual predators unfed nymphs and adults was determined as in (b). For these unfed stages there were ten replicates for nymphs and four replicates for each of adult males and females.

(d) weight gain or loss of individual predators and weight loss of individual prey were expressed as live gram weights (Appendix pt. 1, Tables I to IV).

(e) a Mettler balance, type H_{15} (used in an earlier experiment, Section IV) was used to weigh G. mellonella larvae, and a Mettler microbalance, model M_5 (sensitive to .001 gm., Plate V A, C, D), was used to weigh P. maculiventris nymphs and adults. To facilitate the handling of individual predators and prevent escape, each was weighed in a small cap-covered plastic container 10 mm. deep X 20 mm. in diameter. Prior to each weighing the container was cleaned with 95 per cent alcohol, dried, and weighed. Following each weighing the weight of the P. maculiventris specimen was obtained by subtracting the known weight of the container from the predator + container weight. To facilitate the handling of G. mellonella larvae each prey was immobilized by anaesthetizing lightly with ether vapour before weighing. In all experiments constant temperature and humidity conditions were maintained as mentioned in Section IV.

To obtain dry weight estimates of live prey, of the four sizes fed to P. maculiventris nymphs and adults, twenty-five fresh G. mellonella larvae of each size (Section IV) were individually oven dried at 105°C for four hours, or until constant dry weight values were obtained per specimen per prey size. The weight of each specimen per prey size was expressed as a percentage of the initial live weight of the specimen and percentages per prey size averaged as follows:

Per cent solid content of live G. mellonella larvae fed to P. maculiventris

Feeding stages of P. maculiventris	Size 1 (Diet level 1)	Size 2 (Diet level 2)	Size 3 (Diet level 3)	Size 4 (Diet level 4)
Nymph (Instars 2 to 5)	21.8±0.18	21.4±0.26	21.5±0.17	22.4±0.25
Adult (both sexes)	21.5±0.17	22.4±0.19	23.8±0.19	23.1±0.31

Dry weight percentages were similarly determined for amounts of each of the four sizes of live prey consumed by individual nymphs and adults of P. maculiventris. These percentages were found to be of the same order as those listed above and were used in all experiments to convert amounts of live prey consumed to dry weights (Appendix pt. 2, Tables V and VII). For each of nymphal instars one to five of P. maculiventris percentage dry weight values were determined (a) before feeding (category 1 - young) and (b) at the end of the feeding period (category 2 - mature). Specimens of each category of each instar were individually oven dried at 105°C for approximately four hours and percentage dry weights calculated from initial live weights.

Values obtained for specimens of the non-feeding instar one differed between categories but not between replicates within categories. For this instar, averages, given below for each category, were used to convert live weights to dry weights. Values obtained for specimens of the feeding instars two to five did not differ between categories, nor between diet levels within categories, but differed between instars. Averages used to convert live weights obtained per category in these instars to dry weight (Appendix pt. 2, Table VII) are also given below. Total specimens on which all values were based are also listed:

P. maculiventris instar	Category	Total specimens	Percentage dry weight
1st	Young	40	53.4±0.19
	Mature	40	31.1±0.65
2nd	Young and mature	120	24.2±0.16
3rd	Young and mature	64	23.7±0.21
4th	Young and mature	40	23.3±0.55
5th	Young and mature	16	22.0±0.58

For adult P. maculiventris dry weight percentages were obtained by individually oven drying at 105°C, at each of the four diet levels, 27 each of fed males and 32 each of fed females. Similarly dry weight percentages were obtained from 27 and 32 unfed males and females respectively. For fed males, each total was made up of specimens collected every three days from the fifth to the 33rd day of adult life and at death, and for fed females made up of specimens collected every second day during the same period and at death. For unfed males specimens were collected every three days from the first to the 29th days of adult life and at death, and for unfed females every two days during the same period and at death. Percentages obtained for each sex per diet level and also for unfed males and females are listed below and were used in all experiments to convert daily live weights to dry weights (Appendix pt. 2, Tables V and VI).

	Adults of P. maculiventris	
	Male	Female
Diet level	% dry weight	
1	36.4±1.8	41.9±1.5
2	38.9±1.6	39.8±1.7
3	43.3±1.1	42.3±1.3

(cont'd)

4	46.3±1.2	45.5±1.9
Unfed	39.5±6.5	42.1±5.9

Additional records kept in conjunction with the above experiments at diets of four levels were: mean duration of stadia from instars two to five of P. maculiventris; mean fecundity and longevity of adults; mean weight of eggs based on weighings taken following each egg deposition during adult life.

C. RESULTS

1. Nymphal stages

a. Prey supply and mortality

Percentage survival of P. maculiventris nymphal stages was high at all diet levels, except in the fifth-instar at diet level one (Table 10) where significant predator mortality was clearly due to insufficient food. Percentage survival of second- and third-instar nymphs fed the two larger sized prey (.0129 and .0225 gms.), although high, was lower than for instars fed the two smaller sized prey (.0037 and .0073 gms.). Predators in these two stages are quite small and have difficulty feeding on the large sized G. mellonella larvae of diet levels three and four, though the latter have no obvious defence. At the lower diet levels, fourth- and fifth-instar nymphs completed their development, but the amount of food supplied was clearly below the optimum needed for normal growth. In the fifth-instar, at the lowest diet level, only 40 per cent of the nymphs survived due to low food supply, and mortality occurred mainly at moulting. Turnbull (1962) observed a similar

TABLE 10

Percentage survival of nymphs (instars two to five) of P. maculiventris reared individually on G. mellonella larvae at four diet levels with mean[1] prey killed, and mean[1] nymphal longevity, per instar per diet level.

Diet level	Number fed	*P. maculiventris* nymphs: Number surviving	% surviving	$\bar{x}$ longevity	$\bar{x}$ *G. mellonella* larvae killed
		Second instar			
1	10	10	100	3.6 ± 0.15	2.4 ± 0.16
2	10	10	100	3.0 ± 0.0	2.0 ± 0.0
3	14	12	86	3.1 ± 0.10	1.9 ± 0.10
4	15	11	73	3.2 ± 0.15	1.7 ± 0.26
		Third instar			
1	10	10	100	3.7 ± 0.21	2.7 ± 0.21
2	10	10	100	3.4 ± 0.15	2.4 ± 0.16
3	12	11	92	3.5 ± 0.15	2.5 ± 0.17
4	11	10	91	3.6 ± 0.18	2.5 ± 0.17
		Fourth instar			
1	10	10	100	5.3 ± 0.15	4.3 ± 0.15
2	10	10	100	4.2 ± 0.21	3.1 ± 0.21
3	11	10	91	3.9 ± 0.18	2.7 ± 0.15
4	10	10	100	3.9 ± 0.28	2.3 ± 0.15
		Fifth instar			
1	10	4	40	15.1 ± 0.28	13.9 ± 0.23
2	10	10	100	7.6 ± 0.26	5.7 ± 0.21
3	10	10	100	6.5 ± 0.15	4.9 ± 0.28
4	10	10	100	6.4 ± 0.21	3.9 ± 0.23

[1] Mean of 10 specimens per diet level.

phenomenon at lower regimens of food supply for Linyphiid spiders and concluded that death at moulting was due to the lack of energy reserves normally utilized during this critical period.

b. Rate of food consumption

For each instar, two to five, of P. maculiventris the daily food consumption increased as food supply increased. The amount consumed at the beginning of the feeding period in each stage was always higher than at its end (Appendix pt. 1, Table III). The mean daily food consumed for each of ten nymphs per instar was calculated by dividing total food consumed per nymph in each stadium by the number of days spent feeding in the stadium.

c. Effect of daily food consumption on rate of growth

The mean daily growth of each of 10 predators per nymphal instar two to five was calculated by subtracting the live weight of the predator at the beginning of the stadium from that obtained at the end of its feeding period in the stadium and dividing this value by the number of days spent feeding. Daily live weight values per predator per instar were converted to dry weights, using the appropriate conversion factors reported earlier.

Growth was observed to take place only during the feeding period. In all stadia, when the predator stopped feeding, growth ceased and the weight of the predator decreased (Appendix pt. 1, Table III). It has been observed, for insects generally, that food intake stops for varying periods of time before moulting and that during this non-feeding period growth is at a standstill - in some cases weight may even decrease. Hence, to obtain an accurate estimate of the growth of P. maculiventris in the present calculations, only the period of feeding in each nymphal instar was considered. This approach differs from that used by Turnbull (1962, 1965) who, to obtain mean daily growth of individual stages of the spiders *Linyphia triangularis* Clerck and *Agelenopsis potteri* (Blackwall), divided total growth in each stadium by the number of days spent in the stadium - whether feeding or not.

Regression lines plotted for mean daily weights against mean daily food consumption values, for individual second- to fifth-instar nymphs of *P. maculiventris* (Figs. 5 to 8), showed that for all instars the relationship between these two variables was a straight line. However, for the second-instar stage, a number of points aggregated at the lower end of the slope of the regression line indicated that in this stage the predator requires much less food for maximum growth than is supplied. Correlation analyses indicate that a significant relationship existed between the rate of food consumption and the rate of growth in all instars.

Regression lines for all stages intersect the abscissae to the left of the origin indicating that growth can take place even in the absence of food. This was confirmed by rearing unfed nymphs successfully up to the third instar, at which stage they died. In these nymphs growth was dependent on food reserves initially obtained in the egg and on water provided daily (Appendix pt. 1, Table IV).

d. Effect of daily food consumption on rate of development

The number of days spent feeding by individual nymphs of *P. maculiventris* in each instar was designated as the "period of development", which differs from the term as used by Turnbull (1962). The average

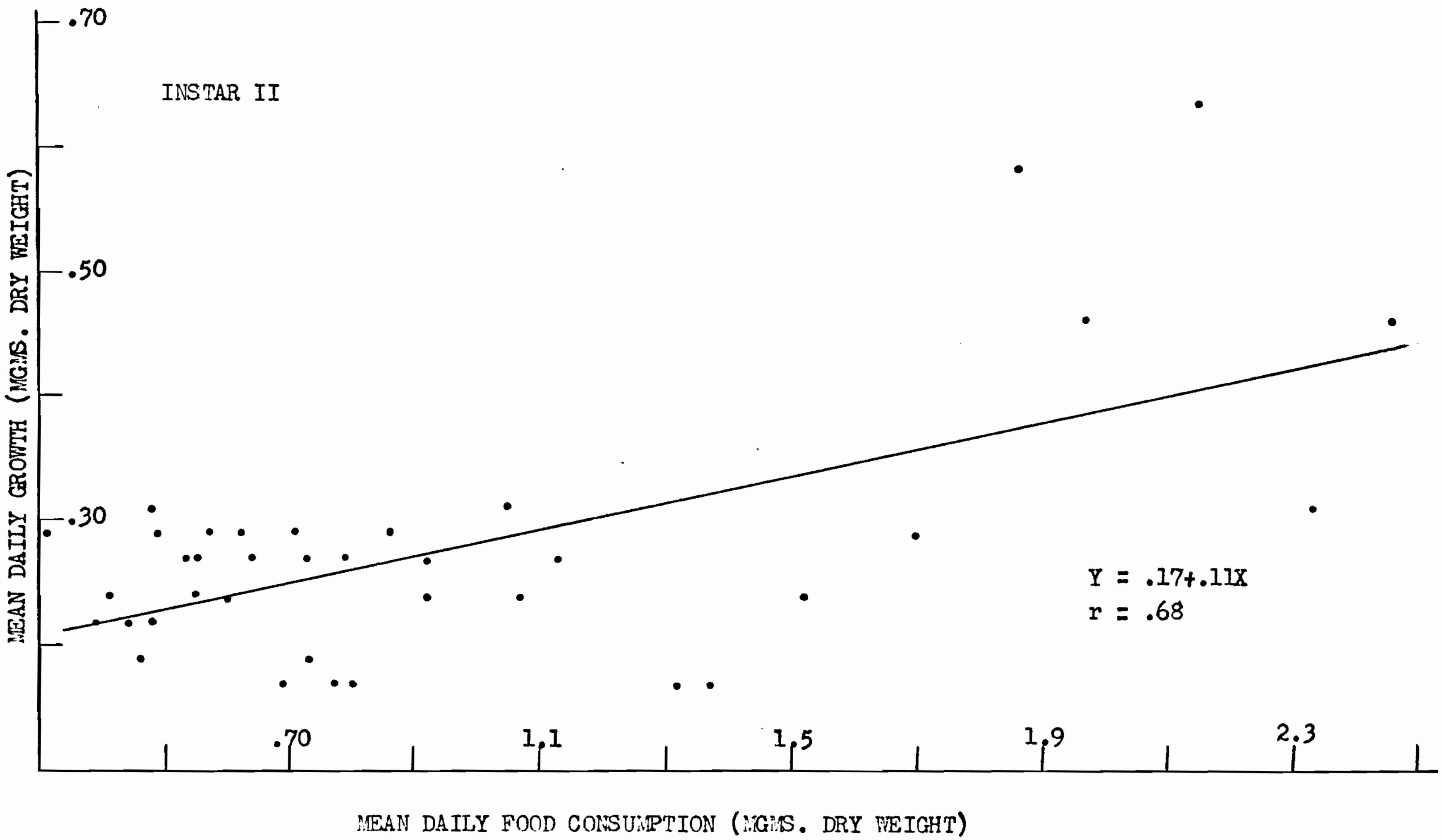

Fig. 5. - Relationship between mean daily food consumption and mean daily growth for second instar nymphs of *P. maculiventris* reared on *G. mellonella* larvae at four diet levels.

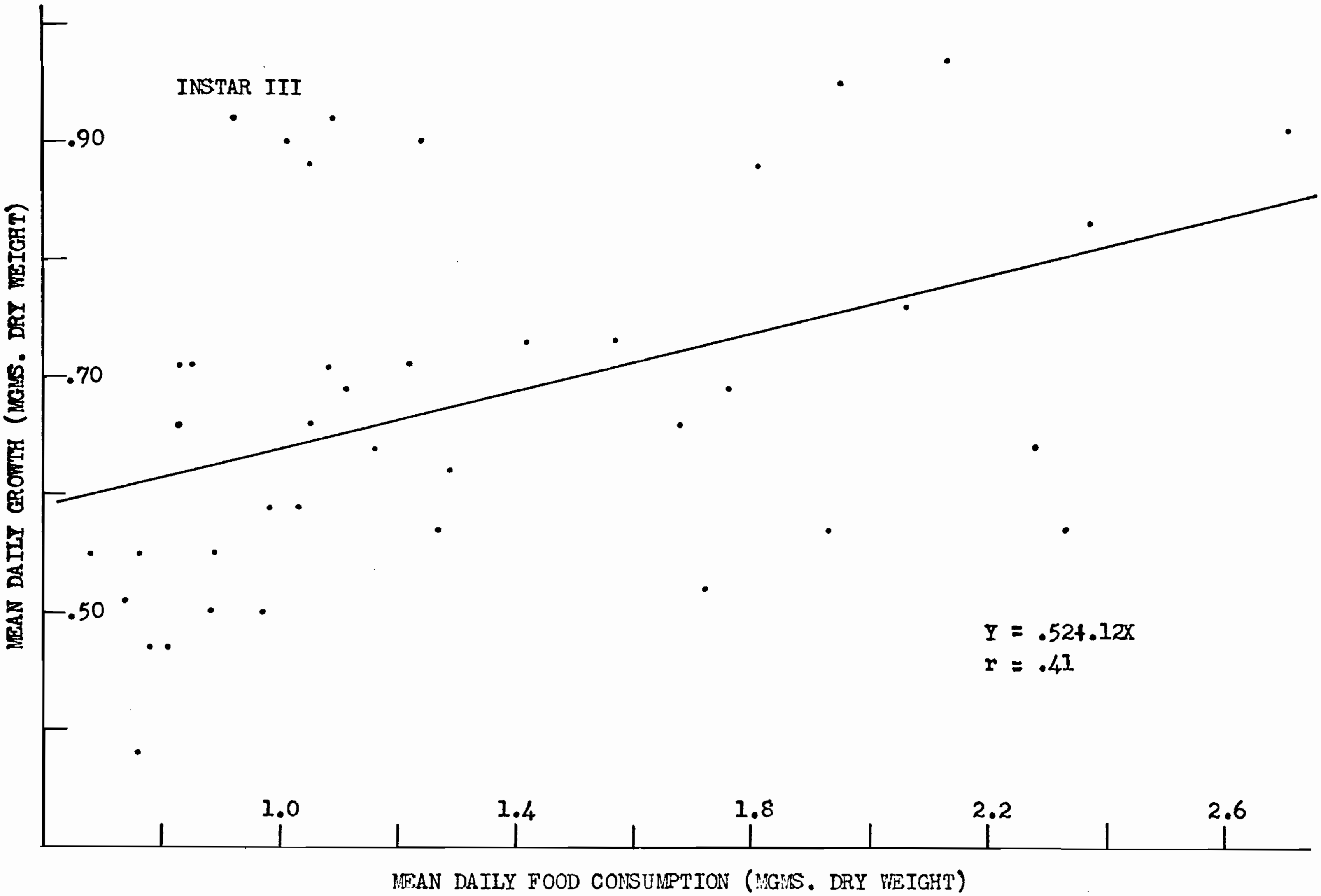

Fig. 6. - Relationship between mean daily food consumption and mean daily growth for third instar nymphs of P. maculiventris reared on G. mellonella larvae at four diet levels.

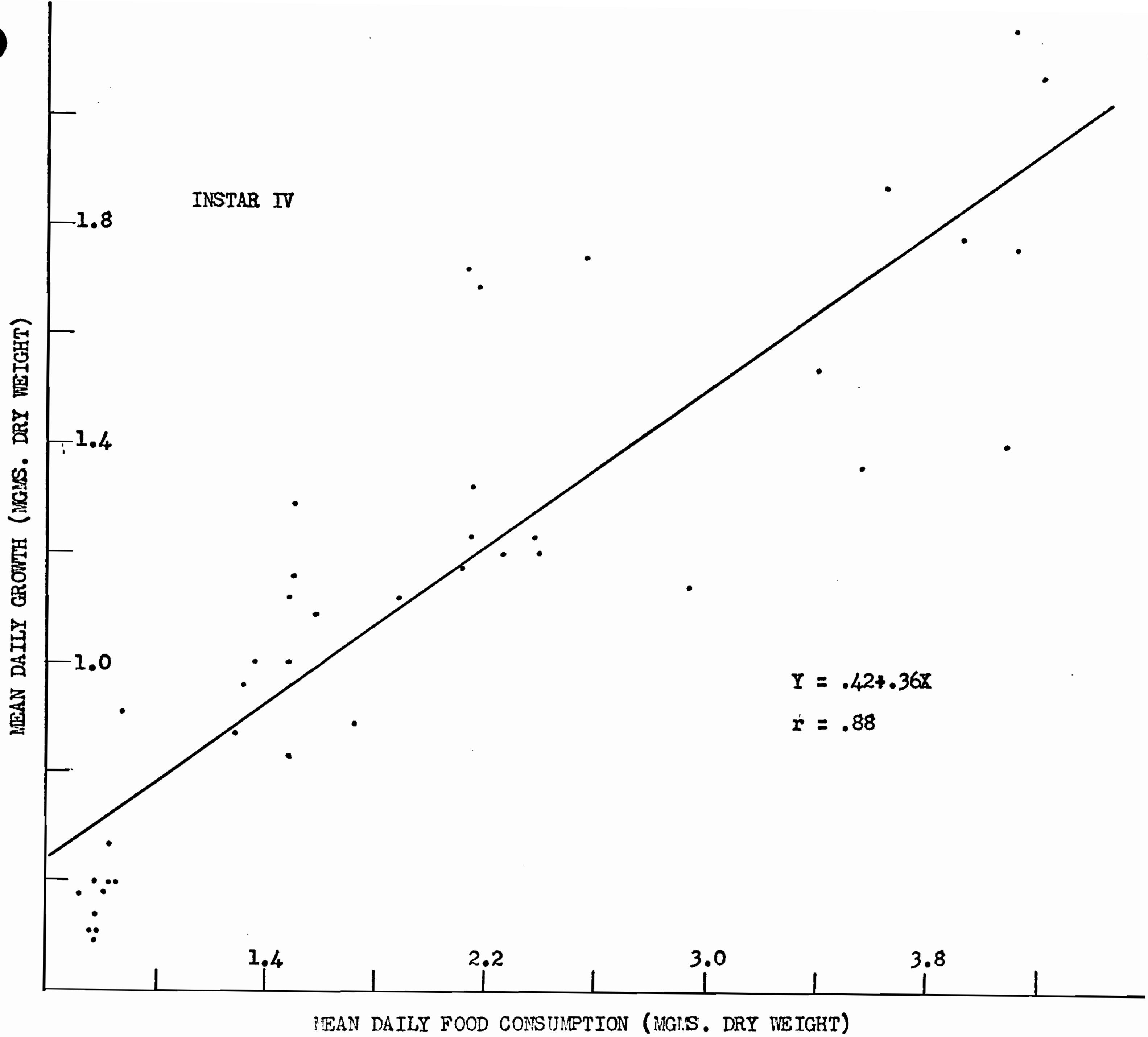

Fig. 7. - Relationship between mean daily food consumption and mean daily growth for fourth instar nymphs of P. maculiventris reared on G. mellonella larvae at four diet levels.

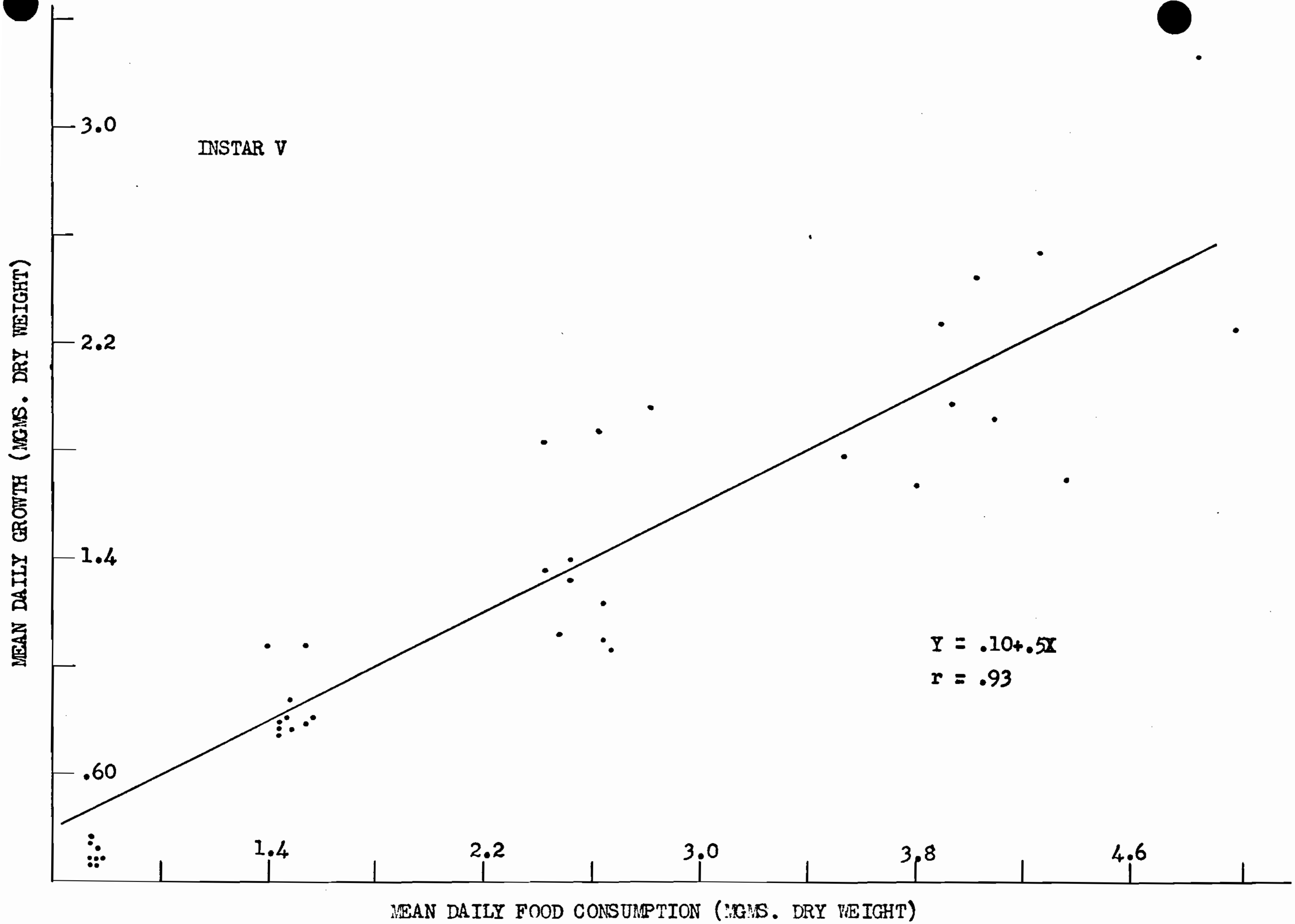

Fig. 8. - Relationship between mean daily food consumption and mean daily growth for fifth instar nymphs of *P. maculiventris* reared on *G. mellonella* larvae at four diet levels.

"period of development", in days, based on values obtained for each of ten nymphs per diet level per instar was determined to be as follows:

Mean "period of development", in days

Diet level	Instar two	Instar three	Instar four	Instar five
1	2.4±0.16	2.7±0.21	4.3±0.15	13.9±0.23
2	2.0±0.0	2.4±0.16	3.1±0.21	5.7±0.21
3	1.9±0.10	2.5±0.17	2.7±0.15	4.9±0.28
4	1.7±0.26	2.5±0.15	2.3±0.15	3.9±0.23

Results show that the mean period of development for each instar is inversely proportional to food supply; that is, as the rate of food consumption in each instar increased, the feeding period decreased curvilinearly to a lower asymptote. The curvilinear relationship for each instar was transformed into a straight line relationship by plotting the reciprocal values of the "period of development" (rate of development) data given above. A regression line fitted to plotted points for each instar (Figs. 9 and 10) showed slopes decreasing from instars two to five (except for instar three, Fig. 9) indicating that development was more rapid with increased rate of food intake in early instars than in later ones. Turnbull (1962) has observed a similar phenomenon for the spider, L. triangularis.

e. Formulation of growth curves

The regression lines drawn for rate of growth (Figs. 5 to 8) and rate of development (Figs. 9 and 10) for each second to fifth nymphal instars of P. maculiventris provide estimates of these parameters at any rate of feeding. From these estimates mean growth per

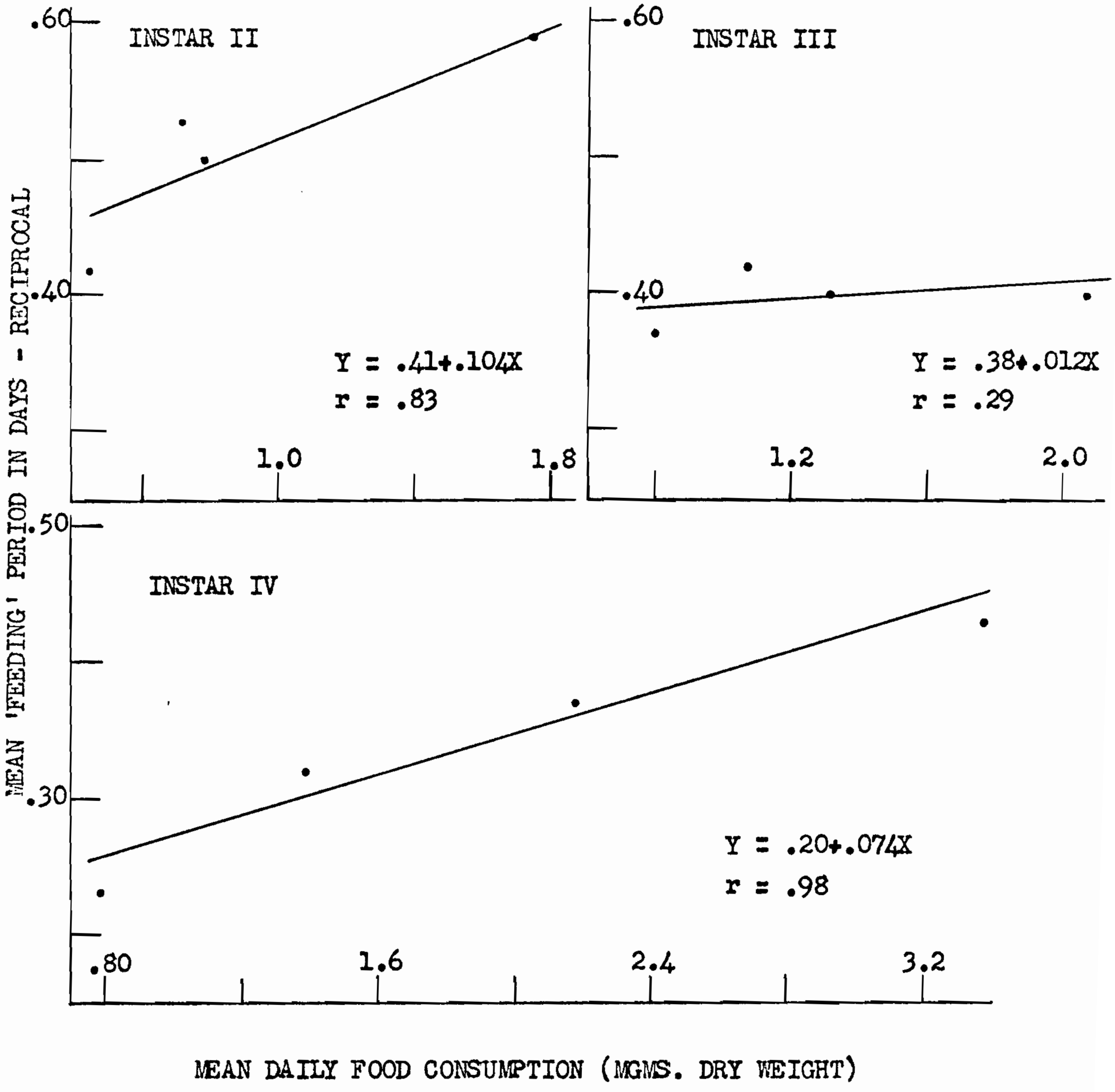

Fig. 9. - Relationship between mean daily food consumption and mean 'feeding' period in days - reciprocal for second-, third- and fourth-instar nymphs of P. maculiventris reared on G. mellonella larvae at four diet levels (for information on means used above see Section on Feeding Biology).

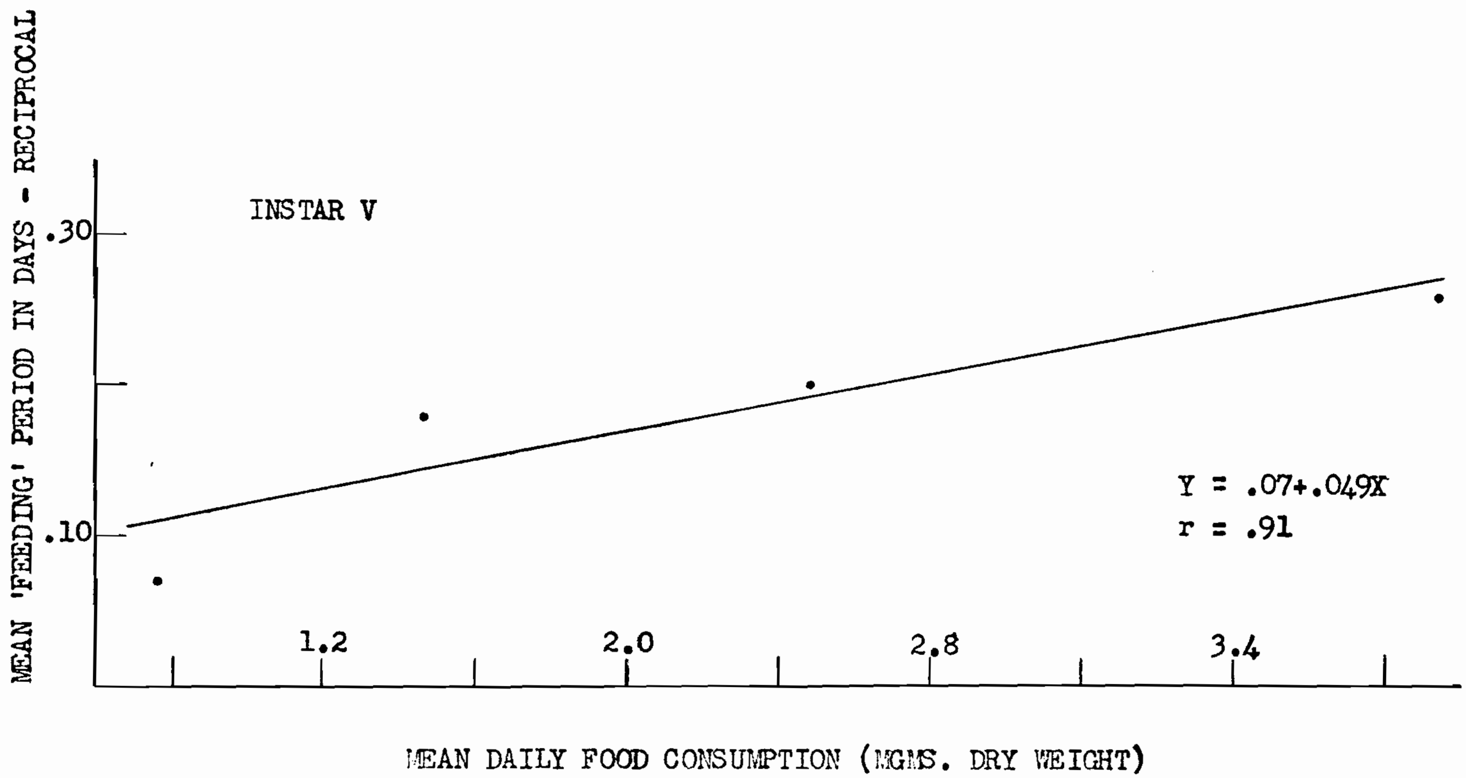

Fig. 10. - Relationship between mean daily food consumption and mean 'feeding' period in days - reciprocal for second-, third-, and fifth-instar nymphs of P. maculiventris reared on G. mellonella larvae at four diet levels (for information on means used above see Section on Feeding Biology).

stage for all rates of feeding can be calculated using Turnbull's (1962) formula, generally stated as: Growth per stage = $\frac{\text{Rate of growth}}{\text{Rate of development}}$

but more precisely defined as:

$$\text{Growth} = \frac{a + bx}{a_1 + b_1x} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where, a, is the intercept; b, the regression coefficient; x, the rate of food consumption. The limits of this equation can be written as,

$$\lim_{x = 0} \frac{a + bx}{a_1 + b_1x} = \frac{a}{a_1}$$

$$\lim_{x \to \infty} \frac{a + bx}{a_1 + b_1x} = \frac{b}{b_1}$$

The lower limits of the equation suggest that growth in P. maculiventris is possible in the absence of food, and this fact was confirmed in the present experiment. Conversely, the upper limits suggest that maximum growth is possible if the rate of food consumption is increased indefinitely. In reality such a phenomenon never occurred for P. maculiventris since there was a limit to the amount of food that the predator could consume in a unit of time.

Growth curves calculated from the above formula (1) for each stage of the predator and superimposed on scatter diagrams of actual growth per stage are illustrated in Figures 11 to 13.

f. Accumulative effects of rate of food consumption

For second- to fifth-instar nymphs of P. maculiventris the rate of development has been shown to vary with the rate of food consumption (Figs. 9 and 10). Since the period of development per instar is based on the mean number of feeding days it is possible to project this period

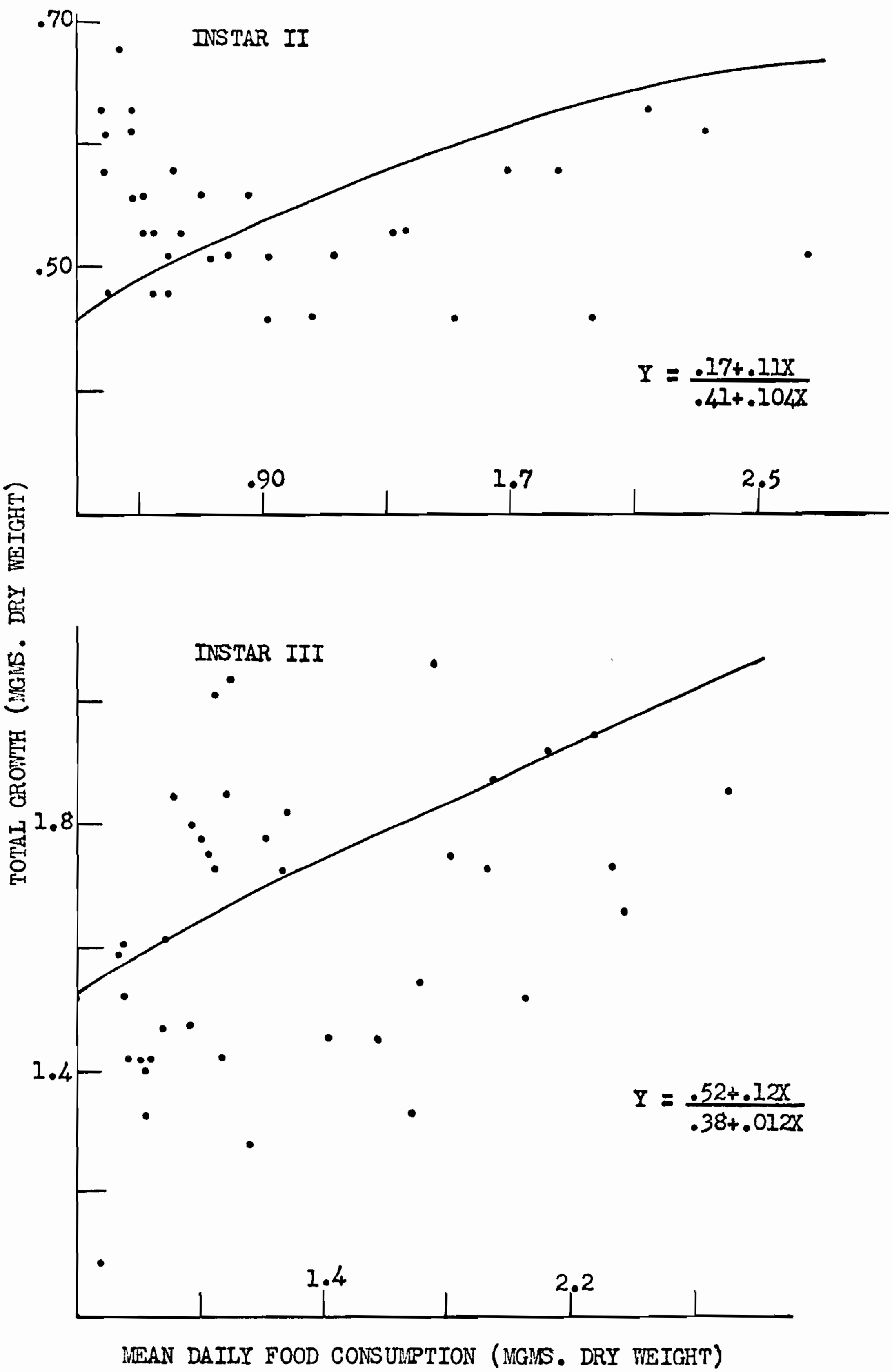

Fig. 11. - Relationship between mean daily food consumption and total growth for second- and third-instar nymphs of *P. maculiventris* reared on *G. mellonella* larvae at four diet levels.

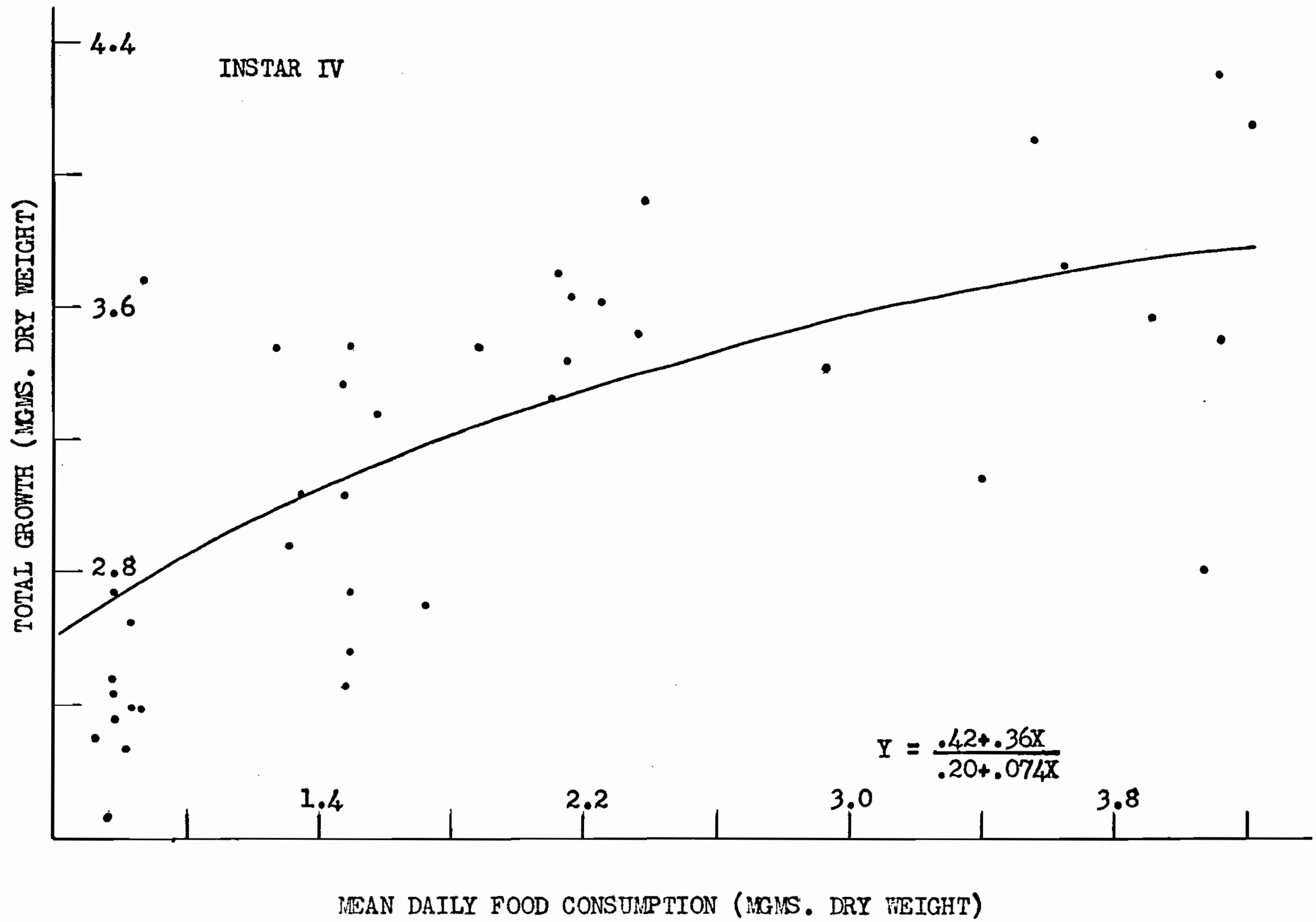

Fig. 12. - Relationship between mean daily food consumption and total growth for fourth-instar nymphs of P. maculiventris reared on G. mellonella larvae at four diet levels.

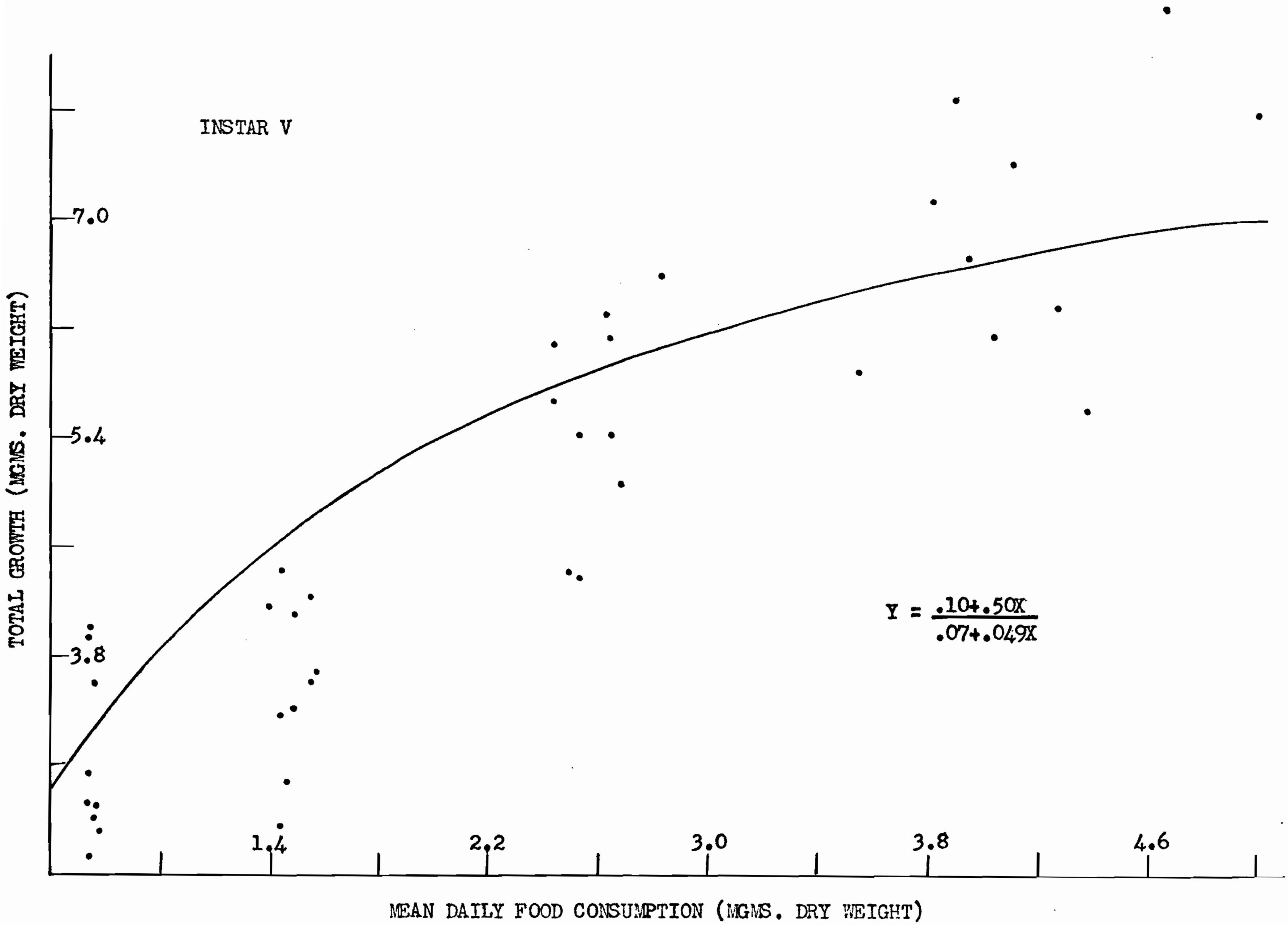

Fig. 13. - Relationship between mean daily food consumption and total growth for fifth-instar nymphs of P. maculiventris reared on G. mellonella larvae at four diet levels.

using the following equation taken from Figures 9 and 10 and stated in general terms as:

$$\text{Feeding period per stage} = \frac{1}{\text{Developmental rate}}$$

but more precisely as:

$$\text{Time} = \frac{1}{a_1 + b_1 x}$$

where, a, is the intercept; b, the regression coefficient; x, the rate of food consumption. The limits of this equation can be written as,

$$\lim_{x = 0} \frac{1}{a_1 + b_1 x} = \frac{1}{a_1}$$

$$\lim_{x \to \infty} \frac{1}{a_1 + b_1 x} = \frac{1}{b_1 x}$$

Time $\frac{1}{a_1}$ is the number of days theoretically required for P. maculiventris to complete development without food at a particular nymphal stage. For second-instar nymphs, for example, the time required was calculated as 2.4 days which is close to the three days observed for the stage in this experiment. Time $\frac{1}{b_1 x}$ represents the theoretical minimum time required by the predator to complete each stage. In this experiment, for second-instar nymphs at the fourth diet level a minimum of 1.7 days was needed to complete development. On the basis of this value total time theoretically required for development of nymphal instars two to five is 6.8 days. In the present experiment total developmental time for nymphal stages two to five was determined to be 10.4 days; i.e., slightly more than 1.7 days per instar. Turnbull's (1962) explanation of a similar phenomenon for spiders may be applicable here, i.e., "it appears that the attainment of maximal feeding rates at one stage of the spider's life somehow inhibits the maintenance of maximal rates in subsequent stages".

g. Total food consumption

Total food consumed by nymphs of P. maculiventris instars two to five, was approximately the same at the first two diet levels, but increased significantly at diet levels three and four (Fig. 14). These findings differ from those of Turnbull (1962) who observed that spiders consume virtually the same amount of food irrespective of the diet level (food supply). The feeding period for nymphal instars two to four at the first two diet levels was of the same order, but a significant increase in this period was obtained for fifth-instar nymphs at diet level one. At the first diet level, food supply was sufficient for normal development of second- and third-instar stages, but not for fourth- and fifth-instars which fed for a longer period before transforming to adults. Fifth-instar nymphs fed for a considerably longer time than fourth-instar nymphs and both nymphs expended a certain amount of energy searching for prey. At the second diet level food supply for fifth-instar nymphs were also inadequate for optimum development and energy loss due to searching for prey was slight. Diet level one (one .0037 gm. size G. mellonella larva per day) very nearly constituted a semi-starvation diet for fifth-instar nymphs of P. maculiventris and mortality at moulting on this diet level was approximately 60 per cent for this stage. Conversely, the highest diet level (one .0225 gm. size G. mellonella larva per day) for all stages was very close to the maximum food that can be consumed by the predator and growth curves at this

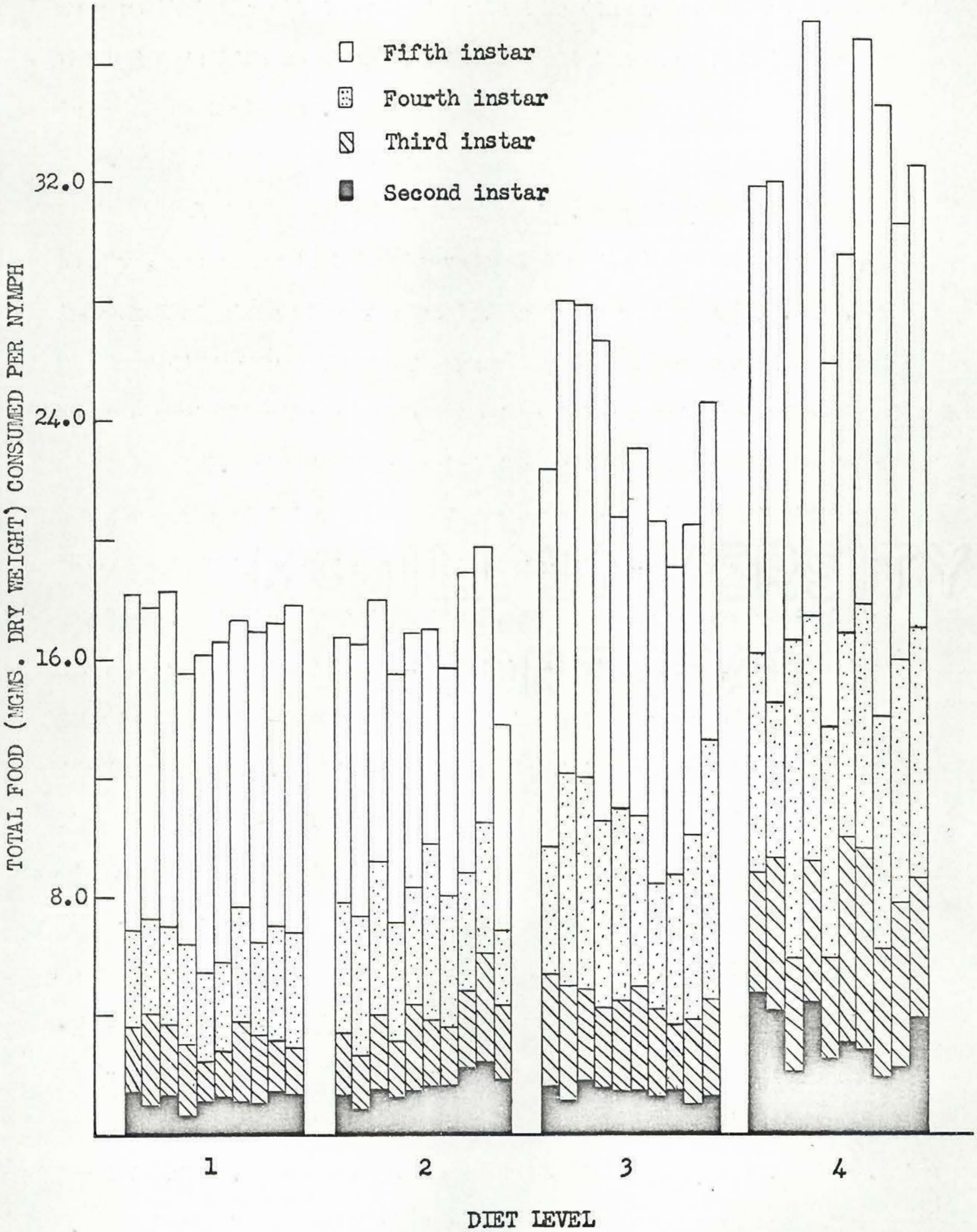

Fig. 14. - Total food consumed per second - to fifth-instar nymphs of P. maculiventris reared individually on G. mellonella larvae at four diet levels.

level reached the upper asymptote (Figs. 11 to 13).

Results obtained above are similar to those obtained by Ullyett (1950) for *Lucilia sericata* Meig. and Nicholson (1950) for *L. cuprina* (Weid.), when they supplied food in abundance to the immature stages of both species, larger adults were obtained in a shorter time. When food was scarce smaller adults were obtained in a longer time. Andrewartha (1961) commenting on Nicholson's results, categorizes food given to *L. cuprina* as "effective" food if amount given in one generation contributes to the formation of next but if not as "waste" food.

2. Adult stage

Adult *P. maculiventris* used in the diet experiments came from the standard culture, where food supply was adequate for optimum development of the species (Section III). For adult males and females, the rate of food consumption at all diet levels increased during the first 10 and 35 days of life, respectively, as the food supply was increased and thereafter decreased for both sexes. Decreases were slight at diet level two but more pronounced at diet levels three and four. At the first diet level the rate of food consumption remained constant. In general at all four diet levels, the rate of food consumption was lower in males than in females (Tables 14 to 17). Figure 15 indicates the total food consumption for both sexes of the predator during their mean length of life at four diet levels. The longevity of both sexes was maximum at the first diet level and appears to be correlated with low food consumption (Table 11).

Adults reared at the third and fourth diet levels rested between feedings and did not search actively for prey. On the other hand,

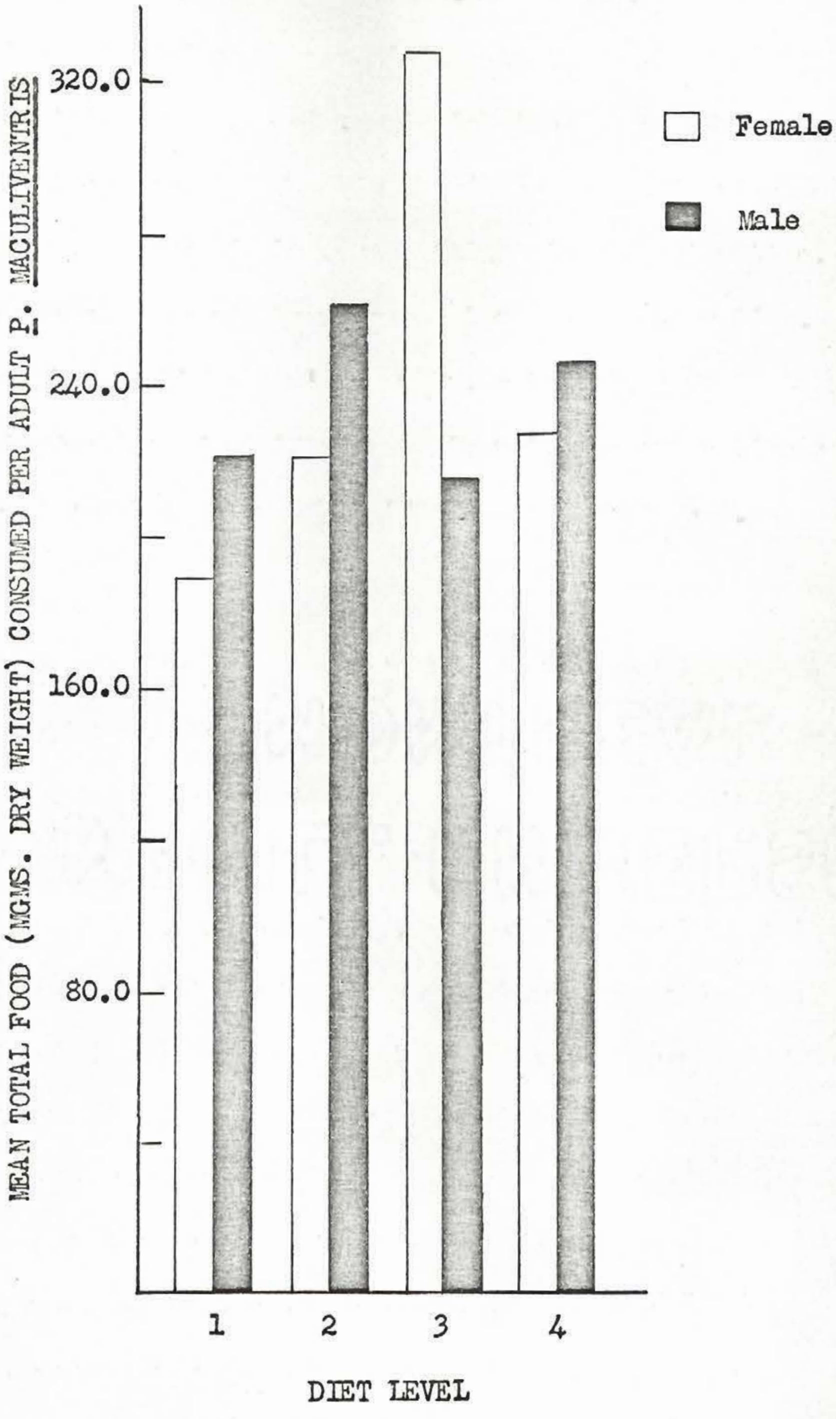

Fig. 15. - Mean total food consumed per adult male and female P. maculiventris reared on G. mellonella larvae at four diet levels during mean length of life.

TABLE 11

Mean[1] longevity of adult male and female *P. maculiventris* reared individually on *G. mellonella* larvae at four diet levels, and mean eggs and egg masses deposited per female per diet level.

	$\bar{x}$ longevity of adults				$\bar{x}$ eggs and egg masses per female			
	In Days		Period in 1964			Masses		
	Male	Female	Male	Female	Eggs	Total	Eggs per	Range
1	113.3 ± 13.9	87.0 ± 7.8	May-Oct.	May-Sept.	250.5 ± 8.2	12.3 ± 1.3	20.4 ± 1.7	9 - 15
2	94.3 ± 17.5	67.8 ± 10.8	May-Oct.	May-Aug.	317.0 ± 155.0	11.0 ± 4.4	28.8 ± 0.2	2 - 20
3	78.0 ± 8.7	69.5 ± 8.4	May-Aug.	May-Aug.	591.5 ± 263.5	21.8 ± 16.0	27.2 ± 1.3	3 - 47
4	91.5 ± 15.4	49.0 ± 3.4	May-Sept.	May-July	410.0 ± 61.0	14.0 ± 2.3	29.3 ± 0.8	8 - 18

[1] Mean of four males and females per diet level. For unfed males, May to July, 1964, mean longevity was 58.3 ± 2.9; for unfed females, May to August, 1964, mean longevity was 73.5 ± 1.0 days.

unfed adults searched actively for prey during the first 15 days of their adult life; thereafter they searched less, spending much of their time resting. Unfed (water supplied) females lived longer than unfed males (Table 11) and daily live weights for both sexes (Appendix pt. 1, Table II) fluctuated slightly depending on whether or not adults took water. Conversely, daily dry weights showed gradual decrease until death. Starved females, fertilized or not, did not lay eggs.

Because of the cannibalistic tendencies of males and for the purpose of obtaining separately food consumption data for both sexes adults were mated once during the first few days of the experiment. For this reason it is not possible to comment on the effects diet levels had on sperm production and number of matings.

Females mated once, did not lay fertilized eggs throughout adult life, although egg production did not decrease. The number of eggs that hatched gradually decreased after the first 35 days until all eggs laid were infertile (Figs. 16 and 17). Hence for individually reared P. maculiventris females, the number of fertilized eggs laid depends upon the number of matings and length of life. During the first 35 days of life, the number of eggs produced per female, whether fertilized or not, increased as food consumption increased. From the 36th to 55th day, the number of eggs laid at diet levels one, two and four was virtually constant but increased at the third diet level (Table 28). The percentage number of eggs that hatched per diet level one to four was 57.8, 54.4, 39.1 and 67.0 respectively, and the mean preoviposition period for these levels was 14, 12, 7 and 5 days respectively, and inversely proportional to the amount of food consumed.

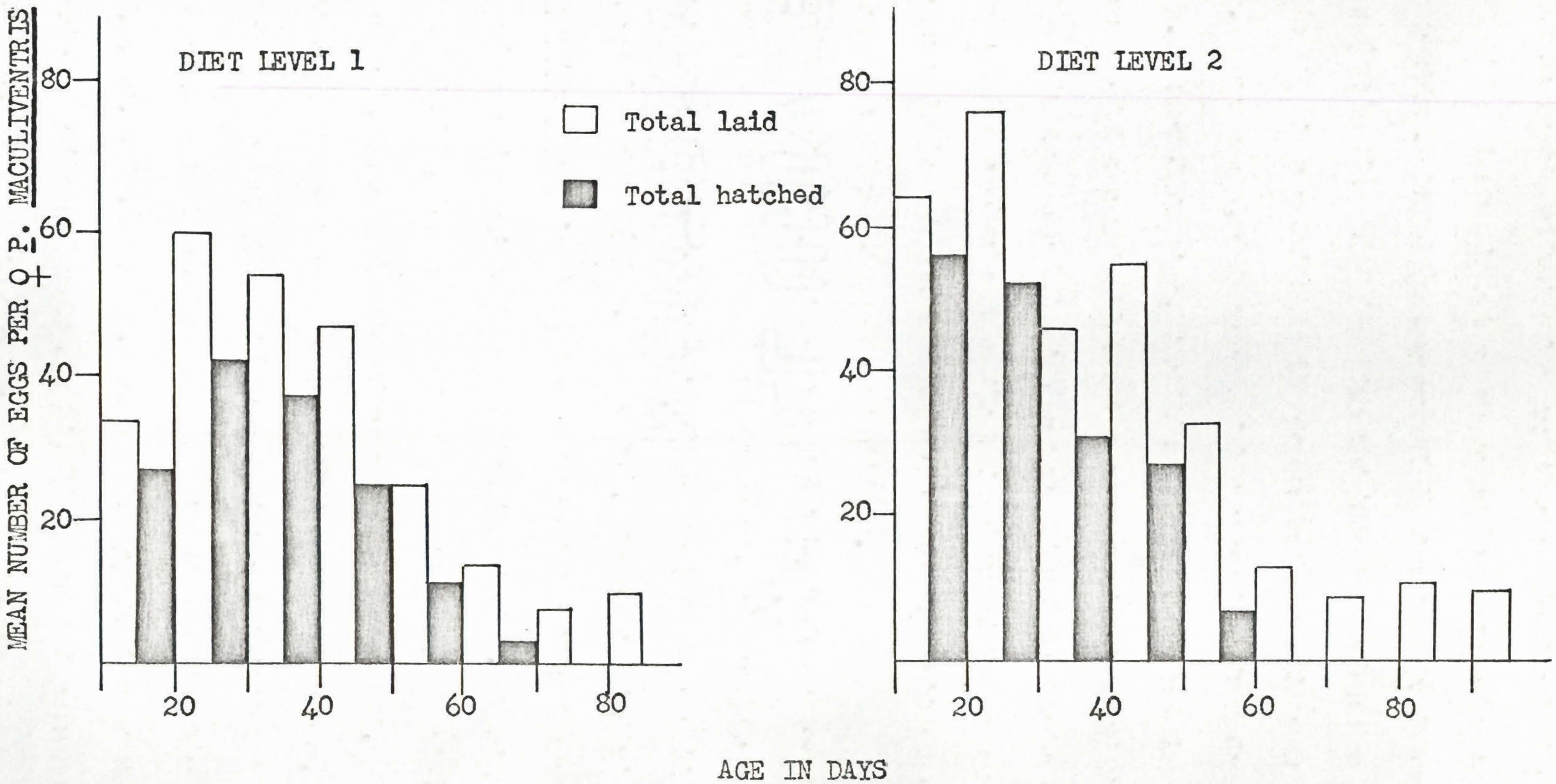

Fig. 16. - Mean number of eggs laid per 10-day interval (non-cumulative), and mean number hatched, for adult female P. maculiventris reared on G. mellonella larvae at diet levels one and two.

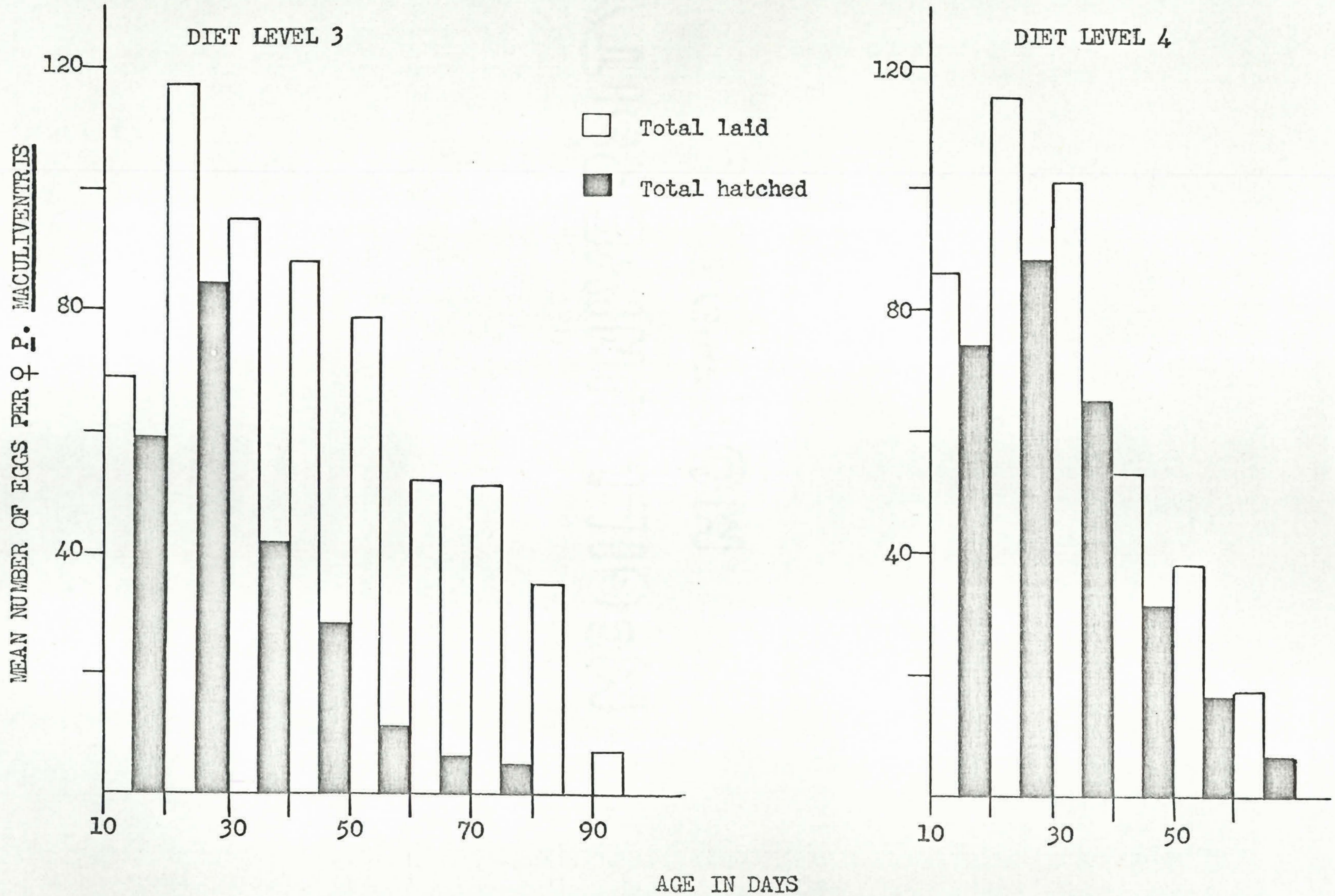

Fig. 17. - Mean number of eggs laid per 10-day interval (non-cumulative), and mean number hatched, for adult female P. maculiventris reared on G. mellonella larvae at diet levels three and four.

The mean weight of fertilized eggs increased as food consumption increased, but this increase was not significant. For unfertilized eggs, the mean weight generally remained constant at all diet levels and did not differ significantly from fertilized eggs (Table 12). It would appear that the amount of energy channelled by females, whether fertilized or not, for the production of individual eggs is much the same at all diet levels.

3. The consumption quotient or Van der Drift Constant

Van der Drift (1951), Gere (1956) and Dunger (1958) found that food consumption (generally accepted as an approximate measure of metabolic activity) in different sized adult diplopods and isopods was directly proportional to the surface area of the consumer.

This relationship was expressed as $c/\sqrt[3]{g^2}$, where c, is the dry weight of food consumed in unit time, $\sqrt[3]{g^2}$, the surface area of the animal and g, the live body weight. This expression, termed the Van der Drift Constant by Balogh (1953) and Gere (1956) was restated by Dunger (1958) as $100c/\sqrt[3]{g^2}$ and called "Konsumquotient" (KQ). According to Van der Drift (1951) an accurate estimate of the metabolic activity of a species, based on food consumption can only be attained if temperature and humidity conditions are kept constant and Gere (1956) found this is the case for adult diplopods and isopods except this "constant" was independent of size. Dunger (1958) reported that KQ was independent of size as well as of age within a species.

a. KQ estimations for stages of P. maculiventris

In the present investigation, Dunger's (1958) formula was applied to determine the consumption quotient of the immature and adult stages

TABLE 12

Mean[1] live and dry weights (in milligrams), and mean calorific values, for fertilized and unfertilized eggs of adult female *P. maculiventris* reared individually on *G. mellonella* larvae at four diet levels.

	Live weight (milligram)		Dry weight (milligram)		Calorific value	
Diet level	Fertilized	Unfertilized	Fertilized	Unfertilized	Fertilized	Unfertilized
1	.387 ± .004	.337 ± .005	.219 ± .002	.178 ± .003	1.7 ± .02	1.3 ± .02
2	.386 ± .004	.344 ± .005	.218 ± .002	.181 ± .003	1.7 ± .02	1.3 ± .02
3	.397 ± .003	.347 ± .004	.224 ± .002	.183 ± .002	1.7 ± .02	1.4 ± .01
4	.408 ± .002	.341 ± .005	.231 ± .001	.178 ± .003	1.8 ± .007	1.3 ± .02

[1] Mean of 25 eggs, fertilized and unfertilized, per diet level.

of *P. maculiventris*. Results showed that for nymphal stages, metabolic activity (based on KQ) was directly proportional to rate of food consumption (Table 13) within each of the second- to fifth-instar nymphs but decreased between instars as food consumption increased. Food consumption was not proportional to body surface area in instars two and three and adults, but proportional in instars four and five. The lack of constancy was also observed for stages of the phalangid, *Mitopus morio* (F.) by Phillipson (1960).

Zeuthen (1947) mentions that for insects in general, the metabolic rate decreases with increasing size and, within species, decreases rapidly during ontogeny, regardless of the size of the animal.

In adult males and females metabolic activity was directly proportional to the rate of food consumption. The gradual decrease in KQ estimates (Tables 14 to 17) within each diet level (except for first diet level) during adult life appears to be due to senescence of the predator and is in agreement with KQ values obtained for *M. morio* by Phillipson (1960). For *P. maculiventris* adults KQ estimates in both sexes were of the same order at each diet level, though the rate of food consumption in males was generally lower than in females (Tables 14 to 17).

4. Relationships between body weight, food intake and age for adult *P. maculiventris*

A series of total regression and total correlation analyses were carried out for adult males and females at all diet levels on the following relationships:

TABLE 13

Mean daily food intake, mean body weight before moulting and consumption quotient (KQ) for second- to fifth-instar nymphs of P. maculiventris reared at four diet levels.

Diet level	Mean daily food intake (dry wt. in grams)	Mean body weight before moulting (live wt. in grams)	$KQ = 100c/\sqrt[3]{g^2}$
		2nd instar nymphs	
1	.0005	.0030	2.4
2	.0008	.0027	4.1
3	.0007	.0024	3.9
4	.0020	.0027	10.0
		3rd instar nymphs	
1	.0008	.0089	1.9
2	.0010	.0102	2.1
3	.0010	.0091	2.3
4	.0020	.0098	4.4
		4th instar nymphs	
1	.0008	.0195	1.1
2	.0010	.0231	1.2
3	.0020	.0248	2.4
4	.0030	.0253	3.5
		5th instar nymphs	
1	.0008	.0367	.73
2	.0020	.0441	1.6
3	.0030	.0541	2.1
4	.0040	.0611	2.6

TABLE 14

Mean daily food intake, mean daily body weight and consumption quotient, per 10-day interval, for adult male and female P. *maculiventris* reared at diet level one.

	Male			Female		
Age in days	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$
10	.0019	.0568	1.3	.0021	.0768	1.2
20	.0020	.0573	1.3	.0021	.0817	1.1
30	.0021	.0569	1.4	.0021	.0855	1.1
40	.0021	.0575	1.4	.0021	.0870	1.1
50	.0021	.0577	1.4	.0021	.0858	1.1
60	.0021	.0576	1.4	.0022	.0838	1.1
70	.0021	.0576	1.4	.0022	.0829	1.2
80	.0021	.0573	1.4	.0022	.0828	1.2
90	.0020	.0570	1.4	.0022	.0832	1.2
100	.0020	.0571	1.3	-	-	-
110	.0020	.0570	1.3	-	-	-

TABLE 15

Mean daily food intake, mean daily body weight and consumption quotient, per 10-day interval, for adult male and female *P. maculiventris* reared at diet level two.

	Male			Female		
Age in days	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$
10	.0032	.0623	2.0	.0036	.0784	2.0
20	.0029	.0610	1.9	.0033	.0836	1.7
30	.0032	.0604	2.1	.0034	.0859	1.7
40	.0033	.0611	2.1	.0033	.0891	1.7
50	.0031	.0617	2.0	.0032	.0911	1.6
60	.0029	.0620	1.9	.0032	.0901	1.6
70	.0028	.0624	1.8	.0033	.0872	1.7
80	.0028	.0625	1.8	-	-	-
90	.0028	.0629	1.8	-	-	-

TABLE 16

Mean daily food intake, mean daily body weight and consumption quotient, per 10-day interval, for adult male and female P. <u>maculiventris</u> reared at diet level three.

	Male			Female		
Age in days	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$
10	.0050	.0666	3.0	.0061	.0914	3.0
20	.0043	.0661	2.6	.0056	.0970	2.7
30	.0040	.0659	2.5	.0052	.0993	2.4
40	.0037	.0667	2.2	.0050	.1018	2.3
50	.0032	.0668	1.9	.0047	.1038	2.1
60	.0031	.0664	1.9	.0046	.1047	2.1
70	.0029	.0656	1.8	.0047	.1042	2.1
80	.0027	.0648	1.7	-	-	-

TABLE 17

Mean daily food intake, mean daily body weight and consumption quotient, per 10-day interval, for adult male and female *P. maculiventris* reared at diet level four.

	Male			Female		
Age in days	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$	Mean daily food intake (dry wt. in grams)	Mean daily body weight (live wt. in grams)	KQ = $100c/\sqrt[3]{g^2}$
10	.0048	.0644	3.0	.0065	.0964	3.1
20	.0038	.0641	2.4	.0059	.1039	2.7
30	.0037	.0646	2.3	.0054	.1071	2.4
40	.0034	.0656	2.1	.0050	.1099	2.2
50	.0031	.0662	1.9	.0046	.1120	2.0
60	.0028	.0663	1.7	-	-	-
70	.0027	.0663	1.6	-	-	-
80	.0025	.0664	1.5	-	-	-
90	.0027	.0666	1.6	-	-	-

a) age and food intake

b) age and body weight

c) food intake and body weight

Results showed that at the first diet level a direct relationship existed between age and food intake for both males and females (Figs. 18 and 20) and between age and body weight for females only (Fig. 22). No relationship was found to exist at this diet level between food intake and body weight for either sex. For both sexes, relationships "age versus food intake" and "food intake versus body weight" were inversely proportional at the second and fourth diet levels, and inversely and directly proportional respectively, for females and males at the third diet level (Figs. 18 to 20 and 24 to 26). The "age versus body weight" relationship for both sexes was directly proportional to age at the second and fourth diet levels, and inversely and directly proportional respectively, for males and females at the third diet level (Figs. 21 to 23).

The combined effect of age, food intake and body weight for both sexes was determined by partial correlation analyses at diet levels two, three and four. Results showed that when "age" was held constant, a significant relationship existed between food intake and body weight for females at the second and third diet levels and that if "body weight" was held constant, the relationship between age and food intake for males at the third level was significant. In all other cases, when one of the three variables was held constant, the relationship between two other variables was non-significant (Table 18).

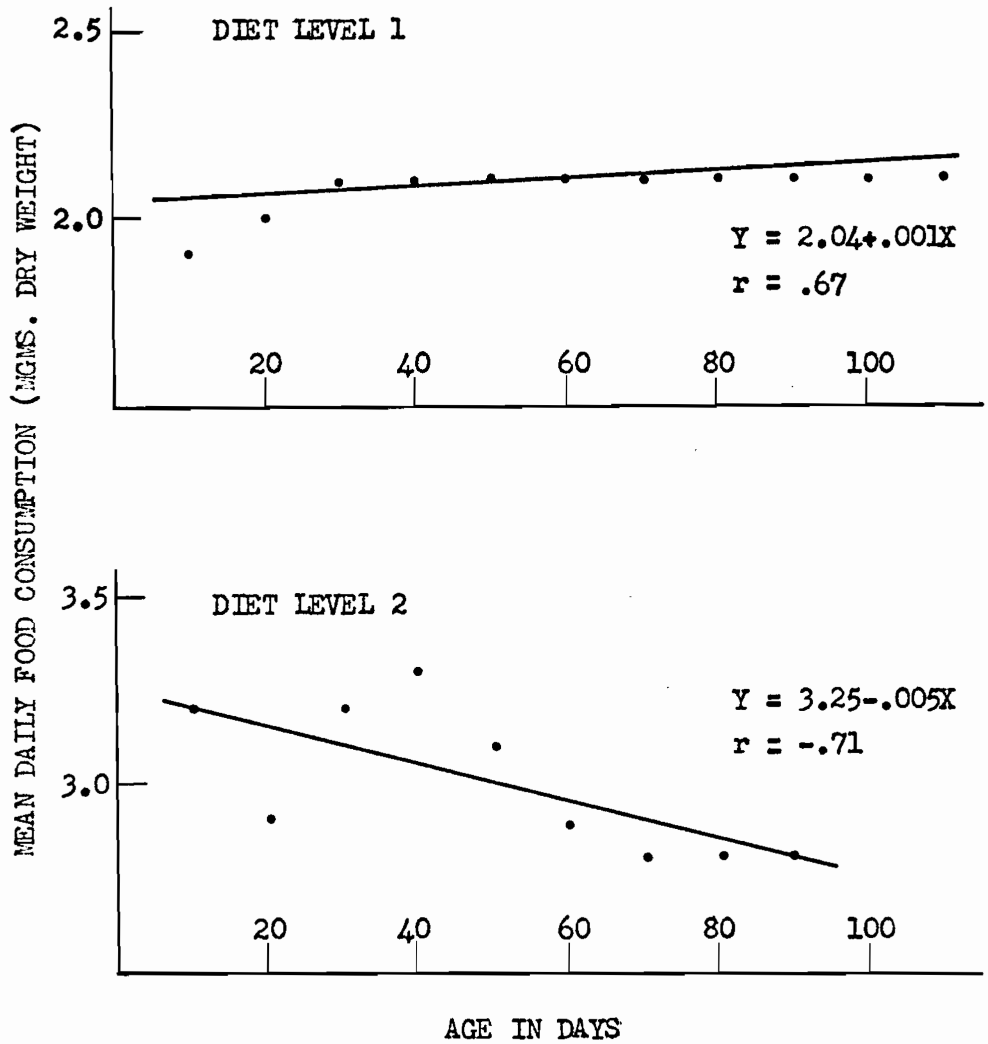

Fig. 18. - Relationship between age and mean daily food consumption for adult male P. maculiventris reared on G. mellonella larvae at diet levels one and two.

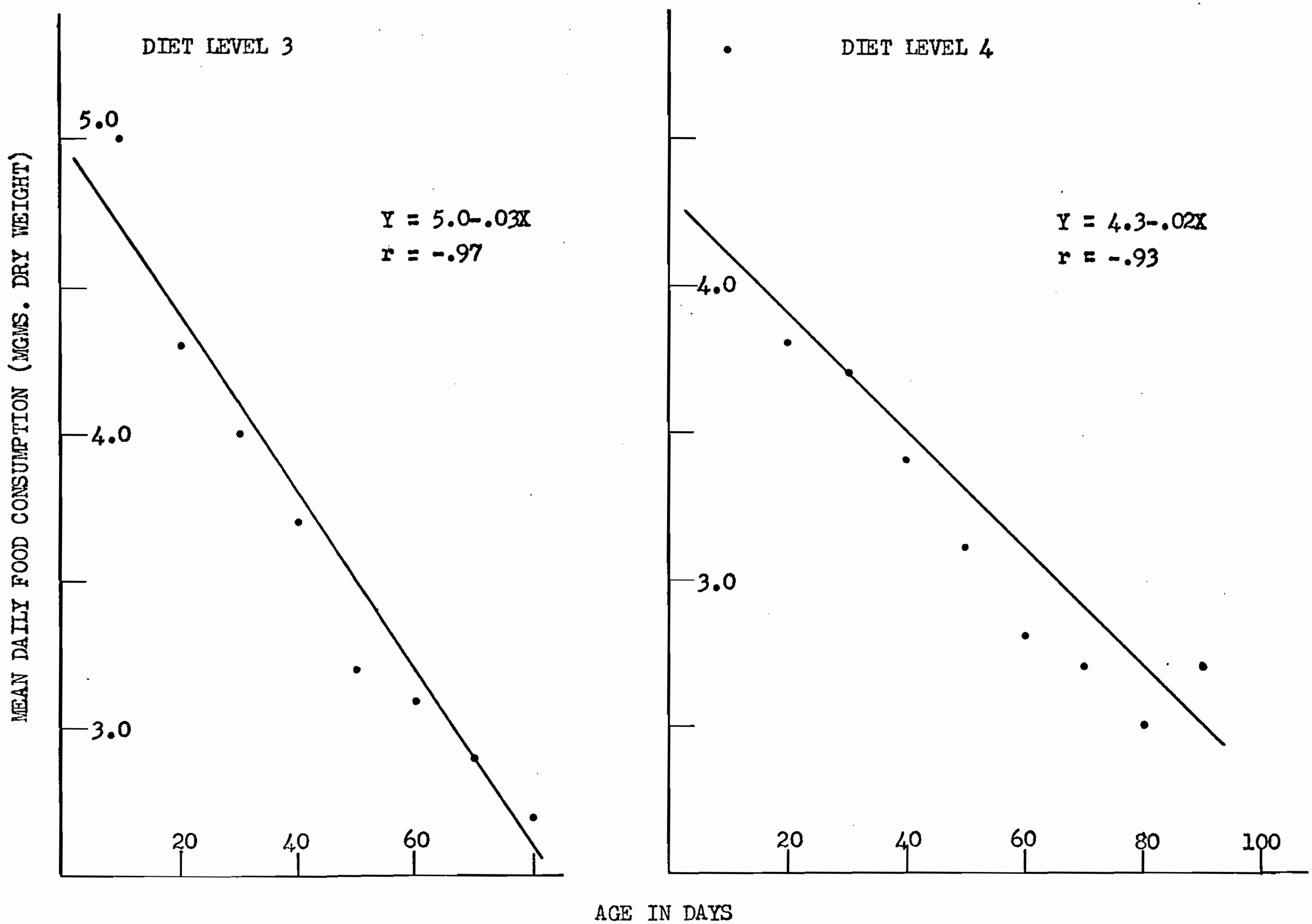

Fig. 19. - Relationship between age and mean daily food consumption for adult male P. maculiventris reared on G. mellonella larvae at diet levels three and four.

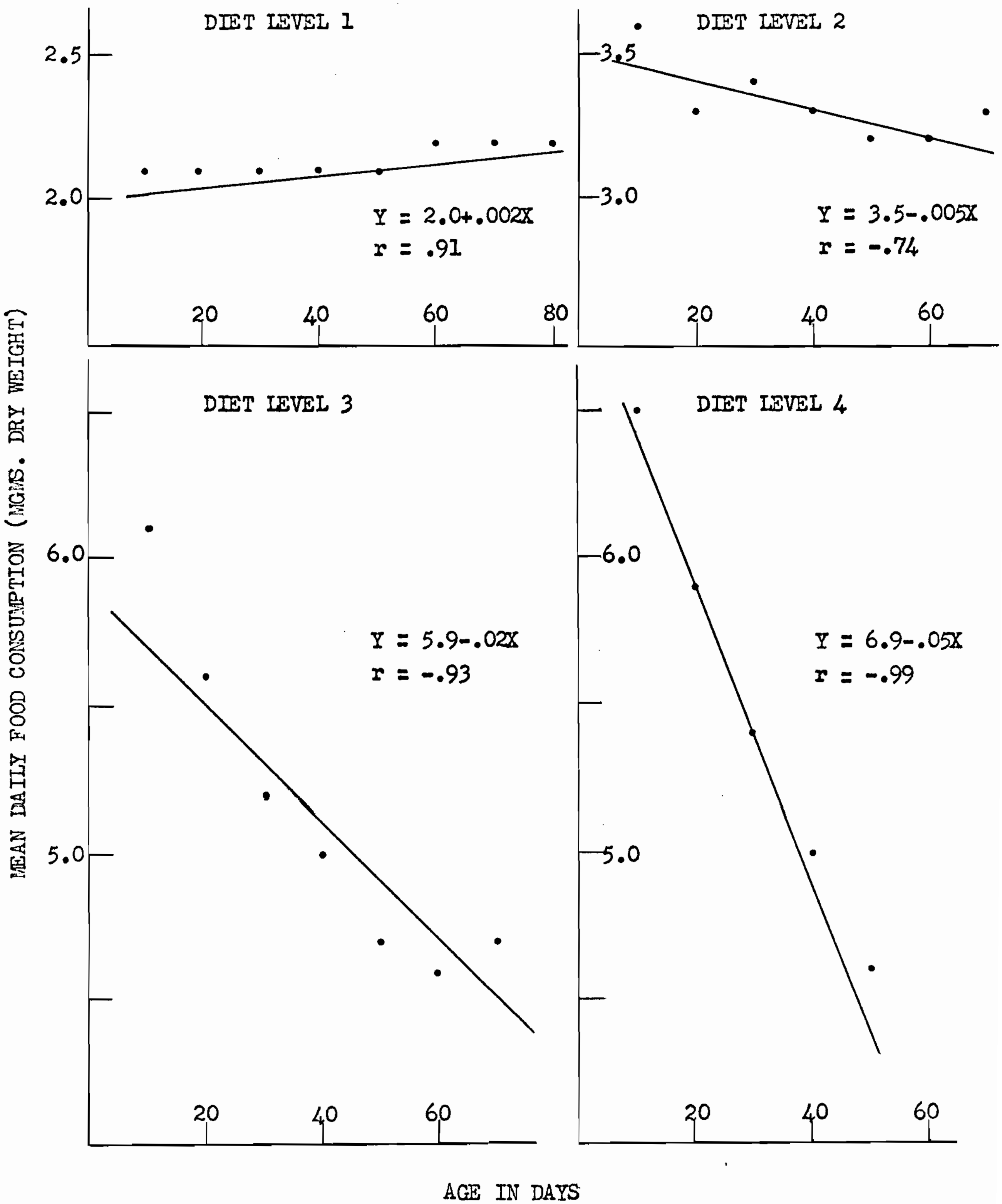

Fig. 20. - Relationships between age and mean daily food consumption for adult female P. maculiventris reared on G. mellonella at diet levels one to four.

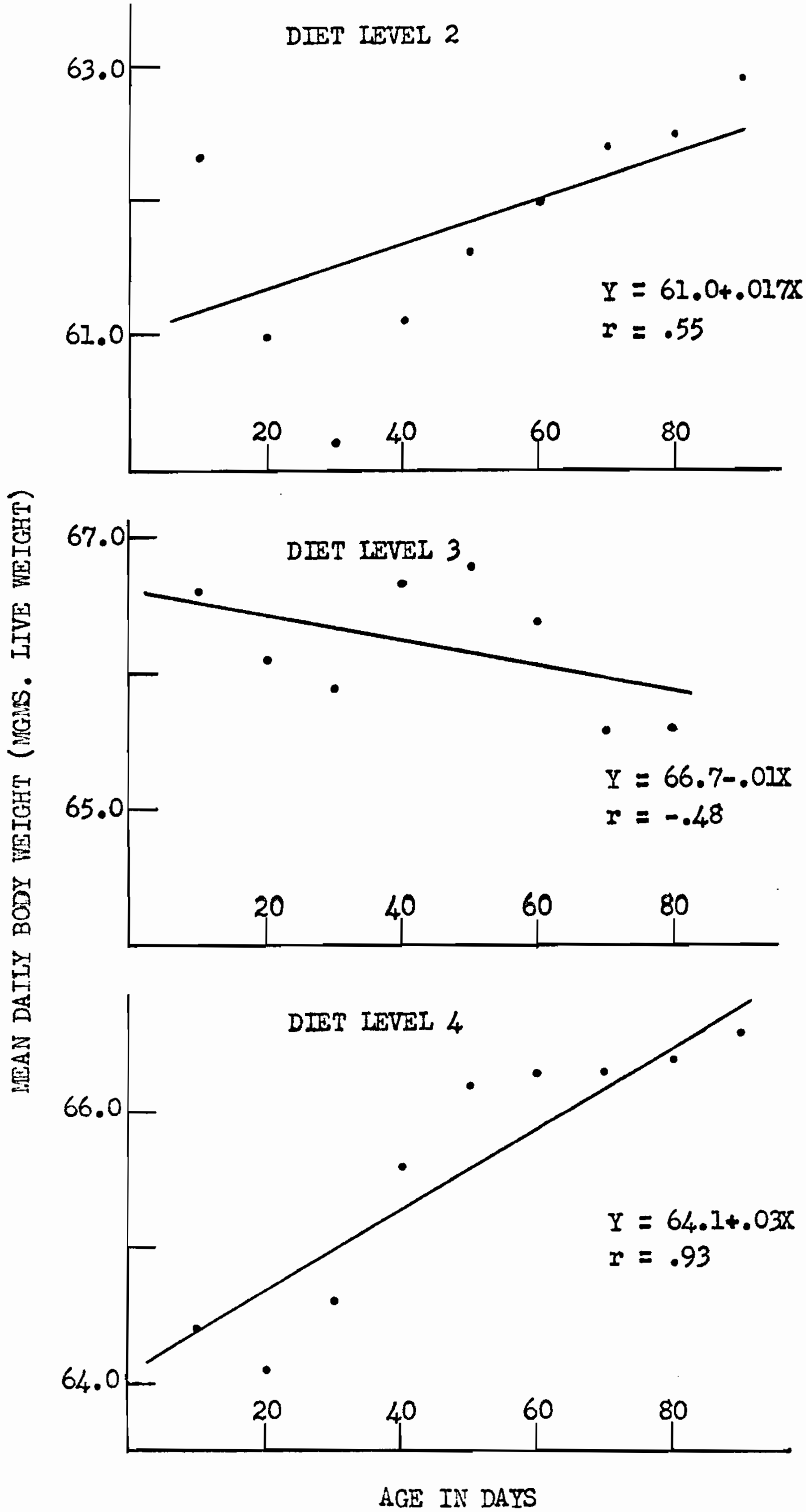

Fig. 21. - Relationship between age and mean daily body weight for adult male P. maculiventris reared on G. mellonella larvae at diet levels two, three, and four.

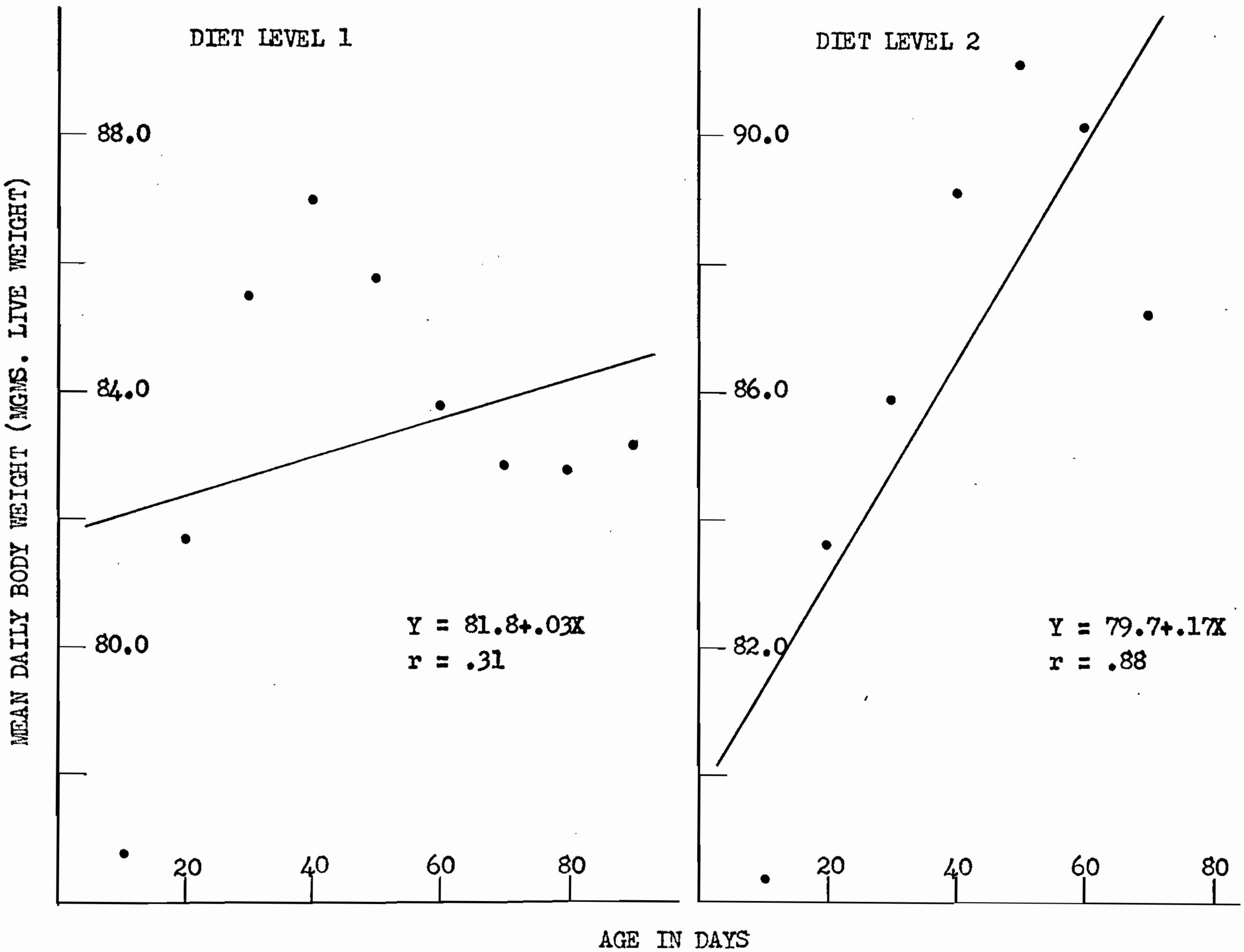

Fig. 22. - Relationship between age and mean daily body weight for adult female *P. maculiventris* reared on *G. mellonella* larvae diet levels one and two.

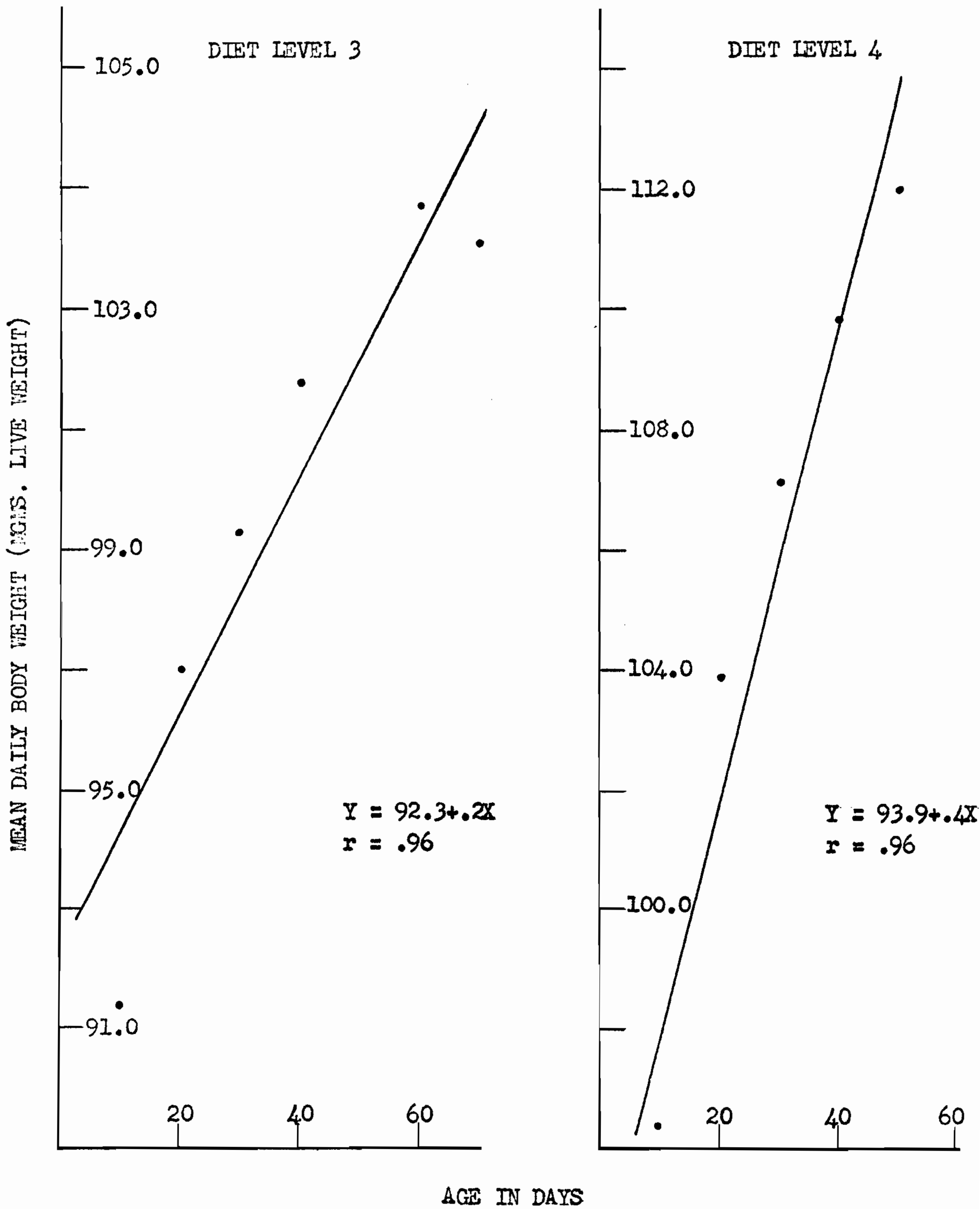

Fig. 23. - Relationship between age and mean body weight for adult female P. maculiventris reared on G. mellonella larvae at diet levels three and four.

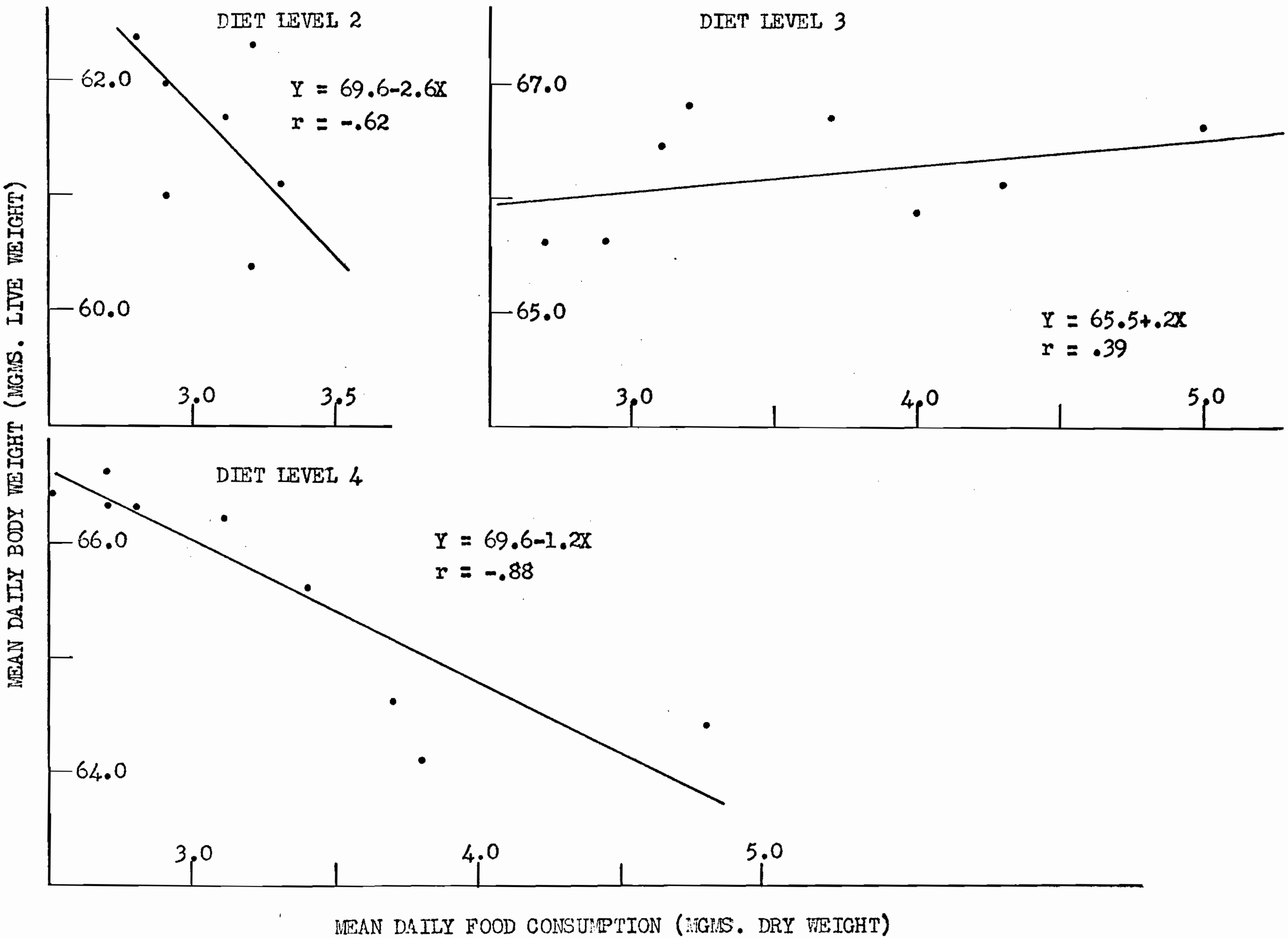

Fig. 24. - Relationship between mean daily food consumption and mean daily body weight for adult male P. maculiventris reared on G. mellonella larvae at diet levels two, three, and four.

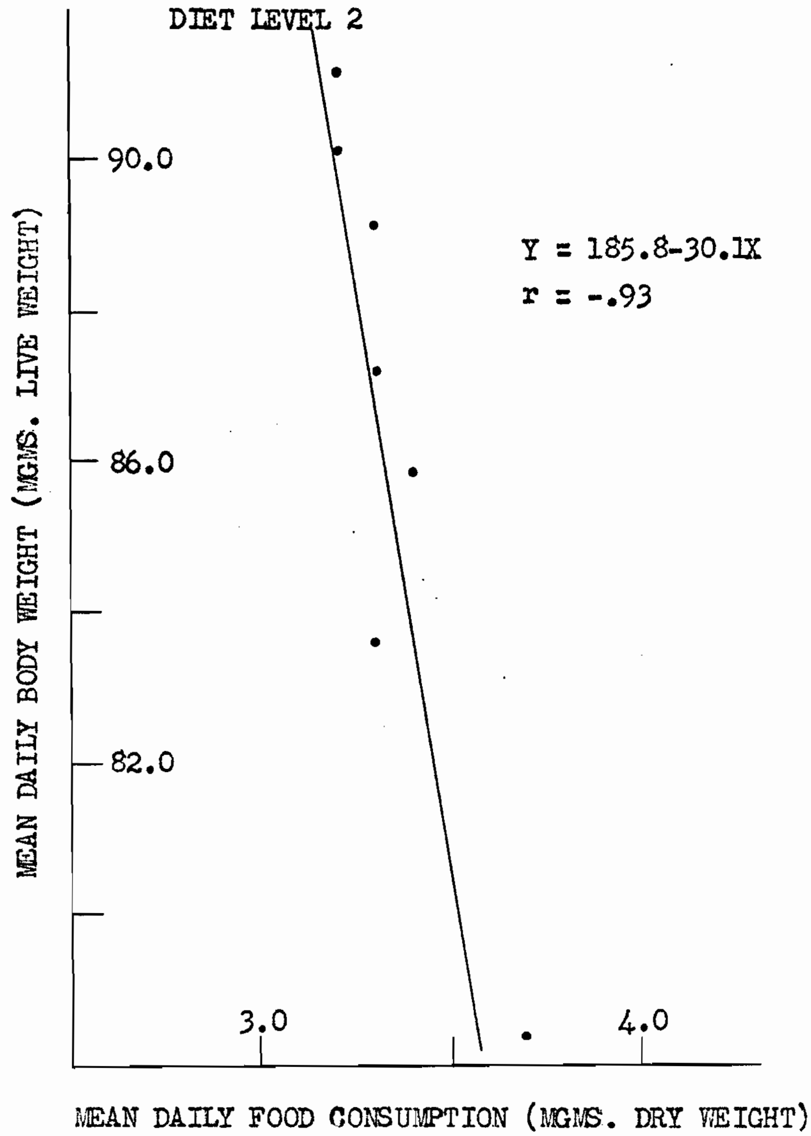

Fig. 25. - Relationship between mean daily food consumption and mean daily body weight for adult female *P. maculiventris* reared on *G. mellonella* larvae at diet level two.

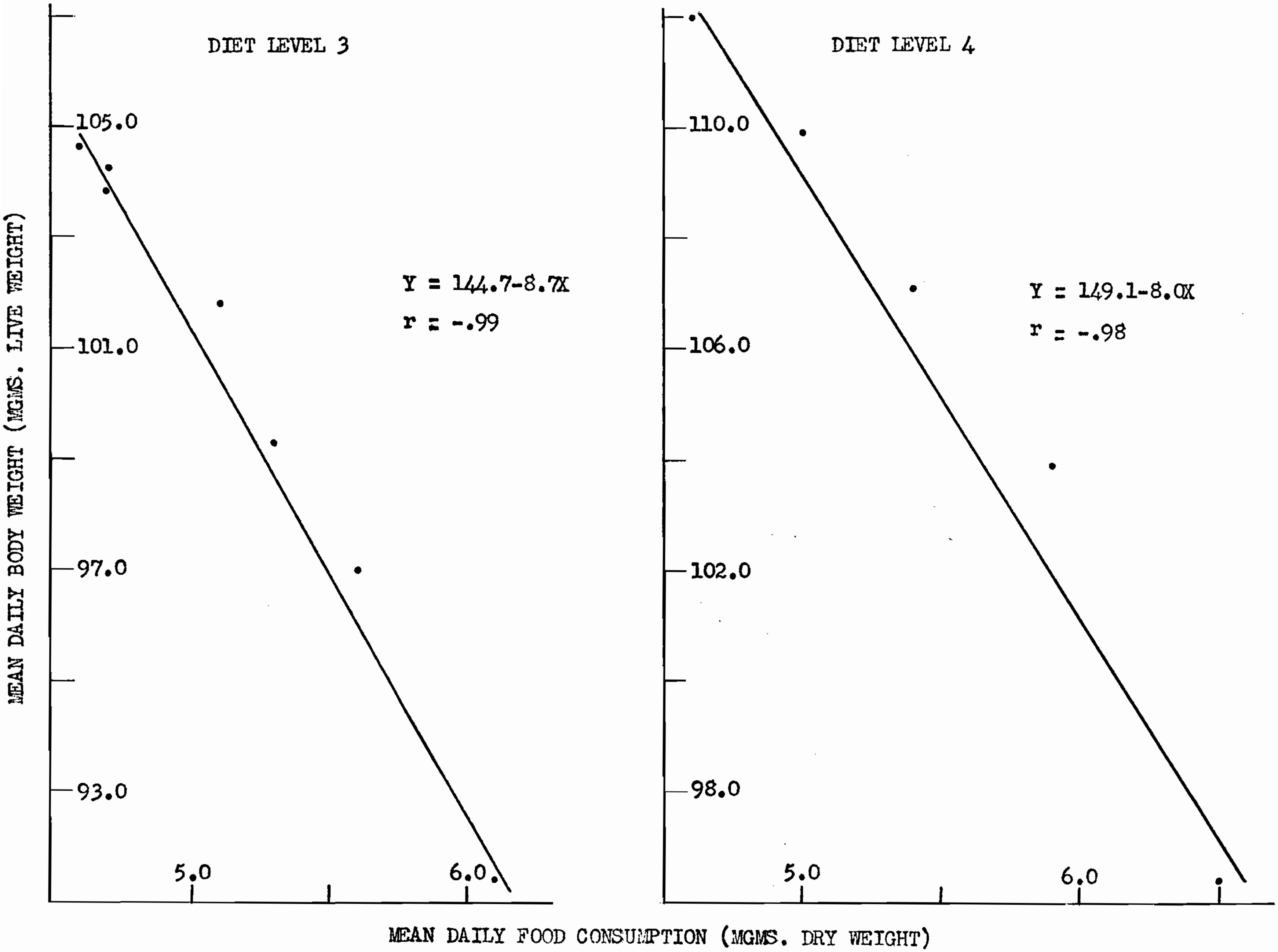

Fig. 26. - Relationship between mean daily food consumption and mean daily body weight for adult female *P. maculiventris* reared on *G. mellonella* larvae at diet levels three and four.

TABLE 18

Relationships between age and food intake, age and body weight, food intake and body weight, as revealed by total and partial correlation analyses, for adult male and female *P. maculiventris* reared at three diet levels.

	Male					Female				
Variables	Total correlation	Significance	Variable held constant	Partial correlation	Significance	Total correlation	Significance	Variable held constant	Partial correlation	Significance
Diet level 2.										
Age vs. Food intake	-.71	x	Body weight	-.56	-	-.74	-	Body weight	+.45	-
Age vs. Body weight	+.55	-	Food intake	+.20	-	+.88	xx	Food intake	+.78	-
Food intake vs. Body weight	-.62	-	Age	-.59	-	-.93	xx	Age	-.87	x
Diet level 3.										
Age vs. Food intake	-.97	xx	Body weight	-.93	xx	-.93	xx	Body weight	+.52	-
Age vs. Body weight	-.48	-	Food intake	-.45	-	+.96	xx	Food intake	+.76	-
Food intake vs. Body weight	+.39	-	Age	-.35	-	-.99	xx	Age	-.95	xx
Diet level 4.										
Age vs. Food intake	-.93	xx	Body weight	-.64	-	-.99	xx	Body weight	-.17	-
Age vs. Body weight	+.93	xx	Food intake	+.64	-	+.96	xx	Food intake	-.36	-
Food intake vs. Body weight	-.88	xx	Age	-.11	-	-.99	xx	Age	-.75	-

x Significance at 5 per cent level xx Significance at 1 per cent level - Non-significance

VI. STUDIES ON THE TRANSFORMATION OF ENERGY

BY P. MACULIVENTRIS

A. INTRODUCTION

Lindeman's (1942) pioneering work on energy transfer in a natural community constituted a preliminary application of the principles of Physics to living organisms. Studies that followed on the measurement of rate of energy transfer in natural and laboratory ecosystems, listed below, are a further application of these principles: dynamics of production in aquatic communities - Juday (1940), Lindeman (1941, 1942), Clarke (1946), Harvey (1950), Dineen (1953), Odum and Odum (1955), Odum (1957), Teal (1957); energetics of populations in the field - Odum and Smalley (1959), Golly (1960), Smalley (1960), Engelmann (1961), Odum, Connell and Davenport (1962); energetics of laboratory populations - Trama (1957), Richman (1958), Slobodkin (1959), Armstrong (1960) and Weigert (1964).

These studies have shown, in particular, the need for more precise information on calorific values of different organisms, since conversion of biomass estimates into energy using approximated calorific constants is unsatisfactory. According to Macfadyen (1948), "we rarely know the calorific values by which to multiply the biomass figures and, as a first approximation, these are assumed equal for all organisms so that, when considering the whole ecosystem, it is assumed that the biomass and energy values will give essentially the same relative importance to each group of organisms. However, Bornebush (1930) has shown that this is far from being the case in forest soils, and the available figures for fresh-water organisms point in the same direction. The ready conversion of biomass to energy figures, and the discriminate use of the terms as used by American authors would seem to have led to the obscuring of the fact that the energy and biomass cycles are fundamentally distinct and of a different nature". Macfadyen (1963) further suggests that estimates of the metabolic activity for each organism should be made to determine the relative importance of these organisms in an ecosystem. Such estimates used in conjunction with life tables would provide a precise method of analysing the relationships that exist between intrinsic rate of increase of an organism and its success in competition in an ecosystem.

In view of the great lack of energy work on organisms in terrestrial ecosystems, the present study on the energy transfer in P. maculiventris was initiated. The object was to measure directly the amount of energy consumed by the predator at different stages and how much of this amount went into growth, production of eggs, respiration and excrement combined. From these measurements, it would then be possible to calculate the efficiency with which consumed energy was converted into new protoplasm.

B. METHODS AND MATERIALS

P. maculiventris was found to be particularly suitable for a study of energetics since it can be cultured easily in the laboratory and has a relatively short life cycle. Rearing and feeding of the predator on different sized larvae of G. mellonella for purposes of this study was carried out as described in Section V.

All samples used for calorimetric determinations were dried in an oven at 105°C for approximately four hours, i.e., until the dry weight of each sample was constant. Samples were kept in dessicators pending analyses. The calorific value per gram of each sample was determined by incinerating it in a semimicro oxygen bomb Calorimeter which consisted of the following parts (Plate VI):

1. Calorimeter jacket: A double-walled and double-bottomed non-metallic bakelite jacket which encloses the calorimeter chamber for effective thermal insulation. On the outer wall of the jacket is screwed a small motor which (by means of a belt) activates the stirrer located in the jacket cover (Plate VI, B III). An electric wire fitted to the terminals of the ignition unit within the calorimeter jacket provides the electric power source for the bomb.

2. Calorimeter cover: A circular bakelite plate carrying internally the stirrer shaft and externally the stirrer pulley (Plate VI, B I), and used to seal the open end of the calorimeter jacket during incinerations.

3. Calorimeter can: A chromium-plated brass container used to hold the vacuum flask (Plate VI, B II).

4. Vacuum flask: A glass Dewar Jar, 665 ml. capacity, with a flanged metal bottom, fitted into the calorimeter can.

5. Combustion bomb: An oxygen bomb consisting of a 22 ml. stainless steel cup; a stainless steel cover containing a small valve with an insulated electrode, an oxygen inlet tube containing an adjustable platinum-irridium loop to hold the pellet capsule, and terminals for the connection of the fuse wire. The steel cup and cap are held tightly

together by means of a nickel plated jacket and a perforated screw cap (Plate VI, B VI).

6. Ignition unit: A step-down transformer of 115 volts - 50/60 cycles A.C. - with a push switch, pilot light, and terminals connecting the bomb. This unit provides current for ignition of the sample (Plate VI, B IV).

To record the temperature produced by combustion of each sample, a Bausch and Lomb high sensitivity VOM 7 strip chart recorder was used (Plate VII A and C). To the recorder was attached a thermo chart (Plate VII D) provided with temperature settings ranging from 0° to 100°C, and to the thermo chart was connected, by means of a long insulated electrical wire, the thermistor probe inserted through the calorimeter cover and rested in the water near bomb in the jacket.

Each sample to be incinerated was placed inside the bomb and sealed as described above, and the bomb charged with oxygen to a maximum of 35 atmospheres. The bomb was then placed in the vacuum flask to which had previously been added 450±.05 grams of water (distilled or tap; weighed by Mettler balance, model K7T, sensitive to 0.01 gram; Plate V E) adjusted to an initial temperature of 17° to 18°C. The stirrer, in the calorimeter cover, was then placed vertically inside the vacuum flask. Through the hole in the calorimeter cover provided for this purpose was inserted the thermistor probe which rested in the water in the calorimeter vacuum flask and the space in the cover around the probe was sealed with plasticene.

The water equivalent of the calorimeter was calculated from the data obtained on the incineration of three benzoic acid pellets, weighing approximately 0.2 grams, by means of the following formula (Parr Manual 128):

$$W = \frac{Hm + f}{t - RC}$$

where: W = water equivalent of the calorimeter in calories per degree Centigrade

H = heat of combustion of benzoic acid

m = mass of samples in grams

f = heat input (1.13 calories) from 7 cm. fuse wire

t = net temperature rise in degrees Centigrade

RC = radiation correction in degrees Centigrade

Since the calorimeter was not adiabatic, corrections were made for radiation gain and loss using the following formula (Parr Manual 128):

$$RC = \frac{5(T_{18} - T_{12}) + (T_6 - T_0)}{6}$$

where: RC = radiation correction

T_0 = temperature at the beginning

T_6 = temperature at sixth minute

T_{12} = temperature at twelfth minute

T_{18} = temperature at eighteenth minute

Corrections were also made for the burning of the fuse wire in the bomb. Hence, for each sample, the temperature rise corrected for radiation gain or loss and multiplied by the water equivalent gave the total calories produced in each combustion. Total calories, divided by the gram weight of the sample gave the number of calories per gram. Benzoic acid was not mixed with any of the samples, since weights of samples used were within the five to 200 milligrams range capacity of the calorimeter. For some samples, as for example eggs, a pellet press (Plate VII B) was used to prepare compact samples for testing. In using the press, utmost care had to be taken not to apply too great a pressure to the sample, since excess pressure resulted in the loss of fatty substances and consequent loss of calories.

The above bomb calorimeter assembly was found to be a most sturdy unit, functioned well throughout the many incinerations made and is considered most adequate for the type of quantitative work done here.

C. RESULTS

1. Energy Input

a. Calorific values of G. mellonella larvae

For each of six different sized fresh G. mellonella larvae fed to nymphs and adults of P. maculiventris the mean milligram dry weight value, from the smallest to the largest, was, respectively, 0.8, 1.6, 2.7, 4.9, 10.0 and 12.0. The first four weights represent the amounts of dry food given to each of the second- to fifth-instar nymphs of P. maculiventris and are designated, respectively, diet levels one, two, three, and four, and the last four weights represent dry amounts given to each of the adult males and females and are similarly designated diet levels one, two, three, and four.

Gram calorific values for each of five replicates of each of the six G. mellonella prey sizes are given in Table 19. Results show that as the size of prey increased, the calorific values increased. Values per replicate overlapped between prey sizes one to four and between five and six, but not between prey sizes one to four and five, and

TABLE 19

Calories per gram of dry weight for each of six different sizes of G. mellonella larvae, for each of five replicates, with means of replicates, standard deviations and coefficients of variation.

	Larval sizes in grams of dry weight					
	1 .0008	2 .0016	3* .0027	4* .0049	5 .0100	6 .0120
Replications	Calories per gram of dry weight					
1	5865	5978	6179	6879	7319	6847
2	5903	6210	6082	6246	7229	6861
3	6142	6426	6405	6271	6708	7300
4	5818	6009	6421	6519	7068	6964
5	5951	6270	5944	6114	6594	7531
Mean	5935	6178	6206	6405	6982	7100
Standard deviations	125	187	206	303	323	303
Coeff. of var.	2.11%	3.03%	3.32%	4.73%	4.63%	4.27%

* Larval sizes 3 and 4 constituted diet levels three and four for immature stages and one and two for adult stages of P. maculiventris.

one to four and six. However, the mean calorific values for each prey size did not overlap.

2. Energy utilization for growth

a. Calorific values of immature stages of P. maculiventris

Calorific values were determined for each of feeding instars two to five at each of diet levels three and four (a) after each moult before feeding (Young = Y) and (b) at the end of the feeding period (Mature = M).

Values obtained for mature second-, young and mature third- and young fourth-instar nymphs, at diet levels three and four showed little variation and were averaged separately for each instar, young and mature, (Table 20). These values were used to transform dry weights (Appendix pt. 2, Tables V to VII) of corresponding instars at all diet levels, to calories (Appendix pt. 3, Tables VIII to X). Since there were marked differences in the dry gram weights of mature fourth- and young and mature fifth-instar nymphs, at the four diet levels, the calorific values for these instars at diet levels one and two were extrapolated from calorific values obtained for diet levels three and four (Table 20).

The first-instar nymphs of P. maculiventris do not require food and usually have sufficient energy reserves for growth and development in this stage. Calorific values (Table 20) obtained for newly hatched first-instar nymphs were the highest of any instar and decreased slightly just prior to moulting, indicating loss of energy due to growth. Young second-instar nymphs, before feeding, showed a further reduction in calorific value due to loss of energy at moulting. Calorific values for

TABLE 20

Numbers of replicates, mean calories per gram of dry weight, with standard deviations and coefficients of variation, for young (Y) and mature (M) first- to fifth-instar nymphs of *P. maculiventris* reared individually at a constant temperature of 80°F and a relative humidity of 70 per cent.

	Mean of diet levels 3 and 4							Mean per diet level											
	First instar		Second instar		Third instar		Fourth instar	Fourth instar M Diet				Fifth instar Y Diet				Fifth instar M Diet			
	Y	M	Y	M	Y	M	Y	1	2	3	4	1	2	3	4	1	2	3	4
Replications	2	2	2	2	2	4	3	-	-	2	2	-	-	2	2	-	-	2	2
Calories	7479	7353	6989	7222	6822	6597	6339	5125*	6050*	6313	6584	4742*	5732*	5957	6361	4122*	4910*	6185	6582
Standard deviations	7	12	96	37	36	87	159	-	-	35	38	-	-	110	89	-	-	36	55
Coeff. of var.	.09%	.16%	1.37%	.51%	.53%	1.32%	2.51%	-	-	.55%	.58%	-	-	1.85%	1.40%	-	-	.58%	.84%

* Extrapolated values.

mature second-instar nymphs, at the end of the feeding period before moulting, were higher than at the beginning of the stadium before feeding. These values also increased with increased energy consumption in the fourth and fifth stadia. This result is in agreement with the findings of Slobodkin and Richman (1961) on Dugesia tigrina (Berlese) that well-fed animals increase in calories per gram.

b. Calorific values of adult P. maculiventris

All adults used in the energetics experiments came from the standard culture as described in Section III.

i. Males

Calorific values for males at all diet levels were determined at three day intervals from the fifth to the 33rd day following emergence, and immediately after death, and unfed males at similar intervals from the first to the 29th day and at death - a total of 45 incinerations.

Results revealed that differences in calorific values on the fifth day of the experiment between diet levels one, two, and three were not significant, but were significant at the five per cent level between diet levels one to three and four. The slight variation between the first three diet levels mainly reflects variation in initial calorific value of the individual predators. Results further reveal that at each of the four diet levels the mean calorific values of males increased as energy consumption increased (Table 21).

Tests for significance (t-test) revealed that differences in mean calorific values were significant at the one per cent level between the first and third, first and fourth and second and fourth diet levels, and at the five per cent level between the third and fourth diet levels.

TABLE 21

Calories per gram of dry weight, per three-day interval, for adult males, and one-day interval, for adult females of the predator P. maculiventris reared individually on four diet levels for 33 days (with $\bar{x}$ calories, S.D. and C.V. for each diet level) at a constant temperature of 80°F and a relative humidity of 70 per cent.

	Male				Female			
	Diet level				Diet level			
Age in days	1	2	3	4	1	2	3	4
5	7022	7128	7229	7736	6304	6818	7266	7886
7					7879	7814	7097	8371
9	7134	6910	6860	7569	7738	6711	7214	8028
11					7669	7344	6818	8263
13	6641	7361	7147	8373	7651	6847	6560	7936
15					6944	7142	7262	7955
17	5945	6649	7026	8172	7500	7068	7115	7408
19					6490	6927	7188	7772
21	5741	6649	7627	7396	6683	6554	7202	7900
23					6790	7106	7007	7931
25	5924	6926	7827	8234	6277	6891	6667	7397
27					6349	6774	7606	7568
29	6618	6988	6528	7286	6475	6787	7297	7432
31					6737	6698	7094	7641
33	6436	6533	7285	7708	6497	6120	6906	7578
x	5271	5913	7302	7568	5486	5561	6141	7566
Mean	6303	6784	7203	7782	6841	6822	7027	7789
Standard deviations	621	417	387	387	672	497	349	295
Coeff. of var.	9.85%	6.15%	5.37%	4.97%	9.82%	7.29%	4.97%	3.79%

x Estimates of calories per gram of dry weight at time of death - obtained from a separate experiment - were made for males at diet levels 1, 2, 3 and 4 on the 152nd, 140th, 102nd and 127th days respectively; for females, on the 105th, 100th, 87th and 58th day respectively.

For unfed males calorific values (Table 22) were high at emergence but decreased from the fifth to the 21st day and remained fairly constant thereafter until the 29th day. During the 29 day period, the predator lost approximately 16 per cent of the initial calorific value. From the 29th day to the 62nd day (33 days) there was a gradual decrease in calorific values, the loss in energy during this period being about 20 per cent. The loss for the period of adult life was approximately 36 per cent.

ii. Females

Calorific values for fed females, at all diet levels, was determined on the fifth day of the experiment and every two days thereafter during the first 33 days of adult life and at death, and for unfed females every second day from the first to the 29th day and at death - a total of eighty incinerations.

Results indicate that the mean calorific values obtained for females at the first two diet levels were in the same order, but at the third and fourth diet levels, increased as energy consumption increased, although there was considerable variation between estimates within and between diet levels, this variation was more pronounced in females than in males (Table 21) and was due to incinerations of females before and after egg laying.

Tests for significance (t-test) revealed that the mean calorific values were not significant between diet levels one, two and three, but were significant at the one per cent level between diet levels three and four.

Calorific values for unfed females decreased as predator age

TABLE 22

Calories per gram of dry weight, per three-day interval, for unfed adult males, and one-day interval, for unfed adult females of the predator P. maculiventris reared individually at a constant temperature of 80°F and a relative humidity of 70 per cent.

Age in days	Male: Incinerated value	Male: Extrapolated value (5-day interval)	Female: Incinerated value	Female: Extrapolated value (5-day interval)
1	8613	8455	8688	8372
3		8159	8427	8259
5	8297	7918	8003	7740
7		7608	8291	7400
9	8078	7333	8235	7205
11		7105	8031	7074
13	7965	6870	7563	6902
15		6687	7627	6742
17	7645	6495	7057	6570
19		6315	7190	6412
21	7490	6125	7270	6242
23		5935	7284	6075
25	7169	5788	7061	5925
27			7093	5757
29	7200		7003	5550
x	5746		5485	

x Estimates of calories per gram of dry weight at time of death - obtained from a separate experiment - were made for males on the 62nd day; for females on the 75th day.

decreased. In the first 29 days of life unfed females lost 19 per cent of their initial energy followed in the next 46 days by a 22 per cent loss, for a total loss during adult life of 41 per cent. The degree of decrease was higher for females during the first 29 days and higher for males after the 29th day (Table 22).

It can therefore be concluded that at the four diet levels gram calorific values of fourth- and fifth-instar nymphs of P. maculiventris and of adults of both sexes increased as the energy supply increased. These results are in accordance with those obtained by Slobodkin and Richman (1961) and indicate for P. maculiventris a nutritional index for nymphs and adults.

c. Calorific values of eggs of P. maculiventris

Pilot tests carried out during the period of egg-laying revealed no significant differences in mean calorific values between diet levels for each of the fertilized and unfertilized eggs of P. maculiventris but slight differences between these two types of eggs. Further tests (Table 23), based on five samples - 200 eggs per sample - taken at random from the different diet levels for each of the fertilized and unfertilized eggs revealed no significant differences in mean calorific values between samples either within or between fertilized eggs. It would appear therefore that under conditions of the present experiment energy reserves utilized by females, fertilized or not, for the production of eggs remain constant for the species.

3. Energy budget

To express mathematically the transformation of energy in organisms,

TABLE 23

Calories per gram of dry weight per replicate for fertilized and unfertilized eggs of <u>P. maculiventris</u> with means of replicates, standard deviations and coefficients of variation.

	Eggs	
Replications	Fertilized	Unfertilized
1	7583	7594
2	7819	7463
3	7789	7329
4	7959	7503
5	7640	7224
Mean	7758	7422
Standard deviations	150	147
Coeff. of var.	1.93%	1.98%

Ivlev (1939, 1945) proposed the following equation:

$$Q = Q' - Q_R - Q_t - Q_v - Q_w$$

where, Q is the energy consumed as food; Q', the accumulation of energy as growth; Q_R, the energy loss due to excretion; Q_t, the energy utilized for respiration; Q_v, the energy utilized for external work; Q_w, the energy utilized for internal work. Ricker (1946), later suggested that Q_t, Q_v and Q_w be combined since respiration represents the total energy used by an organism for its normal daily activities. Following Ricker's (1946) suggestion, Richman (1958) modified the equation as follows:

$$\text{Input} = \text{Growth} + \text{Respiration} + \text{Egestion}$$

and this is the equation used in the present study to formulate energy budgets for different stages of P. maculiventris reared at four diet levels. Energy losses due to respiration and excretion were not determined separately but were calculated as follows:

$$\text{Input} - \text{Growth} = \text{Respiration} + \text{Excretion}$$

In P. maculiventris, mean energy as growth and mean energy consumption, per nymphal instars two to five and adults of both sexes, were calculated by converting the biomass obtained per individual in each of these stages at each of the four diet levels (Appendix pt. 2, Tables V and VII) into calories (Appendix pt. 3, Tables VIII and X). From these mean values energy budgets were developed.

The efficiency of growth has generally been expressed as percentage of energy consumed to form new protoplasm, or percentage of energy assimilated that is transformed into new protoplasm. Ivlev (1945) and Ricker (1946) called the former the energy coefficient of growth of the first order, and the latter, the energy coefficient of growth of the second order. Richman (1958) subsequently called the first ratio of growth the gross efficiency, and the second the net efficiency. Following Richman's method, gross efficiency of growth only was determined for feeding stages of P. maculiventris.

a. Immature stages of P. maculiventris

Energy budgets developed for different feeding nymphal stages showed that in general energy intake was directly proportional to energy supply. For second- and third-instar nymphs energy intake increased with supply, but energy of growth remained virtually constant per instar at each of the four diet levels (Table 24). In these instars, energy loss due to respiration + egestion increased with consumption. In instars four and five, energy of growth, respiration + egestion, was directly proportional to energy consumed.

Gross efficiency of growth for second- and third-instar nymphs was inversely proportional to energy consumption, and this efficiency for fourth- and fifth-instar nymphs at diet level one and fifth-instar nymphs at diet level two was lower than in diet levels three and four (Table 24). Clearly, for these stages, energy supplied at the lower diet levels, was insufficient and predators were never satiated. Total growth efficiency for the period instar two to five was 37.67, 50.91, 54.70, 45.22 per cent, respectively, at the first, second, third and fourth diet levels (Table 25).

b. Adult P. maculiventris

Two energy budgets were formed for each of P. maculiventris males and females covering the period of growth from the fifth to the

TABLE 24

Mean[1] energy budget for "feeding" nymphs (instars two to five) of P. maculiventris reared individually on G. mellonella larvae at four diet levels.

Diet level	Consumed	Of growth	Of respiration and egestion[2]	% consumed as growth
		Mean energy in calories		
		Second instar		
1	6.5	4.3	2.2	66.15
2	9.9	3.7	6.2	37.37
3	8.7	3.2	5.5	36.78
4	19.2	3.7	15.5	19.27
		Third instar		
1	13.1	9.4	3.7	71.76
2	16.1	12.0	4.1	74.53
3	20.5	10.7	9.8	52.20
4	33.3	11.1	22.2	33.33
		Fourth instar		
1	20.2	10.3	9.9	50.99
2	26.6	17.8	8.8	66.92
3	36.6	22.3	14.3	60.93
4	50.0	23.8	26.2	47.60
		Fifth instar		
1	62.3	14.4	47.9	23.11
2	51.9	19.7	32.2	37.96
3	78.8	42.9	35.9	54.44
4	103.8	54.7	49.1	52.70

[1] Mean of 10 nymphs per instar per diet level.

[2] Energy consumed - Energy of growth.

TABLE 25

Total[1] energy budget per diet level for "feeding" nymphs (second to fifth instars combined) of P. maculiventris reared individually on G. mellonella larvae.

Diet level	Consumed	Of growth	Of respiration and egestion[2]	% consumed as growth
	Total energy in calories			
1	102.1	38.4	63.7	37.61
2	104.5	53.2	51.3	50.91
3	144.6	79.1	65.5	54.70
4	206.3	93.3	113.0	45.22

[1] Obtained from mean values for each diet level of each of second to fifth instars - Table 24

[2] Energy consumed - Energy of growth.

35th day (first period) following emergence, and from the 36th to 75th day (second period). During the first period, energy consumed by males was directly proportional to the energy supplied, save at the highest diet level when a slight decrease in energy intake, due to ageing was recorded (Table 26). This result is in agreement with information reported for males in Section V where the rate of food intake was inversely proportional to age (Fig. 19), particularly at the higher diet levels. Energy of growth for males was not correlated with increased energy consumption, and growth efficiency was low and showed no relationship to energy consumption. Energy loss due to respiration + egestion was higher when energy consumption was higher.

During the second period, energy consumption for males decreased markedly at the third and fourth diet levels due to age and growth efficiency was zero, though fluctuations were observed in the day to day growth. Energy loss due to respiration + egestion increased as energy consumption increased (Table 26).

Energy budget of female P. maculiventris for the first period showed that energy consumption at the four diet levels was directly proportional to energy supplied. Energy of growth was virtually the same at the first three diet levels but increased at diet level four, probably due to the greater accumulation of eggs (Table 27). Energy loss due to respiration + egestion was directly proportional to energy intake and growth efficiency inversely proportional to energy consumption, except at diet level four where there was a slight increase. The gross efficiency of growth of females during this period did not include the energy utilized for egg production, and hence the energy

TABLE 26

Mean[1] energy budget for adult male P. maculiventris reared individually on G. mellonella larvae at four diet levels during successive periods following emergence.

Diet level	Consumed	Mean energy in calories Of growth	Of respiration and egestion[2]	% consumed as growth
		For 5th to 35th day		
1	395.0	6.9	388.1	1.75
2	626.7	5.5	621.2	0.88
3	753.7	16.6	737.1	2.20
4	711.1	9.4	701.7	1.32
		For 36th to 75th day		
1	525.0	0	525.0	0
2	612.9	.6	612.3	.1
3	551.7	0	551.7	0
4	486.9	0	486.0	0

[1] Mean of four males per diet level per period.

[2] Energy consumed - Energy of growth.

TABLE 27

Mean[1] energy budget for adult female P. *maculiventris* reared individually on G. *mellonella* larvae at four diet levels during successive periods following emergence.

Diet level	Consumed	Of growth	Of respiration and egestion[2]	% consumed as growth
	Mean energy in calories			
	For 5th to 35th day			
1	402.3	54.7	176.9	13.60
2	634.2	53.9	344.0	8.50
3	1060.3	54.1	595.9	5.10
4	1063.8	95.9	485.5	9.01
	For 36th to 55th day			
1	200.7	0	102.0	0
2	283.7	0	170.7	0
3	396.8	2.9	190.9	.73
4	323.6	0	195.9	0

1 Mean of four females per diet level per period.

2 Energy consumed - Energy of growth.

budget for this period is not balanced.

During the second period (36th to 55th day) values obtained for total energy consumption, and energy loss due to respiration + egestion, were similar to values obtained during the first period. Energy utilized for growth was zero (except at diet level three) and the growth efficiency was correspondingly zero (Table 27). Because of energy utilized for egg production the energy budget during this second period was also not balanced.

The major portion of assimilated energy in adult females was used for egg production. The efficiency of reproduction (gross efficiency of the production of eggs) above ranged from 37.26 to 45.35 per cent for the period fifth to 35th day and from 39.83 to 49.18 per cent for the period 36th to 55th day and in neither period showed a relationship with diet levels (Table 28).

In this study, the gross efficiency of growth for individual second- and third-instar nymphs of P. maculiventris was high (Table 24) compared to published data on developing stages of other species. Ivlev (1939) determined the maximum growth efficiency (gross) to be 31.6 per cent in young Tubifex and Odum (1957) and Brody (1945) to be 44 per cent for herbivores at Silver Springs and 35 per cent for growing cattle, respectively. The writer believes that the high values reported here for individual P. maculiventris nymphs are accurate since they are based on a large number of estimates. When gross efficiency values (Table 25) for all P. maculiventris nymphal stages were combined, these values ranged from 37.61 to 54.70 per cent and were of the same order as reported by other authors.

TABLE 28

Mean[1] efficiency of reproduction for adult female P. maculiventris reared individually on G. mellonella larvae at four diet levels during successive periods following emergence.

	Mean energy in calories				
Diet level	Eggs produced	Consumed	Of eggs	% consumed as eggs	% consumed as growth and eggs[2]
			For period 5th to 35th day		
1	113.8	402.3	170.7	42.43	56.03
2	157.5	634.2	236.3	37.26	45.76
3	273.5	1060.3	410.3	38.70	43.80
4	301.5	1063.8	482.4	45.35	54.36
			For period 36th to 55th day		
1	65.8	200.7	98.7	49.18	49.18
2	75.3	283.7	113.0	39.83	39.83
3	135.3	396.8	203.0	51.16	51.89
4	79.8	323.6	127.7	39.46	39.46

1 Mean of four females per diet level per period.

2 % energy consumed as growth (Table 27) + % energy consumed as eggs.

VII. CLAIMS TO ORIGINAL RESEARCH

The author wishes to claim that the quantitative results herein reported on the rearing, functional response, feeding biology and energetics of P. *maculiventris* fed G. *mellonella* larvae constitute an original contribution to science.

VIII. TIME SPENT ON EXPERIMENTS AND ON ANALYSES OF DATA

To collect and analyse quantitative data on *P. maculiventris* of the type herein reported, the effort involved is painstaking, must be consistent and without long breaks. In the course of the present study 9470 hours were spent accumulating and analysing the information presented in this thesis, i.e., 8520 hours by the writer and 950 hours by assistants who helped in the rearing and handling of predator and prey. This time represents the equivalent of four persons working a normal forty-hour week during one year and a quarter.

IX. SUMMARY AND CONCLUSIONS

A field-collected Quebec strain of the predator *Podisus maculiventris* (Say) taken off apple was reared at Macdonald College at constant temperatures and relative humidities for twenty generations each consisting of the egg stage, five nymphal stages and the adult. The first two generations were reared on both ugly nest caterpillars, *Archips cerasivordnus* (Fitch), and wax moth larvae, *Galleria mellonella* (L.); the remaining generations on wax moth larvae alone.

Under field conditions three generations of the predator may be completed each year during the period May-June to September with some overlapping of the generations. Adults of the third generation hibernate in October under the bark or undercover of debris, etc.

In the laboratory, adults mated when two to four days old and the preoviposition period that followed lasted from three to 10 days. Female adults lived on the average 125.3 days; males 179.8 days. Eggs were laid singly or in groups of 22 to 71, and averaged 362.7 per female for the first six generations. The maximum number of eggs laid by a single adult female was 1220. Incubation of eggs lasted from four to seven days and 94 per cent of the eggs hatched successfully. Nymphal instars one to four each lasted from four to seven days and instar five, eight to 11 days. The entire nymphal period lasted from 25 to 31 days. First-instar nymphs did not feed and animal food was required only from the second instar onwards.

Under normal conditions of food supply the sex ratio of adults was 50:50 but a higher proportion of males was obtained when food was scarce.

When different sized G. mellonella larvae (prey) were fed to nymphs and adults of P. maculiventris in simple confined universes, the rate of attack by the predator was higher at the smaller than at the larger prey sizes. This indicates that the hunger stress of the predators, particularly the older instars and adults, was more intense when they fed on smaller prey. As prey size increased the rate of attack decreased, i.e., the predator being satiated at each feeding abstained for a longer period between each attack. During this period the hunger stress built up once more.

For adult males and females, the rate of attack was inversely proportional to predator age at all diet levels (prey sizes) except at the first diet level where age had no significant influence.

To predict the functional response of P. maculiventris at different prey sizes of G. mellonella larvae Holling's (1959) "disc" equation was applied to "prey density" values. Calculations showed that accurate predictions on the basis of the equation could be made at the two lowest "prey densities" but not at the two highest densities where predator searching time was zero.

Studies on the feeding biology of the predator revealed that second- to fifth-instar nymphs and adults of P. maculiventris reared on different sizes of live G. mellonella larvae captured prey, consumed food and grew at rates varying with the amounts of food supplied. Survival of second-, third- and fourth-instar nymphs was higher at low food supply and lower at high food supply. Increased mortality at high food levels may in part be attributed to injury incurred by the predator while subduing the prey. Mortality in the fifth-instar was high at low food supply since the amount of food given in this stage was clearly inadequate for successful growth. In all the immature stages the daily food consumption increased as food supply increased and the rate of food consumption was always higher at the beginning of the feeding period.

A straight line relationship was obtained between the quantity of food consumed per day and daily growth for different feeding nymphs of P. maculiventris. Growth of unfed nymphs was, however, observed to take place up to the third instar. Unfed nymphs always died before completing the third instar.

A straight line relationship was obtained between quantity of food consumed per day and daily development for different feeding nymphs of the predator. As daily growth increased the number of days during which growth took place diminished. Where the quantity of food given per day was less, the number of days spent in each nymphal stage increased and the size of the nymphs at the end of the stage decreased. This phenomenon was particularly true for instars four and five reared at the lowest diet level.

Total food consumption for instars two to five was virtually constant at diet levels one and two, but increased for this period at diet levels three and four. Consequently predator-size at diet levels one and two was smaller and at diet levels three and four larger.

In both males and females the rate of food consumption increased with increased food supply during the first 10 and 35 days respectively, but decreased thereafter with age. There was no decrease in the rate of food consumption with age at the lowest diet level. The longevity of both sexes was maximum at the first diet level and appeared to be due to low food consumption.

The number of eggs laid per female was directly proportional to food consumption up to 35 days but thereafter decreased with age. The mean weight of fertilized and unfertilized eggs between diet levels did not differ significantly.

For individual P. maculiventris instars two to five and adults, the consumption quotient (index of metabolic activity; Van der Drift, 1951) increased as the rate of food consumption increased. Conversely, the consumption quotient decreased with age at each of the four diet levels for nymphs, and at each of diet levels two to four for males and females. For adults of both sexes, the consumption quotient remained constant at diet level one.

Regression and correlation analyses revealed that in general for adult males and females (exception in males at the third diet level), at diet levels two to four, the relationship between age versus food intake and food intake versus body weight was inverse, and the relationship between age and body weight was direct.

Based on bomb calorimeter determinations the calorific values of the four different sized G. mellonella larvae fed to the predator (nymphs and adults) increased as the larval size increased.

Calorific values for P. maculiventris nymphal instars four and five, and adult males and females increased with increased energy supply. Energy supplied at all diet levels to P. maculiventris instars two and three was adequate for growth and development but at instars four and five insufficient at diet levels one and two but adequate at diet levels three and four.

Increases in energy consumption of both nymphs and adults resulted in increases in energy losses due to respiration + egestion. In unfed males and females calorific values decreased with age, i.e., as initial body energy reserves were used up.

There were no significant differences in mean calorific values for fertilized and unfertilized eggs produced by females at different diet levels. This suggests that the amount of energy utilized by females in the production of eggs is fairly constant irrespective of the amount of energy consumed.

Energy budgets formed for individual second- to fifth-instar nymphs of P. maculiventris, and for the nymphal period instars two to five, showed that gross efficiency of growth for second- and third-instar nymphs was inversely proportional to energy consumed while no such relationship was observed for fourth and fifth instars. Energy budgets for males showed that at all diet levels little growth took place during adult life, with gross efficiency at diet levels one to four ranging from 0.88 to 2.20 per cent. For females, there was some growth at all diet levels during the first 35 days of adult life due mainly to the production of eggs. Gross efficiency during this period ranged from 5.5 to 13.6 per cent.

Reproduction efficiency at diet levels one to four during the first 35 days ranged from 43.80 to 56.03 per cent and during the next 20 days from 39.46 to 51.89 per cent.

It can be concluded from the results obtained in this study that *P. maculiventris* can survive and mature satisfactorily, during extended periods, on small prey but needs large prey to accelerate development, increase its growth, maintain a high reproductive potential.

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PLATE I

PLATE I

A. Linear arrangement of newly-laid P. *maculiventris* eggs (X48).

B. Mature P. *maculiventris* eggs showing red eye spots (X48).

C. Enlarged (X100) view of hatched P. *maculiventris* eggs showing micropylar processes around opercular lid and T-shaped egg burster between lid and rim of egg cup.

D. Clustering of newly-emerged first-instar P. *maculiventris* nymphs (X24) on empty egg mass.

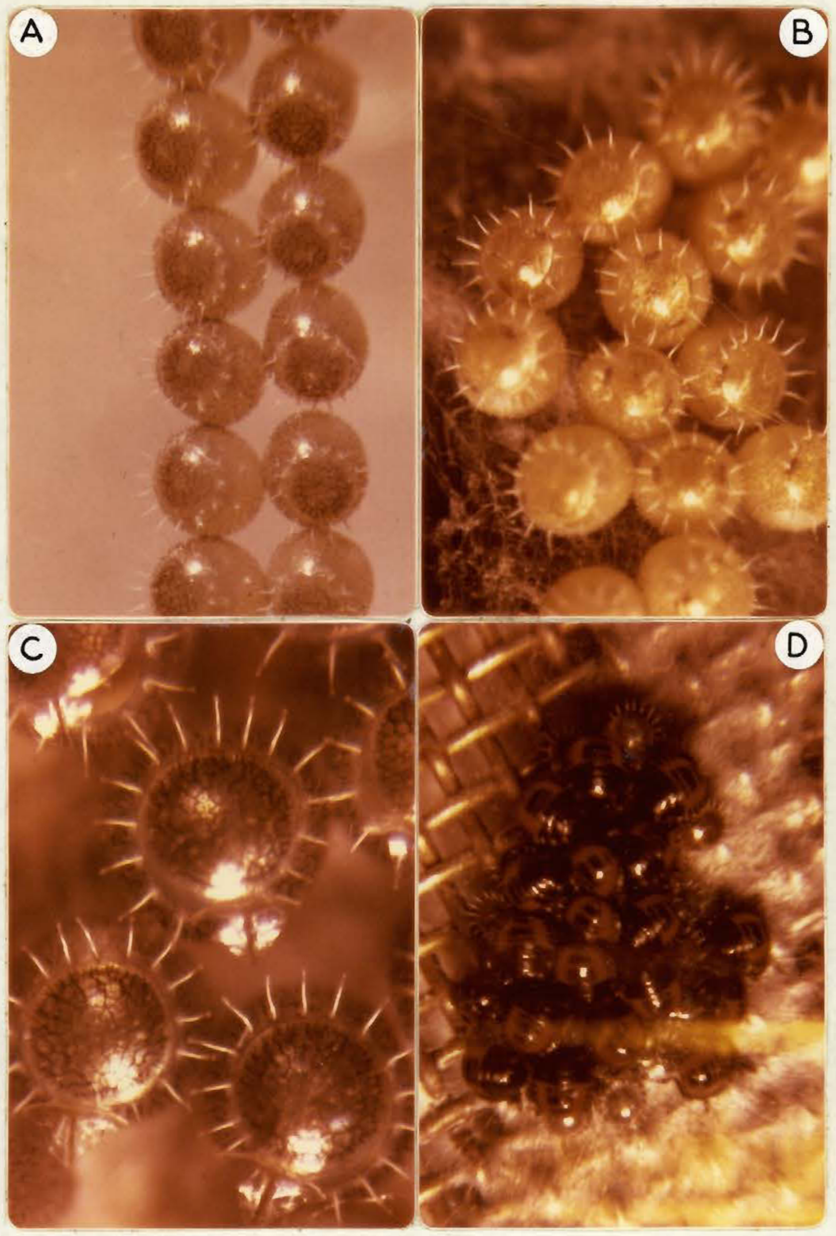

A
B
C
D

PLATE II

PLATE II A. Clustering of mature first-instar P. maculiventris nymphs (X24) on wet cotton plug.

B. Enlarged (X48) view of same.

C. Enlarged (X48) dorsal view of mature second-instar P. maculiventris nymph.

D. Enlarged (X24) dorsal view of mature third-instar P. maculiventris nymph.

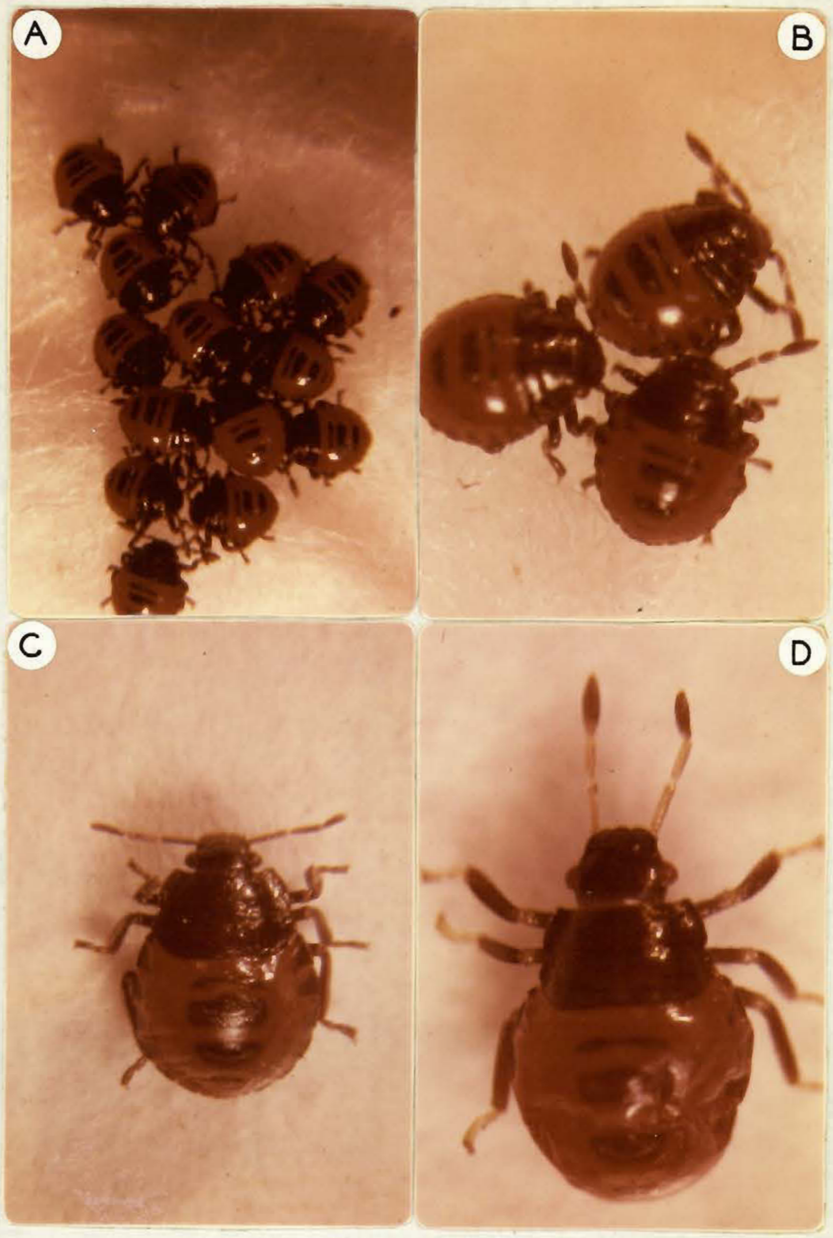

A
B
C
D

PLATE III A. Enlarged (X24) dorsal view of mature fourth-instar _P_. _maculiventris_ nymph.

B. View of jars and cabinet used in the rearing of _P_. _maculiventris_.

C. Enlarged (X12) dorsal view of mature fifth-instar _P_. _maculiventris_ nymph.

D. Enlarged (X10) dorsal view of adult female _P_. _maculiventris_.


A
B
C
D

PLATE IV

PLATE IV A, B and C. Enlarged (X24) dorsal view mature fifth-instar *P. maculiventris* nymph showing variations in colour patterns observed in this stage.

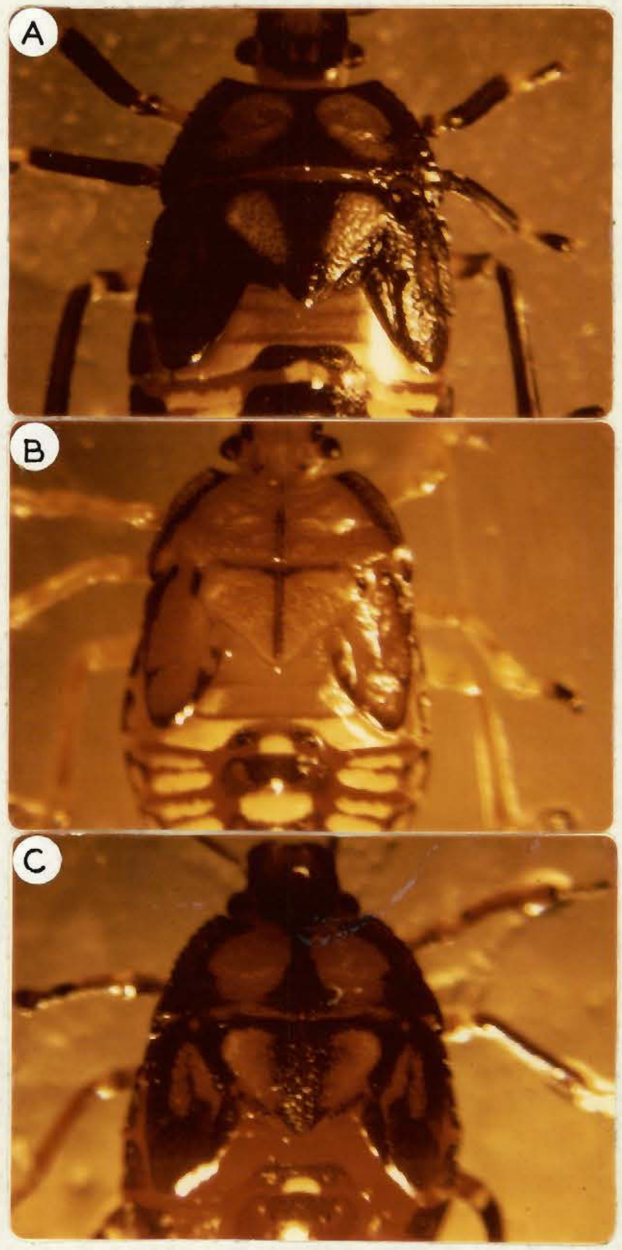

A
B
C

PLATE V

PLATE V

A. Mettler microanalytical balance Model M5.

B. Mettler macroanalytical balance Type H15.

C. Mettler microanalytical balance showing pan in a loading position.

D. Mettler microanalytical balance showing pan in a weighing position.

E. Mettler precision balance Model K7T.

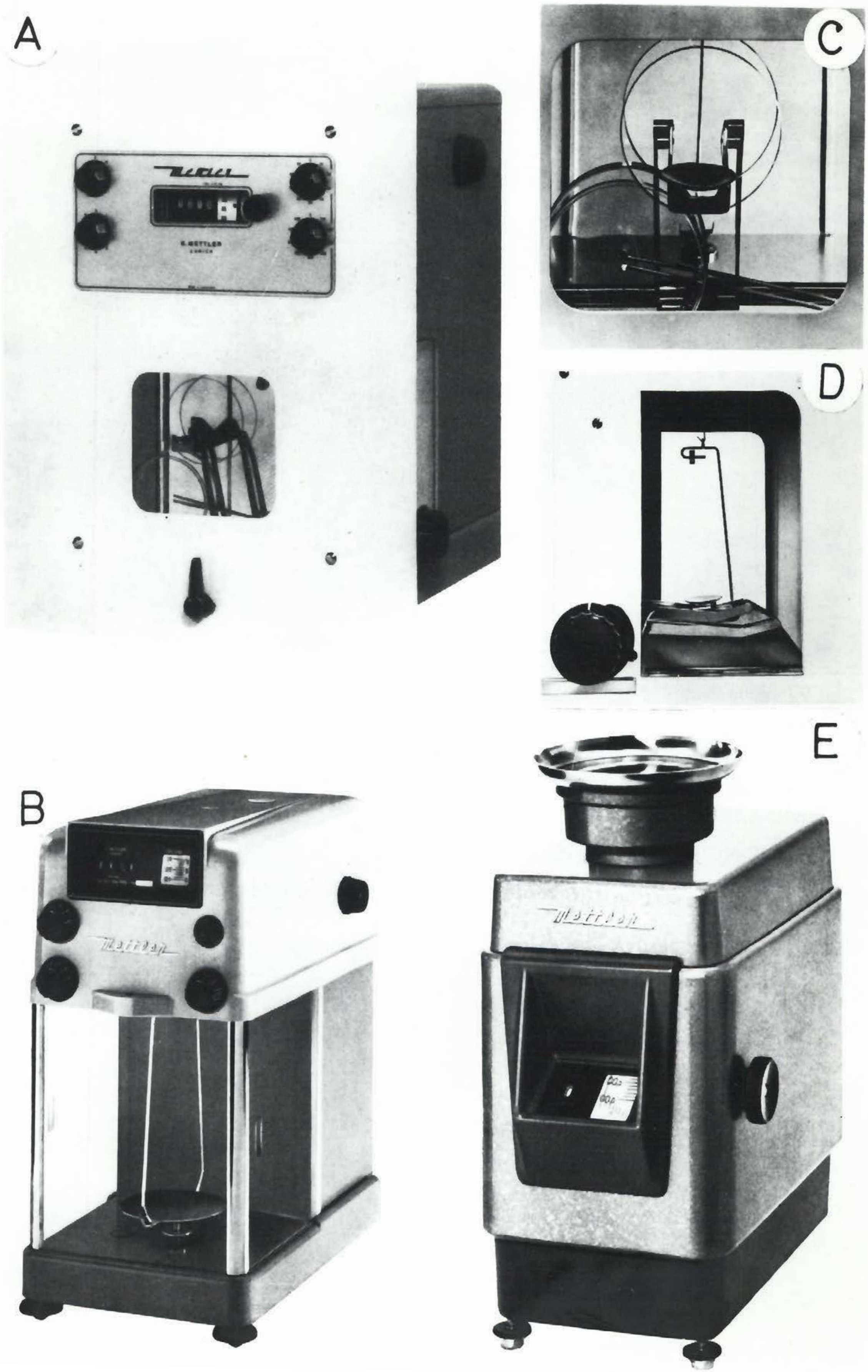

A
C
D
B
E

PLATE VI

PLATE VI A. PARR Semimicro Calorimeter assembly Number 1411 with thermometer.

B. Calorimeter dis-assembled: I. Calorimeter cover on base with thermometer attached; II. Calorimeter can with vacuum flask; III. Calorimeter jacket with stirrer drive motor; IV. Ignition unit; V. Oxygen safety connection with measuring gauges; VI. Left to right - fuse wire; bench socket; bomb support assembly; bomb wrench; combustion bomb; bomb head gaskets with encircling stirrer drive belt; benzoic acid pellets in glass tube.

A

B

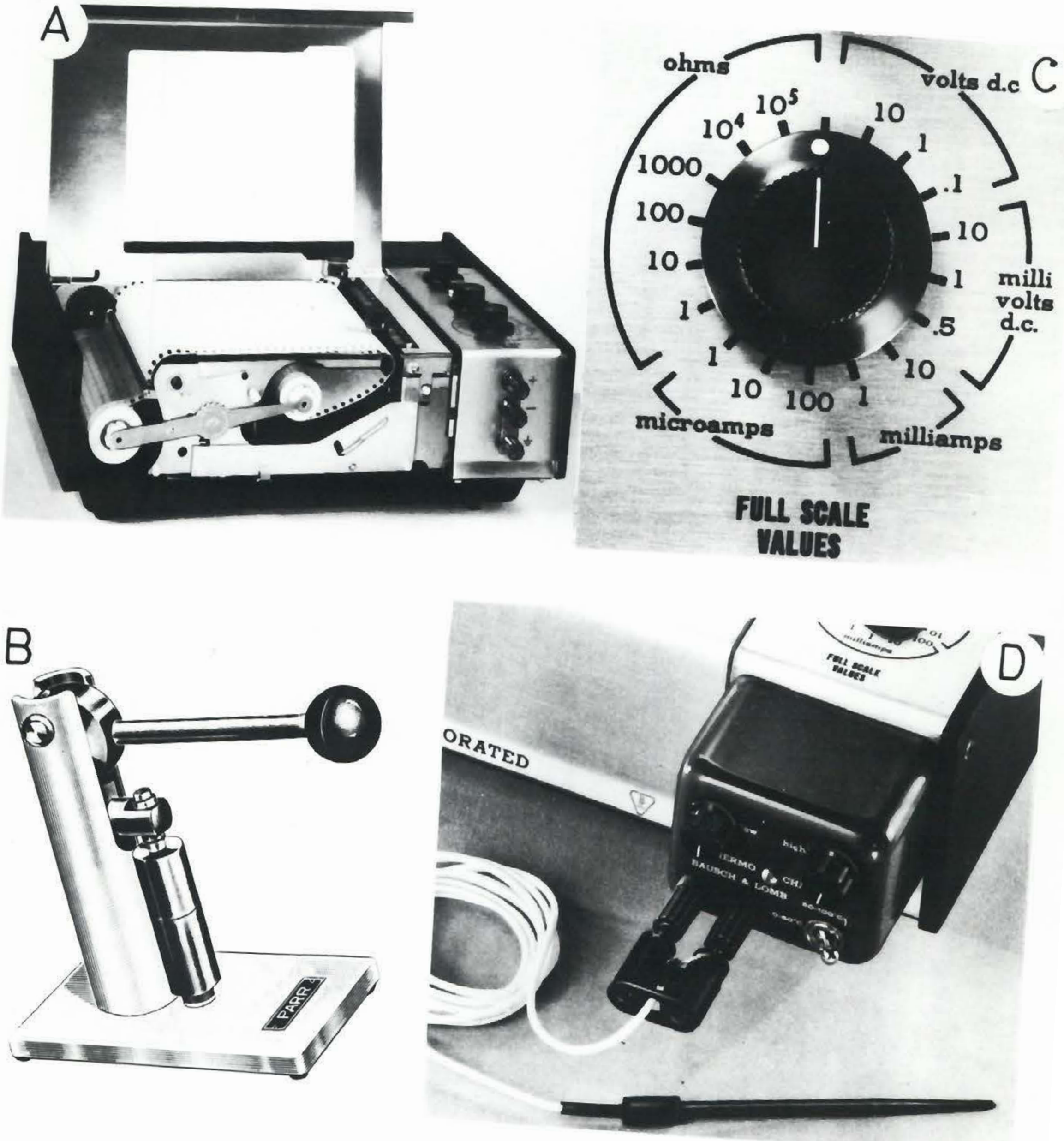
PLATE VII

PLATE VII A. Bausch and Lomb VOM7 Strip Chart Recorder with open lid showing the chart paper.

B. One-eighth ($\frac{1}{8}$) inch diameter PARR Pellet Press.

C. Input dial of VOM7 Strip Chart Recorder showing seventeen different range settings.

D. A part of VOM7 Strip Chart Recorder showing thermo chart, connecting wire and thermistor probe (bottom of photo).


A
ohms
volts d.c
C
10^4
10^5
10
1
1000
.1
100
10
10
1
milli
volts
d.c.
1
.5
1
10
10
100
1
microamps
milliamps
FULL SCALE
VALUES
B
PARR
D
ORATED
BAUSCH & LOMB
high

APPENDIX

PART 1

LIVE WEIGHTS FOR PREDATOR AND PREY

TABLE I

Daily live gram weights per replicate (4), and means of replicates, for adults of the predator P. maculiventris and its prey G. mellonella larvae reared at a constant temperature of 80°F and a relative humidity of 70 per cent.

	P. maculiventris			G. mellonella		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
			Diet level 1 - adult males.			
1	.0495	.0517	.0022	.0129	.0129	-
2	.0550	.0607	.0057	.0137	.0011	.0126
3	.0626	.0655	.0029	.0126	.0006	.0120
4	.0525	.0595	.0070	.0160	.0028	.0132
Total	.2196	.2374	.0178	.0552	.0174	.0378
$\bar{x}$	.0549	.0594	.0045	.0138	.0044	.0095
1	.0517	.0594	.0077	.0101	.0019	.0082
2	.0607	.0544	-.0063	.0097	.0010	.0087
3	.0655	.0580	-.0075	.0124	.0009	.0115
4	.0595	.0493	-.0102	.0121	.0121	-
Total	.2374	.2211	-.0163	.0443	.0159	.0284
$\bar{x}$	.0594	.0553	-.0041	.0111	.0040	.0071
1	.0594	.0560	-.0034	.0156	.0037	.0119
2	.0544	.0584	.0040	.0157	.0018	.0139
3	.0580	.0583	.0003	.0137	.0015	.0122
4	.0493	.0526	.0033	.0097	.0011	.0086
Total	.2211	.2253	.0042	.0547	.0081	.0466
$\bar{x}$	.0553	.0563	.0011	.0137	.0020	.0117
1	.0560	.0625	.0065	.0149	.0025	.0124
2	.0584	.0551	-.0033	.0114	.0028	.0086
3	.0583	.0642	.0059	.0097	.0022	.0075
4	.0526	.0550	.0024	.0095	.0020	.0075
Total	.2253	.2368	.0115	.0455	.0095	.0360
$\bar{x}$	.0563	.0592	.0029	.0114	.0024	.0090
1	.0625	.0548	-.0077	.0135	.0020	.0115
2	.0551	.0553	.0002	.0094	.0020	.0074
3	.0642	.0618	-.0024	.0103	.0010	.0093
4	.0550	.0471	-.0079	.0094	.0094	-
Total	.2368	.2190	-.0178	.0426	.0144	.0282
$\bar{x}$	.0592	.0548	-.0045	.0107	.0036	.0071

	Before	After	Gain or loss	Before	After	Loss
1	.0548	.0529	-.0019	.0094	.0094	-
2	.0553	.0577	.0024	.0126	.0035	.0091
3	.0618	.0547	-.0071	.0143	.0021	.0122
4	.0471	.0540	.0069	.0156	.0031	.0125
Total	.2190	.2193	.0003	.0519	.0181	.0338
$\bar{\bar{x}}$	.0548	.0548	-	.0130	.0045	.0085
1	.0529	.0555	.0026	.0137	.0046	.0091
2	.0577	.0543	-.0034	.0106	.0017	.0089
3	.0547	.0604	.0057	.0117	.0015	.0102
4	.0540	.0536	-.0004	.0123	.0035	.0088
Total	.2193	.2238	.0045	.0483	.0113	.0370
$\bar{x}$	.0548	.0560	.0011	.0121	.0028	.0093
1	.0555	.0571	.0016	.0094	.0018	.0076
2	.0543	.0572	.0029	.0154	.0021	.0133
3	.0604	.0675	.0071	.0123	.0036	.0087
4	.0536	.0627	.0091	.0129	.0028	.0101
Total	.2238	.2445	.0207	.0500	.0103	.0397
$\bar{\bar{x}}$	.0560	.0611	.0052	.0125	.0026	.0099
1	.0571	.0603	.0032	.0153	.0054	.0099
2	.0572	.0549	-.0023	.0094	.0022	.0072
3	.0675	.0586	-.0089	.0100	.0028	.0072
4	.0627	.0511	-.0116	.0141	.0039	.0102
Total	.2445	.2249	-.0196	.0488	.0143	.0345
$\bar{\bar{x}}$	.0611	.0562	-.0049	.0122	.0036	.0086
1	.0603	.0540	-.0063	.0158	.0078	.0080
2	.0549	.0618	.0069	.0159	.0056	.0103
3	.0586	.0688	.0102	.0143	.0046	.0097
4	.0511	.0486	-.0025	.0153	.0153	-
Total	.2249	.2332	.0083	.0613	.0333	.0280
$\bar{\bar{x}}$	.0562	.0583	.0021	.0153	.0083	.0070
1	.0540	.0543	.0003	.0152	.0018	.0134
2	.0618	.0620	.0002	.0143	.0078	.0065
3	.0688	.0713	.0025	.0147	.0083	.0064
4	.0486	.0658	.0172	.0152	.0095	.0057
Total	.2332	.2534	.0202	.0594	.0274	.0320
$\bar{x}$	.0583	.0634	.0051	.0149	.0069	.0080
1	.0543	.0543	-	.0157	.0099	.0058
2	.0620	.0610	-.0010	.0151	.0082	.0069
3	.0713	.0661	-.0052	.0147	.0081	.0066
4	.0658	.0540	-.0118	.0158	.0158	-
Total	.2534	.2354	-.0180	.0613	.0420	.0193
$\bar{\bar{x}}$	.0634	.0589	-.0045	.0153	.0105	.0048
1	.0543	.0521	-.0022	.0094	.0094	-
2	.0610	.0609	-.0001	.0104	.0020	.0084
3	.0661	.0683	.0022	.0129	.0035	.0094
4	.0540	.0588	.0048	.0119	.0053	.0066
Total	.2354	.2401	.0047	.0446	.0202	.0244
$\bar{x}$	.0589	.0600	.0012	.0112	.0051	.0061

	Before	After	Gain or loss	Before	After	Loss
1	.0521	.0564	.0043	.0147	.0010	.0137
2	.0609	.0537	-.0072	.0126	.0020	.0106
3	.0683	.0613	-.0070	.0164	.0013	.0151
4	.0588	.0560	-.0028	.0154	.0036	.0118
Total	.2401	.2274	-.0127	.0591	.0079	.0512
$\bar{x}$	.0600	.0569	.0032	.0148	.0020	.0128
1	.0564	.0551	-.0013	.0166	.0021	.0145
2	.0537	.0544	.0007	.0112	.0015	.0097
3	.0613	.0611	-.0002	.0170	.0018	.0152
4	.0560	.0514	-.0046	.0110	.0043	.0067
Total	.2274	.2220	-.0054	.0558	.0097	.0461
$\bar{x}$	.0569	.0555	-.0014	.0140	.0024	.0115
1	.0551	.0533	-.0018	.0095	.0012	.0083
2	.0544	.0548	.0004	.0118	.0016	.0102
3	.0611	.0609	-.0002	.0118	.0043	.0075
4	.0514	.0563	.0049	.0105	.0011	.0094
Total	.2220	.2253	.0086	.0436	.0082	.0354
$\bar{x}$	.0555	.0563	.0022	.0109	.0021	.0089
1	.0533	.0555	.0022	.0106	.0010	.0096
2	.0548	.0564	.0016	.0137	.0018	.0119
3	.0609	.0592	-.0017	.0084	.0004	.0080
4	.0563	.0590	.0027	.0160	.0026	.0134
Total	.2253	.2301	.0048	.0487	.0058	.0429
$\bar{x}$	.0563	.0575	.0012	.0122	.0015	.0107
1	.0555	.0548	-.0007	.0137	.0013	.0124
2	.0564	.0547	-.0027	.0096	.0023	.0073
3	.0592	.0530	-.0062	.0151	.0015	.0136
4	.0590	.0520	-.0070	.0105	.0023	.0082
Total	.2301	.2145	-.0166	.0489	.0074	.0415
$\bar{x}$	.0575	.0536	-.0042	.0122	.0019	.0104
1	.0548	.0473	-.0075	.0107	.0013	.0094
2	.0547	.0607	.0060	.0143	.0044	.0099
3	.0530	.0636	.0106	.0139	.0010	.0129
4	.0520	.0591	.0071	.0158	.0073	.0085
Total	.2145	.2307	.0162	.0547	.0140	.0407
$\bar{x}$	.0536	.0577	.0041	.0137	.0035	.0102
1	.0473	.0585	.0112	.0116	.0010	.0106
2	.0607	.0564	-.0043	.0133	.0028	.0105
3	.0636	.0584	-.0052	.0144	.0012	.0132
4	.0591	.0583	-.0008	.0145	.0025	.0120
Total	.2307	.2316	.0009	.0538	.0075	.0463
$\bar{x}$	.0577	.0579	.0002	.0135	.0019	.0116
1	.0585	.0552	-.0033	.0131	.0013	.0118
2	.0564	.0555	-.0009	.0120	.0024	.0096
3	.0584	.0600	.0016	.0153	.0005	.0148
4	.0583	.0579	-.0004	.0130	.0028	.0102
Total	.2316	.2286	-.0030	.0534	.0070	.0464
$\bar{x}$	.0579	.0572	-.0008	.0134	.0018	.0116

	Before	After	Gain or loss	Before	After	Loss
1	.0552	.0537	-.0015	.0113	.0029	.0084
2	.0555	.0502	-.0053	.0157	.0031	.0126
3	.0600	.0546	-.0054	.0094	.0009	.0085
4	.0579	.0687	.0108	.0166	.0025	.0141
Total	.2286	.2272	-.0014	.0530	.0094	.0436
$\bar{x}$	.0572	.0568	-.0004	.0133	.0024	.0109
1	.0537	.0522	-.0015	.0164	.0031	.0133
2	.0502	.0502	-	.0116	.0013	.0103
3	.0546	.0581	.0035	.0156	.0029	.0127
4	.0687	.0667	-.0020	.0160	.0041	.0119
Total	.2272	.2272	-	.0596	.0114	.0482
$\bar{x}$	.0568	.0568	-	.0149	.0029	.0121
1	.0522	.0568	.0046	.0167	.0025	.0142
2	.0502	.0561	.0059	.0155	.0070	.0085
3	.0581	.0595	.0014	.0162	.0013	.0149
4	.0667	.0626	-.0041	.0087	.0009	.0078
Total	.2272	.2350	.0078	.0571	.0117	.0454
$\bar{x}$	.0568	.0588	.0020	.0143	.0029	.0114
1	.0568	.0564	-.0004	.0149	.0009	.0140
2	.0561	.0534	-.0027	.0155	.0025	.0130
3	.0595	.0571	-.0024	.0159	.0017	.0142
4	.0626	.0647	.0021	.0157	.0042	.0115
Total	.2350	.2316	-.0034	.0620	.0093	.0527
$\bar{x}$	.0588	.0579	-.0009	.0155	.0023	.0132
1	.0564	.0518	-.0046	.0161	.0007	.0154
2	.0534	.0525	-.0009	.0095	.0009	.0086
3	.0571	.0542	-.0029	.0094	.0005	.0089
4	.0647	.0580	-.0067	.0094	.0005	.0089
Total	.2316	.2165	-.0151	.0444	.0026	.0418
$\bar{x}$	.0579	.0541	-.0038	.0111	.0007	.0105
1	.0518	.0519	.0001	.0099	.0099	-
2	.0525	.0490	-.0035	.0095	.0028	.0067
3	.0542	.0574	.0032	.0103	.0014	.0089
4	.0580	.0616	.0036	.0102	.0013	.0089
Total	.2165	.2199	.0034	.0399	.0154	.0245
$\bar{x}$	.0541	.0550	.0009	.0100	.0039	.0061
1	.0519	.0458	-.0061	.0117	.0007	.0110
2	.0490	.0513	.0023	.0119	.0009	.0110
3	.0574	.0506	-.0068	.0098	.0013	.0085
4	.0616	.0575	-.0041	.0099	.0015	.0084
Total	.2199	.2052	-.0147	.0433	.0044	.0389
$\bar{x}$	.0550	.0513	-.0037	.0108	.0011	.0097
1	.0458	.0540	.0082	.0117	.0010	.0107
2	.0513	.0574	.0061	.0122	.0023	.0099
3	.0506	.0475	-.0031	.0115	.0016	.0099
4	.0575	.0601	.0026	.0112	.0009	.0103
Total	.2052	.2190	.0138	.0466	.0058	.0408
$\bar{x}$	.0513	.0548	.0035	.0117	.0015	.0102

	Before	After	Gain or loss	Before	After	Loss
1	.0540	.0600	.0060	.0160	.0007	.0153
2	.0574	.0623	.0049	.0094	.0005	.0089
3	.0475	.0585	.0110	.0097	.0010	.0087
4	.0601	.0653	.0052	.0162	.0011	.0151
Total	.2190	.2461	.0271	.0513	.0033	.0480
$\bar{x}$	.0548	.0615	.0068	.0128	.0008	.0120
1	.0600	.0528	-.0072	.0121	.0015	.0106
2	.0623	.0538	-.0085	.0118	.0011	.0107
3	.0585	.0591	.0006	.0098	.0039	.0059
4	.0653	.0574	-.0079	.0114	.0040	.0074
Total	.2461	.2231	-.0230	.0451	.0105	.0346
$\bar{x}$	.0615	.0558	-.0058	.0113	.0026	.0087
1	.0528	.0626	.0098	.0116	.0036	.0080
2	.0538	.0583	.0045	.0144	.0019	.0125
3	.0591	.0691	.0100	.0153	.0024	.0129
4	.0574	.0578	.0004	.0146	.0010	.0136
Total	.2231	.2478	.0247	.0559	.0089	.0470
$\bar{x}$	.0558	.0619	.0062	.0140	.0022	.0118
1	.0626	.0555	-.0071	.0100	.0010	.0090
2	.0583	.0548	-.0035	.0128	.0021	.0107
3	.0691	.0659	-.0032	.0127	.0010	.0117
4	.0578	.0638	.0060	.0130	.0028	.0102
Total	.2478	.2400	-.0078	.0485	.0069	.0416
$\bar{x}$	.0619	.0600	-.0020	.0121	.0017	.0104
1	.0555	.0509	-.0046	.0160	.0160	-
2	.0548	.0578	.0030	.0164	.0035	.0129
3	.0659	.0700	.0041	.0152	.0019	.0133
4	.0638	.0658	.0020	.0146	.0023	.0123
Total	.2400	.2445	.0045	.0622	.0237	.0385
$\bar{x}$	.0600	.0611	.0011	.0156	.0059	.0096
1	.0509	.0570	.0061	.0147	.0016	.0131
2	.0578	.0569	-.0009	.0155	.0021	.0134
3	.0700	.0667	-.0033	.0155	.0010	.0145
4	.0658	.0640	-.0018	.0146	.0012	.0134
Total	.2445	.2446	.0001	.0603	.0059	.0544
$\bar{x}$	.0611	.0612	.0001	.0151	.0015	.0136
1	.0570	.0616	.0046	.0149	.0018	.0131
2	.0569	.0581	.0012	.0160	.0035	.0125
3	.0667	.0633	-.0034	.0150	.0011	.0139
4	.0640	.0662	.0022	.0154	.0014	.0140
Total	.2446	.2492	.0046	.0613	.0078	.0535
$\bar{x}$	.0612	.0623	.0012	.0153	.0020	.0134
1	.0616	.0516	-.0100	.0162	.0162	-
2	.0581	.0508	-.0073	.0107	.0107	-
3	.0633	.0634	.0001	.0164	.0164	-
4	.0662	.0640	-.0022	.0112	.0035	.0077
Total	.2492	.2298	-.0194	.0545	.0468	.0077
$\bar{x}$	.0623	.0575	-.0049	.0136	.0117	.0019

	Before	After	Gain or loss	Before	After	Loss
1	.0516	.0558	.0042	.0157	.0030	.0127
2	.0508	.0508	-	.0145	.0145	-
3	.0634	.0594	-.0040	.0123	.0011	.0112
4	.0640	.0640	-	.0143	.0022	.0121
Total	.2298	.2300	.0002	.0568	.0208	.0360
$\bar{x}$	.0575	.0575	-	.0142	.0052	.0090
1	.0558	.0425	-.0133	.0130	.0022	.0108
2	.0508	.0445	-.0063	.0131	.0039	.0092
3	.0594	.0673	.0079	.0155	.0012	.0143
4	.0640	.0611	-.0029	.0143	.0019	.0124
Total	.2300	.2154	.0146	.0559	.0092	.0467
$\bar{x}$	.0575	.0539	.0037	.0140	.0023	.0117
1	.0425	.0583	.0158	.0132	.0010	.0122
2	.0445	.0528	.0083	.0114	.0048	.0066
3	.0673	.0650	-.0023	.0107	.0011	.0096
4	.0611	.0616	.0005	.0137	.0015	.0122
Total	.2154	.2377	.0223	.0490	.0084	.0406
$\bar{x}$	.0539	.0594	.0558	.0123	.0021	.0102
1	.0583	.0500	-.0083	.0124	.0124	-
2	.0528	.0526	-.0002	.0131	.0131	-
3	.0650	.0592	-.0058	.0139	.0139	-
4	.0616	.0627	.0011	.0139	.0007	.0132
Total	.2377	.2245	-.0132	.0533	.0401	.0132
$\bar{x}$	.0594	.0561	-.0033	.0133	.0100	.0033
1	.0500	.0577	.0077	.0148	.0013	.0135
2	.0526	.0535	.0009	.0155	.0028	.0127
3	.0592	.0676	.0084	.0162	.0018	.0144
4	.0627	.0632	.0005	.0146	.0009	.0137
Total	.2245	.2420	.0175	.0611	.0068	.0543
$\bar{x}$	.0561	.0605	.0044	.0153	.0017	.0136
1	.0577	.0599	.0022	.0142	.0021	.0121
2	.0535	.0563	.0028	.0143	.0031	.0112
3	.0676	.0674	-.0002	.0136	.0027	.0109
4	.0632	.0585	-.0047	.0140	.0007	.0133
Total	.2420	.2421	.0001	.0561	.0086	.0475
$\bar{x}$	.0605	.0605	-	.0140	.0022	.0119
1	.0599	.0566	-.0033	.0094	.0006	.0088
2	.0563	.0529	-.0034	.0162	.0162	-
3	.0674	.0607	-.0067	.0094	.0094	-
4	.0585	.0609	.0024	.0107	.0010	.0097
Total	.2421	.2311	-.0110	.0457	.0272	.0185
$\bar{x}$	.0605	.0578	-.0028	.0114	.0068	.0046
1	.0566	.0580	.0014	.0163	.0009	.0154
2	.0529	.0548	.0019	.0104	.0012	.0092
3	.0607	.0634	.0027	.0094	.0008	.0086
4	.0609	.0564	-.0045	.0138	.0021	.0117
Total	.2311	.2326	.0015	.0499	.0050	.0449
$\bar{x}$	.0578	.0582	.0004	.0125	.0013	.0112

	Before	After	Gain or loss	Before	After	Loss
1	.0580	.0536	-.0044	.0098	.0008	.0090
2	.0548	.0546	-.0002	.0164	.0007	.0157
3	.0634	.0683	.0049	.0144	.0038	.0106
4	.0564	.0549	-.0015	.0108	.0005	.0103
Total	.2326	.2314	-.0012	.0514	.0058	.0456
$\bar{x}$	.0582	.0579	-.0003	.0129	.0015	.0114
1	.0536	.0594	.0058	.0157	.0016	.0141
2	.0546	.0554	.0008	.0148	.0034	.0114
3	.0683	.0644	-.0039	.0158	.0019	.0139
4	.0549	.0580	.0031	.0158	.0016	.0142
Total	.2314	.2372	.0058	.0621	.0085	.0536
$\bar{x}$	.0579	.0593	.0015	.0155	.0021	.0134
1	.0594	.0583	-.0011	.0147	.0018	.0129
2	.0554	.0542	-.0012	.0146	.0013	.0133
3	.0644	.0675	.0031	.0160	.0046	.0114
4	.0580	.0543	-.0037	.0147	.0011	.0136
Total	.2372	.2343	-.0029	.0600	.0088	.0512
$\bar{x}$	.0593	.0586	-.0007	.0150	.0022	.0128
1	.0583	.0610	.0027	.0116	.0013	.0103
2	.0542	.0481	-.0061	.0136	.0136	-
3	.0675	.0607	-.0068	.0129	.0129	-
4	.0543	.0577	.0034	.0157	.0019	.0138
Total	.2343	.2275	-.0068	.0538	.0297	.0241
$\bar{x}$	.0586	.0569	-.0017	.0135	.0074	.0060
1	.0610	.0580	-.0030	.0156	.0007	.0149
2	.0481	.0542	.0061	.0153	.0090	.0063
3	.0607	.0608	.0001	.0143	.0143	-
4	.0577	.0577	-	.0151	.0029	.0122
Total	.2275	.2307	.0032	.0603	.0269	.0334
$\bar{x}$	.0569	.0577	.0008	.0151	.0068	.0084
1	.0580	.0517	-.0063	.0150	.0042	.0108
2	.0542	.0460	-.0082	.0145	.0023	.0122
3	.0608	.0606	-.0002	.0152	.0066	.0086
4	.0577	.0544	-.0033	.0147	.0017	.0130
Total	.2307	.2127	-.0180	.0594	.0148	.0446
$\bar{x}$	.0577	.0532	-.0045	.0149	.0037	.0112
1	.0517	.0569	.0052	.0149	.0022	.0127
2	.0460	.0476	.0016	.0164	.0025	.0139
3	.0606	.0638	.0032	.0126	.0037	.0089
4	.0544	.0551	.0007	.0134	.0009	.0125
Total	.2127	.2234	.0107	.0573	.0093	.0480
$\bar{x}$	.0532	.0559	.0027	.0143	.0023	.0120
1	.0569	.0587	.0018	.0155	.0020	.0135
2	.0476	.0437	-.0039	.0117	.0011	.0106
3	.0638	.0631	-.0007	.0122	.0027	.0095
4	.0551	.0546	-.0005	.0139	.0025	.0114
Total	.2234	.2201	-.0033	.0533	.0083	.0450
$\bar{x}$	.0559	.0550	-.0008	.0133	.0021	.0113

	Before	After	Gain or loss	Before	After	Loss
1	.0587	.0605	.0018	.0127	.0014	.0113
2	.0437	.0570	.0133	.0145	.0010	.0135
3	.0631	.0708	.0077	.0137	.0029	.0108
4	.0546	.0572	.0026	.0140	.0017	.0123
Total	.2201	.2455	.0254	.0549	.0070	.0479
$\bar{x}$	.0550	.0614	.0064	.0137	.0018	.0120
1	.0605	.0613	.0008	.0161	.0032	.0129
2	.0570	.0492	-.0078	.0135	.0135	-
3	.0708	.0595	-.0113	.0145	.0145	-
4	.0572	.0560	-.0012	.0094	.0014	.0080
Total	.2455	.2260	-.0195	.0535	.0326	.0209
$\bar{x}$	.0614	.0565	-.0049	.0134	.0082	.0052
1	.0613	.0601	-.0012	.0151	.0014	.0137
2	.0492	.0539	.0047	.0164	.0014	.0150
3	.0595	.0562	-.0033	.0153	.0153	-
4	.0560	.0557	-.0003	.0158	.0014	.0144
Total	.2260	.2259	-.0001	.0626	.0195	.0431
$\bar{x}$	.0565	.0565	-	.0157	.0049	.0108
1	.0601	.0615	.0014	.0148	.0048	.0100
2	.0539	.0573	.0034	.0123	.0013	.0110
3	.0562	.0584	.0022	.0158	.0158	-
4	.0557	.0607	.0050	.0127	.0022	.0105
Total	.2259	.2379	.0120	.0556	.0241	.0315
$\bar{x}$	.0565	.0594	.0030	.0139	.0060	.0079
1	.0615	.0582	-.0033	.0142	.0019	.0123
2	.0573	.0586	.0013	.0148	.0014	.0134
3	.0584	.0595	.0011	.0140	.0140	-
4	.0607	.0575	-.0032	.0162	.0022	.0140
Total	.2379	.2338	-.0041	.0592	.0195	.0397
$\bar{x}$	.0594	.0585	-.0010	.0148	.0049	.0099
1	.0582	.0603	.0021	.0104	.0007	.0097
2	.0586	.0461	-.0125	.0164	.0047	.0117
3	.0595	.0555	-.0040	.0152	.0009	.0143
4	.0575	.0561	-.0014	.0102	.0013	.0089
Total	.2338	.2180	-.0158	.0522	.0076	.0446
$\bar{x}$	.0585	.0545	-.0040	.0131	.0019	.0112
1	.0603	.0557	-.0046	.0134	.0017	.0117
2	.0461	.0497	.0036	.0090	.0090	-
3	.0555	.0566	.0011	.0105	.0009	.0096
4	.0561	.0555	-.0006	.0124	.0010	.0114
Total	.2180	.2175	-.0005	.0453	.0126	.0327
$\bar{x}$	.0545	.0544	-.0001	.0113	.0032	.0082
1	.0557	.0611	.0054	.0133	.0014	.0119
2	.0497	.0537	.0040	.0141	.0019	.0122
3	.0566	.0584	.0018	.0106	.0106	-
4	.0555	.0626	.0071	.0110	.0012	.0098
Total	.2175	.2358	.0183	.0490	.0151	.0339
$\bar{x}$	.0544	.0590	.0046	.0123	.0038	.0085

	Before	After	Gain or loss	Before	After	Loss
1	.0611	.0573	-.0038	.0124	.0019	.0105
2	.0537	.0558	.0021	.0140	.0011	.0129
3	.0584	.0583	-.0001	.0126	.0044	.0082
4	.0626	.0623	-.0003	.0169	.0015	.0154
Total	.2358	.2337	-.0021	.0559	.0089	.0470
x̄	.0590	.0584	-.0005	.0140	.0022	.0118
1	.0573	.0489	-.0084	.0158	.0010	.0148
2	.0558	.0516	-.0042	.0155	.0019	.0136
3	.0583	.0569	-.0014	.0132	.0132	-
4	.0623	.0626	.0003	.0164	.0012	.0152
Total	.2337	.2200	-.0137	.0609	.0173	.0436
x̄	.0584	.0550	-.0034	.0152	.0043	.0109
1	.0489	.0561	.0072	.0148	.0027	.0121
2	.0516	.0532	.0016	.0153	.0020	.0133
3	.0569	.0579	.0010	.0153	.0008	.0145
4	.0626	.0590	-.0036	.0147	.0070	.0077
Total	.2200	.2262	.0062	.0601	.0125	.0476
x̄	.0550	.0566	.0016	.0150	.0031	.0119
1	.0561	.0595	.0034	.0164	.0009	.0155
2	.0532	.0422	-.0110	.0113	.0007	.0106
3	.0579	.0646	.0067	.0142	.0012	.0130
4	.0590	.0575	-.0015	.0096	.0013	.0083
Total	.2262	.2238	-.0024	.0515	.0041	.0474
x̄	.0566	.0560	-.0006	.0129	.0010	.0119
1	.0595	.0589	-.0006	.0155	.0020	.0135
2	.0422	.0499	.0077	.0107	.0005	.0102
3	.0646	.0658	.0012	.0116	.0025	.0091
4	.0575	.0671	.0096	.0120	.0004	.0116
Total	.2238	.2417	.0179	.0498	.0054	.0444
x̄	.0560	.0604	.0045	.0125	.0014	.0111
1	.0589	.0627	.0038	.0156	.0013	.0143
2	.0499	.0550	.0051	.0164	.0031	.0133
3	.0658	.0597	-.0061	.0164	.0164	-
4	.0671	.0634	-.0037	.0153	.0153	-
Total	.2417	.2408	-.0009	.0637	.0361	.0276
x̄	.0604	.0602	-.0002	.0159	.0090	.0069
1	.0627	.0614	-.0013	.0155	.0035	.0120
2	.0550	.0512	-.0038	.0150	.0150	-
3	.0597	.0575	-.0022	.0129	.0129	-
4	.0634	.0601	-.0033	.0130	.0130	-
Total	.2408	.2302	-.0106	.0564	.0444	.0120
x̄	.0602	.0575	-.0027	.0141	.0111	.0030
1	.0614	.0535	-.0079	.0143	.0029	.0114
2	.0512	.0576	.0064	.0162	.0013	.0149
3	.0575	.0597	.0022	.0138	.0025	.0113
4	.0601	.0605	.0004	.0099	.0099	-
Total	.2302	.2313	.0011	.0542	.0166	.0376
x̄	.0575	.0578	.0003	.0136	.0042	.0094

	Before	After	Gain or loss	Before	After	Loss
1	.0535	.0512	-.0023	.0162	.0162	-
2	.0576	.0605	.0029	.0131	.0029	.0102
3	.0597	.0601	.0004	.0159	.0008	.0151
4	.0605	.0618	.0013	.0134	.0058	.0076
Total	.2313	.2336	.0023	.0586	.0257	.0329
$\bar{x}$	.0578	.0584	.0006	.0147	.0064	.0082
1	.0512	.0525	.0013	.0123	.0010	.0113
2	.0605	.0479	-.0126	.0136	.0013	.0123
3	.0601	.0579	-.0022	.0157	.0011	.0146
4	.0618	.0535	-.0083	.0154	.0154	-
Total	.2336	.2118	-.0218	.0570	.0188	.0382
$\bar{x}$	.0584	.0530	-.0055	.0142	.0047	.0096
1	.0525	.0592	.0067	.0161	.0015	.0146
2	.0479	.0573	.0094	.0162	.0024	.0138
3	.0579	.0618	.0039	.0155	.0020	.0135
4	.0535	.0585	.0050	.0152	.0152	-
Total	.2118	.2368	.0250	.0630	.0211	.0419
$\bar{x}$	.0530	.0592	.0062	.0158	.0053	.0105
1	.0592	.0487	-.0105	.0154	.0020	.0134
2	.0573	.0428	-.0145	.0141	.0021	.0120
3	.0618	.0548	-.0070	.0132	.0030	.0102
4	.0585	.0561	-.0024	.0145	.0033	.0112
Total	.2368	.2024	-.0344	.0572	.0104	.0468
$\bar{x}$	.0592	.0506	-.0086	.0143	.0026	.0117
1	.0487	.0535	.0048	.0150	.0010	.0140
2	.0428	.0499	.0071	.0144	.0144	-
3	.0548	.0574	.0026	.0107	.0005	.0102
4	.0561	.0588	.0027	.0144	.0095	.0049
Total	.2024	.2196	.0172	.0545	.0254	.0291
$\bar{x}$	.0506	.0549	.0043	.0136	.0064	.0073
1	.0535	.0612	.0077	.0161	.0009	.0152
2	.0499	.0537	.0038	.0162	.0009	.0153
3	.0574	.0640	.0066	.0150	.0017	.0133
4	.0588	.0613	.0025	.0155	.0082	.0073
Total	.2196	.2402	.0206	.0628	.0117	.0511
$\bar{x}$	.0549	.0601	.0052	.0157	.0029	.0128
1	.0612	.0485	-.0127	.0136	.0071	.0065
2	.0537	.0546	.0009	.0125	.0029	.0096
3	.0640	.0584	-.0056	.0116	.0028	.0088
4	.0613	.0546	-.0067	.0129	.0078	.0051
Total	.2402	.2161	-.0241	.0506	.0206	.0300
$\bar{x}$	.0601	.0540	-.0060	.0127	.0052	.0075
1	.0485	.0555	.0070	.0106	.0005	.0101
2	.0546	.0337	-.0209	.0117	.0011	.0106
3	.0584	.0591	.0007	.0096	.0019	.0077
4	.0546	.0541	-.0005	.0100	.0030	.0070
Total	.2161	.2024	-.0137	.0419	.0065	.0354
$\bar{x}$	.0540	.0506	-.0034	.0105	.0016	.0088

	Before	After	Gain or loss	Before	After	Loss
1	.0555	.0597	.0042	.0097	.0011	.0086
2	.0337	.0573	.0236	.0112	.0014	.0098
3	.0591	.0611	.0020	.0094	.0005	.0089
4	.0541	.0535	-.0006	.0107	.0047	.0060
Total	.2024	.2316	.0292	.0410	.0077	.0333
$\bar{x}$	.0506	.0579	.0073	.0103	.0019	.0083
1	.0597	.0607	.0010	.0102	.0004	.0098
2	.0573	.0514	-.0059	.0100	.0008	.0092
3	.0611	.0589	-.0022	.0106	.0017	.0089
4	.0535	.0542	.0007	.0118	.0012	.0106
Total	.2316	.2252	-.0064	.0426	.0041	.0385
$\bar{x}$	.0579	.0563	-.0016	.0107	.0010	.0096
1	.0607	.0539	-.0068	.0103	.0010	.0093
2	.0514	.0524	.0010	.0113	.0009	.0104
3	.0589	.0563	-.0026	.0116	.0005	.0111
4	.0542	.0540	-.0002	.0111	.0034	.0077
Total	.2252	.2166	-.0086	.0443	.0058	.0385
$\bar{x}$	.0563	.0542	-.0022	.0111	.0015	.0096
1	.0539	.0571	.0032	.0132	.0017	.0115
2	.0524	.0526	.0002	.0127	.0038	.0089
3	.0563	.0568	.0005	.0135	.0039	.0096
4	.0540	.0557	.0017	.0137	.0025	.0112
Total	.2166	.2222	.0056	.0531	.0119	.0412
$\bar{x}$	.0542	.0556	.0014	.0133	.0030	.0103
1	.0571	.0597	.0026	.0115	.0015	.0100
2	.0526	.0506	-.0020	.0111	.0111	-
3	.0568	.0558	-.0010	.0114	.0036	.0078
4	.0557	.0544	-.0013	.0101	.0023	.0078
Total	.2222	.2205	-.0017	.0441	.0185	.0256
$\bar{x}$	.0556	.0551	-.0004	.0110	.0046	.0064
1	.0597	.0551	-.0046	.0115	.0013	.0102
2	.0506	.0494	-.0012	.0113	.0113	-
3	.0558	.0572	.0014	.0118	.0021	.0097
4	.0544	.0531	-.0013	.0114	.0043	.0071
Total	.2205	.2148	-.0057	.0460	.0190	.0270
$\bar{x}$	.0551	.0537	-.0014	.0115	.0048	.0068
1	.0551	.0577	.0026	.0105	.0005	.0100
2	.0494	.0488	-.0006	.0104	.0104	-
3	.0572	.0586	.0014	.0114	.0005	.0109
4	.0531	.0572	.0041	.0120	.0007	.0113
Total	.2148	.2223	.0075	.0443	.0121	.0322
$\bar{x}$	.0537	.0556	.0019	.0111	.0030	.0081
1	.0577	.0604	.0027	.0118	.0008	.0110
2	.0488	.0456	-.0032	.0119	.0119	-
3	.0586	.0579	-.0007	.0113	.0008	.0105
4	.0572	.0554	-.0018	.0102	.0027	.0075
Total	.2223	.2193	-.0030	.0452	.0162	.0290
$\bar{x}$	.0556	.0548	-.0008	.0113	.0041	.0073

	Before	After	Gain or loss	Before	After	Loss
1	.0604	.0502	-.0102	.0108	.0005	.0103
2	.0456	.0361	-.0095	.0105	.0105	-
3	.0579	.0564	-.0015	.0111	.0007	.0104
4	.0554	.0548	.0006	.0115	.0061	.0054
Total	.2193	.1975	-.0218	.0439	.0178	.0261
$\bar{x}$	.0548	.0494	-.0056	.0110	.0045	.0065
1	.0502	.0457	-.0045	.0115	.0010	.0105
2	Male died - replicate 2 terminated.					
3	.0564	.0557	-.0007	.0103	.0005	.0098
4	.0548	.0523	-.0025	.0107	.0016	.0091
Total	.1614	.1537	-.0077	.0325	.0031	.0294
$\bar{x}$	.0538	.0512	-.0026	.0108	.0010	.0098
1	.0457	.0557	.0100	.0130	.0021	.0109
3	.0557	.0574	.0017	.0115	.0012	.0103
4	.0523	.0549	.0026	.0140	.0017	.0123
Total	.1537	.1680	.0143	.0385	.0050	.0335
$\bar{x}$	.0512	.0560	.0048	.0128	.0017	.0112
1	.0557	.0556	-.0001	.0104	.0015	.0089
3	.0574	.0562	-.0012	.0106	.0106	-
4	.0549	.0589	.0040	.0104	.0018	.0086
Total	.1680	.1707	.0027	.0314	.0139	.0175
$\bar{x}$	.0560	.0569	.0009	.0105	.0046	.0058
1	.0556	.0610	.0054	.0105	.0006	.0099
3	.0562	.0594	.0032	.0106	.0017	.0089
4	.0589	.0511	-.0078	.0110	.0110	-
Total	.1707	.1715	.0008	.0321	.0133	.0188
$\bar{x}$	.0569	.0572	.0003	.0107	.0044	.0063
1	.0610	.0615	.0005	.0103	.0020	.0083
3	.0594	.0600	.0006	.0094	.0005	.0089
4	.0511	.0520	.0009	.0104	.0009	.0095
Total	.1715	.1735	.0020	.0301	.0034	.0267
$\bar{x}$	.0572	.0578	.0007	.0100	.0011	.0089
1	.0615	.0597	-.0018	.0108	.0006	.0102
3	.0600	.0596	-.0004	.0111	.0008	.0103
4	.0520	.0579	.0059	.0114	.0019	.0095
Total	.1735	.1772	.0037	.0333	.0033	.0300
$\bar{x}$	.0578	.0591	.0012	.0111	.0011	.0100
1	.0597	.0568	-.0029	.0111	.0009	.0102
3	.0596	.0546	-.0050	.0095	.0009	.0086
4	.0579	.0611	.0032	.0117	.0009	.0108
Total	.1772	.1725	-.0047	.0323	.0027	.0296
$\bar{x}$	.0591	.0575	-.0016	.0108	.0009	.0099
1	.0568	.0546	-.0022	.0119	.0008	.0111
3	.0546	.0640	.0094	.0117	.0007	.0110
4	.0611	.0556	-.0055	.0118	.0030	.0088
Total	.1725	.1742	.0017	.0354	.0045	.0309
$\bar{x}$	.0575	.0581	.0006	.0118	.0015	.0103

	Before	After	Gain or loss	Before	After	Loss
1	.0546	.0574	.0028	.0101	.0005	.0096
3	.0640	.0482	-.0158	.0108	.0006	.0102
4	.0556	.0590	.0034	.0105	.0019	.0086
Total	.1742	.1646	-.0096	.0314	.0030	.0284
$\bar{x}$	.0581	.0549	-.0032	.0105	.0010	.0095
1	.0574	.0605	.0031	.0116	.0010	.0106
3	.0482	.0619	.0137	.0108	.0006	.0102
4	.0590	.0572	-.0018	.0107	.0009	.0098
Total	.1646	.1796	.0150	.0331	.0025	.0306
$\bar{x}$	.0549	.0599	.0050	.0110	.0008	.0102
1	.0605	.0625	.0020	.0116	.0022	.0094
3	.0619	.0599	-.0020	.0105	.0022	.0083
4	.0572	.0625	.0053	.0100	.0043	.0057
Total	.1796	.1849	.0053	.0321	.0087	.0234
$\bar{x}$	.0599	.0616	.0018	.0107	.0029	.0078
1	.0625	.0595	-.0030	.0107	.0014	.0093
3	.0599	.0531	-.0068	.0106	.0019	.0087
4	.0625	.0602	-.0023	.0107	.0027	.0080
Total	.1849	.1728	-.0121	.0320	.0060	.0260
$\bar{x}$	.0616	.0576	-.0040	.0107	.0020	.0087
1	.0595	.0458	-.0137	.0100	.0006	.0094
3	.0531	.0518	-.0013	.0112	.0021	.0091
4	.0602	.0557	-.0045	.0124	.0070	.0054
Total	.1728	.1533	-.0195	.0336	.0097	.0239
$\bar{x}$	.0576	.0511	-.0065	.0112	.0032	.0080
1	.0458	.0536	.0078	.0110	.0008	.0102
3	.0518	.0638	.0120	.0115	.0115	-
4	.0557	.0532	.0025	.0123	.0010	.0113
Total	.1533	.1706	.0223	.0348	.0133	.0215
$\bar{x}$	.0511	.0569	.0074	.0116	.0044	.0072
1	.0536	.0554	.0018	.0112	.0009	.0103
3	.0638	.0546	-.0092	.0116	.0006	.0110
4	.0532	.0528	-.0004	.0107	.0005	.0102
Total	.1706	.1628	-.0078	.0335	.0020	.0315
$\bar{x}$	.0569	.0543	-.0026	.0112	.0007	.0105
1	.0554	.0556	.0002	.0107	.0019	.0088
3	.0546	.0563	.0017	.0109	.0011	.0098
4	.0528	.0503	-.0025	.0107	.0107	-
Total	.1628	.1622	-.0006	.0323	.0137	.0186
$\bar{x}$	.0543	.0541	-.0002	.0108	.0046	.0062
1	.0556	.0582	.0026	.0112	.0010	.0102
3	.0563	.0600	.0037	.0097	.0097	-
4	.0503	.0541	.0038	.0105	.0105	-
Total	.1622	.1723	.0101	.0314	.0212	.0102
$\bar{x}$	.0541	.0574	.0034	.0105	.0071	.0034

	Before	After	Gain or loss	Before	After	Loss
1	.0582	.0589	.0007	.0100	.0017	.0083
3	.0600	.0661	.0061	.0112	.0017	.0095
4	.0541	.0585	.0044	.0102	.0061	.0041
Total	.1723	.1835	.0112	.0314	.0095	.0219
$\bar{x}$	.0574	.0612	.0037	.0105	.0032	.0073
1	.0589	.0651	.0062	.0109	.0033	.0076
3	.0661	.0523	-.0138	.0107	.0107	-
4	.0585	.0577	-.0008	.0106	.0014	.0092
Total	.1835	.1751	-.0084	.0322	.0154	.0168
$\bar{x}$	.0612	.0583	-.0028	.0107	.0051	.0056
1	.0651	.0646	-.0005	.0104	.0029	.0075
3	.0523	.0589	.0066	.0122	.0122	-
4	.0577	.0586	.0009	.0117	.0061	.0056
Total	.1751	.1821	.0070	.0343	.0212	.0131
$\bar{x}$	.0583	.0607	.0023	.0114	.0071	.0044
1	.0646	.0617	-.0029	.0114	.0114	-
3	.0589	.0461	-.0128	.0108	.0108	-
4	.0586	.0574	-.0012	.0107	.0030	.0077
Total	.1821	.1652	-.0169	.0329	.0252	.0077
$\bar{x}$	.0607	.0551	-.0056	.0110	.0084	.0026
1	.0617	.0527	-.0090	.0119	.0119	-
3	Male died - replicate 3 terminated.					
4	.0574	.0528	-.0046	.0129	.0129	-
Total	.1191	.1055	-.0136	.0248	.0248	-
$\bar{x}$	.0596	.0528	-.0068	.0124	.0124	-
1	Male died - replicate 1 terminated.					
4[1]	.0528	.0537	.0009	.0113	.0019	.0094
4	.0537	.0552	.0015	.0110	.0110	-
4	.0552	.0531	-.0021	.0098	.0008	.0090
4	.0531	.0551	.0020	.0099	.0008	.0091
4	.0551	.0527	-.0024	.0117	.0015	.0102
4	.0527	.0574	.0047	.0112	.0036	.0076
4	.0574	.0505	-.0069	.0112	.0012	.0100
4	.0505	.0556	.0051	.0112	.0074	.0038
4	.0556	.0567	.0011	.0108	.0012	.0096
4	.0567	.0523	-.0044	.0107	.0107	-
4	.0523	.0511	-.0012	.0110	.0025	.0085
4	.0511	.0521	.0010	.0112	.0020	.0092
4	.0521	.0478	-.0043	.0117	.0020	.0097
4	.0478	.0517	.0039	.0115	.0013	.0102
4	.0517	.0532	.0015	.0116	.0006	.0110
4	.0532	.0489	-.0043	.0114	.0015	.0099

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[1] All subsequent daily values for diet level 1 are based on replicate 4 i.e. the value obtained for the sole surviving adult male <u>P. maculiventris</u> in this experiment.

	Before	After	Gain or loss	Before	After	Loss
4	.0489	.0538	.0049	.0116	.0012	.0104
4	.0538	.0449	-.0089	.0107	.0006	.0101
4	.0449	.0416	-.0033	.0111	.0011	.0100
4	.0416	.0569	.0153	.0118	.0007	.0111
4	.0569	.0430	-.0139	.0110	.0006	.0104
4	.0430	.0536	.0106	.0116	.0012	.0104
4	.0536	.0580	.0044	.0111	.0021	.0090
4	.0580	.0480	-.0100	.0107	.0008	.0099
4	.0480	.0534	.0054	.0118	.0012	.0106
4	.0534	.0513	-.0021	.0112	.0010	.0102
4	.0513	.0485	-.0028	.0112	.0112	-
4	.0485	.0567	.0082	.0128	.0039	.0089
4	.0567	.0527	-.0040	.0116	.0020	.0096
4	.0527	.0535	.0008	.0107	.0013	.0094
4	.0535	.0520	-.0015	.0160	.0090	.0070
4	.0520	.0548	.0028	.0120	.0010	.0110
4	.0548	.0462	-.0086	.0100	.0023	.0077
4	.0462	.0525	-.0063	.0138	.0017	.0121
4	.0525	.0516	-.0009	.0135	.0036	.0099
4	.0516	.0540	.0024	.0138	.0011	.0127
4	.0540	.0562	.0022	.0123	.0026	.0097
4	.0562	.0550	-.0012	.0155	.0020	.0098
4	.0550	.0525	-.0025	.0118	.0020	.0098
4	.0525	.0556	.0031	.0135	.0021	.0114
4	.0556	.0525	-.0031	.0159	.0159	-
4	.0525	.0498	-.0027	.0130	.0130	-
4	.0498	.0490	-.0008	.0141	.0141	-
4	.0490	.0465	-.0052	.0125	.0125	-

Replications	*P. maculiventris* Weight before feeding	*P. maculiventris* Weight after feeding	*P. maculiventris* Gain or loss in weight	*G. mellonella* Weight before predation	*G. mellonella* Weight after predation	*G. mellonella* Loss in weight
Diet level 2 - adult males.						
1	.0553	.0592	.0039	.0216	.0058	.0158
2	.0616	.0622	.0006	.0196	.0075	.0121
3	.0599	.0613	.0014	.0222	.0025	.0197
4	.0594	.0563	-.0031	.0194	.0011	.0183
Total	.2362	.2390	.0028	.0828	.0169	.0659
$\bar{x}$	.0590	.0598	.0007	.0207	.0042	.0165
1	.0592	.0623	.0031	.0217	.0217	-
2	.0622	.0641	.0019	.0194	.0058	.0136
3	.0613	.0576	-.0037	.0194	.0035	.0159
4	.0563	.0674	.0111	.0195	.0035	.0160
Total	.2390	.2514	.0124	.0800	.0345	.0455
$\bar{x}$	.0598	.0629	.0031	.0200	.0086	.0114
1	.0623	.0735	.0112	.0216	.0067	.0149
2	.0641	.0651	.0010	.0217	.0066	.0151
3	.0576	.0615	.0039	.0196	.0078	.0118
4	.0674	.0699	.0025	.0207	.0025	.0182
Total	.2514	.2700	.0186	.0836	.0236	.0600
$\bar{x}$	.0629	.0675	.0047	.0209	.0059	.0150
1	.0735	.0611	-.0124	.0227	.0077	.0150
2	.0651	.0605	-.0046	.0230	.0077	.0153
3	.0615	.0622	.0007	.0194	.0025	.0169
4	.0699	.0637	-.0062	.0205	.0027	.0178
Total	.2700	.2475	-.0225	.0856	.0206	.0650
$\bar{x}$	.0675	.0619	-.0056	.0214	.0052	.0163
1	.0611	.0597	-.0014	.0217	.0076	.0141
2	.0605	.0647	.0042	.0264	.0050	.0214
3	.0622	.0652	.0030	.0194	.0021	.0173
4	.0637	.0663	.0026	.0195	.0023	.0172
Total	.2475	.2559	.0084	.0870	.0170	.0700
$\bar{x}$	.0619	.0640	.0021	.0218	.0043	.0175
1	.0597	.0572	-.0025	.0197	.0197	-
2	.0647	.0518	-.0129	.0194	.0194	-
3	.0652	.0594	-.0058	.0194	.0023	.0171
4	.0663	.0574	-.0089	.0201	.0029	.0172
Total	.2559	.2258	-.0301	.0786	.0443	.0343
$\bar{x}$	.0640	.0565	-.0075	.0197	.0111	.0086
1	.0572	.0670	.0098	.0194	.0034	.0160
2	.0518	.0625	.0107	.0194	.0087	.0107
3	.0594	.0643	.0049	.0195	.0037	.0158
4	.0574	.0588	.0014	.0194	.0041	.0153
Total	.2258	.2526	.0268	.0777	.0199	.0578
$\bar{x}$	.0565	.0632	.0067	.0194	.0050	.0145

	Before	After	Gain or loss	Before	After	Loss
1	.0670	.0658	-.0012	.0252	.0053	.0199
2	.0625	.0575	-.0050	.0221	.0021	.0200
3	.0643	.0668	.0025	.0212	.0021	.0191
4	.0588	.0633	.0045	.0218	.0035	.0183
Total	.2526	.2534	.0008	.0903	.0130	.0773
$\bar{x}$	.0632	.0634	.0002	.0226	.0033	.0193
1	.0658	.0644	-.0014	.0196	.0058	.0138
2	.0575	.0665	.0090	.0232	.0232	-
3	.0668	.0583	-.0085	.0194	.0114	.0080
4	.0633	.0710	.0077	.0231	.0023	.0208
Total	.2534	.2602	.0068	.0853	.0427	.0426
$\bar{x}$	.0634	.0651	.0017	.0213	.0107	.0107
1	.0644	.0681	.0037	.0255	.0078	.0177
2	.0665	.0601	-.0064	.0205	.0111	.0094
3	.0583	.0587	.0004	.0194	.0023	.0171
4	.0710	.0651	-.0059	.0256	.0137	.0119
Total	.2602	.2520	-.0082	.0910	.0349	.0561
$\bar{x}$	.0651	.0630	-.0021	.0228	.0087	.0140
1	.0681	.0622	-.0059	.0220	.0220	-
2	.0601	.0509	-.0092	.0194	.0194	-
3	.0587	.0661	.0074	.0227	.0093	.0134
4	.0651	.0673	.0022	.0229	.0064	.0165
Total	.2520	.2465	-.0055	.0870	.0571	.0299
$\bar{x}$	.0630	.0616	-.0014	.0218	.0143	.0075
1	.0622	.0678	.0056	.0248	.0119	.0129
2	.0509	.0582	.0073	.0253	.0185	.0068
3	.0661	.0548	-.0113	.0258	.0135	.0123
4	.0673	.0704	.0031	.0247	.0091	.0156
Total	.2465	.2512	.0047	.1006	.0530	.0476
$\bar{x}$	.0616	.0628	.0012	.0252	.0133	.0119
1	.0678	.0628	-.0050	.0235	.0154	.0081
2	.0582	.0514	-.0068	.0240	.0240	-
3	.0548	.0631	.0083	.0223	.0064	.0159
4	.0704	.0656	-.0048	.0219	.0067	.0152
Total	.2512	.2429	-.0083	.0917	.0525	.0392
$\bar{x}$	.0628	.0607	-.0021	.0229	.0131	.0098
1	.0628	.0556	-.0072	.0260	.0088	.0172
2	.0514	.0563	.0049	.0210	.0131	.0079
3	.0631	.0556	-.0075	.0246	.0160	.0086
4	.0656	.0626	-.0030	.0204	.0054	.0150
Total	.2429	.2301	-.0128	.0920	.0433	.0487
$\bar{x}$	.0607	.0575	-.0032	.0230	.0108	.0122
1	.0556	.0627	.0071	.0210	.0044	.0166
2	.0563	.0508	-.0055	.0201	.0201	-
3	.0556	.0573	.0017	.0195	.0044	.0151
4	.0626	.0651	.0025	.0259	.0068	.0191
Total	.2301	.2359	.0058	.0865	.0357	.0508
$\bar{x}$	.0575	.0590	.0015	.0216	.0089	.0127

	Before	After	Gain or loss	Before	After	Loss
1	.0627	.0589	-.0038	.0212	.0212	-
2	.0508	.0490	-.0018	.0194	.0194	-
3	.0573	.0598	.0025	.0187	.0052	.0135
4	.0651	.0676	.0025	.0205	.0030	.0175
Total	.2359	.2353	-.0006	.0798	.0488	.0310
$\bar{x}$	.0590	.0588	-.0003	.0200	.0122	.0078
1	.0589	.0589	-	.0200	.0053	.0047
2	.0490	.0482	-.0008	.0197	.0197	-
3	.0598	.0616	.0018	.0193	.0027	.0166
4	.0676	.0666	-.0010	.0225	.0059	.0166
Total	.2353	.2353	-	.0815	.0336	.0379
$\bar{x}$	.0588	.0588	-	.0204	.0084	.0095
1	.0589	.0620	.0031	.0245	.0061	.0184
2	.0482	.0361	-.0121	.0200	.0200	-
3	.0616	.0655	.0039	.0223	.0037	.0186
4	.0666	.0623	-.0043	.0239	.0049	.0190
Total	.2353	.2259	-.0094	.0907	.0347	.0560
$\bar{x}$	.0588	.0565	-.0024	.0227	.0087	.0140
1	.0620	.0657	.0037	.0194	.0047	.0147
2	.0361	.0462	.0101	.0258	.0050	.0208
3	.0655	.0561	-.0094	.0265	.0167	.0098
4	.0623	.0675	.0052	.0194	.0056	.0138
Total	.2259	.2355	.0096	.0911	.0320	.0591
$\bar{x}$	.0565	.0589	.0024	.0228	.0080	.0148
1	.0657	.0656	-.0001	.0228	.0086	.0142
2	.0462	.0450	-.0012	.0226	.0009	.0217
3	.0561	.0600	.0039	.0212	.0027	.0185
4	.0675	.0617	-.0058	.0212	.0096	.0116
Total	.2355	.2323	-.0032	.0878	.0218	.0660
$\bar{x}$	.0589	.0581	-.0008	.0220	.0055	.0165
1	.0656	.0636	-.0020	.0216	.0020	.0196
2	.0450	.0452	.0002	.0212	.0005	.0207
3	.0600	.0714	.0114	.0224	.0032	.0192
4	.0617	.0645	.0028	.0243	.0070	.0173
Total	.2323	.2447	.0124	.0895	.0127	.0768
$\bar{x}$	.0581	.0612	.0031	.0224	.0032	.0192
1	.0636	.0606	-.0030	.0262	.0042	.0220
2	.0452	.0447	-.0005	.0216	.0017	.0199
3	.0714	.0618	-.0096	.0247	.0029	.0218
4	.0645	.0653	.0008	.0218	.0042	.0176
Total	.2447	.2324	-.0123	.0943	.0130	.0813
$\bar{x}$	.0612	.0581	-.0031	.0236	.0033	.0203
1	.0606	.0635	.0029	.0210	.0023	.0187
2	.0447	.0463	.0016	.0196	.0011	.0185
3	.0618	.0657	.0039	.0197	.0050	.0147
4	.0653	.0673	.0020	.0203	.0017	.0186
Total	.2324	.2428	.0104	.0806	.0101	.0705
$\bar{x}$	.0581	.0607	.0026	.0202	.0025	.0176

	Before	After	Gain or loss	Before	After	Loss
1	.0635	.0592	-.0043	.0193	.0044	.0149
2	.0463	.0447	-.0016	.0189	.0012	.0177
3	.0657	.0607	-.0050	.0219	.0033	.0186
4	.0673	.0638	-.0035	.0206	.0043	.0163
Total	.2428	.2284	-.0144	.0807	.0132	.0675
$\bar{x}$	.0607	.0571	-.0036	.0202	.0033	.0169
1	.0592	.0603	.0011	.0260	.0028	.0232
2	.0447	.0446	-.0001	.0247	.0020	.0227
3	.0607	.0642	.0035	.0214	.0104	.0110
4	.0638	.0671	.0033	.0205	.0028	.0177
Total	.2284	.2362	.0078	.0926	.0180	.0746
$\bar{x}$	.0571	.0591	.0020	.0232	.0045	.0187
1	.0603	.0611	.0008	.0196	.0026	.0170
2	.0446	.0453	.0007	.0217	.0016	.0201
3	.0642	.0665	.0023	.0208	.0018	.0190
4	.0671	.0681	.0010	.0197	.0027	.0170
Total	.2362	.2410	.0048	.0818	.0087	.0731
$\bar{x}$	.0591	.0603	.0012	.0205	.0022	.0183
1	.0611	.0553	-.0058	.0207	.0207	-
2	.0453	.0474	.0021	.0209	.0018	.0191
3	.0665	.0644	-.0021	.0205	.0048	.0157
4	.0681	.0665	-.0016	.0210	.0048	.0162
Total	.2410	.2336	-.0074	.0831	.0321	.0510
$\bar{x}$	.0603	.0584	-.0019	.0208	.0080	.0128
1	.0553	.0507	-.0046	.0194	.0036	.0158
2	.0474	.0466	-.0008	.0194	.0020	.0174
3	.0644	.0608	-.0036	.0194	.0033	.0161
4	.0665	.0559	-.0106	.0198	.0031	.0167
Total	.2336	.2140	-.0196	.0780	.0120	.0660
$\bar{x}$	.0584	.0535	-.0049	.0195	.0030	.0165
1	.0507	.0619	.0112	.0205	.0016	.0189
2	.0466	.0535	.0069	.0197	.0013	.0184
3	.0608	.0734	.0126	.0265	.0062	.0203
4	.0559	.0679	.0120	.0194	.0030	.0164
Total	.2140	.2567	.0427	.0861	.0121	.0740
$\bar{x}$	.0535	.0642	.0107	.0215	.0030	.0185
1	.0619	.0691	.0072	.0192	.0025	.0167
2	.0535	.0551	.0016	.0193	.0046	.0147
3	.0734	.0733	-.0001	.0203	.0049	.0154
4	.0679	.0706	.0027	.0198	.0065	.0133
Total	.2567	.2681	.0114	.0786	.0185	.0601
$\bar{x}$	.0642	.0670	.0029	.0197	.0046	.0150
1	.0691	.0638	-.0053	.0195	.0029	.0166
2	.0551	.0514	-.0037	.0197	.0020	.0177
3	.0733	.0644	-.0089	.0214	.0048	.0166
4	.0706	.0680	-.0026	.0258	.0018	.0240
Total	.2681	.2476	-.0205	.0864	.0115	.0749
$\bar{x}$	.0670	.0619	-.0051	.0216	.0029	.0187

	Before	After	Gain or loss	Before	After	Loss
1	.0638	.0660	.0022	.0246	.0032	.0214
2	.0514	.0524	.0010	.0256	.0024	.0232
3	.0644	.0688	.0044	.0209	.0040	.0169
4	.0680	.0649	-.0031	.0198	.0010	.0188
Total	.2476	.2521	.0045	.0909	.0106	.0803
$\bar{x}$	.0619	.0630	.0011	.0227	.0027	.0201
1	.0660	.0648	-.0012	.0210	.0041	.0169
2	.0524	.0541	.0017	.0208	.0017	.0191
3	.0688	.0656	-.0032	.0222	.0222	-
4	.0649	.0708	.0059	.0226	.0052	.0174
Total	.2521	.2553	.0032	.0866	.0332	.0534
$\bar{x}$	.0630	.0638	.0008	.0217	.0083	.0134
1	.0648	.0631	-.0017	.0210	.0029	.0181
2	.0541	.0542	.0001	.0264	.0030	.0234
3	.0656	.0551	-.0105	.0199	.0199	-
4	.0708	.0723	.0015	.0243	.0025	.0218
Total	.2553	.2447	-.0106	.0916	.0283	.0633
$\bar{x}$	.0638	.0612	-.0027	.0229	.0071	.0158
1	.0631	.0571	-.0060	.0218	.0053	.0165
2	.0542	.0597	.0055	.0235	.0026	.0209
3	.0551	.0627	.0076	.0241	.0241	-
4	.0723	.0691	-.0032	.0218	.0039	.0179
Total	.2447	.2486	.0039	.0912	.0359	.0553
$\bar{x}$	.0612	.0622	.0010	.0228	.0090	.0138
1	.0571	.0592	.0021	.0238	.0028	.0210
2	.0597	.0512	-.0085	.0238	.0037	.0201
3	.0627	.0571	-.0056	.0226	.0226	-
4	.0691	.0680	-.0011	.0245	.0071	.0174
Total	.2486	.2355	-.0131	.0947	.0362	.0585
$\bar{x}$	.0622	.0589	-.0033	.0237	.0091	.0146
1	.0592	.0640	.0048	.0212	.0212	-
2	.0512	.0583	.0071	.0193	.0027	.0166
3	.0570	.0611	.0041	.0208	.0208	-
4	.0680	.0745	.0065	.0211	.0035	.0176
Total	.2354	.2579	.0225	.0824	.0482	.0342
$\bar{x}$	.0589	.0645	.0056	.0206	.0121	.0086
1	.0640	.0630	-.0010	.0230	.0038	.0192
2	.0583	.0550	-.0033	.0225	.0037	.0188
3	.0611	.0722	.0111	.0255	.0077	.0178
4	.0745	.0742	-.0003	.0225	.0043	.0182
Total	.2579	.2644	.0065	.0935	.0195	.0740
$\bar{x}$	.0645	.0661	.0016	.0234	.0049	.0185
1	.0630	.0644	.0014	.0222	.0013	.0209
2	.0550	.0545	-.0005	.0225	.0033	.0192
3	.0722	.0598	-.0124	.0252	.0252	-
4	.0742	.0758	.0016	.0244	.0085	.0159
Total	.2644	.2545	-.0099	.0943	.0383	.0560
$\bar{x}$	.0661	.0636	-.0025	.0236	.0096	.0140

	Before	After	Gain or loss	Before	After	Loss
1	.0644	.0576	-.0068	.0215	.0028	.0187
2	.0545	.0542	-.0003	.0212	.0048	.0164
3	.0598	.0691	.0093	.0200	.0032	.0168
4	.0758	.0744	-.0014	.0240	.0070	.0170
Total	.2545	.2553	.0008	.0867	.0178	.0689
$\bar{x}$	.0636	.0638	.0002	.0217	.0045	.0172
1	.0576	.0627	.0051	.0257	.0047	.0210
2	.0542	.0547	.0005	.0228	.0041	.0187
3	.0691	.0655	-.0036	.0264	.0264	-
4	.0744	.0671	-.0073	.0261	.0261	-
Total	.2553	.2500	-.0053	.1010	.0613	.0397
$\bar{x}$	.0638	.0625	-.0013	.0253	.0153	.0099
1	.0627	.0591	-.0036	.0248	.0248	-
2	.0547	.0567	.0020	.0196	.0035	.0161
3	.0655	.0630	-.0025	.0235	.0235	-
4	.0671	.0729	.0058	.0194	.0128	.0066
Total	.2500	.2517	.0017	.0873	.0646	.0227
$\bar{x}$	.0625	.0629	.0004	.0218	.0162	.0057
1	.0591	.0681	.0090	.0248	.0038	.0210
2	.0567	.0556	-.0011	.0223	.0077	.0146
3	.0630	.0618	-.0012	.0232	.0232	-
4	.0729	.0654	-.0075	.0214	.0214	-
Total	.2517	.2509	-.0008	.0917	.0561	.0356
$\bar{x}$	.0629	.0627	-.0002	.0229	.0140	.0089
1	.0681	.0649	-.0032	.0250	.0090	.0160
2	.0556	.0571	.0015	.0195	.0060	.0135
3	.0618	.0675	.0057	.0253	.0022	.0231
4	.0654	.0617	-.0037	.0261	.0261	-
Total	.2509	.2512	.0003	.0959	.0433	.0526
$\bar{x}$	.0627	.0628	.0001	.0240	.0108	.0132
1	.0649	.0657	.0008	.0225	.0063	.0162
2	.0571	.0589	.0018	.0258	.0086	.0172
3	.0675	.0746	.0071	.0194	.0086	.0108
4	.0617	.0656	.0039	.0195	.0195	-
Total	.2512	.2648	.0136	.0872	.0430	.0442
$\bar{x}$	.0628	.0662	.0034	.0218	.0108	.0111
1	.0657	.0592	-.0065	.0231	.0040	.0191
2	.0589	.0535	-.0054	.0235	.0235	-
3	.0746	.0722	-.0024	.0235	.0235	-
4	.0656	.0628	-.0028	.0235	.0055	.0180
Total	.2648	.2477	-.0171	.0936	.0565	.0371
$\bar{x}$	.0662	.0619	-.0043	.0234	.0141	.0093
1	.0592	.0676	.0084	.0245	.0050	.0195
2	.0535	.0590	.0055	.0210	.0055	.0155
3	.0722	.0759	.0037	.0230	.0054	.0176
4	.0628	.0704	.0076	.0220	.0116	.0104
Total	.2477	.2729	.0252	.0905	.0275	.0630
$\bar{x}$	.0619	.0682	.0063	.0226	.0069	.0158

	Before	After	Gain or loss	Before	After	Loss
1	.0676	.0641	-.0035	.0264	.0092	.0172
2	.0590	.0510	-.0080	.0238	.0063	.0175
3	.0759	.0667	-.0092	.0235	.0235	-
4	.0704	.0656	-.0048	.0247	.0247	-
Total	.2729	.2474	-.0255	.0984	.0637	.0347
$\bar{x}$	.0682	.0619	-.0064	.0246	.0159	.0087
1	.0641	.0611	-.0030	.0225	.0225	-
2	.0510	.0563	.0053	.0253	.0033	.0220
3	.0667	.0801	.0134	.0247	.0029	.0218
4	.0656	.0669	.0013	.0249	.0249	-
Total	.2474	.2644	.0170	.0974	.0536	.0438
$\bar{x}$	.0619	.0661	.0043	.0244	.0134	.0110
1	.0611	.0636	.0025	.0231	.0078	.0153
2	.0563	.0532	-.0031	.0249	.0249	-
3	.0801	.0663	-.0138	.0241	.0241	-
4	.0669	.0618	-.0051	.0233	.0233	-
Total	.2644	.2449	-.0195	.0954	.0801	.0153
$\bar{x}$	.0661	.0612	-.0049	.0239	.0200	.0038
1	.0636	.0577	-.0059	.0220	.0062	.0158
2	.0532	.0560	.0028	.0243	.0062	.0181
3	.0663	.0729	.0066	.0252	.0125	.0127
4	.0618	.0642	.0024	.0238	.0238	-
Total	.2449	.2508	.0059	.0953	.0487	.0466
$\bar{x}$	.0612	.0627	.0015	.0238	.0122	.0117
1	.0577	.0596	.0019	.0217	.0054	.0163
2	.0560	.0598	.0038	.0227	.0086	.0141
3	.0729	.0690	-.0039	.0228	.0178	.0050
4	.0642	.0713	.0071	.0222	.0049	.0173
Total	.2508	.2597	.0089	.0894	.0367	.0527
$\bar{x}$	.0627	.0649	.0022	.0224	.0092	.0132
1	.0596	.0553	-.0043	.0236	.0236	-
2	.0598	.0473	-.0125	.0220	.0220	-
3	.0690	.0681	-.0009	.0248	.0181	.0067
4	.0713	.0596	-.0117	.0225	.0225	-
Total	.2597	.2303	-.0294	.0929	.0862	.0067
$\bar{x}$	.0649	.0576	-.0074	.0232	.0216	.0017
1	.0553	.0590	.0037	.0223	.0028	.0195
2	Male died - replicate 2 terminated.					
3	.0681	.0639	-.0042	.0230	.0230	-
4	.0596	.0666	.0070	.0250	.0250	-
Total	.1830	.1895	.0065	.0703	.0508	.0195
$\bar{x}$	.0610	.0632	.0022	.0234	.0169	.0065
1	.0590	.0569	-.0021	.0251	.0251	-
3	.0639	.0652	.0013	.0252	.0252	-
4	.0666	.0714	.0048	.0244	.0050	.0194
Total	.1895	.1935	.0040	.0747	.0553	.0194
$\bar{x}$	.0632	.0645	.0013	.0249	.0184	.0065

	Before	After	Gain or loss	Before	After	Loss
1	.0569	.0582	.0013	.0241	.0017	.0224
3	.0652	.0721	.0069	.0256	.0082	.0174
4	.0714	.0592	-.0122	.0235	.0180	.0055
Total	.1935	.1895	-.0040	.0732	.0279	.0453
$\bar{x}$	.0645	.0632	-.0013	.0244	.0092	.0152
1	.0582	.0637	.0055	.0220	.0046	.0174
3	.0721	.0670	-.0051	.0210	.0210	-
4	.0592	.0664	.0072	.0260	.0169	.0091
Total	.1895	.1971	.0076	.0690	.0425	.0265
$\bar{x}$	.0632	.0657	.0025	.0230	.0142	.0088
1	.0637	.0655	.0018	.0253	.0027	.0226
3	.0670	.0748	.0078	.0260	.0022	.0238
4	.0664	.0658	-.0006	.0220	.0220	-
Total	.1971	.2061	.0090	.0733	.0269	.0464
$\bar{x}$	.0657	.0688	.0030	.0244	.0090	.0154
1	.0655	.0587	-.0068	.0220	.0017	.0203
3	.0748	.0619	-.0129	.0217	.0217	-
4	.0658	.0740	.0082	.0231	.0099	.0132
Total	.2061	.1946	-.0115	.0668	.0333	.0335
$\bar{x}$	.0688	.0649	-.0039	.0223	.0111	.0112
1	.0587	.0627	.0040	.0250	.0052	.0198
3	.0619	.0649	.0030	.0230	.0070	.0160
4	.0740	.0640	-.0100	.0256	.0256	-
Total	.1946	.1916	-.0030	.0736	.0378	.0358
$\bar{x}$	.0649	.0639	-.0010	.0245	.0126	.0119
1	.0627	.0549	-.0078	.0210	.0110	.0100
3	.0649	.0610	-.0039	.0207	.0207	-
4	.0640	.0710	.0070	.0240	.0100	.0140
Total	.1916	.1869	-.0047	.0657	.0417	.0240
$\bar{x}$	.0639	.0623	-.0016	.0219	.0139	.0080
1	.0549	.0632	.0083	.0219	.0031	.0188
3	.0610	.0644	.0034	.0230	.0046	.0184
4	.0710	.0662	-.0048	.0231	.0164	.0067
Total	.1869	.1938	.0069	.0680	.0241	.0439
$\bar{x}$	.0623	.0646	.0023	.0227	.0080	.0147
1	.0632	.0585	-.0047	.0259	.0046	.0213
3	.0644	.0647	.0003	.0259	.0259	-
4	.0662	.0688	.0026	.0256	.0256	-
Total	.1938	.1920	-.0018	.0774	.0561	.0213
$\bar{x}$	.0646	.0640	-.0006	.0258	.0187	.0071
1	.0585	.0600	.0015	.0247	.0034	.0213
3	.0647	.0732	.0085	.0191	.0024	.0167
4	.0688	.0647	-.0041	.0268	.0268	-
Total	.1920	.1979	.0059	.0706	.0326	.0380
$\bar{x}$	.0640	.0660	.0020	.0235	.0109	.0126

	Before	After	Gain or loss	Before	After	Loss
1	.0600	.0576	-.0024	.0207	.0092	.0115
3	.0732	.0624	-.0108	.0200	.0046	.0204
4	.0647	.0701	.0054	.0207	.0085	.0122
Total	.1979	.1901	-.0078	.0664	.0223	.0441
$\bar{x}$	.0660	.0634	-.0026	.0221	.0074	.0147
1	.0576	.0586	.0010	.0198	.0028	.0170
3	.0624	.0635	.0011	.0208	.0208	-
4	.0701	.0749	.0048	.0217	.0080	.0137
Total	.1901	.1970	.0069	.0623	.0316	.0307
$\bar{x}$	.0634	.0657	.0023	.0208	.0106	.0102
1	.0586	.0628	.0042	.0212	.0042	.0170
3	.0635	.0621	-.0014	.0242	.0242	-
4	.0749	.0635	-.0114	.0242	.0242	-
Total	.1970	.1884	-.0086	.0696	.0526	.0170
$\bar{x}$	.0657	.0628	-.0029	.0232	.0175	.0057
1	.0628	.0609	-.0019	.0210	.0040	.0170
3	.0621	.0657	.0036	.0224	.0224	-
4	.0635	.0760	.0125	.0235	.0221	.0014
Total	.1884	.2026	.0142	.0669	.0485	.0184
$\bar{x}$	.0628	.0675	.0047	.0223	.0162	.0061
1	.0609	.0596	-.0013	.0243	.0045	.0198
3	.0657	.0636	-.0021	.0216	.0216	-
4	.0760	.0661	-.0099	.0221	.0221	-
Total	.2026	.1893	-.0133	.0680	.0482	.0198
$\bar{x}$	.0675	.0631	-.0044	.0227	.0161	.0066
1	.0596	.0586	-.0010	.0196	.0034	.0162
3	.0636	.0718	.0082	.0255	.0040	.0215
4	.0661	.0664	.0003	.0261	.0261	-
Total	.1893	.1968	.0075	.0682	.0335	.0377
$\bar{x}$	.0631	.0656	.0025	.0227	.0112	.0125
1	.0586	.0615	.0029	.0250	.0070	.0180
3	.0718	.0657	-.0061	.0253	.0110	.0143
4	.0664	.0615	-.0049	.0257	.0257	-
Total	.1968	.1887	-.0081	.0760	.0437	.0323
$\bar{x}$	.0656	.0629	-.0027	.0253	.0145	.0108
1	.0615	.0648	.0033	.0261	.0261	-
3	.0657	.0650	-.0007	.0212	.0020	.0192
4	.0615	.0616	.0001	.0205	.0205	-
Total	.1887	.1914	.0027	.0678	.0486	.0192
$\bar{x}$	.0629	.0638	.0009	.0226	.0162	.0064
1	.0648	.0546	-.0102	.0241	.0026	.0215
3	.0650	.0650	-	.0208	.0208	-
4	.0616	.0629	.0013	.0244	.0071	.0173
Total	.1914	.1825	-.0089	.0693	.0305	.0388
$\bar{x}$	.0638	.0609	-.0029	.0231	.0102	.0129

	Before	After	Gain or loss	Before	After	Loss
1	.0546	.0588	.0042	.0194	.0050	.0144
3	.0650	.0634	-.0016	.0195	.0195	-
4	.0629	.0592	-.0037	.0200	.0200	-
Total	.1825	.1814	-.0011	.0589	.0445	.0144
$\bar{x}$	.0609	.0605	-.0004	.0196	.0148	.0048
1	.0588	.0635	.0047	.0197	.0038	.0159
3	.0634	.0624	-.0010	.0219	.0219	-
4	.0592	.0731	.0139	.0194	.0044	.0150
Total	.1814	.1990	.0176	.0610	.0301	.0309
$\bar{x}$	.0605	.0663	.0059	.0203	.0100	.0103
1	.0635	.0573	-.0062	.0206	.0082	.0124
3	.0624	.0603	-.0021	.0194	.0037	.0157
4	.0731	.0659	-.0072	.0213	.0213	-
Total	.1990	.1835	-.0155	.0613	.0332	.0281
$\bar{x}$	.0663	.0612	-.0052	.0204	.0111	.0093
1	.0573	.0597	.0024	.0205	.0017	.0188
3	.0603	.0655	.0052	.0212	.0212	-
4	.0659	.0713	.0054	.0215	.0060	.0155
Total	.1835	.1965	.0130	.0632	.0289	.0343
$\bar{x}$	.0612	.0655	.0043	.0211	.0096	.0114
1	.0597	.0598	.0001	.0200	.0019	.0181
3	.0655	.0626	-.0029	.0196	.0196	-
4	.0713	.0735	.0022	.0199	.0071	.0128
Total	.1965	.1959	-.0006	.0595	.0286	.0309
$\bar{x}$	.0655	.0653	-.0002	.0198	.0095	.0103
1	.0598	.0556	-.0042	.0220	.0034	.0186
3	.0626	.0677	.0051	.0194	.0042	.0152
4	.0735	.0706	-.0029	.0200	.0091	.0109
Total	.1959	.1939	-.0020	.0614	.0167	.0447
$\bar{x}$	.0653	.0646	-.0007	.0205	.0056	.0149
1	.0556	.0621	.0065	.0200	.0034	.0166
3	.0677	.0694	.0017	.0194	.0194	-
4	.0706	.0776	.0070	.0199	.0076	.0123
Total	.1939	.2091	.0152	.0593	.0304	.0289
$\bar{x}$	.0646	.0697	.0051	.0198	.0102	.0096
1	.0621	.0626	.0005	.0225	.0064	.0161
3	.0694	.0736	.0042	.0277	.0060	.0217
4	.0776	.0763	-.0013	.0220	.0113	.0107
Total	.2091	.2125	.0034	.0722	.0237	.0485
$\bar{x}$	.0697	.0708	.0011	.0241	.0079	.0162
1	.0626	.0665	.0039	.0215	.0077	.0138
3	.0736	.0634	-.0102	.0220	.0220	-
4	.0763	.0721	-.0042	.0221	.0221	-
Total	.2125	.2020	-.0105	.0656	.0518	.0138
$\bar{x}$	.0708	.0673	-.0035	.0219	.0173	.0046

	Before	After	Gain or loss	Before	After	Loss
1	.0665	.0622	-.0043	.0206	.0115	.0091
3	.0634	.0665	.0031	.0218	.0092	.0126
4	.0721	.0676	-.0055	.0201	.0201	-
Total	.2020	.1963	-.0067	.0625	.0408	.0217
$\bar{x}$	.0673	.0653	-.0022	.0208	.0136	.0072
1	.0622	.0615	-.0007	.0200	.0014	.0186
3	.0665	.0667	.0002	.0203	.0021	.0182
4	.0676	.0595	-.0081	.0204	.0045	.0159
Total	.1963	.1877	-.0086	.0607	.0080	.0527
$\bar{x}$	.0654	.0625	-.0029	.0202	.0027	.0175
1	.0015	.0623	.0008	.0210	.0042	.0168
3	.0667	.0626	-.0041	.0210	.0053	.0157
4	.0595	.0614	.0019	.0194	.0194	-
Total	.1877	.1863	-.0014	.0614	.0289	.0325
$\bar{x}$	.0626	.0621	-.0005	.0205	.0096	.0108
1	.0623	.0581	-.0042	.0201	.0014	.0187
3	.0626	.0652	.0026	.0206	.0032	.0174
4	.0614	.0679	.0065	.0194	.0089	.0105
Total	.1863	.1912	.0049	.0601	.0135	.0466
$\bar{x}$	.0621	.0637	.0016	.0200	.0045	.0155
1	.0581	.0566	-.0015	.0209	.0041	.0168
3	.0652	.0612	-.0040	.0208	.0040	.0168
4	.0679	.0687	.0008	.0213	.0173	.0040
Total	.1912	.1865	-.0047	.0630	.0254	.0376
$\bar{x}$	.0637	.0622	-.0016	.0210	.0085	.0125
1	.0566	.0648	.0082	.0222	.0042	.0180
3	.0612	.0739	.0127	.0243	.0067	.0176
4	.0687	.0722	.0035	.0254	.0139	.0115
Total	.1865	.2109	.0244	.0719	.0248	.0471
$\bar{x}$	.0622	.0703	.0081	.0240	.0083	.0157
1	.0648	.0629	-.0019	.0194	.0042	.0152
3	.0739	.0692	-.0047	.0194	.0039	.0155
4	.0722	.0690	-.0032	.0194	.0118	.0076
Total	.2109	.2011	-.0098	.0582	.0199	.0383
$\bar{x}$	.0703	.0670	-.0033	.0194	.0066	.0128
1	.0629	.0670	.0041	.0200	.0103	.0097
3	.0692	.0615	-.0077	.0198	.0112	.0086
4	.0690	.0665	-.0025	.0202	.0084	.0118
Total	.2011	.1950	-.0061	.0600	.0299	.0301
$\bar{x}$	.0670	.0650	-.0020	.0200	.0100	.0100
1	.0670	.0597	-.0073	.0223	.0113	.0110
3	.0615	.0647	.0032	.0209	.0061	.0148
4	.0665	.0712	.0047	.0223	.0112	.0111
Total	.1950	.1956	.0006	.0655	.0286	.0369
$\bar{x}$	.0650	.0652	.0002	.0218	.0095	.0123

	Before	After	Gain or loss	Before	After	Loss
1	.0597	.0615	.0018	.0197	.0058	.0139
3	Male died - replicate 3 terminated.					
4	.0712	.0685	-.0027	.0215	.0136	.0079
Total	.1309	.1300	-.0009	.0412	.0194	.0218
$\bar{x}$	.0655	.0650	-.0004	.0206	.0097	.0109
1	.0615	.0632	.0017	.0200	.0110	.0090
4	.0685	.0713	.0028	.0217	.0081	.0136
Total	.1300	.1345	.0045	.0417	.0191	.0226
$\bar{x}$	.0650	.0673	.0023	.0209	.0096	.0113
1	Male died - replicate 1 terminated.					
4[1]	.0713	.0729	.0016	.0194	.0052	.0142
4	.0729	.0711	-.0018	.0210	.0062	.0148
4	.0711	.0725	.0014	.0208	.0065	.0133
4	.0725	.0659	-.0066	.0201	.0201	-
4	.0659	.0655	-.0004	.0202	.0147	.0055
4	.0655	.0659	.0004	.0194	.0027	.0167
4	.0659	.0689	.0030	.0208	.0031	.0177
4	.0689	.0594	-.0095	.0207	.0010	.0197
4	.0594	.0610	.0016	.0217	.0059	.0158
4	.0610	.0710	.0100	.0195	.0041	.0154
4	.0710	.0715	.0005	.0195	.0015	.0180
4	.0715	.0690	-.0025	.0196	.0052	.0144
4	.0690	.0718	.0028	.0200	.0087	.0113
4	.0718	.0650	-.0068	.0194	.0029	.0165
4	.0650	.0618	-.0032	.0194	.0034	.0160
4	.0618	.0630	.0012	.0207	.0035	.0172
4	.0630	.0727	.0097	.0205	.0106	.0099
4	.0727	.0694	-.0033	.0203	.0068	.0135
4	.0694	.0704	.0010	.0199	.0088	.0111
4	.0704	.0572	-.0132	.0203	.0029	.0174
4	.0572	.0664	.0092	.0213	.0074	.0139
4	.0664	.0547	-.0117	.0215	.0019	.0196
4	.0547	.0702	.0155	.0215	.0051	.0164
4	.0702	.0697	-.0005	.0212	.0125	.0087
4	.0697	.0621	-.0076	.0208	.0043	.0165
4	.0621	.0677	.0056	.0214	.0057	.0157
4	.0677	.0572	-.0105	.0209	.0028	.0181
4	.0572	.0624	.0052	.0206	.0038	.0168
4	.0624	.0665	.0041	.0211	.0030	.0181
4	.0665	.0665	-	.0209	.0098	.0111
4	.0665	.0595	-.0070	.0208	.0085	.0123
4	.0595	.0661	.0066	.0225	.0138	.0087
4	.0661	.0619	-.0042	.0203	.0078	.0125
4	.0619	.0579	-.0040	.0225	.0056	.0169

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[1] All subsequent daily values for diet level 2 are based on replicate 4 i.e. the value obtained for the sole surviving adult male <u>P</u>. <u>maculiventris</u> in this experiment.

	Before	After	Gain or loss	Before	After	Loss
4	.0579	.0693	.0114	.0215	.0036	.0179
4	.0693	.0554	-.0139	.0230	.0058	.0172
4	.0554	.0703	.0149	.0201	.0029	.0172
4	.0703	.0582	-.0121	.0216	.0216	-
4	.0582	.0500	-.0082	.0202	.0049	.0153
4	.0500	.0676	.0176	.0230	.0045	.0185
4	.0676	.0635	-.0041	.0215	.0093	.0122
4	.0635	.0580	-.0055	.0197	.0197	-
4	.0580	.0635	.0055	.0236	.0236	-
4	.0635	.0598	-.0037	.0226	.0226	-
4	.0598	.0671	.0073	.0215	.0215	-
4	.0671	.0578	-.0093	.0253	.0253	-
4	.0578	.0480	-.0098	.0218	.0218	-

	P. maculiventris			*G. mellonella*		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
			Diet level 3 - adult males.			
1	.0483	.0684	.0201	.0394	.0055	.0339
2	.0639	.0699	.0060	.0449	.0173	.0276
3	.0612	.0562	-.0050	.0418	.0418	-
4	.0659	.0713	.0054	.0440	.0111	.0329
Total	.2393	.2658	.0265	.1701	.0757	.0944
$\bar{x}$	.0598	.0664	.0066	.0425	.0189	.0236
1	.0684	.0666	-.0018	.0434	.0083	.0351
2	.0699	.0678	-.0021	.0394	.0134	.0260
3	.0562	.0646	.0084	.0394	.0083	.0311
4	.0713	.0732	.0019	.0433	.0132	.0301
Total	.2658	.2722	.0064	.1655	.0432	.1223
$\bar{x}$	.0664	.0680	.0016	.0414	.0108	.0306
1	.0666	.0619	-.0047	.0394	.0083	.0311
2	.0678	.0649	-.0029	.0397	.0155	.0242
3	.0646	.0691	.0045	.0415	.0125	.0290
4	.0732	.0730	-.0002	.0405	.0179	.0226
Total	.2722	.2689	-.0033	.1611	.0542	.1069
$\bar{x}$	.0680	.0672	-.0008	.0403	.0136	.0267
1	.0619	.0624	.0005	.0399	.0139	.0260
2	.0649	.0719	.0070	.0444	.0138	.0306
3	.0691	.0645	-.0046	.0401	.0112	.0289
4	.0730	.0762	.0032	.0447	.0201	.0246
Total	.2689	.2750	.0061	.1691	.0590	.1101
$\bar{x}$	.0672	.0688	.0016	.0423	.0148	.0275
1	.0624	.0656	.0032	.0394	.0203	.0191
2	.0719	.0728	.0009	.0417	.0294	.0123
3	.0645	.0590	-.0055	.0394	.0213	.0181
4	.0762	.0758	-.0004	.0396	.0184	.0212
Total	.2750	.2732	-.0018	.1601	.0894	.0707
$\bar{x}$	.0688	.0683	-.0005	.0400	.0224	.0176
1	.0656	.0655	-.0001	.0436	.0208	.0228
2	.0728	.0720	-.0008	.0407	.0166	.0241
3	.0590	.0696	.0106	.0420	.0254	.0166
4	.0758	.0741	-.0017	.0443	.0261	.0182
Total	.2732	.2812	.0080	.1706	.0889	.0817
$\bar{x}$	.0683	.0703	.0020	.0427	.0222	.0204

	Before	After	Gain or loss	Before	After	Loss
1	.0655	.0639	-.0016	.0440	.0301	.0139
2	.0720	.0698	-.0022	.0394	.0107	.0287
3	.0696	.0668	-.0028	.0438	.0228	.0210
4	.0741	.0570	-.0171	.0422	.0422	-
Total	.2812	.2575	-.0237	.1694	.1058	.0636
$\bar{\bar{x}}$	.0703	.0644	-.0059	.0424	.0265	.0159
1	.0639	.0596	-.0043	.0402	.0402	-
2	.0698	.0736	.0038	.0420	.0192	.0228
3	.0668	.0662	-.0006	.0394	.0194	.0200
4	.0570	.0583	.0013	.0394	.0044	.0350
Total	.2575	.2577	.0002	.1610	.0832	.0778
$\bar{\bar{x}}$	.0644	.0644	-	.0403	.0218	.0185
1	.0596	.0633	.0037	.0398	.0135	.0263
2	.0736	.0685	-.0051	.0404	.0331	.0073
3	.0662	.0740	.0078	.0443	.0239	.0204
4	.0583	.0682	.0099	.0440	.0281	.0159
Total	.2577	.2740	.0163	.1685	.0986	.0699
$\bar{\bar{x}}$	.0644	.0685	.0041	.0421	.0247	.0174
1	.0633	.0625	-.0008	.0463	.0463	-
2	.0685	.0698	.0013	.0399	.0164	.0235
3	.0740	.0637	-.0103	.0432	.0432	-
4	.0682	.0700	.0018	.0432	.0194	.0238
Total	.2740	.2660	-.0080	.1726	.1253	.0473
$\bar{\bar{x}}$	.0685	.0665	-.0020	.0432	.0313	.0119
1	.0625	.0528	-.0097	.0419	.0419	-
2	.0698	.0694	-.0004	.0400	.0227	.0173
3	.0637	.0668	.0031	.0396	.0334	.0062
4	.0700	.0718	.0018	.0408	.0271	.0137
Total	.2660	.2608	-.0052	.1623	.1251	.0372
$\bar{\bar{x}}$	.0665	.0652	-.0013	.0406	.0313	.0093
1	.0528	.0630	.0102	.0394	.0141	.0253
2	.0694	.0699	.0005	.0445	.0386	.0059
3	.0668	.0690	.0022	.0405	.0141	.0264
4	.0718	.0435	-.0283	.0394	.0394	-
Total	.2608	.2454	-.0154	.1638	.1062	.0576
$\bar{\bar{x}}$	.0652	.0614	-.0039	.0410	.0266	.0144
1	.0630	.0574	-.0056	.0394	.0394	-
2	.0699	.0679	-.0020	.0442	.0313	.0129
3	.0690	.0637	-.0053	.0440	.0440	-
4	.0435	.0704	.0269	.0427	.0238	.0189
Total	.2454	.2594	.0140	.1703	.1385	.0318
$\bar{\bar{x}}$	.0614	.0649	.0035	.0426	.0346	.0080
1	.0574	.0554	-.0020	.0389	.0389	-
2	.0679	.0639	-.0040	.0417	.0325	.0092
3	.0637	.0701	.0064	.0447	.0262	.0185
4	.0704	.0651	-.0053	.0403	.0171	.0232
Total	.2594	.2545	-.0049	.1656	.1147	.0509
$\bar{\bar{x}}$	.0649	.0636	-.0013	.0414	.0287	.0127

	Before	After	Gain or loss	Before	After	Loss
1	.0554	.0629	.0075	.0383	.0098	.0285
2	.0639	.0616	-.0023	.0438	.0221	.0217
3	.0701	.0656	-.0045	.0428	.0428	-
4	.0651	.0698	.0047	.0453	.0200	.0253
Total	.2545	.2599	.0054	.1702	.0947	.0755
$\bar{x}$	.0636	.0650	.0014	.0426	.0237	.0190
1	.0629	.0598	-.0031	.0430	.0335	.0095
2	.0616	.0680	.0064	.0405	.0214	.0191
3	.0656	.0744	.0088	.0406	.0210	.0196
4	.0698	.0626	-.0072	.0428	.0428	-
Total	.2599	.2648	.0049	.1669	.1187	.0482
$\bar{x}$	.0650	.0662	.0012	.0417	.0297	.0120
1	.0598	.0670	.0072	.0429	.0125	.0304
2	.0680	.0655	-.0025	.0395	.0251	.0144
3	.0744	.0619	-.0125	.0438	.0438	-
4	.0626	.0692	.0066	.0446	.0203	.0243
Total	.2648	.2636	-.0012	.1708	.1017	.0691
$\bar{x}$	.0662	.0659	-.0003	.0427	.0254	.0173
1	.0670	.0701	.0031	.0435	.0142	.0293
2	.0655	.0673	.0018	.0455	.0233	.0222
3	.0619	.0712	.0093	.0436	.0176	.0260
4	.0692	.0632	-.0060	.0422	.0154	.0268
Total	.2636	.2718	.0082	.1748	.0705	.1043
$\bar{x}$	.0659	.0680	.0021	.0437	.0176	.0261
1	.0701	.0640	-.0061	.0394	.0233	.0161
2	.0673	.0644	-.0029	.0452	.0452	-
3	.0712	.0705	-.0007	.0412	.0331	.0081
4	.0632	.0751	.0119	.0456	.0255	.0201
Total	.2718	.2740	.0022	.1714	.1271	.0443
$\bar{x}$	.0680	.0685	.0006	.0429	.0318	.0111
1	.0640	.0601	-.0039	.0438	.0379	.0059
2	.0644	.0650	.0006	.0422	.0304	.0118
3	.0705	.0760	.0055	.0439	.0279	.0160
4	.0751	.0653	-.0098	.0419	.0264	.0155
Total	.2740	.2664	-.0076	.1718	.1226	.0492
$\bar{x}$	.0685	.0666	-.0019	.0430	.0307	.0123
1	.0601	.0688	.0087	.0453	.0178	.0275
2	.0650	.0702	.0052	.0464	.0299	.0165
3	.0760	.0688	-.0072	.0455	.0455	-
4	.0653	.0753	.0100	.0458	.0316	.0142
Total	.2664	.2831	.0167	.1830	.1248	.0582
$\bar{x}$	.0666	.0708	.0042	.0458	.0312	.0146
1	.0688	.0669	-.0019	.0418	.0265	.0153
2	.0702	.0586	-.0116	.0392	.0392	-
3	.0688	.0730	.0042	.0402	.0221	.0181
4	.0753	.0613	-.0140	.0412	.0246	.0166
Total	.2831	.2598	-.0233	.1624	.1124	.0500
$\bar{x}$	.0708	.0650	-.0058	.0406	.0281	.0125

	Before	After	Gain or loss	Before	After	Loss
1	.0669	.0618	-.0051	.0394	.0394	-
2	.0586	.0609	.0023	.0396	.0396	-
3	.0730	.0724	-.0006	.0399	.0218	.0181
4	.0613	.0648	.0035	.0395	.0083	.0312
Total	.2598	.2599	.0001	.1584	.1091	.0493
$\bar{x}$	.0650	.0650	-	.0396	.0273	.0123
1	.0618	.0672	.0054	.0455	.0216	.0239
2	.0609	.0674	.0065	.0448	.0167	.0281
3	.0724	.0691	-.0033	.0441	.0267	.0174
4	.0648	.0570	-.0078	.0461	.0461	-
Total	.2599	.2607	.0008	.1805	.1111	.0694
$\bar{x}$	.0650	.0652	.0002	.0451	.0278	.0174
1	.0672	.0547	-.0125	.0448	.0448	-
2	.0674	.0679	.0005	.0454	.0385	.0069
3	.0691	.0716	.0025	.0409	.0316	.0093
4	.0570	.0652	.0082	.0463	.0180	.0283
Total	.2607	.2594	-.0013	.1774	.1329	.0445
$\bar{x}$	.0652	.0649	-.0003	.0444	.0332	.0111
1	.0547	.0551	.0004	.0396	.0396	-
2	.0679	.0639	-.0040	.0425	.0425	-
3	.0716	.0748	.0032	.0418	.0258	.0160
4	.0652	.0638	-.0014	.0398	.0246	.0152
Total	.2594	.2576	-.0018	.1637	.1325	.0312
$\bar{x}$	.0649	.0644	-.0005	.0409	.0331	.0078
1	.0551	.0582	.0031	.0394	.0394	-
2	.0639	.0616	-.0023	.0395	.0395	-
3	.0748	.0677	-.0071	.0410	.0195	.0215
4	.0638	.0646	.0008	.0415	.0238	.0177
Total	.2576	.2521	-.0055	.1614	.1222	.0392
$\bar{x}$	.0644	.0630	-.0014	.0404	.0306	.0098
1	.0582	.0560	-.0022	.0395	.0229	.0166
2	.0616	.0597	-.0019	.0448	.0231	.0217
3	.0677	.0648	-.0029	.0458	.0203	.0255
4	.0646	.0621	-.0025	.0429	.0204	.0225
Total	.2521	.2426	-.0095	.1730	.0867	.0863
$\bar{x}$	.0630	.0606	-.0024	.0433	.0217	.0216
1	.0560	.0690	.0130	.0460	.0267	.0193
2	.0597	.0605	.0008	.0397	.0302	.0095
3	.0648	.0768	.0120	.0410	.0238	.0172
4	.0621	.0756	.0135	.0458	.0183	.0275
Total	.2426	.2819	.0393	.1725	.0990	.0735
$\bar{x}$	.0606	.0705	.0098	.0431	.0248	.0184
1	.0690	.0683	-.0007	.0404	.0289	.0115
2	.0605	.0681	.0076	.0400	.0250	.0150
3	.0768	.0702	-.0066	.0401	.0401	-
4	.0756	.0760	.0004	.0402	.0290	.0112
Total	.2819	.2826	.0007	.1607	.1230	.0377
$\bar{x}$	.0705	.0707	.0002	.0402	.0308	.0094

	Before	After	Gain or loss	Before	After	Loss
1	.0683	.0697	.0014	.0417	.0350	.0067
2	.0681	.0690	.0009	.0397	.0238	.0159
3	.0702	.0705	.0003	.0410	.0240	.0170
4	.0760	.0681	-.0079	.0402	.0192	.0210
Total	.2826	.2773	-.0053	.1626	.1020	.0606
$\bar{\bar{x}}$	.0707	.0693	-.0013	.0407	.0255	.0152
1	.0697	.0744	.0047	.0464	.0263	.0201
2	.0690	.0651	-.0039	.0456	.0456	-
3	.0705	.0662	-.0043	.0460	.0315	.0145
4	.0681	.0688	.0007	.0453	.0129	.0324
Total	.2773	.2745	-.0028	.1833	.1163	.0670
$\bar{\bar{x}}$	.0693	.0686	-.0007	.0458	.0291	.0168
1	.0744	.0692	-.0052	.0446	.0446	-
2	.0651	.0622	-.0029	.0446	.0446	-
3	.0662	.0710	.0048	.0418	.0229	.0189
4	.0688	.0657	-.0031	.0413	.0334	.0079
Total	.2745	.2681	-.0064	.1723	.1455	.0268
$\bar{\bar{x}}$	.0686	.0670	-.0016	.0431	.0364	.0067
1	.0692	.0728	.0036	.0450	.0226	.0224
2	.0622	.0710	.0088	.0394	.0233	.0161
3	.0710	.0765	.0055	.0408	.0236	.0172
4	.0657	.0670	.0013	.0410	.0140	.0270
Total	.2681	.2873	.0192	.1662	.0835	.0827
$\bar{\bar{x}}$	.0670	.0718	.0048	.0416	.0209	.0207
1	.0728	.0736	.0008	.0439	.0316	.0123
2	.0710	.0647	-.0063	.0414	.0280	.0134
3	.0765	.0691	-.0074	.0400	.0335	.0065
4	.0670	.0704	.0034	.0427	.0220	.0207
Total	.2873	.2778	-.0095	.1680	.1151	.0529
$\bar{\bar{x}}$	.0718	.0695	-.0024	.0420	.0288	.0132
1	.0736	.0707	-.0029	.0450	.0245	.0205
2	.0647	.0660	.0013	.0450	.0267	.0183
3	.0691	.0703	.0012	.0458	.0277	.0181
4	.0704	.0636	-.0068	.0453	.0453	-
Total	.2778	.2706	-.0072	.1811	.1242	.0569
$\bar{\bar{x}}$	.0695	.0677	-.0018	.0453	.0311	.0142
1	.0707	.0680	-.0027	.0464	.0464	-
2	.0660	.0660	-	.0450	.0450	-
3	.0703	.0725	.0022	.0461	.0367	.0094
4	.0636	.0666	.0030	.0463	.0398	.0065
Total	.2706	.2731	.0025	.1838	.1679	.0159
$\bar{\bar{x}}$	.0677	.0683	.0006	.0460	.0420	.0040
1	.0680	.0724	.0044	.0450	.0319	.0131
2	.0660	.0399	.0039	.0458	.0305	.0153
3	.0725	.0728	.0003	.0451	.0310	.0141
4	.0666	.0696	.0030	.0458	.0250	.0208
Total	.2731	.2847	.0116	.1817	.1184	.0633
$\bar{\bar{x}}$	.0683	.0712	.0029	.0454	.0296	.0158

	Before	After	Gain or loss	Before	After	Loss
1	.0724	.0705	-.0019	.0423	.0286	.0137
2	.0699	.0626	-.0073	.0425	.0425	-
3	.0728	.0738	.0010	.0430	.0430	-
4	.0696	.0663	-.0033	.0425	.0425	-
Total	.2847	.2732	-.0115	.1703	.1566	.0137
$\bar{\bar{x}}$	.0712	.0683	-.0029	.0426	.0392	.0034
1	.0705	.0685	-.0020	.0433	.0433	-
2	.0626	.0649	.0023	.0427	.0427	-
3	.0738	.0775	.0037	.0452	.0315	.0137
4	.0663	.0685	.0022	.0457	.0285	.0172
Total	.2732	.2794	.0062	.1769	.1460	.0309
$\bar{\bar{x}}$	.0683	.0699	.0016	.0442	.0365	.0077
1	.0685	.0685	-	.0449	.0361	.0088
2	.0649	.0637	-.0012	.0439	.0439	-
3	.0775	.0695	-.0080	.0459	.0459	-
4	.0685	.0684	-.0001	.0444	.0444	-
Total	.2794	.2701	-.0093	.1791	.1703	.0088
$\bar{\bar{x}}$	.0699	.0675	-.0023	.0448	.0426	.0022
1	.0685	.0679	-.0006	.0449	.0339	.0110
2	.0637	.0613	-.0024	.0460	.0460	-
3	.0695	.0729	.0034	.0451	.0451	-
4	.0684	.0657	-.0027	.0444	.0444	-
Total	.2701	.2678	-.0023	.1804	.1694	.0110
$\bar{\bar{x}}$	.0675	.0670	-.0006	.0451	.0424	.0028
1	.0679	.0664	-.0015	.0431	.0431	-
2	.0613	.0606	-.0007	.0421	.0421	-
3	.0729	.0759	.0030	.0423	.0352	.0071
4	.0657	.0665	.0008	.0436	.0355	.0081
Total	.2678	.2694	.0016	.1710	.1559	.0152
$\bar{\bar{x}}$	.0670	.0674	.0004	.0428	.0390	.0038
1	.0664	.0671	.0007	.0394	.0240	.0154
2	.0606	.0598	-.0008	.0457	.0457	-
3	.0759	.0781	.0022	.0403	.0309	.0094
4	.0665	.0629	-.0036	.0464	.0464	-
Total	.2694	.2679	-.0015	.1718	.1470	.0248
$\bar{\bar{x}}$	.0674	.0670	-.0004	.0430	.0368	.0062
1	.0671	.0630	-.0041	.0465	.0336	.0129
2	.0598	.0600	.0002	.0435	.0435	-
3	.0781	.0767	-.0014	.0459	.0315	.0144
4	.0629	.0617	-.0012	.0455	.0271	.0184
Total	.2679	.2614	-.0065	.1814	.1357	.0457
$\bar{\bar{x}}$	.0670	.0654	-.0016	.0454	.0339	.0114
1	.0630	.0697	.0067	.0434	.0283	.0151
2	.0600	.0580	-.0020	.0399	.0399	-
3	.0767	.0740	-.0027	.0425	.0425	-
4	.0617	.0731	.0114	.0436	.0239	.0197
Total	.2614	.2748	.0134	.1694	.1346	.0348
$\bar{\bar{x}}$	.0654	.0687	.0034	.0424	.0337	.0087

	Before	After	Gain or loss	Before	After	Loss
1	.0697	.0625	-.0072	.0437	.0437	-
2	.0580	.0595	.0015	.0424	.0424	-
3	.0740	.0727	-.0013	.0455	.0323	.0132
4	.0731	.0680	-.0051	.0443	.0369	.0074
Total	.2748	.2627	-.0121	.1759	.1553	.0206
$\bar{x}$	.0687	.0657	-.0030	.0440	.0388	.0052
1	.0625	.0688	.0063	.0442	.0218	.0224
2	.0595	.0576	-.0019	.0438	.0438	-
3	.0727	.0735	.0008	.0442	.0278	.0164
4	.0680	.0625	-.0055	.0436	.0365	.0071
Total	.2627	.2624	-.0003	.1758	.1299	.0459
$\bar{x}$	.0657	.0656	-.0001	.0440	.0325	.0115
1	.0688	.0684	-.0004	.0439	.0261	.0178
2	.0576	.0570	-.0006	.0439	.0439	-
3	.0735	.0790	.0055	.0433	.0304	.0129
4	.0625	.0624	-.0001	.0446	.0446	-
Total	.2624	.2668	.0044	.1757	.1450	.0307
$\bar{x}$	.0656	.0667	.0011	.0439	.0363	.0077
1	.0684	.0637	-.0047	.0454	.0454	-
2	.0570	.0537	-.0033	.0415	.0415	-
3	.0790	.0733	-.0057	.0458	.0458	-
4	.0624	.0733	.0109	.0461	.0220	.0241
Total	.2668	.2640	-.0028	.1788	.1547	.0241
$\bar{x}$	.0667	.0660	-.0007	.0447	.0387	.0060
1	.0637	.0651	.0014	.0459	.0290	.0169
2	.0537	.0516	-.0021	.0459	.0459	-
3	.0733	.0752	.0019	.0413	.0237	.0176
4	.0733	.0677	-.0056	.0464	.0263	.0201
Total	.2640	.2596	-.0044	.1795	.1249	.0546
$\bar{x}$	.0660	.0649	-.0011	.0449	.0312	.0137
1	.0651	.0663	.0012	.0446	.0250	.0196
2	.0516	.0626	.0110	.0464	.0304	.0160
3	.0752	.0726	-.0026	.0464	.0329	.0135
4	.0677	.0686	.0009	.0443	.0336	.0107
Total	.2596	.2701	.0105	.1817	.1219	.0598
$\bar{x}$	.0649	.0675	.0026	.0454	.0305	.0150
1	.0663	.0645	-.0018	.0420	.0187	.0233
2	.0626	.0625	-.0001	.0425	.0425	-
3	.0726	.0628	-.0098	.0435	.0435	-
4	.0686	.0727	.0041	.0427	.0193	.0234
Total	.2701	.2625	-.0076	.1707	.1240	.0467
$\bar{x}$	.0675	.0656	-.0019	.0427	.0310	.0117
1	.0645	.0687	.0042	.0420	.0230	.0190
2	.0625	.0634	.0009	.0427	.0274	.0153
3	.0628	.0671	.0043	.0427	.0296	.0131
4	.0727	.0677	-.0050	.0415	.0305	.0110
Total	.2625	.2669	.0044	.1689	.1105	.0584
$\bar{x}$	.0656	.0667	.0011	.0422	.0276	.0146

	Before	After	Gain or loss	Before	After	Loss
1	.0687	.0676	-.0011	.0453	.0453	-
2	.0634	.0554	-.0080	.0455	.0455	-
3	.0671	.0697	.0026	.0461	.0382	.0079
4	.0677	.0657	-.0020	.0402	.0283	.0119
Total	.2669	.2584	-.0085	.1771	.1573	.0198
$\bar{x}$	.0667	.0646	-.0021	.0443	.0393	.0050
1	.0676	.0677	.0001	.0457	.0295	.0162
2	.0554	.0478	-.0076	.0443	.0390	.0053
3	.0697	.0651	-.0046	.0435	.0310	.0125
4	.0657	.0676	.0019	.0406	.0192	.0214
Total	.2584	.2482	-.0102	.1741	.1187	.0554
$\bar{x}$	.0646	.0621	-.0025	.0435	.0297	.0139
1	.0677	.0690	.0013	.0446	.0446	-
2	.0478	.0520	.0042	.0419	.0419	-
3	.0651	.0643	-.0008	.0450	.0450	-
4	.0676	.0661	-.0015	.0442	.0442	-
Total	.2482	.2514	.0032	.1757	.1757	-
$\bar{x}$	.0621	.0629	.0008	.0439	.0439	-
1	.0690	.0663	-.0027	.0420	.0283	.0137
2	.0520	.0482	-.0038	.0429	.0429	-
3	.0643	.0681	.0038	.0436	.0196	.0240
4	.0661	.0676	.0015	.0445	.0285	.0160
Total	.2514	.2502	-.0012	.1730	.1193	.0537
$\bar{x}$	.0629	.0626	-.0003	.0433	.0299	.0134
1	.0663	.0683	.0020	.0464	.0287	.0177
2	.0482	.0544	.0062	.0400	.0400	-
3	.0681	.0648	-.0033	.0445	.0445	-
4	.0676	.0626	-.0050	.0442	.0442	-
Total	.2502	.2501	-.0001	.1751	.1574	.0177
$\bar{x}$	.0626	.0625	-.0001	.0438	.0394	.0044
1	.0683	.0699	.0016	.0421	.0257	.0164
2	.0544	.0511	-.0033	.0420	.0420	-
3	.0648	.0637	-.0011	.0430	.0228	.0202
4	.0626	.0705	.0079	.0438	.0190	.0248
Total	.2501	.2552	.0051	.1709	.1095	.0614
$\bar{x}$	.0625	.0638	.0013	.0427	.0274	.0153
1	.0699	.0682	-.0017	.0450	.0236	.0214
2	.0511	.0471	-.0040	.0442	.0442	-
3	.0637	.0631	-.0006	.0445	.0445	-
4	.0705	.0570	-.0135	.0440	.0440	-
Total	.2552	.2354	-.0198	.1777	.1563	.0214
$\bar{x}$	.0638	.0589	-.0050	.0444	.0391	.0054
1	.0682	.0653	-.0029	.0427	.0427	-
2	.0471	.0502	.0031	.0401	.0401	-
3	.0631	.0715	.0084	.0431	.0431	-
4	Male died - replicate 4 terminated.					
Total	.1784	.1870	.0086	.1259	.1259	-
$\bar{x}$	.0595	.0623	.0022	.0420	.0420	-

	Before	After	Gain or loss	Before	After	Loss
1	.0653	.0685	.0032	.0435	.0435	-
2	.0502	.0495	-.0007	.0398	.0398	-
3	.0715	.0664	-.0051	.0451	.0206	.0245
Total	.1870	.1844	-.0026	.1284	.1039	.0245
$\bar{x}$	.0623	.0615	-.0009	.0428	.0346	.0082
1	.0685	.0658	-.0027	.0439	.0312	.0127
2	.0495	.0433	-.0062	.0397	.0397	-
3	.0664	.0641	-.0023	.0422	.0422	-
Total	.1844	.1732	-.0112	.1258	.1131	.0127
$\bar{x}$	.0615	.0577	-.0037	.0419	.0377	.0042
1	.0658	.0697	.0039	.0454	.0272	.0182
2	.0433	.0468	.0035	.0410	.0410	-
3	.0641	.0668	.0027	.0460	.0213	.0247
Total	.1732	.1833	.0101	.1324	.0895	.0429
$\bar{x}$	.0577	.0611	.0034	.0441	.0298	.0143
1	.0697	.0643	-.0054	.0413	.0248	.0165
2	.0468	.0461	-.0007	.0414	.0414	-
3	.0668	.0717	.0049	.0420	.0086	.0334
Total	.1833	.1821	-.0012	.1247	.0748	.0499
$\bar{x}$	.0611	.0607	-.0004	.0416	.0249	.0166
1	.0643	.0707	.0064	.0394	.0226	.0168
2	.0461	.0530	.0069	.0448	.0269	.0179
3	.0717	.0659	-.0058	.0434	.0434	-
Total	.1821	.1896	.0075	.1276	.0929	.0347
$\bar{x}$	.0607	.0632	.0025	.0425	.0310	.0116
1	.0707	.0663	-.0044	.0405	.0405	-
2	.0530	.0482	-.0048	.0398	.0398	-
3	.0659	.0626	-.0033	.0410	.0410	-
Total	.1896	.1771	-.0125	.1213	.1213	-
$\bar{x}$	.0632	.0590	-.0042	.0404	.0404	-
1	.0663	.0657	-.0006	.0451	.0451	-
2	.0482	.0481	-.0001	.0445	.0445	-
3	.0626	.0630	.0004	.0443	.0443	-
Total	.1771	.1768	-.0003	.1339	.1339	-
$\bar{x}$	.0590	.0589	-.0001	.0446	.0446	-
1	.0657	.0694	.0037	.0462	.0310	.0152
2	.0481	.0491	.0010	.0412	.0412	-
3	.0630	.0624	-.0006	.0427	.0427	-
Total	.1768	.1809	.0041	.1301	.1149	.0152
$\bar{x}$	.0589	.0603	.0014	.0433	.0383	.0051
1	.0694	.0657	-.0037	.0401	.0347	.0054
2	.0491	.0451	-.0040	.0441	.0441	-
3	.0624	.0674	.0050	.0405	.0198	.0207
Total	.1809	.1782	-.0027	.1247	.0986	.0261
$\bar{x}$	.0603	.0594	-.0009	.0416	.0329	.0087

	Before	After	Gain or loss	Before	After	Loss
1	.0657	.0329	-.0328	.0431	.0431	-
2	.0451	.0433	-.0018	.0428	.0428	-
3	.0674	.0609	-.0065	.0430	.0256	.0174
Total	.1782	.1371	-.0411	.1289	.1115	.0174
x̄	.0594	.0457	-.0137	.0430	.0372	.0058
1	Male died - replicate 1 terminated.					
2	.0433	.0437	.0004	.0443	.0443	-
3	.0609	.0622	.0013	.0433	.0135	.0298
Total	.1042	.1059	.0017	.0876	.0578	.0298
x̄	.0521	.0530	.0009	.0438	.0289	.0149
2	.0437	.0411	-.0026	.0394	.0394	-
3	.0622	.0673	.0051	.0403	.0328	.0075
Total	.1059	.1084	.0025	.0797	.0722	.0075
x̄	.0530	.0542	.0012	.0399	.0361	.0038
2	.0411	.0500	.0089	.0455	.0455	-
3	.0673	.0745	.0072	.0446	.0269	.0177
Total	.1084	.1245	.0161	.0901	.0724	.0177
x̄	.0542	.0623	.0081	.0451	.0362	.0089
2	.0500	.0401	-.0099	.0441	.0441	-
3	.0745	.0645	-.0100	.0394	.0394	-
Total	.1245	.1046	-.0199	.0835	.0835	-
x̄	.0623	.0523	-.0100	.0409	.0409	-
2	.0401	.0347	-.0054	.0434	.0434	-
3	.0645	.0680	.0035	.0436	.0237	.0199
Total	.1046	.1027	-.0019	.0870	.0671	.0199
x̄	.0523	.0513	-.0010	.0435	.0335	.0100
2	Male died - replicate 2 terminated.					
3[1]	.0680	.0634	-.0046	.0395	.0395	-
3	.0634	.0679	.0045	.0394	.0234	.0160
3	.0679	.0633	-.0046	.0394	.0394	-
3	.0633	.0763	.0130	.0397	.0131	.0266
3	.0763	.0601	-.0162	.0409	.0409	-
3	.0601	.0627	.0026	.0418	.0182	.0236
3	.0627	.0709	.0082	.0426	.0123	.0303
3	.0709	.0635	-.0074	.0425	.0425	-
3	.0635	.0642	.0007	.0394	.0394	-
3	.0642	.0642	-	.0394	.0180	.0214
3	.0642	.0672	.0030	.0446	.0191	.0255
3	.0672	.0676	.0004	.0394	.0394	-
3	.0676	.0679	.0003	.0405	.0151	.0254
3	.0679	.0710	.0031	.0398	.0193	.0205

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1 All subsequent daily values for diet level 3 are based on replicate 3 i.e. the value obtained for the sole surviving adult male <u>P. maculiventris</u> in this experiment.

	Before	After	Gain or loss	Before	After	Loss
3	.0710	.0659	-.0051	.0394	.0144	.0250
3	.0659	.0630	-.0029	.0405	.0405	-
3	.0630	.0643	.0013	.0400	.0400	-
3	.0643	.0592	-.0051	.0395	.0271	.0124
3	.0592	.0735	.0143	.0413	.0214	.0199
3	.0735	.0665	-.0070	.0401	.0401	-
3	.0665	.0640	-.0025	.0394	.0263	.0131
3	.0640	.0594	-.0046	.0394	.0267	.0127
3	.0594	.0573	-.0021	.0394	.0394	-
3	.0573	.0617	.0044	.0398	.0327	.0071
3	.0617	.0586	-.0031	.0394	.0394	-

Replications	P. maculiventris Weight before feeding	Weight after feeding	Gain or loss in weight	G. mellonella Weight before predation	Weight after predation	Loss in weight
			Diet level 4 - adult males.			
1	.0604	.0740	.0136	.0564	.0170	.0394
2	.0442	.0606	.0164	.0531	.0098	.0433
3	.0624	.0729	.0105	.0563	.0122	.0441
4	.0507	.0613	.0106	.0561	.0224	.0337
Total	.2177	.2688	.0511	.2219	.0614	.1605
$\bar{x}$	.0544	.0672	.0128	.0555	.0154	.0401
1	.0740	.0758	.0018	.0494	.0252	.0242
2	.0606	.0611	.0005	.0494	.0202	.0292
3	.0729	.0716	-.0013	.0551	.0195	.0356
4	.0613	.0623	.0010	.0561	.0286	.0275
Total	.2688	.2708	.0020	.2100	.0935	.1165
$\bar{x}$	.0672	.0677	.0005	.0525	.0234	.0291
1	.0758	.0755	-.0003	.0502	.0256	.0246
2	.0611	.0624	.0013	.0505	.0300	.0205
3	.0716	.0756	.0040	.0554	.0299	.0255
4	.0623	.0525	-.0098	.0551	.0551	-
Total	.2708	.2660	-.0048	.2112	.1406	.0706
$\bar{x}$	.0677	.0665	-.0012	.0528	.0352	.0177
1	.0755	.0631	-.0124	.0570	.0332	.0238
2	.0624	.0647	.0023	.0498	.0308	.0190
3	.0756	.0665	-.0091	.0512	.0308	.0204
4	.0525	.0661	.0136	.0542	.0299	.0243
Total	.2660	.2604	-.0056	.2122	.1247	.0875
$\bar{x}$	.0665	.0651	-.0014	.0531	.0312	.0219
1	.0631	.0657	.0026	.0494	.0256	.0238
2	.0647	.0588	-.0059	.0555	.0375	.0180
3	.0665	.0603	-.0062	.0495	.0240	.0255
4	.0661	.0594	-.0067	.0494	.0220	.0274
Total	.2604	.2442	-.0162	.2038	.1091	.0947
$\bar{x}$	.0651	.0611	-.0041	.0510	.0273	.0237
1	.0647	.0674	.0017	.0538	.0411	.0127
2	.0588	.0553	-.0035	.0494	.0257	.0237
3	.0603	.0706	.0103	.0550	.0407	.0143
4	.0594	.0641	.0047	.0527	.0427	.0100
Total	.2442	.2574	.0132	.2109	.1502	.0607
$\bar{x}$	.0611	.0644	.0033	.0527	.0376	.0152

	Before	After	Gain or loss	Before	After	Loss
1	.0674	.0743	.0069	.0497	.0335	.0162
2	.0553	.0640	.0087	.0538	.0275	.0263
3	.0706	.0601	-.0105	.0508	.0186	.0322
4	.0641	.0588	-.0053	.0504	.0296	.0208
Total	.2574	.2572	-.0002	.2047	.1092	.0955
$\bar{x}$	.0644	.0643	-.0001	.0512	.0273	.0239
1	.0743	.0736	-.0007	.0555	.0555	-
2	.0640	.0633	-.0007	.0538	.0423	.0115
3	.0601	.0728	.0127	.0564	.0434	.0130
4	.0588	.0616	.0028	.0560	.0368	.0192
Total	.2572	.2713	.0141	.2217	.1780	.0437
$\bar{x}$	.0643	.0678	.0035	.0554	.0445	.0109
1	.0736	.0688	-.0048	.0563	.0352	.0211
2	.0633	.0615	-.0018	.0545	.0405	.0140
3	.0728	.0749	.0021	.0546	.0322	.0224
4	.0616	.0564	-.0052	.0511	.0511	-
Total	.2713	.2616	-.0097	.2165	.1590	.0575
$\bar{x}$	.0678	.0654	-.0024	.0541	.0398	.0144
1	.0688	.0749	.0061	.0494	.0268	.0226
2	.0615	.0601	-.0014	.0495	.0372	.0123
3	.0749	.0672	-.0077	.0554	.0554	-
4	.0564	.0518	-.0046	.0512	.0512	-
Total	.2616	.2540	-.0076	.2055	.1706	.0349
$\bar{x}$	.0654	.0635	-.0019	.0514	.0427	.0087
1	.0749	.0717	-.0032	.0502	.0335	.0167
2	.0601	.0532	-.0069	.0554	.0554	-
3	.0672	.0732	.0060	.0529	.0249	.0280
4	.0518	.0504	-.0014	.0539	.0539	-
Total	.2540	.2485	-.0055	.2124	.1677	.0447
$\bar{x}$	.0635	.0621	-.0014	.0531	.0419	.0112
1	.0717	.0732	.0015	.0545	.0405	.0140
2	.0532	.0574	.0042	.0513	.0513	-
3	.0732	.0639	-.0093	.0558	.0558	-
4	.0504	.0487	-.0017	.0561	.0561	-
Total	.2485	.2432	-.0053	.2177	.2037	.0140
$\bar{x}$	.0621	.0608	-.0013	.0544	.0509	.0035
1	.0732	.0709	-.0023	.0498	.0498	-
2	.0574	.0488	-.0086	.0543	.0543	-
3	.0639	.0742	.0103	.0482	.0358	.0124
4	.0487	.0577	.0090	.0550	.0435	.0115
Total	.2432	.2516	.0084	.2073	.1834	.0239
$\bar{x}$	.0608	.0629	.0021	.0518	.0459	.0060
1	.0709	.0678	-.0031	.0495	.0495	-
2	.0488	.0509	.0021	.0507	.0507	-
3	.0742	.0699	-.0043	.0494	.0229	.0265
4	.0577	.0572	-.0005	.0501	.0233	.0268
Total	.2516	.2458	-.0058	.1997	.1464	.0533
$\bar{x}$	.0629	.0615	-.0015	.0499	.0366	.0133

	Before	After	Gain or loss	Before	After	Loss
1	.0678	.0691	.0013	.0489	.0321	.0168
2	.0509	.0588	.0079	.0510	.0332	.0178
3	.0699	.0773	.0074	.0514	.0240	.0274
4	.0572	.0548	-.0024	.0530	.0223	.0307
Total	.2458	.2600	.0142	.2043	.1116	.0927
$\bar{\bar{x}}$	.0615	.0650	.0036	.0511	.0279	.0232
1	.0691	.0716	.0025	.0532	.0244	.0288
2	.0588	.0604	.0016	.0515	.0410	.0105
3	.0773	.0731	-.0042	.0500	.0390	.0110
4	.0548	.0665	.0117	.0524	.0273	.0251
Total	.2600	.2716	.0116	.2071	.1317	.0754
$\bar{\bar{x}}$	.0650	.0679	.0029	.0518	.0329	.0189
1	.0716	.0664	-.0052	.0559	.0559	-
2	.0604	.0626	.0022	.0550	.0351	.0199
3	.0731	.0633	-.0098	.0547	.0547	-
4	.0665	.0591	-.0074	.0570	.0387	.0183
Total	.2716	.2514	-.0202	.2226	.1844	.0382
$\bar{\bar{x}}$	.0679	.0629	-.0051	.0557	.0461	.0096
1	.0664	.0692	.0028	.0563	.0333	.0230
2	.0626	.0576	-.0050	.0556	.0556	-
3	.0633	.0731	.0098	.0523	.0251	.0272
4	.0591	.0566	-.0025	.0562	.0300	.0262
Total	.2514	.2565	.0051	.2204	.1440	.0764
$\bar{\bar{x}}$	.0629	.0641	.0013	.0551	.0360	.0191
1	.0692	.0758	.0066	.0519	.0293	.0226
2	.0576	.0554	-.0022	.0501	.0501	-
3	.0731	.0767	.0036	.0509	.0211	.0298
4	.0566	.0621	.0055	.0566	.0369	.0197
Total	.2565	.2700	.0135	.2095	.1374	.0721
$\bar{\bar{x}}$	.0641	.0675	.0034	.0524	.0344	.0180
1	.0758	.0680	-.0078	.0503	.0377	.0126
2	.0554	.0563	.0009	.0508	.0508	-
3	.0767	.0690	-.0077	.0500	.0500	-
4	.0621	.0543	-.0078	.0510	.0510	-
Total	.2700	.2476	-.0224	.2021	.1895	.0126
$\bar{\bar{x}}$	.0675	.0619	-.0056	.0505	.0474	.0032
1	.0680	.0686	.0006	.0537	.0537	-
2	.0563	.0656	.0093	.0544	.0311	.0233
3	.0690	.0750	.0060	.0497	.0267	.0230
4	.0543	.0573	.0030	.0562	.0266	.0296
Total	.2476	.2665	.0189	.2140	.1381	.0759
$\bar{\bar{x}}$	.0619	.0666	.0047	.0535	.0345	.0190
1	.0686	.0724	.0038	.0496	.0141	.0355
2	.0656	.0584	-.0072	.0510	.0510	-
3	.0750	.0726	-.0024	.0497	.0138	.0359
4	.0573	.0640	.0067	.0495	.0206	.0289
Total	.2665	.2674	.0009	.1998	.0995	.1003
$\bar{\bar{x}}$	.0666	.0669	.0002	.0500	.0249	.0251

	Before	After	Gain or loss	Before	After	Loss
1	.0724	.0736	.0012	.0564	.0339	.0225
2	.0584	.0627	.0043	.0555	.0319	.0236
3	.0726	.0791	.0065	.0558	.0256	.0302
4	.0640	.0623	-.0017	.0545	.0260	.0285
Total	.2674	.2777	.0103	.2222	.1174	.1048
$\bar{x}$	.0669	.0694	.0026	.0556	.0294	.0262
1	.0736	.0708	-.0028	.0499	.0380	.0119
2	.0627	.0601	-.0026	.0497	.0497	-
3	.0791	.0699	-.0092	.0497	.0404	.0093
4	.0623	.0583	-.0040	.0562	.0343	.0219
Total	.2777	.2591	-.0186	.2055	.1624	.0431
$\bar{x}$	.0694	.0648	-.0047	.0514	.0406	.0108
1	.0708	.0736	.0028	.0565	.0408	.0157
2	.0601	.0599	-.0002	.0563	.0464	.0099
3	.0699	.0742	.0043	.0562	.0337	.0225
4	.0583	.0606	.0023	.0559	.0464	.0095
Total	.2591	.2683	.0092	.2249	.1673	.0576
$\bar{x}$	.0648	.0671	.0023	.0562	.0418	.0144
1	.0736	.0743	.0007	.0500	.0205	.0295
2	.0599	.0652	.0053	.0507	.0314	.0193
3	.0742	.0763	.0021	.0498	.0390	.0108
4	.0606	.0591	-.0015	.0494	.0280	.0214
Total	.2683	.2749	.0066	.1999	.1189	.0810
$\bar{x}$	.0671	.0687	.0017	.0500	.0297	.0203
1	.0743	.0680	-.0063	.0494	.0160	.0334
2	.0652	.0620	-.0032	.0495	.0495	-
3	.0763	.0710	-.0053	.0494	.0494	-
4	.0591	.0593	.0002	.0495	.0292	.0203
Total	.2749	.2603	-.0146	.1978	.1441	.0537
$\bar{x}$	.0687	.0651	-.0037	.0495	.0360	.0134
1	.0680	.0696	.0016	.0494	.0280	.0214
2	.0620	.0613	-.0007	.0496	.0496	-
3	.0710	.0658	-.0052	.0562	.0562	-
4	.0593	.0509	-.0084	.0548	.0307	.0241
Total	.2603	.2476	-.0127	.2100	.1645	.0455
$\bar{x}$	.0651	.0619	-.0032	.0525	.0411	.0114
1	.0696	.0719	.0023	.0566	.0487	.0079
2	.0613	.0585	-.0028	.0517	.0517	-
3	.0658	.0725	.0067	.0566	.0481	.0085
4	.0509	.0549	.0040	.0499	.0499	-
Total	.2476	.2578	.0102	.2148	.1984	.0164
$\bar{x}$	.0619	.0645	.0026	.0537	.0496	.0041
1	.0719	.0740	.0021	.0514	.0295	.0219
2	.0585	.0592	.0007	.0495	.0365	.0130
3	.0725	.0668	-.0057	.0497	.0497	-
4	.0549	.0528	-.0021	.0511	.0511	-
Total	.2578	.2528	-.0050	.2017	.1668	.0349
$\bar{x}$	.0645	.0632	-.0013	.0504	.0417	.0087

	Before	After	Gain or loss	Before	After	Loss
1	.0740	.0728	-.0012	.0495	.0188	.0307
2	.0592	.0589	-.0003	.0494	.0494	-
3	.0668	.0787	.0119	.0497	.0158	.0339
4	.0528	.0600	.0072	.0495	.0227	.0268
Total	.2528	.2704	.0176	.1981	.1067	.0914
$\bar{x}$	.0632	.0676	.0044	.0495	.0267	.0229
1	.0728	.0737	.0009	.0549	.0183	.0366
2	.0589	.0584	-.0005	.0504	.0504	-
3	.0787	.0819	.0032	.0498	.0244	.0254
4	.0600	.0643	.0043	.0563	.0359	.0204
Total	.2704	.2783	.0079	.2114	.1290	.0824
$\bar{x}$	.0676	.0696	.0020	.0529	.0323	.0206
1	.0737	.0736	-.0001	.0496	.0431	.0065
2	.0584	.0591	.0007	.0508	.0508	-
3	.0819	.0723	-.0096	.0494	.0494	-
4	.0643	.0620	-.0023	.0513	.0450	.0063
Total	.2783	.2670	-.0113	.2011	.1883	.0128
$\bar{x}$	.0696	.0668	-.0028	.0503	.0471	.0032
1	.0736	.0727	-.0009	.0495	.0364	.0131
2	.0591	.0631	.0040	.0556	.0556	-
3	.0723	.0677	-.0046	.0500	.0380	.0120
4	.0620	.0636	.0016	.0558	.0375	.0183
Total	.2670	.2671	.0001	.2109	.1675	.0434
$\bar{x}$	.0668	.0668	-	.0527	.0419	.0109
1	.0727	.0762	.0035	.0520	.0298	.0222
2	.0631	.0650	.0019	.0553	.0553	-
3	.0677	.0705	.0028	.0494	.0494	-
4	.0636	.0704	.0068	.0495	.0411	.0084
Total	.2671	.2821	.0150	.2062	.1756	.0306
$\bar{x}$	.0668	.0705	.0038	.0516	.0439	.0077
1	.0762	.0784	.0022	.0557	.0387	.0170
2	.0650	.0591	-.0059	.0555	.0555	-
3	.0705	.0711	.0006	.0537	.0537	-
4	.0704	.0656	-.0048	.0528	.0528	-
Total	.2821	.2742	-.0079	.2177	.2007	.0170
$\bar{x}$	.0705	.0686	-.0020	.0544	.0502	.0043
1	.0784	.0736	-.0048	.0546	.0440	.0146
2	.0591	.0621	.0030	.0553	.0553	-
3	.0711	.0837	.0126	.0494	.0256	.0238
4	.0656	.0648	-.0008	.0515	.0515	-
Total	.2742	.2842	.0100	.2108	.1764	.0384
$\bar{x}$	.0686	.0712	.0025	.0527	.0441	.0096
1	.0736	.0755	.0019	.0550	.0426	.0124
2	.0621	.0646	.0025	.0555	.0336	.0219
3	.0837	.0724	-.0113	.0552	.0552	-
4	.0648	.0722	.0074	.0545	.0297	.0248
Total	.2842	.2847	.0005	.2202	.1611	.0591
$\bar{x}$	.0712	.0712	.0001	.0551	.0403	.0148

	Before	After	Gain or loss	Before	After	Loss
1	.0755	.0774	.0019	.0537	.0381	.0156
2	.0646	.0642	-.0004	.0556	.0556	-
3	.0724	.0679	-.0045	.0536	.0536	-
4	.0722	.0732	.0010	.0549	.0430	.0119
Total	.2847	.2827	-.0020	.2178	.1903	.0275
$\bar{x}$	.0712	.0707	-.0005	.0545	.0476	.0069
1	.0774	.0642	-.0132	.0527	.0403	.0124
2	.0642	.0623	-.0019	.0539	.0539	-
3	.0679	.0756	.0077	.0538	.0538	-
4	.0732	.0692	-.0040	.0518	.0518	-
Total	.2827	.2713	-.0114	.2122	.1998	.0124
$\bar{x}$	.0707	.0678	-.0029	.0531	.0500	.0031
1	.0642	.0737	.0095	.0535	.0399	.0136
2	.0623	.0668	.0045	.0547	.0404	.0143
3	.0756	.0821	.0065	.0532	.0291	.0241
4	.0692	.0674	-.0018	.0542	.0542	-
Total	.2713	.2900	.0187	.2156	.1636	.0520
$\bar{x}$	.0678	.0725	.0047	.0539	.0409	.0130
1	.0737	.0676	-.0061	.0562	.0562	-
2	.0668	.0621	-.0047	.0504	.0504	-
3	.0821	.0761	-.0060	.0564	.0564	-
4	.0674	.0687	.0013	.0564	.0396	.0168
Total	.2900	.2745	-.0155	.2194	.2026	.0168
$\bar{x}$	.0725	.0686	-.0039	.0549	.0507	.0042
1	.0676	.0758	.0082	.0515	.0270	.0245
2	.0621	.0621	-	.0518	.0518	-
3	.0761	.0735	-.0026	.0519	.0519	-
4	.0687	.0626	-.0061	.0514	.0514	-
Total	.2745	.2740	-.0005	.2066	.1821	.0245
$\bar{x}$	.0686	.0685	-.0001	.0516	.0455	.0061
1	.0758	.0728	-.0030	.0563	.0267	.0296
2	.0621	.0612	-.0009	.0532	.0532	-
3	.0735	.0726	-.0009	.0533	.0533	-
4	.0626	.0625	-.0001	.0553	.0553	-
Total	.2740	.2691	-.0049	.2181	.1885	.0296
$\bar{x}$	.0685	.0672	-.0012	.0545	.0471	.0074
1	.0728	.0732	.0004	.0521	.0222	.0299
2	.0618	.0608	-.0010	.0494	.0494	-
3	.0726	.0681	-.0045	.0561	.0561	-
4	.0625	.0695	.0070	.0528	.0288	.0240
Total	.2697	.2716	.0019	.2104	.1565	.0539
$\bar{x}$	.0674	.0679	.0005	.0526	.0391	.0135
1	.0732	.0724	-.0008	.0543	.0379	.0164
2	.0608	.0643	.0035	.0544	.0485	.0059
3	.0681	.0702	.0021	.0537	.0537	-
4	.0695	.0699	.0004	.0557	.0389	.0168
Total	.2716	.2768	.0052	.2181	.1790	.0391
$\bar{x}$	.0679	.0692	.0013	.0545	.0447	.0098

	Before	After	Gain or loss	Before	After	Loss
1	.0724	.0702	-.0022	.0507	.0507	-
2	.0643	.0614	-.0029	.0538	.0538	-
3	.0702	.0727	.0025	.0551	.0551	-
4	.0699	.0669	-.0030	.0537	.0537	-
Total	.2768	.2712	-.0056	.2133	.2133	-
$\bar{x}$	.0692	.0678	-.0014	.0533	.0533	-
1	.0702	.0643	-.0059	.0541	.0541	-
2	.0614	.0594	-.0020	.0546	.0546	-
3	.0727	.0682	-.0045	.0544	.0544	-
4	.0669	.0654	-.0015	.0539	.0539	-
Total	.2712	.2573	-.0139	.2170	.2170	-
$\bar{x}$	.0678	.0643	-.0035	.0542	.0542	-
1	.0643	.0772	.0129	.0542	.0278	.0264
2	.0594	.0670	.0076	.0542	.0360	.0182
3	.0682	.0715	.0033	.0510	.0510	-
4	.0654	.0691	.0037	.0520	.0321	.0199
Total	.2573	.2848	.0275	.2114	.1469	.0645
$\bar{x}$	.0643	.0712	.0069	.0529	.0367	.0161
1	.0772	.0681	-.0091	.0535	.0535	-
2	.0670	.0645	-.0025	.0564	.0564	-
3	.0715	.0697	-.0018	.0564	.0564	-
4	.0691	.0653	-.0038	.0506	.0463	.0043
Total	.2848	.2676	-.0172	.2169	.2126	.0043
$\bar{x}$	.0712	.0669	-.0043	.0542	.0532	.0011
1	.0681	.0658	-.0023	.0513	.0513	-
2	.0645	.0639	-.0006	.0555	.0555	-
3	.0697	.0652	-.0045	.0558	.0558	-
4	.0653	.0592	-.0061	.0547	.0486	.0061
Total	.2676	.2541	-.0135	.2173	.2112	.0061
$\bar{x}$	.0669	.0635	-.0034	.0543	.0528	.0015
1	.0658	.0752	.0094	.0543	.0343	.0200
2	.0639	.0692	.0053	.0537	.0391	.0146
3	.0652	.0696	.0044	.0519	.0519	-
4	.0592	.0686	.0094	.0497	.0348	.0149
Total	.2541	.2826	.0285	.2096	.1601	.0495
$\bar{x}$	.0635	.0707	.0071	.0524	.0400	.0124
1	.0752	.0779	.0027	.0553	.0271	.0282
2	.0692	.0632	-.0060	.0523	.0523	-
3	.0696	.0707	.0011	.0542	.0542	-
4	.0686	.0691	.0005	.0535	.0348	.0187
Total	.2826	.2809	-.0017	.2153	.1684	.0469
$\bar{x}$	.0707	.0702	-.0004	.0538	.0421	.0117
1	.0779	.0757	-.0022	.0520	.0314	.0206
2	.0632	.0621	-.0011	.0494	.0494	-
3	.0707	.0703	-.0004	.0494	.0494	-
4	.0691	.0658	-.0033	.0535	.0535	-
Total	.2809	.2739	-.0070	.2043	.1837	.0206
$\bar{x}$	.0702	.0685	-.0018	.0511	.0459	.0052

	Before	After	Gain or loss	Before	After	Loss
1	.0757	.0731	-.0026	.0541	.0541	-
2	.0621	.0622	.0001	.0552	.0552	-
3	.0703	.0664	-.0039	.0522	.0522	-
4	.0658	.0705	.0047	.0514	.0288	.0226
Total	.2739	.2722	-.0017	.2129	.1903	.0226
x̄	.0685	.0681	-.0004	.0532	.0475	.0057
1	.0731	.0706	-.0025	.0542	.0389	.0153
2	.0622	.0586	-.0036	.0529	.0529	-
3	.0664	.0693	.0029	.0529	.0349	.0180
4	.0705	.0691	-.0014	.0559	.0559	-
Total	.2722	.2676	-.0046	.2159	.1826	.0333
x̄	.0681	.0669	-.0012	.0540	.0457	.0083
1	.0706	.0618	-.0088	.0546	.0546	-
2	.0586	.0564	-.0022	.0522	.0522	-
3	.0693	.0646	-.0047	.0529	.0529	-
4	.0691	.0693	.0002	.0564	.0363	.0201
Total	.2676	.2521	-.0155	.2161	.1960	.0201
x̄	.0669	.0630	-.0039	.0540	.0490	.0050
1	Male died - replicate 1 terminated.					
2	.0564	.0659	.0095	.0553	.0354	.0199
3	.0646	.0626	-.0020	.0496	.0496	-
4	.0693	.0707	.0014	.0499	.0283	.0216
Total	.1903	.1992	.0089	.1548	.1133	.0415
x̄	.0634	.0664	.0030	.0516	.0378	.0138
2	.0659	.0651	-.0008	.0532	.0532	-
3	.0626	.0612	-.0014	.0546	.0546	-
4	.0707	.0684	-.0023	.0512	.0336	.0176
Total	.1992	.1947	-.0045	.1590	.1414	.0176
x̄	.0664	.0649	-.0015	.0530	.0471	.0059
2	.0651	.0656	.0005	.0560	.0560	-
3	.0612	.0648	.0036	.0542	.0542	-
4	.0684	.0707	.0023	.0538	.0303	.0235
Total	.1947	.2011	.0064	.1640	.1405	.0235
x̄	.0649	.0670	.0021	.0547	.0468	.0078
2	.0656	.0634	-.0022	.0494	.0494	-
3	.0648	.0641	-.0007	.0495	.0495	-
4	.0707	.0657	-.0050	.0494	.0347	.0147
Total	.2011	.1932	-.0079	.1483	.1336	.0147
x̄	.0670	.0644	-.0026	.0494	.0445	.0049
2	.0634	.0592	-.0042	.0494	.0494	-
3	.0641	.0798	.0157	.0495	.0212	.0283
4	.0657	.0709	.0052	.0494	.0353	.0141
Total	.1932	.2099	.0167	.1483	.1059	.0424
x̄	.0644	.0700	.0056	.0494	.0353	.0141

	Before	After	Gain or loss	Before	After	Loss
2	.0592	.0609	.0017	.0494	.0494	-
3	.0798	.0732	-.0066	.0517	.0517	-
4	.0709	.0635	-.0074	.0495	.0495	-
Total	.2099	.1976	-.0123	.1506	.1506	-
$\bar{x}$	.0700	.0659	-.0041	.0502	.0502	-
2	.0609	.0566	-.0043	.0560	.0560	-
3	.0732	.0687	-.0045	.0506	.0506	-
4	.0635	.0623	-.0012	.0538	.0484	.0054
Total	.1976	.1876	-.0100	.1604	.1550	.0054
$\bar{x}$	.0659	.0625	-.0033	.0535	.0517	.0018
2	.0566	.0597	.0031	.0536	.0536	-
3	.0687	.0691	.0004	.0510	.0510	-
4	.0623	.0674	.0051	.0506	.0295	.0211
Total	.1876	.1962	.0086	.1552	.1341	.0211
$\bar{x}$	.0625	.0654	.0029	.0517	.0447	.0070
2	.0597	.0636	.0039	.0517	.0315	.0202
3	.0691	.0627	-.0064	.0495	.0495	-
4	.0674	.0634	-.0040	.0535	.0437	.0098
Total	.1962	.1897	-.0065	.1547	.1247	.0300
$\bar{x}$	.0654	.0632	-.0022	.0516	.0416	.0100
2	.0636	.0668	.0032	.0494	.0366	.0128
3	.0627	.0676	.0049	.0495	.0495	-
4	.0634	.0706	.0072	.0495	.0242	.0253
Total	.1897	.2050	.0153	.1484	.1103	.0381
$\bar{x}$	.0632	.0683	.0051	.0495	.0368	.0127
2	.0668	.0621	-.0047	.0500	.0500	-
3	.0676	.0650	-.0026	.0498	.0498	-
4	.0706	.0699	-.0007	.0496	.0312	.0184
Total	.2050	.1970	-.0080	.1494	.1310	.0184
$\bar{x}$	.0683	.0657	-.0027	.0498	.0437	.0061
2	.0621	.0616	-.0005	.0529	.0529	-
3	.0650	.0781	.0131	.0533	.0376	.0157
4	.0699	.0669	-.0030	.0550	.0426	.0124
Total	.1970	.2066	.0096	.1612	.1331	.0281
$\bar{x}$	.0657	.0689	.0032	.0537	.0444	.0094
2	.0616	.0621	.0005	.0530	.0530	-
3	.0781	.0758	-.0023	.0506	.0463	.0043
4	.0669	.0623	-.0046	.0543	.0452	.0091
Total	.2066	.2002	-.0064	.1579	.1445	.0134
$\bar{x}$	.0689	.0667	-.0021	.0526	.0482	.0645
2	.0621	.0589	-.0032	.0512	.0512	-
3	.0758	.0703	-.0055	.0554	.0554	-
4	.0623	.0707	.0084	.0514	.0353	.0161
Total	.2002	.1999	-.0003	.1580	.1419	.0161
$\bar{x}$	.0667	.0666	-.0001	.0527	.0473	.0054

	Before	After	Gain or loss	Before	After	Loss
2	.0589	.0601	.0012	.0521	.0521	-
3	.0703	.0659	-.0044	.0511	.0511	-
4	.0707	.0676	-.0031	.0544	.0358	.0186
Total	.1999	.1936	-.0063	.1576	.1390	.0186
x̄	.0666	.0645	-.0021	.0525	.0463	.0062
2	.0601	.0561	-.0040	.0493	.0493	-
3	.0659	.0661	.0002	.0546	.0345	.0201
4	.0676	.0581	-.0095	.0538	.0538	-
Total	.1936	.1803	-.0133	.1577	.1376	.0201
x̄	.0645	.0601	-.0044	.0526	.0459	.0067
2	.0561	.0672	.0111	.0501	.0378	.0123
3	.0661	.0685	.0024	.0494	.0494	-
4	.0581	.0719	.0138	.0517	.0260	.0257
Total	.1803	.2076	.0273	.1512	.1132	.0380
x̄	.0601	.0692	.0091	.0504	.0377	.0127
2	.0672	.0653	-.0019	.0494	.0494	-
3	.0685	.0653	-.0032	.0505	.0505	-
4	.0719	.0692	-.0027	.0494	.0494	-
Total	.2076	.1998	-.0078	.1493	.1493	-
x̄	.0692	.0666	-.0026	.0498	.0498	-
2	.0653	.0604	-.0049	.0525	.0525	-
3	.0653	.0626	-.0027	.0505	.0505	-
4	.0692	.0693	.0001	.0520	.0520	-
Total	.1998	.1923	-.0075	.1550	.1550	-
x̄	.0666	.0641	-.0025	.0517	.0517	-
2	.0604	.0547	-.0057	.0537	.0537	-
3	.0626	.0782	.0156	.0524	.0228	.0296
4	.0693	.0659	-.0034	.0526	.0526	-
Total	.1923	.1988	.0065	.1587	.1291	.0296
x̄	.0641	.0663	.0022	.0529	.0430	.0099
2	Male died - replicate 2 terminated.					
3	.0782	.0710	-.0072	.0498	.0498	-
4	.0659	.0740	.0081	.0519	.0335	.0184
Total	.1441	.1450	.0009	.1017	.0833	.0184
x̄	.0721	.0725	.0005	.0509	.0417	.0092
3	.0710	.0617	-.0093	.0496	.0496	-
4	.0740	.0680	-.0060	.0525	.0432	.0093
Total	.1450	.1297	-.0153	.1021	.0928	.0093
x̄	.0725	.0649	-.0077	.0511	.0464	.0047
3	.0617	.0633	.0016	.0494	.0494	-
4	.0680	.0668	-.0012	.0517	.0289	.0228
Total	.1297	.1301	.0004	.1011	.0783	.0228
x̄	.0649	.0651	.0002	.0506	.0392	.0114
3	.0633	.0714	.0081	.0498	.0263	.0235
4	.0668	.0643	-.0025	.0505	.0329	.0176
Total	.1301	.1357	.0056	.1003	.0592	.0411
x̄	.0651	.0679	.0028	.0502	.0296	.0206

	Before	After	Gain or loss	Before	After	Loss
3	.0714	.0685	-.0029	.0507	.0342	.0165
4	.0643	.0663	.0020	.0515	.0266	.0249
Total	.1357	.1348	-.0009	.1022	.0608	.0414
$\bar{x}$	.0679	.0674	-.0005	.0511	.0304	.0207
3	.0685	.0736	.0051	.0531	.0235	.0296
4	.0663	.0720	.0057	.0515	.0159	.0356
Total	.1348	.1456	.0108	.1046	.0394	.0652
$\bar{x}$	.0674	.0728	.0540	.0523	.0197	.0326
3	.0736	.0740	.0004	.0527	.0261	.0266
4	.0720	.0717	-.0003	.0519	.0305	.0214
Total	.1456	.1457	.0001	.1046	.0566	.0480
$\bar{x}$	.0728	.0729	.0001	.0523	.0283	.0240
3	.0740	.0744	.0004	.0496	.0496	-
4	.0717	.0677	-.0040	.0494	.0337	.0157
Total	.1457	.1421	-.0036	.0990	.0833	.0157
$\bar{x}$	.0729	.0711	-.0018	.0495	.0417	.0079
3	.0744	.0684	-.0060	.0539	.0387	.0152
4	.0677	.0630	-.0047	.0515	.0515	-
Total	.1421	.1314	-.0107	.1054	.0902	.0152
$\bar{x}$	.0711	.0657	-.0054	.0527	.0451	.0076
3	.0684	.0676	-.0008	.0494	.0494	-
4	.0630	.0646	.0016	.0494	.0249	.0245
Total	.1314	.1322	.0008	.0988	.0743	.0245
$\bar{x}$	.0657	.0661	.0004	.0494	.0372	.0123
3	.0676	.0674	-.0002	.0556	.0353	.0203
4	.0646	.0681	.0035	.0527	.0465	.0062
Total	.1322	.1355	.0033	.1083	.0818	.0265
$\bar{x}$	.0661	.0678	.0017	.0542	.0409	.0133
3	.0674	.0719	.0045	.0494	.0318	.0176
4	.0681	.0639	-.0042	.0515	.0515	-
Total	.1355	.1358	.0003	.1009	.0833	.0176
$\bar{x}$	.0678	.0679	.0002	.0505	.0417	.0088
3	.0719	.0746	.0027	.0494	.0339	.0155
4	.0639	.0719	.0080	.0494	.0224	.0240
Total	.1358	.1465	.0107	.0988	.0563	.0425
$\bar{x}$	.0679	.0733	.0054	.0494	.0282	.0213
3	.0746	.0626	-.0120	.0497	.0497	-
4	.0719	.0669	-.0050	.0514	.0514	-
Total	.1465	.1295	-.0170	.1011	.1011	-
$\bar{x}$	.0733	.0648	-.0085	.0506	.0506	-
3	.0626	.0734	.0108	.0494	.0340	.0154
4	.0669	.0746	.0077	.0495	.0147	.0348
Total	.1295	.1480	.0185	.0989	.0487	.0502
$\bar{x}$	.0648	.0740	.0093	.0495	.0244	.0251

	Before	After	Gain or loss	Before	After	Loss
3	.0734	.0683	-.0051	.0494	.0340	.0154
4	.0746	.0750	.0004	.0495	.0321	.0174
Total	.1480	.1433	-.0047	.0989	.0661	.0328
$\bar{x}$	.0740	.0717	-.0024	.0495	.0331	.0164
3	.0683	.0684	.0001	.0494	.0312	.0182
4	.0750	.0711	-.0039	.0496	.0234	.0262
Total	.1433	.1395	-.0038	.0990	.0546	.0444
$\bar{x}$	.0717	.0698	-.0019	.0495	.0273	.0222
3	.0684	.0668	-.0016	.0498	.0320	.0178
4	.0711	.0583	-.0128	.0496	.0496	-
Total	.1395	.1251	-.0144	.0994	.0816	.0178
$\bar{x}$	.0698	.0625	-.0072	.0497	.0408	.0089
3	.0668	.0817	.0149	.0499	.0235	.0264
4	.0583	.0703	.0120	.0494	.0285	.0209
Total	.1251	.1520	.0269	.0993	.0520	.0473
$\bar{x}$	.0625	.0760	.0135	.0497	.0260	.0237
3	.0817	.0711	-.0106	.0502	.0502	-
4	.0703	.0697	-.0006	.0496	.0272	.0224
Total	.1520	.1408	-.0112	.0998	.0774	.0224
$\bar{x}$	.0760	.0704	-.0056	.0499	.0387	.0112
3	.0711	.0678	-.0033	.0525	.0351	.0174
4	.0697	.0689	-.0008	.0504	.0504	-
Total	.1408	.1367	-.0041	.1029	.0855	.0174
$\bar{x}$	.0704	.0684	-.0021	.0515	.0428	.0087
3	.0678	.0645	-.0033	.0494	.0323	.0171
4	.0689	.0703	.0014	.0495	.0323	.0172
Total	.1367	.1348	-.0019	.0989	.0646	.0343
$\bar{x}$	.0684	.0674	-.0010	.0495	.0323	.0172
3	.0645	.0694	.0049	.0514	.0302	.0212
4	.0703	.0737	.0034	.0504	.0326	.0178
Total	.1348	.1431	.0083	.1018	.0628	.0390
$\bar{x}$	.0674	.0716	.0042	.0509	.0314	.0195
3	.0694	.0696	.0002	.0521	.0275	.0246
4	.0737	.0665	-.0072	.0505	.0292	.0213
Total	.1431	.1361	-.0070	.1026	.0567	.0459
$\bar{x}$	.0716	.0681	-.0035	.0513	.0284	.0230
3	.0696	.0664	-.0032	.0495	.0396	.0099
4	.0665	.0688	.0023	.0513	.0294	.0219
Total	.1361	.1352	-.0009	.1008	.0690	.0318
$\bar{x}$	.0681	.0676	-.0005	.0540	.0345	.0159
3	.0664	.0695	.0031	.0515	.0515	-
4	.0688	.0704	.0016	.0523	.0523	-
Total	.1352	.1399	.0047	.1038	.1038	-
$\bar{x}$	.0676	.0700	.0024	.0519	.0519	-
3	.0695	.0648	-.0047	.0497	.0497	-
4	.0704	.0706	.0002	.0517	.0408	.0109
Total	.1399	.1354	-.0045	.1014	.0905	.0109
$\bar{x}$	.0700	.0677	-.0023	.0507	.0453	.0055

	Before	After	Gain or loss	Before	After	Loss
3	.0648	.0718	.0070	.0506	.0304	.0202
4	.0706	.0605	-.0101	.0509	.0509	-
Total	.1354	.1323	-.0031	.1015	.0813	.0202
$\bar{x}$	.0677	.0662	-.0016	.0508	.0407	.0101
3[1]	.0718	.0771	.0053	.0521	.0230	.0291
4	Male died - replicate 4 terminated.					
3	.0771	.0735	-.0036	.0497	.0447	.0050
3	.0735	.0691	-.0044	.0504	.0243	.0261
3	.0691	.0629	-.0062	.0495	.0495	-
3	.0629	.0692	.0063	.0494	.0494	-
3	.0692	.0644	-.0048	.0494	.0494	-
3	.0644	.0716	.0072	.0494	.0279	.0215
3	.0716	.0580	-.0136	.0513	.0513	-
3	.0580	.0684	.0104	.0517	.0240	.0277
3	.0684	.0796	.0112	.0503	.0074	.0429
3	.0796	.0728	-.0068	.0510	.0510	-
3	.0728	.0677	-.0051	.0494	.0180	.0314
3	.0677	.0715	.0038	.0509	.0289	.0220
3	.0715	.0684	-.0031	.0528	.0332	.0196
3	.0684	.0646	-.0038	.0507	.0507	-
3	.0646	.0777	.0131	.0500	.0363	.0137
3	.0777	.0688	-.0089	.0494	.0494	-
3	.0688	.0649	-.0039	.0510	.0510	-
3	.0649	.0775	.0126	.0525	.0525	-
3	.0775	.0818	.0043	.0494	.0305	.0189
3	.0818	.0718	-.0100	.0510	.0510	-
3	.0718	.0668	-.0050	.0506	.0506	-

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[1] All subsequent daily values for diet level 4 are based on replicate 3 i.e. the value obtained for the sole surviving adult male *P. maculiventris* in this experiment.

	P. maculiventris			*G. mellonella*		
Repli-cations	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
			Diet level 1 - adult females.			
1	.0810	.0754	-.0056	.0102	.0102	-
2	.0766	.0795	.0029	.0095	.0017	.0078
3	.0938	.0885	-.0053	.0094	.0094	-
4	.0727	.0685	-.0042	.0094	.0094	-
Total	.3241	.3119	-.0122	.0385	.0307	.0078
$\bar{x}$	.0810	.0780	-.0031	.0096	.0077	.0020
1	.0754	.0815	.0061	.0134	.0013	.0121
2	.0795	.0792	-.0003	.0094	.0014	.0080
3	.0885	.0904	.0019	.0117	.0040	.0077
4	.0685	.0682	-.0003	.0094	.0012	.0082
Total	.3119	.3193	.0074	.0439	.0079	.0360
$\bar{x}$	.0780	.0798	.0019	.0110	.0020	.0090
1	.0815	.0712	-.0103	.0127	.0011	.0116
2	.0792	.0732	-.0060	.0115	.0008	.0107
3	.0904	.0735	-.0169	.0128	.0015	.0113
4	.0682	.0665	-.0017	.0147	.0008	.0139
Total	.3193	.2844	-.0349	.0517	.0042	.0475
$\bar{x}$	.0798	.0711	-.0087	.0129	.0011	.0119
1	.0712	.0668	-.0044	.0120	.0011	.0109
2	.0732	.0742	.0010	.0140	.0014	.0126
3	.0735	.0690	-.0045	.0109	.0109	-
4	.0665	.0649	-.0016	.0127	.0127	-
Total	.2844	.2749	-.0095	.0496	.0261	.0235
$\bar{x}$	.0711	.0687	-.0024	.0124	.0065	.0059
1	.0668	.0811	.0143	.0137	.0010	.0127
2	.0742	.0789	.0047	.0141	.0023	.0118
3	.0690	.0797	.0107	.0148	.0019	.0129
4	.0649	.0668	.0019	.0147	.0019	.0128
Total	.2749	.3065	.0316	.0573	.0071	.0502
$\bar{x}$	.0687	.0766	.0079	.0143	.0018	.0126
1	.0811	.0744	-.0067	.0124	.0012	.0112
2	.0789	.0763	-.0026	.0103	.0009	.0094
3	.0797	.0766	-.0031	.0150	.0019	.0131
4	.0668	.0718	.0050	.0139	.0010	.0129
Total	.3065	.2991	-.0074	.0516	.0050	.0466
$\bar{x}$	.0766	.0748	-.0019	.0129	.0013	.0117

	Before	After	Gain or loss	Before	After	Loss
1	.0744	.0759	.0015	.0144	.0014	.0130
2	.0763	.0790	.0027	.0094	.0009	.0085
3	.0766	.0851	.0085	.0125	.0011	.0114
4	.0718	.0734	.0016	.0124	.0011	.0113
Total	.2991	.3134	.0143	.0487	.0045	.0442
$\bar{\bar{x}}$	.0748	.0784	.0036	.0122	.0011	.0111
1	.0759	.0750	-.0009	.0094	.0016	.0078
2	.0790	.0807	.0017	.0112	.0011	.0101
3	.0851	.0821	-.0030	.0141	.0012	.0129
4	.0734	.0701	-.0033	.0107	.0015	.0092
Total	.3134	.3079	-.0055	.0454	.0054	.0400
$\bar{\bar{x}}$	.0784	.0770	-.0014	.0114	.0014	.0100
1	.0750	.0814	.0064	.0158	.0012	.0146
2	.0807	.0819	.0012	.0146	.0006	.0140
3	.0821	.0895	.0074	.0154	.0008	.0146
4	.0701	.0759	.0058	.0120	.0007	.0113
Total	.3079	.3287	.0208	.0578	.0033	.0545
$\bar{\bar{x}}$	.0770	.0822	.0052	.0145	.0008	.0136
1	.0814	.0860	.0046	.0143	.0009	.0134
2	.0819	.0875	.0056	.0136	.0019	.0117
3	.0895	.0892	-.0003	.0142	.0007	.0135
4	.0759	.0705	-.0054	.0141	.0141	-
Total	.3287	.3332	.0045	.0562	.0176	.0386
$\bar{\bar{x}}$	.0822	.0833	.0011	.0141	.0044	.0097
1	.0860	.0845	-.0015	.0136	.0004	.0132
2	.0875	.0827	-.0048	.0133	.0133	-
3	.0892	.0888	-.0004	.0094	.0005	.0089
4	.0705	.0716	.0011	.0131	.0005	.0126
Total	.3332	.3276	-.0056	.0494	.0147	.0347
$\bar{\bar{x}}$	.0833	.0819	-.0014	.0124	.0034	.0087
1	.0845	.0927	.0082	.0112	.0008	.0104
2	.0827	.0821	-.0006	.0131	.0131	-
3	.0888	.0935	.0047	.0114	.0010	.0104
4	.0716	.0816	.0100	.0115	.0008	.0107
Total	.3276	.3499	.0223	.0472	.0157	.0315
$\bar{\bar{x}}$	.0819	.0875	.0056	.0118	.0039	.0079
1	.0927	.0860	-.0067	.0151	.0004	.0147
2	.0821	.0852	.0031	.0129	.0013	.0116
3	.0935	.0941	.0006	.0157	.0008	.0149
4	.0816	.0770	-.0046	.0156	.0012	.0144
Total	.3499	.3423	-.0076	.0593	.0037	.0556
$\bar{\bar{x}}$	.0875	.0856	-.0019	.0148	.0009	.0139
1	.0860	.0854	-.0006	.0117	.0007	.0110
2	.0852	.0915	.0063	.0162	.0011	.0151
3	.0941	.0801	-.0140	.0141	.0012	.0129
4	.0770	.0824	.0054	.0174	.0010	.0164
Total	.3423	.3394	-.0029	.0594	.0040	.0554
$\bar{\bar{x}}$	.0856	.0849	-.0007	.0149	.0010	.0139

	Before	After	Gain or loss	Before	After	Loss
1	.0854	.0800	-.0054	.0158	.0010	.0148
2	.0915	.0896	-.0019	.0162	.0022	.0140
3	.0801	.0848	.0047	.0135	.0006	.0129
4	.0824	.0879	.0055	.0135	.0029	.0106
Total	.3394	.3423	.0029	.0590	.0067	.0523
$\bar{\bar{x}}$	.0849	.0856	.0007	.0148	.0017	.0131
1	.0800	.0746	-.0054	.0155	.0067	.0088
2	.0896	.1017	.0121	.0141	.0042	.0099
3	.0848	.0915	.0067	.0138	.0010	.0128
4	.0879	.0885	.0006	.0123	.0016	.0107
Total	.3423	.3563	.0140	.0557	.0135	.0422
$\bar{\bar{x}}$	.0856	.0891	.0035	.0139	.0034	.0106
1	.0746	.0753	.0007	.0163	.0014	.0149
2	.1017	.0931	-.0086	.0148	.0148	-
3	.0915	.0925	.0010	.0140	.0008	.0132
4	.0885	.0941	.0056	.0148	.0031	.0117
Total	.3563	.3550	-.0013	.0599	.0201	.0398
$\bar{\bar{x}}$	.0891	.0888	-.0003	.0150	.0050	.0100
1	.0753	.0858	.0105	.0110	.0068	.0042
2	.0931	.0972	.0041	.0154	.0127	.0027
3	.0925	.0856	-.0069	.0136	.0136	-
4	.0941	.0892	-.0049	.0148	.0148	-
Total	.3550	.3578	.0028	.0548	.0479	.0069
$\bar{\bar{x}}$	.0888	.0895	.0007	.0137	.0120	.0017
1	.0858	.0844	-.0014	.0142	.0011	.0131
2	.0972	.1030	.0058	.0132	.0053	.0079
3	.0856	.0823	-.0033	.0164	.0007	.0157
4	.0892	.0910	.0018	.0165	.0165	-
Total	.3578	.3607	.0029	.0603	.0236	.0367
$\bar{\bar{x}}$	.0895	.0902	.0007	.0151	.0059	.0092
1	.0844	.0823	-.0021	.0118	.0006	.0112
2	.1030	.1031	.0001	.0145	.0145	-
3	.0823	.0857	.0034	.0096	.0003	.0093
4	.0910	.0937	.0027	.0146	.0062	.0084
Total	.3607	.3648	.0041	.0505	.0216	.0289
$\bar{\bar{x}}$	.0902	.0912	.0010	.0126	.0054	.0072
1	.0823	.0879	.0056	.0116	.0006	.0110
2	.1031	.1018	-.0013	.0123	.0013	.0110
3	.0857	.0760	-.0097	.0122	.0007	.0115
4	.0937	.0936	-.0001	.0128	.0032	.0096
Total	.3648	.3593	-.0055	.0489	.0058	.0431
$\bar{\bar{x}}$	.0912	.0898	-.0014	.0122	.0015	.0108
1	.0879	.0865	-.0014	.0123	.0008	.0115
2	.1018	.1042	.0024	.0136	.0136	-
3	.0760	.0845	.0085	.0155	.0010	.0145
4	.0936	.0986	.0050	.0157	.0035	.0122
Total	.3593	.3738	.0145	.0571	.0189	.0382
$\bar{\bar{x}}$	.0898	.0935	.0036	.0143	.0047	.0096

	Before	After	Gain or loss	Before	After	Loss
1	.0865	.0896	.0031	.0135	.0004	.0131
2	.1042	.0972	-.0070	.0142	.0039	.0103
3	.0845	.0897	.0052	.0126	.0006	.0120
4	.0986	.0969	-.0017	.0155	.0155	-
Total	.3738	.3734	-.0004	.0558	.0204	.0354
$\bar{x}$	.0935	.0934	-.0001	.0140	.0051	.0089
1	.0896	.0841	-.0055	.0113	.0017	.0096
2	.0972	.1075	.0103	.0118	.0091	.0027
3	.0897	.0816	-.0081	.0124	.0008	.0116
4	.0969	.0988	.0019	.0119	.0028	.0091
Total	.3734	.3720	-.0014	.0474	.0144	.0330
$\bar{x}$	.0934	.0930	-.0004	.0119	.0036	.0083
1	.0841	.0842	.0001	.0150	.0004	.0146
2	.1075	.1072	-.0003	.0150	.0150	-
3	.0816	.0867	.0051	.0127	.0004	.0123
4	.0988	.1016	.0028	.0146	.0020	.0126
Total	.3720	.3797	.0077	.0573	.0178	.0395
$\bar{x}$	.0930	.0949	.0019	.0143	.0045	.0099
1	.0842	.0909	.0067	.0125	.0009	.0116
2	.1072	.1007	-.0065	.0116	.0116	-
3	.0867	.0864	-.0003	.0125	.0006	.0119
4	.1016	.1017	.0001	.0101	.0008	.0093
Total	.3797	.3797	-	.0467	.0139	.0328
$\bar{x}$	.0949	.0949	-	.0117	.0035	.0082
1	.0909	.0921	.0012	.0150	.0013	.0137
2	.1007	.0984	-.0023	.0158	.0158	-
3	.0864	.0837	-.0027	.0140	.0008	.0132
4	.1017	.0920	-.0097	.0142	.0028	.0114
Total	.3797	.3662	-.0135	.0590	.0207	.0383
$\bar{x}$	.0949	.0916	-.0034	.0148	.0052	.0096
1	.0921	.0831	-.0090	.0142	.0008	.0134
2	.0984	.1052	.0068	.0146	.0009	.0137
3	.0837	.0931	.0094	.0132	.0009	.0123
4	.0920	.0963	.0043	.0143	.0011	.0132
Total	.3662	.3777	.0115	.0563	.0037	.0526
$\bar{x}$	.0916	.0944	.0029	.0141	.0009	.0132
1	.0831	.0793	-.0038	.0121	.0009	.0112
2	.1052	.1053	.0001	.0137	.0008	.0129
3	.0931	.1000	.0069	.0122	.0013	.0109
4	.0963	.0965	.0002	.0136	.0015	.0121
Total	.3777	.3811	.0034	.0516	.0045	.0471
$\bar{x}$	.0944	.0953	.0009	.0129	.0011	.0118
1	.0793	.0770	-.0023	.0139	.0005	.0134
2	.1053	.0990	-.0063	.0146	.0009	.0137
3	.1000	.1047	.0047	.0150	.0016	.0134
4	.0965	.0960	-.0005	.0126	.0014	.0112
Total	.3811	.3767	-.0044	.0561	.0044	.0517
$\bar{x}$	.0953	.0942	-.0011	.0140	.0011	.0129

	Before	After	Gain or loss	Before	After	Loss
1	.0770	.0809	.0039	.0134	.0003	.0131
2	.0990	.1000	.0010	.0120	.0120	-
3	.1047	.0959	-.0088	.0122	.0028	.0094
4	.0960	.0896	-.0064	.0127	.0013	.0114
Total	.3767	.3664	-.0103	.0503	.0164	.0339
$\bar{\bar{x}}$	.0942	.0916	-.0026	.0126	.0041	.0085
1	.0809	.0930	.0121	.0130	.0014	.0116
2	.1000	.1123	.0123	.0140	.0075	.0065
3	.0959	.1066	.0107	.0152	.0010	.0142
4	.0896	.0816	-.0080	.0135	.0021	.0114
Total	.3664	.3035	.0271	.0557	.0120	.0437
$\bar{\bar{x}}$	.0916	.0989	.0068	.0139	.0030	.0109
1	.0930	.0802	-.0128	.0123	.0123	-
2	.1123	.0933	-.0190	.0126	.0126	-
3	.1066	.1088	.0022	.0128	.0013	.0115
4	.0816	.0875	.0059	.0125	.0008	.0117
Total	.3935	.3698	-.0237	.0502	.0270	.0232
$\bar{\bar{x}}$	.0989	.0925	-.0059	.0126	.0068	.0058
1	.0802	.0774	-.0028	.0126	.0007	.0119
2	.0933	.1066	.0133	.0126	.0011	.0115
3	.1088	.1121	.0033	.0142	.0019	.0123
4	.0875	.0891	.0016	.0135	.0008	.0127
Total	.3698	.3852	.0154	.0529	.0045	.0484
$\bar{\bar{x}}$	.0925	.0963	.0039	.0132	.0011	.0121
1	.0774	.0786	.0012	.0102	.0004	.0098
2	.1066	.1059	-.0007	.0110	.0007	.0103
3	.1121	.0983	-.0138	.0130	.0015	.0115
4	.0891	.0871	-.0020	.0120	.0014	.0106
Total	.3852	.3699	-.0153	.0462	.0040	.0422
$\bar{\bar{x}}$	.0963	.0925	-.0038	.0116	.0010	.0106
1	.0786	.0894	.0108	.0156	.0007	.0149
2	.1059	.1010	-.0049	.0158	.0037	.0121
3	.0983	.0997	.0014	.0147	.0009	.0138
4	.0871	.0927	.0056	.0150	.0012	.0138
Total	.3699	.3828	.0129	.0611	.0065	.0546
$\bar{\bar{x}}$	.0925	.0957	.0032	.0153	.0016	.0137
1	.0894	.0829	-.0065	.0111	.0009	.0102
2	.1010	.0997	-.0013	.0103	.0011	.0092
3	.0997	.0990	-.0007	.0112	.0007	.0105
4	.0927	.0696	-.0231	.0109	.0011	.0098
Total	.3828	.3512	-.0316	.0435	.0038	.0397
$\bar{\bar{x}}$	.0957	.0878	-.0079	.0109	.0010	.0099
1	.0829	.0906	.0077	.0100	.0055	.0045
2	.0997	.0973	-.0024	.0108	.0008	.0100
3	.0990	.0874	-.0116	.0101	.0013	.0088
4	.0696	.0661	-.0035	.0102	.0006	.0096
Total	.3512	.3414	-.0098	.0411	.0082	.0329
$\bar{\bar{x}}$	.0878	.0854	-.0025	.0103	.0021	.0082

	Before	After	Gain or loss	Before	After	Loss
1	.0906	.0777	-.0129	.0103	.0005	.0098
2	.0973	.0907	-.0066	.0107	.0005	.0102
3	.0874	.0839	-.0035	.0108	.0004	.0104
4	.0661	.0662	.0001	.0100	.0006	.0094
Total	.3414	.3185	-.0229	.0418	.0020	.0398
$\bar{x}$	.0854	.0796	-.0057	.0105	.0005	.0100
1	.0777	.0756	-.0021	.0118	.0004	.0114
2	.0907	.0956	.0049	.0105	.0105	-
3	.0839	.0919	.0080	.0114	.0011	.0103
4	.0662	.0763	.0101	.0118	.0003	.0115
Total	.3185	.3394	.0209	.0455	.0123	.0332
$\bar{x}$	.0796	.0849	.0052	.0114	.0031	.0083
1	.0756	.0870	.0114	.0133	.0133	-
2	.0956	.1041	.0085	.0105	.0005	.0100
3	.0919	.0862	-.0057	.0115	.0004	.0111
4	.0763	.0682	-.0081	.0110	.0007	.0103
Total	.3394	.3455	.0061	.0463	.0149	.0314
$\bar{x}$	.0849	.0864	.0015	.0116	.0037	.0079
1	.0870	.0697	-.0173	.0124	.0003	.0121
2	.1041	.0837	-.0204	.0116	.0116	-
3	.0862	.0827	-.0035	.0116	.0005	.0111
4	.0682	.0676	-.0006	.0122	.0005	.0117
Total	.3455	.3037	-.0418	.0478	.0129	.0349
$\bar{x}$	.0864	.0759	-.0105	.0120	.0032	.0087
1	.0697	.0663	-.0034	.0109	.0004	.0105
2	.0837	.0903	.0066	.0125	.0005	.0120
3	.0827	.0890	.0063	.0122	.0007	.0115
4	.0676	.0723	.0047	.0111	.0006	.0105
Total	.3037	.3179	.0142	.0467	.0022	.0445
$\bar{x}$	.0759	.0795	.0036	.0117	.0006	.0111
1	.0663	.0782	.0119	.0123	.0006	.0117
2	.0903	.0904	.0001	.0108	.0005	.0103
3	.0890	.0861	-.0029	.0111	.0007	.0104
4	.0723	.0627	-.0096	.0108	.0004	.0104
Total	.3179	.3174	-.0005	.0450	.0022	.0428
$\bar{x}$	.0795	.0794	-.0001	.0113	.0006	.0107
1	.0782	.0681	-.0101	.0117	.0007	.0110
2	.0904	.0894	-.0010	.0114	.0003	.0111
3	.0861	.0877	.0016	.0116	.0006	.0110
4	.0627	.0626	-.0001	.0117	.0004	.0113
Total	.3174	.3078	-.0096	.0464	.0020	.0444
$\bar{x}$	.0794	.0770	-.0024	.0116	.0005	.0111
1	.0681	.0819	.0138	.0095	.0004	.0091
2	.0894	.0862	-.0032	.0120	.0007	.0113
3	.0877	.0964	.0087	.0125	.0007	.0118
4	.0626	.0658	.0032	.0094	.0006	.0088
Total	.3078	.3303	.0225	.0434	.0024	.0410
$\bar{x}$	.0770	.0826	.0056	.0109	.0006	.0103

	Before	After	Gain or loss	Before	After	Loss
1	.0819	.0754	-.0065	.0111	.0005	.0106
2	.0862	.0893	.0031	.0109	.0008	.0101
3	.0964	.0959	-.0005	.0126	.0005	.0121
4	.0658	.0660	.0002	.0109	.0006	.0103
Total	.3303	.3266	-.0037	.0455	.0024	.0431
$\bar{x}$	.0826	.0817	-.0009	.0114	.0006	.0108
1	.0754	.0757	.0003	.0110	.0007	.0103
2	.0893	.0863	-.0030	.0100	.0010	.0090
3	.0959	.0927	-.0032	.0099	.0013	.0086
4	.0660	.0647	-.0013	.0112	.0007	.0105
Total	.3266	.3194	-.0072	.0421	.0037	.0384
$\bar{x}$	.0817	.0799	-.0018	.0105	.0009	.0096
1	.0757	.0834	.0077	.0121	.0004	.0117
2	.0863	.0872	.0009	.0102	.0006	.0096
3	.0927	.0862	-.0065	.0113	.0010	.0103
4	.0647	.0632	-.0015	.0112	.0007	.0105
Total	.3194	.3200	.0006	.0448	.0027	.0421
$\bar{x}$	.0799	.0800	.0001	.0112	.0007	.0105
1	.0834	.0700	-.0134	.0118	.0007	.0111
2	.0872	.0850	-.0022	.0094	.0006	.0088
3	.0862	.0867	.0005	.0101	.0006	.0095
4	.0632	.0649	.0017	.0143	.0006	.0137
Total	.3200	.3066	-.0134	.0456	.0025	.0431
$\bar{x}$	.0800	.0766	-.0034	.0114	.0006	.0108
1	.0700	.0615	-.0085	.0096	.0004	.0092
2	.0850	.0915	.0065	.0124	.0007	.0117
3	.0867	.0837	-.0030	.0109	.0009	.0100
4	.0649	.0643	-.0006	.0096	.0005	.0091
Total	.3066	.3010	-.0056	.0425	.0025	.0400
$\bar{x}$	.0766	.0753	-.0014	.0106	.0006	.0100
1	.0615	.0783	.0168	.0116	.0005	.0111
2	.0915	.0763	-.0152	.0114	.0007	.0107
3	.0837	.0745	-.0092	.0108	.0006	.0102
4	.0643	.0570	-.0073	.0112	.0008	.0104
Total	.3010	.2861	-.0149	.0450	.0026	.0424
$\bar{x}$	.0753	.0715	-.0037	.0113	.0007	.0106
1	.0783	.0771	-.0012	.0094	.0011	.0083
2	.0763	.0779	.0016	.0107	.0009	.0098
3	.0745	.0776	.0031	.0111	.0009	.0102
4	.0570	.0616	.0046	.0115	.0012	.0103
Total	.2861	.2942	.0081	.0427	.0041	.0386
$\bar{x}$	.0715	.0736	.0020	.0107	.0010	.0097
1	.0771	.0800	.0029	.0108	.0005	.0103
2	.0779	.0874	.0095	.0122	.0005	.0117
3	.0776	.0836	.0060	.0199	.0024	.0095
4	.0616	.0625	.0009	.0120	.0007	.0113
Total	.2942	.3135	.0193	.0549	.0041	.0428
$\bar{x}$	.0736	.0784	.0048	.0117	.0010	.0107

	Before	After	Gain or loss	Before	After	Loss
1	.0800	.0651	-.0149	.0139	.0014	.0125
2	.0874	.0786	-.0088	.0128	.0014	.0114
3	.0836	.0751	-.0085	.0114	.0114	-
4	.0625	.0576	-.0049	.0122	.0014	.0108
Total	.3135	.2764	-.0371	.0503	.0156	.0347
x̄	.0784	.0691	-.0093	.0126	.0039	.0087
1	.0651	.0673	.0022	.0122	.0004	.0118
2	.0786	.0914	.0128	.0121	.0006	.0115
3	.0751	.0826	.0075	.0115	.0008	.0107
4	.0576	.0603	.0027	.0112	.0058	.0054
Total	.2764	.3016	.0252	.0470	.0076	.0394
x̄	.0691	.0754	.0063	.0118	.0019	.0099
1	.0673	.0590	-.0083	.0121	.0004	.0117
2	.0914	.0903	-.0011	.0129	.0007	.0122
3	.0826	.0783	-.0043	.0128	.0005	.0123
4	.0603	.0616	.0013	.0134	.0011	.0123
Total	.3016	.2892	-.0124	.0512	.0027	.0485
x̄	.0754	.0723	-.0031	.0128	.0007	.0121
1	.0590	.0674	.0084	.0137	.0004	.0133
2	.0903	.0777	-.0126	.0144	.0006	.0138
3	.0783	.0851	.0068	.0144	.0008	.0136
4	.0616	.0588	-.0028	.0148	.0006	.0142
Total	.2892	.2890	-.0002	.0573	.0024	.0549
x̄	.0723	.0723	-	.0143	.0006	.0137
1	.0674	.0684	.0010	.0106	.0013	.0093
2	.0777	.0811	.0034	.0122	.0006	.0116
3	.0851	.0824	-.0027	.0110	.0010	.0100
4	.0588	.0623	.0035	.0105	.0005	.0100
Total	.2890	.2942	.0052	.0443	.0034	.0409
x̄	.0723	.0736	.0013	.0111	.0009	.0102
1	.0684	.0737	.0053	.0094	.0003	.0091
2	.0811	.0772	-.0039	.0110	.0005	.0105
3	.0824	.0817	-.0007	.0117	.0008	.0109
4	.0623	.0608	-.0015	.0115	.0006	.0109
Total	.2942	.2934	-.0008	.0436	.0022	.0414
x̄	.0736	.0734	-.0002	.0109	.0006	.0104
1	.0737	.0765	.0028	.0098	.0003	.0095
2	.0772	.0807	.0035	.0094	.0002	.0092
3	.0817	.0791	-.0026	.0109	.0003	.0106
4	.0608	.0623	.0015	.0101	.0004	.0097
Total	.2934	.2986	.0052	.0402	.0012	.0390
x̄	.0734	.0747	.0013	.0101	.0003	.0098
1	.0765	.0702	-.0063	.0094	.0007	.0087
2	.0807	.0708	-.0063	.0094	.0007	.0087
3	.0791	.0871	.0080	.0095	.0006	.0089
4	.0623	.0611	-.0012	.0110	.0008	.0102
Total	.2986	.2892	-.0094	.0419	.0031	.0388
x̄	.0747	.0723	-.0024	.0105	.0008	.0097

	Before	After	Gain or loss	Before	After	Loss
1	.0702	.0808	.0106	.0108	.0008	.0100
2	.0708	.0816	.0108	.0102	.0009	.0093
3	.0871	.0832	-.0039	.0125	.0008	.0117
4	.0611	.0694	.0083	.0126	.0007	.0119
Total	.2892	.3150	.0258	.0461	.0032	.0429
$\bar{x}$	.0723	.0788	.0065	.0115	.0008	.0107
1	.0808	.0826	.0018	.0144	.0009	.0135
2	.0816	.0725	-.0091	.0135	.0007	.0128
3	.0832	.0834	.0002	.0147	.0008	.0139
4	.0694	.0709	.0015	.0143	.0010	.0133
Total	.3150	.3094	-.0056	.0569	.0034	.0535
$\bar{x}$	.0788	.0774	-.0014	.0142	.0009	.0134
1	.0826	.0861	.0035	.0138	.0006	.0132
2	.0725	.0851	.0126	.0145	.0006	.0139
3	.0834	.0863	.0029	.0147	.0005	.0142
4	.0709	.0742	.0033	.0135	.0010	.0125
Total	.3094	.3317	.0223	.0565	.0027	.0538
$\bar{x}$	.0774	.0829	.0558	.0141	.0007	.0135
1	.0861	.0828	-.0033	.0094	.0006	.0088
2	.0851	.0685	-.0166	.0094	.0003	.0091
3	.0863	.0941	.0078	.0115	.0011	.0104
4	.0742	.0771	.0029	.0126	.0006	.0120
Total	.3317	.3225	-.0092	.0429	.0026	.0403
$\bar{x}$	.0829	.0806	-.0023	.0107	.0007	.0101
1	.0828	.0796	-.0032	.0098	.0098	-
2	.0685	.0790	.0105	.0099	.0004	.0095
3	.0941	.0916	-.0025	.0109	.0013	.0096
4	.0771	.0691	-.0080	.0115	.0010	.0105
Total	.3225	.3193	-.0032	.0421	.0125	.0296
$\bar{x}$	.0806	.0798	-.0008	.0105	.0031	.0074
1	.0796	.0724	-.0072	.0118	.0005	.0113
2	.0790	.0771	-.0019	.0123	.0005	.0118
3	.0916	.0852	-.0064	.0124	.0010	.0114
4	.0691	.0666	-.0025	.0120	.0004	.0116
Total	.3193	.3013	-.0180	.0485	.0024	.0461
$\bar{x}$	.0798	.0753	-.0045	.0121	.0006	.0115
1	.0724	.0834	.0110	.0109	.0004	.0105
2	.0771	.0791	.0020	.0110	.0004	.0106
3	.0852	.0903	.0051	.0100	.0004	.0096
4	.0666	.0670	.0004	.0124	.0004	.0120
Total	.3013	.3198	.0185	.0443	.0016	.0427
$\bar{x}$	.0753	.0800	.0046	.0111	.0004	.0107
1	.0834	.0831	-.0003	.0116	.0008	.0108
2	.0791	.0706	-.0085	.0136	.0045	.0091
3	.0903	.0834	-.0069	.0157	.0004	.0153
4	.0670	.0601	-.0069	.0154	.0006	.0148
Total	.3198	.2972	-.0226	.0563	.0063	.0500
$\bar{x}$	.0800	.0743	-.0057	.0141	.0016	.0125

	Before	After	Gain or loss	Before	After	Loss
1	.0831	.0790	-.0041	.0143	.0021	.0122
2	Female died - replicate 2 terminated.					
3	.0834	.0975	.0141	.0147	.0005	.0142
4	.0601	.0685	.0084	.0140	.0004	.0136
Total	.2266	.2450	.0184	.0430	.0030	.0400
$\bar{\bar{x}}$	.0755	.0817	.0061	.0143	.0010	.0133
1	.0790	.0770	-.0020	.0113	.0003	.0110
3	.0975	.0829	-.0146	.0110	.0005	.0105
4	.0685	.0682	-.0003	.0127	.0003	.0124
Total	.2450	.2281	-.0169	.0350	.0011	.0339
$\bar{\bar{x}}$	.0817	.0760	-.0056	.0117	.0004	.0113
1	.0770	.0887	.0117	.0126	.0013	.0113
3	.0829	.0938	.0109	.0121	.0005	.0116
4	.0682	.0700	.0018	.0108	.0004	.0104
Total	.2281	.2525	.0244	.0355	.0022	.0333
$\bar{\bar{x}}$	.0760	.0842	.0081	.0118	.0007	.0111
1	.0887	.0879	-.0008	.0126	.0126	-
3	.0938	.0974	.0036	.0125	.0014	.0111
4	.0700	.0744	.0044	.0124	.0005	.0119
Total	.2525	.2597	.0072	.0375	.0145	.0230
$\bar{\bar{x}}$	.0842	.0866	.0024	.0125	.0048	.0077
1	.0879	.0857	-.0022	.0094	.0006	.0088
3	.0974	.0893	-.0081	.0107	.0010	.0097
4	.0744	.0722	-.0022	.0103	.0062	.0041
Total	.2597	.2472	-.0125	.0304	.0078	.0226
$\bar{\bar{x}}$	.0866	.0824	-.0042	.0101	.0026	.0075
1	.0857	.0906	.0049	.0105	.0002	.0103
3	.0893	.0925	.0032	.0104	.0007	.0097
4	.0722	.0778	.0056	.0103	.0005	.0098
Total	.2472	.2609	.0137	.0312	.0014	.0298
$\bar{\bar{x}}$	.0824	.0870	.0046	.0104	.0005	.0099
1	.0906	.0848	-.0058	.0114	.0067	.0047
3	.0925	.0986	.0061	.0114	.0006	.0108
4	.0778	.0786	.0008	.0108	.0007	.0101
Total	.2609	.2620	.0011	.0336	.0080	.0256
$\bar{\bar{x}}$	.0870	.0873	.0004	.0112	.0027	.0085
1	.0848	.0820	-.0028	.0110	.0110	-
3	.0986	.0886	-.0100	.0112	.0004	.0108
4	.0786	.0767	-.0019	.0114	.0004	.0110
Total	.2620	.2473	-.0147	.0336	.0118	.0218
$\bar{\bar{x}}$	.0873	.0824	-.0049	.0112	.0039	.0073
1	.0820	.0739	-.0081	.0111	.0111	-
3	.0886	.0854	-.0032	.0112	.0008	.0104
4	.0767	.0813	.0046	.0117	.0004	.0113
Total	.2473	.2406	-.0067	.0340	.0123	.0217
$\bar{\bar{x}}$	.0824	.0802	-.0022	.0113	.0041	.0072

	Before	After	Gain or loss	Before	After	Loss
1	Female died - replicate 1 terminated.					
3	.0854	.0985	.0131	.0125	.0021	.0104
4	.0813	.0793	-.0020	.0130	.0008	.0122
Total	.1667	.1778	.0111	.0255	.0029	.0226
$\bar{\bar{x}}$	.0834	.0889	.0055	.0128	.0015	.0113
3	.0985	.0921	-.0064	.0130	.0023	.0107
4	.0793	.0861	.0068	.0121	.0014	.0107
Total	.1778	.1782	.0004	.0251	.0037	.0214
$\bar{\bar{x}}$	.0889	.0891	.0002	.0126	.0019	.0107
3	.0921	.0993	.0072	.0096	.0020	.0076
4	.0861	.0857	-.0004	.0106	.0008	.0098
Total	.1782	.1850	.0068	.0202	.0028	.0174
$\bar{\bar{x}}$	.0891	.0925	.0034	.0101	.0014	.0087
3	.0993	.0994	.0001	.0117	.0007	.0110
4	.0857	.0698	-.0159	.0125	.0005	.0120
Total	.1850	.1692	-.0158	.0242	.0012	.0230
$\bar{\bar{x}}$	.0925	.0846	-.0079	.0121	.0006	.0115
3	.0994	.1028	.0034	.0105	.0006	.0099
4	.0698	.0718	.0020	.0105	.0008	.0097
Total	.1692	.1746	.0054	.0210	.0014	.0196
$\bar{\bar{x}}$	.0846	.0873	.0027	.0105	.0007	.0098
3	.1028	.0921	-.0107	.0118	.0009	.0109
4	.0718	.0719	.0001	.0114	.0005	.0109
Total	.1746	.1640	-.0106	.0232	.0014	.0218
$\bar{\bar{x}}$	.0873	.0820	-.0053	.0116	.0007	.0109
3	.0921	.0973	.0052	.0111	.0026	.0085
4	.0719	.0736	.0017	.0111	.0004	.0107
Total	.1640	.1709	.0069	.0222	.0030	.0192
$\bar{\bar{x}}$	.0820	.0855	.0035	.0111	.0015	.0096
3	.0973	.0896	-.0077	.0115	.0005	.0110
4	.0736	.0598	-.0138	.0113	.0004	.0109
Total	.1709	.1494	-.0215	.0228	.0009	.0219
$\bar{\bar{x}}$	.0855	.0747	-.0108	.0114	.0005	.0110
3	.0896	.1009	.0113	.0114	.0006	.0108
4	.0598	.0796	.0198	.0115	.0004	.0111
Total	.1494	.1805	.0311	.0229	.0010	.0219
$\bar{\bar{x}}$	.0747	.0903	.0156	.0115	.0005	.0110
3	.1009	.1044	.0035	.0110	.0017	.0093
4	.0796	.0742	-.0054	.0115	.0008	.0107
Total	.1805	.1786	-.0019	.0225	.0025	.0200
$\bar{\bar{x}}$	.0903	.0893	-.0010	.0113	.0013	.0100
3	.1044	.0900	-.0144	.0112	.0009	.0103
4	.0742	.0737	-.0005	.0115	.0004	.0111
Total	.1786	.1637	-.0149	.0227	.0013	.0214
$\bar{\bar{x}}$	.0893	.0819	-.0075	.0114	.0007	.0107

	Before	After	Gain or loss	Before	After	Loss
3	.0900	.0936	.0036	.0116	.0011	.0105
4	.0737	.0721	-.0016	.0124	.0006	.0118
Total	.1637	.1657	.0020	.0240	.0017	.0223
$\bar{x}$	.0819	.0829	.0010	.0120	.0009	.0112
3	.0936	.0936	-	.0123	.0008	.0115
4	.0721	.0709	-.0012	.0118	.0004	.0114
Total	.1657	.1645	-.0012	.0241	.0012	.0229
$\bar{x}$	.0829	.0823	-.0006	.0121	.0006	.0115
3	.0936	.1060	.0124	.0123	.0008	.0115
4	.0709	.0758	.0049	.0122	.0008	.0114
Total	.1645	.1818	.0173	.0245	.0016	.0229
$\bar{x}$	.0823	.0909	.0087	.0123	.0008	.0115
3	.1060	.0936	-.0124	.0111	.0006	.0105
4	.0758	.0641	-.0117	.0113	.0015	.0098
Total	.1818	.1577	-.0241	.0224	.0021	.0203
$\bar{x}$	.0909	.0789	-.0121	.0112	.0011	.0102
3[1]	.0936	.1011	.0075	.0123	.0010	.0113
4	Female died - replicate 4 terminated.					
3	.1011	.1083	.0072	.0123	.0008	.0115
3	.1083	.0982	-.0101	.0119	.0025	.0094
3	.0982	.1037	.0055	.0127	.0007	.0120
3	.1037	.1024	-.0013	.0129	.0008	.0121
3	.1024	.0985	-.0039	.0123	.0004	.0119
3	.0985	.1069	.0084	.0120	.0004	.0116
3	.1069	.0992	-.0077	.0108	.0004	.0104
3	.0992	.0985	-.0007	.0125	.0008	.0117
3	.0985	.1033	.0048	.0115	.0025	.0090
3	.1033	.0899	-.0134	.0124	.0124	-

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1 All subsequent daily values for diet level 1 are based on replicate 3 i.e. the value obtained for the sole surviving adult female *P. maculiventris* in this experiment.

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 2 - adult females.			
1	.0714	.0647	-.0067	.0262	.0177	.0085
2	.0840	.0884	.0044	.0251	.0041	.0210
3	.0856	.0829	-.0027	.0210	.0210	-
4	.0664	.0738	.0074	.0208	.0032	.0176
Total	.3074	.3098	.0024	.0931	.0460	.0471
$\bar{x}$	.0769	.0775	.0006	.0233	.0115	.0118
1	.0647	.0685	.0038	.0196	.0013	.0183
2	.0884	.0873	-.0011	.0241	.0027	.0214
3	.0829	.0726	-.0103	.0262	.0262	-
4	.0738	.0697	-.0041	.0194	.0029	.0165
Total	.3098	.2981	-.0117	.0893	.0331	.0562
$\bar{x}$	.0775	.0745	-.0029	.0223	.0083	.0141
1	.0685	.0688	.0003	.0216	.0043	.0173
2	.0873	.0887	.0014	.0252	.0031	.0221
3	.0726	.0727	.0001	.0239	.0010	.0229
4	.0697	.0670	-.0027	.0259	.0045	.0214
Total	.2981	.2972	-.0009	.0966	.0129	.0837
$\bar{x}$	.0745	.0743	-.0002	.0242	.0032	.0209
1	.0688	.0729	.0041	.0255	.0013	.0242
2	.0887	.0828	-.0059	.0220	.0019	.0201
3	.0727	.0726	-.0001	.0196	.0016	.0180
4	.0670	.0711	.0041	.0194	.0039	.0155
Total	.2972	.2994	.0022	.0865	.0087	.0778
$\bar{x}$	.0743	.0749	.0006	.0216	.0022	.0195
1	.0729	.0699	-.0030	.0196	.0027	.0169
2	.0828	.0879	.0051	.0235	.0015	.0220
3	.0726	.0725	-.0001	.0194	.0033	.0161
4	.0711	.0782	.0071	.0254	.0029	.0225
Total	.2994	.3085	.0091	.0879	.0104	.0775
$\bar{x}$	.0749	.0771	.0023	.0220	.0026	.0194
1	.0699	.0737	.0038	.0240	.0026	.0214
2	.0879	.0865	-.0014	.0205	.0205	-
3	.0725	.0718	-.0007	.0239	.0020	.0219
4	.0782	.0787	.0005	.0215	.0036	.0179
Total	.3085	.3107	.0022	.0899	.0287	.0612
$\bar{x}$	.0771	.0777	.0006	.0225	.0072	.0153

	Before	After	Gain or loss	Before	After	Loss
1	.0737	.0806	.0069	.0238	.0021	.0217
2	.0865	.0922	.0057	.0233	.0064	.0169
3	.0718	.0912	.0194	.0194	.0042	.0152
4	.0787	.0777	-.0010	.0264	.0044	.0220
Total	.3107	.3417	.0310	.0929	.0171	.0758
$\bar{x}$	.0777	.0854	.0078	.0232	.0043	.0190
1	.0806	.0782	-.0024	.0216	.0014	.0202
2	.0922	.0848	-.0074	.0216	.0216	-
3	.0912	.0833	-.0079	.0233	.0043	.0190
4	.0777	.0775	-.0002	.0236	.0017	.0219
Total	.3417	.3238	-.0179	.0901	.0290	.0611
$\bar{x}$	.0854	.0810	-.0045	.0225	.0073	.0153
1	.0782	.0863	.0081	.0223	.0033	.0190
2	.0848	.0790	-.0058	.0214	.0017	.0197
3	.0833	.0858	.0025	.0194	.0062	.0132
4	.0775	.0869	.0094	.0239	.0091	.0148
Total	.3238	.3380	.0142	.0870	.0203	.0667
$\bar{x}$	.0810	.0845	.0036	.0218	.0051	.0167
1	.0863	.0833	-.0030	.0194	.0194	-
2	.0790	.0905	.0115	.0258	.0028	.0230
3	.0858	.0908	.0050	.0194	.0026	.0168
4	.0869	.0807	-.0062	.0236	.0236	-
Total	.3380	.3453	.0073	.0882	.0484	.0398
$\bar{x}$	.0845	.0863	.0018	.0221	.0121	.0100
1	.0833	.0786	-.0047	.0256	.0256	-
2	.0905	.0898	-.0007	.0266	.0017	.0249
3	.0908	.0860	-.0048	.0254	.0254	-
4	.0807	.0804	-.0003	.0243	.0243	-
Total	.3453	.3348	-.0105	.1019	.0770	.0249
$\bar{x}$	.0863	.0837	-.0026	.0255	.0193	.0062
1	.0786	.0791	.0005	.0253	.0029	.0224
2	.0898	.1019	.0121	.0255	.0023	.0232
3	.0860	.0887	.0027	.0257	.0257	-
4	.0804	.0958	.0154	.0249	.0129	.0120
Total	.3348	.3655	.0307	.1014	.0438	.0576
$\bar{x}$	.0837	.0914	.0077	.0254	.0110	.0144
1	.0791	.0831	.0040	.0220	.0035	.0185
2	.1019	.1064	.0045	.0196	.0025	.0171
3	.0887	.0854	-.0033	.0201	.0201	-
4	.0958	.0860	-.0098	.0219	.0219	-
Total	.3655	.3609	-.0046	.0836	.0480	.0356
$\bar{x}$	.0914	.0902	-.0012	.0209	.0120	.0089
1	.0831	.0886	.0055	.0194	.0020	.0174
2	.1064	.0956	-.0108	.0194	.0071	.0123
3	.0854	.0817	-.0037	.0205	.0205	-
4	.0860	.0872	.0012	.0220	.0220	-
Total	.3609	.3531	-.0078	.0813	.0516	.0297
$\bar{x}$	.0902	.0883	-.0020	.0203	.0129	.0074

	Before	After	Gain or loss	Before	After	Loss
1	.0886	.0851	-.0035	.0254	.0018	.0236
2	.0956	.0928	-.0028	.0256	.0068	.0188
3	.0817	.0905	.0088	.0252	.0019	.0233
4	.0872	.0813	-.0059	.0211	.0158	.0053
Total	.3531	.3497	-.0034	.0973	.0263	.0710
$\bar{\bar{x}}$	.0883	.0874	-.0009	.0243	.0066	.0178
1	.0851	.0821	-.0030	.0230	.0043	.0187
2	.0928	.0916	-.0012	.0212	.0013	.0199
3	.0905	.0910	.0005	.0211	.0211	-
4	.0813	.0843	.0030	.0215	.0215	-
Total	.3497	.3490	-.0007	.0868	.0482	.0386
$\bar{\bar{x}}$	.0874	.0873	-.0002	.0217	.0121	.0097
1	.0821	.0842	.0021	.0247	.0022	.0225
2	.0916	.1018	.0102	.0264	.0012	.0252
3	.0910	.0871	-.0039	.0219	.0219	-
4	.0843	.0955	.0112	.0248	.0045	.0203
Total	.3490	.3686	.0196	.0978	.0298	.0680
$\bar{\bar{x}}$	.0873	.0922	.0049	.0245	.0075	.0170
1	.0842	.0907	.0065	.0247	.0011	.0236
2	.1018	.0925	-.0093	.0241	.0031	.0210
3	.0871	.0968	.0097	.0243	.0023	.0220
4	.0955	.0881	-.0074	.0265	.0216	.0049
Total	.3686	.3681	-.0005	.0996	.0281	.0715
$\bar{\bar{x}}$	.0922	.0920	-.0001	.0249	.0070	.0179
1	.0907	.0803	-.0104	.0225	.0022	.0203
2	.0925	.0946	.0021	.0263	.0012	.0251
3	.0968	.0899	-.0069	.0252	.0252	-
4	.0881	.0890	.0009	.0228	.0228	-
Total	.3681	.3538	-.0143	.0968	.0514	.0454
$\bar{\bar{x}}$	.0920	.0885	-.0036	.0242	.0129	.0114
1	.0803	.0806	.0003	.0208	.0012	.0196
2	.0946	.0958	.0012	.0195	.0024	.0171
3	.0899	.1084	.0185	.0264	.0063	.0201
4	.0890	.0934	.0044	.0260	.0069	.0191
Total	.3538	.3782	.0244	.0927	.0168	.0759
$\bar{\bar{x}}$	.0885	.0946	.0061	.0232	.0042	.0190
1	.0806	.0825	.0019	.0261	.0013	.0248
2	.0958	.0950	-.0008	.0242	.0010	.0232
3	.1084	.0967	-.0117	.0234	.0209	.0025
4	.0934	.0931	-.0003	.0251	.0251	-
Total	.3782	.3673	-.0109	.0988	.0483	.0505
$\bar{\bar{x}}$	.0946	.0918	-.0027	.0247	.0121	.0126
1	.0825	.0865	.0040	.0261	.0020	.0241
2	.0950	.1023	.0073	.0221	.0028	.0193
3	.0967	.0956	-.0011	.0203	.0203	-
4	.0931	.0908	-.0023	.0244	.0216	.0028
Total	.3673	.3752	.0079	.0929	.0467	.0462
$\bar{x}$	.0918	.0938	.0020	.0232	.0117	.0116

	Before	After	Gain or loss	Before	After	Loss
1	.0865	.0758	-.0107	.0218	.0013	.0205
2	.1023	.0857	-.0166	.0230	.0015	.0215
3	.0956	.1104	.0148	.0232	.0023	.0209
4	.0908	.0993	.0085	.0221	.0032	.0189
Total	.3752	.3712	-.0040	.0901	.0083	.0818
$\bar{x}$	.0938	.0928	-.0010	.0225	.0021	.0205
1	.0758	.0852	.0094	.0248	.0022	.0226
2	.0857	.0911	.0054	.0244	.0018	.0226
3	.1104	.1055	-.0049	.0230	.0230	-
4	.0993	.0863	-.0130	.0235	.0187	.0048
Total	.3712	.3681	-.0031	.0957	.0457	.0500
$\bar{x}$	.0928	.0920	-.0008	.0239	.0114	.0125
1	.0852	.0711	-.0141	.0245	.0014	.0231
2	.0911	.0980	.0069	.0231	.0030	.0201
3	.1055	.0999	-.0056	.0250	.0250	-
4	.0863	.0880	.0017	.0230	.0067	.0163
Total	.3681	.3570	-.0111	.0956	.0361	.0595
$\bar{x}$	.0920	.0893	-.0028	.0239	.0090	.0149
1	.0711	.0754	.0043	.0216	.0018	.0198
2	.0980	.0776	-.0204	.0231	.0013	.0218
3	.0999	.0932	-.0067	.0229	.0229	-
4	.0880	.0918	.0038	.0200	.0025	.0175
Total	.3570	.3380	-.0190	.0876	.0285	.0591
$\bar{x}$	.0893	.0845	-.0048	.0219	.0071	.0148
1	.0754	.0705	-.0049	.0241	.0014	.0227
2	.0776	.0848	.0072	.0225	.0013	.0212
3	.0932	.1095	.0163	.0247	.0025	.0222
4	.0918	.0934	.0016	.0235	.0030	.0205
Total	.3380	.3582	.0202	.0948	.0082	.0866
$\bar{x}$	.0845	.0896	.0051	.0237	.0021	.0217
1	.0705	.0668	-.0037	.0207	.0015	.0192
2	.0848	.0921	.0073	.0215	.0054	.0161
3	.1095	.1158	.0063	.0235	.0076	.0159
4	.0934	.1032	.0098	.0215	.0072	.0143
Total	.3582	.3779	.0197	.0872	.0217	.0655
$\bar{x}$	.0896	.0945	.0049	.0218	.0054	.0164
1	.0668	.0672	.0004	.0204	.0015	.0189
2	.0921	.0739	-.0182	.0229	.0042	.0187
3	.1158	.0872	-.0286	.0209	.0042	.0167
4	.1032	.0984	-.0048	.0222	.0056	.0166
Total	.3779	.3267	-.0512	.0864	.0155	.0709
$\bar{x}$	.0945	.0817	-.0128	.0216	.0039	.0177
1	.0672	.0662	-.0010	.0230	.0025	.0205
2	.0739	.0815	.0076	.0249	.0023	.0226
3	.0872	.0957	.0085	.0235	.0057	.0178
4	.0984	.1007	.0023	.0254	.0242	.0012
Total	.3267	.3441	.0174	.0968	.0347	.0621
$\bar{x}$	.0817	.0860	.0044	.0242	.0087	.0155

	Before	After	Gain or loss	Before	After	Loss
1	.0662	.0761	.0099	.0217	.0020	.0197
2	.0815	.0912	.0097	.0207	.0025	.0182
3	.0957	.0978	.0021	.0210	.0145	.0065
4	.1007	.1100	.0093	.0217	.0029	.0188
Total	.3441	.3751	.0310	.0851	.0219	.0632
$\bar{x}$	.0860	.0938	.0078	.0213	.0055	.0158
1	.0761	.0896	.0135	.0251	.0010	.0241
2	.0912	.0876	-.0036	.0226	.0018	.0208
3	.0978	.1114	.0136	.0252	.0063	.0189
4	.1100	.0994	-.0106	.0260	.0260	-
Total	.3751	.3880	.0129	.0989	.0351	.0638
$\bar{x}$	.0938	.0970	.0032	.0247	.0088	.0160
1	.0896	.0946	.0050	.0225	.0014	.0211
2	.0876	.0812	-.0064	.0218	.0013	.0205
3	.1114	.1040	-.0074	.0214	.0214	-
4	.0994	.1049	.0055	.0220	.0109	.0111
Total	.3880	.3847	-.0033	.0877	.0350	.0527
$\bar{x}$	.0970	.0962	-.0008	.0219	.0088	.0132
1	.0946	.0938	-.0008	.0235	.0044	.0191
2	.0812	.0956	.0144	.0244	.0041	.0203
3	.1040	.1207	.0167	.0226	.0045	.0181
4	.1049	.1078	.0029	.0230	.0071	.0159
Total	.3847	.4179	.0332	.0935	.0201	.0734
$\bar{x}$	.0962	.1045	.0083	.0234	.0050	.0184
1	.0938	.0950	.0012	.0217	.0026	.0191
2	.0956	.0871	-.0085	.0221	.0007	.0214
3	.1207	.1052	-.0155	.0243	.0243	-
4	.1078	.1080	.0002	.0218	.0218	-
Total	.4179	.3953	-.0226	.0899	.0494	.0405
$\bar{x}$	.1045	.0988	-.0057	.0225	.0124	.0101
1	.0950	.0914	-.0036	.0219	.0011	.0208
2	.0871	.0893	.0022	.0226	.0009	.0217
3	.1052	.1212	.0160	.0224	.0037	.0187
4	.1080	.1115	.0035	.0225	.0082	.0143
Total	.3953	.4134	.0181	.0894	.0139	.0755
$\bar{x}$	.0988	.1033	.0045	.0224	.0035	.0189
1	.0914	.0995	.0081	.0219	.0040	.0179
2	.0893	.0916	.0023	.0216	.0012	.0204
3	.1212	.1229	.0017	.0207	.0040	.0167
4	.1115	.1062	-.0053	.0202	.0202	-
Total	.4134	.4202	.0068	.0844	.0294	.0550
$\bar{x}$	.1033	.1051	.0017	.0211	.0074	.0138
1	.0995	.0951	-.0044	.0253	.0053	.0200
2	.0916	.0898	-.0018	.0227	.0024	.0203
3	.1229	.1186	-.0043	.0247	.0247	-
4	.1062	.1126	.0064	.0214	.0091	.0123
Total	.4202	.4161	-.0041	.0941	.0415	.0526
$\bar{x}$	.1051	.1040	-.0010	.0235	.0104	.0132

	Before	After	Gain or loss	Before	After	Loss
1	.0951	.0921	-.0030	.0200	.0034	.0166
2	.0898	.0828	-.0070	.0218	.0011	.0207
3	.1186	.1161	-.0025	.0200	.0050	.0150
4	.1126	.1004	-.0122	.0194	.0194	-
Total	.4161	.3914	-.0247	.0812	.0289	.0523
$\bar{\bar{x}}$	.1040	.0979	-.0062	.0203	.0072	.0131
1	.0921	.0905	-.0016	.0197	.0197	-
2	.0828	.0866	.0038	.0209	.0020	.0189
3	.1161	.1244	.0083	.0211	.0040	.0171
4	.1004	.1081	.0077	.0194	.0078	.0116
Total	.3914	.4096	.0182	.0811	.0335	.0476
$\bar{\bar{x}}$	.0979	.1024	.0046	.0203	.0084	.0119
1	.0905	.0974	.0069	.0195	.0027	.0168
2	.0866	.0964	.0098	.0214	.0012	.0202
3	.1244	.1269	.0025	.0199	.0031	.0168
4	.1081	.1028	-.0053	.0208	.0208	-
Total	.4096	.4235	.0139	.0816	.0278	.0538
$\bar{\bar{x}}$	.1024	.1059	.0035	.0204	.0070	.0135
1	.0974	.0959	-.0015	.0196	.0032	.0164
2	.0964	.0804	-.0160	.0194	.0194	-
3	.1269	.1333	.0064	.0204	.0036	.0168
4	.1028	.1077	.0049	.0209	.0209	-
Total	.4235	.4173	-.0062	.0803	.0471	.0332
$\bar{\bar{x}}$	.1059	.1043	-.0016	.0201	.0118	.0083
1	.0959	.0830	-.0129	.0248	.0056	.0192
2	.0804	.0779	-.0025	.0196	.0010	.0186
3	.1333	.1279	-.0054	.0235	.0235	-
4	.1077	.1070	-.0007	.0194	.0066	.0128
Total	.4173	.3958	-.0215	.0873	.0367	.0506
$\bar{\bar{x}}$	.1043	.0990	-.0054	.0218	.0092	.0127
1	.0830	.0864	.0034	.0218	.0015	.0203
2	.0779	.0739	-.0040	.0202	.0019	.0183
3	.1279	.1224	-.0055	.0204	.0204	-
4	.1070	.1011	-.0059	.0208	.0208	-
Total	.3958	.3838	-.0120	.0832	.0446	.0386
$\bar{\bar{x}}$	.0990	.0960	-.0030	.0208	.0112	.0097
1	.0864	.0921	.0057	.0208	.0024	.0184
2	.0739	.0776	.0037	.0199	.0013	.0186
3	.1224	.1188	-.0036	.0232	.0208	.0024
4	.1011	.1080	.0069	.0213	.0062	.0151
Total	.3838	.3965	.0127	.0852	.0307	.0545
$\bar{\bar{x}}$	.0960	.0991	.0032	.0213	.0077	.0136
1	.0921	.0926	.0005	.0206	.0022	.0184
2	.0776	.0800	.0024	.0194	.0013	.0181
3	.1188	.1241	.0053	.0202	.0034	.0168
4	.1080	.1085	.0005	.0200	.0100	.0100
Total	.3965	.4052	.0087	.0802	.0169	.0633
$\bar{\bar{x}}$	.0991	.1013	.0022	.0201	.0042	.0158

	Before	After	Gain or loss	Before	After	Loss
1	.0926	.0835	-.0091	.0202	.0019	.0183
2	.0800	.0683	-.0117	.0210	.0014	.0196
3	.1241	.1137	-.0104	.0207	.0207	-
4	.1085	.1012	-.0073	.0220	.0080	.0140
Total	.4052	.3667	-.0385	.0839	.0320	.0519
$\bar{x}$	.1013	.0917	-.0096	.0210	.0080	.0130
1	.0835	.0819	-.0016	.0217	.0059	.0158
2	.0683	.0725	.0042	.0211	.0020	.0191
3	.1137	.1246	.0109	.0215	.0215	-
4	.1012	.1088	.0076	.0212	.0094	.0118
Total	.3667	.3878	.0211	.0855	.0388	.0467
$\bar{x}$	.0917	.0970	.0053	.0214	.0097	.0117
1	.0819	.0942	.0123	.0208	.0019	.0189
2	.0725	.0751	.0026	.0224	.0012	.0212
3	.1246	.1178	-.0068	.0224	.0224	-
4	.1088	.1024	-.0064	.0198	.0198	-
Total	.3878	.3895	.0017	.0854	.0453	.0401
$\bar{x}$	.0970	.0974	.0004	.0214	.0113	.0100
1	.0942	.0901	-.0041	.0210	.0029	.0181
2	.0751	.0654	-.0097	.0211	.0027	.0184
3	.1178	.1157	-.0021	.0209	.0209	-
4	.1024	.1040	.0016	.0201	.0057	.0144
Total	.3895	.3752	-.0143	.0831	.0322	.0509
$\bar{x}$	.0974	.0938	-.0036	.0208	.0081	.0127
1	.0901	.0886	-.0015	.0215	.0045	.0170
2	.0654	.0744	.0090	.0210	.0020	.0190
3	.1157	.1129	-.0028	.0198	.0198	-
4	.1040	.1054	.0014	.0198	.0108	.0090
Total	.3752	.3813	.0061	.0821	.0371	.0450
$\bar{x}$	.0938	.0953	.0015	.0205	.0093	.0113
1	.0886	.0876	-.0010	.0194	.0042	.0152
2	.0744	.0747	.0003	.0204	.0019	.0185
3	.1129	.1085	-.0044	.0204	.0204	-
4	.1054	.1044	-.0010	.0211	.0211	-
Total	.3813	.3752	-.0061	.0813	.0476	.0337
$\bar{x}$	.0953	.0938	-.0015	.0203	.0119	.0084
1	.0876	.0722	-.0154	.0200	.0046	.0154
2	.0747	.0736	-.0011	.0218	.0022	.0196
3	.1085	.1062	-.0023	.0212	.0212	-
4	.1044	.1002	-.0042	.0200	.0200	-
Total	.3752	.3522	-.0230	.0830	.0480	.0350
$\bar{x}$	.0938	.0881	-.0058	.0208	.0120	.0087
1	.0722	.0743	.0021	.0200	.0014	.0186
2	.0736	.0680	-.0056	.0218	.0027	.0191
3	.1062	.1067	.0005	.0225	.0225	-
4	.1002	.1100	.0098	.0202	.0106	.0096
Total	.3522	.3590	.0068	.0845	.0372	.0473
$\bar{x}$	.0881	.0898	.0017	.0211	.0093	.0118

	Before	After	Gain or loss	Before	After	Loss
1	.0743	.0779	.0036	.0194	.0016	.0178
2	.0680	.0708	.0028	.0201	.0018	.0183
3	Female died - replicate 3 terminated.					
4	.1100	.1050	-.0050	.0203	.0079	.0124
Total	.2523	.2537	.0014	.0598	.0113	.0485
$\bar{\bar{x}}$	.0841	.0846	.0005	.0199	.0038	.0162
1	.0779	.0848	.0069	.0216	.0015	.0201
2	.0708	.0649	-.0059	.0223	.0030	.0193
4	.1050	.1096	.0046	.0200	.0042	.0158
Total	.2537	.2593	.0056	.0639	.0087	.0552
$\bar{\bar{x}}$	.0846	.0864	.0019	.0213	.0029	.0184
1	.0848	.0703	-.0145	.0194	.0015	.0179
2	.0649	.0724	.0075	.0218	.0019	.0199
4	.1096	.0980	-.0116	.0196	.0196	-
Total	.2593	.2407	-.0186	.0608	.0230	.0378
$\bar{\bar{x}}$	.0864	.0802	-.0062	.0203	.0077	.0126
1	.0703	.0749	.0046	.0202	.0029	.0173
2	.0724	.0735	.0011	.0203	.0020	.0183
4	Female died - replicate 4 terminated.					
Total	.1427	.1484	.0057	.0405	.0049	.0356
$\bar{\bar{x}}$	.0714	.0742	.0029	.0203	.0025	.0178
1	.0749	.0790	.0041	.0197	.0020	.0177
2	.0735	.0748	.0013	.0194	.0010	.0184
Total	.1484	.1538	.0054	.0391	.0030	.0361
$\bar{\bar{x}}$	.0742	.0769	.0027	.0196	.0015	.0181
1	.0790	.0666	-.0124	.0216	.0015	.0201
2	.0748	.0784	.0036	.0206	.0010	.0196
Total	.1538	.1450	-.0088	.0422	.0025	.0397
$\bar{\bar{x}}$	.0769	.0725	-.0044	.0211	.0013	.0199
1	Female died - replicate 1 terminated.					
2[1]	.0784	.0855	.0071	.0202	.0048	.0154
2	.0855	.0716	-.0139	.0203	.0051	.0152
2	.0716	.0712	-.0004	.0205	.0007	.0198
2	.0712	.0581	-.0131	.0209	.0021	.0188
2	.0581	.0644	.0063	.0222	.0010	.0212
2	.0644	.0639	-.0005	.0247	.0012	.0235
2	.0639	.0737	.0098	.0231	.0231	-
2	.0737	.0607	-.0130	.0197	.0035	.0162
2	.0607	.0744	.0137	.0225	.0015	.0210
2	.0744	.0739	-.0005	.0200	.0010	.0190
2	.0739	.0686	-.0053	.0218	.0010	.0208

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[1] All subsequent daily values for diet level 2 are based on replicate 2 i.e. the value obtained for the sole surviving adult female *P. maculiventris* in this experiment.

	Before	After	Gain or loss	Before	After	Loss
2	.0686	.0768	.0082	.0231	.0026	.0205
2	.0768	.0874	.0106	.0246	.0015	.0231
2	.0874	.0762	-.0112	.0221	.0010	.0211
2	.0762	.0935	.0173	.0204	.0014	.0190
2	.0935	.0853	-.0082	.0221	.0018	.0203
2	.0853	.0723	-.0130	.0208	.0124	.0084
2	.0723	.0783	.0060	.0206	.0010	.0196
2	.0783	.0760	-.0023	.0216	.0018	.0198
2	.0760	.0856	.0096	.0212	.0006	.0206
2	.0856	.0904	.0048	.0202	.0013	.0189
2	.0904	.0893	-.0011	.0215	.0045	.0170
2	.0893	.0946	.0053	.0210	.0045	.0165
2	.0946	.0969	.0023	.0207	.0037	.0170
2	.0969	.0804	-.0165	.0217	.0013	.0204
2	.0804	.0899	.0095	.0203	.0024	.0179
2	.0899	.0829	-.0070	.0212	.0022	.0190
2	.0829	.0815	-.0014	.0212	.0008	.0204
2	.0815	.0908	.0093	.0204	.0020	.0184
2	.0908	.0975	.0067	.0200	.0009	.0191
2	.0975	.0967	-.0008	.0212	.0051	.0161
2	.0967	.0994	.0027	.0224	.0012	.0212
2	.0994	.0832	-.0162	.0216	.0019	.0197
2	.0832	.0818	-.0014	.0224	.0012	.0212
2	.0818	.0997	.0179	.0213	.0014	.0199
2	.0997	.0815	-.0182	.0214	.0013	.0201
2	.0815	.0916	.0101	.0220	.0024	.0196
2	.0916	.0859	-.0057	.0202	.0013	.0189
2	.0859	.0775	-.0084	.0215	.0018	.0197
2	.0775	.0771	-.0004	.0205	.0021	.0184

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 3 - adult females.			
1	.0649	.0811	.0162	.0413	.0047	.0366
2	.0854	.0824	-.0030	.0464	.0464	-
3	.0704	.0914	.0210	.0426	.0127	.0299
4	.0839	.0759	-.0080	.0464	.0306	.0158
Total	.3046	.3308	.0262	.1767	.0944	.0823
$\bar{x}$	.0762	.0827	.0065	.0442	.0236	.0206
1	.0811	.0816	.0005	.0417	.0084	.0333
2	.0824	.0862	.0038	.0426	.0379	.0047
3	.0914	.0988	.0074	.0456	.0079	.0377
4	.0759	.0823	.0064	.0431	.0192	.0239
Total	.3308	.3489	.0181	.1730	.0734	.0996
$\bar{x}$	.0827	.0872	.0045	.0433	.0184	.0249
1	.0816	.0833	.0017	.0411	.0139	.0272
2	.0862	.1028	.0166	.0460	.0079	.0381
3	.0988	.1012	.0024	.0418	.0044	.0374
4	.0823	.0926	.0103	.0437	.0115	.0322
Total	.3489	.3799	.0310	.1726	.0377	.1349
$\bar{x}$	.0872	.0950	.0078	.0432	.0094	.0337
1	.0833	.0999	.0166	.0425	.0103	.0322
2	.1028	.1081	.0053	.0394	.0057	.0337
3	.1012	.1030	.0018	.0394	.0094	.0300
4	.0926	.0852	-.0074	.0413	.0233	.0180
Total	.3799	.3962	.0163	.1626	.0487	.1139
$\bar{x}$	.0950	.0991	.0041	.0407	.0122	.0285
1	.0999	.0836	-.0163	.0394	.0121	.0273
2	.1081	.0873	-.0208	.0441	.0203	.0238
3	.1030	.0974	-.0056	.0431	.0137	.0294
4	.0852	.0758	-.0094	.0394	.0394	-
Total	.3962	.3441	-.0521	.1660	.0855	.0805
$\bar{x}$	.0991	.0860	-.0130	.0415	.0214	.0201
1	.0836	.0899	.0063	.0411	.0093	.0318
2	.0873	.0982	.0109	.0394	.0056	.0338
3	.0974	.0987	.0013	.0399	.0053	.0346
4	.0758	.0881	.0123	.0409	.0111	.0298
Total	.3441	.3749	.0308	.1613	.0313	.1300
$\bar{x}$	.0860	.0937	.0077	.0403	.0783	.0325

	Before	After	Gain or loss	Before	After	Loss
1	.0899	.0964	.0065	.0442	.0065	.0377
2	.0982	.1125	.0143	.0422	.0013	.0409
3	.0987	.1007	.0020	.0394	.0034	.0360
4	.0881	.0778	-.0103	.0442	.0442	-
Total	.3749	.3874	.0125	.1700	.0554	.1146
$\bar{x}$	.0937	.0969	.0031	.0425	.0139	.0287
1	.0964	.0952	-.0012	.0413	.0054	.0359
2	.1125	.1046	-.0079	.0415	.0356	.0059
3	.1007	.1033	.0026	.0394	.0034	.0360
4	.0778	.1010	.0232	.0395	.0123	.0272
Total	.3874	.4041	.0167	.1617	.0567	.1050
$\bar{x}$	.0969	.1010	.0042	.0404	.0142	.0263
1	.0952	.0723	-.0229	.0426	.0426	-
2	.1046	.1149	.0103	.0394	.0133	.0261
3	.1033	.1053	.0020	.0394	.0029	.0365
4	.1010	.0907	-.0103	.0444	.0286	.0158
Total	.4041	.3832	-.0209	.1658	.0874	.0784
$\bar{x}$	.1010	.0958	-.0052	.0415	.0219	.0196
1	.0723	.0989	.0266	.0421	.0055	.0366
2	.1149	.1096	-.0053	.0394	.0394	-
3	.1053	.1191	.0138	.0453	.0044	.0409
4	.0907	.0886	-.0021	.0394	.0394	-
Total	.3832	.4162	.0330	.1662	.0887	.0775
$\bar{x}$	.0958	.1041	.0083	.0416	.0222	.0194
1	.0989	.1005	.0016	.0425	.0127	.0298
2	.1096	.1093	-.0003	.0409	.0332	.0077
3	.1191	.1087	-.0104	.0408	.0055	.0353
4	.0886	.0957	.0071	.0394	.0210	.0184
Total	.4162	.4142	-.0020	.1636	.0724	.0912
$\bar{x}$	.1041	.1036	-.0005	.0409	.0181	.0228
1	.1005	.0965	-.0040	.0447	.0099	.0348
2	.1093	.1017	-.0076	.0394	.0394	-
3	.1087	.1097	.0010	.0401	.0048	.0353
4	.0957	.0914	-.0043	.0400	.0400	-
Total	.4142	.3993	-.0149	.1642	.0941	.0701
$\bar{x}$	.1036	.0998	-.0037	.0411	.0235	.0175
1	.0965	.1062	.0097	.0454	.0223	.0231
2	.1017	.1180	.0163	.0458	.0214	.0244
3	.1097	.1084	-.0013	.0459	.0063	.0396
4	.0914	.0951	.0037	.0461	.0328	.0133
Total	.3993	.4277	.0284	.1832	.0828	.1004
$\bar{x}$	.0998	.1069	.0071	.0458	.0207	.0251
1	.1062	.1015	-.0047	.0394	.0072	.0322
2	.1180	.1082	-.0098	.0395	.0395	-
3	.1084	.1085	.0001	.0423	.0423	-
4	.0951	.0926	-.0025	.0395	.0395	-
Total	.4277	.4108	-.0169	.1607	.1285	.0322
$\bar{x}$	.1069	.1027	-.0042	.0402	.0321	.0081

	Before	After	Gain or loss	Before	After	Loss
1	.1015	.1040	.0025	.0412	.0099	.0313
2	.1082	.1099	.0017	.0425	.0425	-
3	.1085	.0973	-.0112	.0395	.0395	-
4	.0926	.0933	.0007	.0447	.0397	.0050
Total	.4108	.4045	-.0063	.1679	.1316	.0363
$\bar{\bar{x}}$	.1027	.1011	-.0016	.0420	.0329	.0091
1	.1040	.1019	-.0021	.0460	.0048	.0412
2	.1099	.0973	-.0126	.0420	.0370	.0050
3	.0973	.1070	.0097	.0424	.0068	.0356
4	.0933	.0976	.0043	.0414	.0235	.0179
Total	.4045	.4038	-.0007	.1718	.0721	.0997
$\bar{\bar{x}}$	.1011	.1010	-.0002	.0430	.0180	.0249
1	.1019	.0932	-.0087	.0445	.0091	.0354
2	.0973	.1067	.0094	.0464	.0032	.0432
3	.1070	.1092	.0022	.0467	.0131	.0336
4	.0976	.0973	-.0003	.0455	.0455	-
Total	.4038	.4064	.0026	.1831	.0709	.1122
$\bar{\bar{x}}$	.1010	.1016	.0007	.0458	.0177	.0281
1	.0932	.1002	.0070	.0443	.0035	.0408
2	.1067	.1060	-.0007	.0447	.0113	.0334
3	.1092	.1105	.0013	.0436	.0209	.0227
4	.0973	.0953	-.0020	.0448	.0448	-
Total	.4064	.4120	.0056	.1774	.0805	.0969
$\bar{\bar{x}}$	.1016	.1030	.0014	.0444	.0201	.0242
1	.1002	.1087	.0085	.0462	.0094	.0368
2	.1060	.1009	-.0051	.0448	.0448	-
3	.1105	.1001	-.0104	.0460	.0460	-
4	.0953	.0972	.0019	.0456	.0126	.0330
Total	.4120	.4069	-.0051	.1826	.1128	.0698
$\bar{\bar{x}}$	.1030	.1017	-.0013	.0457	.0282	.0175
1	.1087	.1056	-.0031	.0442	.0061	.0381
2	.1009	.1187	.0178	.0462	.0089	.0373
3	.1001	.1034	.0033	.0461	.0113	.0348
4	.0972	.0978	.0006	.0455	.0080	.0375
Total	.4069	.4255	.0186	.1820	.0343	.1477
$\bar{\bar{x}}$	.1017	.1064	.0047	.0455	.0086	.0369
1	.1056	.1060	.0004	.0396	.0031	.0365
2	.1187	.1198	.0011	.0423	.0144	.0279
3	.1034	.1090	.0056	.0433	.0110	.0323
4	.0978	.0939	-.0039	.0419	.0419	-
Total	.4255	.4287	.0032	.1671	.0704	.0967
$\bar{\bar{x}}$	.1064	.1072	.0008	.0418	.0176	.0242
1	.1060	.1059	-.0001	.0438	.0042	.0396
2	.1198	.1198	-	.0422	.0422	-
3	.1090	.1175	.0085	.0439	.0114	.0325
4	.0939	.1017	.0078	.0419	.0222	.0197
Total	.4287	.4449	.0162	.1718	.0800	.0918
$\bar{\bar{x}}$	.1072	.1112	.0041	.0430	.0200	.0230

	Before	After	Gain or loss	Before	After	Loss
1	.1059	.1052	-.0007	.0423	.0068	.0355
2	.1198	.1078	-.0120	.0386	.0386	-
3	.1175	.1054	-.0121	.0431	.0431	-
4	.1017	.1033	.0016	.0433	.0293	.0140
Total	.4449	.4217	-.0232	.1673	.1178	.0495
$\bar{\bar{x}}$	.1112	.1054	-.0058	.0418	.0295	.0124
1	.1052	.1000	-.0052	.0444	.0062	.0382
2	.1078	.1036	-.0042	.0437	.0099	.0338
3	.1054	.1064	.0010	.0431	.0213	.0218
4	.1033	.1060	.0027	.0450	.0306	.0144
Total	.4217	.4160	-.0057	.1762	.0680	.1082
$\bar{\bar{x}}$	.1054	.1040	-.0014	.0441	.0170	.0271
1	.1000	.0996	-.0004	.0449	.0034	.0415
2	.1036	.1106	.0070	.0436	.0250	.0186
3	.1064	.1076	.0012	.0436	.0230	.0206
4	.1060	.1062	.0002	.0455	.0455	-
Total	.4160	.4240	.0080	.1776	.0969	.0807
$\bar{\bar{x}}$	.1040	.1060	.0020	.0444	.0242	.0202
1	.0996	.1107	.0111	.0424	.0091	.0333
2	.1106	.0988	-.0118	.0437	.0437	-
3	.1076	.0997	-.0079	.0432	.0432	-
4	.1062	.1058	-.0004	.0415	.0415	-
Total	.4240	.4150	-.0090	.1708	.1375	.0333
$\bar{\bar{x}}$	.1060	.1038	-.0023	.0427	.0344	.0083
1	.1107	.1011	-.0096	.0422	.0135	.0287
2	.0988	.0915	-.0073	.0422	.0295	.0127
3	.0997	.0977	-.0020	.0407	.0407	-
4	.1058	.1103	.0045	.0418	.0262	.0156
Total	.4150	.4006	-.0144	.1669	.1099	.0570
$\bar{\bar{x}}$	.1038	.1002	-.0036	.0417	.0275	.0143
1	.1011	.0915	-.0096	.0427	.0098	.0329
2	.0915	.0980	.0065	.0460	.0263	.0197
3	.0977	.0899	-.0078	.0425	.0176	.0249
4	.1103	.1055	-.0048	.0419	.0419	-
Total	.4006	.3849	-.0157	.1731	.0956	.0775
$\bar{\bar{x}}$	.1002	.0960	-.0039	.0433	.0239	.0194
1	.0915	.0965	.0050	.0421	.0074	.0347
2	.0980	.0985	.0005	.0415	.0379	.0036
3	.0899	.0948	.0049	.0396	.0053	.0343
4	.1055	.1063	.0008	.0418	.0418	-
Total	.3849	.3961	.0112	.1650	.0924	.0726
$\bar{\bar{x}}$	.0960	.0990	.0028	.0413	.0231	.0182
1	.0965	.0923	-.0042	.0429	.0083	.0346
2	.0985	.0970	-.0015	.0462	.0242	.0220
3	.0948	.0941	-.0007	.0415	.0066	.0349
4	.1063	.1075	.0012	.0440	.0349	.0091
Total	.3961	.3909	-.0052	.1746	.0740	.1006
$\bar{\bar{x}}$	.0990	.0977	-.0013	.0437	.0185	.0252

	Before	After	Gain or loss	Before	After	Loss
1	.0923	.1086	.0163	.0435	.0093	.0342
2	.0970	.0935	-.0035	.0436	.0379	.0057
3	.0941	.1215	.0274	.0440	.0051	.0389
4	.1075	.1113	.0038	.0431	.0431	-
Total	.3909	.4349	.0440	.1742	.0254	.0788
$\bar{x}$	.0977	.1087	.0110	.0436	.0064	.0197
1	.1086	.0883	-.0203	.0430	.0430	-
2	.0935	.1050	.0115	.0453	.0099	.0354
3	.1215	.1245	.0030	.0452	.0345	.0107
4	.1113	.1115	.0002	.0420	.0342	.0078
Total	.4349	.4293	-.0056	.1755	.1216	.0539
$\bar{x}$	.1087	.1073	-.0014	.0439	.0304	.0135
1	.0883	.0993	.0110	.0462	.0033	.0429
2	.1050	.1079	.0029	.0424	.0211	.0213
3	.1245	.1192	-.0053	.0448	.0047	.0401
4	.1115	.1100	-.0015	.0448	.0448	-
Total	.4293	.4364	.0071	.1782	.0739	.1043
$\bar{x}$	.1073	.1091	.0018	.0446	.0185	.0261
1	.0993	.1030	.0037	.0433	.0018	.0415
2	.1079	.1084	.0005	.0409	.0225	.0184
3	.1192	.1089	-.0103	.0433	.0153	.0280
4	.1100	.1133	.0033	.0424	.0424	-
Total	.4364	.4336	-.0028	.1699	.0820	.0879
$\bar{x}$	.1091	.1084	-.0007	.0425	.0205	.0220
1	.1030	.1051	.0021	.0438	.0029	.0409
2	.1084	.1118	.0034	.0430	.0306	.0124
3	.1089	.1141	.0052	.0429	.0275	.0154
4	.1133	.1121	-.0012	.0428	.0428	-
Total	.4336	.4431	.0095	.1725	.1038	.0687
$\bar{x}$	.1084	.1108	.0024	.0431	.0260	.0172
1	.1051	.0971	-.0080	.0412	.0041	.0371
2	.1118	.1051	-.0067	.0427	.0164	.0263
3	.1141	.1173	.0032	.0443	.0443	-
4	.1121	.1222	.0101	.0424	.0424	-
Total	.4431	.4417	-.0014	.1706	.1072	.0634
$\bar{x}$	.1108	.1104	-.0004	.0427	.0268	.0159
1	.0971	.0936	-.0035	.0430	.0202	.0228
2	.1051	.1078	.0027	.0439	.0254	.0185
3	.1173	.1154	-.0019	.0430	.0292	.0138
4	.1222	.1272	.0050	.0448	.0064	.0384
Total	.4417	.4440	.0023	.1747	.0812	.0935
$\bar{x}$	.1104	.1110	.0006	.0437	.0203	.0234
1	.0936	.1105	.0169	.0417	.0071	.0346
2	.1078	.1062	-.0016	.0419	.0419	-
3	.1154	.1263	.0109	.0410	.0093	.0317
4	.1272	.1181	-.0091	.0394	.0394	-
Total	.4440	.4611	.0171	.1640	.0977	.0663
$\bar{x}$	.1110	.1153	.0043	.0410	.0244	.0166

	Before	After	Gain or loss	Before	After	Loss
1	.1105	.1093	-.0012	.0399	.0038	.0361
2	.1062	.1007	-.0055	.0425	.0425	-
3	.1263	.1221	-.0042	.0423	.0258	.0165
4	.1181	.1224	.0043	.0422	.0422	-
Total	.4611	.4545	-.0066	.1669	.1143	.0526
$\bar{x}$	.1153	.1136	-.0017	.0417	.0286	.0132
1	.1093	.1092	-.0001	.0403	.0208	.0195
2	.1007	.0985	-.0022	.0422	.0422	-
3	.1221	.1251	.0030	.0433	.0121	.0312
4	.1224	.1244	.0020	.0420	.0324	.0096
Total	.4545	.4572	.0027	.1678	.1075	.0603
$\bar{x}$	.1136	.1143	.0007	.0420	.0269	.0151
1	.1092	.1030	-.0062	.0401	.0106	.0295
2	.0985	.1031	.0046	.0395	.0191	.0204
3	.1251	.1201	-.0050	.0405	.0367	.0038
4	.1244	.1275	.0031	.0397	.0397	-
Total	.4572	.4537	-.0035	.1598	.1061	.0537
$\bar{x}$	.1143	.1134	-.0009	.0400	.0265	.0134
1	.1030	.1061	.0031	.0406	.0215	.0191
2	.1031	.1067	.0036	.0401	.0401	-
3	.1201	.1199	-.0002	.0409	.0265	.0144
4	.1275	.1229	-.0046	.0408	.0408	-
Total	.4537	.4556	.0019	.1624	.1289	.0335
$\bar{x}$	.1134	.1139	.0005	.0406	.0322	.0084
1	.1061	.1042	-.0019	.0416	.0061	.0355
2	.1067	.1136	.0069	.0437	.0285	.0152
3	.1199	.1010	-.0189	.0398	.0245	.0153
4	.1229	.1215	-.0014	.0398	.0398	-
Total	.4556	.4403	-.0153	.1649	.0989	.0660
$\bar{x}$	.1139	.1101	-.0038	.0412	.0247	.0165
1	.1042	.1114	.0072	.0400	.0070	.0330
2	.1136	.1049	-.0087	.0427	.0427	-
3	.1010	.1196	.0186	.0414	.0111	.0303
4	.1215	.1274	.0059	.0409	.0323	.0086
Total	.4403	.4633	.0230	.1650	.0931	.0719
$\bar{x}$	.1101	.1158	.0058	.0413	.0233	.0180
1	.1114	.1083	-.0031	.0394	.0271	.0123
2	.1049	.1142	.0093	.0404	.0239	.0165
3	.1196	.0955	-.0241	.0409	.0409	-
4	.1274	.1227	-.0047	.0412	.0412	-
Total	.4633	.4407	-.0226	.1619	.1331	.0288
$\bar{x}$	.1158	.1102	-.0057	.0405	.0333	.0072
1	.1083	.1087	.0004	.0412	.0075	.0337
2	.1142	.0995	-.0147	.0413	.0413	-
3	.0955	.1158	.0203	.0423	.0095	.0328
4	.1227	.1262	.0035	.0403	.0403	-
Total	.4407	.4502	.0095	.1651	.0986	.0665
$\bar{x}$	.1102	.1126	.0024	.0413	.0247	.0166

	Before	After	Gain or loss	Before	After	Loss
1	.1087	.1064	-.0023	.0422	.0060	.0362
2	.0995	.0925	-.0070	.0426	.0426	-
3	.1158	.1193	.0035	.0411	.0081	.0330
4	.1262	.1216	-.0046	.0397	.0397	-
Total	.4502	.4398	-.0104	.1656	.0964	.0692
$\bar{\bar{x}}$	.1126	.1100	-.0026	.0414	.0241	.0173
1	.1064	.1014	-.0050	.0421	.0144	.0277
2	.0925	.1047	.0122	.0421	.0181	.0240
3	.1193	.1165	-.0028	.0401	.0120	.0281
4	.1216	.1250	.0034	.0402	.0402	-
Total	.4398	.4476	.0078	.1645	.0847	.0798
$\bar{\bar{x}}$	.1100	.1119	.0020	.0411	.0212	.0200
1	.1014	.1006	-.0008	.0394	.0052	.0342
2	.1047	.0989	-.0058	.0406	.0367	.0039
3	.1165	.1038	-.0127	.0410	.0410	-
4	.1250	.1194	-.0056	.0415	.0415	-
Total	.4476	.4227	-.0249	.1625	.1244	.0381
$\bar{\bar{x}}$	.1119	.1057	-.0062	.0406	.0311	.0095
1	.1006	.1062	.0056	.0399	.0043	.0356
2	.0989	.1113	.0124	.0427	.0113	.0314
3	.1038	.1249	.0211	.0425	.0055	.0370
4	.1194	.1121	-.0073	.0430	.0430	-
Total	.4227	.4545	.0318	.1681	.0641	.1040
$\bar{\bar{x}}$	.1057	.1136	.0080	.0420	.0160	.0260
1	.1062	.0990	-.0072	.0416	.0061	.0355
2	.1113	.1142	-.0029	.0412	.0235	.0177
3	.1249	.1079	-.0170	.0415	.0415	-
4	.1121	.1198	.0077	.0418	.0418	-
Total	.4545	.4409	.0194	.1661	.1129	.0532
$\bar{\bar{x}}$	.1136	.1102	.0049	.0415	.0282	.0133
1	.0990	.1109	.0119	.0408	.0278	.0130
2	.1142	.1080	-.0062	.0396	.0396	-
3	.1079	.1140	.0061	.0400	.0400	-
4	.1198	.1228	.0030	.0409	.0409	-
Total	.4409	.4557	.0148	.1613	.1483	.0130
$\bar{\bar{x}}$	.1102	.1139	.0037	.0403	.0371	.0033
1	.1109	.1001	-.0108	.0408	.0106	.0302
2	.1080	.0972	-.0108	.0399	.0399	-
3	.1140	.1195	.0055	.0419	.0163	.0256
4	.1228	.1142	-.0086	.0394	.0394	-
Total	.4557	.4310	-.0247	.1620	.1062	.0558
$\bar{\bar{x}}$	.1139	.1078	-.0062	.0405	.0266	.0140
1	.1001	.1018	.0017	.0406	.0039	.0367
2	.0972	.1085	.0113	.0395	.0065	.0330
3	.1195	.1101	-.0094	.0438	.0438	-
4	.1142	.1292	.0150	.0418	.0245	.0173
Total	.4310	.4496	.0186	.1657	.0787	.0870
$\bar{\bar{x}}$	.1078	.1124	.0047	.0414	.0197	.0218

	Before	After	Gain or loss	Before	After	Loss
1	.1018	.0993	-.0025	.0394	.0043	.0351
2	.1085	.0983	-.0102	.0404	.0109	.0295
3	.1101	.1093	-.0008	.0407	.0407	-
4	.1292	.1283	-.0009	.0410	.0410	-
Total	.4496	.4352	-.0144	.1615	.0969	.0646
$\bar{x}$	.1124	.1088	-.0036	.0404	.0242	.0162
1	.0993	.1137	.0144	.0404	.0080	.0324
2	.0983	.0973	-.0010	.0394	.0130	.0264
3	Female died - replicate 3 terminated.					
4	Female died - replicate 4 terminated.					
Total	.1976	.2110	.0134	.0798	.0210	.0588
$\bar{x}$	.0988	.1055	.0068	.0399	.0105	.0294
1	.1137	.1093	-.0044	.0403	.0065	.0338
2	.0973	.1059	.0086	.0403	.0403	-
Total	.2110	.2152	.0042	.0806	.0468	.0338
$\bar{x}$	.1055	.1076	.0021	.0403	.0234	.0169
1	.1093	.1126	.0033	.0404	.0132	.0272
2	.1059	.1088	.0029	.0411	.0191	.0220
Total	.2152	.2214	.0062	.0815	.0323	.0492
$\bar{x}$	.1076	.1107	.0031	.0408	.0162	.0246
1	.1126	.1106	-.0020	.0414	.0112	.0302
2	.1088	.1114	.0026	.0410	.0410	-
Total	.2214	.2220	.0006	.0824	.0522	.0302
$\bar{x}$	.1107	.1110	.0003	.0412	.0261	.0151
1	.1106	.1065	-.0041	.0407	.0166	.0241
2	.1114	.0910	-.0204	.0401	.0401	-
Total	.2220	.1975	-.0245	.0808	.0567	.0241
$\bar{x}$	.1110	.0988	-.0123	.0404	.0284	.0121
1	.1065	.0953	-.0112	.0418	.0305	.0113
2	.0910	.0934	.0024	.0410	.0126	.0284
Total	.1975	.1887	-.0088	.0828	.0431	.0497
$\bar{x}$	.0988	.0944	-.0044	.0414	.0216	.0249
1	.0953	.0982	.0029	.0405	.0058	.0347
2	.0934	.0916	-.0018	.0405	.0405	-
Total	.1887	.1898	.0011	.0810	.0463	.0347
$\bar{x}$	.0944	.0949	.0006	.0405	.0232	.0174
1	.0982	.0964	-.0018	.0400	.0034	.0366
2	.0916	.0970	.0054	.0398	.0398	-
Total	.1898	.1934	.0036	.0798	.0432	.0366
$\bar{x}$	.0949	.0967	.0018	.0399	.0216	.0183
1	.0964	.1042	.0078	.0417	.0059	.0358
2	.0970	.1122	.0152	.0411	.0110	.0301
Total	.1934	.2164	.0230	.0828	.0169	.0659
$\bar{x}$	.0967	.1082	.0115	.0414	.0085	.0330
1	.1042	.0828	-.0214	.0425	.0125	.0300
2	.1122	.1125	.0003	.0426	.0426	-
Total	.2164	.1953	-.0211	.0851	.0551	.0300
$\bar{x}$	.1082	.0977	-.0106	.0426	.0276	.0150

	Before	After	Gain or loss	Before	After	Loss
1	.0828	.1043	.0215	.0426	.0035	.0391
2	.1125	.1110	-.0015	.0421	.0240	.0181
Total	.1953	.2153	.0200	.0847	.0275	.0572
$\bar{x}$	.0977	.1077	.0100	.0424	.0138	.0286
1	.1043	.1032	-.0011	.0424	.0058	.0366
2	.1110	.1104	-.0006	.0431	.0431	-
Total	.2153	.2136	-.0017	.0855	.0489	.0366
$\bar{x}$	.1077	.1068	-.0009	.0428	.0245	.0183
1	.1032	.1033	.0001	.0424	.0104	.0320
2	.1104	.1138	.0034	.0431	.0203	.0228
Total	.2136	.2171	.0035	.0855	.0307	.0548
$\bar{x}$	.1068	.1086	.0018	.0428	.0154	.0274
1	.1033	.1035	.0002	.0439	.0159	.0280
2	.1138	.1016	-.0122	.0427	.0427	-
Total	.2171	.2051	-.0120	.0866	.0586	.0280
$\bar{x}$	.1086	.1026	-.0060	.0433	.0293	.0140
1	.1035	.1152	.0117	.0410	.0052	.0358
2	.1016	.1016	-	.0415	.0415	-
Total	.2051	.2168	.0117	.0825	.0467	.0358
$\bar{x}$	.1026	.1084	.0059	.0413	.0234	.0179
1	.1152	.0988	-.0164	.0425	.0094	.0331
2	.1016	.0835	-.0181	.0445	.0445	-
Total	.2168	.1823	-.0345	.0870	.0539	.0331
$\bar{x}$	.1084	.0912	-.0173	.0435	.0270	.0166
1	.0988	.1026	.0038	.0406	.0406	-
2	.0835	.0767	-.0068	.0407	.0407	-
Total	.1823	.1793	-.0030	.0813	.0813	-
$\bar{x}$	.0912	.0897	-.0015	.0407	.0407	-
1	.1026	.1099	.0073	.0420	.0160	.0260
2	.0767	.0788	.0021	.0416	.0416	-
Total	.1793	.1887	.0094	.0836	.0576	.0260
$\bar{x}$	.0897	.0944	.0047	.0418	.0238	.0130
1	.1099	.0973	-.0126	.0429	.0118	.0311
2	.0788	.0850	.0062	.0422	.0352	.0070
Total	.1887	.1823	-.0064	.0851	.0470	.0381
$\bar{x}$	.0944	.0912	-.0032	.0426	.0235	.0191
1	.0973	.0893	-.0080	.0412	.0112	.0300
2	.0850	.0852	.0002	.0425	.0425	-
Total	.1823	.1745	-.0078	.0837	.0537	.0300
$\bar{x}$	.0912	.0873	-.0039	.0419	.0269	.0150
1	.0893	.1134	.0241	.0394	.0059	.0335
2	.0852	.0721	-.0131	.0403	.0403	-
Total	.1745	.1855	.0110	.0797	.0462	.0335
$\bar{x}$	.0873	.0928	.0055	.0399	.0231	.0168
1	.1134	.1119	-.0015	.0394	.0105	.0289
2	.0721	.0740	.0019	.0423	.0423	-
Total	.1855	.1859	.0004	.0817	.0528	.0289
$\bar{x}$	.0928	.0930	.0002	.0409	.0264	.0145

	Before	After	Gain or loss	Before	After	Loss
1	.1119	.0950	-.0169	.0394	.0041	.0353
2	.0740	.0682	-.0058	.0400	.0400	-
Total	.1859	.1632	-.0227	.0794	.0441	.0353
$\bar{\bar{x}}$	.0930	.0816	-.0114	.0397	.0221	.0177
1	.0950	.1106	.0156	.0421	.0082	.0339
2	.0682	.0627	-.0055	.0394	.0394	-
Total	.1632	.1733	.0101	.0815	.0476	.0339
$\bar{\bar{x}}$	.0816	.0867	.0051	.0408	.0238	.0170
1	.1106	.1020	-.0086	.0401	.0047	.0354
2	.0627	.0591	-.0036	.0407	.0407	-
Total	.1733	.1611	-.0122	.0808	.0454	.0354
$\bar{\bar{x}}$	.0867	.0806	-.0061	.0404	.0227	.0177
1	.1020	.1056	.0036	.0413	.0053	.0360
2	.0591	.0552	-.0039	.0415	.0415	-
Total	.1611	.1608	-.0003	.0828	.0468	.0360
$\bar{\bar{x}}$	.0806	.0804	-.0002	.0414	.0234	.0180
1	.1056	.1087	.0031	.0418	.0046	.0372
2	.0552	.0528	-.0024	.0407	.0407	-
Total	.1608	.1615	.0007	.0825	.0453	.0372
$\bar{\bar{x}}$	.0804	.0808	.0004	.0413	.0227	.0186
1[1]	.1087	.0936	-.0151	.0398	.0061	.0337
2	Female died - replicate 2 terminated.					
1	.0936	.0988	.0052	.0404	.0022	.0382
1	.0988	.1008	.0020	.0403	.0023	.0380
1	.1088	.0723	-.0365	.0394	.0394	-
1	.0723	.0696	-.0027	.0408	.0408	-

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1 All subsequent daily values for diet level 3 are based on replicate 1 i.e. the value obtained for the sole surviving adult female P. maculiventris in this experiment.

Replications	*P. maculiventris* Weight before feeding	*P. maculiventris* Weight after feeding	*P. maculiventris* Gain or loss in weight	*G. mellonella* Weight before predation	*G. mellonella* Weight after predation	*G. mellonella* Loss in weight
			Diet level 4 - adult females.			
1	.0702	.0789	.0087	.0537	.0259	.0278
2	.0763	.0958	.0195	.0493	.0191	.0302
3	.0673	.0780	.0107	.0506	.0255	.0251
4	.0666	.1033	.0367	.0495	.0229	.0266
Total	.2804	.3560	.0756	.2031	.0934	.1097
$\bar{x}$	.0701	.0890	.0189	.0508	.0234	.0274
1	.0789	.0995	.0206	.0525	.0093	.0432
2	.0958	.0976	.0018	.0504	.0151	.0353
3	.0780	.0797	.0017	.0503	.0096	.0407
4	.1033	.1057	.0024	.0504	.0115	.0389
Total	.3560	.3825	.0265	.2036	.0455	.1581
$\bar{x}$	.0890	.0956	.0066	.0509	.0114	.0395
1	.0995	.0955	-.0040	.0564	.0175	.0389
2	.0976	.0984	.0008	.0563	.0176	.0387
3	.0797	.0793	-.0004	.0564	.0342	.0222
4	.1057	.1067	.0010	.0508	.0133	.0375
Total	.3825	.3799	-.0026	.2199	.0826	.1373
$\bar{x}$	.0956	.0950	-.0007	.0550	.0207	.0343
1	.0955	.1039	.0084	.0552	.0122	.0430
2	.0984	.1051	.0067	.0494	.0235	.0259
3	.0793	.0780	-.0013	.0539	.0337	.0202
4	.1067	.1146	.0079	.0494	.0091	.0403
Total	.3799	.4016	.0217	.2079	.0785	.1294
$\bar{x}$	.0950	.1004	.0054	.0520	.0196	.0324
1	.1039	.1025	-.0014	.0542	.0208	.0334
2	.1051	.1087	.0036	.0564	.0155	.0409
3	.0780	.0834	.0054	.0564	.0311	.0253
4	.1146	.0942	-.0204	.0494	.0494	-
Total	.4016	.3888	-.0128	.2164	.1168	.0996
$\bar{x}$	.1004	.0972	-.0032	.0541	.0292	.0249
1	.1025	.0881	-.0144	.0548	.0199	.0349
2	.1087	.1130	.0043	.0564	.0136	.0428
3	.0834	.0733	-.0101	.0494	.0494	-
4	.0942	.1177	.0235	.0515	.0114	.0401
Total	.3888	.3921	.0033	.2121	.0943	.1178
$\bar{x}$	.0972	.0980	.0008	.0530	.0236	.0295

	Before	After	Gain or loss	Before	After	Loss
1	.0881	.0982	.0101	.0502	.0318	.0184
2	.1130	.1161	.0031	.0564	.0120	.0444
3	.0733	.0714	-.0019	.0555	.0555	-
4	.1177	.1143	-.0034	.0550	.0261	.0289
Total	.3921	.4000	.0079	.2171	.1254	.0917
$\bar{x}$	.0980	.1000	.0020	.0543	.0314	.0229
1	.0982	.1022	.0040	.0503	.0503	-
2	.1161	.1182	.0021	.0538	.0201	.0337
3	.0714	.0769	.0055	.0496	.0270	.0226
4	.1143	.1258	.0115	.0528	.0129	.0399
Total	.4000	.4231	.0231	.2065	.1103	.0962
$\bar{x}$	.1000	.1058	.0058	.0516	.0276	.0241
1	.1022	.1105	.0083	.0564	.0161	.0403
2	.1182	.1145	-.0037	.0519	.0151	.0368
3	.0769	.1168	.0399	.0494	.0051	.0443
4	.1258	.1101	-.0157	.0494	.0494	-
Total	.4231	.4519	.0288	.2071	.0857	.1214
$\bar{x}$	.1058	.1130	.0072	.0518	.0214	.0304
1	.1105	.1053	-.0052	.0553	.0553	-
2	.1145	.1194	.0049	.0500	.0166	.0334
3	.1168	.1263	.0095	.0494	.0251	.0243
4	.1101	.0972	-.0129	.0540	.0540	-
Total	.4519	.4482	-.0037	.2087	.1510	.0577
$\bar{x}$	.1130	.1121	-.0009	.0522	.0378	.0144
1	.1053	.1144	.0091	.0495	.0349	.0146
2	.1194	.1168	-.0026	.0508	.0082	.0426
3	.1263	.1204	-.0059	.0513	.0082	.0431
4	.0972	.0864	-.0108	.0521	.0521	-
Total	.4482	.4380	-.0102	.2037	.1034	.1003
$\bar{x}$	.1121	.1095	-.0026	.0509	.0259	.0251
1	.1144	.1092	-.0052	.0546	.0438	.0108
2	.1168	.1191	.0023	.0551	.0207	.0344
3	.1204	.1332	.0128	.0533	.0082	.0451
4	.0864	.1025	.0161	.0554	.0258	.0296
Total	.4380	.4640	.0260	.2184	.0985	.1199
$\bar{x}$	.1095	.1160	.0065	.0546	.0246	.0300
1	.1092	.1081	-.0011	.0556	.0556	-
2	.1191	.1129	-.0062	.0563	.0250	.0313
3	.1332	.1191	-.0141	.0564	.0346	.0218
4	.1025	.0889	-.0136	.0527	.0527	-
Total	.4640	.4290	-.0350	.2210	.1679	.0531
$\bar{x}$	.1160	.1073	-.0088	.0553	.0420	.0133
1	.1081	.1049	-.0032	.0508	.0508	-
2	.1129	.1213	.0084	.0514	.0156	.0358
3	.1191	.1280	.0089	.0531	.0060	.0471
4	.0889	.0921	.0032	.0512	.0512	-
Total	.4290	.4463	.0173	.2065	.1236	.0829
$\bar{x}$	.1073	.1116	.0043	.0516	.0309	.0207

	Before	After	Gain or loss	Before	After	Loss
1	.1049	.1094	.0045	.0470	.0317	.0153
2	.1213	.1179	-.0034	.0511	.0157	.0354
3	.1280	.1196	-.0084	.0549	.0098	.0451
4	.0921	.0906	-.0015	.0552	.0552	-
Total	.4463	.4375	-.0088	.2082	.1124	.0958
$\bar{x}$	.1116	.1094	-.0022	.0521	.0281	.0240
1	.1094	.1051	-.0043	.0528	.0528	-
2	.1179	.1239	.0060	.0550	.0190	.0360
3	.1196	.1260	.0064	.0513	.0185	.0328
4	.0906	.1033	.0127	.0522	.0321	.0201
Total	.4375	.4583	.0208	.2113	.1224	.0889
$\bar{x}$	.1094	.1146	.0052	.0528	.0306	.0222
1	.1051	.1125	.0074	.0549	.0243	.0306
2	.1239	.1157	-.0082	.0564	.0138	.0426
3	.1260	.1199	-.0061	.0556	.0157	.0399
4	.1033	.0990	-.0043	.0556	.0556	-
Total	.4583	.4471	-.0112	.2225	.1094	.1131
$\bar{x}$	.1146	.1118	-.0028	.0556	.0274	.0283
1	.1125	.1147	.0022	.0536	.0406	.0130
2	.1157	.1116	-.0041	.0559	.0559	-
3	.1199	.1294	.0095	.0554	.0233	.0321
4	.0990	.0964	-.0026	.0533	.0489	.0044
Total	.4471	.4521	.0050	.2182	.1687	.0495
$\bar{x}$	.1118	.1130	.0013	.0546	.0422	.0124
1	.1147	.1023	-.0124	.0538	.0538	-
2	.1116	.1166	.0050	.0521	.0117	.0404
3	.1294	.1234	-.0060	.0541	.0188	.0353
4	.0964	.0958	-.0006	.0559	.0559	-
Total	.4521	.4381	-.0140	.2159	.1402	.0757
$\bar{x}$	.1130	.1095	-.0035	.0540	.0351	.0189
1	.1023	.1098	.0075	.0520	.0144	.0376
2	.1166	.1198	.0032	.0524	.0234	.0290
3	.1234	.1245	.0011	.0534	.0224	.0310
4	.0958	.1065	.0107	.0558	.0096	.0462
Total	.4381	.4606	.0225	.2136	.0698	.1438
$\bar{x}$	.1095	.1152	.0056	.0534	.0175	.0360
1	.1098	.1062	-.0036	.0549	.0031	.0518
2	.1198	.1120	-.0078	.0564	.0144	.0420
3	.1245	.1322	.0077	.0567	.0110	.0457
4	.1065	.1065	-	.0565	.0565	-
Total	.4606	.4569	-.0037	.2245	.0850	.1395
$\bar{x}$	.1152	.1142	-.0009	.0561	.0213	.0349
1	.1062	.1106	.0044	.0526	.0526	-
2	.1120	.1094	-.0026	.0513	.0092	.0421
3	.1322	.1240	-.0082	.0510	.0318	.0192
4	.1065	.1083	.0018	.0521	.0521	-
Total	.4569	.4523	-.0046	.2070	.1457	.0613
$\bar{x}$	.1142	.1131	-.0012	.0518	.0364	.0153

	Before	After	Gain or loss	Before	After	Loss
1	.1106	.1124	.0018	.0505	.0505	-
2	.1094	.1220	.0126	.0526	.0235	.0291
3	.1240	.1275	.0035	.0559	.0154	.0405
4	.1083	.1083	-	.0552	.0552	-
Total	.4523	.4702	.0179	.2142	.1446	.0696
$\bar{x}$	.1131	.1175	.0045	.0536	.0362	.0174
1	.1124	.1090	-.0034	.0542	.0118	.0424
2	.1220	.1055	-.0165	.0511	.0511	-
3	.1275	.1227	-.0048	.0522	.0319	.0203
4	.1083	.1112	.0029	.0562	.0562	-
Total	.4702	.4484	-.0218	.2137	.1510	.0627
$\bar{x}$	.1175	.1121	-.0055	.0534	.0378	.0157
1	.1090	.1142	.0052	.0561	.0280	.0281
2	.1055	.1185	.0130	.0536	.0173	.0363
3	.1227	.1336	.0109	.0531	.0353	.0178
4	.1112	.1204	.0092	.0525	.0193	.0332
Total	.4484	.4867	.0383	.2153	.0999	.1154
$\bar{x}$	.1121	.1217	.0096	.0538	.0250	.0289
1	.1142	.1085	-.0057	.0502	.0502	-
2	.1185	.1168	-.0017	.0516	.0274	.0242
3	.1336	.1185	-.0151	.0549	.0549	-
4	.1204	.1123	-.0081	.0524	.0302	.0222
Total	.4867	.4561	-.0306	.2091	.1627	.0464
$\bar{x}$	.1217	.1140	-.0077	.0523	.0407	.0116
1	.1085	.1134	.0049	.0534	.0184	.0350
2	.1168	.1047	-.0121	.0523	.0523	-
3	.1185	.1247	.0062	.0521	.0247	.0274
4	.1123	.1153	.0030	.0515	.0515	-
Total	.4561	.4581	.0020	.2093	.1469	.0624
$\bar{x}$	.1140	.1145	.0005	.0523	.0367	.0156
1	.1134	.0904	-.0230	.0527	.0527	-
2	.1047	.0954	-.0093	.0517	.0517	-
3	.1247	.1164	-.0083	.0522	.0522	-
4	.1153	.1087	-.0066	.0535	.0180	.0355
Total	.4581	.4109	-.0472	.2101	.1746	.0355
$\bar{x}$	.1145	.1027	-.0118	.0525	.0437	.0089
1	.0904	.1013	.0109	.0494	.0068	.0426
2	.0954	.1180	.0226	.0495	.0227	.0268
3	.1164	.1205	.0041	.0557	.0557	-
4	.1087	.1017	-.0070	.0540	.0540	-
Total	.4109	.4415	.0306	.2086	.1392	.0694
$\bar{x}$	.1027	.1104	.0077	.0522	.0348	.0174
1	.1013	.1115	.0102	.0541	.0249	.0292
2	.1180	.0869	-.0311	.0498	.0498	-
3	.1205	.1295	.0090	.0563	.0249	.0314
4	.1017	.1102	.0085	.0562	.0271	.0291
Total	.4415	.4381	-.0034	.2164	.1267	.0897
$\bar{x}$	.1104	.1095	-.0009	.0541	.0317	.0224

	Before	After	Gain or loss	Before	After	Loss
1	.1115	.1079	-.0036	.0531	.0531	-
2	.0869	.1203	.0334	.0533	.0054	.0479
3	.1295	.1275	-.0020	.0513	.0198	.0315
4	.1102	.1257	.0155	.0520	.0245	.0275
Total	.4381	.4814	.0433	.2097	.1028	.1069
$\bar{\bar{x}}$	.1095	.1204	.0108	.0524	.0257	.0267
1	.1079	.1157	.0078	.0530	.0250	.0280
2	.1203	.1043	-.0160	.0522	.0522	-
3	.1275	.1310	.0035	.0531	.0315	.0216
4	.1257	.1159	-.0098	.0530	.0530	-
Total	.4814	.4669	-.0145	.2113	.1617	.0496
$\bar{\bar{x}}$	.1204	.1167	-.0036	.0528	.0404	.0124
1	.1157	.1039	-.0118	.0520	.0145	.0375
2	.1043	.1068	.0025	.0497	.0497	-
3	.1310	.1369	.0059	.0563	.0211	.0352
4	.1159	.1112	-.0047	.0529	.0529	-
Total	.4669	.4588	-.0081	.2109	.1382	.0727
$\bar{\bar{x}}$	.1167	.1147	-.0020	.0527	.0346	.0182
1	.1039	.1127	.0088	.0534	.0107	.0427
2	.1068	.1059	-.0009	.0506	.0506	-
3	.1369	.1348	-.0021	.0511	.0205	.0306
4	.1112	.1229	.0117	.0515	.0243	.0272
Total	.4588	.4763	.0175	.2066	.1061	.1005
$\bar{\bar{x}}$	.1147	.1191	.0044	.0517	.0265	.0251
1	.1127	.1183	.0056	.0513	.0220	.0293
2	.1059	.0890	-.0169	.0523	.0523	-
3	.1348	.1359	.0011	.0523	.0376	.0147
4	.1229	.1355	.0126	.0528	.0368	.0160
Total	.4763	.4787	.0024	.2087	.1487	.0600
$\bar{\bar{x}}$	.1191	.1197	.0006	.0522	.0372	.0150
1	.1183	.1127	-.0056	.0519	.0519	-
2	.0890	.1060	.0170	.0503	.0053	.0450
3	.1359	.1330	-.0029	.0516	.0375	.0141
4	.1355	.1233	-.0122	.0520	.0364	.0156
Total	.4787	.4750	-.0037	.2058	.1311	.0747
$\bar{\bar{x}}$	.1197	.1188	-.0009	.0515	.0328	.0187
1	.1127	.1191	.0064	.0536	.0340	.0196
2	.1060	.1220	.0160	.0524	.0060	.0464
3	.1330	.1364	.0034	.0533	.0402	.0131
4	.1233	.1205	-.0028	.0528	.0307	.0221
Total	.4750	.4980	.0230	.2121	.1109	.1012
$\bar{\bar{x}}$	.1188	.1245	.0058	.0530	.0277	.0253
1	.1191	.1013	-.0178	.0515	.0515	-
2	.1220	.1165	-.0055	.0508	.0323	.0185
3	.1364	.1367	.0003	.0519	.0393	.0126
4	.1205	.1210	.0005	.0524	.0217	.0307
Total	.4980	.4755	-.0225	.2066	.1448	.0618
$\bar{\bar{x}}$	.1245	.1189	-.0056	.0517	.0362	.0155

	Before	After	Gain or loss	Before	After	Loss
1	.1013	.1191	.0178	.0503	.0130	.0373
2	.1165	.1147	-.0018	.0503	.0503	-
3	.1367	.1360	-.0007	.0534	.0470	.0064
4	.1210	.1108	-.0102	.0529	.0529	-
Total	.4755	.4806	.0051	.2069	.1632	.0437
$\bar{x}$	.1189	.1202	.0013	.0517	.0408	.0109
1	.1191	.1221	.0030	.0510	.0475	.0035
2	.1147	.1157	.0010	.0504	.0504	-
3	.1360	.1482	.0122	.0528	.0528	-
4	.1108	.1193	.0085	.0500	.0273	.0227
Total	.4806	.5053	.0247	.2042	.1780	.0262
$\bar{x}$	.1202	.1263	.0062	.0511	.0445	.0066
1	.1221	.1201	-.0020	.0516	.0516	-
2	.1157	.1147	-.0010	.0518	.0518	-
3	.1482	.1401	-.0081	.0510	.0510	-
4	.1193	.1169	-.0024	.0510	.0510	-
Total	.5053	.4918	-.0135	.2054	.2054	-
$\bar{x}$	.1263	.1230	-.0034	.0514	.0514	-
1	.1201	.1175	-.0026	.0508	.0508	-
2	.1147	.1150	.0003	.0496	.0496	-
3	.1401	.1331	-.0070	.0515	.0515	-
4	.1169	.1203	.0034	.0515	.0200	.0315
Total	.4918	.4859	-.0059	.2034	.1719	.0315
$\bar{x}$	.1230	.1215	-.0015	.0509	.0430	.0079
1	Female died - replicate 1 terminated.					
2	.1150	.1112	-.0038	.0514	.0514	-
3	.1331	.1376	.0045	.0518	.0518	-
4	.1203	.1246	.0043	.0511	.0212	.0299
Total	.3684	.3734	.0050	.1543	.1244	.0299
$\bar{x}$	.1228	.1245	.0017	.0514	.0415	.0100
2	.1112	.1102	-.0010	.0547	.0547	-
3	.1376	.1344	-.0032	.0542	.0542	-
4	.1246	.1168	-.0078	.0556	.0556	-
Total	.3734	.3614	-.0120	.1645	.1645	-
$\bar{x}$	.1245	.1205	-.0040	.0548	.0548	-
2	.1102	.1073	-.0029	.0500	.0149	.0351
3	.1344	.1318	-.0026	.0509	.0509	-
4	.1168	.1200	.0032	.0509	.0181	.0328
Total	.3614	.3591	-.0023	.1518	.0839	.0679
$\bar{x}$	.1205	.1197	-.0008	.0506	.0280	.0226
2	.1073	.1198	.0125	.0507	.0036	.0471
3	.1318	.1277	-.0041	.0510	.0510	-
4	.1200	.1165	-.0035	.0521	.0521	-
Total	.3591	.3640	.0049	.1538	.1067	.0471
$\bar{x}$	.1197	.1213	.0016	.0513	.0356	.0157

	Before	After	Gain or loss	Before	After	Loss
2	.1198	.1211	.0013	.0513	.0153	.0360
3	Female died - replicate 3 terminated.					
4	.1165	.1218	.0053	.0512	.0287	.0225
Total	.2363	.2429	.0066	.1025	.0440	.0585
$\bar{\bar{x}}$	.1182	.1215	.0033	.0513	.0220	.0293
2	.1211	.1066	-.0145	.0498	.0498	-
4	.1218	.1060	-.0158	.0496	.0496	-
Total	.2429	.2126	-.0303	.0994	.0994	-
$\bar{\bar{x}}$	.1215	.1063	-.0152	.0497	.0497	-
2	.1066	.1240	.0174	.0494	.0272	.0222
4	.1060	.1186	.0126	.0496	.0125	.0371
Total	.2126	.2426	.0300	.0990	.0397	.0593
$\bar{\bar{x}}$	.1063	.1213	.0150	.0495	.0199	.0297
2	.1240	.1122	-.0118	.0498	.0498	-
4	.1186	.1135	-.0051	.0500	.0500	-
Total	.2426	.2257	-.0169	.0998	.0998	-
$\bar{\bar{x}}$	.1213	.1129	-.0085	.0499	.0499	-
2	Female died - replicate 2 terminated.					
4[1]	.1135	.1168	.0033	.0494	.0494	-
4	.1168	.1153	-.0055	.0504	.0247	.0257
4	.1153	.1267	.0114	.0508	.0348	.0160
4	.1267	.1307	.0040	.0498	.0305	.0193
4	.1307	.1278	-.0029	.0494	.0320	.0174
4	.1278	.1213	-.0065	.0494	.0494	-
4	.1213	.1186	-.0027	.0505	.0505	-
4	.1186	.1182	-.0004	.0496	.0496	-

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[1] All subsequent daily values for diet level 4 are based on replicate 4 i.e. the value obtained for the sole surviving adult female P. maculiventris in this experiment.

TABLE II

Daily live gram weights per replicate (4), and means of replicates, for unfed adults of the predator P. *maculiventris* reared at a constant temperature of 80°F and a relative humidity of 70 per cent during the period May to August 1964.

	Adult male			Adult female		
Replications	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0667	.0536	-.0131	.0781	.0809	.0028
2	.0584	.0538	-.0046	.0853	.0797	-.0056
3	.0642	.0542	-.0100	.0699	.0669	-.0030
4	.0583	.0553	-.0030	.0802	.0782	-.0020
Total	.2476	.2169	-.0307	.3135	.3057	-.0078
$\bar{x}$	.0619	.0542	-.0077	.0784	.0764	-.0020
1	.0536	.0513	-.0023	.0809	.0738	-.0071
2	.0538	.0559	.0021	.0797	.0643	-.0154
3	.0542	.0521	-.0021	.0669	.0634	-.0035
4	.0553	.0526	-.0027	.0782	.0656	-.0126
Total	.2169	.2119	-.0050	.3057	.2671	-.0386
$\bar{x}$	.0542	.0529	-.0013	.0764	.0668	-.0097
1	.0513	.0515	.0002	.0738	.0653	-.0085
2	.0559	.0456	-.0103	.0643	.0621	-.0022
3	.0521	.0530	.0009	.0634	.0583	-.0051
4	.0526	.0532	.0006	.0656	.0631	-.0025
Total	.2119	.2033	-.0086	.2671	.2488	-.0183
$\bar{x}$	.0529	.0508	-.0022	.0668	.0622	-.0046
1	.0515	.0492	-.0023	.0653	.0621	-.0032
2	.0456	.0438	-.0018	.0621	.0629	.0008
3	.0530	.0512	-.0018	.0583	.0577	-.0006
4	.0532	.0455	-.0077	.0631	.0629	-.0002
Total	.2033	.1897	-.0136	.2488	.2456	-.0032
$\bar{x}$	.0508	.0474	-.0034	.0622	.0614	-.0008
1	.0492	.0516	.0024	.0621	.0646	.0025
2	.0438	.0445	.0007	.0629	.0615	-.0014
3	.0512	.0495	-.0017	.0577	.0603	.0026
4	.0455	.0426	-.0029	.0629	.0619	-.0010
Total	.1897	.1882	-.0015	.2456	.2483	.0027
$\bar{x}$	.0474	.0471	-.0004	.0614	.0621	.0007

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0516	.0490	-.0026	.0646	.0596	-.0050
2	.0445	.0419	-.0026	.0615	.0622	.0007
3	.0495	.0485	-.0010	.0603	.0566	-.0037
4	.0426	.0416	-.0010	.0619	.0669	.0050
Total	.1882	.1810	-.0072	.2483	.2453	-.0030
$\bar{x}$	.0471	.0453	-.0018	.0621	.0613	-.0008
1	.0490	.0491	.0001	.0596	.0565	-.0031
2	.0419	.0413	-.0006	.0622	.0594	-.0028
3	.0485	.0503	.0018	.0566	.0566	-
4	.0416	.0554	.0138	.0619	.0576	-.0093
Total	.1810	.1961	.0151	.2453	.2301	-.0152
$\bar{x}$	.0453	.0490	.0038	.0613	.0575	-.0038
1	.0491	.0481	-.0010	.0565	.0586	.0021
2	.0413	.0418	.0005	.0594	.0593	-.0001
3	.0503	.0483	-.0020	.0566	.0531	-.0035
4	.0554	.0444	-.0110	.0576	.0605	.0029
Total	.1961	.1826	-.0135	.2301	.2315	.0014
$\bar{x}$	.0490	.0457	-.0034	.0575	.0579	.0004
1	.0481	.0457	-.0024	.0586	.0556	-.0030
2	.0418	.0425	.0007	.0593	.0587	-.0006
3	.0483	.0458	-.0025	.0531	.0535	.0004
4	.0444	.0404	-.0040	.0605	.0619	.0014
Total	.1826	.1744	-.0082	.2315	.2297	-.0018
$\bar{x}$	.0457	.0436	-.0021	.0579	.0574	-.0005
1	.0457	.0478	.0021	.0556	.0536	-.0020
2	.0425	.0398	-.0027	.0587	.0551	-.0036
3	.0458	.0468	.0010	.0535	.0534	-.0001
4	.0404	.0395	-.0009	.0619	.0589	-.0030
Total	.1744	.1739	-.0005	.2297	.2210	-.0087
$\bar{x}$	.0436	.0435	-.0001	.0574	.0553	-.0022
1	.0478	.0481	.0003	.0536	.0555	.0019
2	.0398	.0392	-.0006	.0551	.0570	.0019
3	.0468	.0462	-.0006	.0534	.0533	-.0001
4	.0395	.0389	-.0006	.0589	.0620	.0031
Total	.1739	.1724	-.0015	.2210	.2278	.0068
$\bar{x}$	.0435	.0431	-.0004	.0553	.0570	.0017
1	.0481	.0458	-.0023	.0555	.0570	.0015
2	.0392	.0379	-.0013	.0570	.0569	-.0001
3	.0462	.0459	-.0003	.0533	.0489	-.0044
4	.0389	.0384	-.0005	.0620	.0563	-.0057
Total	.1724	.1680	-.0044	.2278	.2191	-.0087
$\bar{x}$	.0431	.0420	-.0011	.0570	.0548	-.0022

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0458	.0402	-.0056	.0570	.0583	.0013
2	.0379	.0442	.0063	.0569	.0536	-.0033
3	.0459	.0465	.0006	.0489	.0519	.0030
4	.0384	.0406	.0022	.0563	.0597	.0034
Total	.1680	.1715	.0035	.2191	.2235	.0044
$\bar{x}$	.0420	.0429	.0009	.0548	.0559	.0011
1	.0402	.0434	.0032	.0583	.0560	-.0023
2	.0442	.0383	-.0059	.0536	.0541	.0005
3	.0465	.0454	-.0011	.0519	.0521	.0002
4	.0406	.0412	.0006	.0597	.0578	-.0019
Total	.1715	.1683	-.0032	.2235	.2200	-.0035
$\bar{x}$	.0429	.0421	-.0008	.0559	.0550	-.0009
1	.0434	.0426	-.0008	.0560	.0567	.0007
2	.0383	.0392	.0009	.0541	.0546	.0005
3	.0454	.0434	-.0020	.0521	.0514	-.0007
4	.0412	.0397	-.0015	.0578	.0570	-.0008
Total	.1683	.1649	-.0034	.2200	.2197	-.0003
$\bar{x}$	.0421	.0412	-.0009	.0550	.0549	-.0001
1	.0426	.0426	-	.0567	.0515	-.0052
2	.0392	.0383	-.0009	.0546	.0540	-.0006
3	.0434	.0433	-.0001	.0514	.0535	.0021
4	.0397	.0382	-.0015	.0570	.0568	-.0002
Total	.1649	.1624	-.0025	.2197	.2158	-.0039
$\bar{x}$	.0412	.0406	-.0006	.0549	.0540	-.0010
1	.0426	.0419	-.0007	.0515	.0541	.0026
2	.0383	.0390	.0007	.0540	.0546	.0006
3	.0433	.0427	-.0006	.0535	.0502	-.0033
4	.0382	.0387	.0005	.0568	.0550	-.0018
Total	.1624	.1623	-.0001	.2158	.2139	-.0019
$\bar{x}$	.0406	.0406	-	.0540	.0535	-.0005
1	.0419	.0420	.0001	.0541	.0555	.0014
2	.0390	.0374	-.0016	.0546	.0567	.0021
3	.0427	.0454	.0027	.0502	.0495	-.0007
4	.0387	.0368	-.0019	.0550	.0577	.0027
Total	.1623	.1616	-.0007	.2139	.2194	.0055
$\bar{x}$	.0406	.0404	-.0002	.0535	.0549	.0014
1	.0420	.0433	.0013	.0555	.0563	.0008
2	.0374	.0378	.0004	.0567	.0535	-.0032
3	.0454	.0439	-.0015	.0495	.0515	.0020
4	.0368	.0381	.0013	.0577	.0600	.0023
Total	.1616	.1631	.0015	.2194	.2213	.0019
$\bar{x}$	.0404	.0408	.0004	.0549	.0553	.0005

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0433	.0423	-.0010	.0563	.0564	.0001
2	.0378	.0388	.0010	.0535	.0533	-.0002
3	.0439	.0417	-.0022	.0515	.0519	.0004
4	.0381	.0361	-.0020	.0600	.0559	-.0041
Total	.1631	.1589	-.0042	.2213	.2175	-.0038
$\bar{x}$	.0408	.0397	-.0011	.0553	.0543	-.0010
1	.0423	.0432	.0009	.0564	.0586	.0022
2	.0388	.0497	.0109	.0533	.0553	.0020
3	.0417	.0430	.0013	.0519	.0538	.0019
4	.0361	.0390	.0029	.0559	.0555	-.0004
Total	.1589	.1749	.0160	.2175	.2232	.0057
$\bar{x}$	.0397	.0437	.0040	.0543	.0558	.0014
1	.0432	.0434	.0002	.0586	.0541	-.0045
2	.0497	.0397	-.0100	.0553	.0524	-.0029
3	.0430	.0440	.0010	.0538	.0513	-.0025
4	.0390	.0391	.0001	.0555	.0529	-.0026
Total	.1749	.1662	-.0087	.2232	.2107	-.0125
$\bar{x}$	.0437	.0416	-.0022	.0558	.0527	.0031
1	.0434	.0430	-.0004	.0541	.0535	-.0006
2	.0397	.0372	-.0025	.0524	.0561	.0037
3	.0440	.0424	-.0016	.0513	.0489	-.0024
4	.0391	.0349	-.0042	.0529	.0571	.0042
Total	.1662	.1575	-.0087	.2107	.2156	.0049
$\bar{x}$	.0416	.0394	-.0022	.0527	.0539	.0012
1	.0430	.0432	.0002	.0535	.0535	-
2	.0372	.0351	-.0021	.0561	.0533	-.0028
3	.0424	.0432	.0008	.0489	.0500	.0011
4	.0349	.0364	.0015	.0571	.0566	-.0005
Total	.1575	.1579	.0004	.2156	.2134	-.0022
$\bar{x}$	.0394	.0395	.0001	.0539	.0534	-.0006
1	.0432	.0422	-.0010	.0535	.0532	-.0003
2	.0351	.0368	.0017	.0533	.0545	.0012
3	.0432	.0424	-.0008	.0500	.0502	.0002
4	.0364	.0367	.0003	.0566	.0553	-.0013
Total	.1579	.1581	.0002	.2134	.2132	-.0002
$\bar{x}$	.0395	.0395	-	.0534	.0533	-.0001
1	.0422	.0412	-.0010	.0532	.0531	-.0001
2	.0368	.0374	.0006	.0545	.0501	-.0044
3	.0424	.0424	-	.0502	.0496	-.0006
4	.0367	.0371	.0004	.0553	.0547	-.0006
Total	.1581	.1581	-	.2132	.2075	-.0057
$\bar{x}$	.0395	.0395	-	.0533	.0519	-.0014

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0412	.0415	.0003	.0531	.0495	-.0036
2	.0374	.0370	-.0004	.0501	.0531	.0030
3	.0424	.0399	-.0025	.0496	.0485	-.0011
4	.0371	.0371	-	.0547	.0510	-.0037
Total	.1581	.1555	-.0026	.2075	.2021	-.0054
$\bar{x}$	.0395	.0389	-.0007	.0519	.0505	-.0014
1	.0415	.0407	-.0008	.0495	.0529	.0034
2	.0370	.0358	-.0012	.0531	.0506	-.0025
3	.0399	.0418	.0019	.0485	.0497	.0012
4	.0371	.0357	-.0014	.0510	.0551	.0041
Total	.1555	.1540	-.0015	.2021	.2083	.0062
$\bar{x}$	.0389	.0385	-.0004	.0505	.0521	.0016
1	.0407	.0365	-.0042	.0529	.0486	-.0043
2	.0358	.0350	-.0008	.0506	.0512	.0006
3	.0418	.0412	-.0006	.0497	.0492	-.0005
4	.0357	.0350	-.0007	.0551	.0518	-.0033
Total	.1540	.1477	-.0063	.2083	.2008	-.0075
$\bar{x}$	.0385	.0369	-.0016	.0521	.0502	-.0019
1	.0365	.0420	.0055	.0486	.0515	.0029
2	.0350	.0367	.0017	.0512	.0545	.0033
3	.0412	.0414	.0002	.0492	.0490	-.0002
4	.0350	.0345	-.0005	.0518	.0553	.0035
Total	.1477	.1546	.0069	.2008	.2103	.0095
$\bar{x}$	.0369	.0387	.0017	.0502	.0526	.0024
1	.0420	.0365	-.0055	.0515	.0508	-.0007
2	.0367	.0378	.0011	.0545	.0503	-.0042
3	.0414	.0418	.0004	.0490	.0467	-.0023
4	.0345	.0350	.0005	.0553	.0551	-.0002
Total	.1546	.1511	-.0035	.2103	.2029	-.0074
$\bar{x}$	.0387	.0378	-.0009	.0526	.0507	-.0019
1	.0365	.0413	.0048	.0508	.0510	.0002
2	.0378	.0362	-.0016	.0503	.0527	.0024
3	.0418	.0393	-.0025	.0467	.0486	.0019
4	.0350	.0344	-.0006	.0551	.0515	-.0034
Total	.1511	.1512	.0001	.2029	.2038	.0009
$\bar{x}$	.0378	.0378	-	.0507	.0510	.0002
1	.0413	.0421	.0008	.0510	.0537	.0027
2	.0362	.0364	.0002	.0527	.0488	-.0039
3	.0393	.0406	.0013	.0486	.0472	-.0014
4	.0344	.0353	.0009	.0515	.0523	.0008
Total	.1512	.1544	.0032	.2038	.2020	-.0018
$\bar{x}$	.0378	.0386	.0008	.0510	.0505	-.0005

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0421	.0386	-.0035	.0537	.0473	.0036
2	.0364	.0365	.0001	.0488	.0577	-.0011
3	.0406	.0400	-.0006	.0472	.0474	.0002
4	.0353	.0360	.0007	.0523	.0546	.0023
Total	.1544	.1511	-.0033	.2020	.2070	.0050
$\bar{\bar{x}}$	.0386	.0378	-.0008	.0505	.0518	.0013
1	.0386	.0393	.0007	.0473	.0472	-.0001
2	.0365	.0373	.0008	.0577	.0497	-.0080
3	.0400	.0395	-.0005	.0474	.0492	.0018
4	.0360	.0344	-.0016	.0546	.0506	-.0040
Total	.1511	.1505	-.0006	.2070	.1967	-.0103
$\bar{\bar{x}}$	.0378	.0376	-.0002	.0518	.0492	-.0026
1	.0393	.0399	.0006	.0472	.0500	.0028
2	.0373	.0353	-.0020	.0497	.0496	-.0001
3	.0395	.0417	.0022	.0492	.0464	-.0028
4	.0344	.0334	-.0010	.0506	.0565	.0059
Total	.1505	.1503	-.0002	.1967	.2025	.0058
$\bar{\bar{x}}$	.0376	.0376	-	.0492	.0506	.0015
1	.0399	.0350	-.0049	.0500	.0461	-.0039
2	.0353	.0341	-.0012	.0496	.0502	.0006
3	.0417	.0399	-.0018	.0464	.0484	.0020
4	.0334	.0320	-.0014	.0565	.0517	-.0048
Total	.1503	.1410	-.0093	.2025	.1964	-.0061
$\bar{\bar{x}}$	.0376	.0353	-.0023	.0506	.0491	-.0015
1	.0350	.0380	.0030	.0461	.0513	.0052
2	.0341	.0380	.0039	.0502	.0520	.0018
3	.0399	.0416	.0017	.0484	.0466	-.0018
4	.0320	.0364	.0044	.0517	.0523	.0006
Total	.1410	.1540	.0130	.1964	.2022	.0058
$\bar{\bar{x}}$	.0353	.0385	.0033	.0491	.0506	.0015
1	.0380	.0409	.0029	.0513	.0470	-.0043
2	.0380	.0365	-.0015	.0520	.0519	-.0001
3	.0416	.0498	.0082	.0466	.0468	.0002
4	.0364	.0374	.0010	.0523	.0495	-.0028
Total	.1540	.1646	.0106	.2022	.1952	-.0070
$\bar{\bar{x}}$	.0385	.0412	.0027	.0506	.0488	-.0018
1	.0409	.0388	-.0021	.0470	.0501	.0031
2	.0365	.0373	.0008	.0519	.0472	-.0047
3	.0498	.0383	-.0115	.0468	.0436	-.0032
4	.0374	.0345	-.0029	.0495	.0513	.0018
Total	.1646	.1489	.0157	.1952	.1922	-.0030
$\bar{\bar{x}}$	.0412	.0372	.0039	.0488	.0481	-.0008

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0388	.0364	-.0024	.0501	.0447	-.0054
2	.0373	.0365	-.0008	.0472	.0484	.0012
3	.0383	.0387	.0004	.0436	.0471	.0035
4	.0345	.0354	.0009	.0513	.0544	.0031
Total	.1489	.1470	-.0019	.1922	.1946	.0024
$\bar{x}$	.0372	.0368	-.0005	.0481	.0487	.0006
1	.0364	.0387	.0023	.0447	.0505	.0058
2	.0365	.0370	.0005	.0484	.0491	.0007
3	.0387	.0422	.0035	.0471	.0459	-.0012
4	.0354	.0327	-.0027	.0544	.0502	-.0042
Total	.1470	.1506	.0036	.1946	.1957	.0011
$\bar{x}$	.0368	.0377	.0009	.0487	.0489	.0003
1	.0387	.0393	.0006	.0505	.0498	-.0007
2	.0370	.0363	-.0007	.0491	.0459	-.0032
3	.0422	.0381	-.0041	.0459	.0439	-.0020
4	.0327	.0344	.0017	.0502	.0518	.0016
Total	.1506	.1481	-.0025	.1957	.1914	-.0043
$\bar{x}$	.0377	.0370	-.0006	.0489	.0479	-.0011
1	.0393	.0341	-.0052	.0498	.0433	-.0065
2	.0363	.0368	.0005	.0459	.0496	.0037
3	.0381	.0374	-.0007	.0439	.0441	.0002
4	.0344	.0312	-.0032	.0518	.0471	-.0047
Total	.1481	.1395	-.0086	.1914	.1841	-.0073
$\bar{x}$	.0370	.0349	-.0022	.0479	.0460	-.0018
1	.0341	.0382	.0041	.0433	.0461	.0028
2	.0368	.0371	.0003	.0496	.0472	-.0024
3	.0374	.0384	.0010	.0441	.0457	.0016
4	.0312	.0328	.0016	.0471	.0512	.0041
Total	.1395	.1465	.0070	.1841	.1902	.0061
$\bar{x}$	.0349	.0366	.0018	.0460	.0476	.0015
1	.0382	.0382	-	.0461	.0461	-
2	.0371	.0368	-.0003	.0472	.0482	.0010
3	.0384	.0363	-.0021	.0457	.0437	-.0020
4	.0328	.0328	-	.0512	.0479	-.0033
Total	.1465	.1441	-.0024	.1902	.1859	-.0043
$\bar{x}$	.0366	.0360	-.0006	.0476	.0465	-.0011
1	.0382	.0383	.0001	.0461	.0496	.0035
2	.0368	.0348	-.0020	.0482	.0474	-.0008
3	.0363	.0372	.0009	.0437	.0433	-.0004
4	.0328	.0342	.0014	.0479	.0516	.0037
Total	.1441	.1445	.0004	.1859	.1919	.0060
$\bar{x}$	.0360	.0361	.0001	.0465	.0480	.0015

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.0383	.0419	.0036	.0496	.0435	-.0061
2	.0348	.0344	-.0004	.0474	.0452	-.0022
3	.0372	.0376	.0004	.0433	.0447	.0014
4	.0342	.0340	-.0002	.0516	.0511	-.0005
Total	.1445	.1479	.0034	.1919	.1845	-.0074
$\bar{x}$	.0361	.0370	.0009	.0480	.0461	-.0019
1	.0419	.0401	-.0018	.0435	.0477	.0042
2	.0344	.0341	-.0003	.0452	.0486	.0034
3	.0376	.0385	.0009	.0447	.0441	-.0006
4	.0340	.0338	-.0002	.0511	.0491	-.0020
Total	.1479	.1465	-.0014	.1845	.1895	.0050
$\bar{x}$	.0370	.0366	-.0004	.0461	.0474	.0013
1	.0401	.0370	-.0031	.0477	.0424	-.0053
2	.0341	.0352	.0011	.0486	.0444	-.0042
3	.0385	.0388	.0003	.0441	.0466	.0025
4	.0338	.0341	.0003	.0491	.0452	-.0039
Total	.1465	.1451	-.0014	.1895	.1786	-.0109
$\bar{x}$	.0366	.0363	-.0004	.0474	.0447	-.0027
1	Male died - replicate 1 terminated.			.0424	.0461	.0037
2	.0352	.0352	-	.0444	.0485	.0041
3	.0338	.0348	.0010	.0466	.0444	-.0022
4	.0341	.0339	-.0002	.0452	.0506	.0054
Total	.1031	.1039	.0008	.1786	.1896	.0110
$\bar{x}$	.0344	.0346	.0003	.0447	.0474	.0028
1	-	-	-	.0461	.0449	-.0012
2	.0352	.0358	.0006	.0485	.0415	-.0070
3	.0348	.0324	-.0024	.0444	.0427	-.0017
4	.0339	.0305	-.0034	.0506	.0499	-.0007
Total	.1039	.0987	-.0052	.1896	.1790	-.0106
$\bar{x}$	.0346	.0329	-.0017	.0474	.0448	-.0027
1	-	-	-	.0449	.0455	.0006
2	.0358	.0373	.0015	.0415	.0460	.0045
3	.0324	.0366	.0042	.0427	.0436	.0009
4	.0305	.0356	.0051	.0499	.0453	-.0046
Total	.0987	.1095	.0108	.1790	.1804	.0014
$\bar{x}$	.0329	.0365	.0036	.0448	.0451	.0004
1	-	-	-	.0455	.0442	-.0013
2	.0373	.0359	-.0014	.0460	.0473	.0013
3	.0366	.0393	.0027	.0436	.0469	.0033
4	.0356	.0357	.0001	.0453	.0513	.0060
Total	.1095	.1109	.0014	.1804	.1897	.0093
$\bar{x}$	.0365	.0370	.0005	.0451	.0474	.0023

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	-	-	-	.0442	.0452	.0010
2	.0359	.0357	-.0002	.0473	.0449	-.0024
3	.0393	.0345	-.0048	.0469	.0449	-.0020
4	.0357	.0390	.0033	.0513	.0455	-.0058
Total	.1109	.1092	-.0017	.1897	.1805	-.0092
$\bar{x}$	.0370	.0364	-.0006	.0474	.0451	-.0023
1	-	-	-	.0452	.0463	.0011
2	.0357	.0328	-.0029	.0449	.0404	-.0045
3	.0345	.0377	.0032	.0449	.0425	-.0024
4	.0390	.0367	-.0023	.0455	.0484	.0029
Total	.1092	.1072	-.0020	.1805	.1776	-.0029
$\bar{x}$	.0364	.0357	-.0007	.0451	.0444	-.0007
1	-	-	-	.0463	.0443	-.0020
2	.0328	.0346	.0018	.0404	.0474	.0070
3	.0377	.0324	-.0053	.0425	.0440	.0015
4	.0367	.0353	-.0014	.0484	.0430	-.0054
Total	.1072	.1023	-.0049	.1776	.1787	.0011
$\bar{x}$	.0357	.0341	-.0016	.0444	.0447	.0003
1	-	-	-	.0443	.0469	.0026
2	.0346	.0345	-.0001	.0474	.0447	-.0027
3	.0324	.0330	.0006	.0440	.0428	-.0012
4	.0353	.0358	.0005	.0430	.0472	.0042
Total	.1023	.1033	.0010	.1787	.1816	.0029
$\bar{x}$	.0341	.0344	.0003	.0447	.0454	.0007
1	-	-	-	.0469	.0448	-.0021
2	.0345	.0336	-.0009	.0447	.0466	.0019
3	.0330	.0327	-.0003	.0428	.0465	.0037
4	.0358	.0277	-.0081	.0472	.0523	.0051
Total	.1033	.0940	-.0093	.1816	.1902	.0086
$\bar{x}$	.0344	.0313	-.0031	.0454	.0476	.0022
1	-	-	-	.0448	.0477	.0029
2	.0336	.0387	.0051	.0466	.0425	-.0041
3	.0327	.0329	.0002	.0465	.0417	-.0048
4	Male died - replicate 4 terminated.			.0523	.0456	-.0067
Total	.0663	.0716	.0053	.1902	.1775	-.0127
$\bar{x}$	.0332	.0358	.0027	.0476	.0444	-.0032
1	-	-	-	.0477	.0426	-.0051
2	.0387	.0345	-.0042	.0425	.0468	.0043
3	.0329	.0328	-.0001	.0417	.0430	.0013
4	-	-	-	.0456	.0415	-.0041
Total	.0716	.0673	-.0043	.1775	.1739	-.0036
$\bar{x}$	.0358	.0337	-.0022	.0444	.0435	-.0009

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	-	-	-	.0426	.0436	.0010
2	.0345	.0304	-.0041	.0468	.0418	-.0050
3	.0328	.0344	.0016	.0430	.0451	.0021
4	-	-	-	.0415	.0476	.0061
Total	.0673	.0648	-.0025	.1739	.1781	.0042
$\bar{x}$	.0337	.0324	-.0013	.0435	.0445	.0011
1	-	-	-	.0436	.0448	.0012
2	-	-	-	.0418	.0436	.0018
3	-	-	-	.0451	.0417	-.0034
4	-	-	-	.0476	.0424	-.0052
Total	-	-	-	.1781	.1725	-.0056
$\bar{x}$	-	-	-	.0445	.0431	-.0014
1	-	-	-	.0448	.0441	-.0007
2	-	-	-	.0436	.0449	.0013
3	-	-	-	.0417	.0381	-.0036
4	-	-	-	.0424	.0442	.0018
Total	-	-	-	.1725	.1713	-.0012
$\bar{x}$	-	-	-	.0431	.0428	-.0003
1	-	-	-	.0441	.0445	.0004
2	-	-	-	.0449	.0417	-.0032
3	-	-	-	.0381	.0426	.0045
4	-	-	-	.0442	.0479	.0037
Total	-	-	-	.1713	.1767	.0054
$\bar{x}$	-	-	-	.0428	.0442	.0014
1	-	-	-	.0445	.0440	-.0005
2	-	-	-	.0417	.0447	.0030
3	-	-	-	.0426	.0377	-.0049
4	-	-	-	.0479	.0448	-.0031
Total	-	-	-	.1767	.1712	-.0055
$\bar{x}$	-	-	-	.0442	.0428	-.0014
1	-	-	-	.0440	.0443	.0003
2	-	-	-	.0447	.0416	-.0031
3	-	-	-	.0377	.0421	.0044
4	-	-	-	.0448	.0452	.0004
Total	-	-	-	.1712	.1732	.0020
$\bar{x}$	-	-	-	.0428	.0433	.0005
1	-	-	-	.0443	.0449	.0006
2	-	-	-	.0416	.0434	.0018
3	-	-	-	.0421	.0455	.0034
4	-	-	-	.0452	.0487	.0035
Total	-	-	-	.1732	.1825	.0093
$\bar{x}$	-	-	-	.0433	.0456	.0023

	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	-	-	-	.0449	.0406	-.0043
2	-	-	-	.0434	.0451	.0017
3	-	-	-	.0455	.0408	-.0047
4	-	-	-	.0487	.0435	-.0052
Total	-	-	-	.1825	.1700	-.0125
$\bar{x}$	-	-	-	.0456	.0425	-.0031
1	-	-	-	.0406	.0464	.0058
2	-	-	-	.0451	.0433	-.0018
3	-	-	-	.0408	.0416	.0008
4	-	-	-	.0435	.0377	-.0058
Total	-	-	-	.1700	.1690	-.0010
$\bar{x}$	-	-	-	.0425	.0423	-.0003
1	-	-	-	.0464	.0421	-.0043
2	-	-	-	.0433	.0395	-.0038
3	-	-	-	.0416	.0365	-.0051
4	-	-	-	.0377	.0329	-.0048
Total	-	-	-	.1690	.1510	-.0180
$\bar{x}$	-	-	-	.0423	.0378	-.0045
1	-	-	-	.0421	.0488	.0067
2	-	-	-	.0395	.0354	-.0041
3	-	-	-	.0365	.0293	-.0072
4	-	-	-	Female died - replicate 4 terminated.		
Total	-	-	-	.1181	.1134	-.0046
$\bar{x}$	-	-	-	.0394	.0378	-.0016
1	-	-	-	.0488	.0443	-.0045
2	-	-	-	.0354	.0439	-.0085
3	-	-	-	.0293	.0305	.0012
Total	-	-	-	.1135	.1187	.0052
$\bar{x}$	-	-	-	.0378	.0396	.0017
1	-	-	-	.0443	.0409	-.0034
2	-	-	-	.0439	.0405	-.0034
3	-	-	-	Female died - replicate 3 terminated.		
Total	-	-	-	.0882	.0814	-.0068
$\bar{x}$	-	-	-	.0441	.0407	-.0034
1	-	-	-	.0409	.0377	-.0032
2	-	-	-	.0405	.0327	-.0078
Total	-	-	-	.0814	.0704	-.0110
$\bar{x}$	-	-	-	.0407	.0352	-.0055

TABLE III

Daily live gram weights per replicate (10), and means of replicates, for different nymphal instars of the predator P. maculiventris and its prey G. mellonella larvae reared at a constant temperature of 80°F and relative humidity of 70 per cent, during the period May to June 1964.

	P. maculiventris			G. mellonella		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
			Diet level 1 - 2nd instar nymphs.			
1	.0006	.0020	.0014	.0042	.0016	.0026
2	.0005	.0022	.0017	.0043	.0016	.0027
3	.0006	.0022	.0016	.0039	.0012	.0027
4	.0006	.0020	.0014	.0030	.0018	.0012
5	.0006	.0018	.0012	.0044	.0017	.0027
6	.0006	.0021	.0015	.0036	.0015	.0021
7	.0006	.0020	.0014	.0040	.0016	.0024
8	.0005	.0022	.0017	.0040	.0020	.0020
9	.0005	.0020	.0015	.0041	.0016	.0025
10	.0006	.0021	.0015	.0035	.0017	.0018
Total	.0057	.0206	.0149	.0390	.0163	.0227
$\bar{x}$	.0006	.0021	.0015	.0039	.0016	.0023
1	.0020	.0027	.0007	.0045	.0019	.0026
2	.0022	.0029	.0007	.0043	.0022	.0021
3	.0022	.0029	.0007	.0045	.0020	.0025
4	.0020	.0030	.0010	.0031	.0015	.0016
5	.0018	.0028	.0010	.0036	.0013	.0023
6	.0021	.0029	.0008	.0040	.0018	.0022
7	.0020	.0027	.0007	.0041	.0015	.0026
8	.0022	.0030	.0008	.0037	.0013	.0024
9	.0020	.0028	.0008	.0042	.0018	.0024
10	.0021	.0028	.0007	.0045	.0017	.0028
Total	.0206	.0285	.0079	.0405	.0170	.0235
$\bar{x}$	.0021	.0029	.0008	.0041	.0017	.0024

	Before	After	Gain or loss	Before	After	Loss
1	.0027	.0031	.0004	.0039	.0028	.0011
2	.0029	.0027	-.0002	.0032	.0032	-
*3	.0029	.0028	-.0001	.0042	.0042	-
*4	.0030	.0028	-.0002	.0030	.0030	-
*5	.0028	.0027	-.0001	.0045	.0045	-
6	.0029	.0032	.0003	.0030	.0020	.0010
7	.0027	.0026	-.0001	.0035	.0035	-
*8	.0030	.0028	-.0002	.0042	.0042	-
9	.0028	.0031	.0003	.0038	.0022	.0016
10	.0028	.0034	.0006	.0033	.0020	.0013
Total	.0285	.0292	.0007	.0366	.0316	.0050
$\bar{x}$	.0029	.0029	-	.0037	.0032	.0005
*1	.0031	.0030	-.0001	.0035	.0035	-
*2	.0027	.0026	-.0001	.0030	.0030	-
*6	.0032	.0031	-.0001	.0040	.0040	-
*7	.0026	.0024	-.0002	.0032	.0032	-
*9	.0031	.0030	-.0001	.0037	.0037	-
*10	.0034	.0032	-.0002	.0039	.0039	-
Total	.0181	.0173	-.0008	.0213	.0213	-
$\bar{x}$	.0030	.0029	-.0001	.0036	.0036	-

* Moulted to 3rd instar

	P. maculiventris			*G. mellonella*		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
Diet level 1 - 3rd instar nymphs.						
1	.0030	.0059	.0029	.0041	.0006	.0035
2	.0026	.0029	.0003	.0030	.0011	.0019
3	.0028	.0031	.0003	.0037	.0002	.0035
4	.0028	.0038	.0010	.0030	.0002	.0028
5	.0027	.0053	.0026	.0039	.0015	.0024
6	.0031	.0055	.0024	.0035	.0003	.0032
7	.0024	.0047	.0023	.0045	.0001	.0044
8	.0028	.0040	.0012	.0030	.0006	.0024
9	.0030	.0055	.0025	.0037	.0002	.0035
10	.0032	.0056	.0024	.0040	.0003	.0037
Total	.0284	.0463	.0179	.0364	.0051	.0313
$\bar{x}$	.0028	.0046	.0018	.0036	.0005	.0031
1	.0059	.0061	.0002	.0030	.0005	.0025
2	.0029	.0048	.0019	.0042	.0001	.0042
3	.0031	.0055	.0024	.0036	.0004	.0032
4	.0038	.0058	.0020	.0045	.0003	.0042
5	.0053	.0073	.0020	.0039	.0002	.0037
6	.0055	.0090	.0035	.0044	.0001	.0043
7	.0047	.0077	.0030	.0045	.0001	.0044
8	.0040	.0060	.0020	.0045	.0003	.0042
9	.0055	.0090	.0035	.0043	.0001	.0042
10	.0056	.0088	.0032	.0040	.0002	.0038
Total	.0463	.0700	.0237	.0409	.0023	.0387
$\bar{x}$	.0046	.0070	.0024	.0041	.0002	.0039
1	.0061	.0097	.0036	.0045	.0003	.0042
2	.0048	.0077	.0029	.0045	.0001	.0044
3	.0055	.0088	.0033	.0044	.0001	.0043
4	.0058	.0088	.0030	.0040	.0002	.0038
*5	.0073	.0071	-.0002	.0045	.0045	-
*6	.0090	.0087	-.0003	.0040	.0040	-
7	.0077	.0092	.0015	.0042	.0008	.0034
8	.0060	.0096	.0036	.0039	.0001	.0038
*9	.0090	.0087	-.0003	.0035	.0035	-
*10	.0088	.0083	-.0005	.0043	.0043	-
Total	.0700	.0866	.0166	.0418	.0179	.0239
$\bar{x}$	.0070	.0087	.0017	.0042	.0018	.0024

* Moulted to 4th instar

	Before	After	Gain or loss	Before	After	Loss
*1	.0097	.0093	-.0004	.0033	.0033	-
2	.0077	.0090	.0013	.0045	.0009	.0036
*3	.0088	.0085	-.0003	.0042	.0042	-
*4	.0088	.0079	-.0009	.0045	.0045	-
*7	.0092	.0089	-.0003	.0042	.0042	-
*8	.0096	.0094	-.0002	.0034	.0034	-
Total	.0538	.0530	-.0008	.0241	.0205	.0036
$\bar{x}$	.0090	.0088	-.0001	.0040	.0034	.0006
*2	.0090	.0085	-.0005	.0045	.0045	-

* Moulted to 4th instar

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
Diet level 1 - 4th instar nymphs.						
1	.0093	.0117	.0024	.0045	.0002	.0043
2	.0085	.0093	.0008	.0036	.0002	.0034
3	.0085	.0116	.0031	.0045	.0002	.0043
4	.0079	.0090	.0011	.0045	.0006	.0039
5	.0071	.0085	.0014	.0030	.0001	.0029
6	.0087	.0113	.0026	.0034	.0001	.0033
7	.0089	.0100	.0011	.0036	.0001	.0035
8	.0094	.0118	.0024	.0043	.0002	.0041
9	.0087	.0115	.0028	.0037	.0001	.0036
10	.0083	.0100	.0017	.0040	.0001	.0039
Total	.0853	.1047	.0194	.0391	.0019	.0372
$\bar{x}$	.0085	.0105	.0019	.0039	.0002	.0037
1	.0117	.0150	.0033	.0045	.0003	.0042
2	.0093	.0106	.0013	.0042	.0002	.0040
3	.0116	.0108	-.0008	.0043	.0002	.0041
4	.0090	.0105	.0015	.0031	.0001	.0030
5	.0085	.0080	-.0005	.0030	.0002	.0028
6	.0113	.0100	-.0013	.0040	.0002	.0038
7	.0100	.0100	-	.0039	.0002	.0037
8	.0118	.0154	.0036	.0039	.0002	.0037
9	.0115	.0100	-.0015	.0041	.0002	.0039
10	.0100	.0099	-.0001	.0039	.0002	.0037
Total	.1047	.1102	.0055	.0389	.0020	.0369
$\bar{x}$	.0105	.0110	.0006	.0039	.0002	.0037
1	.0150	.0201	.0051	.0038	.0001	.0037
2	.0106	.0143	.0037	.0043	.0004	.0039
3	.0108	.0152	.0044	.0045	.0002	.0043
4	.0105	.0167	.0062	.0045	.0002	.0043
5	.0080	.0115	.0035	.0045	.0002	.0043
6	.0100	.0154	.0054	.0040	.0004	.0036
7	.0100	.0123	.0023	.0037	.0002	.0035
8	.0154	.0202	.0048	.0042	.0002	.0040
9	.0100	.0136	.0036	.0043	.0002	.0041
10	.0099	.0146	.0047	.0041	.0003	.0038
Total	.1102	.1539	.0437	.0419	.0024	.0395
$\bar{x}$	.0110	.0154	.0044	.0042	.0002	.0040

	Before	After	Gain or loss	Before	After	Loss
1	.0201	.0200	-.0001	.0035	.0005	.0030
2	.0143	.0187	.0044	.0036	.0001	.0035
3	.0152	.0204	.0052	.0030	.0007	.0023
4	.0167	.0186	.0019	.0043	.0001	.0042
5	.0115	.0174	.0059	.0043	.0001	.0042
6	.0154	.0180	.0026	.0035	.0003	.0032
7	.0123	.0164	.0041	.0037	.0002	.0035
8	.0202	.0200	-.0002	.0031	.0004	.0027
9	.0136	.0170	.0034	.0038	.0002	.0036
10	.0146	.0188	.0042	.0036	.0001	.0035
Total	.1539	.1853	.0314	.0364	.0027	.0337
$\bar{x}$	.0154	.0185	.0031	.0036	.0003	.0034
*1	.0200	.0184	-.0016	.0034	.0034	-
*2	.0187	.0184	-.0003	.0031	.0031	-
*3	.0204	.0174	-.0030	.0030	.0030	-
*4	.0186	.0174	-.0012	.0030	.0030	-
*5	.0174	.0170	-.0004	.0035	.0035	-
*6	.0180	.0176	-.0004	.0041	.0041	-
7	.0164	.0200	.0036	.0040	.0002	.0038
*8	.0200	.0184	-.0016	.0035	.0035	-
9	.0170	.0210	.0040	.0030	.0001	.0029
10	.0188	.0205	.0017	.0031	.0001	.0030
Total	.1853	.1861	.0008	.0337	.0240	.0097
$\bar{x}$	.0185	.0186	.0001	.0034	.0024	.0010
*7	.0200	.0184	-.0016	.0037	.0037	-
*9	.0210	.0190	-.0020	.0031	.0031	-
*10	.0205	.0187	-.0018	.0030	.0030	-
Total	.0615	.0561	-.0054	.0098	.0098	-
$\bar{x}$	.0205	.0187	-.0018	.0033	.0033	-

* Moulted to 5th instar

	P. maculiventris			*G. mellonella*		
Repli-cations	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight

Diet level 1 - 5th instar nymphs.

1	.0184	.0164	-.0020	.0030	.0001	.0029
2	.0184	.0157	-.0027	.0036	.0001	.0035
3	.0174	.0219	.0045	.0032	.0001	.0031
4	.0174	.0177	.0003	.0039	.0002	.0037
5	.0170	.0161	-.0009	.0040	.0003	.0037
6	.0176	.0150	-.0026	.0040	.0002	.0038
7	.0184	.0197	.0013	.0031	.0001	.0030
8	.0184	.0162	-.0022	.0035	.0001	.0034
9	.0190	.0234	.0044	.0035	.0001	.0034
10	.0187	.0195	.0008	.0034	.0001	.0033
Total	.1807	.1816	.0009	.0352	.0014	.0338
$\bar{x}$	.0181	.0182	.0001	.0035	.0001	.0034
1	.0164	.0215	.0051	.0030	.0001	.0029
2	.0157	.0193	.0036	.0031	.0001	.0030
3	.0219	.0189	-.0030	.0030	.0001	.0029
4	.0177	.0176	-.0001	.0030	.0001	.0029
5	.0161	.0170	.0009	.0031	.0001	.0030
6	.0150	.0191	.0041	.0030	.0001	.0029
7	.0197	.0176	-.0021	.0034	.0001	.0033
8	.0162	.0211	.0049	.0032	.0001	.0031
9	.0234	.0216	-.0018	.0044	.0001	.0043
10	.0195	.0172	-.0023	.0035	.0002	.0033
Total	.1816	.1909	.0093	.0327	.0011	.0316
$\bar{x}$	.0182	.0191	.0009	.0033	.0001	.0032
1	.0215	.0175	-.0040	.0037	.0002	.0035
2	.0193	.0172	-.0021	.0033	.0001	.0032
3	.0189	.0221	.0032	.0034	.0001	.0033
4	.0176	.0216	.0040	.0045	.0003	.0042
5	.0170	.0187	.0017	.0038	.0003	.0035
6	.0191	.0170	-.0021	.0034	.0001	.0033
7	.0176	.0199	.0023	.0041	.0001	.0040
8	.0211	.0190	-.0021	.0040	.0001	.0039
9	.0216	.0230	.0014	.0040	.0001	.0039
10	.0172	.0209	.0037	.0035	.0001	.0034
Total	.1909	.1969	.0060	.0377	.0015	.0362
$\bar{x}$	.0191	.0197	.0006	.0038	.0002	.0036

	Before	After	Gain or loss	Before	After	Loss
1	.0175	.0200	.0025	.0045	.0002	.0043
2	.0172	.0200	.0028	.0041	.0002	.0039
3	.0221	.0190	-.0031	.0045	.0001	.0044
4	.0216	.0221	.0005	.0041	.0001	.0040
5	.0187	.0195	.0008	.0042	.0002	.0040
6	.0170	.0196	.0026	.0040	.0002	.0038
7	.0199	.0216	.0017	.0032	.0001	.0031
8	.0190	.0230	.0040	.0036	.0002	.0034
9	.0230	.0210	-.0020	.0036	.0002	.0034
10	.0209	.0198	-.0011	.0035	.0002	.0033
Total	.1969	.2056	.0087	.0393	.0017	.0376
$\bar{x}$	.0197	.0206	.0009	.0039	.0002	.0038
1	.0200	.0204	.0004	.0032	.0002	.0030
2	.0200	.0201	.0001	.0031	.0001	.0030
3	.0190	.0229	.0039	.0035	.0002	.0033
4	.0221	.0206	-.0015	.0034	.0002	.0032
5	.0195	.0179	-.0016	.0030	.0002	.0028
6	.0196	.0200	.0004	.0031	.0002	.0029
7	.0216	.0203	-.0013	.0030	.0003	.0027
8	.0230	.0206	-.0024	.0035	.0003	.0032
9	.0210	.0213	.0003	.0035	.0001	.0034
10	.0198	.0186	-.0012	.0039	.0002	.0037
Total	.2056	.2027	-.0029	.0332	.0020	.0312
$\bar{x}$	.0206	.0203	-.0003	.0033	.0002	.0031
1	.0204	.0217	.0013	.0033	.0002	.0031
2	.0201	.0187	-.0014	.0032	.0001	.0031
3	.0229	.0212	-.0017	.0030	.0002	.0028
4	.0206	.0200	-.0006	.0030	.0001	.0029
5	.0179	.0195	.0016	.0045	.0001	.0044
6	.0200	.0216	.0016	.0035	.0002	.0033
7	.0203	.0226	.0023	.0031	.0001	.0030
8	.0206	.0195	-.0011	.0031	.0002	.0029
9	.0213	.0196	-.0017	.0037	.0002	.0035
10	.0186	.0220	.0034	.0040	.0001	.0039
Total	.2027	.2064	.0037	.0344	.0015	.0329
$\bar{x}$	.0203	.0206	.0004	.0034	.0002	.0033
1	.0217	.0194	-.0023	.0033	.0002	.0031
2	.0187	.0216	.0029	.0033	.0002	.0031
3	.0212	.0213	.0001	.0032	.0003	.0029
4	.0200	.0202	.0002	.0030	.0002	.0028
5	.0195	.0228	.0033	.0040	.0003	.0037
6	.0216	.0206	-.0010	.0035	.0003	.0032
7	.0226	.0213	-.0013	.0030	.0003	.0027
8	.0195	.0200	.0005	.0032	.0002	.0030
9	.0196	.0254	.0058	.0041	.0001	.0040
10	.0220	.0210	-.0010	.0040	.0003	.0037
Total	.2064	.2136	.0072	.0346	.0024	.0322
$\bar{x}$	.0206	.0214	.0007	.0035	.0002	.0032

	Before	After	Gain or loss	Before	After	Loss
1	.0194	.0245	.0051	.0032	.0002	.0030
2	.0216	.0226	.0010	.0039	.0002	.0037
3	.0213	.0230	.0017	.0030	.0001	.0029
4	.0202	.0238	.0036	.0031	.0002	.0029
5	.0228	.0235	.0007	.0036	.0003	.0033
6	.0206	.0239	.0033	.0039	.0002	.0037
7	.0213	.0206	-.0007	.0041	.0003	.0038
8	.0200	.0236	.0036	.0040	.0001	.0039
9	.0254	.0235	-.0019	.0035	.0003	.0032
10	.0210	.0219	.0009	.0034	.0002	.0032
Total	.2136	.2309	.0173	.0357	.0021	.0336
$\bar{x}$	.0214	.0231	.0017	.0036	.0002	.0034
1	.0245	.0249	.0004	.0042	.0001	.0041
2	.0226	.0202	-.0024	.0037	.0001	.0036
3	.0230	.0226	-.0004	.0034	.0002	.0032
4	.0238	.0242	.0004	.0032	.0001	.0031
5	.0235	.0238	.0003	.0037	.0001	.0036
6	.0239	.0246	.0007	.0039	.0001	.0038
7	.0206	.0245	.0039	.0041	.0002	.0039
8	.0236	.0206	-.0030	.0030	.0001	.0029
9	.0235	.0216	-.0019	.0033	.0003	.0030
10	.0219	.0240	.0021	.0037	.0001	.0036
Total	.2309	.2310	.0001	.0362	.0014	.0348
$\bar{x}$	.0231	.0231	.0001	.0036	.0001	.0035
1	.0249	.0205	-.0044	.0030	.0001	.0029
2	.0202	.0252	.0050	.0042	.0002	.0040
3	.0226	.0245	.0019	.0039	.0001	.0038
4	.0242	.0229	-.0013	.0030	.0001	.0029
5	.0238	.0211	-.0027	.0031	.0001	.0030
6	.0246	.0214	-.0032	.0040	.0003	.0037
7	.0245	.0277	.0032	.0030	.0001	.0029
8	.0206	.0230	.0024	.0035	.0001	.0034
9	.0216	.0263	.0047	.0031	.0001	.0030
10	.0240	.0268	.0028	.0040	.0003	.0037
Total	.2310	.2394	.0084	.0348	.0015	.0333
$\bar{x}$	.0231	.0239	.0008	.0035	.0002	.0033
1	.0205	.0268	.0063	.0030	.0001	.0029
2	.0252	.0272	.0020	.0030	.0001	.0029
3	.0245	.0226	-.0019	.0032	.0001	.0031
4	.0229	.0260	.0031	.0030	.0002	.0028
5	.0211	.0259	.0048	.0030	.0001	.0029
6	.0214	.0260	.0046	.0035	.0001	.0034
7	.0277	.0282	.0005	.0043	.0001	.0042
8	.0230	.0270	.0040	.0032	.0001	.0031
9	.0263	.0291	.0028	.0039	.0001	.0038
10	.0268	.0267	-.0001	.0037	.0002	.0035
Total	.2394	.2655	.0261	.0338	.0012	.0326
$\bar{x}$	.0239	.0266	.0026	.0034	.0001	.0033

	Before	After	Gain or loss	Before	After	Loss
1	.0268	.0266	-.0002	.0041	.0001	.0040
2	.0272	.0281	.0009	.0036	.0002	.0034
3	.0226	.0262	.0036	.0044	.0002	.0042
4	.0260	.0305	.0045	.0036	.0001	.0035
5	.0259	.0240	-.0019	.0040	.0001	.0039
6	.0260	.0257	-.0003	.0042	.0002	.0040
7	.0282	.0366	.0084	.0040	.0001	.0039
8	.0270	.0270	-	.0040	.0001	.0039
9	.0291	.0310	.0019	.0042	.0002	.0040
10	.0267	.0264	-.0003	.0040	.0002	.0038
Total	.2655	.2821	.0166	.0401	.0015	.0386
$\bar{x}$	.0266	.0282	.0017	.0040	.0002	.0039
1	.0266	.0263	-.0003	.0042	.0001	.0041
2	.0281	.0378	.0097	.0036	.0002	.0034
3	.0262	.0292	.0030	.0040	.0001	.0039
4	.0305	.0329	.0024	.0030	.0001	.0029
5	.0240	.0288	.0048	.0035	.0002	.0033
6	.0257	.0290	.0033	.0037	.0001	.0036
7	.0366	.0346	-.0020	.0035	.0001	.0034
8	.0270	.0300	.0030	.0041	.0001	.0040
9	.0310	.0358	.0048	.0040	.0001	.0039
10	.0264	.0300	.0036	.0041	.0001	.0040
Total	.2821	.3144	.0323	.0377	.0012	.0365
$\bar{x}$	.0282	.0314	.0032	.0038	.0001	.0037
1	.0263	.0301	.0038	.0045	.0001	.0044
2	.0378	.0372	-.0006	.0039	.0001	.0038
3	.0292	.0367	.0075	.0044	.0003	.0041
4	.0329	.0293	-.0036	.0036	.0036	-
5	.0288	.0349	.0061	.0040	.0001	.0039
6	.0290	.0350	.0060	.0041	.0001	.0040
***7	.0346	.0219	-.0127	.0037	.0037	-
8	.0300	.0364	.0064	.0036	.0001	.0035
***9	.0358	.0281	-.0077	.0035	.0035	-
10	.0300	.0421	.0121	.0042	.0001	.0041
Total	.3144	.3317	.0173	.0395	.0117	.0278
$\bar{x}$	.0314	.0332	.0017	.0040	.0012	.0028
1	.0301	.0422	.0121	.0036	.0001	.0035
*2	.0372	.0291	-.0081	.0043	.0043	-
3	.0367	.0422	.0055	.0041	.0001	.0040
***4	.0293	.0275	-.0018	.0032	.0032	-
***5	.0349	.0225	-.0124	.0034	.0034	-
***6	.0350	.0231	-.0119	.0035	.0035	-
*8	.0364	.0300	-.0064	.0030	.0030	-
**10	.0421	.0358	-.0063	.0037	.0037	-
Total	.2817	.2524	-.0293	.0288	.0213	.0075
$\bar{x}$	.0352	.0316	-.0037	.0036	.0027	.0009

* Emerged as adult male
** Emerged as adult female
*** Died, while shedding exuviae

	Before	After	Gain or loss	Before	After	Loss
***1	.0422	.0384	-.0038	.0030	.0030	-
3	.0422	.0394	-.0028	.0040	.0040	-
Total	.0844	.0778	-.0066	.0070	.0070	-
$\bar{x}$	.0422	.0389	-.0033	.0035	.0035	-
*3	.0394	.0327	-.0067	.0035	.0035	-

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* Emerged as adult male
** Emerged as adult female
*** Died, while shedding exuviae

Repli- cations	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 2 - 2nd instar nymphs.			
1	.0006	.0026	.0020	.0066	.0020	.0046
2	.0005	.0021	.0016	.0079	.0052	.0027
3	.0006	.0026	.0020	.0072	.0013	.0059
4	.0006	.0024	.0018	.0067	.0039	.0028
5	.0006	.0028	.0022	.0063	.0016	.0047
6	.0005	.0022	.0017	.0065	.0025	.0040
7	.0005	.0022	.0017	.0075	.0019	.0056
8	.0006	.0022	.0016	.0077	.0018	.0059
9	.0006	.0022	.0016	.0080	.0023	.0057
10	.0006	.0023	.0017	.0069	.0013	.0056
Total	.0057	.0236	.0179	.0713	.0238	.0475
$\bar{x}$	.0006	.0024	.0018	.0071	.0024	.0048
1	.0026	.0028	.0002	.0066	.0052	.0014
2	.0021	.0025	.0004	.0063	.0053	.0010
3	.0026	.0029	.0003	.0080	.0059	.0021
4	.0024	.0027	.0003	.0080	.0052	.0028
5	.0028	.0029	.0001	.0079	.0060	.0019
6	.0022	.0026	.0004	.0065	.0032	.0033
7	.0022	.0026	.0004	.0067	.0049	.0018
8	.0022	.0025	.0003	.0075	.0029	.0046
9	.0022	.0025	.0003	.0074	.0031	.0043
10	.0023	.0027	.0004	.0075	.0045	.0030
Total	.0236	.0267	.0031	.0724	.0462	.0262
$\bar{x}$	.0024	.0027	.0003	.0072	.0046	.0026
*1	.0028	.0027	-.0001	.0061	.0061	-
*2	.0025	.0024	-.0001	.0061	.0061	-
*3	.0029	.0024	-.0005	.0079	.0079	-
*4	.0027	.0025	-.0002	.0056	.0056	-
*5	.0029	.0027	-.0002	.0078	.0078	-
*6	.0026	.0025	-.0001	.0067	.0067	-
*7	.0026	.0025	-.0001	.0071	.0071	-
*8	.0025	.0024	-.0001	.0074	.0074	-
*9	.0025	.0024	-.0001	.0080	.0080	-
*10	.0027	.0026	-.0001	.0075	.0075	-
Total	.0267	.0251	-.0016	.0702	.0702	-
$\bar{x}$	.0027	.0025	-.0002	.0070	.0070	-

* Moulted to 3rd instar

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 2 - 3rd instar nymphs.			
1	.0027	.0071	.0044	.0069	.0008	.0061
2	.0024	.0072	.0048	.0062	.0015	.0047
3	.0024	.0049	.0025	.0070	.0013	.0057
4	.0025	.0042	.0017	.0055	.0026	.0029
5	.0027	.0054	.0027	.0067	.0039	.0028
6	.0025	.0071	.0046	.0068	.0008	.0060
7	.0025	.0071	.0046	.0065	.0009	.0056
8	.0024	.0050	.0026	.0073	.0017	.0056
9	.0024	.0068	.0044	.0077	.0016	.0061
10	.0026	.0071	.0045	.0080	.0010	.0070
Total	.0251	.0619	.0368	.0686	.0161	.0525
$\bar{x}$	.0025	.0062	.0037	.0069	.0016	.0053
1	.0071	.0100	.0029	.0066	.0030	.0036
2	.0072	.0102	.0030	.0067	.0028	.0039
3	.0049	.0078	.0029	.0063	.0012	.0051
4	.0042	.0088	.0046	.0070	.0007	.0063
5	.0054	.0097	.0043	.0065	.0012	.0053
6	.0071	.0103	.0032	.0071	.0029	.0042
7	.0071	.0100	.0029	.0066	.0028	.0038
8	.0050	.0096	.0046	.0067	.0013	.0054
9	.0068	.0100	.0032	.0065	.0011	.0054
10	.0071	.0101	.0030	.0075	.0029	.0046
Total	.0619	.0965	.0346	.0675	.0199	.0476
$\bar{x}$	.0062	.0097	.0035	.0068	.0020	.0048
*1	.0100	.0097	-.0003	.0073	.0073	-
*2	.0102	.0092	-.0010	.0080	.0080	-
*3	.0078	.0071	-.0007	.0069	.0069	-
4	.0088	.0110	.0022	.0066	.0011	.0055
5	.0097	.0103	.0006	.0067	.0009	.0058
*6	.0103	.0094	-.0009	.0080	.0080	-
*7	.0100	.0099	-.0001	.0075	.0075	-
8	.0096	.0110	.0014	.0069	.0012	.0057
9	.0100	.0113	.0013	.0065	.0009	.0056
*10	.0101	.0093	-.0008	.0067	.0067	-
Total	.0965	.0982	.0017	.0711	.0485	.0226
$\bar{x}$	.0097	.0098	.0002	.0071	.0049	.0023

* Moulted to 4th instar

	Before	After	Gain or loss	Before	After	Loss
*4	.0110	.0106	-.0004	.0080	.0080	-
*5	.0103	.0098	-.0005	.0067	.0067	-
*8	.0110	.0098	-.0012	.0071	.0071	-
*9	.0113	.0099	-.0014	.0070	.0070	-
Total	.0436	.0401	-.0035	.0288	.0288	-
$\bar{\bar{x}}$	.0109	.0100	-.0009	.0072	.0072	-

* Moulted to 4th instar

	P. maculiventris			*G. mellonella*		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight

Diet level 2 - 4th instar nymphs.

1	.0097	.0143	.0046	.0066	.0005	.0061
2	.0092	.0153	.0061	.0080	.0011	.0069
3	.0071	.0115	.0044	.0056	.0022	.0034
4	.0106	.0188	.0082	.0080	.0012	.0068
5	.0098	.0174	.0076	.0080	.0018	.0062
6	.0094	.0145	.0051	.0065	.0002	.0063
7	.0099	.0140	.0041	.0069	.0010	.0059
8	.0098	.0176	.0078	.0075	.0011	.0064
9	.0099	.0168	.0069	.0071	.0006	.0065
10	.0093	.0139	.0046	.0069	.0011	.0058
Total	.0947	.1541	.0594	.0711	.0108	.0603
$\bar{x}$	.0095	.0154	.0059	.0071	.0011	.0060
1	.0143	.0130	-.0013	.0075	.0007	.0068
2	.0153	.0191	.0038	.0080	.0007	.0073
3	.0115	.0111	-.0004	.0080	.0015	.0065
4	.0188	.0235	.0047	.0080	.0008	.0072
5	.0174	.0209	.0035	.0078	.0013	.0065
6	.0145	.0170	.0025	.0080	.0006	.0074
7	.0140	.0183	.0043	.0076	.0005	.0071
8	.0176	.0213	.0037	.0079	.0004	.0075
9	.0168	.0205	.0037	.0080	.0004	.0076
10	.0139	.0185	.0046	.0069	.0007	.0062
Total	.1541	.1832	.0291	.0777	.0076	.0701
$\bar{x}$	.0154	.0183	.0029	.0078	.0008	.0070
1	.0130	.0212	.0082	.0080	.0003	.0077
2	.0191	.0239	.0048	.0080	.0001	.0079
3	.0111	.0176	.0065	.0080	.0006	.0074
4	.0235	.0242	.0007	.0080	.0032	.0048
5	.0209	.0227	.0018	.0080	.0023	.0057
6	.0170	.0205	.0035	.0076	.0002	.0074
7	.0183	.0235	.0052	.0078	.0001	.0077
*8	.0213	.0205	-.0008	.0079	.0079	-
9	.0205	.0250	.0045	.0075	.0010	.0065
10	.0185	.0216	.0031	.0079	.0077	.0002
Total	.1832	.2207	.0375	.0787	.0234	.0553
$\bar{x}$	.0183	.0221	.0038	.0079	.0023	.0055

* Moulted to 5th instar

	Before	After	Gain or loss	Before	After	Loss
1	.0212	.0207	-.0005	.0078	.0078	-
*2	.0239	.0223	-.0016	.0080	.0080	-
3	.0176	.0227	.0051	.0073	.0005	.0068
*4	.0242	.0231	-.0011	.0057	.0057	-
*5	.0227	.0210	-.0017	.0056	.0056	-
6	.0205	.0250	.0045	.0078	.0009	.0069
*7	.0235	.0220	-.0015	.0075	.0075	-
*9	.0250	.0239	-.0011	.0065	.0065	-
*10	.0216	.0207	-.0009	.0080	.0080	-
Total	.2002	.2014	.0012	.0642	.0505	.0137
$\bar{\bar{x}}$	.0200	.0201	.0001	.0071	.0056	.0015
*1	.0207	.0206	-.0001	.0072	.0072	-
*3	.0227	.0216	-.0011	.0063	.0063	-
*6	.0250	.0249	-.0001	.0080	.0080	-
Total	.0684	.0671	-.0013	.0215	.0215	-
$\bar{\bar{x}}$	.0228	.0223	-.0004	.0072	.0072	-

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* Moulted to 5th instar

	P. maculiventris			G. mellonella		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight

Diet level 2 - 5th instar nymphs.

1	.0206	.0257	.0051	.0080	.0003	.0077
2	.0223	.0286	.0063	.0080	.0004	.0076
3	.0216	.0310	.0094	.0077	.0002	.0075
4	.0231	.0270	.0039	.0079	.0002	.0077
5	.0210	.0285	.0075	.0077	.0015	.0062
6	.0249	.0275	.0026	.0078	.0003	.0075
7	.0220	.0279	.0059	.0075	.0006	.0069
8	.0205	.0282	.0077	.0073	.0003	.0070
9	.0239	.0285	.0046	.0078	.0006	.0072
10	.0207	.0265	.0058	.0057	.0002	.0055
Total	.2206	.2794	.0588	.0754	.0046	.0708
$\bar{x}$	.0221	.0279	.0059	.0075	.0005	.0071
1	.0257	.0239	-.0018	.0067	.0003	.0064
2	.0286	.0240	-.0046	.0074	.0005	.0069
3	.0310	.0286	-.0024	.0072	.0007	.0065
4	.0270	.0256	-.0014	.0063	.0004	.0059
5	.0285	.0261	-.0024	.0064	.0005	.0059
6	.0275	.0287	.0012	.0067	.0007	.0060
7	.0279	.0305	.0026	.0073	.0004	.0069
8	.0282	.0281	-.0001	.0069	.0015	.0054
9	.0285	.0276	-.0009	.0073	.0004	.0069
10	.0265	.0275	.0010	.0057	.0002	.0055
Total	.2794	.2706	-.0088	.0679	.0056	.0623
$\bar{x}$	.0279	.0271	-.0009	.0068	.0006	.0062
1	.0239	.0283	.0044	.0068	.0002	.0066
2	.0240	.0282	.0042	.0080	.0005	.0075
3	.0286	.0329	.0043	.0064	.0002	.0062
4	.0256	.0299	.0043	.0063	.0002	.0061
5	.0261	.0274	.0013	.0054	.0002	.0052
6	.0287	.0319	.0032	.0063	.0003	.0060
7	.0305	.0389	.0084	.0075	.0003	.0072
8	.0281	.0291	.0010	.0069	.0005	.0064
9	.0276	.0299	.0023	.0078	.0002	.0076
10	.0275	.0390	.0115	.0072	.0003	.0069
Total	.2706	.3155	.0449	.0686	.0029	.0657
$\bar{x}$	.0271	.0316	.0045	.0069	.0003	.0066

	Before	After	Gain or loss	Before	After	Loss
1	.0283	.0261	-.0022	.0080	.0002	.0078
2	.0282	.0268	-.0014	.0062	.0003	.0059
3	.0329	.0384	.0055	.0073	.0003	.0070
4	.0299	.0396	.0097	.0072	.0003	.0069
5	.0274	.0302	.0028	.0077	.0003	.0074
6	.0319	.0379	.0060	.0074	.0002	.0072
7	.0389	.0412	.0023	.0080	.0004	.0076
8	.0291	.0285	-.0006	.0069	.0004	.0065
9	.0299	.0388	.0089	.0079	.0002	.0077
10	.0390	.0429	.0039	.0080	.0002	.0078
Total	.3155	.3504	.0349	.0746	.0028	.0718
$\bar{x}$	.0316	.0350	.0035	.0075	.0003	.0072
1	.0261	.0423	.0162	.0070	.0003	.0067
2	.0268	.0291	.0023	.0080	.0004	.0076
3	.0384	.0428	.0044	.0071	.0003	.0068
4	.0396	.0417	.0021	.0080	.0008	.0072
5	.0302	.0410	.0108	.0080	.0003	.0077
6	.0379	.0454	.0075	.0073	.0003	.0070
7	.0412	.0479	.0067	.0080	.0005	.0075
8	.0285	.0375	.0090	.0080	.0002	.0078
9	.0388	.0413	.0025	.0077	.0002	.0075
10	.0429	.0457	.0028	.0073	.0007	.0066
Total	.3504	.4147	.0643	.0764	.0040	.0724
$\bar{x}$	.0350	.0415	.0064	.0076	.0004	.0072
1	.0423	.0417	-.0006	.0069	.0007	.0062
2	.0291	.0465	.0174	.0080	.0003	.0077
3	.0428	.0470	.0042	.0077	.0005	.0072
*4	.0417	.0385	-.0032	.0080	.0080	-
5	.0410	.0456	.0046	.0080	.0004	.0076
6	.0454	.0442	-.0012	.0079	.0079	-
7	.0479	.0466	-.0013	.0080	.0080	-
8	.0375	.0426	.0051	.0075	.0003	.0072
9	.0413	.0469	.0056	.0075	.0008	.0067
10	.0457	.0450	-.0007	.0080	.0080	-
Total	.4147	.4446	.0299	.0775	.0349	.0426
$\bar{x}$	.0415	.0445	.0030	.0078	.0035	.0043

* Emerged as adult male

	Before	After	Gain or loss	Before	After	Loss
*1	.0417	.0395	-.0022	.0065	.0065	-
2	.0465	.0441	-.0024	.0066	.0066	-
3	.0470	.0457	-.0013	.0075	.0075	-
5	.0456	.0418	-.0038	.0080	.0080	-
6	.0442	.0420	-.0022	.0079	.0079	-
**7	.0466	.0433	-.0033	.0080	.0080	-
8	.0426	.0462	.0036	.0076	.0007	.0069
9	.0469	.0461	-.0008	.0075	.0075	-
*10	.0450	.0433	-.0017	.0073	.0073	-
Total	.4061	.3920	-.0141	.0669	.0600	.0069
$\bar{x}$	.0451	.0436	-.0016	.0074	.0067	.0007
*2	.0441	.0410	-.0031	.0068	.0068	-
*3	.0457	.0429	-.0028	.0078	.0078	-
*5	.0418	.0394	-.0024	.0065	.0065	-
*6	.0420	.0399	-.0021	.0067	.0067	-
8	.0462	.0460	-.0002	.0076	.0076	-
**9	.0461	.0453	-.0008	.0079	.0079	-
Total	.2659	.2545	-.0114	.0433	.0433	-
$\bar{x}$	.0443	.0424	-.0019	.0072	.0072	-
**8	.0460	.0454	-.0006	.0078	.0078	-

* Emerged as adult male
** Emerged as adult female

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 3 - 2nd instar nymphs.			
1	.0006	.0017	.0011	.0094	.0040	.0054
2	.0006	.0019	.0013	.0118	.0069	.0049
3	.0006	.0025	.0019	.0116	.0056	.0060
4	.0006	.0018	.0012	.0100	.0075	.0025
5	.0006	.0018	.0012	.0101	.0073	.0028
6	.0006	.0028	.0022	.0094	.0040	.0054
7	.0006	.0018	.0012	.0116	.0090	.0026
8	.0006	.0018	.0012	.0109	.0069	.0040
9	.0006	.0024	.0018	.0110	.0081	.0029
10	.0006	.0024	.0018	.0117	.0079	.0038
Total	.0060	.0209	.0149	.1075	.0672	.0403
$\bar{x}$	.0006	.0021	.0015	.0108	.0067	.0040
1	.0017	.0020	.0003	.0125	.0105	.0020
2	.0019	.0019	-	.0125	.0125	-
3	.0025	.0025	-	.0140	.0115	.0025
4	.0018	.0020	.0002	.0120	.0073	.0047
5	.0018	.0021	.0003	.0106	.0067	.0039
6	.0028	.0027	-.0001	.0140	.0127	.0013
7	.0018	.0028	.0010	.0134	.0105	.0029
8	.0018	.0020	.0002	.0136	.0112	.0024
9	.0024	.0029	.0005	.0100	.0083	.0017
10	.0024	.0030	.0006	.0097	.0078	.0019
Total	.0209	.0239	.0030	.1223	.0990	.0233
$\bar{x}$	.0021	.0024	.0003	.0122	.0099	.0023
*1	.0020	.0018	-.0002	.0134	.0134	-
*2	.0019	.0018	-.0001	.0111	.0111	-
*3	.0025	.0024	-.0001	.0137	.0137	-
*4	.0020	.0019	-.0001	.0127	.0127	-
*5	.0021	.0019	-.0002	.0125	.0125	-
*6	.0027	.0025	-.0002	.0134	.0134	-
7	.0028	.0026	-.0002	.0094	.0094	-
*8	.0020	.0019	-.0001	.0123	.0123	-
*9	.0029	.0028	-.0001	.0096	.0096	-
*10	.0030	.0028	-.0002	.0146	.0146	-
Total	.0239	.0224	-.0015	.1227	.1227	-
$\bar{x}$	.0024	.0022	-.0002	.0123	.0123	-
*7	.0026	.0024	-.0002	.0122	.0122	-

* Moulted to 3rd instar

	P. maculiventris			*G. mellonella*		
Replications	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
Diet level 3 - 3rd instar nymphs.						
1	.0018	.0058	.0040	.0108	.0045	.0063
2	.0018	.0059	.0041	.0111	.0049	.0062
3	.0024	.0051	.0027	.0133	.0083	.0050
4	.0019	.0061	.0042	.0107	.0052	.0055
5	.0019	.0062	.0043	.0110	.0043	.0067
6	.0025	.0072	.0047	.0135	.0040	.0095
7	.0024	.0062	.0038	.0136	.0088	.0048
8	.0019	.0061	.0042	.0142	.0092	.0050
9	.0028	.0032	.0004	.0096	.0082	.0014
10	.0028	.0048	.0020	.0132	.0051	.0081
Total	.0222	.0566	.0344	.1210	.0625	.0585
$\bar{x}$	.0022	.0057	.0034	.0121	.0063	.0059
1	.0058	.0074	.0016	.0140	.0075	.0065
2	.0059	.0077	.0018	.0138	.0070	.0068
3	.0051	.0098	.0047	.0157	.0063	.0094
4	.0061	.0080	.0019	.0145	.0068	.0077
5	.0062	.0080	.0018	.0143	.0065	.0078
6	.0072	.0099	.0027	.0151	.0078	.0073
7	.0062	.0083	.0021	.0149	.0081	.0068
8	.0061	.0079	.0018	.0142	.0092	.0050
9	.0032	.0071	.0039	.0133	.0078	.0055
10	.0048	.0090	.0042	.0116	.0026	.0090
Total	.0566	.0831	.0265	.1414	.0696	.0718
$\bar{x}$	.0057	.0083	.0027	.0141	.0070	.0072
1	.0074	.0091	.0017	.0135	.0085	.0050
2	.0077	.0095	.0018	.0130	.0079	.0051
*3	.0098	.0095	-.0003	.0146	.0146	-
*4	.0080	.0078	-.0002	.0143	.0143	-
*5	.0080	.0079	-.0001	.0140	.0140	-
*6	.0099	.0095	-.0004	.0110	.0110	-
7	.0083	.0086	.0003	.0094	.0074	.0020
*8	.0079	.0077	-.0002	.0138	.0138	-
9	.0071	.0090	.0019	.0133	.0078	.0055
10	.0090	.0115	.0025	.0138	.0064	.0074
Total	.0831	.0901	.0070	.1307	.1057	.0250
$\bar{x}$	.0083	.0090	.0007	.0131	.0106	.0025

* Moulted to 4th instar

	Before	After	Gain or loss	Before	After	Loss
*1	.0091	.0088	-.0003	.0130	.0130	-
*2	.0095	.0093	-.0002	.0135	.0135	-
*7	.0086	.0082	-.0004	.0149	.0149	-
*9	.0090	.0089	-.0001	.0157	.0157	-
*10	.0115	.0109	-.0006	.0145	.0145	-
Total	.0477	.0461	-.0016	.0716	.0716	-
$\bar{x}$	.0095	.0092	-.0003	.0143	.0143	-

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* Moulted to 4th instar

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 3 - 4th instar nymphs.			
1	.0088	.0193	.0105	.0140	.0021	.0119
2	.0093	.0132	.0039	.0135	.0035	.0100
3	.0095	.0137	.0042	.0128	.0034	.0094
4	.0078	.0157	.0079	.0138	.0014	.0124
5	.0079	.0170	.0091	.0142	.0017	.0125
6	.0095	.0154	.0059	.0130	.0022	.0108
7	.0082	.0184	.0102	.0134	.0016	.0118
8	.0077	.0149	.0072	.0137	.0013	.0124
9	.0089	.0138	.0049	.0111	.0033	.0078
10	.0109	.0132	.0023	.0094	.0010	.0084
Total	.0885	.1546	.0661	.1289	.0215	.1074
$\bar{x}$	.0089	.0155	.0066	.0129	.0022	.0107
1	.0193	.0239	.0046	.0099	.0017	.0082
2	.0132	.0159	.0027	.0121	.0019	.0102
3	.0137	.0161	.0024	.0128	.0021	.0107
4	.0157	.0209	.0052	.0125	.0030	.0095
5	.0170	.0236	.0066	.0130	.0021	.0109
6	.0154	.0215	.0061	.0130	.0038	.0092
7	.0184	.0236	.0052	.0094	.0014	.0080
8	.0149	.0242	.0093	.0150	.0036	.0114
9	.0138	.0189	.0051	.0099	.0006	.0093
10	.0132	.0174	.0042	.0116	.0015	.0101
Total	.1546	.2060	.0514	.1192	.0217	.0975
$\bar{x}$	.0155	.0206	.0051	.0119	.0022	.0098
*1	.0239	.0226	-.0013	.0123	.0123	-
2	.0159	.0258	.0099	.0145	.0018	.0127
3	.0161	.0258	.0097	.0150	.0019	.0131
4	.0209	.0236	.0027	.0130	.0055	.0075
5	.0236	.0255	.0019	.0119	.0053	.0066
6	.0215	.0244	.0029	.0125	.0060	.0065
*7	.0236	.0223	-.0013	.0097	.0097	-
8	.0242	.0233	-.0009	.0148	.0148	-
9	.0189	.0255	.0066	.0151	.0024	.0127
10	.0174	.0271	.0097	.0150	.0020	.0130
Total	.2060	.2459	.0399	.1338	.0617	.0721
$\bar{x}$	.0206	.0246	.0040	.0134	.0062	.0072

* Moulted to 5th instar

	Before	After	Gain or loss	Before	After	Loss
*2	.0258	.0230	-.0028	.0145	.0145	-
*3	.0258	.0236	-.0022	.0142	.0142	-
*4	.0236	.0229	-.0007	.0105	.0105	-
*5	.0255	.0239	-.0016	.0135	.0135	-
*6	.0244	.0235	-.0009	.0130	.0130	-
*8	.0233	.0231	-.0002	.0103	.0103	-
*9	.0255	.0238	-.0017	.0121	.0121	-
10	.0271	.0269	-.0002	.0128	.0128	-
Total	.2010	.1907	-.0103	.1009	.1009	-
$\bar{\bar{x}}$	.0251	.0238	-.0013	.0126	.0126	-
*10	.0269	.0252	-.0017	.0126	.0126	-

* Moulted to 5th instar

	P. maculiventris			*G. mellonella*		
Repli-cations	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
			Diet level 3 - 5th instar nymphs.			
1	.0226	.0237	.0011	.0098	.0035	.0063
2	.0230	.0250	.0020	.0135	.0045	.0090
3	.0236	.0258	.0022	.0137	.0054	.0083
4	.0229	.0250	.0021	.0134	.0040	.0094
5	.0239	.0262	.0023	.0135	.0025	.0110
6	.0235	.0260	.0025	.0127	.0014	.0113
7	.0223	.0302	.0079	.0094	.0012	.0082
8	.0231	.0301	.0070	.0152	.0013	.0139
9	.0238	.0265	.0027	.0094	.0013	.0081
10	.0252	.0318	.0066	.0130	.0012	.0118
Total	.2339	.2703	.0364	.1236	.0263	.0973
$\bar{x}$	.0234	.0270	.0036	.0124	.0026	.0097
1	.0237	.0276	.0039	.0164	.0018	.0146
2	.0250	.0307	.0057	.0160	.0018	.0142
3	.0258	.0315	.0057	.0164	.0027	.0137
4	.0250	.0306	.0056	.0157	.0021	.0136
5	.0262	.0346	.0084	.0097	.0004	.0093
6	.0260	.0287	.0027	.0094	.0009	.0085
7	.0302	.0277	-.0025	.0108	.0009	.0099
8	.0301	.0345	.0044	.0095	.0005	.0090
9	.0265	.0330	.0065	.0155	.0014	.0141
10	.0318	.0352	.0034	.0162	.0008	.0154
Total	.2703	.3141	.0438	.1356	.0133	.1223
$\bar{x}$	.0270	.0314	.0044	.0136	.0013	.0122
1	.0276	.0350	.0074	.0155	.0008	.0147
2	.0307	.0299	-.0008	.0140	.0008	.0132
3	.0315	.0286	-.0029	.0142	.0007	.0135
4	.0306	.0290	-.0016	.0145	.0006	.0139
5	.0346	.0471	.0125	.0120	.0003	.0117
6	.0287	.0299	.0012	.0115	.0004	.0111
7	.0277	.0329	.0052	.0153	.0023	.0130
8	.0345	.0471	.0126	.0122	.0003	.0119
9	.0330	.0440	.0110	.0113	.0007	.0106
10	.0352	.0507	.0155	.0151	.0009	.0142
Total	.3141	.3742	.0601	.1356	.0078	.1278
$\bar{x}$	.0314	.0374	.0060	.0136	.0008	.0128

	Before	After	Gain or loss	Before	After	Loss
1	.0350	.0462	.0112	.0120	.0004	.0116
2	.0299	.0369	.0070	.0150	.0009	.0141
3	.0286	.0352	.0066	.0159	.0008	.0151
4	.0290	.0351	.0061	.0149	.0007	.0142
5	.0471	.0592	.0121	.0150	.0017	.0133
6	.0299	.0406	.0107	.0158	.0011	.0147
7	.0329	.0450	.0121	.0144	.0012	.0132
8	.0471	.0600	.0129	.0156	.0018	.0138
9	.0440	.0498	.0058	.0148	.0007	.0141
10	.0507	.0616	.0109	.0129	.0019	.0110
Total	.3742	.4696	.0954	.1463	.0112	.1351
$\bar{x}$	.0374	.0470	.0095	.0146	.0011	.0135
1	.0462	.0528	.0066	.0120	.0005	.0115
2	.0369	.0476	.0107	.0120	.0003	.0117
3	.0352	.0463	.0111	.0117	.0003	.0114
4	.0351	.0460	.0109	.0119	.0004	.0115
5	.0592	.0570	-.0022	.0131	.0131	-
6	.0406	.0498	.0092	.0140	.0017	.0123
7	.0450	.0535	.0085	.0129	.0006	.0123
8	.0600	.0572	-.0028	.0134	.0134	-
9	.0498	.0491	-.0007	.0153	.0153	-
10	.0616	.0613	-.0003	.0140	.0140	-
Total	.4696	.5206	.0510	.1303	.0596	.0707
$\bar{x}$	.0470	.0521	.0051	.0130	.0060	.0071
*1	.0528	.0500	-.0028	.0134	.0134	-
2	.0476	.0563	.0087	.0119	.0003	.0116
3	.0463	.0538	.0075	.0124	.0005	.0119
4	.0460	.0514	.0054	.0125	.0006	.0119
**5	.0570	.0545	-.0025	.0133	.0133	-
6	.0498	.0491	-.0007	.0131	.0131	-
**7	.0535	.0518	-.0017	.0135	.0135	-
*8	.0572	.0567	-.0005	.0134	.0134	-
*9	.0491	.0475	-.0016	.0145	.0145	-
10	.0613	.0606	-.0007	.0135	.0135	-
Total	.5206	.5317	.0111	.1315	.0961	.0354
$\bar{x}$	.0521	.0532	.0011	.0132	.0096	.0035
*2	.0563	.0490	-.0073	.0130	.0130	-
**3	.0538	.0535	-.0003	.0131	.0131	-
*4	.0514	.0483	-.0031	.0125	.0125	-
*6	.0491	.0460	-.0031	.0125	.0125	-
**10	.0606	.0553	-.0053	.0129	.0129	-
Total	.2712	.2521	-.0191	.0640	.0640	-
$\bar{x}$	.0542	.0504	-.0038	.0128	.0128	-

* Emerged as adult male

** Emerged as adult female

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 4 - 2nd instar nymphs.			
1	.0006	.0014	.0008	.0215	.0141	.0074
2	.0006	.0014	.0008	.0220	.0119	.0101
3	.0006	.0025	.0019	.0210	.0122	.0088
4	.0007	.0021	.0014	.0227	.0110	.0117
5	.0006	.0015	.0009	.0225	.0115	.0110
6	.0006	.0014	.0008	.0221	.0126	.0095
7	.0005	.0026	.0021	.0230	.0111	.0119
8	.0006	.0029	.0023	.0200	.0117	.0083
9	.0006	.0034	.0028	.0201	.0105	.0096
10	.0006	.0014	.0008	.0231	.0118	.0113
Total	.0060	.0206	.0146	.2180	.1184	.0996
$\bar{x}$	.0006	.0021	.0015	.0218	.0118	.0100
1	.0014	.0031	.0017	.0260	.0126	.0134
2	.0014	.0029	.0015	.0194	.0128	.0066
3	.0025	.0026	.0001	.0199	.0199	-
4	.0021	.0031	.0010	.0202	.0168	.0034
5	.0015	.0021	.0006	.0202	.0202	-
6	.0014	.0021	.0007	.0205	.0165	.0040
7	.0026	.0026	-	.0251	.0251	-
8	.0029	.0030	.0001	.0260	.0260	-
9	.0034	.0032	-.0002	.0198	.0198	-
10	.0014	.0021	.0007	.0197	.0169	.0028
Total	.0206	.0268	.0062	.2168	.1866	.0302
$\bar{x}$	.0021	.0027	.0006	.0217	.0187	.0030
*1	.0031	.0029	-.0002	.0194	.0194	-
2	.0029	.0028	-.0001	.0222	.0206	.0016
*3	.0026	.0025	-.0001	.0241	.0241	-
*4	.0031	.0030	-.0001	.0248	.0248	-
*5	.0021	.0020	-.0001	.0230	.0230	-
*6	.0021	.0020	-.0001	.0206	.0206	-
*7	.0026	.0025	-.0001	.0194	.0194	-
*8	.0030	.0028	-.0002	.0196	.0196	-
*9	.0032	.0031	-.0001	.0200	.0200	-
10	.0021	.0028	.0007	.0205	.0170	.0035
Total	.0268	.0264	-.0004	.2136	.2085	.0051
$\bar{x}$	.0027	.0026	-.0001	.0214	.0209	.0005
*2	.0028	.0027	-.0001	.0194	.0194	-
*10	.0028	.0027	-.0001	.0219	.0219	-
Total	.0056	.0054	-.0002	.0413	.0413	-
$\bar{x}$	.0028	.0027	-.0001	.0207	.0207	-

* Moulted to 3rd instar

Replications	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 4 - 3rd instar nymphs.			
1	.0029	.0062	.0033	.0212	.0099	.0113
2	.0027	.0057	.0030	.0200	.0128	.0072
3	.0025	.0043	.0018	.0216	.0160	.0056
4	.0030	.0039	.0009	.0246	.0184	.0062
5	.0020	.0057	.0037	.0211	.0106	.0105
6	.0020	.0033	.0013	.0218	.0159	.0059
7	.0025	.0045	.0020	.0221	.0146	.0075
8	.0028	.0081	.0053	.0196	.0056	.0140
9	.0031	.0080	.0049	.0210	.0055	.0155
10	.0028	.0059	.0031	.0230	.0119	.0111
Total	.0263	.0556	.0293	.2160	.1212	.0948
$\bar{x}$	.0026	.0057	.0029	.0216	.0121	.0095
1	.0062	.0093	.0031	.0240	.0170	.0070
2	.0057	.0080	.0023	.0231	.0141	.0090
3	.0043	.0079	.0036	.0215	.0097	.0118
4	.0039	.0063	.0024	.0194	.0103	.0091
5	.0057	.0076	.0019	.0215	.0170	.0045
6	.0033	.0070	.0037	.0217	.0050	.0167
7	.0045	.0087	.0042	.0222	.0066	.0156
8	.0081	.0109	.0028	.0198	.0148	.0050
9	.0080	.0109	.0029	.0225	.0129	.0096
10	.0059	.0098	.0039	.0235	.0135	.0100
Total	.0556	.0864	.0308	.2192	.1209	.0983
$\bar{x}$	.0057	.0086	.0031	.0219	.0121	.0098
1	.0093	.0093	-	.0222	.0222	-
2	.0080	.0092	.0012	.0238	.0162	.0076
3	.0079	.0104	.0025	.0214	.0171	.0043
4	.0063	.0103	.0040	.0194	.0089	.0105
*5	.0076	.0075	-.0001	.0256	.0256	-
6	.0070	.0093	.0023	.0217	.0130	.0087
7	.0087	.0107	.0020	.0243	.0168	.0075
*8	.0109	.0108	-.0001	.0244	.0244	-
*9	.0109	.0099	-.0010	.0205	.0205	-
*10	.0098	.0094	-.0004	.0238	.0238	-
Total	.0864	.0968	.0104	.2271	.1885	.0386
$\bar{x}$	.0086	.0097	.0010	.0227	.0189	.0039

* Moulted to 4th instar

	Before	After	Gain or loss	Before	After	Loss
*1	.0093	.0092	-.0001	.0212	.0212	-
*2	.0092	.0091	-.0001	.0238	.0238	-
*3	.0104	.0094	-.0010	.0264	.0264	-
*4	.0103	.0098	-.0005	.0255	.0255	-
*6	.0093	.0091	-.0002	.0250	.0250	-
*7	.0107	.0101	-.0006	.0194	.0194	-
Total	.0592	.0567	-.0025	.1413	.1413	-
$\bar{x}$	.0099	.0095	-.0004	.0236	.0236	-

* Moulted to 4th instar

Replications	P. maculiventris Weight before feeding	Weight after feeding	Gain or loss in weight	G. mellonella Weight before predation	Weight after predation	Loss in weight
		Diet level 4 - 4th instar nymphs.				
1	.0092	.0209	.0117	.0236	.0038	.0198
2	.0091	.0105	.0014	.0264	.0197	.0067
3	.0094	.0152	.0058	.0239	.0086	.0153
4	.0098	.0154	.0056	.0238	.0078	.0160
5	.0075	.0159	.0084	.0220	.0053	.0167
6	.0091	.0143	.0052	.0221	.0077	.0144
7	.0101	.0115	.0014	.0219	.0030	.0189
8	.0108	.0178	.0070	.0247	.0063	.0184
9	.0099	.0166	.0067	.0235	.0060	.0175
10	.0094	.0208	.0114	.0223	.0035	.0188
Total	.0943	.1589	.0646	.2342	.0717	.1625
$\bar{x}$	.0094	.0159	.0065	.0234	.0072	.0163
1	.0209	.0259	.0050	.0194	.0066	.0128
2	.0105	.0203	.0098	.0264	.0161	.0103
3	.0152	.0214	.0062	.0197	.0023	.0174
4	.0154	.0256	.0102	.0231	.0063	.0168
5	.0159	.0229	.0070	.0243	.0081	.0162
6	.0143	.0256	.0113	.0199	.0039	.0160
7	.0115	.0294	.0179	.0221	.0043	.0178
8	.0178	.0268	.0090	.0194	.0029	.0165
9	.0166	.0249	.0083	.0225	.0037	.0188
10	.0208	.0280	.0072	.0223	.0035	.0188
Total	.1589	.2508	.0919	.2191	.0577	.1614
$\bar{x}$	.0159	.0251	.0092	.0219	.0058	.0161
*1	.0259	.0253	-.0006	.0217	.0217	-
2	.0203	.0212	.0009	.0194	.0132	.0062
3	.0214	.0278	.0064	.0194	.0043	.0151
4	.0256	.0255	-.0001	.0222	.0222	-
5	.0229	.0231	.0002	.0231	.0211	.0020
6	.0256	.0240	-.0016	.0205	.0205	-
*7	.0294	.0283	-.0011	.0197	.0197	-
*8	.0268	.0247	-.0021	.0219	.0219	-
9	.0249	.0235	-.0014	.0223	.0223	-
*10	.0280	.0250	-.0030	.0215	.0215	-
Total	.2508	.2484	-.0024	.2117	.1884	.0233
$\bar{x}$	.0251	.0248	-.0002	.0212	.0188	.0023

* Moulted to 5th instar

	Before	After	Gain or loss	Before	After	Loss
*2	.0212	.0210	-.0002	.0215	.0215	-
*3	.0278	.0259	-.0019	.0237	.0237	-
*4	.0255	.0253	-.0002	.0217	.0217	-
5	.0231	.0228	-.0003	.0194	.0194	-
6	.0240	.0229	-.0011	.0199	.0199	-
9	.0235	.0225	-.0010	.0197	.0197	-
Total	.1451	.1404	-.0047	.1259	.1259	-
$\bar{\bar{x}}$	.0242	.0234	-.0008	.0210	.0210	-
*5	.0228	.0221	-.0007	.0194	.0194	-
*6	.0229	.0220	-.0009	.0205	.0205	-
*9	.0225	.0221	-.0004	.0199	.0199	-
Total	.0682	.0662	-.0020	.0598	.0598	-
$\bar{\bar{x}}$	.0227	.0221	-.0007	.0199	.0199	-

* Moulted to 5th instar

Replications	P. maculiventris Weight before feeding	Weight after feeding	Gain or loss in weight	G. mellonella Weight before predation	Weight after predation	Loss in weight
	Diet level 4 - 5th instar nymphs.					
1	.0253	.0400	.0147	.0213	.0053	.0160
2	.0210	.0314	.0104	.0205	.0044	.0161
3	.0259	.0364	.0105	.0229	.0059	.0170
4	.0253	.0319	.0066	.0210	.0016	.0194
5	.0221	.0412	.0191	.0248	.0088	.0160
6	.0220	.0399	.0179	.0245	.0090	.0155
7	.0283	.0367	.0084	.0194	.0043	.0151
8	.0247	.0296	.0049	.0194	.0115	.0079
9	.0221	.0409	.0188	.0250	.0040	.0210
10	.0250	.0298	.0048	.0203	.0116	.0087
Total	.2417	.3578	.1161	.2191	.0664	.1527
$\bar{x}$	.0242	.0358	.0116	.0219	.0066	.0153
1	.0400	.0430	.0030	.0198	.0055	.0143
2	.0314	.0373	.0059	.0255	.0071	.0184
3	.0364	.0376	.0012	.0205	.0140	.0065
4	.0319	.0419	.0100	.0248	.0018	.0230
5	.0412	.0507	.0095	.0255	.0010	.0245
6	.0399	.0528	.0129	.0259	.0025	.0234
7	.0367	.0400	.0033	.0239	.0100	.0139
8	.0296	.0326	.0030	.0194	.0028	.0166
9	.0409	.0580	.0171	.0255	.0013	.0242
10	.0298	.0430	.0132	.0264	.0075	.0189
Total	.3578	.4369	.0791	.2372	.0535	.1837
$\bar{x}$	.0358	.0437	.0079	.0237	.0054	.0184
1	.0430	.0582	.0152	.0254	.0021	.0233
2	.0373	.0465	.0092	.0257	.0025	.0232
3	.0376	.0536	.0160	.0254	.0033	.0221
4	.0419	.0581	.0162	.0244	.0013	.0231
5	.0507	.0588	.0081	.0213	.0079	.0134
6	.0528	.0602	.0074	.0210	.0030	.0180
7	.0400	.0522	.0122	.0209	.0024	.0185
8	.0326	.0401	.0075	.0257	.0020	.0237
9	.0580	.0689	.0109	.0217	.0018	.0199
10	.0430	.0574	.0144	.0250	.0029	.0221
Total	.4369	.5540	.1171	.2365	.0292	.2073
$\bar{x}$	.0437	.0554	.0117	.0237	.0029	.0207

	Before	After	Gain or loss	Before	After	Loss
1	.0582	.0653	.0071	.0197	.0030	.0167
2	.0465	.0575	.0110	.0259	.0055	.0204
3	.0536	.0607	.0071	.0210	.0034	.0176
4	.0581	.0704	.0123	.0263	.0025	.0238
5	.0588	.0560	-.0028	.0262	.0262	-
6	.0602	.0580	-.0022	.0263	.0263	-
7	.0522	.0663	.0141	.0264	.0030	.0234
8	.0401	.0573	.0172	.0264	.0023	.0241
9	.0689	.0665	-.0024	.0264	.0264	-
10	.0574	.0679	.0105	.0220	.0023	.0197
Total	.5540	.6259	.0719	.2466	.1009	.1457
$\bar{x}$	.0554	.0626	.0072	.0247	.0101	.0146
1	.0653	.0611	-.0042	.0244	.0244	-
2	.0575	.0536	-.0039	.0245	.0245	-
3	.0607	.0581	-.0026	.0263	.0263	-
4	.0704	.0661	-.0043	.0244	.0244	-
5	.0560	.0554	-.0006	.0209	.0209	-
6	.0580	.0564	-.0016	.0235	.0235	-
7	.0663	.0700	.0037	.0220	.0080	.0140
8	.0573	.0657	.0084	.0215	.0022	.0193
**9	.0665	.0612	-.0053	.0229	.0229	-
10	.0679	.0663	-.0016	.0260	.0260	-
Total	.6259	.6139	-.0120	.2364	.2031	.0333
$\bar{x}$	.0626	.0614	-.0012	.0236	.0203	.0033
*1	.0611	.0578	-.0033	.0225	.0225	-
2	.0536	.0519	-.0017	.0215	.0215	-
*3	.0581	.0538	-.0043	.0246	.0246	-
**4	.0661	.0611	-.0050	.0227	.0227	-
*5	.0554	.0509	-.0045	.0234	.0234	-
*6	.0564	.0517	-.0047	.0250	.0250	-
7	.0700	.0662	-.0038	.0260	.0260	-
8	.0657	.0638	-.0019	.0263	.0263	-
**10	.0663	.0605	-.0058	.0241	.0241	-
Total	.5527	.5177	-.0350	.2161	.2161	-
$\bar{x}$	.0553	.0518	-.0035	.0216	.0216	-
*2	.0519	.0467	-.0052	.0215	.0215	-
**7	.0662	.0612	-.0050	.0250	.0250	-
**8	.0638	.0596	-.0042	.0244	.0244	-
Total	.1819	.1675	-.0144	.0709	.0709	-
$\bar{x}$	.0606	.0558	-.0048	.0236	.0236	-

* Emerged as adult male

** Emerged as adult female

TABLE IV

Daily live gram weights per replicate (10), and means of replicates, for unfed first, second and third nymphal instars of the predator *P. maculiventris* at a constant temperature of 80°F and relative humidity of 70 per cent, during the period May 15 to May 26, 1964.

Replications	Initial weight	Weight at end of 24 hours	Gain or loss in weight
	First instar nymphs.		
1	.000376	.000424	.000048
2	.000323	.000425	.000102
3	.000365	.000540	.000175
4	.000348	.000475	.000127
5	.000358	.000460	.000102
6	.000343	.000515	.000172
7	.000347	.000420	.000073
8	.000370	.000464	.000094
9	.000375	.000548	.000173
10	.000342	.000510	.000168
Total	.003547	.004781	.001234
$\bar{x}$	.000355	.000478	.000123
1	.000424	.000560	.000136
2	.000425	.000525	.000100
3	.000540	.000600	.000060
4	.000475	.000610	.000135
5	.000460	.000602	.000142
6	.000515	.000606	.000091
7	.000420	.000520	.000100
8	.000464	.000545	.000081
9	.000548	.000635	.000087
10	.000510	.000600	.000090
Total	.004781	.005803	.001022
$\bar{x}$	.000478	.000580	.000102

	Initial weight	Weight at end of 24 hours	Gain or loss in weight
*1	.000560	.000550	-.000010
2	.000525	.000620	.000095
*3	.000600	.000557	-.000043
*4	.000610	.000595	-.000015
*5	.000602	.000587	-.000015
*6	.000606	.000590	-.000016
7	.000520	.000599	.000079
8	.000545	.000588	.000043
*9	.000635	.000605	-.000030
*10	.000600	.000580	-.000020
Total	.005803	.005871	.000068
$\bar{\bar{x}}$	.000580	.000587	.000007
*2	.000620	.000587	-.000033
*7	.000599	.000576	-.000023
*8	.000588	.000551	-.000037
Total	.001807	.001714	-.000093
$\bar{\bar{x}}$	.000602	.000571	-.000031

* Moulted to 2nd instar

Replications	Initial weight	Weight at end of 24 hours	Gain or loss in weight
		Second instar nymphs.	
1	.000550	.000670	.000120
2	.000587	.000690	.000103
3	.000557	.000665	.000108
4	.000595	.000660	.000065
5	.000587	.000695	.000108
6	.000590	.000710	.000120
7	.000576	.000700	.000124
8	.000551	.000655	.000104
9	.000605	.000720	.000115
10	.000580	.000695	.000115
Total	.005778	.006860	.001082
$\bar{x}$	.000578	.000686	.000108
1	.000670	.000600	-.000070
2	.000690	.001000	.000310
3	.000665	.001090	.000425
4	.000660	.001190	.000530
5	.000695	.000850	.000155
6	.000710	.001125	.000415
7	.000700	.001100	.000400
8	.000655	.001085	.000430
9	.000720	.001112	.000392
10	.000695	.001150	.000455
Total	.006860	.010302	.003442
$\bar{x}$	.000686	.001030	.000344
1	.000600	.000760	.000160
2	.001000	.000650	-.000350
3	.001090	.001210	.000120
4	.001190	.001090	-.000100
+5	.000850	.000790	-.000060
6	.001125	.000770	-.000355
7	.001100	.001235	.000135
8	.001085	.001007	-.000078
9	.001112	.001018	-.000094
10	.001150	.001189	.000039
Total	.010302	.009719	-.000583
$\bar{x}$	.001030	.000972	-.000066

+ Died

	Initial weight	Weight at end of 24 hours	Gain or loss in weight
1	.000760	.000715	-.000045
2	.000650	.001170	.000520
3	.001210	.001315	.000105
4	.001090	.001405	.000315
+6	.000770	.000690	-.000080
7	.001235	.000897	-.000338
8	.001007	.001247	.000240
9	.001018	.000875	-.000143
10	.001189	.001035	-.000154
Total	.008929	.009349	.000420
$\bar{\bar{x}}$	.000992	.001039	.000047
1	.000715	.000610	-.000105
2	.001170	.001050	-.000120
3	.001315	.001425	.000110
4	.001405	.001420	.000015
+7	.000690	.000523	-.000167
8	.001247	.001345	.000098
+9	.000875	.000594	-.000281
10	.001035	.001268	.000233
Total	.008452	.008235	-.000217
$\bar{\bar{x}}$	.001057	.001029	-.000027
+1	.000610	.000540	-.000070
+2	.001050	.000915	-.000135
3	.001425	.001264	-.000161
*4	.001420	.001228	-.000192
*8	.001345	.001019	-.000326
*10	.001268	.000993	-.000275
Total	.007118	.005959	-.001159
$\bar{\bar{x}}$	.001186	.000993	-.000193
x3	.001264	.000815	-.000449

+ Died

* Moulted to third instar

x Died, while shedding exuviae.

Repli- cations	Initial weight	Weight at end of 24 hours	Gain or loss in weight
		Third instar nymphs.	
+4	.001228	.000925	-.000303
+8	.001019	.000750	-.000269
+10	.000993	.000698	-.000295
Total	.003240	.002373	-.000867
$\bar{\bar{x}}$	.001080	.000791	-.000289

+ Died

APPENDIX

PART 2

MEAN DRY WEIGHTS FOR PREDATOR AND PREY

TABLE V

Mean dry gram weights, per 5-day interval, for adults of the predator P. maculiventris and its prey, G. mellonella larvae, reared at a constant temperature of 80°F and a relative humidity of 70 per cent.

	P. maculiventris			*G. mellonella*		
Age in days	Weight before feeding	Weight after feeding	Gain or loss in weight	Weight before predation	Weight after predation	Loss in weight
			Diet level 1 - adult males.			
5	.0207	.0207	-	.0026	.0007	.0019
10	.0206	.0208	.0002	.0028	.0010	.0018
15	.0216	.0214	-.0002	.0030	.0011	.0019
20	.0204	.0206	.0002	.0027	.0005	.0022
25	.0209	.0209	-	.0031	.0006	.0025
30	.0199	.0201	.0002	.0024	.0003	.0021
35	.0218	.0218	-	.0029	.0006	.0023
40	.0213	.0211	-.0002	.0030	.0010	.0020
45	.0214	.0213	-.0001	.0029	.0010	.0019
50	.0212	.0211	-.0001	.0031	.0008	.0023
55	.0206	.0205	-.0001	.0030	.0008	.0022
60	.0208	.0206	-.0002	.0030	.0009	.0021
65	.0206	.0208	.0002	.0030	.0006	.0024
70	.0212	.0214	.0002	.0030	.0013	.0017
75	.0201	.0202	.0001	.0032	.0009	.0023
80	.0203	.0199	-.0004	.0024	.0005	.0019
85	.0199	.0200	.0001	.0025	.0008	.0017
90	.0198	.0197	-.0001	.0024	.0007	.0017
95	.0211	.0209	-.0002	.0023	.0002	.0021
100	.0208	.0209	.0001	.0024	.0006	.0018
105	.0207	.0208	.0001	.0023	.0009	.0014
110	.0207	.0202	-.0005	.0025	.0018	.0007
115	.0199	.0196	-.0003	.0023	.0003	.0020
120	.0194	.0195	.0001	.0024	.0011	.0013
125	.0185	.0186	.0001	.0025	.0003	.0022
130	.0175	.0175	-	.0024	.0002	.0022
135	.0192	.0188	-.0004	.0024	.0007	.0017
140	.0192	.0196	.0004	.0027	.0007	.0020
145	.0189	.0190	.0001	.0027	.0005	.0022
150	.0198	.0193	-.0005	.0030	.0015	.0015
152[1]	.0180	.0174	-.0006	.0029	.0029	-

[1] two-day interval only.

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 2 - adult males.			
5	.0239	.0246	.0007	.0047	.0012	.0035
10	.0243	.0242	-.0001	.0047	.0017	.0030
15	.0238	.0235	-.0003	.0051	.0027	.0024
20	.0227	.0227	-	.0048	.0020	.0028
25	.0230	.0230	-	.0049	.0008	.0041
30	.0230	.0236	.0006	.0046	.0010	.0036
35	.0247	.0243	-.0004	.0050	.0013	.0037
40	.0245	.0246	.0001	.0051	.0018	.0033
45	.0245	.0247	.0002	.0052	.0030	.0022
50	.0252	.0248	-.0004	.0053	.0031	.0022
55	.0243	.0243	-	.0053	.0035	.0018
60	.0255	.0254	-.0001	.0053	.0025	.0028
65	.0250	.0249	-.0001	.0052	.0026	.0026
70	.0251	.0253	.0002	.0050	.0031	.0019
75	.0244	.0245	.0001	.0050	.0030	.0020
80	.0251	.0254	.0003	.0045	.0020	.0025
85	.0261	.0255	-.0006	.0048	.0023	.0025
90	.0253	.0255	.0002	.0047	.0015	.0032
95	.0265	.0263	-.0002	.0046	.0018	.0028
100	.0265	.0263	-.0002	.0045	.0011	.0024
105	.0258	.0258	-	.0045	.0008	.0037
110	.0257	.0260	.0003	.0045	.0013	.0032
115	.0262	.0248	-.0014	.0046	.0012	.0034
120	.0252	.0254	.0002	.0047	.0013	.0034
125	.0243	.0250	.0007	.0047	.0017	.0030
130	.0242	.0245	.0003	.0048	.0011	.0037
135	.0241	.0231	-.0010	.0047	.0027	.0020
140	.0238	.0231	-.0007	.0052	.0052	-

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in Weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
Diet level 3 - adult males.						
5	.0278	.0293	.0015	.0098	.0038	.0060
10	.0291	.0289	-.0002	.0100	.0060	.0040
15	.0278	.0277	-.0001	.0100	.0064	.0036
20	.0289	.0290	.0001	.0102	.0065	.0037
25	.0288	.0286	-.0002	.0103	.0071	.0032
30	.0280	.0285	.0005	.0099	.0067	.0032
35	.0301	.0299	-.0002	.0102	.0068	.0034
40	.0299	.0299	-	.0106	.0084	.0022
45	.0293	.0289	-.0004	.0105	.0092	.0013
50	.0287	.0288	.0001	.0104	.0086	.0018
55	.0286	.0285	-.0001	.0104	.0075	.0029
60	.0273	.0272	-.0001	.0103	.0081	.0022
65	.0264	.0261	-.0019	.0103	.0088	.0015
70	.0262	.0262	-	.0101	.0085	.0016
75	.0242	.0229	-.0013	.0101	.0081	.0020
80	.0272	.0258	-.0014	.0097	.0085	.0012
85	.0288	.0289	.0001	.0098	.0060	.0038
90	.0283	.0287	.0004	.0097	.0063	.0034
95	.0287	.0280	-.0007	.0095	.0067	.0028
100	.0279	.0278	-.0001	.0095	.0073	.0022
102 [1]	.0258	.0261	.0003	.0095	.0086	.0009

[1] two-day interval only.

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
	Diet level 4 - adult males.					
5	.0297	.0303	.0006	.0122	.0061	.0061
10	.0299	.0301	.0002	.0122	.0088	.0034
15	.0288	.0289	.0001	.0120	.0093	.0027
20	.0303	.0300	-.0003	.0123	.0091	.0032
25	.0305	.0310	.0005	.0123	.0079	.0044
30	.0303	.0300	-.0003	.0118	.0091	.0027
35	.0309	.0316	.0007	.0119	.0089	.0030
40	.0326	.0324	-.0002	.0125	.0107	.0018
45	.0319	.0319	-	.0124	.0104	.0020
50	.0315	.0314	-.0001	.0124	.0111	.0013
55	.0315	.0316	.0001	.0122	.0105	.0017
60	.0305	.0305	-	.0123	.0104	.0019
65	.0305	.0304	-.0001	.0117	.0104	.0013
70	.0307	.0308	.0001	.0119	.0099	.0020
75	.0303	.0303	-	.0119	.0105	.0014
80	.0315	.0308	-.0007	.0119	.0103	.0016
85	.0320	.0326	.0006	.0118	.0069	.0049
90	.0313	.0315	.0002	.0118	.0089	.0029
95	.0327	.0317	-.0010	.0115	.0081	.0034
100	.0319	.0328	.0009	.0116	.0079	.0037
105	.0319	.0314	-.0005	.0120	.0095	.0025
110	.0328	.0326	-.0002	.0116	.0088	.0028
115	.0307	.0317	.0010	.0116	.0073	.0043
120	.0333	.0319	-.0014	.0118	.0084	.0034
125	.0327	.0343	.0016	.0117	.0102	.0015
127 [1]	.0356	.0321	-.0035	.0117	.0117	-

[1] two-day interval only.

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 1 - adult females.			
5	.0317	.0314	-.0003	.0026	.0008	.0018
10	.0326	.0331	.0005	.0028	.0004	.0024
15	.0355	.0357	.0002	.0030	.0005	.0025
20	.0371	.0376	.0005	.0030	.0013	.0017
25	.0386	.0389	.0003	.0029	.0009	.0020
30	.0395	.0394	-.0001	.0029	.0005	.0024
35	.0397	.0395	-.0002	.0027	.0007	.0020
40	.0370	.0363	-.0007	.0025	.0003	.0022
45	.0340	.0334	-.0006	.0025	.0004	.0021
50	.0336	.0336	-	.0024	.0002	.0022
55	.0315	.0308	-.0007	.0024	.0002	.0022
60	.0304	.0308	.0004	.0026	.0002	.0024
65	.0316	.0323	.0007	.0026	.0001	.0025
70	.0334	.0327	-.0007	.0025	.0002	.0023
75	.0339	.0344	.0005	.0026	.0004	.0022
80	.0354	.0357	.0003	.0024	.0005	.0019
85	.0371	.0365	-.0006	.0025	.0003	.0022
90	.0353	.0353	-	.0025	.0002	.0023
95	.0362	.0366	.0004	.0026	.0002	.0024
100	.0431	.0428	-.0003	.0026	.0001	.0025
105	.0425	.0417	-.0008	.0026	.0008	.0018

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 2 - adult females.			
5	.0301	.0301	-	.0051	.0031	.0038
10	.0323	.0330	.0007	.0050	.0016	.0034
15	.0350	.0351	.0001	.0052	.0027	.0025
20	.0354	.0359	.0005	.0053	.0019	.0034
25	.0370	.0366	-.0004	.0053	.0021	.0032
30	.0350	.0347	-.0003	.0051	.0012	.0039
35	.0380	.0390	.0010	.0051	.0018	.0033
40	.0405	.0408	.0003	.0048	.0016	.0032
45	.0404	.0401	-.0003	.0047	.0021	.0026
50	.0387	.0383	-.0014	.0047	.0019	.0028
55	.0367	.0359	-.0008	.0046	.0021	.0025
60	.0313	.0311	-.0002	.0046	.0007	.0039
65	.0290	.0279	-.0011	.0047	.0007	.0040
70	.0268	.0276	.0008	.0050	.0014	.0036
75	.0305	.0320	.0015	.0050	.0003	.0047
80	.0323	.0316	-.0007	.0048	.0008	.0040
85	.0364	.0360	-.0004	.0047	.0007	.0040
90	.0339	.0352	.0013	.0046	.0003	.0043
95	.0365	.0367	.0002	.0049	.0005	.0044
100	.0347	.0329	-.0018	.0047	.0004	.0043

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 3 - adult females.			
5	.0372	.0381	.0009	.0101	.0040	.0061
10	.0400	.0416	.0016	.0098	.0038	.0060
15	.0437	.0435	-.0002	.0100	.0061	.0039
20	.0430	.0435	.0005	.0107	.0044	.0063
25	.0452	.0451	-.0001	.0102	.0051	.0051
30	.0427	.0420	-.0007	.0101	.0060	.0041
35	.0449	.0461	.0012	.0104	.0057	.0047
40	.0475	.0478	.0003	.0101	.0061	.0040
45	.0480	.0477	-.0003	.0097	.0067	.0030
50	.0465	.0468	.0003	.0098	.0055	.0043
55	.0472	.0468	-.0004	.0097	.0064	.0033
60	.0451	.0451	-	.0096	.0049	.0047
65	.0417	.0416	-.0001	.0098	.0046	.0052
70	.0443	.0452	.0009	.0101	.0050	.0051
75	.0402	.0384	-.0018	.0100	.0070	.0030
80	.0373	.0368	-.0005	.0096	.0056	.0040
85	.0391	.0415	.0024	.0097	.0027	.0070
87[1]	.0383	.0300	-.0083	.0096	.0096	-

[1] two-day interval only.

Age in days	*P. maculiventris* Weight before feeding	Weight after feeding	Gain or loss in weight	*G. mellonella* Weight before predation	Weight after predation	Loss in weight
			Diet level 4 - adult females.			
5	.0405	.0434	.0029	.0121	.0048	.0073
10	.0468	.0481	.0013	.0121	.0065	.0056
15	.0506	.0504	-.0002	.0122	.0070	.0052
20	.0508	.0513	.0005	.0125	.0071	.0054
25	.0521	.0527	.0006	.0124	.0072	.0052
30	.0513	.0501	-.0012	.0122	.0087	.0035
35	.0528	.0538	.0010	.0121	.0076	.0045
40	.0548	.0554	.0006	.0119	.0084	.0035
45	.0562	.0554	-.0008	.0120	.0101	.0019
50	.0534	.0531	-.0003	.0116	.0081	.0035
55	.0549	.0562	.0013	.0115	.0079	.0036
58[1]	.0558	.0543	-.0015	.0115	.0115	-

1 three-day interval only.

TABLE VI

Mean dry gram weights, per 5-day interval, for unfed adults of the predator P. *maculiventris* reared at a constant temperature of 80°F and a relative humidity of 70 per cent during the period May to August 1964.

Adult males				Adult females			
Age in days	Initial weight	Weight at end of 24 hours	Gain or loss in weight	Age in days	Initial weight	Weight at end of 24 hours	Gain or loss in weight
5	.0211	.0199	-.0012	5	.0291	.0277	-.0014
10	.0182	.0180	-.0002	10	.0249	.0244	-.0005
15	.0169	.0167	-.0002	15	.0234	.0234	-
20	.0161	.0160	-.0001	20	.0229	.0229	-
25	.0161	.0161	-	25	.0228	.0227	-.0001
30	.0153	.0152	-.0001	30	.0217	.0216	-.0001
35	.0150	.0150	-	35	.0216	.0213	-.0003
40	.0150	.0150	-	40	.0209	.0208	-.0001
45	.0145	.0145	-	45	.0202	.0201	-.0001
50	.0144	.0144	-	50	.0198	.0196	-.0002
55	.0139	.0140	.0001	55	.0193	.0194	.0001
60	.0137	.0135	-	60	.0191	.0191	-
62[1]	.0137	.0131	-.0006	65	.0184	.0184	-
				70	.0184	.0182	-.0002
				75	.0172	.0161	-.0011

[1] two-day interval only.

TABLE VII

Mean[1] dry gram weight per "feeding" nymph (instars two to five) of P. maculiventris reared at a constant temperature of 80°F and a relative humidity of 70 per cent, during the period May to June 1964, and total dry gram weight of G. mellonella larvae supplied per stadium at each of four diet levels.

Diet level	Instar	P. maculiventris Weight before feeding	P. maculiventris Weight after feeding	P. maculiventris Gain in weight	G. mellonella Weight before predation	G. mellonella Weight after predation	G. mellonella Loss in weight
1	II	.00015	.00073	.00058	.0033	.0022	.0011
	III	.00066	.00210	.00144	.0044	.0022	.0022
	IV	.00190	.00435	.00245	.0049	.0015	.0034
	V	.00398	.00807	.00409	.0133	.0028	.0105
2	II	.00015	.00065	.00050	.0046	.0030	.0016
	III	.00059	.00242	.00183	.0060	.0034	.0026
	IV	.00212	.00515	.00303	.0079	.0036	.0043
	V	.00486	.00970	.00484	.0142	.0058	.0084
3	II	.00015	.00058	.00043	.0076	.0062	.0014
	III	.00052	.00216	.00164	.0115	.0082	.0033
	IV	.00198	.00553	.00355	.0136	.0077	.0059
	V	.00515	.01190	.00675	.0200	.0073	.0127
4	II	.00015	.00065	.00050	.0191	.0161	.0030
	III	.00062	.00232	.00170	.0201	.0149	.0052
	IV	.00210	.00564	.00354	.0241	.0163	.0078
	V	.00532	.01344	.00812	.0370	.0208	.0162

1 Mean of 10 P. maculiventris nymphs per instar per diet level.

APPENDIX

PART 3

MEAN CALORIFIC VALUES FOR PREDATOR AND PREY

TABLE VIII

Mean calorific values, per 5-day interval, for adults of the predator P. maculiventris and its prey, G. mellonella larvae, reared at a constant temperature of 80°F and a relative humidity of 70 per cent.

	P. maculiventris			G. mellonella		
Age in days	Calories before feeding	Calories after feeding	Gain or loss in calories	Calories before predation	Calories after predation	Loss in calories
			Diet level 1 - adult males.			
5	130.5	130.5	-	16.1	4.3	11.8
10	129.8	131.1	1.3	17.4	6.2	11.2
15	136.1	134.9	-1.2	18.6	6.8	11.8
20	128.6	129.8	1.2	16.8	3.1	13.7
25	131.7	131.7	-	19.2	3.7	15.5
30	125.4	126.7	1.3	14.9	1.9	13.0
35	137.4	137.4	-	18.0	3.7	14.3
40	134.3	133.0	-1.3	18.6	6.2	12.4
45	134.9	134.3	-0.6	18.0	6.2	11.8
50	133.6	133.0	-0.6	19.2	4.9	14.3
55	129.8	129.2	-0.6	18.6	4.9	13.7
60	131.1	129.8	-1.3	18.6	5.6	13.0
65	129.8	131.1	1.3	18.6	3.7	14.9
70	133.6	134.9	1.3	18.6	8.0	10.6
75	126.7	127.3	0.8	19.9	5.6	14.3
80	128.0	125.4	-2.6	14.9	3.1	11.8
85	125.4	126.1	0.7	15.5	4.9	10.6
90	124.8	124.2	-0.6	14.9	4.3	10.6
95	133.0	131.7	-1.3	14.3	1.3	13.0
100	131.1	131.7	0.6	14.9	3.7	11.2
105	130.5	131.1	0.6	14.3	5.7	8.6
110	130.5	127.3	-3.2	15.5	11.2	4.3
115	125.4	123.5	-1.9	14.3	1.9	12.4
120	122.3	122.9	0.6	14.9	6.8	8.1
125	116.6	117.2	0.6	15.5	1.8	13.7
130	110.3	110.3	-	14.9	1.2	13.7
135	121.0	118.5	-2.5	14.9	4.3	10.6
140	121.0	123.5	2.5	16.8	4.4	12.4
145	119.1	119.8	0.7	16.8	3.1	13.7
150	124.8	121.6	-3.2	18.6	9.3	9.3
152[1]	113.5	109.7	-3.8	18.0	18.0	-

[1] two-day interval only.

Age in days	*P. maculiventris* Calories before feeding	Calories after feeding	Gain or loss in calories	*G. mellonella* Calories before predation	Calories after predation	Loss in calories
			Diet level 2 - adult males.			
5	162.1	166.9	4.8	30.1	7.7	22.4
10	164.9	164.2	-0.7	30.1	10.9	19.2
15	161.5	159.4	2.1	32.7	17.3	15.4
20	154.0	154.0	-	30.7	12.8	17.9
25	156.0	156.0	-	31.4	5.1	26.3
30	156.0	160.1	4.1	29.5	6.4	23.1
35	167.6	164.9	-2.7	32.0	8.3	23.7
40	166.2	166.9	0.7	32.7	11.6	21.1
45	166.2	167.6	1.4	33.3	19.2	14.1
50	171.0	168.2	-2.8	33.9	19.8	14.1
55	164.9	164.9	-	33.9	22.4	11.5
60	173.0	172.3	-0.7	33.9	16.0	17.9
65	169.6	168.9	-0.7	33.3	16.6	16.7
70	170.3	171.6	1.3	32.0	19.8	12.2
75	165.5	166.2	0.7	32.0	19.2	12.8
80	170.3	172.3	2.0	28.8	12.8	16.0
85	177.1	173.0	-4.1	30.7	14.7	16.0
90	171.6	173.0	1.4	30.1	9.6	20.5
95	179.8	.78.4	-1.4	29.5	11.6	17.9
100	179.8	178.4	-1.4	28.8	13.4	15.4
105	175.0	175.0	-	28.8	5.1	23.7
110	174.3	176.4	2.1	28.8	8.3	20.5
115	177.7	168.2	-9.5	29.5	7.7	21.8
120	171.0	172.3	1.3	30.1	8.3	21.8
125	164.9	169.6	4.7	30.1	10.9	19.2
130	164.2	166.2	2.0	30.7	7.0	23.7
135	163.5	156.7	-6.8	30.1	17.3	12.8
140	161.5	156.7	-4.8	33.3	33.3	-

	P. maculiventris			*G. mellonella*		
Age in days	Calories before feeding	Calories after feeding	Gain or loss in calories	Calories before predation	Calories after predation	Loss in calories
			Diet level 3 - adult males.			
5	200.2	211.0	10.8	68.4	26.5	41.9
10	209.6	208.2	-1.4	69.8	41.9	27.9
15	200.2	199.5	-0.7	69.8	44.7	25.1
20	208.2	208.8	0.7	71.2	45.4	25.8
25	207.4	206.0	-1.4	71.9	49.6	22.3
30	201.7	205.3	3.6	69.1	46.8	22.3
35	216.8	215.4	-1.4	71.2	47.5	23.7
40	215.4	215.4	-	74.0	58.6	15.4
45	211.0	208.2	-2.8	73.3	64.2	9.1
50	206.7	207.4	0.7	72.6	60.0	12.6
55	206.0	205.3	-0.7	72.6	52.4	20.2
60	196.6	195.9	-0.7	71.9	36.5	15.4
65	190.2	188.0	-2.2	71.9	61.4	10.5
70	188.7	188.7	-	70.5	59.3	11.2
75	174.3	164.9	-9.4	70.5	56.5	14.0
80	195.9	185.8	-10.1	67.7	59.3	8.4
85	207.4	208.2	0.8	68.4	41.9	26.5
90	203.8	206.7	2.9	67.7	44.0	23.7
95	206.7	201.7	-5.0	66.3	46.8	19.5
100	201.0	200.2	-0.8	66.3	50.9	15.4
102[1]	185.8	188.0	2.1	66.3	60.0	6.3

[1] two-day interval only.

Age in days	*P. maculiventris* Calories before feeding	Calories after feeding	Gain or loss in calories	*G. mellonella* Calories before predation	Calories after predation	Loss in calories
			Diet level 4 - adult males.			
5	231.1	235.8	4.7	86.6	43.3	43.3
10	232.7	234.2	1.5	86.6	62.5	24.1
15	224.1	224.9	0.8	85.2	66.0	19.2
20	235.8	233.5	-2.3	87.3	64.6	22.7
25	237.4	241.2	3.8	87.3	56.1	31.2
30	235.8	233.5	-2.3	83.8	64.6	19.2
35	240.5	245.9	5.4	84.5	63.2	21.3
40	253.7	252.1	-1.6	88.8	76.0	12.8
45	248.2	248.2	-	88.0	73.8	14.2
50	245.1	244.4	-0.7	88.0	78.8	9.2
55	245.1	245.9	0.8	86.6	74.5	12.1
60	237.4	237.5	-	87.3	73.8	13.5
65	237.4	236.6	-0.8	83.1	73.9	9.2
70	238.9	239.7	0.8	84.5	70.3	14.2
75	235.8	235.8	-	84.5	74.6	9.9
80	245.1	239.7	-5.4	84.5	73.1	11.4
85	249.0	253.7	4.7	83.8	49.0	34.8
90	243.6	245.1	1.5	83.8	63.2	20.6
95	254.5	246.7	-7.8	81.7	57.6	24.1
100	248.2	255.2	7.0	82.4	56.1	26.3
105	248.2	244.4	-3.8	85.2	67.4	17.8
110	255.2	253.7	-1.5	82.4	62.5	19.9
115	238.9	246.7	7.8	82.4	51.9	30.5
120	259.1	248.2	-10.9	83.8	59.7	24.1
125	254.5	266.9	12.4	83.1	72.5	10.6
127[1]	277.0	249.8	-27.2	83.1	83.1	-

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1 two-day interval only.

	P. maculiventris			*G. mellonella*		
Age in days	Calories before feeding	Calories after feeding	Gain or loss in calories	Calories before predation	Calories after predation	Loss in calories
			Diet level 1 - adult females.			
5	216.9	214.8	-2.1	16.1	4.9	11.2
10	223.0	226.4	3.4	17.4	2.5	14.9
15	242.9	244.2	1.3	18.6	3.1	15.5
20	253.8	257.2	3.4	18.6	8.0	10.6
25	264.1	266.1	2.0	18.0	5.6	12.4
30	270.2	269.5	-0.7	18.0	3.1	14.9
35	271.6	270.2	-1.4	16.8	4.4	12.4
40	253.1	248.3	-4.8	15.5	1.8	13.7
45	232.6	228.5	-4.1	15.5	2.5	13.0
50	229.9	229.9	-	14.9	1.2	13.7
55	215.5	210.7	-4.8	14.9	1.2	13.7
60	208.0	210.7	2.7	16.1	1.2	14.9
65	216.2	221.0	4.8	16.1	0.6	15.5
70	228.5	223.7	-4.8	15.5	1.2	14.3
75	231.9	235.3	3.4	16.1	2.4	13.7
80	242.2	244.2	2.0	14.9	3.1	11.8
85	253.8	249.7	-4.1	15.5	1.8	13.7
90	241.5	241.5	-	15.5	1.2	14.3
95	247.6	250.4	2.8	16.1	1.2	14.9
100	294.8	292.8	-2.0	16.1	0.6	15.5
105	290.7	285.3	-5.4	16.1	4.9	11.2

Age in days	*P. maculiventris* Calories before feeding	Calories after feeding	Gain or loss in calories	*G. mellonella* Calories before predation	Calories after predation	Loss in calories
Diet level 2 - adult females.						
5	205.3	205.3	-	32.7	8.4	24.3
10	220.4	225.1	4.7	32.0	10.2	21.8
15	238.8	239.5	0.7	33.3	17.3	16.0
20	241.5	244.9	3.4	33.9	12.1	21.8
25	252.4	249.7	-2.7	33.9	13.4	20.5
30	238.8	236.7	-2.1	32.7	7.7	25.0
35	259.2	266.1	6.9	32.7	11.6	21.1
40	276.3	278.3	2.0	30.7	10.2	20.5
45	275.6	273.6	-2.0	30.1	13.4	16.7
50	264.0	261.3	-2.7	30.1	12.2	17.9
55	250.4	244.9	-5.5	29.5	13.5	16.0
60	213.5	212.2	-1.3	29.5	4.5	25.0
65	197.8	190.3	-7.5	30.1	4.5	25.6
70	182.8	188.3	5.5	32.0	8.9	23.1
75	208.1	218.3	10.2	32.0	1.9	30.1
80	220.4	215.6	-4.8	30.7	5.1	25.6
85	248.3	245.6	-2.7	30.1	4.5	25.6
90	231.3	240.1	8.8	29.5	2.0	27.5
95	249.0	250.4	1.4	31.4	3.2	28.2
100	236.7	224.4	12.3	30.1	2.6	27.5

Age in days	*P. maculiventris* Calories before feeding	Calories after feeding	Gain or loss in calories	*G. mellonella* Calories before predation	Calories after predation	Loss in calories
			Diet level 3 - adult females.			
5	261.4	267.7	6.3	70.5	27.9	42.6
10	281.1	292.3	11.2	68.4	26.5	41.9
15	307.1	305.7	1.4	69.8	42.6	27.2
20	302.2	305.7	3.5	74.7	30.7	44.0
25	317.6	316.9	-0.7	71.2	35.6	35.6
30	300.1	295.1	-5.0	70.5	41.9	28.6
35	315.5	323.9	8.4	72.6	39.8	32.8
40	333.8	335.9	2.1	70.5	42.6	27.9
45	337.3	335.2	-2.1	67.7	46.8	20.9
50	326.8	328.9	2.1	68.4	38.4	30.0
55	331.7	328.9	-2.8	67.7	44.7	23.0
60	316.9	316.9	-	67.0	34.2	32.8
65	293.0	292.3	-0.7	68.4	32.1	36.3
70	311.3	317.6	6.3	70.5	34.9	35.6
75	282.5	269.8	-12.7	69.8	48.9	20.9
80	262.1	258.6	-3.5	67.0	39.1	27.9
85	274.8	291.6	16.8	67.7	18.8	48.9
87[1]	269.1	210.8	-58.3	67.0	67.0	-

[1] two-day interval only.

Age in days	*P. maculiventris* Calories before feeding	Calories after feeding	Gain or loss in calories	*G. mellonella* Calories before predation	Calories after predation	Loss in calories
Diet level 4 - adult females.						
5	315.4	338.0	22.6	85.9	34.1	51.8
10	364.5	374.7	10.2	85.9	46.1	39.8
15	394.1	392.6	-1.5	86.6	49.7	36.9
20	395.7	399.6	3.9	88.8	50.5	38.3
25	405.8	410.5	4.7	88.0	51.1	36.9
30	399.6	390.2	-9.4	86.6	61.7	24.9
35	411.3	419.0	7.7	85.9	53.9	32.0
40	426.8	431.5	4.7	84.5	59.6	24.9
45	437.7	431.5	-6.2	85.2	71.7	13.5
50	415.9	413.6	-2.3	82.4	57.5	24.9
55	427.6	437.7	10.1	81.7	25.6	56.1
58[1]	434.6	422.9	-11.7	81.7	81.7	-

[1] three-day interval only.

TABLE IX

Mean calorific values, per 5-day interval, for unfed adults of the predator P. maculiventris reared at a constant temperature of 80°F and a relative humidity of 70 per cent during the period May to August 1964.

Adult males				Adult females			
Age in days	Initial calories	Calories at end of 24 hours	Gain or loss in calories	Age in days	Initial calories	Calories at end of 24 hours	Gain or loss in calories
5	179.2	169.1	-10.1	5	243.6	231.9	-11.7
10	148.5	146.9	-1.6	10	205.6	201.5	-4.1
15	133.8	132.2	-1.6	15	181.1	181.1	-
20	122.5	121.7	-0.8	20	169.5	169.5	-
25	118.1	118.1	-	25	164.3	163.6	-0.7
30	108.7	108.0	-0.7	30	153.5	152.8	-4.3
35	103.1	103.1	-	35	149.1	147.0	-2.1
40	100.3	100.3	-	40	140.9	140.2	-0.7
45	94.2	94.2	-	45	132.7	132.1	-0.6
50	90.9	90.9	-	50	127.0	125.7	-1.3
55	85.1	85.3	0.2	55	120.5	121.1	0.6
60	81.3	80.1	-1.2	60	116.0	116.0	-
62[1]	79.3	75.8	-3.5	65	109.0	108.4	-0.6
				70	105.9	104.8	-1.1
				75	95.5	89.4	-3.3

[1] two-day interval only.

TABLE X

Mean[1] calorific values per "feeding" nymph (instars two to five) of P. maculiventris reared individually on G. mellonella larvae at four diet levels, with gain in calories per nymphal instar per diet level and total energy consumed.

Diet level	Instar	Calories before feeding	Calories after feeding	Gain in calories	Total energy consumed
1	II	1.0	5.3	4.3	6.5
	III	4.5	13.9	9.4	13.1
	IV	12.0	22.3	10.3	20.2
	V	18.9	33.3	14.4	62.3
2	II	1.0	4.7	3.7	9.9
	III	4.0	16.0	12.0	16.1
	IV	13.4	31.2	17.8	26.6
	V	27.9	47.6	19.7	51.9
3	II	1.0	4.2	3.2	8.7
	III	3.5	14.2	10.7	20.5
	IV	12.6	34.9	22.3	36.6
	V	30.7	73.6	42.9	78.8
4	II	1.0	4.7	3.7	19.2
	III	4.2	15.3	11.1	33.3
	IV	13.3	37.1	23.8	50.0
	V	33.8	88.5	54.7	103.8

[1] Mean of 10 nymphs per instar per diet level.