RECORDS OF SOME INSECTS PREDACIOUS ON EPILACHNA CORRUPTA MULS. IN MEXICO.

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During the summer of 1930 a great many insects were found associated with *Epilachna corrupta* Muls. on bean foliage, with *E. obscuriella* Muls. on beans and squash, and with *E. defecta* Muls. and *E. mexicana* Guer. on wild solanaceous plants, in the Republic of Mexico. In many instances these insects were observed feeding on the immature stages of Epilachninae in the field. Other insects captured on, or near, beans and suspected of preying on *E. corrupta* were brought to the laboratory of Tropical and Subtropical Insects and La Defensa Agricola in cooperation with Truck Crop Insect Investigations in Mexico City, and placed in cages with immature stages of *corrupta*, where their habits were observed. Twenty-one species of insects were found to feed on *E. corrupta* under these conditions.* No attempt has been made to find additional hosts of these predators in the field, laboratory, or literature. It seems probable, however, that many of them attack insects other than Epilachninae.

Many of the species were taken at Cuernavaca, Morelos, although collections at Cordoba, Guadalajara, Oxaca, and Puebla added greatly to the total number of species obtained.

METHOD OF COLLECTING INSECTS.

Late in the summer, when these predators appeared in numbers, notes were taken of the quantity of food consumed daily by individuals of each species. Field-collected material was confined in small Petri dishes or glass mason jars with screened tops. Known numbers and stages of *E. corrupta* were confined in these containers in the laboratory. Wet pieces of blotting paper furnished the necessary moisture. Fresh bean foliage was supplied daily for the *E. corrupta* larvae. The temperature in the laboratory varied but slightly from

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17° C. Late in September the predators were taken to Columbus, Ohio, where they were fed and observed until the last of October.

Considerable data were obtained on the quantities of food consumed for a large number of hemipterous predators. An individual of *E. corrupta* was considered eaten when it had been sucked dry and only the sclerotized exoskeleton was left. In the case of the carabid species the food was entirely consumed. Although *E. corrupta* in the egg stage would undoubtedly have been acceptable to many of the predators, this was not

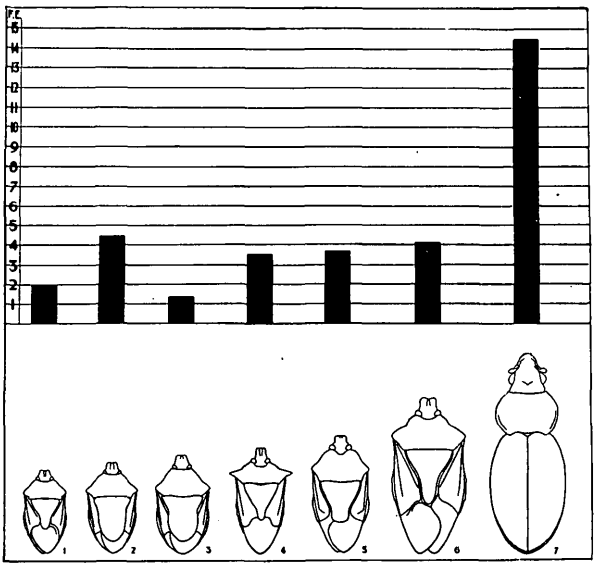

FIGURE 1. Daily consumption of *E. corrupta* by predators, in food equivalents (F. E.): 1, *Perillus confluens;* 2, *Stiretrus anchorago;* 3, *Stiretrus caeruleus;* 4, *Podisus sagitta;* 5, *Oplomus dichrous;* 6, *Podisus lineolatus;* 7, *Calosoma laeve.*

determined. The usual practice was to expose larvae or pupae to the predators, although in a few cases adults were introduced into the containers.

Podisus sagitta (Fab.), *Oplomus dichrous* H. S., and *Podisus lineolatus* (H. S.) were cannibalistic in the late immature stages. Nymphs rendered inactive and delicate during the molting process were apparently preferred as food to stages of *E. corrupta* in many instances.

Several species of pentatomids were reared for more than one generation in the laboratory. Species appearing late in the

season, or in small numbers throughout the season, were not always reared through a complete generation.

E. corrupta was the only host used in the laboratory. It was not always possible to supply a large number of individuals of this host of the same size and stage. For this reason it would be impossible to collate the value of the several species of predators without reducing the quantity of food consumed to some standard measure. In order to condense these data and express the different food requirements of the several species in comparable values, a number of individuals of *E. corrupta* of the third instar to adult stage, inclusive, were weighed and their relationship thereby established. By arbitrarily assigning a value of 1 to a third-instar larva, the other stages and sizes have the following comparable values: Small fourth-instar larva, 2; medium fourth-instar larva, 4; large fourth-instar larva, 6; pupa, 4; adult, 3. This means that a small fourth-instar larva weighs twice as much as a medium third-instar larva; a medium fourth-instar larva four times as much as an average-sized third-instar larva, etc. Inasmuch as the sclerotized exoskeletons are the only parts of the insects not eaten by the predators (Calosoma excluded), there is a greater discrepancy in the figure assigned to the adult than in that for any other stage because the adult has more sclerotized body parts than any of the immature forms. However, since the number of adults consumed was very small, this point is of slight importance. By means of the values assigned above, "food equivalents" have been determined from the actual laboratory data. A food equivalent may be defined as the quantity of food consumed by one individual in one day. The average food equivalent consumed by a single individual is determined by averaging the total food consumed by all the adults in one container. A comparison of the food equivalents consumed by the various predators is shown in Figure 1.

FAMILY PENTATOMIDAE.

Podisus sagitta (Fab.).

This pentatomid was the most abundant of the predacious insects attacking *E. corrupta* at Cuernavaca, Morelos. Adults were collected in the field there from August 1 until late September. In the fields at Amecameca, Mexico, and at Chalco

and other localities within the Federal District, it was present, but scarce, during late August and early September.

TABLE I.

Food Consumed by Nymphs of *Podisus sagitta.*

Stage	Number of Nymphs	Date	Food Consumed	Food Equivalent
Hatched	42	Aug. 7	(No larvae eaten in this stage)	0
Molt 1		Aug. 18		
	40	18–20	15 large second instar larvae*	0.09
	33	20–23	5 first,† 2 second, 4 third instar larvae	0.06
	32	23–25	7 third instar larvae	0.10
Molt 2		Aug. 27–31		
	32	25–28	2 first, 2 third, 2 medium fourth instar larvae	1.09
	30	28–30	1 second, 6 medium fourth instar larvae	0.40
	30	30–31	5 third, 1 large fourth instar larvae	0.36
	30	Aug. 31 to Sept. 2	2 large fourth instar larvae	0.20
Molt 3		Sept. 4–10		
	27	2–6	1 third, 6 large fourth instar larvae	0.34
	27	6–8	5 large fourth instar larvae, 1 pupa	0.62
	18	8–10	8 medium fourth instar larvae	0.94
Molt 4		Sept. 11–19		
	17	10–13	1 third, 5 medium fourth, 2 large fourth instar larvae	0.64
	17	13–17	5 medium fourth, 18 large fourth instar larvae	1.88
	17	17–19	7 medium fourth, 7 large fourth instar larvae, 1 pupa	2.17
	17	19–22	7 medium fourth, 5 large fourth instar larvae	0.82
Final molt	15	Sept. 24–28 Sept. 22 to Oct. 1	14 medium fourth, 9 large fourth instar larvae, 19 pupae	1.46

*A second-stage larva is given an arbitrary value of 0.50.
†A first-stage larva is given an arbitrary value of 0.25.

This species laid its eggs in masses consisting of from 20 to 50 each. The incubation period was found to be 12 days in length. The entire life cycle was completed under laboratory

conditions in from 62 to 64 days. The long developmental period seems to be largely responsible for the scarcity of this and related species in the field until the peak of bean-beetle infestation has passed.

The records of the quantity of food consumed by diminishing numbers of nymphs of *P. sagitta* given in Table I show the value of this pentatomid as a predator of *E. corrupta*. Unfortunately, the food consumed throughout a single nymphal stage is not shown exactly, since some of the nymphs spend more time in any one stage than others hatched from the same egg mass. The range of days during which molting took place is indicated.

First-stage nymphs of all species of pentatomids observed failed to feed on larvae of *E. corrupta*. As soon as the first molt occurred the nymphs attacked the larvae. It was also noted that the nymphs fed little, if any, on the day prior to a molt. This is not shown to any great extent in the data given above, because the molt extended over several days for a group of nymphs of the same age.

The nymphs of *P. sagitta* are voracious eaters. For example, when the seven third-instar larvae of *E. corrupta* were introduced on August 23, the 33 half-grown nymphs immediately attacked and killed them all. They were observed with their beaks remaining in the same larva for several hours. At one time 10 nymphs were feeding on a single larva.

A summary of the data obtained for adults of this species is given below:

Number of containers	13
Number of individuals	45
Length of life in the laboratory, days	44 to 3
Food equivalent	3.53
Extremes of food equivalents	12.0 to 0.28

The number of individuals of all species gradually diminished during the period they were held in the laboratory and observations were continued until all the adults had died. The length of life and the equivalent quantities of food consumed varied considerably owing in part to the age, sex, and size of the adults. The average daily food equivalent consumed by *P. sagitta* is 3½ third-instar *E. corrupta* larvae.

Podisus lineolatus (H. S.).

This large gray species was second in abundance among the pentatomids preying on *E. corrupta* at Cuernavaca, Morelos. The first adults were collected on August 1, and later collections were made late in August and early in September. Late in August and September they were also found in bean fields at Chalco, D. F. No complete life history for this species was obtained in the laboratory, but the data shown in Table II

TABLE II.

Food Consumed by Nymphs of *Podisus lineolatus*.

Stage	Number of Nymphs	Date	Food Consumed	Food Equivalent
Collected	18	Sept. 1	(First instar nymphs, no food consumed.)	
Molt 1	18	Sept. 5–6		
	18	5–9	2 third, 7 medium fourth instar larvae	0.25
	18	9–10	2 medium, 1 large fourth instar larvae	0.77
Molt 2		Sept. 10–12		
	16	10–12	6 medium fourth instar larvae.	0.75
	16	12–16	9 medium fourth instar larvae.	0.56
Molt 3		Sept. 14–16		
	16	16–19	14 medium fourth, 6 large fourth instar larvae	1.91
	16	19–21	7 large fourth instar larvae, 1 pupa	1.43
Molt 4		Sept. 24–27		
	15	Sept. 21 to Oct. 1	12 medium fourth, 12 large fourth instar larvae, 4 pupae.	0.90
	15	1–2	7 medium fourth instar larvae.	1.86
	15	2–5	12 large fourth, 3 medium fourth instar larvae	2.38
	15	5–12	6 pupae, 1 adult, 15 large, 9 medium fourth instar larvae.	2.00
Final molt		Oct. 6–12		

indicate that it is somewhat shorter than that of *P. sagitta*. One egg mass of 93 eggs was the single oviposition record procured.

The records for the nymphs of this species (Table II) show the increasing quantities of food consumed by each nymph as it

approached maturity. The greatest quantities of food were usually consumed when the nymph in any stage of development was about half grown.

Data pertaining to the adults of *P. lineolatus* are summarized below:

Number of containers	10
Number of individuals	31
Length of life in laboratory, days	35 to 2
Food equivalent	4.13
Extremes of food equivalents	8.57 to 1.0

Oplomus dichrous (H. S.).

Adults of this species were collected in bean fields at Cuernavaca, Morelos, and Cholula, Puebla, during August and September. This species is slightly smaller than *Podisus lineolatus* and larger than *P. sagitta*. The adults are extremely variable in color pattern and some individuals superficially resemble *O. tripustulatus* (Fab.).

Masses of 5 to 48 eggs were laid in the laboratory. The incubation period ranged from 18 to 22 days. The entire life cycle, egg to adult, of the two lots of nymphs whose records appear in Table III (Page 702) was found to be 64 to 66 and 58 days, respectively. This period is comparable with that of *P. sagitta*.

A summary of data concerning the adults of *O. dichrous* is given below:

Number of containers	8
Number of individuals	25
Length of life in laboratory, days	39 to 2
Food equivalent	3.67
Extremes of food equivalents	16 to 0.5

The food equivalent of 3.67 is much the same as the 4.13 obtained for *Podisus lineolatus*, a species of similar size.

Oplomus nigripennis pulcher Dall.

This pentatomid resembles certain individuals of *Oplomus dichrous*. An adult was observed feeding on larvae of *E. mexicana* at Cordoba, Vera Cruz, on July 3.

Stiretrus anchorago (Fab.).

This pentatomid was found to be widely distributed. It was taken at Cordoba, Vera Cruz, on July 3; Puente de Ixtla, Morelos, on July 25; Oaxaca City, Oaxaca, on August 22; and at Cuernavaca, Morelos, during September.

TABLE III.

Food Consumed by Nymphs of *Oplomus dichrous*.

FIRST LOT.

Stage	Number of Nymphs	Date	Food Consumed	Food Equivalent
Eggs laid		July 31		
Hatched	12	Aug. 22–23	(No larvae consumed by first stage nymphs)	
Molt 1		Aug. 29–30		
	12	30–31	2 first, 4 third instar larvae	0.37
	12	Aug. 31 to Sept. 10	2 third, 11 medium fourth instar larvae	0.38
Molt 2		Sept. 6–12		
	11	10–14	5 large fourth instar larvae, 1 pupa	0.77
Molt 3		Sept. 12–14		
	10	14–17	8 medium fourth, 7 large fourth instar larvae	2.46
	10	17–22	9 medium fourth instar larvae.	0.72
Molt 4		Sept. 20–24		
	10	22–23	4 large fourth instar larvae	3.6
	9	23–25	6 large fourth instar larvae, 2 pupae	2.44
	6	26–28	No larvae; 3 nymphs eaten.	
	6	Sept. 28 to Oct. 1	19 medium fourth instar larvae, 2 pupae	4.66
Final molt		Oct. 3–5		

SECOND LOT.

Eggs laid		Aug. 8		
Hatched	10	26–27	(No larvae consumed by first stage nymphs)	
Molt 1		Sept. 2		
	9	2–12	7 large fourth instar larvae	0.46
Molt 2		Sept. 10–11		
	7	12–14	2 third, 6 medium fourth instar larvae	1.85
	6	14–17	3 large fourth instar larvae	1.00
Molt 3		Sept. 16–17		
	6	17–19	9 large fourth instar larvae, 1 pupa	4.83
Molt 4		Sept. 25–27		
	6	Sept. 19 to Oct. 1	12 medium fourth, 14 large fourth instar larvae, 13 pupae	2.55
	5	1–7	1 small fourth, 8 large fourth instar larvae, 1 pupa	1.80
Final molt		Oct. 5		

Nine second-stage nymphs were brought to Mexico City from Oaxaca City and their record is given in Table IV.

TABLE IV.

Food Consumed by Nymphs of *Stiretrus anchorago*.

Stage	Number of Nymphs	Date	Food Consumed	Food Equivalent
Second stage collected		Aug. 22		
	9	24	3 third instar larvae	0.33
	9	24–26	3 third instar larvae	0.16
	9	26–30	3 third, 1 medium fourth instar larvae	0.16
Molt 2		Aug. 29–30		
	9	30–31	4 third instar larvae	0.11
	9	Aug. 31 to Sept. 1	6 third instar larvae	0.66
Molt 3		Aug. 6–8		
	9	2–7	5 medium fourth instar larvae	0.44
	9	7–8	2 medium fourth instar larvae	0.88
	9	8–9	3 large fourth instar larvae	2.00
	9	9–10	4 medium fourth instar larvae	1.77
Molt 4		Aug. 13–16		
	9	10–16	18 medium fourth instar larvae	1.33
	9	16–17	7 medium fourth instar larvae	3.11
	9	17–18	6 large fourth instar larvae	4.00
	9	18–19	5 large fourth instar larvae	3.33
	9	19–21	6 medium fourth instar larvae	1.33
	9	Sept. 21 to Oct. 1	10 medium fourth, 4 large fourth instar larvae	0.71
Final molt		Sept. 28–29		

Table IV shows that increasing quantities of food are consumed by each nymph as it approaches maturity. It also indicates that the greatest quantity of food is consumed when the nymphs of any one stage are half grown.

The food consumed by adults of *S. anchorago* is summarized as follows:

Number of containers 2
Number of individuals 10
Length of life in laboratory, days ..... 45 to 2
Food equivalent 4.40
Extremes of food equivalent ..... 7.60 to 0.66

It is seen in Figure 1 that the food equivalent of this species is quite high compared with that of other pentatomids of a similar size.

S. anchorago was kept in the laboratory in 4-inch Petri dishes with greater success than were other species. The 9 second-stage nymphs collected on August 22 at Oaxaca City survived and molted en route to, or at, Columbus, Ohio, between September 28 and 29. Later the adults produced viable eggs. Some of the 9 adults deposited 21 masses of eggs, in the container, consisting of 4 to 21 eggs each, the average being 14 eggs per mass. The last adult died on October 22.

Stiretrus caeruleus Dall.

Adults of this species were collected at Cordoba, Vera Cruz, on July 3; at Guadalajara, Jalisco, on August 8; and at Cuernavaca, and Puente de Ixtla, Morelos, on August 10 and 25, respectively. A few adults were collected at Xochimilco and Chalco, D. F., during the summer. At Cordoba and Puente de Ixtla they were found associated with *Epilachna mexicana* and at Guadalajara and Cuernavaca they were found on bean foliage.

This species differs from *S. anchorago* in that it appears to have a longer life and a lower food equivalent. One female deposited a mass of 8 eggs and later a mass of 13 eggs.

The food consumed by adults of *S. caeruleus* is summarized as follows:

Number of containers	3
Number of individuals	8
Length of life in laboratory, days	70 to 11
Food equivalent	1.38
Extremes of equivalent	6.0 to 0.33

Although one adult lived 70 days, this longevity record does not compensate for the low equivalent quantity of food (1.38) consumed per day per adult. *S. anchorago*, with an adult food equivalent of 4.40, would appear to be over three times as effective as *S. caeruleus*.

Perillus confluens (H. S.).

This species was taken at Xochimilco, D. F., on July 24; at Chalco, D. F., on August 18; and at Cuernavaca, Morelos, on September 1. One second-stage nymph was collected at Chalco on August 31. The final molt occurred October 7. During these 42 days it consumed 11 large and 6 medium-sized fourth-instar *E. corrupta* larvae.

A summary of food consumed by adults of *P. confluens* is as follows:

Number of containers	6
Number of individuals	7
Length of life in laboratory, days	52 to 4
Food equivalent	1.98
Extremes of equivalents	6.0 to 0.66

P. confluens with a food equivalent of 1.98 would seem to be slightly more valuable as a predator than the larger *Stiretrus caeruleus*, which has a food equivalent of 1.38.

Perillus bioculatus (Fab.).

A few of these pentatomids were collected at Chalco, D. F., late in the season. One adult consumed 8 large fourth-instar larvae and 3 third-instar larvae in 11 days. A mass of 17 eggs was laid in the laboratory.

Perillus virgatus Stal.

This species was sparsely present at Xochimilco and Chalco, D. F., late in July, in August, and early in September. It was taken at Cuernavaca, Morelos, early in August. One nymph collected at Chalco early in September molted the last time on October 2. From September 14 to October 12 it consumed 12 large and 4 medium-sized fourth-instar larvae. Two large fourth-instar larvae were consumed by the adult in 3 days.

Euthyrhynchus floridanus (L.).

This brightly colored pentatomid was observed feeding on larvae of *E. defecta* at Cordoba, Vera Cruz, on July 3.

Piezodorus guildinii (Westw.).

Although this pentatomid is not generally considered to be predacious, an adult collected at Cuernavaca on August 11 ate 2 medium-sized fourth-instar larvae during the 17 days it lived in the laboratory.

PENTATOMIDS NOT PREDACIOUS ON E. CORRUPTA.

Phineus fuscopunctatus Stal. and *Padaeus irroratus* (H. S.) collected at Chalco on August 3; *Mormidea notulata* H. S., *Hymenarcys reticulata* Stal, and *Galgupha coerulescens* Stal, at Cuernavaca on September 1; *Solubea pugnax* (Fab.), at Cuer-

navaca in August and September; *Edessa patricia* Stal (?), at Chalco in August; *Nezara viridula* (L.), at Cuernavaca on August 24; *Acrosternum marginatum* (P. B.), at Oaxaca City on August 22; *Euschistus biformis* Stal. and *E. rugifer* Stal, at Cuernavaca and Chalco in August and September; and *E. comptus* Walk., at Oaxaca City on August 22.

FAMILY REDUVIIDAE.

An adult, *Sinea confusa* Caud., collected at Cuernavaca on September 6, consumed 1 third-instar larva during the 11 days it lived in confinement.

One adult, *Zelus rubidus* L. S., collected at Cuernavaca on August 10, devoured 1 medium-sized fourth-instar larva and 1 third-instar larva in 8 days.

An adult, *Pselliopus zebra* (Stal), collected at Cuernavaca on September 6, consumed 3 small fourth-instar larvae in 13 days.

One specimen of *Apiomerus pictipes* H. S. was taken at Cordoba, Vera Cruz, on July 3, where it was feeding on a larva of *E. defecta*. It fed on larvae of *E. corrupta* in the laboratory, where it lived 24 days.

Apiomerus longispinis Champ., collected at Cuernavaca on August 24, would not feed on larvae of *E. corrupta*.

Castolus plagiaticollis Stal was collected at Cordoba on July 3, where it was found associated with *E. defecta*.

From the above records it appears that reduviids are not of great importance in the control of *E. corrupta* in the vicinity of Mexico City.

FEEDING HABITS OF OTHER HEMIPTERA.

A coreid, *Anasa denticulata* Stal (?) was observed feeding on a larva of *E. defecta* at Puente de Ixtla, Morelos, on July 25. Another specimen collected at the same locality on August 24 did not feed during the time it was held in the laboratory.

Another coreid, *Anasa maculipes* Stal, was taken at Cuernavaca on August 1. This adult devoured 2 medium-sized fourth-instar larvae during the 13 days it lived in the laboratory.

A corizid, *Harmostes nebulosus* Stal, and a coreid, *Zicca* sp., were collected at Cuernavaca on September 1. Unfortunately these were kept in the same feeding jar. In three days one, or both of them together, devoured 1 medium-sized fourth-instar larva.

A coreid, *Phthia picta* (Drury), in the nymphal stage, collected on August 10 at Cuernavaca, consumed 4 small fourth-instar larvae in 12 days.

COLEOPTERA.

Adults of the large, black carabid, *Calosoma laeve* Chev., were occasionally present in the bean fields of Cuernavaca, Morelos, and Chalco, D. F., late in the summer. Although the larvae of this species were not observed, they are believed to be predacious. Adults kept under laboratory conditions consumed large quantities of food.

Data concerning *Calosoma laeve* adults are given below:

Number of containers	3
Number of individuals	3
Length of life in laboratory, days	35, 21, 11
Food equivalent	14.56

Another carabid, *Onypterygia thoreyi* Mann., was found on corn at Cuernavaca on August 1. During the 16 days it was held in the laboratory it partly devoured 2 fourth-instar larvae.

A clerid, *Enoclerus bombycinus* Chev., was taken September 8 at Chalco, D. F., at which time it was observed holding a dead adult of *E. corrupta* in its mandibles. This specimen lived 18 days in the laboratory and consumed part of one adult beetle. It is not known if this adult was dead or alive when attacked.

SUMMARY AND CONCLUSIONS.

Several species of Hemiptera and Coleoptera were observed to be associated with *E. corrupta*, *E. defecta*, *E. mexicana*, and *E. obscuriella* in various parts of Mexico. Various stages were collected in the field and brought to the laboratory at Mexico City, where efforts were made to induce them to feed on immature stages of *E. corrupta*. Several species consumed large numbers of this insect, thus indicating their importance in the natural control of the bean beetle.

The first-stage nymphs of pentatomids were not found to be predacious. The quantity of food consumed by growing nymphs in other stages of development appeared to be greatest about midway between the molts. Little, if any, food was taken for a day prior to a molt. Nymphs of most species were cannibalistic, especially when one of their number was rendered defenseless during the process of molting.

The quantity of food consumed by several species of adult pentatomids varied considerably, even among species of similar sizes. The food equivalents range from 4.40 for *Stiretrus anchorago* through 4.13 for *Podisus lineolatus*, 3.67 for *Oplomus dichrous*, 3.53 for *Podisus sagitta*, 1.98 for *Perillus confluens*, to 1.38 for *Stiretrus caeruleus*. A carabid, *Calosoma laeve*, had a high food equivalent of 14.56. (Fig. 1.)

One adult pentatomid, *Stiretrus caeruleus*, lived in the laboratory as long as 70 days. Most of the adults lived from 20 to 40 days.

The life cycle, egg to adult, was found to be between 58 and 64 to 66 days, respectively, for two lots of *Oplomus dichrous*, and 62 to 64 days for one group of *Podisus sagitta*.

The following pentatomids were also found to be predacious: *Oplomus nigripennis pulcher* on *E. mexicana; Euthyrhynchus floridanus* on *E. defecta; Piezodorus guildinii*, *Perillus virgatus*, and *P. bioculatus* on *E. corrupta*. Several nonpredacious pentatomids were also collected.

Records concerning the food habits of the reduviids are given for the following species: *Sinea confusa*, *Zelus rubidus*, *Pselliopus zebra*, *Apiomerus pictipes*, *A. longispinis*, and *Castolus plagiaticollis*. Records for the three coreids, *Anasa denticulata*, *A. maculipes*, and *Phthia picta*, are included, as well as some doubtful records concerning the corizid *Harmostes nebulosus* and the coreid *Zicca sp.*

The carabid *Onypterygia thoreyi* and the clerid *Enoclerus bombycinus* may not, under different conditions, prove to be predacious as far as *E. corrupta* is concerned.

In the vicinity of Mexico City the life cycle of these pentatomids was several days longer than that of a single generation of *E. corrupta*. The peak of the larval population of the bean beetle is reached and damage to bean foliage accomplished before an appreciable number of pentatomids appear in the fields. As the winter survival of *E. corrupta* in most parts of the infested areas of Mexico is high, it is likely that the number of *E. corrupta* destroyed by predators during the late summer does not greatly reduce the numbers of beetles necessary to maintain the bean beetle the following season. Although *Stiretrus anchorago* and *Perillus bioculatus* are present in the United States, they play only a small part in the control of *E. corrupta*, although the former species becomes rather abundant as a rule in late summer in the Southern States.