

# Curculionidae, Bruchidae, Lepidoptera, and Their Parasites, Infesting the Seed Pods of Cowpea and Various Wild Plants\*

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In 1938 the writer published a report on the host plants of a number of Curculionidae and Bruchidae that had been discovered in the course of work on the cowpea curculio. Several additional records made in the two seasons following are reported here. Short descriptive notes of the insects

(1933) to inhabit river banks. The seed of *S. helvola* was received from the Soil Conservation Service, Americus, Georgia, which organization is testing the plant as a cover crop. Although the cowpea curculio infested the pods of both species, it was four times as numerous in *S. umbel-*

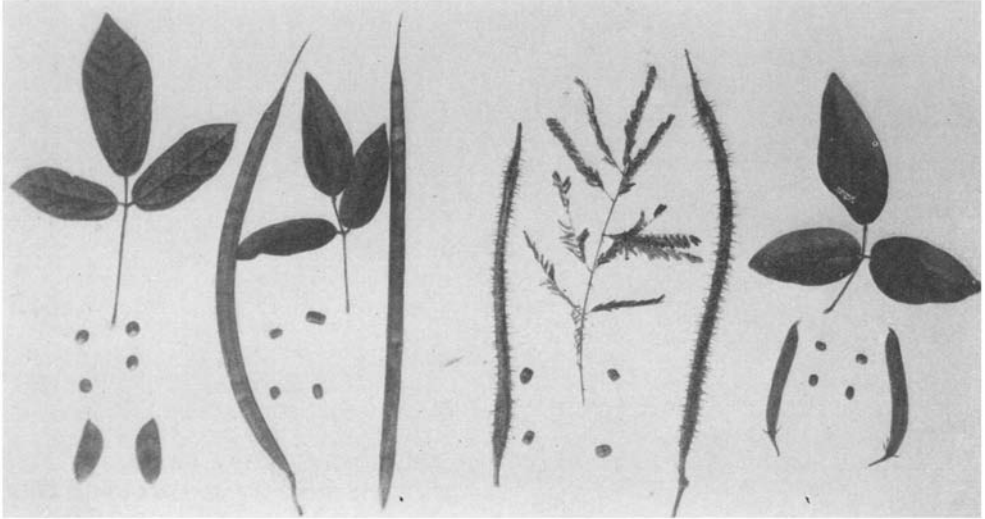


FIG. 1.—Leaf, pod, and seed specimens of leguminous hosts of *Chalcodermus inaequicollis* Horn. Left to right: *Rhynchosia erecta*, *Bradburya virginiana*, *Leptoglottis Nuttallii*, and *Galactia volubilis*.

and plants are added to aid in quick recognition of the species.

All collections were made in Spalding County, Georgia, unless stated otherwise. Determinations of insects have been checked by specialists in the Division of Insect Identification, U. S. Bureau of Entomology and Plant Quarantine and the plants were identified by Dr. W. A. Jenkins, Georgia Experiment Station.

*Chalcodermus aeneus* Boh.—In 1939 various species of wild legumes were planted in uniform plots to observe growth and insect infestation. These included *Strophostyles umbellata* (Muhl.) Britton, a species that grows wild in central Georgia, and *S. helvola* (L.) Ell., a coarser species, which is said by Small

*lata*, which has already been reported as a host. Pods of *S. umbellata* usually contained one larva of *C. aeneus*; rarely there were two. The pods contained 4 to 11 seeds. The number of seeds consumed by an individual grub was variable but about 5 or 6 are necessary for full development. The height of infestation of *Strophostyles* pods occurred about the first of October in both 1938 and 1939.

*Chalcodermus inaequicollis* Horn was bred from the pods of *Rhynchosia (Dolicholus) erecta* (Walt.) DC. and from *Leptoglottis (Schranksia) Nuttallii* DC. Four leguminous host plants, two of which were reported in 1938, are now known for this weevil. Photographs of the host plants are shown in figure 1. It will be noted that the pods of the four differ noticeably in size and structure, but the seeds are similar in

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size. *Rhynchosia erecta* is an upright shrubby plant; *Bradburya* and *Galactia* climb on others for support; while *Leptoglottis*, a thorny plant with sensitive leaflets, trails along the ground.

Blatchley and Leng (1916) reported taking this weevil from the leaf axils of a thistle, *Carduus spinosissimus* Walt., in Florida, but did not give a breeding host.

Time of infestation of the various hosts depends, of course, on the fruiting period. Grubs developed in pods of *Leptoglottis*

after the latter have left the plant pod and entered the soil.

The remaining parasites kill the host larvae in the pods and emerge therefrom. Species in the table marked "X" have been definitely found to be parasites of *Chalcodermus*, either by rearing from larvae caged in soil or by dissection from infested seed. *Eupelmus cyaniceps* variety *amicus* Gir. was found in one case as a secondary parasite of another species of Hymenoptera in cowpeas. Judging by

Table 1.—Parasites of *Chalcodermus* larvae in leguminous plants in Georgia.

PARASITE	HOST AND ITS HOST PLANT					
	<i>C. aeneus</i>	Host plant	<i>C. inaequicollis</i>	Host plant	<i>C. collaris</i>	Host plant
<i>Myiophasia globosa</i> Tns.	X X	Cowpea Stringbean	X	<i>Leptoglottis</i>	X	<i>Chamaecrista robusta</i> and <i>C. procumbens</i>
<i>Triaspis curculionis</i> var. <i>rufus</i> (Riley)	X	Cowpea				
<i>Triaspis</i> sp. (undescribed)	X	Cowpea	X	<i>Leptoglottis</i>		
<i>Microbracon mellitor</i> (Say)	X	Cowpea	X 1	<i>Rhynchosia</i>		
<i>Microbracon variabilis</i> (Prov.)					X	<i>C. robusta</i>
<i>Eurytoma tylodermatis</i> (Ashm.)	X	Cowpea				
<i>Eupelmus cyaniceps</i> var. <i>amicus</i> Gir.	?	Cowpea	X	<i>Rhynchosia</i>		
<i>Zatropis incertus</i> (Ashm.)	X	Strophostyles spp.	X 1	<i>Leptoglottis</i>		
	X	Cowpea				
<i>Tetrastichus doteni</i> (Cwfd.)					H 1	<i>C. robusta</i>

X Relation of host and parasite certain.

? Parasite bred from host plant, insect host uncertain.

X 1 Hyperparasite on *Microbracon*?, one specimen.

early in July in 1938 and 1939. *Rhynchosia* is found infested in late July and in August. *Bradburya* and *Galactia* pods with grubs were collected from August to October. Over the several years the earliest seasonal collection of infested pods was July 4, the latest October 21.

Grubs emerge from the pods within a week after collection and seek soil in which to burrow and pupate. The earliest grubs emerged July 5; the latest October 28. Adults from these matured July 25 to December 3, that is, 20 to 36 days after the grubs burrowed into the soil. It is likely that there are two generations of this weevil yearly.

Parasites of *Chalcodermus* larvae which have appeared in the course of this work are given in table 1. *Myiophasia globosa* has been the most abundant species and in cowpeas it kills about twenty per cent of the curculio grubs that leave the pods. This tachinid fly and the two species of *Triaspis* (Braconidae) emerge from larvae

emergence dates it appears to be parasitic on *C. aeneus* but it may also attack caterpillars and bruchids in the pods. *Zatropis incertus* (Ashm.) was found positively on *C. aeneus* only once when a third instar grub was parasitized. However, more than 50 specimens have been bred from various lots of cowpeas, usually emerging 12 to 25 days after picking, and the curculio is the most likely host. *Z. incertus* was the only parasite definitely found on *C. aeneus* in pods of *Strophostyles*.

*Myiophasia globosa* is shining black and bristly. *Triaspis* sp. is black with longitudinal grooves on the abdomen and the legs are yellow, while *T. curculionis* var. *rufus* has a red thorax and is larger. *Microbracon mellitor* is pale brown or reddish brown and sometimes has black patches on the adjoining parts of thorax and abdomen. *Eurytoma* is black with coarse pits on the thorax but has a smooth abdomen. *Eupelmus* is greenish bronze and hairy, and the female has a V-shaped impression

on the thorax. *Zatropis* is green or coppery with sparse white hairs. It is much smaller than any of the other parasites of *Chalcodermus aeneus*.

Three species of Hymenoptera reported earlier (Bissell 1938), *Callimome anthomyiae* (Ashm.), *Galeopsomyia* sp., and *Zatropis coelioidis* (Ashm.), have not been encountered again and their hosts are not known.

*Apion delta* Buch.—This curculionid is about the same size as *A. griseum* Smith but differs from that species in having red legs, brown hair on the back, and three white spots of hair around the scutellum. It was bred from the pods of *Croton glandulosus* L. of the family Euphorbiaceae. Each of the spherical pods contains three seeds but only one was used by a given developing weevil. A lot of 128 pods contained 15 adult and immature weevils, and 14 parasitized weevil larvae.

Three species of hymenopterous parasites were dissected from the seed pods of *Croton* and found on the larvae of *Apion delta*. These were *Trimeromicrus* sp. (an undescribed species near *T. maculatus* Gahan), a striking chalcid with green spots or stripes on a black thorax; *Eupelmus allynii* (French), the male with yellow femurs quite different from the female; and *Heterospilus* sp. The first named parasite was the most abundant.

*Apion rostrum* Say, the largest species of the genus known to the writer, was found June 22 in pods of *Baptisia tinctoria* (L.) R. Br. at Tifton, Georgia. Weevils were then in the adult stage and no pod contained more than one insect. About two-thirds of the seeds were consumed in each infested pod.

*Acanthoscelides alboscuteallatus* (Horn), Bruchidae, was found in the pods of *Ludwigia alternifolia* L., "seedbox," of the evening primrose family. The seeds of this plant are minute and many are contained in each of the four compartments of the pod. Each weevil was found in a cell with walls formed of closely compacted seeds and excrement. The chalcid *Eupelmus cyaniceps* var. *amicus* emerged from the *Ludwigia* pods along with the bruchids.

*Acanthoscelides distinguendus* (Horn).—This gray checkered beetle, rather broad, emerged from August to November from the pods of two species of legumes, *Rhynchosia erecta* (Walt.) DC. and *R. interme-*

*dia* (T. & G.) Small. Blatchley, in "Coleoptera of Indiana," states that this bruchid breeds in the pods of *Cracca virginiana* L., but in view of Yip's work (Yip 1936) with this plant, Blatchley possibly had reference to *A. obsoletus* Say, which Mr. J. C. Bridwell indicates (in correspondence) is similar to *A. distinguendus*.

*Acanthoscelides schrankiae* (Horn), a small bruchid with red fore and mid legs and an almost solid gray back developed in pods of the sensitive brier, *Leptoglottis* (*Schrankia*) *Nuttallii* DC. In several collections of pods this insect was about as common as the grubs of *Chalcodermus inaequicollis*; however, in one lot there were bruchids only, which had destroyed about one-third of the seeds. Emergence occurred from July 15 to October 5.

*Acanthoscelides longistilus* (Horn), the smallest bruchid in this series, emerged from the seed of *Lespedeza* sp. (*L. frutescens* (L.) Britton or *virginica* (L.) Britton), and from *L. hirta* (L.) Ell. collected at Mitchell, Georgia, in October, 1937. From the same lot of seed came the weevil, *Apion decoloratum* Smith, and three chalcids, *Zatropis incertus* (Ashm.), *Catolacus* sp. (undescribed), and *Tetrastichus* sp. (undescribed). The exact host of any of these Hymenoptera is not known.

*Callosobruchus maculatus* (Fab.).—The cowpea weevil is associated with peas in storage but infestations often begin in the field. A lot of blackeyed cowpeas picked July 20 and caged in the pods, produced weevils beginning August 7. Parasites began emerging the latter part of August but they were not distinguished from parasites of the curculio until some time later. Three chalcids were later definitely found to be parasites of *Callosobruchus*. These were *Bruchobius laticeps* (Ashm.) copper-colored and robust; *Lariophagus texanus* Cwfd., black; and *Aplastomorpha calandrae* (How.), green, with conspicuous fine white hair, and the smallest of the three. The number of *Lariophagus* per weevil grub ranged from one to eight and it appeared that the number varied directly with the size of the host. The other two parasites always occurred singly. The degree of parasitism by the three chalcids in the single lot of cowpeas was about equal. In a random lot of 24 seeds they killed 57 grubs or 43 per cent of the total number.

No positive case was discovered in which the parasites of *Chalcoedermus aeneus*, listed in Table 1, attacked *Callosobruchus* or in which parasites of the latter attacked the curculio, although curculios and weevils often infested the same peas.

Caterpillars of two moths, the Indian-meal moth and the Angoumois grain moth, fed and matured in dry cowpea pods. In every case observed they entered the cells in the peas vacated by the cowpea curculio and usually pupated in these places. It appeared that the caterpillars consumed the frass of the curculio but may have also eaten cowpea tissue.

*Ulophora grotei* Rag.—A small moth of the family Pyralididae was bred from pods of *Cracca spicata* (Walt.) Kuntze, collected in Spalding County and from *Cracca virginiana* L., collected in Glascock County. The caterpillars, which were quite common in some lots, were white or yellow when small and blue or bluish-green

when mature. Pupation occurred in the soil in well made cocoons a little below the surface. Moths were obtained September 22 to November 20.

Yip (1936) found caterpillars of *Ulophora tephrosiella* Dyar in pods of *Cracca virginiana* which were collected in several parts of the United States. Descriptions of three species of *Ulophora* were given by Forbes (1923).

There were two parasites of the *Ulophora grotei* caterpillars, *Eupelmus cyaniceps* var. *amicus* and *Heterospilus* sp. (undescribed), the latter being found the more commonly in collections from both Spalding and Glascock Counties. Yip also found a new species of *Heterospilus*, but we do not know that they are the same.

*Myelois venipars* Dyar.—The navel orange worm fed in pods of honey locust, *Gleditsia triacanthos* L., and moths emerged in January in the laboratory. This insect is known to be a scavenger.—7-13-40.

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## Lateral Migration and Depth of Pupation of the Larvae of the Primary Screwworm *Cochliomyia americana* C. and P.

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The distance that larvae of the primary screwworm, *Cochliomyia americana* C. and P., will migrate from the place where they have dropped to the ground and the depth at which they pupate in the soil were studied under field conditions during the fall of 1935 and the spring of 1936 at Valdosta, Ga. These tests were conducted to determine the advisability of further studies on methods of control for larvae and pupae of the screwworm in carcasses of animals or in the soil near infested animals. Tests on methods of controlling larvae and pupae in the soil and carcass have been conducted by Brody & Knipling (1940).

Data on the distance that screwworms migrate laterally and the depth at which

they pupate are of practical significance in control campaigns, as well as of biological interest. Infested animals usually hide in some secluded spot for several days before their death, and frequently the larvae have dropped in the soil before the animal is found. Tests have indicated that larvae of the primary screwworm begin to migrate from a carcass immediately after death of the infested animal and that practically all have left the carcass within 48 hours. The destruction of such larvae and pupae may prove to be a worth while control measure, but before such measures of control are recommended, the size of the area to be treated and the depth to which the treatment should penetrate the soil must be known.