CONTENTS

Platt, A. P. Possible photosensitivity of the abdominal saddlepatch region of **Limenitis archippus** larvae (Lepidoptera: Nymphalidae)..........................57-66
Staines, C. L. Observations on **Gnorimella maculosa** (Coleoptera: Scarabediae: Cetoniinae)..............67-68
Staines, C. L. Additional records on Maryland Silphidae (Coleoptera).......................................69-70
Stevenson, H. G. The genus **Meropleon** (Lepidoptera: Noctuidae, Amphipyrine) in Maryland...........................71-73
Mather, B. Tidewater Maryland- Central Mississippi Lepidoptera. 74
Staines, C. L. & S. L. Staines. Observations on two beetles (Coleoptera) feeding on Rumex (Polygonaceae) in Maryland with a review of the literature...........78-79
Stevenson, H. G. The genus **Spragueia** Grote (Lepidoptera: Noctuidae, Acontiinae) in Tidewater Maryland.......80-82
Staines, C. L. & S. L. Staines. A bibliography of New World Hispinae (Coleoptera: Chrysomelidae)...............83-122
Tipping, P. W. & S. D. Hight. Status of **Rhinocyllus conicus** (Coleoptera: Curculionidae) in Maryland...........123-128
Book Reviews-
Acarology- Mites and Human Welfare.....................68
Silent Spring Revisited...........................75-77
Recent Literature.....................................70,77,82
Voucher Specimen Policy.....................................77

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Possible Photosensitivity of the Abdominal Saddlepatch Region of Limenitis archippus Larvae (Lepidoptera: Nymphalidae)

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Abstract

This paper reports preliminary experiments testing whether or not the saddlepatch region of 2nd and 3rd instar (prediapause) viceroy larvae is photosenstive. The results of these experiments are equivocal, but they do not rule out this possibility. Covering the saddlepatch area of 2nd and 3rd instar larvae with non-toxic black (acrylic or enamel) paint failed to inhibit the faculatative diapause responses of L. archippus larvae in most groups. However, pronounced detrimental effects (including high mortality) subsequently occurred in the experimental groups during later instars and at the time of pupation. These effects did not occur in either untreated or clear paint-treated control groups, suggesting that neuroendocrine effects are caused by masking the saddlepatch area of these larvae. Such effects are drastic enough to prevent the larval-pupal ecdysis in many individuals.

Temperate insects utilize photoperiod as an important environmental cue. Among various species, different life stages are capable of diapausing through the winter season (Wigglesworth, 1970; Beck, 1980). Among the nearctic admirals [Limenitis (Basilarchia) (Lepidoptera: Nymphalidae)], the 2nd and early 3rd instars are photosensitive. These half-grown larvae entrain to photoperiod over a four to seven day period (25°C ± 2°C), and enter faculatative diapause during late summer and autumn, in response to decreasing daylength (Clark & Platt, 1969; Hong & Platt, 1975; Frankos & Platt, 1976; Platt, 1984; Williams & Platt, 1987; Platt & Harrison, 1988). Diapause is accompanied by slowed larval growth and the construction of elaborate hibernacula (Edwards, 1884; Scudder, 1889; Weed, 1926; Klots, 1951).

The physiology of insect diapause and its associated metabolism are complex (Lees, 1955; Harvey, 1962). The means by which Lepidoptera and other insects perceive and respond to changes in photoperiod are not well-understood, but in many species such responses involve endogenous rhythms (Beck, 1980; Saunders, 1982).

The individual ommatidia of adult insect compound eyes, as well as ocelli, and larval stemmata (equivalent to ocelli) often are specialized for receiving specific wavelengths of light (Goldsmith, 1961; Burkhardt, 1964; Silbergleid, 1979; Ichikawa & Tateda, 1982). However, the mechanisms for larval photoperiod responses in Lepidoptera remain essentially unknown. Cauterization experiments by Tanaka (1950a, b, c;

1951a, b) suggest that the larval stemmata are not involved in the diapause responses of the Chinese Tussar silkworm, **Antheraea pernyi** Guérin-Ménéville (Saturniidae).

In addition to stemmata, many young nymphalid and papilionid larvae possess a mid-abdominal, grayish-white, dorsolateral saddlepatch. In **Limenitis**, the saddlepatch is centered on the eighth abdominal segment above the primordial gonads. The dark paired gonads of male larvae are sometimes visible through the saddlepatch. The saddlepatch possesses a faint grayish-pink color and is thought to serve a cryptic function, making young larvae closely resemble bird droppings as they rest in a curled position on the upper surfaces of leaves and plant stems. This behavior and morphology provides an effective means of avoiding visually oriented vertebrate predators (mainly birds).

The saddlepatch may serve an additional function: photosensitivity of larval **Limenitis** is correlated with the appearance of this pale, dorsal abdominal patch. Reciprocal transfer experiments, first reported by Clark & Platt (1969) and later repeated by Platt (unpubl.) reveal that both the eggs and first instars do not entrain to photoperiod. These early stages do not respond to either longday or shortday photoperiods. The first instar larvae are entirely orange-brown in color. They lack the saddlepatches which appear following their first molt. I suspect that such saddlepatches may represent "cuticular windows" through which the larvae sense the environmental photoregime, in order to determine whether or not to diapause. Non-optic light reception causing photoperiod responses in Lepidoptera and other insects has been recorded by Lees (1955, 1960; Beck & Alexander (1964a, b, c); Callahan (1965); and Hinks (1975).

Materials and Methods

Laboratory strains of the viceroy, L. **archippus** Cramer, larvae were established from hibernacula collected in northern Maryland and on the UMBC campus. Larvae emerging from the hibernacula were reared on weeping willow foliage (**Salix babylonica** L., Salicaceae), in light-tight wooden photochambers (61x61x42 cm, inside dimensions) at room temperature (25°C ± 2°C). Each chamber contained a 38.1 cm, 15 watt, G. E. fluorescent cool white bulb. Larvae were reared individually in labeled 7.6 cm white styrofoam cups covered with plastic bags held in place with rubber bands. The cups were enclosed in clear plastic shoe boxes lined with moist paper towels. Each cup was cleared of larval frass and provided with fresh food daily.

Adults obtained from these L. archippus larvae were bred by hand-pairing (Platt, 1969). Bred females were induced to oviposit on potted cuttings of S. babylonica covered by silk organza bags. The F_1 eggs and larvae that resulted from these crosses were used in the experiments.

Experimental larvae were reared on both longday (LD 20:4) and shortday, either LD 13:11 (Tables 1 & 2) or 12:12 (Tables 3 & 4), photoperiod using the conditions described above. Eggs and first instar larvae were evenly divided into three groups as follows: I) untreated controls, II) treated controls (painted with clear paint), and III) experimentals (painted with black paint). Painting was not begun until the saddlepatches appeared on 2nd instar larvae. Larvae were repainted in dim red light after each molt, prior to the daily on-set of the photoperiod lights at 10 a.m. E.S.T. Painting was continued through the 5th instar, for larvae that exhibited direct development. Diapausing larvae remained painted even after the larvae had entered their hibernacula. An acrylic polymer water soluble non-toxic paint was used in the first series of experiments done in Maryland. The clear paint contained only the transparent plastisized base, whereas, the black paint contained a ferrous oxide pigment imbedded in the clear acrylic base. All painted larvae were able to molt freely during their larval stages.

With similar procedures, additional experiments were carried out at the University of Liverpool in England (Tables 3 & 4). In these later experiments, a shortday photoperiod of LD 12:12 was used, and non-toxic Humbrol black enamel and clear Polyurethane paints were employed in the masking procedures. The later experimental protocol closely followed that of the prior experiments. The artifical photophase on-set in Britain was correlated with 10 a.m. Greenwich mean time.

Results

In the initial studies all 45 larvae in the shortday photoperiod (LD 13:11) entered diapause at 3rd instar (Table 1), regardless of treatment group. Covering the saddlepatch of 2nd and 3rd instar larvae in shortday conditions with black acrylic paint failed to inhibit the diapause response. The untreated controls and both treated groups grew and molted normally, and required about three weeks to construct their hibernacula and enter diapause. However, among 51 treated larvae reared on longday photoperiod (LD 20:4), the mortality rate among black painted larvae was significantly higher than among the clear painted controls (Table 2). Mortality among the treated controls was similar to that of untreated larvae (16.0%). Among the experimental group, 23 of 36 larvae (63.8%) died at pupation (sum chi square d.f.=1 Yates= 69.25, P<.001). Twenty of 23 larvae died as prepupae. The remaining three died later as malformed chrysalids. None of the experimental group eclosed as adults.

Prior to pupation larval growth in both shortday and longday conditions was unaffected by the painting experiments. Six weeks after diapause the experimental shortday larvae were still alive when their hibernacula were opened. Thus, it can be inferred that the acrylic based paints were non-toxic to the larvae.

Results of my experiments done in Britain are shown in

Table 1. Results of "masking" the white abdominal saddlepatch area of 2nd and 3rd instar Maryland Viceroy larvae with an acrylic black paint prior to diapause (LD 13:11; 25°C ± 2°C), 1970 data.

Treatment	No. of larvae	No. diapausing	avg. Wt. mg	avg. No. days to diapause
untreated controls	12	11[1]	21.5	20
treated controls	17	17	24.8	20
experimental larvae	18	17[1]	29.0	24
Totals & Means	47	45	25.6	21.5

[1] One larva died in each group prior to 3rd instar.

Tables 3 and 4. The longday and shortday untreated controls (group I) either developed, or diapaused at 3rd instar as expected. The clear paint treated controls did likewise (group II), with n = 6 in each. Coating either the saddlepatch or the head stemmata with clear polyurethane paint produced no deterimental effects on the treated control larvae.

However, among the three experimental subgroups (III, A, B, and C) of longday experimental larvae coated with black enamel paint, mortality among 18 larvae (n = 6 per treatment) was 100%. Most mortality occurred between the 3rd instar and pupation, just as it had in the earlier experiments.

Eleven of these longday experimental insects died either as prepupae or pupae. In group III C, in which only the stemmata were painted, the head capsule remained attached to otherwise normally formed pupae in three cases. Microscopic examination of these pupae indicated that the problem was not simply a mechanical failure to shed the painted head capsules, but rather that the head region itself had not undergone metamorphosis. No pupal cuticle was found beneath the larval head capsules. A number of specimens of adult Lepidoptera (including two **Limenitis**) have been recorded, in which the head region remained larval (Hagen, 1876; Brewer, 1978; Stammenhaus, 1978; Platt, 1979).

Among 19 experimental shortday larvae (groups III A, B, and C) eleven died between the 3rd instar and the pupal stage (Table 4). All six larvae in group III A, which had the saddlepatch region covered with black enamel paint, died as larvae, with three of them (50%) developing beyond the diapause stage. Thus, there appears to be some inhibition of the diapause response in this subgroup, possibly as a direct result of masking the saddlepatch area. The black enamel paint appeared to provide a more solid and uniform mask than did the water soluble acrylic paint used eariler. However, these results are inconsistent with those of group III B, in which six of seven larvae, having both their saddlepatch areas and stemmata painted black, formed hibernacula and diapaused in shortday photoperiod. Two of six larvae in group III C (having only the stemmata painted black) did likewise, but three others showed partial development beyond 3rd instar before dying, despite the shortday conditions to which they were exposed.

Table 2. Growth of treated (painted) Maryland viceroy larvae exhibiting direct development in longday photoperiod (LD 20:4; 25° ± 2°C), 1970 data.

Treatment		No. of larvae	No. and % surviving[1] (to pupa)	Expected No. Surviving	sum Chi sq. (d.f.=1) (Yates)
Treated controls (clear)	alive	25	21 (84%)	21.0	0.08
	dying		4 (16%)	4.0	(p = 0.77)
Experimental larvae (black)	alive	36	13 (36%)	30.24	69.25
	dying		23[2] (64%)	5.76	(p<.001)

[1] The survival rate for untreated **L. archippus** larvae (instars 1-3)= 0.84, and mortality= 0.16. The expected numbers were calculated using these values.

[2] 20 larvae died as prepupae, three as pupae.

Although results of other experiments suggested that diapause termination occurred equally well under both shortday and longday photoregimes (Platt, 1984; per. obs.), I suspect that the 4th and 5th larval instars do remain photosensitive. Certain additional observations of mine support this contention: larvae reared either under continuous light or in complete darkness almost invariably died. Molting larvae and prepupae seem to be especially sensitive to photophase disturbance or alteration. Presumably this is because the diel hormonal neurosecretory rhythms influencing growth and development (mainly those involving brain hormone, juvenile hormone (JH), and ecdysone) remain unregulated, so that each separate secretory rhythm drifts out of phase with the others. Additionally, shifting photophase, or subjecting larvae to both artifical photoperiod and ambient cycles of differing lengths at the same time cause the larvae to exhibit viral-like symptoms, which I have termed "photoperiod disease". Death usually results from such treatments. Often, the grayish-white dorsolateral abdominal saddlepatches of these larvae become discolored, and turn a rusty orange-brown as these effects take place. Larval death usually is associated with molting (or the larval-pupal ecdysis) in such cases (Platt, per. obs.).

A few larvae that exhibited the above symptoms were sent to the USDA Insect Pathology Laboratory at Beltsville, MD for

Table 3. Growth of longday experimental and control groups of Maryland viceroy larvae (two F_1 broods, UMBC stocks) reared in Liverpool, England during May-June, 1976. (Longday = LD 16:8; 25° ± 2°C). SP= saddlepatches, S= stemmata.

Treatment	No. of larvae	No. & % dying	stages[1] at death	No. Adults (A) or Hibernacula (H)
I. Untreated controls	6	1 (16.6%)	P	5(A)
II. Treated controls (clear)				
A. SP only	6	0	--	6(A)
B. SP & S	6	1 (16.6%)	3rd	5(A)
subtotals	18	2 (11.1%)	3rd, P	16
III. Experimental groups (black)				
A. SP only	6	6 (100%)	4th, 5th (3) PP, P	0
B. SP & S	6	6 (100%)	3rd, PP (5)	0
C. S only	6	6 (100%)	5th (3) P(3)[2]	0
subtotals	18	18 (100%)	3rd, 4th, 5th (6), PP(6) P(4)	0

[1] stages: 3rd, 4th, 5th larval instars; PP= prepupa; P= pupa.
[2] head region of pupae remained larval (see text).

analysis, however, no pathogens were found in the larvae. Only a few yeast cells were present in the larval haemolymph following death, and an "environmental factor" was suggested as the probable cause of death.

Discussion and Conclusions

The black painted experimental larvae reared in longday photoperiod exhibited normal growth and intially formed typical prepupae. The prepupal stage in Limenitis usually lasts about 24 hours before ecdysis occurs. After about 12 hours the experimental larvae began to dehydrate, and then rapidly shrivelled and died. The black paint covering the saddlepatch was considered to be a probable cause of some physiological disorder inhibiting metamorphosis. Very likely, juvenile hormone (JH) titres remained high in the larval haemolymph, rather than shutting down as they do in normal larvae. If so, then the saddlepatch region quite likely served some photoreceptive

Table 4. Growth of shortday experimental and control groups of Maryland viceroy larvae (two F_1 broods, UMBC stocks) reared in Liverpool, England during May-June, 1976. (Shortday= LD 12:12; 25°C ± 2°C). (SP= saddlepatches; S= stemmata).

Treatment	No. of larvae	No. & % dying	stages[1] at death	No. Adults (A) or Hibernacula (H)
I. Untreated controls	6	0	--	6 (H)
II. Treated controls				
A. SP only	6	0	--	6 (H)
subtotals	12	0	--	12
III Experimental groups				
A. SP only	6	6 (100%)	3rd (3), 4th, 5th (2)	0
B. SP & S	7	1 (14.3%)	3rd	6 (H)
C. S only	6	4 (67%)	3rd, PP P[2]	2 (H)
subtotals	19	11 (57.9%)	3rd (6), 4th 5th (2), PP P	8 (H)

[1] stages: 3rd, 4th, 5th larval instars; PP= prepupae; P= pupae.
[2] head region of pupae remained larval (see text).

function. Similar mortality occurs when larvae are allowed to pupate in continuous light, without any diel photophase.

If the above hypothesis is correct, then these larval saddlepatches may function similarly to the white cuticular patches located between the antennae of diapausing pupae of Antheraea silkmoths (Saturniidae). These latter regions act as windows, allowing the insect brains to receive light stimuli through their dense cocoons (Shakhabozov, 1961; Williams & Adkisson, 1964; Williams et al., 1965). The abdominal saddlepatches persist in the later larval and pupal stages of Limenitis, where they possibly remain active in photoreception.

Hinks (1975) demonstrated that larvae of a number of arctiid, noctuid, and sphingid moths all possessed a bilateral segmental series of peripheral neurosecretory cells, located in all three thoracic segments, and in abdominal segments one through eight. He beleived these single cells or small ganglion-like cell clusters functioned as neurohemal organs. Likewise, Beck & Alexander (1964a, b, c) have reported photoperiod-induced diel secretory rhythms that involved the hindgut hormone, proctodone, in mature larvae of the European corn borer, Ostrinia nubilalis (Hübner). In this species, which lacks an abdominal saddlepatch pattern, the hormone released into the haemolymph subsequently stimulated the insect brain.

Beck (1980) noted that photoperiod entrainment of diel behavioral rhythms that involved such activities as flight, sexual behavior, and oviposition, as well as larval locomotion and feeding, depended on the duration of the scotophase, rather than the photophase per se. In all, he recorded 15 species of Heterocera, representing nine families of Lepidoptera. However, all species were nocturnal moths. Diurnal Lepidoptera, such as all species of temperate Limenitis, may respond to the photophase itself. Such behavioral activities as hibernaculum construction, larval locomotion and feeding, and pupation often occur in the light phase of the diel cycle. The results in this paper suggest a photosensitive role of the saddlepatch in Limenitis. Additional experiments are planned to further test the possibility that the pale mid-abdominal saddlepatch of admiral butterfly larvae possibly may be photosensitive.

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Literature Cited

Beck, S. D. 1980. Insect Photoperiodism. Academic Press. New York, NY. 387 pp.

Beck, S. D. & N. Alexander. 1964a. Chemically and photoperiodically induced diapause development in the European corn borer, Ostrinia nubilalis. Biol. Bull. 126:175-184.

Beck, S. D. & N. Alexander. 1964b. Hormonal activation of the insect brain. Science 143:478-479.

Beck, S. D. & N. Alexander. 1964c. Proctodone, an insect developmental hormone. Biol. Bull. 126:185-198.

Brewer, J. (ed.). 1978. What's wrong with this picture? News of the Lepid. Soc. No. 4 (July/Aug.):8.

Burkhardt, D. 1964. Colour discrimination in insects. Adv. Insect Physiol. 2:131-174.

Callahan, P. L. 1965. Intermediate and far infrared sensing of nocturnal insects. I. Evidence for a far infrared (FIR) electromagnetic theory of communication and sensing in moths and its relationship to the limiting biosphere of the corn earworm. Ann. Entomol. Soc. Amer. 58:727-745.

Clark, S. J. & A. P. Platt. 1969. Influence of photoperiod on development and larval diapause in the viceroy butterfly, Limenitis archippus. J. Insect Physiol. 15:1951-1957.

Edwards, W. H. 1884. Butterflies of North America. Privately printed. Vol. 1, pp. 111-147.

Frankos, V. F. & A. P. Platt. 1976. Glycerol accumulation and water content in larvae of Limenitis archippus: Their importance to winter survival. J. Insect Physiol. 22:623-628.

Goldsmith, T. H. 1961. The color vision of insects. in W. D. McElroy & B. Glass (eds.), A symposium on light and life. pp. 771-794. Johns Hopkins Press, Baltimore.

Hagen, H. A. 1876. On some insect deformities. Memoirs of the Mus. Comp. Zool., Harvard Univ. Vol. 11(9).

Harvey, W. R. 1962. Metabolic aspects of insect diapause. Ann. Rev. Entomol. 7:57-80.

Hinks, C. F. 1975. Peripheral neurosecretory cells in some Lepidoptera. Can. J. Zool. 53:1035-1038.

Hong, J. W. & A. P. Platt. 1975. Critical photoperiod and day length threshold differences between northern and southern populations of the butterfly Limenitis archippus. J. Insect Physiol. 21:1159-1165.

Ichikawa, T. & H. Tateda. 1982. Distribution of color receptors in the larval eyes of four species of Lepidoptera. J. Comp. Physiol. 149:317-324.

Klots, A. B. 1951. A field guide to the butterflies. Peterson Nature Guide Series. Houghton-Mifflin Press. NY. 340 pp.

Lees, A. D. 1955. The physiology of diapause in arthropods. Cambridge Univ. Press, Cambridge, Mass. 151 pp.

Lees, A. D. 1960. Some aspects of animal photoperiodism. Cold Spr. Harbor Symp. Quant. Biol. 25:261-268.

Platt, A. P. 1969. A simple technique for hand-pairing Limenitis butterflies (Nymphalidae). J. Lepid. Soc. 23:109-112.

Platt, A. P. 1979. What was wrong?, & cover photographs: "Candidate for the title of nonconformist butterfly for 1979". Ripples, letter to the editor. News of the Lepid. Soc. No. 3 (May/June):4.

Platt, A. P. 1984. Stubby-winged mutants of Limenitis (Nymphalidae) - their occurrence in relation to photoperiod and population size. J. Res. Lepid. 23:217-230.

Platt, A. P. & S. J. Harrison. 1988. "Black-light" induction of photoperiod-controlled diapause responses of the Viceroy butterfly, Limenitis archippus (Nymphalidae). J. Res. Lepid. 26(1-4):177-186.

Saunders, D. S. 1982. Insect clocks. 2nd ed. Pergammon Press, NY. 409 pp.

Scudder, S. H. 1889. The butterflies of North America, with special reference to New England. 3 vols Publ. privately by the author, Cambridge, Mass.

Silberglied, R. E. 1979. Communication in the ultraviolet. Ann. Rev. Ecol. Syst. 10:373-398.
Shakhabazov, V. G. 1961. The reaction to the length of daylight and the light receptor of the pupa of the Chinese oak silkworm, **Antherea pernyi** G. Dokl. Adka. Nauk. SSSR 140:944-946.
Stammenhaus, H. 1978. The correct answer to the question: "What's wrong with this picture?". News of the Lepid. Soc. No. 6 (Nov./ Dec.):3.
Tanaka, Y. 1950a. Studies on hibernation with special reference to photoperiodicity and breeding of the Chinese Tussar-silkworm. Part I. J. Seric. Sci, Japan 19:358-371.
Tanaka, Y. 1950b. Studies on hibernation with special reference to photoperiodicity and breeding of the Chinese Tussar-silkworm. Part II. J. Seric. Sci. Japan 19:429-446.
Tanaka, Y. 1950c. Studies on hibernation with special reference to photoperiodicity and breeding of the Chinese Tussar-silkworm. Part III. J. Seric. Sci. Japan 19:580-590.
Tanaka, Y. 1951a. Studies on hibernation with special reference to photoperiodicity and breeding of the Chinese Tussar-silkworm. Part V. J. Seric. Sci. Japan 20:132-138.
Tanaka, Y. 1951b. Studies on hibernation with special reference to photoperiodicity and breeding of the Chinese Tussar-silkworm. Part VI. J. Seric. Sci. Japan 20:191-201.
Weed, C. M. 1926. The book of butterflies. Doubleday Doran & Co., Inc. Garden City, NY. 286 pp.
Wigglesworth, V. B. 1970. Insect Hormones. W. H. Freeman & Co., San Francisco, CA. 159 pp.
Williams, C. M. & P. L. Adkisson. 1964. Physiology of insect diapause. XIV. An endocrine mechanism for photoperiodic control of pupal diapause in the oak silkworm, **Antherea pernyi**. Biol. Bull. 127:511-524.
Williams, C. M., P. L. Adkisson, & C. Walcott. 1965. Physiology of insect diapause. XV. The transmission of photoperiod signals to the brain of the oak silkworm, **Antherea pernyi**. Biol. Bull. 128:497-507.
Williams, T. F. & A. P. Platt. 1987. Absence of diapause in a laboratory strain of the Florida viceroy butterfly. Amer. Midl. Nat. 117:346-352.

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Observations on **Gnorimella maculosa** (Coleoptera: Scarabaeidae: Cetoniinae)

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Abstract

Gnorimella maculosa is considered rare in collections. During 1988, ten specimens were collected throughout Maryland. This species may not be as rare as is indicated from collections.

Gnorimella maculosa (Knoch) is considered rare in collections (Hinks, 1957, 1958). Staines (1986) reported this species from Charles, Howard, Montgomery, and Prince George's Counties. Glaser (1987) recorded no additional localities. There is little published information on the biology and life history. Ritcher (1945) states that cetoniid larvae feed on organic matter in soil, decaying wood or trash, and other debris accumulated in the hollows of trees. Hinks (1957) collected specimens flying around **Cornus rugosa** Lam. (Cornaceae); he also summarized the following flower records for adults: **Liriodendron tulipifera** L. (Magnoliaceae), **Rubus** sp., **Crataegus** sp., **Malus** sp. (Rosaceae), and **Rhus** sp. (Anacariaceae). Staines (1986) recorded specimens collected from dead red maple (**Acer rubrum** L., Aceraceae), eastern redbud (**Cercis canadensis** L., Leguminosae), and flowering dogwood flowers (**C. florida** L.).

During 1988, ten specimens of **G. maculosa** collected in Maryland were seen by the author (unless noted the specimens are in the collection of the author):

Anne Arundel Co.: Edgewater, 27-30/V/1988, taken in blacklight, two specimens.
Baltimore Co.: Soldiers Delight Natural Area, 14/VI/1988, taken in a southern pine beetle pheromone trap.
Cecil Co.: Elk Neck State Forest, 2/VI/1988, taken in a southern pine beetle pheromone trap.
Garrett Co.: Accident, 5/VII/1988, taken in an Allison-Pike trap, four specimens in the Maryland Department of Agriculture Collection.
Somerset Co.: Princess Anne, 9/V/1988, taken in a southern pine beetle pheromone trap.
Worcester Co.: Girdletree, 17/V/1988, taken in a southern pine beetle pheromone trap.

These records indicate that **G. maculosa** is more common than indicated from collections. The species appears to frequent wooded areas and is a strong flier. The southern pine beetle pheromone traps contained frontalin plus loblolly pine turpentine.

Literature Cited

Glaser, J. D. 1987. Addenda to the checklist of Maryland Scarabaeoidea. MD Entomol. 3:23-24.
Hincks, S. D. 1957. Distribution and occurrence of Gnorimella maculosa (Knoch). Can. Field Nat. 71:199-200.
Hinks, S. D. 1958. Canadian specimens of Gnorimella maculosa (Knoch) (Scarabaeidae) with notes on variation. Coleopts. Bull. 14:91-93.
Ritcher, P. O. 1945. North American Cetoniinae. Bull. Kentucky Agric. Expt. Stn. No. 476. 39 pp.
Staines, C. L. 1986. An annotated checklist of the Scarabaeoidea (Coleoptera) of Maryland. MD Entomol. 2(4):79-89.

MARYLAND ENTOMOLOGIST 3(3):68 (1989)

Book Review- Acarology- Mites and Human Welfare. T. A. Woolley. John Wiley & Sons, New York, 1988. 484 pp. $57.50

As most of the general texts on the Acari are out of print, this book is a welcome addition. Part I is an introduction to acarology, beginning with an overview providing general information about the Acari, their ecological locations, and the major ways they affect people. Chapter 2 discusses the relationship of mites and other arachnids, and provides keys to the subclasses and orders of the Arachnids.

Part II focuses on the anatomy, size, integument, chaetotaxy, internal morphology, feeding habits, reproduction and pheromones.

Part III is on classification. Each of the two cohorts (Parasitiformes, Acariformes) and seven orders (Opilioacarida, Holothyrida, Gamasida, Ixodida, Actinedida, Astigmata, Oribatida) are characterized. Many families are described breifly, and exemplified.

Part IV delves into the history of acarology and the ecology of mites (Chatper 23). References are provided at the end of each chapter.

The author has provided a superb overview of the subject of Acarology, however, this book is not intended as a systematic text.

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MARYLAND ENTOMOLOGIST 3(3):69-70 (1989)

Additional records on Maryland Silphidae (Coleoptera)

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Abstract

Additional county records are presented for **Necrodes surinamensis**, **Silpha americana**, **oiceoptoma inaequale**, **O. novaboracense**, **Nicrophorus orbicollis**, **N. pustulus**, **N. sayi**, and **N. tomentosus**. **Nicrophorus defodiens** is characterized and the key in Staines (1987) is amended to include this species.

Staines (1987) reviewed the Silphidae species known to occur in or near Maryland. After that article was submitted for publication in 1984, an excellent work on Canadian Silphidae was published by Anderson & Peck (1985). In this work there were several generic changes affecting common Maryland species plus range maps of all North American species.

Since 1984, collecting in Maryland has yielded the following new county records and one species that was not included. The museums and collections where the specimens are deposited are noted by the following abbreviations in the text: USNM, National Museum of Natural History, Smithsonian Institution; FSCA, Florida State Collection of Arthropods; MDA, Maryland Department of Agriculture; CLS, C. L. Staines, Jr.

Necrodes surinamensis (Fab.): Caroline Co.: Preston, 8-VIII-1988 (FSCA). Charles Co.: Indiantown, 19-VII-1988 (USNM). Dorchester Co.: Rhodesdale, 28-III-1989 (FSCA). Somerset Co.: Princess Anne, 7-VIII-1988 (USNM, FSCA). Talbot Co.: Seth State Forest, 29-VI-1988 (USNM).

Silpha americana L.: Talbot Co.: Seth State Forest, 29-VI-1988 (USNM).

Oiceoptoma inaequale (Fab.): Talbot Co.: Seth State Forest, 29-VI-1988 (USNM, FSCA).

O. novaboracense (Forster): Talbot Co.: Seth State Forest, 29-VI-1988 (USNM, FSCA).

Nicrophorus orbicollis Say: Calvert Co.: St. Leonard, 19-V-1989 (FSCA). Caroline Co.: Denton, 14-V-1989 (FSCA). Dorchester Co.- Reliance, 16-V-1989 (FSCA). Queen Anne's Co.: Ingleside, 21-V-1989 (FSCA). Somerset Co: Princess Anne, 25-VII-1988 (FSCA).

N. pustulatus Hershel: Caroline Co: Harmony, 20-V-1989 (FSCA). Carroll Co: Eldersburg, 19-V-1989 (FSCA). Charles Co: Waldorf, 21-V-1989 (FSCA). Dorchester Co.: Rhodesdale, 28-III-1989 (FSCA). Howard Co: Woodbine, 6-VII-1988 (USNM, FSCA). Queen Anne's Co.: Ruthsburg, 15-VIII-1988 (USNM).

N. sayi Laporte: Howard Co.: Clarksville, 8-20-XI-1979 (CLS). Talbot Co: Seth State Forest, 29-VI-1988 (USNM).

N. **tomentosus** Weber: Carroll Co.: Hampstead, 24-VI-1988 (USNM). Talbot Co.: Seth State Forest, 29-VI-1988 (USNM).

N. **defodiens** Mannerheim

Description: Pronotum quadrate, with wide lateral and basal margins. Antennal club entirely black. Metasternal pubescense dense, yellow, metepimeron glabrous. Hind tibia straight. Elytral pattern variable. 12 to 18 mm. in length.

Ecology: **Nicrophorus defodiens** is found primarily in forests. Adults do not bury carcasses but conceal them under leaves and other debris (Anderson & Peck, 1985).

Distribution: Transcontinenal in Canada; California, Washington, Oregon, Idaho, Montana, Wyoming, and Utah on the west coast; on the east coast Maine west to North and South Dakota, south to North Carolina (Anderson & Peck, 1985).

Specimens examined: Garrett Co.: Bittinger, 1-VII-1988, 29-VII-1988 (USNM, FSCA, MDA, CLS). A total of 27 specimens of this species were captured. This species can be keyed with the following modifications to the Nicrophorus key in Staines (1987):

6. Three terminal segments of antenna black.............6a
   Three terminal segments of antenna red................7

6a. Base of elytral epipleuron orange, with prebasal black spot.....................................**vespilloides**
   Base of elyral epipleuron entirely black.....**defodiens**

Literature Cited

Anderson, R. S. & S. B. Peck. 1985. The carrion beetles of Canada and Alaska Coleoptera: Silphidae and Agyrtidae. The Insects & Arachnids of Canada Part 13: 1-121.

Staines, C. L. 1987. The Silphidae (Coleoptera) of Maryland. MD Entomol. 3(1):13-18.

RECENT LITERATURE

Wheeler, A. G. 1988. "Violent deaths" of solider beetles revisited: new records of the fungal pathogen **Eryniopsis lampyridarum** Coleopts. Bull. 42:233-236.

Wheeler, A. G. & E. R. Hoebeke. 1988. Biology and seasonal history of **Rhopalus (Brachycarenis) tigrinus**, with descriptions of immature stages. J. New York Entomol. Soc. 96:381-389.

Henry, T. J. 1989. **Carinicoris**, a new phyline plant bug genus from the eastern United States, with a discussion of generic relationships (Heteroptera: Miridae). J. New York Entomol. Soc. 97:87-99.

MARYLAND ENTOMOLOGIST 3(1):71-73

The Genus **Meropleon** Dyar (Lepidoptera: Noctuidae, Amphipyrinae) in Maryland

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Abstract

Four years of continuous collecting have shown that two species of the genus **Meropleon** are resident in Maryland. This is the first report of the occurrence of **M. titan**, and confirms the presence of **M. diversicolor**. Blacklight trapping near marshy habitats during September and October may reveal the presence of one or more of the remaining species.

"**Meropleon** is a distinct and isolated genus of five species endemic to eastern North America." Of the five described species, only one, **M. diversicolor** (Morrison), is recorded from Maryland. This record is based on a single specimen in the collection of the National Museum of Natural History (NMNH), Smithsonian Institution, and is labeled "Md." (Ferguson, 1982).

Nightly collecting with UV lights from 1985 to 1988 at Southaven, Anne Arundel County, and at other locations in the state, has confirmed the presence of **Meropleon** in Maryland.

Meropleon titan Todd (Hodges # 9426)

Meropleon titan was known only from South Carolina, Mississippi, Missouri, and north central Texas (Ferguson, 1982). The flight period is 24 September to 10 October. One specimen reared from larvae found boring in corn (**Zea mays**) 20 June 1957 emerged as an adult 26 September (Ferguson, 1982).

Two specimens of **M. titan** were collected 29 September and 1 October 1986 at Southaven (Stevenson, 1987). Since that time an additional specimen collected 24 September 1985 (previously misidentified), seven from 27 September to 16 October 1987 and seven from 18 September to 16 October 1988 have been identified from the same locality. An additional specimen of **M. titan** was collected at Edgewater, Anne Arundel County, on 26 September 1988 by C. L. Staines. This locality is also on the South River, about one mile from Southaven. These records extend the distribution of **M. titan** from South Carolina to tidewater Maryland, a distance of about 600 miles. The collection site at Southaven is within 200 feet of tidal water of the South River, an inlet of the Chesapeake Bay. Very little marsh grass has survived the onslaught of "civilization" and corn is no longer cultivated locally.

A total of 18 specimens (see Table 1), fifteen male and three female **M. titan**, have been collected between 18 September and 16 October during the four seasons 1985 through 1988. These are more than are known from ony other locality

(Ferguson, pers. comm.). Intensive collecting at the right season, particularly in tidewater areas, may well reveal additional colonies. Five specimens have be deposited in the NMNH collection.

Meropleon diversicolor (Morrison) (Hodges # 9427)

Meropleon diversicolor was first taken at Southaven on 27 September 1985. Another specimen was taken near the South River on 13 August 1988 by John D. Glaser. The only eastern shore record is 24 September 1986 at Quaker Neck Landing, Kent Co.. Eleven other recent specimens have the following data (number of specimens noted in parentheses): Harford Co.- Otter Pt. Creek, 4 September 1987 (1); Garrett Co.- New Germany State Park, 21 September 1988 (1); Glades of Cherry Creek, 9-29 September 1988 (5); Cunningham Swamp, 24 August to 10 September 1988 (4).

Meropleon diversicolor may be distributed throughout the state as these sites extend from the eastern shore (Kent Co.), in the tidewaters of the Chesapeake Bay to the mountains of westernmost Garrett County. The flight period in Maryland is mid-August to the end of September (see Table 1), peaking the last two weeks of September. This peak is two weeks earlier than **M. titan**.

Meropleon ambifuscum (Newman) (Hodges # 9428)

No record of **M. ambifuscum** is known from Maryland. However, its known distribution is the eastern United States from Connecticut and Michigan south to South Carolina, Mississippi, and Arkansas (Ferguson, 1982). This suggests that it should occur in Maryland. Specimens should be checked carefully because of possible confusion between **M. diversicolor** and **M. ambifuscum**.

Meropleon cosmion Dyar (Hodges # 9425)

Ferguson (1982) did not record **M. cosmion** north of North Carolina. Eight specimens of **M. cosmion** were collected during the period 2-18 October 1988 in Burlington, Atlantic, and Cape May Counties, New Jersey by Dale F. Schweitzer (Schweitzer, pers. comm.). The host plant appears to be sugarcane plumegrass, **Erianthus giganteus** (Gramineae). **Erianthus giganteus** is common in swamps and mosit soil on the coastal plain of Maryland. Blacklight trapping near growths of this grass during the first two weeks of October will undoubtedly establish the presence of this moth in Maryland.

Table 1. Blacklight collection of **Meropleon** in Maryland (1985-1988). JDG= John D. Glaser; CLS= C. L. Staines; HGS= H. G. Stevenson.

Species	No. Specimens	Location	Dates
titan	17 (HGS)	Anne Arundel Co.	18 Sept.- 16 Oct.
	1 (CLS)	Anne Arundel Co.	26 Sept.
diversicolor	1 (HGS)	Kent Co.	24 Sept.
	1 (JDG)	Harford Co.	4 Sept.
	1 (JDG)	Anne Arundel Co.	13 Aug.
	1 (HGS)	Anne Arundel Co.	27 Sept.
	10 (JDG)	Garrett Co.	24 Aug.- 29 Sept.

Meropleon cinnamicolor Ferguson (Hodges # 9428.1)

Discovery of this species in Maryland is a remote possibility as it has never been found anywhere other than the type locality on the south side of the South Santee River, South Carolina (Ferguson, 1982). Collections from the tidewater salt marshes near the mouth of the Bay during October and November should be inspected carefully for this species.

Summary

Of the five described species of **Meropleon**, two (**M. diversicolor** and **M. titan**) have now been collected in Maryland. **Meropleon diversicolor**, previously known from a doubtful specimen, appears to be distributed statewide. Limited experience indicates a larger population in the western mountain bog habitats. **Meropleon titan** is a resident of tidewater Maryland, at least in the headwaters of the South River, as evidenced by its appearance each year for the past four years. **Meropleon ambifuscum**, if here, would be expected west of the Chesapeake during October and November. **Meropleon cosmion** may well exist in local colonies in coastal areas. **Meropleon cinnamicolor** should be thought of as a remote possibility in tidewater Maryland salt marsh habitats.

My special thanks to D. C. Ferguson, USDA, SEL, for criticism and suggestions in preparing this paper.

Literature Cited

Ferguson, D. C. 1982. A revision of the genus **Meropleon** Dyar, etc. Entomography 1:223-235.

Stevenson, H. G. 1987. Phaeton 7(5):

Tidewater Maryland- Central Mississippi Lepidoptera

Stevenson (1988a, b, c) reported all five species of **Metaxaglaea** (Lepidoptera: Noctuidae), **Dasychira atrivenosa** (Palm) (Lepidoptera: Lymantriidae), and **Xestia bolli** (Grote) (Lepidoptera: Noctuidae) from Tidewater Maryland. All of these except **Metaxaglaea inulta** (Grote) have been taken in central Mississippi. The records are summarized below:

M. **viatica** (Grote) (Hodges No. 9944): 150 specimens. Hinds, Warren, and Rankin Cos. October to March.
M. **semitaria** (Franclemont) (Hodges No. 9945): 2 specimens Vicksburg, Warren Co. 31 December 1981; Pearl, Rankin Co. 26 December 1970.
M. **australis** Schweitzer (Hodges No. 9945.1): 2 specimens. 29 January 1981 and 18 November 1981. Vicksburg, Warren Co.
M. **violacea** Schweitzer (Hodges No. 9945.2): 7 specimens, all Vicksburg, Warren Co. 28 December 1981, 6 January 1982, 17 February 1982, 3 February 1984.
D. **atrivenosa** (Hodges No. 8299): 19 specimens, all Bovina or Vicksburg, Warren Co. 1 May, 2 June, 2 July, 4 August, 9 September, 1 October.
X. **bollii** (Hodges No. 10956): 8 specimens, all Hinds and Rankin Cos. 1 March, 1 October, 6 November.

Metaxaglaea viatica known to Stevenson from a single specimen, is common in central Mississippi, the others are not common either in Tidewater Maryland or central Mississippi.

Literature Cited

Stevenson, H. G. 1988a. All five species of **Metaxaglaea** (Lepidoptera:Noctuidae: Cuculliinae) at a single site in Tidewater Maryland. MD Entomol. 3(2):40-41.
Stevenson, H. G. 1988b. **Dasychira atrivenosa** (Palm) (Lepidoptera: Lymantriidae) in Tidewater Maryland. MD Entomol. 3(2):46.
Stevenson, H. G. 1988c. **Xestia bollii** (Grote) (Lepidoptera: Noctuidae:Noctuinae) in Tidewater Maryland. MD Entomol. 3(2):53-54.

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Book Review- **Silent Spring Revisited.** C. J. Marco, R. M. Hollingworth, and W. Durham (eds.). American Chemical Society, Washington, D. C. 1987. 214 pp. $17.95.

That Rachel Carson's book Silent Spring was controversial is unrefutable. That all the predictions and statements were correct is questionable. That the book is important is a fact. Silent Spring Revisited is based upon a symposium organized to "address the issues that Rachel Carson raised and to focus on their pertinence for the past, present, and future". The contributors provided an excellent cross-section of opinions on all sides of the issues- though the bias of the authors was evident.

Shirley Briggs, of the Rachel Carson Council, Inc., starts with a discussion of the vision and legacy of Ms Carson. Ms Briggs discusses Carson's motives, the reaction to Silent Spring, and then goes on to the comprehensive view. She states that "we at Rachel Carson Council have yet to be shown a valid example" (of inaccuracies or mistakes). G. K. Kohn of Zoecon Corp., in chapter 10 points out some inaccuracies, though recognizing Carson's achievements. Kohn's chapter is an excellent balance of the conflicting values of a pragmatic approach to agricultural productivity and the preservation of the environment. John Moore of EPA reviews the evolution of government regulations. He states that "the extensive requirements for current regulation do not always provide clear insight as to appropriate action. For example, the technical capability to routinely analyze in parts per million, billion, trillion or quadrillion clearly surpass the toxicologists' and other scientist's ability to confidently interpret human or environmental risk". Unfortunately, EPA gets blamed for not doing enough by environment zealots and for being over zealous by the producers and users of pesticides. It may be of interest to note that the National Agricultural Chemical Association estimates the cost and time of developing a pesticides, from test tube to the market, to be $40 million and 8 years. Most of this is to fulfill EPA testing requirements.

C. F. Wilkinson of Cornell University continues the discussion in a chapter on the science and politics of pesticides. He very succinctly states "For the last decade and a half emotional belief, often verging on hysteria, has existed in the United States that society is being slowly poisoned by pesticides and other products of modern chemical technology. Despite the facts that we live longer and generally enjoy a much better quality of life than at any other time in our history, we have become a society consumed with fear and obsessed by the risks in our lives".

Chapters 4-7 assess the toxicity of pesticides to aquatic organisms (by Nimo, Coppage, Pickering, and Hanson of EPA), the impact of pesticides on ground water contamination (by Carsel and Smith of EPA), and the impact of pesticides on bird populations (by R. J. Hall of Fish and Wildlife Service). To quote Nimo, et al. "while ridding the world of weeds, weevils, and webworms/ Be careful of fins, fur, and feathers".

J. E. Davis and R. Doon in chapter 7 review the human health effects of pesticides and discuss acute pesticide poisoning, including suicides; cancer risk; residues; resistance; and disposal. The beneficial aspects of pesticides in relation to public health are neglected. Rosen and Grech present the evaluation and impact of analytical chemistry of pesticides.

Virgil H. Freed of Oregon State University, in chapter 9, covers the global use of pesticides and concerns. Freed points out that despite the continuing and spreading controversy over the use of pesticides, the use of such chemicals has increased annually by 4-5% on a global basis since the publication of Silent Spring. Most of the pesticides are used by developed nations. He mentions a study in which pesticide poisoning was examined in a number of countries. He estimates a rate of 2.9-4.8 per 100,000 persons, with a mortality rate of 5.5%. This comes to 0.16-0.26 persons per 100,000. If this figure is compared to the worldwide morbidity and mortality for marlaria, I believe most developing nations would consider the benefit far greater than the risk.

G. K. Kohn presents the other side of the coin in chapter 10, agriculture, pesticides, and the American chemical industry.

David Pimentel of Cornell University, in chapter 11 questions "is Silent Spring behind us?". He starts with "Fewer pesticides problems during the past two decades" and then follows with "Increased pesticide problems during the past two decades". His figures on pesticide effects on crops seem to be at odds with Kohn's comments. Pimentel estimates a negative impact on crops of about $70 million annually. Kohn states that the additional wealth created by technology to be $9,125,000,000. Pimentel states that 37% of all crops is lost annually to pests in spite of the combined use of pesticidal and non-chemical controls. If this is correct, what would it have been without the use of agrochemical technology? He concludes that pesticides will continue to be effective pest controls but the challenge now is to find ways to use them judiciously to avoid many of the environmental hazards and human poisionings that exist today.

Marco, et al. conclude the volume with an overview of the symposium. They point out that Silent Spring lead society to evaluate the new technologies in terms of risk versus benefits. Whereas lower levels of pesticides can now be detected, the true significance of these small amounts of pesticide residues is often quite uncertain. Toxicity evaluation is a complex process with great uncertainties, and it does not provide answers that are nearly as precise as the analytical techniques. The diverse opinions and opposing views between manufacture-user and environmentalist are clearly seen in the chapters of this book. There are fewer farmers and less labor available, yet more mouths to feed, therefore their seems no liklihood of completely

eliminating chemical controls in the near future. Rachel Carson was right in many respects, and in fewer respects she was wrong. Nature, not just humans generates its share of carcinogens and other posiions. Nature and humans both use chemicals to their own advantage. The human life span is increasing and birds still sing. What Rachel Carson accomplished was to set in motion a philosophy of using all tools in controlling pests, not relying exclusively on chemicals.

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VOUCHER SPECIMEN POLICY

The Council on Collections of the Association of Systematics Collections has recommended the establishment of voucher specimen policies for journals which do not currently have such policies. A voucher specimen is an organism perserved to document published or unpublished data. Authoritatively identified voucher materials should be routinely designated to document the identity of organisms involved in studies. Voucher specimens ensure the credibility and endurance of research results because they document the identity of studied organisms. Authors publishing in the Maryland Entomologist are urged to deposit voucher specimens in recognized insect collections to document their research, and to cite the place of deposit in publications relating to the research.

RECENT LITERATURE

Wheeler, A. G. 1989. Disconycha punctigera (Coleoptera: Chrysomelidae): first host record of a little known flea beetle. Entomol. News 100:67-71.

Wheeler, A. G. 1989. Late lilac, Syringa villosa: New host of the lace bug Leptoypha mutica (Heteroptera: Tingidae). Great Lakes Entomol. 22:35-38.

Wheeler, A. G. 1989. Texocoris nigrellus: Distribution and hosts of an enigmatic plant bug (Heteroptera: Miridae: Orthotylinae). J. New York Entomol. Soc. 97:167-172.

Staines, C. L. 1989. A new genus and species of Hispinae (Coleoptera: Chrysomelidae) from Central America. Proc. Entomol. Soc. Wash. 91:342-345.

Wheeler, A. G. 1989. Grypotes puncticollis (Homoptera: Cicadellidae), a Palearctic pine-feeding leafhopper new to North America. Proc. Entomol. Soc. Wash. 91:350-354.

Staines, C. L. 1989. A revision of the genus Octotoma (Coleoptera: Chrysomelidae, Hispinae). Insecta Mundi 3:41-56.

MARYLAND ENTOMOLOGIST 3(3):78-79 (1989)

Observations on Two Beetles (Coleoptera) Feeding on **Rumex** (Polygonaceae) in Maryland with a Review of the Literature

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During May, 1989, larvae of two species of Coleoptera were collected feeding on **Rumex crispus** L. (Polygonaceae). Both species were reared in outdoor cages for adult emergence. Larvae, pupae, and adults have been deposited in the U. S. National Museum. Some limited no-choice feeding tests were conducted to determine potential host plant range.

Hypera eximia (LeConte) (Curculionidae)

Larvae of this species were collected on 8 May 1989 in Vienna (Dorchester Co.). The infested plants were found in low areas along the margins of wheat fields (**Triticum aestivum** L.). The first pupae were observed on 22 May. Pupae were found in the soil, in leaf debris, and on the sides of the cage. The last instar larva spins a tough, flexible, yellowish-orange, silken cocoon. Adults remain in the cocoon to harden for about 24 hours after emergence.

Recorded host plants for H. **eximia** are **Rumex orbiculatus** Gray (Popenoe, 1877 as **brittanica**); R. **altissimus** Wood, R. **crispus**, and R. **obtisifolius** L. (Puttler et al., 1973); and **Polygonum** sp. (Anderson, 1971). In no-choice feeding tests larvae would feed on R. **acetosella** L., R. **altissimus**, P. **arifolium** L., and P. **pennsylvanicum** L. (Polygonaceae). Larvae would not feed on **Plantago major** L. (Plantaginaceae).

O'Brien and Wibmer (1982) record the known distribution of H. **eximia** as Illinois, Indiana, Texas, Colorado, Iowa, Kansas, Missouri, Nebraska, and Manitoba. Anderson (1971) recorded the species from Maryland when he described the larva.

Gastrophysa cyanea Melsheimer (Chrysomelidae)

Adults, larvae, and eggs of G. **cyanea** were collected on 26 May 1989 in Brandywine (Prince George's Co.). A female collected in copula laid an egg mass the night of 26-27 May. A field-collected egg mass hatched 29 May. The egg mass laid in captivity hatched 31 May. The first pupae were observed on 29 May. The first adults were collected 4 June.

Force (1966) conducted feeding tests for larval and adult host plants of G. **cyanea**. Larval feeding was observed on: Rumex **crispus**, R. **pulcher** L., R. **californicus** Rech., R. **hymenosephalus** Torr., R. **acetosella**, **Polygonum affine** D. Don, P. **aviculare** L., P. **capitatum** Buch.-Ham., P. **cuspidatum compactum** Hook. (as **reynoutria**), **Fagopyrum esculentum** Moench., and **Muehlenbeckia** sp.

(Polygonaceae). In no-choice feeding tests larvae would feed on P. **arifolium** and P. **pennsylvanicum**.

The larva of G. **cyanea** was illustrated in Boving & Craighead (1931). Howard et al. (1982) published a photograph of an egg mass.

Parasitoids emerged from G. **cyanea** pupae. These were identified as **Microctonus gastrophysae** (Ashmead) (Hymenoptera: Braconidae). This parasitoid attacks G. **cyanea** and G. **viridula** (DeGeer) and has been reported from the District of Columbia, South Carolina, and Virginia (Marsh, 1979). Voucher specimens have been deposited in the U. S. National Museum.

Acknowledgements

We would like to thank E. J. Ford for the identification of the adult **Hypera eximia** and P. M. Marsh, Systematic Entomology Lab., for the identification of **Microctonus gastrophysae**.

Literature Cited

Anderson, D. M. 1971. Observations on the larva of **Hypera eximia** (LeConte) (Coleoptera: Curculionidae). Proc. Entomol. Soc. Wash. 73:117-119.

Boving, A. G. & F. C. Craighead. 1931. An illustrated synopsis of the principal larval forms of the order Coleoptera. Entomol. Amer. 11(n.s.):1-351.

Force, D. C. 1966. Reactions of the green dock beetle, **Gastrophysa cyanea** (Coleoptera: Chrysomelidae), to its host and certain nonhost plants. Ann. Entomol. Soc. Amer. 59:1119-1125.

Howard, D. F., M. S. Blum, T. H. Jones, & D. W. Philips. 1982. Defensive adaptations of eggs and adults of **Gastrophysa cyanea** (Coleoptera: Chrysomelidae). J. Chem. Ecol. 8:453-462.

Marsh, P. M. 1979. Family Braconidae. in Krombein, K. V., P. D. Hurd, D. R. Smith, & B. D. Burks (eds.). Catalog of Hymenoptera in America north of Mexico. Smithson. Inst. Press. 2737 pp.

O'Brien, C. W. & G. J. Wibmer. 1982. Annotated checklist of the weevils (sensu lato) of North America, Central America, and the West Indies (Coleoptera: Curculionoidea). Mem. Amer. Entomol. Inst. 34, 382 pp.

Popenoe, E. A. 1877. A list of Kansas Coleoptera. Trans. Kansas Acad. Sci. 5:21-40.

Puttler, B., S. E. Thewke, & R. E. Warner. 1973. Bionomics of three Nearctic species, one new, of **Hypera** (Coleoptera: Curculionidae), and their parasites. Ann. Entomol. Soc. Amer. 66:1299-1306.

MARYLAND ENTOMOLOGIST 3(3):80-82 (1989)

The genus **Spragueia** Grote (Lepidoptera: Noctuidae, Acontiinae) in Tidewater Maryland

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Abstract

Spragueia apicalis and **S. dama** are reported from Maryland for the first time.

The genus **Spragueia** contains twelve species in north America north of Mexico (Hodges et al., 1983). In the U.S. it is a southern and southwestern genus with only one species, S. leo, recorded north of Virginia.

Daily collection at U-V light traps for five years has disclosed the presence of two additional species- S. apicalis and S. dama at Southaven, Anne Arundel Co. I also report their collection at other locations and speculate the possible presence of S. onagrus.

S. leo (Guenée) (Hodges #9127)

Spagueia leo, the Common Spragueia, was first recognized 14 August 1987 when a single specimen was taken. Numerous specimens were collected from 23 June to 1 September 1988 and 7 July to 12 September 1989 at Southhaven, Bivalve, Wicomico Co., by Mark J. Rothschild (MJR) and Battle Creek Cypress Swamp, Calvert Co. (BCCS) by park personnel. Glaser reports its occurrence west to the piedmont (J. D. Glaser, pers. comm.).

S. **apicalis** (Herrich-Schäffer) (Hodges #9131)

Spagueia apicalis, the Yellow Spragueia is listed in Forbes (1954) as **Helicontia apicella** (Grote). Forbes notes its range as "Southern States to South America, north in August and September to Oconee, Illinois, Missouri and North Carolina." Covell (1984) states its range as "Va. to Fla." with dates Aug.-Sept. northward: Feb.-Nov. in Fla. and its food as Broom-Snakeroot (**Gutierrezia sarothrae** (Pursh) Britt. & Rusby, Compostiae). He also notes that the North American subspecies is S. **apicalis apicella** (Grote). While Holland (1903, pl.29:56) illustrates the female only, Covell (1984, pl.30:10 and 14) gives excellent pictures of both male and female which differ considerably.

The first specimen is a female collected at Edgewater 7 June 1989 by C. L. Staines, Jr. and a second, a male, 17 July at Southhaven both in Anne Arundel Co. An additional female was taken 7 September at Battle Creek Cypress Swamp in Calvert Co.

Inasmuch as two of the specimens were taken before August it is interesting to speculate that it is a rare resident rather than a "stray" and will be found in proper plant association. However, some other host will probably have to be identified as G. **sarothrae** is not known from Maryland but ranges from "SW Canada and western U.S. to northern Mexico" (Hortus III). The host may be a closely related **Eupatorium** such as E. **rugosum** Houtt., the white snakeroot, which is found in tidewater Maryland.

S. **dama** (Guenée) (Hodges #9122)

Covell (1984) gives the range of this species as "Ky. and N.C. to Fla.". First collected and recognized at Southaven 3 August 1989, additional specimens have been taken August 19, 22, 23 and 24. A specimen was collected 20 August at Edgewater, Anne Arundel Co. (CLS) and four at Bivalve, Wicomico CO. (MJR) 26 and 27 August. Four specimens were trapped at Battle Creek Cypress Swamp 23 August to 7 September.

Seventeen specimens (nine female) of S. **dama** have been collected in Anne Arundel, Calvert, and Wicomico counties in tidewater maryland between 3 August and 12 September. **Spragueia dama**, the Southern Spragueia, is quite distinctive in pattern and easily recognized. However, it seems to be rare on a basis of about ten leo to one **dama**. On several occasions both species have been taken in the same trap the same night.

This is the first report of S. **dama** in Maryland.

S. onagrus (Guenée) Hodges #9126

Spagueia onagrus, the Black-dotted Spragueia, ranges from "N.C. to Fla., west to Miss. April-Sept. Common. Food: Chinquapin and field corn" (Covell, 1984). This species is also distinctively marked, however, in Holland (1903, pl. 29.57), leo is shown but identified as **onagrus** which can be a cause of confusion. In Covell (1984, pl. 30.16) onagrus is shown properly. For additional illustration of Spragueia species see Kimball (1965).

This species probably occurs in tidewater Maryland but it will require consistent trapping to find. As with dama, tidewater Maryland may be at its extreme range. Given the amount of field corn grown in this area as well as the presence of Chinquapin (Eastern Chinquapin **Castanea pumila** L. (Mill.), Fagaceae) it should be found here.

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Table 1. Blacklight collections of **Spragueia** in Maryland (1987-1989)

Species	No. Specimens	Location	Dates
dama	6 (HGS)	Anne Arundel Co.	3 Aug.-12 Sept.
	3 (CLS)	Anne Arundel Co.	22-28 Aug.
	6 (BCCS)	Calvert Co.	23 Aug.-18 Sept.
	4 (MJR)	Wicomico Co.	26-27 Aug.
leo	common	all localities	23 June-20 Sept.
apicalis	1 (CLS)	Anne Arundel Co.	7 June
	1 (HGS)	Anne Arundel Co.	17 July
	1 (BCCS)	Calvert Co.	7 Sept.

BCCS= Battle Creek Cypress Swamp; MJR= M. J. Rothschild; CLS= C. L. Staines; HGS= H. G. Stevenson

Literature Cited

Covell, C.V., Jr. 1984. Moths of Eastern North America. Easton Press 496 pp.
Forbes, W. T. M. 1954. Lepidoptera of New York State, Part III (Noctuidae). Cornell University Agric. Exp. Sta. Memoir 329 pps. 280-281.
Hodges, R. W. et al. 1983 Checklist of the Lepidoptera of America North of Mexico. E. W. Classey Ltd. 284 pp.
Holland, W. J. 1903. The Moth Book. Nature Library Vol. VII. 479 pp.
Hortus Third. 1976. A concise dictionary of plants cultivated in the United States and Canada. MacMillian Publ. Co. 1290 pp.
Kimball, C.P. 1965. The Lepidoptera of Florida. Dept. of Agriculture, State of Florida. Gainesville, Florida.

Recent Literature

Scarbrough, A. G. & L. V. Knutson. 1989. Asilidae, Bombyliidae, Conopidae, and Pipunculidae (Diptera) of Dominica, West Indies. Florida Entomol. 72:519-537.
Wheeler, A. G. & J. E. Fetter. 1989. **Blissus breviusculus**: New distribution records of a little-known chinch bug (Heteroptera: Lygaeidae). J. New York Entomol. 97:265-270.
Wheeler, A. G. 1989. **Megalonotus sabulicola** (Heteroptera: Lygaeidae), an immigrant seed predator of **Centaurea** sp. (Asteraceae): Distribution and habits in eastern North America. Proc. Entomol. Soc. Wash. 91:538-544.
Wheeler, A. G. 1989. **Eremocoris borealis** and **E. ferus** (Heteroptera: Lygaeidae) as household pests in Pennsylvania and Connecticut. Entomol. News 100:165-168.

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A Bibliography of New World Hispinae (Coleoptera: Chrysomelidae)

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Abstract

A bibliography on the New World Hispinae from 1767 to 1988 is presented. Some literature from 1989 is included.

The New World Hispinae are poorly known. The literature consists of scattered species descriptions, faunal lists, and a few biological notes. Most of the literature is in European or South American journals, which are difficult to find. The purpose of this article is to list all articles known to the authors as dealing with New World species. No attempt has been made to check all of the agricultural experiment station reports and similar journals for mention of Hispinae. Several articles concerning New World species released as biological control agents against weeds in other parts of the world are included because of the added biological information obtained. The authors would appreciate copies of any additional articles on Hispinae which are not listed.

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BIBLIOGRAPHY

Abbott, W. S. 1925. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 5:365.
Andrade, J. C. de. 1984. Observações preliminares sobre a eco-etologia de quatro Coleópteros (Chrysomelidae, Tenebrionidae, Curculionidae) quedependem da embaúba (**Cecropia lyratiloba** var. **nana**, Cecropiaceae), na restinga do recreio dos Bandeirantes, Rio de Janeiro. Revista Brasileira de Entomologia 28:99-108.
Andrade, E. N. 1928. Contribuição para o estudo da entomologia florestal paulista. Boletin de Agricultura São Paulo 29:446-453.
Andres, L. A. & C. J. Davis. 1973. The biological control of weeds with insects in the United States. in P. H. Dunn (ed.). Proceedings of the 2nd International Symposium on the Biological Control of Weeds. Commonwealth Institute of Biological Control Miscellaneous Publication 6:11-28.
Andrews, A. W. 1916. Results of the Mershon Expedition to the Charity Islands, Lake Huron: Coleoptera. Michigan Geological & Biological Survey Series 4:67-108.
Anonymous. 1880. **Odontota scutellaris** Oliv., bad on a variety

of trees. American Entomologist (n. s.) 1:151.

Arnett, R. H. 1963. The beetles of the United States. American Entomological Institute, Ann Arbor, MI. 1112 pp.

Arnett, R. H. 1985. American insects, a handbook of the insects of America north of Mexico. Van Nostrand Reinhold Co., NY. 850 pp.

Aslam, N. A. 1965. On **Hispoleptis** Baly (Coleoptera, Hispidae) and **Imatidium** F. (Coleoptera, Cassididae). The Annals and Magazine of Natural History (13)8:687-693.

Athey, L. A. & E. F. Conner. 1989. The relationship between foliar nitrogen content and feeding by **Odontota dorsalis** Thun. on **Robinia pseudoacacia** L. Oecologia 79:390-394.

Auerbach, M. J. & D. B. Strong. 1981. Nutritional ecology of **Heliconia** herbivores: Experiments with plant fertilization and alternative hosts. Ecological Monographs 51:63-83.

Baker, W. L. 1972. Eastern forest insects. United States Department of Agriculture Forest Service Miscellaneous Publication 1175 642 pp.

Balazuc, J. 1988. Laboulbeniales (Ascomycetes) parasitic on Chrysomelidae. in P. Jolivet, E. Pettipeirre, & T. H. Hsaio (eds.) Biology of Chrysomelidae. Kluwer Academic Press. pp. 389-398.

Balazuc, J. & J. Demaux. 1973. Une nouvelle espèce de **Laboulbenia** (Ascomycètes, Laboulbéniales) parasite de Coléoptères Chrysomélides Hispinae. Bulletin mensuel de la Société Linnéenne de Lyon 42 (suppl):7-9.

Balsbaugh, E. U. & K. L. Hays. 1972. The leaf beetles of Alabama. Auburn Agricultural Experiment Station Bulletin 441:1-223.

Baly, J. S. 1858. Catalogue of Hispidae in the collection of the British Museum. Part I. London. 172 pp.

Baly, J. S. 1864. Descriptions of genera and species of Hispidae. The Annals and Magazine of Natural History (3)14:261-271.

Baly, J. S. 1864. Further descriptions of new genera and species of Phytophaga. Transactions of the Entomological Society of London (3)2:251-258.

Baly, J. S. 1864. Descriptions of new genera and species of Phytophaga. Transactions of the Entomological Society of London (3)2:333-357.

Baly, J. S. 1869. Characters of some undescribed species of Phytophaga belonging to the families Cassididae and Hispidae. Transactions of the Entomological Society of London 83-90

Baly, J. S. 1869. Descriptions of new genera and species of Hispidae; with notes on some previously described species. Transactions of the Entomological Society of London 363-382.

Baly, J. S. 1875. Descriptions of hitherto uncharacterized species of Phytophaga. The Entomologists Monthly

Magazine 12:73-75.

Baly, J. S. 1875. Descriptions of new species of Phytophagous Coleoptera. Citula Entomologica 2:179-185.

Baly, J. S. 1877. Descriptions of new species of phytophagous Coleoptera. Cistula Entomologica 2:179-185.

Baly, J. S. 1878. V.- Characters of new genera and of some undescribed species of Phytophagous beetles. The Annals and Magazine of Natural History (5)1:38-44.

Baly, J. S. 1885. Biologia Centrali-Americana, Insecta, Coleoptera, Hispidae. 6(2):1-124.

Barber, H. S. 1946. A problematic apterous Hispid beetle from Cuba (Coleoptera, Chrysomelidae). Memoria de la Sociedad Cubana de Historia Natural 18:19-22.

Barber, H. S. & J. C. Bridwell. 1940. Dejean catalogue names (Coleoptera). Bulletin of the Brooklyn Entomological Society 35:1-12.

Beller, S. & M. H. Hatch. 1932. The Chrysomelidae of Washington. University of Washington Publications in Biology 1:65-144.

Berg, C. 1900. Notice sur les espèces du genre **Alurnus** F. appartenant à la Faune Argentine. Communicaciones de Museo Nacional de Buenos Aires 1:252-257.

Berry, P. A. & M. S. Vaquero. 1957. Lista de insectos classificados de El Salvador. Ministerio de Agricultura Ganadería Boletín Técnico 21:1-134.

Berti, N. & R. D. de Chenon. 1975. Coléoptères Hispinae d'Amérique du Sud nuisibles aux Palmiers description d'une nouvelle espèce. Bulletin de la Société Entomologica de France 80:192-198.

Beutenmuller, W. 1890. Food habits of some Chrysomelidae. Entomologica Americana 6:175-178.

Blackwelder, R. E. 1939. Fourth supplement, 1933-1939 (inclusive), to the Leng Catalogue of Coleoptera of America, north of Mexico. John D. Sherman, NY. 146pp.

Blackwelder, R. E. 1946. Checklist of the Coleopterous insects of Mexico, Central America, the West Indies, and South America. United States National Museum Bulletin 185:551-763. [reprinted 1982 by the Smithsonian Institution]

Blackwelder, R. E. 1947. The genotypes (of Coleoptera) fixed by Fabricius. Bulletin of the Brooklyn Entomological Society 42:51-57.

Blaisdell, F. E. 1939. A study of the species of Hispinae belonging to the genus **Stenopodius** with descriptions of new species (Coleoptera: Chrysomelidae). Transactions of the American Entomological Society 64:421-447.

Blake, D. H. 1961. A note on the Monros Collection. Proceedings of the Entomological Society of Washington 63:207-208.

Blake, D. H. 1970. Some new Chrysomelid beetles from Cuba. Casopis Moravského Musea 53:115-126.

Blake, D. H. 1971. Fifteen new West Indian Chrysomelid beetles.

Proceedings of the Entomological Society of Washington 73:269-282.
Blanchard, C. E. 1843. in G. A. Brullé, Insectes de l'Amerique Meridionale recueillis par Alicidae d'Orbigny. Vol. 2, Part 2, Insectes.
Blanchard, E. 1843. in A. d'Orbigny, Insectes du voyage dans l'Amerique méridionale. Bertrand, Paris. 222 pp.
Blanchard, C. E. 1845. Histoire des insectes, traitant de leurs moeurs et de leurs métamorphoses en général, et comprenant une nouvelle classification fondée sur leurs rapports naturels. Vol. 2. Paris. 524 pp.
Blanchard, C. E. 1846. in Brullé, G. A. Insectes de l'Amérique Méridionale recueillis par Alcide d'Orbigny. Vol. 6:105-222. Paris.
Blatchley, W. S. 1910. The Coleoptera of Indiana. Nature Publishing Co., Indianapolis 1386 pp.
Blatchley, W. S. 1924. The Chrysomelidae of Florida. Florida Entomologist 8:39-46.
Blunck, H. 1954. in P. Sorauer (ed.). Handbuch der Pflanzenkrankheiten. Paul Parey, Berlin. Volume 5 part 2, 599 pp.
Boheman, C. H. 1850. Monographia cassididarum. Vol. 1:1-452. Holmiae.
Boheman, C. H. 1858. Coleoptera. Species nova descripsit. in Kongliga Svenska Fregutten **Eugenies** resa omkring Jorden. Zoologi I, Insecta. 112 pp.
Boheman, C. H. 1862. Monographia cassididarum. Vol. 4:1-504. Holmiae (Supplementum).
Boiteau, G. 1983. The arthropod fauna of potato fields: composition and abundance. Agriculture Canada Research Branch Contribution 1983-16E. 57 pp.
Bondar, G. 1915. Os coqueiros do littoral brasileiro e suas pragas. Boletim da Agricultura São Paulo 16:435-441.
Bondar, G. 1915. Bichos damninhos da fructicultura e arboricultura. Bibl. Agr. Pop. Brazil No. 22.
Bondar, G. 1922. Insectos nocivos e molestias do coqueiro (**Cocos nucifera**) no Brasil. Bahia, Imprensa Official do Estado. 113 pp.
Bondar, G. 1925. Insectos damninhos e molestias das plantas culturaes. Boletim de Laboratorio de Pathologia Vegetal do Estado da Bahia 8:41-57.
Bondar, G. 1929. Hispineos minadores das folhas dos feijões. Correio Agricola Bahia 7:179-182.
Bondar, G. 1930. Insectos damninhos e molestias dos feijões na Bahia. Boletim do Laboratorio de Pathologia Vegetal do Estado da Bahia 9:1-83.
Bondar, G. 1931. Notas biologicas sobre alguns hispineos observados na Bahia. O Campo 2:74-75.
Bondar, G. 1931. Notas biologicas sobre algnus Hispineos brasileiros. Correio Agricola Bahia 9:134-137.
Bondar, G. 1937. Notas entomologicas da Bahia. Revista de Entomologia Rio de Janiero 7:475-483.

Bondar, G. 1938. Notas entomologicas da Bahia. II. Revista de Entomologia Rio de Janiero 8:1-24.
Bondar, G. 1940. Insectos nocivos e molestias do coqueiro (**Cocos nucifera**). Boletím do Instituto Central de Fomento Economico da Bahia 8, 160 pp.
Bondar, G. 1940. Notas entomologicas da Bahia. VI. Revista de Entomologia Rio de Janiero 11:842-861.
Bondar, G. 1940. O problema do coqueiro no Brasil. O Campo 11(122):44-45.
Bondar, G. 1940. Crisomelideos nocivos ao coqueiro- Genero **Himatidium**. O Campo 11(125):12-13.
Bondar, G. 1940. Novas observações sobre **Himatidium Neivai** Bondar, praga do coqieiro. O Campo 11(129):26-27.
Bondar, G. 1940. A posição do genero **Himatidium** na familla dos Crisomelideos e descrição de uma especie nova. O Campo 11(130):37-38.
Bondar, G. 1940. Notas entomologicas da Bahia. V. Revista de Entomologia Rio de Janiero 11:199-214.
Bondar, G. 1941. Notas entomológicas de Bahia. VII. Revista de Entomologia Rio de Janiero 12:268-303.
Bondar, G. 1942. Notas entomológicas de Bahia IX. Revista de Entomología Rio de Janiero 13:1-39.
Bondar, G. 1943. Notas entomológicas de Bahia XIII. Revista de Entomología Rio de Janiero 14:337-388.
Bosq, J. M. 1935. Primera lista de los coleopteros de la Republica Argentina dañinos agricultura. Boltín del Ministerio del Agricultura de la Nación 36:313-346.
Bosq, J. M. 1943. Segunda lista de coleóperos de la Repùblica Argentina, dañinos a la agricultura. Ministerio de Agricultura de la Nación, Direccion de Sanidad Vegetal, Division de Zoología Agrícola de "Ingeniería Agronómica" Buenos Aires 4(18-22). 80 pp.
Boving, A. G. & F. C. Craighead. 1930. An illustrated synopsis of the principal larval forms of the order Coleoptera. Entomologica Americana 11:1-351.
Brême, F. 1844. Insectes coléoptères nouveaux ou peu connus. Premiére et deuxiéme décades. Annales de la Sociéte Entomologique de France (2)2:287-313.
Brèthes, J. 1902. Métamorphose de l'**Uroplata (Heterispa) costipennis** (Boh.) Chap. (Hispidae). Anales del Museo Nacional de Buenos Aires (3)1:13-17.
Brèthes, J. 1921. La vaquita de la acacia (**Chalepus medios** (Chap.)). Anales de la Sociedad Rural Argentina LVI:39-41.
Brimely, C. S. 1938. The insects of North Carolina. North Carolina Department of Agriculture, Division of Entomology 560 p.
Britton, W. E. 1920. Check-list of the insects of Connecticut. State of Connecticut Geological and Natural History Survey Bulletin 31:1-397.
Britton, W. E. 1933. Plant pest handbook for Connecticut. I. Insects. Connecticut Agricultural Experiment Station

Bulletin 344:68-182.
Britton, W. E. & M. P. Zappe. 1927. Some insect pests of nursery stock in Connecticut. Connecticut Agricultural Experiment Station Bulletin 292:119-173.
Bruch, C. 1904. Metamorfosis y biológia de coleópteros argentines. I. **Plagiodera erythroptera** Blanch., **Calligrapha polyspila** Germ., **Chalepus medius** (Chap.). Revista del Museo La Plata 11:325-328.
Bruch, C. 1906. Metamórfosis y biologia de coleópteros argentinos. II. **Agasicles vittata** Jac., **Plectonycha correntina** Lac., **Amplipalpa negligens** Weise. Revista del Museo La Plata 12:205-218.
Bruch, C. 1915. Catalogo sistematico de los Coleópteros de la República Argentina. Pars IX. Revista del Museo La Plata 19:346-441.
Bruch, C. 1928. Metamorfosis de **Probaenia atricornis** Pic (Coleóptero hispido). Physis 9:1-7.
Bruch, C. 1928. Supplemento al catàlogo sistemàtico de los coleópteros de al Repùblica Argentina. IV. Physis 9:186-204.
Bruch, C. 1933. Notas biológicas sobre tres híspidos. **Sternostena laeta** Ws., **Octotoma Daguerrei** Pic y **Chalepus (Xenochalepus) tandilensis** n. sp. Physis 11:213-224.
Bruch, C. 1937. Metamorfosis y etología de los híspidos (Col. Hisp.). Revista del Museo La Plata (Zoologia) (n.s.) 1:31-44
Bruner, S. C. et al. 1975. Catalogo de los insectos que atacan a los plantas economicas de Cuba. Academia de Ciencias de Cuba, Instituo de Zoologia Habana. 399 pp.
Bryant, G. E. 1942. Lista provisional de los Crisomelidos (Coleoptera) de Venezuela. Boletin de la Sociedad Venezolana de Ciencias Naturales 7(49):195-209.
Buck, P. 1958. Hispinae (Coleopt. Chrysomelidae) in der entomologischen Sammlung des Instituto Anchietano de Pesquisas, Pòrto Alegre. Pesquisas (Zoologia) 2:145-150.
Buntin, G. D. & L. P. Pedigo. 1982. Foliage consumption and damage potential of **Odontota horni** and **Baliosus nervosus** (Coleoptera: Chrysomelidae) on soybean. Journal of Economic Entomology 75:1034-1037.
Butte, J. G. 1968. Revision of the Tribe Chalepini of America north of Mexico. I. Genus **Xenochalepus** Weise (Coleoptera: Chrysomelidae). Coleopterists Bulletin 22:45-62.
Butte, J. G. 1968. The revision of the Tribe Chalepini of America north of Mexico. II. Genus **Chalepus** Thunberg (Coleoptera: Chrysomelidae). Journal of the New York Entomological Society 76:117-133.
Butte, J. G. 1968. The revision of the Tribe Chalepini of America north of Mexico. III. Genus **Odontota** Chevrolat (Coleoptera, Chrysomelidae). Coleopterists Bulletin 22:101-124.

Butte, J. G. 1969. Revision of the Tribe Chalepini of America north of Mexico. IV. Genus **Sumitrosis** Butte (Coleoptera: Chrysomelidae). Journal of the New York Entomological Society 77:12-30.
Buzzi, Z. J. & J. A. Winder. 1981. A new species of **Uroplata** (Coleoptera, Chrysomelidae, Hispinae) mining leaves of **Lantana tiliaefolia** in Parana State, Brazil. Revista Brasileira de Entomologia 25:49-52.
Callan, E. McC. 1954. Records for Hispinae (Coleoptera: Chrysomelidae) from Trinidad, B. W. I. The Annals and Magazine of Natural History (12)7:943-946.
Candèze, M. E. 1861. Historie des métamorphoses de quelques Coléoptères exotiques. Mémoires de la Société Royal des Sciences de Liège 325-410.
Cannon, W. N. 1970. Distribution records of the locust leaf miner, **Odontota dorsalis** (Thun.), in the United States. Entomological News 81:115-120.
Castelnau, F. L. 1840. Histoire naturelle et iconographie des insectes Coléoptères. Paris.
Castelnau, F. L. 1840. in Brullé M., Histoire naturelle des insectes Coléoptères. Vol. 2. Paris. 563 pp.
Castelnau, F. L. 1840. Histoire naturelle des animaux articlés. Vol. 2. 564 pp. Paris.
Cavey, J. F. 1987. Observations of early spring activity of leaf beetles (Coleoptera: Chrysomelidae) in Maryland. Maryland Entomologist 3:20-23.
Chagnon, G. 1917. A preliminary list of the insects of the Provience of Quebec. Part III- Coleoptera. Supplement to the Report of the Quebec Society for the Protection of Plants. pp. 161-277.
Chagnon, G. 1938. Contribution à l'étude des Coléoptères de la Province de Québec. Le Naturaliste Canadien 65:157-166.
Chagnon, G. & A. Robert. 1962. Principaux Coléoptères de la Province de Québec. University of Montreal Press, 2nd ed., 440 pp.
Chambers, V. T. 1872. On some leaf-mining Coleoptera. Canadian Entomologist 4:123-125.
Chambers, V. T. 1880. Insects injuring the black locust (**Robinia pseudacacia**). American Entomologist 3:59-61.
Champion, G. C. 1894. Biologica Centrali-Americana. Insecta, Coleoptera (Cassididae and supplement, appendix to Hispidae). Vol. 6(2):125-249.
Champion, G. C. 1920. Some new Coleoptera from Costa Rica. The Entomologists Monthly Magazine 56:220-224.
Chapuis, F. 1875. in Lacordaire, T. Histoire naturelle des insectes. Genera des Coléoptères. Vol. 11. Famille des Phytophages. Paris. 420 pp.
Chapuis, F. 1877. Especes inédites de la tribu des hispides. Annales de la Société Entomologique de Belgique. 20:1-33.
Chenu, J. C. 1870. Encylopédie d'histoire naturelle; ou Traité complet de cette science d'après les travaux des

naturalistes les plus éminents de tous les pays et de toutes les époques. Coléoptères. Vol. 3. 2nd ed. Paris.
Chevrolat, L. A. A. 1837. in P. F. M. A. Dejean, Catalogue des Coléoptères de la collection de M. le comte Dejean. 3rd ed., Paris. 503 pp.
Chevrolat, L. A. A. 1843. in d'Orbigny, C. D. Dictionnaire universal d'histoire naturelle. Vol. 3, 744 pp. Paris.
Chevrolat, L. A. A. 1846. in d'Orbigny, C. D. Dictionnaire universal d'histoire naturelle. Vol. 8. Paris.
Chevrolat, L. A. A. 1848. in d'Orbigny, C. D. Dictionnaire universal d'histoire naturelle. Vol. 11. Paris.
Chevrolat, L. A. A. 1848. in d'Orbigny, C. D. Dictionnaire universal d'histoire naturelle. Vol. 12, 816 pp. Paris.
Chiesa Molinari, O. 1942. Entomologia agricola. Identificacion y control de insectos y otros animals dañinos o utiles a las plantas. San Juan. 571 pp.
Chittenden, F. H. 1897. Notes on certain species of Coleoptera that attack useful plants. United States Department of Agriculture Division of Entomology Bulletin (n. s.) 9:20-24.
Chittenden, F. H. 1902. The leaf-mining locust beetle, with notes on related species. United States Department of Agriculture Division of Entomology Bulletin 38:70-89.
Cilliers, C. J. 1977. On the biological control of **Lantana camara** in South Africa. Proceedings of the 2nd National Weeds Conference in South Africa. pp. 341-344.
Cilliers, C. J. 1983. The weed, **Lantana camara** L., and the insect natural enemies imported for its biological control into South Africa. Journal of the Entomological Society of South Africa 46:131-138.
Cilliers, C. J. 1987. Notes on the biology of the established natural enemies of **Lantana camara** L. (Verbenaceae) and their seasonal history in South Africa. Journal of the Entomological Society of South Africa 50:1-13.
Cilliers, C. J. 1987. The evaluation of three insect natural enemies for the biological control of the weed **Lantana camara** L. Journal of the Entomological Society of South Africa 50:15-34.
Clark, S. M. 1983. A revision of the genus **Microrhopala** (Coleoptera: Chrysomelidae) in America north of Mexico. Great Basin Naturalist 43:597-618.
Clausen, C. P. 1978. in B. R. Bartlett et al., Introduced parasites and predators of Arthropod pests and weeds: A world review. United States Department of Agriculture Handbook 480, 545 pp.
Cooper, K. W. 1930. A list of Coleoptera found at Flushing and new to Long Island. Bulletin of the Brooklyn Entomological Society 25:21-24.
Cooper, K. W. 1935. A supplement to the section of the New York state list of insects devoted to Coleoptera. Additions, notes and corrections. Bulletin of the Brooklyn Entomological Society 30:142-159.

de Costa Lima, A. 1922. Catalogo systematico dos insectos que vivem nas plantas do Brasil e ensalo de bibliographia entomologica brasileira. Archivos da Escola Superior de Agricultura e Medicina Veterinaria 6:107-276.
de Costa Lima, A. 1927. Segundo catalogo systematico dos insectos que vivem nas plantas do Brasil e ensalo de bibliographia entomologica brasileira. Archivos da Escola Superior de Agricultura e Medicina Veterinaria 8:69-301.
de Costa Lima, A. 1936. Terceiro catalogo dos insectos que vivem nas plantas do Brasil. Minsterio da Agricultura Departamento Nacional da Producção Vegetal, Escola Nacional Agronomia Rio de Janeiro. 460 pp.
de Costa Lima, A. 1955. Insectos do Brasil. 9th Tomo, Coleópteros, 3a parte. Séries Didàtica 11:1-289.
Couper, W. 1865. Descriptions of new species of Canadian Coleoptera. Canadian Naturalist and Geologist 2:60-63.
Cox, M. L. 1988. Egg bursters in the Chrysomelidae, with a review of their occurrence in the Chrysomeloidea and Curculionidea (Coleoptera). Systematic Entomology 13:393-432.
Craighead, F. C. 1926. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Insect Pest Survey Bulletin 6:295.
Crotch, G. R. 1873. Materials for the study of the Phytophaga of the United States. Proceedings of the Academy of Natural Sciences of Philadelphia 25:19-83.
Crotch, G. R. 1873. Checklist of the Coleoptera of America, north of Mexico. Naturalists Agency, Salem, Mass. 136 pp.
Crotch, G. R. 1874. Descriptions of new species of Coleoptera from the Pacific Coast of the United States. Transactions of the American Entomological Society 5:73-80.
Crowson, R. A. 1981. The biology of the Coleoptera. Academic Press, London. 802 pp.
Csiki, E. 1900. Coleoptera nova in collectione musei Nationalis Hungarici. Természetrajzi Füzetek 23:400-403.
Culberston, G. 1915. A new enemy of the black locust. Proceedings of the Indiana Academy of Science pp. 185-186.
Davis, C. J. 1960. Recent introductions for biological control in Hawaii-V. Proceedings of the Hawaiian Entomological Society 17:244-248.
Davis, C. J. 1963. Notes and exhibitions, November 14, 1962. Proceedings of the Hawaiian Entomological Society 18:217-218.
Davis, C. J. 1972. Recent introductions for biological control in Hawaii XVII. Proceedings of the Hawaiian Entomological Society 21:187-190.
Davis, C. J. & N. L. H. Krauss. 1962. Recent introductions for biological control in Hawaii-VII. Proceedings of the

Hawaiian Entomological Society 18:125-129.
Davis, C. J. & N. L. H. Krauss. 1965. Recent introductions for biological control in Hawaii-X. Proceedings of the Hawaiian Entomological Society 19:87-90.
Davis, C. J. & N. L. H. Krauss. 1966. Recent introductions for biological control in Hawaii-XI. Proceedings of the Hawaiian Entomological Society 19:201-207.
Davis, J. J. 1926. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 6:253.
Deautier, E. A. 1928. Un caso curioso synonymicae et sustematicae de coleopteris. Revista de la Sociedad Entomológica Argentina 2:39-40.
Dejean, P. F. M. A. 1837. Catalogue des Coléoptères de la collection de M. le comte Dejean. 3rd ed. Paris. 503 pp.
DeLong, D. M. 1925. Locust leafminer (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 5(6):326-327.
Descarpentries, A. & A. Villiers. 1959. Les types de la collection M. Pic I. Chrysomelinae et Hispinae du Nouveau-Monde. Bulletin du Muséum d'Histoire Naturelle Paris (2)31:137-154.
Diatloff, G. 1977. Control biologico de la mala hierba **Lantana camara** por **Octotoma championi** y **Uroplata** sp (cerc. **bilineata**). Agronomia Costarricense 1:165-167.
Dillon, E. S. & L. S. Dillon. 1961. A manual of common beetles of eastern North America. Row, Peterson & Co. 894 pp. [reprinted 1972 by Dover Publ.].
Dohrn, C. A. 1880. Exotisches. Stettiner Entomologische Zeitung 41:149-157.
Dohrn, C. A. 1885. Exotisches. Stettiner Entomologische Zeitung 46:138-148.
Dominick, C. B. 1938. Notes on the locust leaf miner, **Chalepus dorsalis** Thunb. Journal of Economic Entomology 31:186-189.
Donckier, H. 1899. Catalogue systématique des Hispides. Annales de la Société Entomologique de France 68:540-615.
Douglass, J. R. 1929. Chrysomelidae of Kansas. Journal of the Kansas Entomological Society 2:26-38.
Downie, N. M. 1957. Records of Indiana Coleoptera, I. Proceedings of the Indiana Academy of Science 66:115-124.
Downie, N. M. & C. E. White. 1966. Records of Indiana Coleoptera, III. Proceedings of the Indiana Academy of Science 76:308-316.
Dozier, H. L. 1918. An annotated list of Gainesville, Florida, Coleoptera. Entomological News 29:295-374.
Dozier, H. L. 1922. An annotated list of Mississippi Chrysomelidae. Ohio Journal of Science 22:117-124.
Drooz, A. T. (ed.). 1985. Insects of eastern forests. United States Department of Agriculture Forest Service

Miscellaneous Publication 1426. 608 pp.
Drury, C. 1902. A revised list of the Coleoptera observed near Cincinnati, Ohio, with notes on localities, bibliographical references and descriptions of six new species. Journal of the Cincinnati Society of Natural History 20:1-196.
Duméril, A. M. C. 1823. Considérations générales sur la classe des insectes. Paris. 272 pp.
Duncan, J. 1835. The natural history of beetles. Natrualists Library 8. Edinburgh.
Duvivier, A. 1884. Description de quelques phytophages nouveaux et notes retificatives. Bulletin da Société Entomologique de Belgique cccx-cccxxii.
Duvivier, A. 1885. Phytophages exotiques. Stettiner Entomologische Zeitung 46:241-250.
Duvivier, A. 1890. Description de quelques espèces nouvelles de la tribu de Hispides. Annales de la Société Entomologique de Belgique 34:37-40.
Easton, N. S. 1909. A list of Coleoptera collected within ten miles of Fall River, Massachusetts. Psyche 16:49-57.
Erichson, G. F. 1847. Conspectus insectorum Coleopterorum. Archiv für Naturgeschite 13:67-185.
Fabricius, J. C. 1775. Systema entomologiae. Lipsiae. 832 pp.
Fabricius, J. C. 1787. Mantissa insectorum I. Hafniae. 348 pp.
Fabricius, J. C. 1787. Mantissa insectorum II. Hafniae. 382 pp.
Fabricius, J. C. 1792. Entomologia systematica. I. Hafinae. 538 pp.
Fabricius, J. C. 1793. Entomologiae systematicae II. Hafniae.
Fabricius, J. C. 1794. Entomologiae systematicae IV. Hafinae. 472 pp.
Fabricius, J. C. 1798. Supplementum entomologiae systematicae. Hafinae. 572 pp.
Fabricius, J. C. 1801. Systema eleutheratorum I. Kiliae. 506 pp.
Fabricius, J. C. 1801. Systema eleutheratorum II. Kiliae. 687 pp.
Fabricius, J. C. 1804. **in** Coquebert, A. J. Illustratio iconographica insectorum quae in Musaeis parisinis observavit et in lucem edidit Joh. Christ. Fabricius, praemissis ejusdem descriptionibus; accedunt species plurimae, vel minus aut nondum cognitae. Paris.
Faeth, S. H. & D. Simberloff. 1981. Experimental isolation of oak host plants: Effects on mortality, survivorship, and abundances of leaf-mining insects. Ecology 62:625-635.
Fairmaire, L. 1851. Description de deux coléoptères nouveaux Venezuela. Revue et Magasin de Zoologie (2)3:348-350.
Fairmaire, L. 1869. Notes sur les coléoptères recueilles par Charles Coquerel à Madagascar et sur les côtes d'Afrique. Annales de la Société Entomologique de France (4)9:179-260.
Felt, E. P. 1912. Locust leaf miner (**Chalepus doraslis** Thunb.). Journal of Economic Entomology 5:411.
Fender, K. M. 1945. Oregon Chrysomelidae. Pan Pacific

Entomologist 21:72-73.
Ferreira, J. M. S. & J. P. Morin. 1986. A barato do coqueiro **Coraliomela brunnea** Thumb. (1981) Coleoptera Chrysomelidae. EMBRAPA circular tenica No. 1 Aracaju Janeiro. 10 pp.
Fischer, C. R. 1938. Os coleopteros phytophagos da tribu Alurnini, pragas das palmeiras (Chrysomelidae, Hispinae). Revista de Entomologica Rio de Janiero 5:257-292.
Fitch, A. D. 1865. Entomological correspondense. The Country Gentleman 26:190-191.
Fletcher, F. C. 1926. in A preliminary biological survey of the Lloyd-Cornell Reservation. Bulletin of the Lloyd Library. Entomological Series 5:128-146.
Ford, E. J. & J. F. Cavey. 1982. Biology and immature stages of the hispine beetle **Anisostena ariadne** (Coleoptera, Chrysomelidae). Coleopterists Bulletin 36:189-192.
Ford, E. J. & J. F. Cavey. 1985. Biology and larval descriptions of some Maryland Hispinae (Coleoptera: Chrysomelidae). Coleopterists Bulletin 39:36-59.
Forno, I. W. & K. L. S. Harley. 1979. The evaluation of biocontrol agents with particular reference two Hispine beetles established on **Lantana camara** in Australia. Proceedings of the IV International Symposium on the Biological Control of Weeds. pp. 152-154.
Frers, A. G. 1923. Metamorfosis de coleópteros argentinos. Physis 6:254-262.
Freude, H. 1949. Liste der von P. Cornelius Vogel in Venezuela Gefangenen Käfer; I. Hispidae und Cassididae. Boletin de Entomología Venezolana 8:125-128.
Fritz, R. S. 1983. Patterns of mating, oviposition, and egg production of the locust leafminer, **Odontota dorsalis** (Coleoptera: Chrysomelidae). Environmental Entomology 12:1841-1853.
Fritz, R. S. 1983. Ant protection of a host plant's defoliator: Consequence of an ant-membracid mutualism. Ecology 64:789-797.
Frost, C. A. 1950. **Chalepus bicolor** Oliv. (Coleoptera). Psyche 57:92.
Frost, S. W. 1924. The leaf mining habit in the Coleoptera. Part I. Annals of the Entomological Society of America 17:457-467.
Frost, S. W. 1942. General Entomology. 2nd ed. McGraw-Hill Book Co. 526 pp. [reprinted 1959 by Dover Publ. as Insect life and insect natural history].
Fullaway, D. T. 1958. Biological control of **Lantana** in Hawaii. Hawaii Agriculture and Forestry Board of Commissioners Biennial Report to June 30, 1958. pp. 70-74.
Gaedike, R. & H. Döbler. 1971. Katalog der in den Sammlungen des ehemaligen Deutschen Entomologischen Institutes aufbewahrten Typen-VII (Coleoptera: Hispinae). Beiträge zur Entomologie 21:341-395.

Gage, D. A. & D. R. Strong, Jr. 1981. The chemistry of **Heliconia imbricata** and **H. latispatha** and the slow growth of a hispine beetle herbivore. Biochemical Systematics and Ecology 9:79-82.
Gahan, C. J. 1900. Stridulating organs in Coleoptera. Transactions of the Entomological Society of London 433-452.
Garman, H. 1916. The locust borer and other enemies of the black locust. Kentucky Agricultural Experiment Station Bulletin 200:99-135.
Gemminger, M. & E. Harold. 1876. Catalogus Coleopterum, hucusque descriptorum, synonymicus et systematicus. London, Williams & Norgate. 12:3479-3822.
Germar, E. F. 1824. Insectorum species novae aut minus cognitae, descriptionibus, illustratae. 624 pp. Halae.
Gestro, R. 1900. Materiali per lo studio delle Hispidae. XI. Annali del Museo Civico Naturale di Genova (2)40:468-472.
Gestro, R. 1909. Materiali per lo studio delle Hispidae. XXXVII. Saggio sulle Hispidae di Madagascar. Annali del Museo Civico Naturale di Genova (3)4:221-301.
Gestro, R. 1909. Materiali per lo studio delle Hispidae. Bollettino del laboratorio de Zoologia generale e agraria della R. Sculola superior d'agricoltura Portici 3:199-204.
Gibson, W. W. & J. L. Carrillo. 1959. Lista de insectos en la colleccion entomologica de la Oficina de Estudios Especiales, S. A. G. Oficina de Estudios Especiales Folleto Miscelanea 9:iii-254.
Girard, M. 1873. Traité élémentaire d'entomologie comprenant l'histoire des espèces utiles et de leurs produits des espèces nuisibles et des moyens de les détruire, l'étude des métamorphoses et des moeurs, les procédés de chasse et de conservation. Paris. 840 pp.
Göldi, E. A. 1887. Biologische miscellen aus Brasilien. Zoologische Jahbücher 2:584-587.
Gomes Costa, R. 1942. Pragas das plantas cultivadus do Rio Grande de Sul. Revista Agronômica 6(69):483-486.
Gorham, H. S. 1891. in Whymper, E. Supplementaty appendix to travels amongst the Great Andes of the equator. London. 147 pp.
Gossard, H. A. 1925. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 5:209.
Gowdey, C. C. 1926. Catalogus Insectorum Jamaicensis. Department of Agriculture Jamaica Entomological Bulletin 4:1-14.
Graaf, J. L. 1986. **Lantana camara**, the plant and some methods for its control. Suid-Afrikaanse Bosboutydskrif 136:26-30.
Grandi, G. 1951. Introduzione allo studio dell'entomologia. Vol. II. Endopterigoti. Edizioni Agricole. Bologna.
Gray, G. R. 1832. Notices of new genera and species. in E.

Griffith & E. Pidegon, The animal kingdom arranged in conformity with its organization by the Baron Cuvier. Vol. 15, The Class Insecta (Part II). London, Whittaker, Treacher & Co. 796 pp.
Greathead, D. J. 1973. Progress in the biological control of **Lantana camara** in East Africa and discussion of problems raised by the unexpected reaction of some of the more promising insects to **Sesamum indicum. in** P. H. Dunn (ed.). Proceedings of the 2nd International Symposium on the Biological Control of Weeds. Commonwealth Institute of Biological Control Miscellaneous Publication 6:89-94.
Grégoire, J. C. 1988. Larval gregariousness in the Chrysomelidae. in P. Jolivet, E. Pettipierre, & T. H. Hsaio (eds.) Biology of Chtysomelidae. Kluwer Academic Press. pp. 253-260.
Grimshaw, P. H. 1897. On some type specimens of Lepidoptera and Coleoptera in the Edinburgh Museum of Scinece and Art. Transactions of the Royal Society of Edinburgh 39:1-11.
Guérin, J. 1953. Coleopteros do Brazil. Edit. Pela Facublade Filos. Cienicas e Letras Univerisdad São Paulo. 356 pp.
Guérin-Méneville, F. E. 1840. Monographique sur le genre de Coléoptères nomme **Alurnus**, par Fabricius, et sur quelques groups voisins. Revue Zoologique, par la Société Cuvierienne pp. 330-334.
Guérin-Méneville, F. E. 1844. Iconographie de régne animal de G. Cuvier. Vol. 7 Insectes. Paris. 576 pp.
Guérin-Méneville, F. E. 1844. Note monographie sur le genre **Amphidesmus**. Magasin de Zoologie pl. 146 (4 pp.).
Gundlach, J. 1891. Contribucion a la Entomologia cubana. Habana. 445 pp.
Günther, K. 1936. Über Käfer der von S. und I. Waehner am oberen Amazonas gesammelten Insektenausbeute. Entomologische Rundschau 53:271-276.
Günther, K. 1940. Über die Verbreitung einiger Insekten im Gehiete des Amazonenstromes und die Froge eines columbischen Fraunendistriktes in der brasilianischen Subregion. Archiv für naturgesichte (n. s.) B 9:450-500.
Guyton, T. L. 1926. Locust leafminer (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 6:295.
Habeck, D. H. 1976. The case for biological control of **Lantana** in Florida citrus groves. Proceedings of the Florida State Horticultural Society 89:17-18.
Hamilton, J. 1895. Catalogue of the Coleoptera of southwestern Pennsylvania, with notes and descriptions. Transactions of the American Entomological Society 22:317-381.
Hargrove, W. W. et al. 1984. Shifts in insect herbivory in the canopy of black locust, **Robinia pseudoacacia** L., following fertilization. Oikos 43:322-328
Hargrove, W. W. 1986. An annotated species list of insect herbivores commonly associated with black locust, **Robinia pseudoacacia**, in the southern Appalachians. Entomological News 97:36-40.

Harley, K. L. S. 1969. The suitability of **Octotoma scabripennis** Guér. and **Uroplata girardi** Pic (Col., Chrysomelidae) for the control of **Lantana** (Verbenaceae) in Australia. Bulletin of Entomological Research 58:835-843.
Harley, K. L. S. 1973. Biological control of Central and South American weeds in Australia. **in** P. H. Dunn (ed.). Proceedings of the 2nd International Symposium on the Biological Control of Weeds. Commonwealth Institute of Biological Control Miscellaneous Publication 6:5-10.
Harley, K. L. S. 1973. Biological control of **Lantana** in Australia. Proceedings of the 3rd International Symposium on the Biological Control of Weeds. Commonwealth Institue of Biological Control Miscellaneous Publication 8:23-29.
Harley, K. L. S. et al. 1979. Effects in S. E. Queensland during 1967-72 of insects introduced to control **Lantana camara**. Entomophaga 24:65-72.
Harold, E. 1875. Beiträge zur Kenntnis de Halticae oedipodes. Coleopterologische Hefte. 13:1-26.
Harris, T. W. 1835. Upon the economy of some American species of **Hispa**. Boston Journal of Natural History 1:141-151.
Harris, T. W. 1862. Treatise on some of the insects injurious to vegetation. 3rd ed. Boston. 640 pp.
Hatch, M. H. 1924. A preliminary list of the Coleoptera of the Cranberry Lake region, New York, exclusive of the Buprestidae, Cerambycidae and Ipidae. New York State College of Forestry Technical Publication 17:272-312.
Hatch, M. H. 1933. Records of Coleoptera from Montana. Canadian Entomologist 65:5-15.
Hatch, M. H. 1939. Preliminary list of the Coleoptera of Washington. Department of Zoology, University of Washington, Seattle, Washington.
Hatch, M. H. 1971. The beetles of the Pacific northwest. Part V. Rhipiceroidea, Sternoxi, Phytophaga, Rhynchophora, and Lamellicornia. University of Washington Publications in Biology 16:1-662.
Hatch, M. H. & S. Beller. 1932. A preliminary catalogue of the Chrysomelidae of Oregon. Pan Pacific Entomologist 8:102-108.
Hatch, M. H. & A. I. Ortenburger. 1930. Records and new species of Coleoptera from Oklahoma. Publications of the University of Oklahoma Biological Survey 2:7-14.
Haviland, E. E. 1943. Hibernation and survival of the locust **leaf-miner**. Journal of Economic Entomology 36:639-640.
Hendrickson, G. O. 1930. Biologic notes on **Microrhopala vittata** Fabr. (Coleoptera: Chrysomelidae). Canadian Entomologist 62:98-99.
Henshaw, S. 1873. List of Coleoptera collected in the vicinity of Cliftondale, Mass., June 12, 1873. Psyche 1:22-23.

Henshaw, S. 1885. List of the Coleoptera of America, north of Mexico. American Entomological Society, Philadelphia. 161 pp.
Heyne, A. & O. Taschenberg. 1907. Die exotischen Käfer in Wort und Bild. Lief 25/26:219-262. Leipzig.
Hicks, S. D. 1944. Notes on some species of Coleoptera taken at Ojibway, Essex County, Ontario. Canadian Entomologist 76:163.
Hicks, S. D. 1965. The northern limits of several species of Coleoptera with special reference to their occurrance in the Ottawa district, Ontario. Coleopterists Bulletin 19:37-42.
Hodson, A. C. 1942. Biological notes on the basswood leaf-miner, **Baliosus ruber** (Weber). Journal of Economic Entomology 35:570-573.
Hoebeke, E. R. 1978. Catalogue of the Coleoptera types in the Cornell University Insect Collection. Search Agriculture 8(3):1-31.
Hoffmann, C. H. 1942. Annotated list of elm insects in the United States. United States Department of Agriculture Miscellaneous Publication 466:1-20
Hopkins, A. D. 1891. Preliminary investigation of insect ravages. Yellow locust. West Virginia Agricultural Experiment Station Bulletin 16:85-91.
Hopkins, A. D. 1893. Catalogue of West Virginia forest and shade insects. West Virginia Agricultural Experiment Station Bulletin 32. 238 pp.
Hopkins, A. D. 1896. Some notes on insect enemies of trees. Canadian Entomologist 28:243-250.
Hopkins, A. D. 1897. Report of the Entomological Department. Ninth Annual Report of the West Virgina Agricultural Experiment Station. pp. 73-169.
Horn, G. H. 1883. Miscellaeous notes and short studies of North American Coleoptera. Transactions of the American Entomological Society 10:269-312.
Horning, D. S., Jr. & W. F. Barr. 1970. Insects of Craters of the Moon National Monument Idaho. University of Idaho College of Agriculture Miscellaneous Series 8:1-118.
Houser, J. S. 1908. The more important insects affecting Ohio shade trees. Ohio Agricultural Experiment Station Bulletin 194:169-243.
Houser, J. S. 1913. The locust leaf miner or locust hispa (**Chalepus dorsalis** Thunb.). Ohio State Horticultural Society Annual Report 1913:29-31.
Houser, J. S. 1918. Destructive insects affecting Ohio shade and forest trees. Ohio Agricultural Experiment Station Bulletin 332:161-487.
Hyslop, J. A. 1925. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 5:279.
Illiger, J. C. W. 1804. Bemerkungen zum zweiten Theile von Fabricius Systema Eleutheratorum. Magazin für

Insektenkunde 3:160-180.
Illiger, J. C. W. 1806. Vermischte Bemerkingen. I. Neue Käfergattungen von Thunberg. Magazin für Insektenkunde 5:247-251.
Jacobson, G. G. 1899. De genere **Alurno** (Coleoptera, Chrysomelidae). Annuaire du Musée Zoologique de l'Académie Impériale des Sciences St. Pétersbourg 4:245-256.
Jacobson, G. G. 1924. Annotationes synonymicae et sustematicae de coleopteris. Revue Russe d'Entomologie 18:237-243.
Jacquelin, P. N. C. 1856. Coleoptera. **in** Sagra. Histoire physique, politique et naturelle de l'Ile de Cuba. Animaux articules, insectes. 136 pp. Paris.
Jaques, H. E. 1951. How to know the beetles. Wm. C. Brown Co., Dubuque, Iowa. 372 pp.
Jeannel, R. & R. Paulian. 1944. Huitième Section: Aglycyderaria. in Grassé, M. Traité de Zoologie anatomie, systématique, biologie. Vol. 9. Paris. 1117 pp.
Johnson, C. W. 1930. A list of the insect fauna of Nantucket, Massachusetts. Nantucket Maria Mitchell Association 3(2):1-174.
Johnson, H. L. 1915. Coleoptera found in the vicinity of Meriden, Connecticut. Entomological News 26:307-319.
Johnson, H. L. 1916. Additions to the Coleoptera of Meriden, Connecticut. Entomological News 27:112-125.
Johnson, W. T. & H. H. Lyon. 1976. Insects that feed on trees and shrubs. Cornell University Press, Ithaca, NY. 464 pp.
Jolivet, P. 1988. Food habits and food selection of Chrysomelidae, bionomic and evolutionary perspectives. in P. Jolivet, E. Petitpierre, & T. H. Hsiao (eds.). Biology of Chrysomelidae. Kluwer Academic Press. pp. 1-24.
Jones, W. W. & H. Brisley. 1925. Field notes concerning a few Arizona Hispinae. Pan Pacific Entomologist 1:174-175.
Julien, M. H. 1982. Biological control of weeds: A world catalogue of agents and their target weeds. Unwin Brothers, Old Working. 108 pp.
Kamath, M. K. 1979. A review of biological control of insect pests and noxious weeds in Fiji (1969-1978). Fiji Agricultural Journal 41:55-72.
Kirby, W. 1837. **in** J. Richardson, Fauna Boreali-Americana. Part 4, Insects. 325 pp. [reprinted 1978 by Arno Press, New York]
Kirk, V. M. 1969. A list of beetles of South Carolina. Part I: Northern coastal plain. South Carolina Agriculutral Experiment Station Technical Bulletin 1033:1-124.
Kirk, V. M. 1970. A list of beetles of South Carolina Part II: Mountain, piedmont, and southern coastal plain. South Carolina Agricultural Experiment Station Technical Bulletin 1038:1-117.
Kirkendall, L. R. 1984. Long copulations and post-copulatory

escort behaviour in the locust leaf miner, **Odontota dorsalis** (Coleoptera: Chrysomelidae). Journal of Natural History 18:905-919.

Kirsch, T. F. W. 1883. Neue südamerikanische Käfer. Berliner Entomologische Zeitischrift 27:187-213.

Knaus, W. 1900. Additions to Kansas Coleoptera for the years 1899 and 1900. Transactions of the Kansas Academy of Sciences 17:109-114.

Knaus, W. 1905. Central Texas Coleoptera. Canadian Entomologist 37:348-352.

Knaus, W. 1907. Additions to the list of Kansas Coleoptera for 1906. Transactions of the Kansas Academy of Sciences 20:233-234.

Knobel, E. 1895. Beetles of New England. Bradlee Whidden, Boston. 45 pp.

Knowlton, G. F. 1951. Utah Hispinae beetles. Bulletin of the Brooklyn Entomological Society 46:91.

Knowlton, G. F. & G. P. Taylor. 1952. Beetles- Coleoptera records and notes, largely from Utah. Utah State Agricultural Experiment Station Mimiograph Series 389. 32 pp.

Kogan, M. & D. D. Kogan. 1979. **Odontota horni**, a hispine leaf miner adapted to soybean feeding in Illinois. Annals of the Entomological Society of America 72:456-461.

Krauss, N. L. H. 1962. Biological control investigations on **Lantana**. Proceedings of the Hawaiian Entomological Society 18:134-136.

Krauss, N. L. H. 1964. Some leaf-mining Chrysomelids of **Lantana** (Coleoptera). Coleopterists Bulletin 18:92-94.

Kumar, R. et al. 1976. Insects of the Central Plains Experiment Range, Pawnee National Grassland. University of Wyoming Agricultural Experiment Station Science Monograph 32:1-74.

Laccordaire, J. T. 1830. Mémoire sur les habitudes des Coléoptères de l'Amérique méridionale. Annales des Sciences Naturelles 20:185-191.

Laccordaire J. T. & F. Chapuis. 1875. Histoire naturelle des insectes. Genera des Coléoptères XI. Paris. 420 pp.

Lago, P. K. & M. O. Mann. 1987. Survey of Coleoptera associated with flowers of wild carrot (**Daucus carota** L.) (Apiaceae) in northern Mississippi. Coleopterists Bulletin 41:1-8.

Lamarck, J. B. P. A. 1835. Histoire naturelle des animaux sans vertèbres. Paris. 787 pp.

Landeiro, R. 1946. Uma praga do arroz no Espírito Santo. Boletím Fitossanitario 1:243-246.

Latreille, P. A. 1807. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimus explicata. Vol. 3: 258 pp. Paris.

Latreille, M. 1836. in G. Cuvier. The animal kingdom arranged in conformity with its organization by the Baron Cuvier. Vol. 4, Insecta- Zoophytes. London, Henderson. 544 pp.

LeConte, J. L. (ed.) 1859. The complete writings of Thomas Say on the entomology of North America. Vol. II. Arno Press (1978 reprint). 1-814.

LeConte, J. L. 1859. Catalogue of the Coleoptera of Fort Tejon, California. Proceedings of the Academy of Natural Sciences of Philadelphia 11:69-90.

LeConte, J. L. 1859. Coleoptera of Kansas and eastern New Mexico. Smithsonian Contributions to Knowledge 11:1-58.

LeConte, J. L. & G. H. Horn. 1883. Classification of the Coleoptera of North America. Smithsonian Miscellaneous Collections 507:iii-567.

Leech, H. B. & J. W. Green. 1955. Plant association data for a few Arizona and New Mexico Coleoptera (Cleridae, Meloidae, Chrysomelidae, Cerambycidae). Coleopterists Bulletin 9:27-28.

Leng, C. W. 1920. Catalogue of the Coleoptera of America, north of Mexico. John D. Sherman, Mt. Vernon, NY. 470 pp.

Leng, C. W. 1933. Catalogue of Coleoptera of North America, north of Mexico. Second and third supplements, 1925-1932 (inclusive). John D. Sherman, NY. 112 pp.

Leng, C. W. & W. T. Davis. 1924. List of the Coleoptera of Staten Island, New York. Proceedings of the Staten Island Institute of Arts and Science 2:3-82.

Leng, C. W. & A. J. Mutchler. 1914. A preliminary list of the Coleoptera of the West Indies as recorded to Jan. 1, 1914. Bulletin of the American Museum of Natural History 33:391-493.

Lepesme, P. 1947. Les insectes des palmiers. Paris. 903 pp.

Lever, R. J. A. 1969. Pests of the coconut palm. Food and Agriculture Organization of the United Nations. FAO Agricultural Studies No. 77 190 pp.

Linell, M. L. 1897. New species of Coleoptera of the family Chrysomelidae, with a short review of the tribe Chlamydini. Proceedings of the United States National Museum 20:473-485.

Linnaeus, C. 1767. Systema naturae. Vol. 1, pars 2. Holimae. pp. 533-1327.

Linnaeus, C. 1771. Mantissa Plantarum. 584 pp.

Linneaus, C. 1788. Systema naturae. Vol. 13. Lipsiae.

Lintner, J. A. 1898. Twelfth report on the insects of the state of New York for the year 1896. University of the State of New York, Albany. 399 pp.

Loding, H. P. 1945. Catalogue of the beetles of Alabama. Alabama Mongograph 11:1-172.

Lucas, P. H. 1857. Entomologie. in Animaux nouveaux ou rares recueillis pendant l'expédition dans les parties centrales de l'Amérique du Sud, de Rio de Janeiro a Lima, et de Lima au Para; exécutée par ordre du Gouvernement français pendant les années 1843 a 1847, sous la direction du Comte Francis de Castelnau. Paris. 204 pp.

Lucas, M. H. 1887. Séance du 22 juin 1887. Annales de la Société Entomologique de France, Bulletin 4:CX.

Lüderwaldt, H. 1910. Die Frasspuren von **Cephaloleia deyrollei** Baly. Zeitschrift für Wissenschaftliche Insektenbiologie 6:61-63.

Lugger, O. 1899. Beetles injurious to fruit-producing plants. University of Minnesota Agricultural Experiment Station 66:85-332.

Maddox, G. D. & R. B. Root. 1987. Resistance to 16 diverse species of herbivorous insects within a population of goldenrod, **Solidago altissima**: genetic variation and heritability. Oecologia 72:8-14.

Mannerheim, C. G. 1843. Beitrag zur Kaefer-fauna der Aleutischen Inseln, der Insel Stika und Neu-Californiens. Bulletin da la Société Impériale des Naturalistes de Moscou 16:175-314.

Mariau, D. 1988. The parasitoids of Hispinae. in P. Jolivet, E. Petitpierre, & T. H. Hsaio (eds.). The biology of Chrysomelidae. Kluwer Academic Press pp. 449-461.

Martorell, L. F. 1976. Annotated food plant catalog of the insects of Puerto Rico. University of Puerto Rico Agricultural Experiment Station. 303 pp.

Maulik, S. 1916. On Cryptostome beetles in the Cambridge University Museum of Zoology. Proceedings of the Zoological Society of London 567-589.

Maulik, S. 1919. Hispinae and Cassidinae of India, Burma and Ceylon. The fauna of British India. Taylor & Francis, London. 439 pp.

Maulik, S. 1924. A new hispid beetle injurious to oil palms in Brazil. Bulletin of Entomological Research 14:245-246.

Maulik, S. 1929. New injurious Hispinae. Bulletin of Entomological Research 20:81-94.

Maulik, S. 1930. New injurious Hispinae. Bulletin of Entomological Research 21:45-56.

Maulik, S. 1931. On the structure of larvae of hispine beetles. Proceedings of the Zoological Society of London 1137-1162.

Maulik, S. 1932. On the structure of larvae of hispine beetles-II. Proceedings of the Zoological Society of London 293-322.

Maulik, S. 1933. New Argentine Hispinae. The Annals and Magazine of Natural History (10)11:605-609.

Maulik, S. 1933. On the structure of larvae of hispine beetles-III. Proceedings of the Zoological Society of London 669-680.

Maulik, S. 1936. A new Brazilian hispine beetle. The Annals and Magazine of Natural History (10)18:392-397.

Maulik, S. 1937. Distributional correlation between hispine beetles and their host-plants. Proceedings of the Zoological Society of London Series A:129-159.

Maulik, S. 1938. On the structure of larvae of hispine beetles-V. Proceedings of the Zoological Society of

London Series B 108:49-71.

Maulik, S. 1940. The food plant of **Platyauchenia latreillei** (Castelnau) (Hispinae, Chrysomelidae, Coleoptera). The Annals and Magazine of Natural History 11(5):256.

Maulik, S. 1941. Biology and morphology of the Sagrinae (Chrysomelidae, Coleoptera). The Annals and Magazine of Natural History (11)7:235-254.

McCauley, R. H., Jr. 1938. A revision of the genus **Microrhopala** in North America, north of Mexico. Bulletin of the Brooklyn Entomological Society 33:145-168.

McCoy, E. D. 1984. Colonization by herbivores of **Heliconia** spp. plants (Zingiberales: Heliconiaceae). Biotropica 16:10-13.

McCoy, E. D. 1985. Interactions among leaf-top herbivores of **Heliconia imbricata** (Zingiberales: Heliconiaceae). Biotropica 17:326-329.

McPheron, B. A. 1985. Parasitoids of the leafmining beetles **Sumitrosis inaequalis** and **S. rosea** (Coleoptera: Chrysomelidae) in East-central Illinois. Journal of the Kansas Entomological Society 58:367-369.

McPherson, R. M. & F. W. Ravlin. 1983. Locust leaf miner development on soybean in Virginia. Journal of the Georgia Entomological Society 18:58-60.

Melsheimer, F. V. 1846. Descriptions of new species of Coleoptera of the United States. Proceedings of the Academy of Natural Sciences of Philadelphia 3:158-181.

Melsheimer, F. E. 1853. Catalogue of the described Coleoptera of the United States. Smithsonian Institution, Washington. 174 pp.

Mendenhall, E. W. 1925. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 5:279.

Merino, M. & A. Varquez. 1963. El "gusano collero", **Alurnus humeralis** (Rosemberg) como plaga de la palma africana de aceite y su combate químico en Ecuador. Turrialba 13:6-13.

Milliron, H. E. 1958. Economic insects and allied pests of Delaware. University of Delaware Agricultural Experiment Station Bulletin 321. 87 pp.

Monrós, F. 1945. A propósito de algunos Chrysomeloidea neotropicales (Coleoptera). Notas del Museo de La Plata (Zoología) 10:143-155.

Monrós, F. 1945. Trés interesantes confusiones en Chrysomeloidea Neotropicales. Revista de la Sociedad Entomológica Argentina 12:410-415.

Monrós, F. 1959. Ilustraciones de Hispinae (Chrysomelidae, Coleoptera). Acta Zoológica Lilloana 17:25-32.

Monrós, F. & J. Bechyné. 1956. Über einige verkannte Chrysomeliden-Namen. Entomologische Arbeiten aus dem Museum G. Frey 7:1118-1137.

Monrós, F. & M. J. Viana. 1947. Revisión sistemàtica de los

Hispidae Argentinos (Insecta, Coleop., Chrysomeloid.). Anales del Museo Argentino Ciencias Naturales "Bernardino Rivadavia" 42:125-324.
Moore, I. 1937. A list of the beetles of San Diego County, California. Occasional Papers of the San Diego Society of Natural History 2:1-109.
Moreira, C. 1921. Algumas pragas do coqueiro. Chacaras E Quintaes 23:469-471.
Moreira, C. 1921. Entomologia Agricola Brasileira. Boletim do Instituto Biologico de Defesa Agricola 1:1-182.
Moreno, I. & F. F. Bibby. 1943. Insectos del Algodon y otras Malvaceas en las regiones de Matamoros, Tams. y del Valle Bajo del Rio Bravo, Texas-E.U.A. Fitofilo 2:20-60.
Morrison, G. & D. R. Strong, Jr.. 1981. Spatial variations in egg density and the intensity of parasitism in a neotropical chrysomelid (**Cephaloleia consanguinea**). Ecological Entomology 6:55-61.
Müller, P. L. S. 1773. Vollständiges Natursystem des C. v. Linné mit einer Erklärung. Nürnberg.
Muniappan, R. & C. A. Viraktamath. 1986. Status of biological control of the weed, **Lantana camara** in India. Tropical Pest Management 32:40-42.
Myers, L. 1918. Coleoptera from the Claremont-Laguna Region. Journal of Entomology and Zoology 10:43-53.
Newman, E. 1838. Entomological notes. The Entomologists Monthly Magazine 5:372-402.
Newman, E. 1841. Entomological notes. The Entomologist 73-79.
Nicolay, A. S. & H. B. Weiss. 1918. Notes on **Chalepus rubra** Web. in New Jersey. Canadian Entomologist 398-400.
Olivier, G. A. 1792. Encyclopédie méthodique. Histoire naturelle. Insectes, Vol. 7 (pt. 1), pp. 1-368.
Olivier, G. A. 1808. Entomologie, ou histoire naturelle des insectes, avec leurs caractères génériques et spécifiques, leur description, leur synonymie, et leur figure enluminée. Paris.
Orbigny, C. 1845. Dictionnaire universal d'histoire naturelle. Paris. Vol. 3, 744 pp.
Orbigny, C. 1846. Dictionnaire universal d'histoire naturelle. Paris. Vol. 8, 766 pp.
Osborn, H. 1892. A partial catalogue of the animals of Iowa. Iowa Agricultural College, Ames, Iowa.
Packard, A. S. 1890. Insects injurious to forest and shade trees. Fifth report of the United States Entomological Commission. Bulletin 7. 955 pp.
Pallister, J. C. 1953. The leaf beetles of north central Mexico collected on the David Rockefeller Mexican Expedition (Coleoptera, Chrysomelidae). American Museum Novitates 1623:1-95.
Panzer, G. W. F. 1794. Voets Beschreibungen und Abbildungen hartschaaligter Insecten. III. Nürnberg.
Panzer, G. W. F. 1798. in Voet, J. E. Catalogus systematicus Coleopterorum. LaHaye.

Papp, C. S. 1953. The Hispinae of America. 3rd contribution for promoting the scientifical results of the International Hylean Amazon Inst. in Manaos, Brazil. Portugaliae Acta Biologica (B)4:1-147.
Perkins, R. C. L. & O. H. Swezey. 1924. The introduction into Hawaii of insects that attack **Lantana**. Bulletin of the Experiment Station of the Hawaiian Sugar Planters Association Entomological Series Bulletin 16:1-83.
Perty, J. A. M. 1834. Delectus animalium articulatorum. fasc 2, 224 pp.
Petitpierre, E. et al. 1988. Chromosome numbers and meioformulae of Chrysomelidae. in P. Jolivet, E. Petitpierre, & T. H. Hsiao (eds.) Biology of Chrysomelidae. Kluwer Academic Press. pp. 161-186.
Pic, M. 1921. Nouveautés diverses. Mélanges Exotico-Entomologiques 34:1-32.
Pic, M. 1922. Nouveautés diverses. Mélanges Exotico-Entomologiques 36:1-32.
Pic, M. 1922. Nouveautés diverses. Mélanges Exotico-Entomologiques 37:1-36.
Pic, M. 1923. Nouveautés diverses. Mélanges Exotico-Entomologiques 38:1-32.
Pic, M. 1925. Nouveautés diverses. Mélanges Exotico-Entomologiques 44:1-32.
Pic, M. 1926. Sept Coléoptères exotiques nouveaux. Bulletin de la Société Entomologique de France 153-155.
Pic, M. 1926. Nouveaux Coléoptères du globe. Bulletin de la Société Zoologique de France 51:235-238.
Pic, M. 1926. Nouveautés diverses. Mélanges Exotico-Entomologiques 46:1-32.
Pic, M. 1926. Nouveautés diverses. Mélanges Exotico-Entomologiques 47:1-32.
Pic, M. 1926. Nouveaux Coléoptères exotiques. Bulletin de Muséum d'Histoire Naturelle Paris pp. 354-359.
Pic, M. 1927. Contribution à l'étude du genre **Probaenia** Weise (Col. Hispidae). Bulletin de la Société Entomologique de France 244-248.
Pic, M. 1927. Nouveautés diverses. Mélanges Exotico-Entomologiques 48:1-32.
Pic, M. 1927. Coléoptères du globe. Mélanges Exotico-Entomologiques 50:1-36.
Pic, M. 1927. **Xenarescus monoceros** Ol. et ses variétés (Col.). Bulletin de la Société Zoologique de France 52:521-524.
Pic, M. 1927. Sur divers Coléoptères. Entomologisches Nachrichtenblatt 1:68-71.
Pic, M. 1928. Coléoptères exotiques en partie nouveaux (suite). L'Echange 44:4.
Pic, M. 1928. Nouveaux Coléoptères de la République Argentine. Revista de la Sociedad Entomológica Argentina 2:49-52.
Pic, M. 1928. Divers Coléoptères nouveaux de la République Argentine. Revista de la Sociedad Entomológica Argentina 2:99-102.

Pic, M. 1928. Notes et descriptions. Mélanges Exotico-Entomologiques 51:1-36.
Pic, M. 1929. Phytophages exotiques nouveaux (Col.). Bulletin de la Société Entomologique de France 147-148.
Pic, M. 1929. Coléoptères de l'Amérique Méridionale. Revista de la Sociedad Entomológica Argentina 2:183-184.
Pic, M. 1929. Nouveautés diverses. Mélanges Exotico-Entomologiques 53:1-36.
Pic, M. 1929. Nouveautés diverses. Mélanges Exotico-Entomologiques 54:1-36.
Pic, M. 1929. Coléoptères exotiques nouveaux ou peu connus. Bulletin de la Société Zoologique de France 54:43-46.
Pic, M. 1929. Coléoptères Phytophages nouveaux. Bulletin de la Société Zoologique de France 54:138-139.
Pic, M. 1930. Nouveautés diverses. Mélanges Exotico-Entomologiques 56:1-36.
Pic, M. 1930. Nouveaux Coléoptères de diverses familles. Revista de la Sociedad Entomológica Agrentina 3:43-46.
Pic, M. 1931. Sur quelques Hispides de l'Amérique Méridionale (Col.). Revista de la Sociedad Entomológica Argentina 3:343-346.
Pic, M. 1931. Coléoptères Hispides en partie nouveaux. Bulletin de la Société Zoologique de France 56:434-437.
Pic, M. 1931. Nouveautés diverses. Mélanges Exotico-Entomologiques 57:1-36.
Pic, M. 1931. Nouveautés diverses. Mélanges Exotico-Entomologiques 58:1-36.
Pic, M. 1932. Nouveautés diverses. Mélanges Exotico-Entomologiques 59:1-36.
Pic, M. 1932. Nouveautés diverses. Mélanges Exotico-Entomologiques 60:1-36.
Pic, M. 1933. Nouveautés diverses. Mélanges Exotico-Entomologiques 62:1-36.
Pic, M. 1933. Nouveaux Coléoptères américains. Bulletin de la Société Entomologique de France 38:292-294.
Pic, M. 1933. Coléoptères exotiques en partie nouveaux (suite). L'Echange 49:12.
Pic, M. 1934. Cinq nouveaux Coléoptères exotiques. Bulletin de la Société Entomologique de France 39:82-84.
Pic, M. 1934. Hispides nouveaux du Vénézuéla. Revue Française d'Entomologie 1:154-157.
Pic, M. 1934. Nouveautés diverses. Mélanges Exotico-Entomologiques 63:1-36.
Pic, M. 1934. Nouveautés diverses. Mélanges Exotico-Entomologiques 64:1-36.
Pic, M. 1934. Coléoptères exotiques nouveaux et notes diverses. Bulletin de la Société Zoologique de France 59:140-143.
Pic, M. 1936. Coléoptères exotiques en partie nouveaux (suite). L'Echange 53:15-16.
Pic, M. 1936. Nouveautés diverses. Mélanges Exotico-Entomologiques 67:1-36.

Pic, M. 1937. Nouveautés diverses. Mélanges Exotico-Entomologiques 69:1-36.
Pic, M. 1937. Nouveautés diverses, mutatuions. Mélanges Exotico-Entomologiques 70:1-36.
Pic, M. 1937. Coléoptères exotiques nouveaux. Bulletin de la Société Entomologique de France 42:16.
Pic, M. 1937. Coléoptères exotiques en parte nouveaux (suite). L'Echange 54:3-4.
Pic, M. 1937. Coléoptères exotiques en partie nouveaux. L'Echange 53:15-16.
Pic, M. 1938. Coléoptères exotiques en partie nouveaux (suite). L'Echange 54:3-4.
Pic, M. 1948. Coléoptères du globe (suite). L'Echange 64:9-12.
Poos, F. W. 1940. The locust leaf miner as a pest of soybean. Journal of Economic Entomology 33:742-745.
Popenoe, E. 1877. A list of Kansas Coleoptera. Transactions of the Kansas Academy of Science 5:21-40.
Powell, E. F. 1941. Relationships within the family Chrysomelidae (Coleoptera) as identified by the male genitalia of certain species. American Midland Naturalist 25:148-195.
Procter, W. 1938. Biological survey of the Mount Desert Region, Part IV. The insect fauna. Wistar Institute of Anatomy and Biology, Philadelphia. 496 pp.
Randall, J. W. 1838. Description of new species of coleopterous insects inhabiting the State of Massachusetts. Boston Journal of Natural History 2:34-52.
Riley, E. G. 1985. Review of the North American species of **Glyphuroplata** Uhmann, 1940 (Coleoptera: Chrysomelidae: Hispinae). Journal of the Kansas Entomological Society 58:428-436.
Riley, E. G. & E. U. Balsbaugh. 1988. Two Middle American leaf beetles (Coleoptera: Chrysomelidae) newly recorded from the United States. Entomological News 99:148-152.
Riley, E. G. & W. R. Enns. 1979. An annotated checklist of Missouri leaf beetles (Coleoptera: Chrysomelidae). Transactions of the Missouri Academy of Sciences 13:53-83.
Riley, E. G. & W. R. Enns. 1982. Supplement to an annotated checklist of Missouri leaf beetles (Coleoptera: Chrysomelidae): new state records and host plant associations. Entomological News 93:32-36.
de Rojas, M. A. 1858. Remarques sur l'**Arescus caudatus** Sallé. Annales de la Société Entomologique de France (3)6:61-71.
Rosenburg, W. F. 1898. Some new species of Coleoptera in the Tring Museum. Novitates Zoologicae 5:92-95.
Ruesink, W. G. 1984. Soybean as a host for the leafminer **Sumitrosis rosea** (Coleoptera: Chrysomelidae). Journal of Economic Entomology 77:108-109.
de Ruette, R. 1970. A catalogue of types of Coleoptera in the

Canadian National Collection of Insects. Memoirs of the Entomological Society of Canada 71:1-134.
Sallé, A. 1849. Coléoptères nouveaux de l'Amérique (2nd partie). Annales de la Société Entomologique de France (2)7:429-435.
Sanderson, M. W. 1951. A new record and two new species of North American Hispinae (Coleoptera Chrysomelidae). Proceedings of the Entomological Society of Washington 53:160-163.
Sanderson, M. W. 1967. New West Indian Hispinae, with notes and keys (Coleoptera: Chrysomelidae). Caribbean Journal of Science 7:135-139.
Sankaran, T. 1973. Biological control of weeds in India, a review of introductions and current investigations of natural enemies. in P. H. Dunn (ed.). Proceedings of the 2nd International Symposium on the Biological Control of Weeds. Commonwealth Institute of Biological Control Miscellaneous Publication 6:82-88.
Say, T. 1823. Descriptions of coleopterous insects collected in the late expedition to the Rocky Mountains, performed by order of Mr. Calhoun, Secretary of War, under the command of Major Long. Journal of the Academy of Natural Sciences of Philadelphia 3:139-216.
Say, T. 1853. Descriptions of new North American coleopterous insects, and observations on some already described. Boston Journal of Natural History 1:151-203.
Say, T. 1859. The complete writings of Thomas Say on the entomology of North America. Vol. II. J. L. LeConte, ed. Arno Press. 1-814.
Schaeffer, C. F. A. 1906. On new and known genera and species of the family Chrysomelidae. The Museum of the Brooklyn Institute of Arts and Science Science Bulletin 1:221-253.
Schaeffer, C. F. A. 1928. Family Chrysomelidae in M. D. Leonard (ed) A list of the insects of New York. Cornell University Agricultural Experiment Station Memoirs 101. 1121 pp.
Schaeffer, C. F. A. 1933. Notes on some Hispini and Cassidini and descriptions of new species (Coleoptera, Chrysomelidae). Pan Pacific Entomologist 9:103-109.
Scheibelreiter, G. K. 1980. Biological control of **Lantana camara** L. (Verbenaceae) in Ghana. Zeitschrift für Angewandte Entomologie 90:99-103.
Schönherr, C. J. 1817. Synonymia insectorum, oder: Versuch einer Synonymie aller bisher bekannten Insecten; nach Fabricii Systema Eleutheratorum geordnet. Vol. 1, pt. 3. 506 pp. Stockholm.
Schwarz, E. A. 1878. The Coleoptera of Florida. Proceedings of the American Philosophical Society 17:353-471.
Schwarz, E. A. 1890. Food-plants and food-habits of some North American Coleoptera. Proceedings of the Entomological Society of Washington 1:231-234.

Schwarz, E. A. 1891. Coleoptera on black locust (**Robinia pseudoacacia**). Proceedings of the Entomological Society of Washington 2:73-76.
Scott, R. W. 1868. Leaf-miners of the locust. American Entomologist 1:58.
Seeno, T. N. & J. A. Wilcox. 1982. Leaf beetle genera (Coleoptera: Chrysomelidae). Entomography 1:1-221.
Seifert, R. P. 1975. Clumps of **Heliconia** inflorescences as ecological islands. Ecology 56:1416-1422.
Seifert, R. P. 1982. Neotropical **Heliconia** insect communities. Quarterly Review of Biology 57:1-28.
Seifert, R. P. & F. H. Seifert. 1976. A community matrix analysis of **Heliconia** insect communities. American Naturalist 110:461-483.
Seifert, R. P. & F. H. Seifert. 1976. Natural history of insects living in inflorescences of two species of **Heliconia.** Journal of the New York Entomological Society 84:233-242.
Seifert, R. P. & F. H. Seifert. Utilization of **Heliconia** (Musaceae) by the beetle **Xenarescus monocerus** (Oliver) (Chrysomelidae: Hispinae) in a Venezuelan forest. Biotropica 11:51-59.
Sharp, D. & F. Muir. 1912. The comparative anatomy of the male genital tube in Coleoptera. Transactions of the Entomological Society of London Part III:477-642. [reprinted 1969 by Entomological Society of America].
Simmons, P. 1926. Locust leaf miner (**Chalepus dorsalis** Thunb.). United States Department of Agriculture Bureau of Entomology Insect Pest Survey Bulletin 6:221, 263.
Slosson, A. T. 1902. Additional list of insects taken in Alpine region of Mt. Washington. Entomological News 13:319-321.
Smith, G. S. 1947. **Anoplitis inaequalis** on **Epilobium** (Coleoptera: Chrysomelidae). Proceedings of the Entomological Society of British Columbia 43:24.
Smith, J. B. 1899. Some new species of Hispini. Entomologia Americana 5:94-95.
Smith, J. B. 1899. Life habits of Hispidae. Entomologia Americana 5:122.
Smith, J. B. 1899. Insects of New Jersey. 27th Annual Report of the State Board of Agriculture. MacCrellish & Quigley, Trenton. 755 pp.
Smith, J. B. 1910. Annual report of the New Jersey State Museum. MacCrellish & Quigley, Trenton. 888 pp.
Smith, R. C. & D. A. Wilbur. 1937. Insects injurious to alfalfa, grasses, and allied plants. Biennial Report of the Kansas Agricultural Experiment Station 8:100-103.
Smith, S. G. 1960. Chromosome numbers of Coleoptera. II. Canadian Journal of Genetics and Cytology 2:66-88.
Snow, F. H. 1904. Lists of Coleoptera, Lepidoptera, Diptera and Hemiptera. Kansas University Science Bulletin 2:323-350.
Soukup, J. S. S. 1942. Apuntes para la zooleografía entomológica

(entomografía peruana). Boletín del Museo de Historia Natural "Javier Prado" 6:302-342.
Spaeth, F. 1914. Coleopterorum catalogus, Chrysomelidae: Cassidinae. Pars 62:1-182.
Spaeth, F. 1917. Beiträge zur Kenntnis der süd- und zentralamerikanischen Cassidinen. Coleopterologische Rundschau 6:24-31.
Spaeth, F. 1929. Ist **Mittinaspis cassidoides** eine Caddidine? Koleopterologische Rundschau 15:28-31.
Spaeth, F. 1934. Eine neue Hispinen-Gattung. Sborník Entomologického Oddelini Nàrodního Musca v Praze 12:105.
Spaeth, F. 1935. Mitteilungen über neue oder bemerkenswerte Cassidinen aus dem Senckenberg-Museum (Ins. Col.). Entomologische Rundschau 53:65-69.
Spaeth, F. 1937. Über die von Regierungsrat E. Reimoser in Argentinien und Paraguay 1907 und 1908 gesammelten Hispinen (Col. Chrysom.). Annalen des Naturhistorischen Museums in Wien 48:143-166.
Spaeth, F. 1938. Die Gattung **Himatidium** Fabr. (Col. Cassidinae). Revista de Entomología Rio de Janiero 9:305-317.
Spaeth, F. 1952. Cassidinae (Col. Chrysom.) **in** E. Titschack, Beiträge zur Fauna Perus 3:12-43. [Originally published as volumne 2 in 1942, all but six copies destroyed in World War II.]
Spaeth, F. 1953. **in** Uhmann, E. Amerikanishe Hispinae IV. Memoria de la Sociedad Cubana de Historia Natural 21:161-172.
Staines, C. L., Jr. 1986. New combination and new synonymy in North American **Stenopodius** (Coleoptera: Chrysomelidae: Hispinae) with a taxonomic note on Uroplatini. Proceedings of the Entomological Society of Washington 88:192.
Staines, C. L., Jr. 1986. A revision of the genus **Brachycoryna** (Coleoptera: Chrysomelidae: Hispinae). Insecta Mundi 1:231-241.
Staines, C. L., Jr. 1987. The correct generic placement of **Sumitrosis gracilis** (Horn) (Coleoptera: Chrysomelidae: Hispinae). Coleopterists Bulletin 41:319-321.
Staines, C. L., Jr. 1988. A review of the species of **Acritispa** Uhmann (Coleoptera: Chrysomelidae, Hispinae). Proceedings of the Entomological Society of Washington 90:193-195.
Staines, C. L., Jr. 1989. A new genus and species of Hispinae (Coleoptera: Chrysomelidae) from Central America. Proceedings of the Entomological Society of Washington 91:342-345.
Staines, C. L., Jr. 1989. A revision of the genus **Octotoma** (Coleoptera: Chrysomelidae, Hispinae). Insecta Mundi 3:41-56.
Stickney, F. S. 1923. The head-capsule of Coleoptera. Illinois Biological Monographs 8:1-104.

Strauss, S. Y. 1988. The Chrysomelidae: a useful group for investigating herbivore-herbivore interactions. in P. Jolivet, E. Petitpierre, & T. H. Hsaio (eds.) Biology of Chrysomelidae. Kluwer Academic Press pp. 91-105.
Strong, D. R., Jr. 1977. Rolled-leaf Hispine beetles (Chrysomelidae) and their Zingiberales host plants in Middle America. Biotropica 9:156-169.
Strong, D. R., Jr. 1977. Insect species richness: Hispine beetles of **Heliconia latispatha.** Ecology 58:573-582.
Strong, D. R. 1982. The possibility of insect communities without competition: Hispine beetles on **Heliconia.** in R. F. Denno & H. Dingle (eds). Insect life history patterns habitat and geographic variation. Springer-Verlag, New York. pp. 183-194.
Strong, D. R., Jr. 1982. Potential interspecific competition and host specificity: Hispine beetles on **Heliconia.** Ecological Entomology 7:217-220.
Strong, D. R., Jr. 1982. Harmonious coexistence of Hispine beetles on **Heliconia** in experimental and natural communities. Ecology 63:1039-1049.
Strong, D. R. et al. 1984. Insects on plants community patterns and mechanisms. Harvard University Press. 313 pp.
Strong, D. R., Jr. & M. D. Wang. 1977. Evolution of insect life histories and host plant chemistry: Hispine beetles on **Heliconia.** Evolution 31:854-862.
Sturm, J. 1843. Catalog der Kaefer-Sammlung von Jacob Sturm. Nürnberg. 386 pp.
Suffrian, E. 1868. Verzeichniss der von Dr. Gundlach auf der Insel Cuba gesammelten Chrysomelinen. Archiv für Naturgeschiethe 34:163-252.
Swezey, O. H. 1925. Records of introduction of beneficial insects into the Hawaiian Islands. Hawaiian Planters' Record 29:369-376.
Symons, T. B. & E. N. Cory. 1913. Miscellaneous insect pests. Maryland Agricultural Experiment Station Bulletin 175:171-180.
Tanner, V. M. 1928. The Coleoptera of Zion National Park, Utah. Annals of the Entomological Society of America 21:269-281.
Teran, A. 1955. Notas sobre la biologia de **Stethispa crenatula** Uhmann (Col., Chrysomelidaae), parasito minador de **Coccoloba tiliacea** Lindau. Revista Agronómica del Noroeste Argentino 1:371-379.
Thomas, D. B. & F. G. Werner. 1981. Grass feeding insects of the western ranges: An annotated checklist. University of Arizona Experiment Station Technical Bulletin 243:1-50.
Thomson, J. 1856. Description de dix-sept Coléoptères. Revue et Magasin de Zoologie (2)8:472-483.
Thomson, J. 1857. Description d'un genre nouveau de la famille des cérambycides. Archives Entomologiques 1:127-128.
Thunberg, C. P. 1805. **in** Göttingen gelehrte Anzeiger. pp. 281-282.

Thunberg, C. P. 1821. **Alurni** tres novae species descriptae. Nova Acta Regiae Societatis Scicientiarum Upsaliensis 8:199-202.
Toledo Piza, S., Jr. 1968. Insectos de Piracicaba. Universidad São Paulo. 123 pp.
Townsend, C. H. T. 1895. On the Coleoptera of New Mexico and Arizona, including biologic and other notes. Canadian Entomologist 27:39-51.
Trippel, A. W. 1934. New records of Indiana Coleoptera. Bulletin of the Brooklyn Entomological Society 39:74-76.
Tucker, E. S. 1910. Incidental captures of Coleoptera at Plano, Texas. Canadian Entomologist 42:229-237.
Uhmann, E. 1926. 1. Beitrag zur Kenntnis der Hispinen (Col.). Entomologische Mitteilungen 15:155-156.
Uhmann, E. 1927. Drei neue amerikanische Hispinen (Col.). 2. Beitrag zur Kenntnis der Hispinen. Entomologische Mitteilungen 16:50-52.
Uhmann, E. 1927. Hispinen des Deutschen Entomologischen Institutes Berlin-Dahlem. 3. Beitrag zur Kenntnis der Hispinen. Entomologische Blätter 23:58-65.
Uhmann, E. 1927. Hispinen des Deutsch. Ent. Institutes (Col.). 4. Beitrag zur Kenntnis der Hispinen. Entomologische Mitteilungen 16:134-137.
Uhmann, E. 1928. **Probaenia crenatula** (n. sp.) nebst Fraßbild und **Alurnus lydiae** (n. sp.). Entomologische Mitteilungen 17:287-290.
Uhmann, E. 1930. Amerikanische Hispinen (Col. Chrys.). 19. Beitrag zur Kenntnis der Hispinen. Entomologische Blätter 26:33-38.
Uhmann, E. 1930. Hispinen aus Costa Rica aus der Ausbeute des Herrn Ferd. Nevermann. 20. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Folia Zoologica et Hydrobiologica 1:209-256.
Uhmann, E. 1930. Hispinen des Zoologischen Staatsinstitutes und Zoologischen Museums zu Hamburg. 21. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Deutsche Entomologische Zeitschrift 161-175.
Uhmann, E. 1930. Hispinen des Deutschen Entomologischen Institutes in Berlin-Dahlem. II. Teil. 23. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Entomologische Blätter 26:125-136.
Uhmann, E. 1930. Neue Hispinen von Costa Rica. 24. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Folia Zoologica et Hydrobiologica 2:135-144.
Uhmann, E. 1930. Amerikanische Hispinen aus den Museen für Tierkunde und Völkerkunde zu Dresden. 25. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Wiener Entomologische Zeitung 47:149-155.
Uhmann, E. 1931. Suedamerikanische Hispinen aus dem Deutschen Entomologischen Institut Berlin-Dahlem. 30. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Bollettino della Società Entomologica Italiana 63:58-61.

Uhmann, E. 1931. Hispinen aus dem höllandischen kolonialgebiet. Zoologische Mededeelingen (Leiden) 13:178-179.
Uhmann, E. 1931. Hispinen aus den Müseen fur Tierkunde und Völkerkunde zu Dresden. 2. Teil. 32. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Stettiner Entomologische Zeitung 92:219-226.
Uhmann, E. 1932. Südamerikanische Hispinen aus der Sammlung des Stettiner Museums und der meinigen. 38. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Stettiner Entomologische Zeitung 93:260-266.
Uhmann, E. 1932. Hispinen aus Brasilien, gesammelt von Herrn Pfarrer Keßel. 36. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Mitteilungen der Deutschen Entomologischen Gesellschraft 3:36-38.
Uhmann, E. 1933. Drei neue südamerikanische Hispinen. 41. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Folia Zoologica et Hydrobiologica 5:77-81.
Uhmann, E. 1933. Eine neue **Cephalolia**-Art aus Costa Rica. 42. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Entomologische Blätter 29:168-169.
Uhmann, E. 1934. Hispinen-Minen aus Costa Rica. 48. Beitrag zur Kenntnis der Hispinen (Col.: Chrysomelidae). Arbeiten über Physiologische und Angewandte Entomologie Berlin-Dahlem 1:272-277.
Uhmann, E. 1935. **Alurnus horni**, nov. nom. (Col. Hispidae). Revista de Entomología Rio de Janiero 5:90.
Uhmann, E. 1935. Zwei neue Hispinen aus Paraguay Beitrag zur Kenntnis der Hispinen (Col. Chrys.) No. 47. Revista Argentina de Entomología 1:13-14.
Uhmann, E. 1935. Hispinen aus Brasilien (Col. Chrysomelidae). Revista de Entomología Rio de Janiero 5:47-59.
Uhmann, E. 1935. Neue Hispinen aus Costa Rica. II. Teil. 52. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Entomologische Blätter 31:103-106.
Uhmann, E. 1935. Hispinen aus Paraguay. 54. Beitrag zur Kenntnis der Hispinen (Col.: Chrysomelidae). Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 2:237-240.
Uhmann, E. 1935. Südamerikanische Hispinen aus dem Zoologischen Museum der Universität Berlin. II. Teil. **Clinocarispa** und **Anoplitis**. 56. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Folia Zoologica et Hydrobiologica 8:227-235.
Uhmann, E. 1936. Amerikanische Hispinen aus dem Zoologischen Museum der Universität Berlin. V. Teil: Die Gattung **Chalepus** i. sp. Thunberg. 61. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Festschrift zum 60. Geburtstage von Professor Dr. Embrik Strand. 1:613-629.
Uhmann, E. 1936. Amerikanische Hispinen. III. Die Gattung **Cephalolia** Chevr. (Col. Chrys.). 57. Beitrag zur Kenntnis der Hispinen. Revista de Entomología Rio de Janiero 6:109-117.

Uhmann, E. 1936. Schlüssel der mir bekannten **Cephalolia**-Arten (Col. Chrys.). 65. Beitrag zur Kenntnis der Hispinen. Revista de Entomología Rio de Janiero 6:481-485.

Uhmann, E. 1937. Hispinen-Minen aus Costa-Rica. II. Teil. 62. Beitrag zur Kenntnis der Hispinen (Coleoptera: Chrysomelidae). Arbeiten über Physiologische und Angewandte Entomologie aus Berlin-Dahlem 4:61-66.

Uhmann, E. 1937. Südamerikanische Hispinen aus dem Deutschen Entomologischen Institut, Berlin-Dahlem. II. Teil. 63. Beitrag zur Kenntnis der Hispinen (Coleoptera: Chrysomelidae). Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 4:153-157.

Uhmann, E. 1937. Amerikanische Hispinen aus dem Zoologischen Museum der Universität Berlin. I. Teil. Subfamilie Amplipalpini und Gattung **Sceloenopla** Chevr. 64. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Mitteilungen aus dem Zoologischen Museum in Berlin 22:198-213.

Uhmann, E. 1937. Übersicht über die ersten Gattungen der Uroplatini (Col. Chrys.). 67. Beitrag zur Kenntnis der Hispinen. Entomologische Blätter 33:336-337.

Uhmann, E. 1937. Amerikanische Hispinen aus dem Zoologischen Museum der Universität Berlin. VI. Teil. Die Gattung **Uroplata** Chap. 68. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Festschrift zum 60. Geburtstage von Professor Dr. Embrik Strand 3:451-467.

Uhmann, E. 1938. Deckenzeichnung von **Stethispa crenatula** n. sp. Südtmerikanische Hispinen aus dem Zoologischen Museum der Universität Berlin. IV. Teil. Chalepini vor **Chalepus**. 58. Beitrag zur Kenntnis der Hispinen. Revista de Argentina Entomología 1:69-72.

Uhmann, E. 1938. Amerikanische Hispinen aus dem Zoologischen Museum der Universität Berlin. VII. Teil. Die Gattung **Xenochalepus** Weise. 70. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Revista de Entomología Rio de Janiero 8:420-440.

Uhmann, E. 1938. Hispinen aus dem Britischen Museum. I. Teil. 71. Beitrag zur Kenntnis der Hispinen (Coleoptera Chrysomelidae). Proceedings of the Royal Entomological Society of London Series B, 7:109-116.

Uhmann, E. 1938 Hispinen aus dem Britischen Museum.-II. Teil. 72. Beitrag zur Kenntnis der Hispinen (Coleoptera, Chrysomelidae). The Annals and Magazine of Natural History (11)1:405-428.

Uhmann, E. 1938. Hispinen aus Argentinien. 76. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Revista de Entomología Rio de Janiero 9:364-370.

Uhmann, E. 1939. Amerikanische Hispinen aus dem Berliner Museum. IX. Teil. Die Gattungen **Octhispa** Chap, **Baliosus** Ws., **Probaenia** Ws., **Acanthodes** Baly, **Cnestispa** Mlk. und **Pentispa** Chap. 77. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Festscrift zum 60. Geburtstage von Professor Dr. Embrik Strand 5:317-345.

Uhmann, E. 1939. Hispinen des Deutschen Entomologischen Instituts, Berlin-Dahlem. III. Teil. (Coleoptera: Chrysomelidae) 82. Beitrag zur Kenntnis der Hispinen. Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 6:151-156.

Uhmann, E. 1939. Amerikanische Hispinen aus dem Zoologischen Museum der Berliner Universität. VIII. Teil. Die Arescini und die Gattungen **Solenispa** Ws. und **Stenispa** Baly. 87. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Entomologische Blätter 35:298-300.

Uhmann, E. 1940. Amerikanische Hispinen aus dem Museum zu Genua. 86. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Memoire della Società Entomologica Italiana 18:167-172.

Uhmann, E. 1940. Hispinen aus dem Britischen Museum.- III. Teil, Amerikaner. 84. Beitrag zur Kenntnis der Hispinen (Coleoptera, Chrysomelidae). The Annals and Magazine of Natural History (11)6:449-461.

Uhmann, E. 1940. Amerikanische Hispinen aus dem Berliner Museum. X. Teil. Eine neue **Heptatoma** und die Gattung **Microrhopala** Baly. 85. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Entomologisk Tidskrift 61:14-18.

Uhmann, E. 1940. Die Genotypen der von mir aufgestellten Hispinen-Gattungen. 88. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Entomologisk Tidskrift 61:143-144.

Uhmann, E. 1940. Hispinen des Deutschen Entomologischen Instituts, Berlin-Dahlem. IV. Teil. (Coleoptera: Chrysomelidae). 89. Beitrag zur Kenntnis der Hispinen. Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 7:113-120.

Uhmann, E. 1940. Die Klauen der Hispinen. 90. Beitrag zur Kenntnis der Hispinen (Col. Chrys.). Zoologischer Anzeiger 130:119-123.

Uhmann, E. 1941. **Paradecatelia pallipes** Ws. Hispinen aus Deutschen Entomologischen Instituts, V. Teil. 93. Beitrag zur Kenntnis der Hispinen (Coleoptera: Chrysomelidae). Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 8:136-138.

Uhmann, E. 1942. Der Borstenkegel und das Pygidium bei **Cephalolia**-Arten. (Coleoptera: Chrysomelidae). 96. Beitrag zur Kenntnis der Hispinen. Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 9:93-102.

Uhmann, E. 1943. Neue amerikanische Hispinen. 100. Beitrag zur Kenntnis der Hispinen (Coleoptera: Chrysomelidae). Folia Zoologica et Hydrobiologica 12:115-121.

Uhmann, E. 1943. **Chalepus teutonicus** n. sp. (Coleoptera: Chrysomelidae) (103. Beitrag zur Kenntnis der Hispinen). Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem 10:223-224.

Uhmann, E. 1944. Hispinen-Minen aus Costa Rica (Coleoptera: Chrysomelidae). Arbeiten über Physiologische und Angewandte Entomologie aus Berlin-Dahlem 11:59-61.
Uhmann, E. 1946. Über Neotypen und Holotypen einiger Hispinae (Chrysom.). (109. Beitrag zur Kenntnis der Hispinae). Additamenta Faunistica Coleopterorum 4:17-20.
Uhmann, E. 1947. Die Deckenelemente der Hispinae-Gruppen Chalepini und Uroplatini (Col. Chrysom.). (108. Beitrag zur Kenntnis der Hispinae). Revista de Entomología Rio de Janiero 18:113-138.
Uhmann, E. 1948. Hispinen aus dem Naturhistorischen Museum Basel. Verhandlungen der Naturforschenden Gesellschaft in Basel 59:12-28.
Uhmann, E. 1948. Neue Hispinae aus Südamerika (Col. Chrysom.). 107. Beitrag zur Kenntnis der Hispinae. Revista de Entomología Rio de Janiero 19:207-230.
Uhmann, E. 1948. Ueber Hispinae (Ins. Col.) des Senckenberg-Museums. Senckenbergiana Biologica 29:73-76.
Uhmann, E. 1949. Hispinae aus dem Britischen Museum.- IV. Teil. Neue Fundorte und ergänzende Beschreibungen bekannte Arten nebst 2 Neuheiten. 117. Beitrag zur Kenntnis der Hispinae (Coleopt., Chrysom.). The Annals and Magazine of Natural History (12)1:668-682.
Uhmann, E. 1949. Praeimaginalstadien einiger mittelamerikanischer Hispinae. 121. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomel.). Arkiv für Zoologi 42A(20):1-43.
Uhmann, E. 1949. Nachtrag zu meiner Arbeit über die "Praeimaginalstadien einiger mittelamerikanischer Hispinae". 122. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomel.). Arkiv für Zoologi 42A(21):1-10.
Uhmann, E. 1949. Hispinae aus der zoologischen Sammulung des Bayerischen Staates zu München. Entomologische Zeitung 59:26-30.
Uhmann, E. 1950. Die Deckenskulptur von **Octotoma** Suffr. und verwandten Gattungen. 118. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysom.). Revista de Entomología Rio de Janiero 21:259-274.
Uhmann, E. 1950. Hispinae aus dem Britischen Museum. V. Teil. 129. Beitrag zur Kenntnis der Hispinae (Coleopt., Chrysom.). The Annals and Magazine of Natural History (12)3:324-337.
Uhmann, E. 1951. "Hispinae" von Brasilien und Argentinien. 130. Beitrag zur Kenntnis der "Hispinae" (Coleopt. Chrysomel.). Acta Zoológia Lilloana 12:331-341.
Uhmann, E. 1951. Hispinae aus dem Britischen Museum.- VI. Teil. 131. Beitrag zur Kenntnis der Hispinae (Coleopt., Chrysom.). The Annals and Magazine of Natural History (12)4:66-76.
Uhmann, E. 1952. Hispinae (Col. Chrys.). in Titschack, E. (ed.) Beiträge zur Fauna Perus 3:44-57. [Originally published as volumne 2 in 1942, all but six copies were

destroyed in World War II.]
Uhmann, E. 1953. 2. Nachtrag zu meiner Arbeit über die "Praeimaginalstadien einiger mittelamerikanischer Hispinae". 132. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysom.). Entomologische Blätter 49:169-173.
Uhmann, E. 1953. Hispinae aus dem Britischen Museum.- VII. Teil. 136. Beitrag zur Kenntnis der Hispinae (Coleopt., Chrysom.). The Annals and Magazine of Natural History (12)6:871-876.
Uhmann, E. 1953. Amerikanische "Hispinae" IV. 139. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysom). Memoria de la Sociedad Cubana Historia Natural 21:161-172.
Uhmann, E. 1953. Hispinae aus dem Institut Royal des Sciences Naturelles de Belgique, I. Teil. 142. Beitrag zur Kenntnis der Hispinae (Coleoptera Chrysomelidae). Bulletin Institut Royal des Sciences Naturelles de Belgique 39(15):1-8.
Uhmann, E. 1954. Zwei Hispinae-Arten aus Perú. 146. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Memoria de la Sociedad Cubana Historia Natural 22:355-359.
Uhmann, E. 1954. Hispinae aus dem Britischen Museum.- VIII. Teil. 156. Beitrag zur Kenntnis der Hispinae (Coleopt., Chrysom.). The Annals and Magazine of Natural History (12)8:497-518.
Uhmann, E. 1955. Vier Typen von Chapuis aus der **Xenochalepus**-Verwandtschaft. 174. Beitrag zur Kenntnis der Hispinae (Coleoptera Chrysomelidae). Institut Royal des Sciences Naturelles de Belgique Bulletin 31(89):1-7.
Uhmann, E. 1956. Hispinae aus dem Institut Royal des Sciences Naturelles de Belgique, II. Teil. 175. Beitrag zur Kenntnis der Hispinae (Coleoptera Chrysomelidae). Institut Royal des Sciences Naturelles de Belgique Bulletin 32(13):1-5.
Uhmann, E. 1956. Hispinae-Typen Thunbergs. 177. Beitrag zur Kenntnis der Hispinae (Coleopt., Chrysom.). Entomologisk Tidskrift 77:134-137.
Uhmann, E. 1956. Hispinae aus dem Museum G. Frey, Tutzing bei München. 179. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Entomologische Arbeiten aus dem Museum G. Frey 7:560-566.
Uhmann, E. 1957. Hispinae aus dem Ungarischen National-Museum in Budapest. 180. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Annales Historico-Naturales Musei Nationalis Hungarici n. s. 8:301-306.
Uhmann, E. 1957. Sechs neue Hispinen aus Südamerika (Coleoptera: Chrysomelidae). 181. Beitrag zur Kenntnis der Hispinae. Beiträge zur Entomologie 7:35-42.
Uhmann, E. 1957. Hispinen-Typen von Fabricius aus den Museen in Kopenhagen und Kiel. 182. Beitrag zur Kenntnis der Hispinae (Col. Chrysom.). Entomologische Meddelelser 28:104-126.
Uhmann, E. 1957. Hispinae aus dem Britischen Museum. IX. Teil.

184. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). The Annals and Magazine of Natural History (12)10:364-368.

Uhmann, E. 1957. Beiträge zur Kenntnis der Insektenfauna Boliviens Teil IV. Coleoptera III. Hispinae. Opuscula Zoologica 8:1-6.

Uhmann, E. 1957. Coleopterum Catalogus. Supplementa. Chrysomelidae: Hispinae, Hispinae Americanae. W. Junk, Gravenhage. Pars 35(1):1-153.

Uhmann, E. 1958. Färbungskreise dreier Hispinae aus Südbrasilien. 191. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Iheringia Zoologica 9:5-17.

Uhmann, E. 1959. **Hispa bihamata** Linné ist eine **Acanthodes**. 185. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Entomologisk Tidskrift 80:116-119.

Uhmann, E. 1959. Das Schildschen der Hispinae und seine Umgebung. 198. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Iheringia Zoologica 11:5-12.

Uhmann, E. 1959. Amerikanische Hispinae aus den Sammlungen Amerikanischer Entomologen. 199. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Pesquisas, Porto Alegre 3:611-630.

Uhmann, E. 1960. Über Hispinae (Ins. Col.) des Senckenberg-Musuems. II. Teil. 204. Beitrag zur Kenntnis der Hispinae (Chrysomelidae). Senckenbergiana Biologica 41:303-305.

Uhmann, E. 1961. Hispinae aus Verschiedenen Erdteilen. 202. Beitrag zur Kenntnis der Hispinae (Coleoptera, Chrysomelidae). Pesquisas, Porto Alegre (Zool.) 10:5-51.

Uhmann, E. 1961. **Hispa serrata** Fabricius, 1787. 206. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). The Annals and Magazine of Natural History (13)4(37):253-256.

Uhmann, E. 1963. Forschungen an alten Arten. 214. Beitrag zur Kenntnis der Hispinae (Coleoptera: Chrysomelidae). Beiträge zur Entomologie 13:576-582.

Uhmann, E. 1963. Hispinae aus dem Museum G. Frey (Col.). 3. Teil. 212. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomel.). Entomologische Arbeiten aus dem Museum G. Frey 14:148-155.

Uhmann, E. 1964. Hispinae aus dem Staate São Paulo, Brasilien (209. Beitrag zur Kenntnis der Hispinae (Coleoptera, Chrysomelidae)). Iheringia (Zoologica) 32:1-27.

Uhmann, E. 1964. Hispinae aus dem Muséum National d'Histoire Naturelle in Paris. 215. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Bulletin du Muséum National d'Histoire Naturelle Paris 2(35):473-477.

Uhmann, E. 1964. Hispinae aus dem Museum G. Frey. 4. Teil. 221. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Entomologische Arbeiten aus dem Museum

G. Frey 15:732-740.

Uhmann, E. 1964. Coleopterum Catalogus, pars 35, fasc. 3. Supplementa. Chrysomelidae: Hispinae, Corrigenda et Addenda. W. Junk. Gravenhage. pp. 399-490.

Uhmann, E. 1965. Insecta Amapaensia: Hispinae (Col., Chrysomelidae). 218. Beitrag zur Kenntnis der Hispinae. Pic, Papéis Avulsos do Departmento de Zoologia 17:113-117.

Uhmann, E. 1965. Die amerikanischen Hispinae von Félicien Chapuis kritisch betrachtet durch Julius Weise. 225. Beitrag zur Kenntnis der Hispinae (Coleoptera Chrysomelidae). Entomologische Abhandlungen 32(13):249-266.

Uhmann, E. 1966. Gattungen und Arten von Guérin-Méneville. 224. Beitrag zur Kenntnis der Hispinae (Coleoptera, Chrysomelidae). Entomologische Abhandlungen 32(14):267-284.

Uhmann, E. 1967. Hispinae aus Peru, Gesammelt von W. Weyrauch. (228. Beitrag zur Kenntnis der Hispinae, Coleopt. Chrysomelidae). Acta Zoológica Lilloana 22:101-104.

Uhmann, E. 1968. Hispinae aus dem Museum G. Frey. 5. Teil. 231. Beitrag zur Kenntnis der Hispinae (Coleopt. Chrysomelidae). Entomologische Arbeiten aus dem Museum G. Frey 19:248-253.

Uhmann, E. 1968. Neue Hispinae aus Brasilien (232. Beitrag zur Kenntnis der Hispinae; Coleoptera, Chrysomelidae). Pic, Papéis Avulsos do Deparmtno de Zoologia 21(12):125-130.

Uhmann, E. & P. Jolivet. 1952. Sur deux espèces d'Hispinae de la collection Chapuis. Institut Royal des Sciences Naturelles de Belgique Bulletin 28(61):1-8.

Ulke, H. 1890. Minutes meeting September 5, 1889. Proceedings of the Entomological Society of Washington 1:248.

Ulke, H. 1902. A list of the beetles of the District of Columbia. Proceedings of the United States National Museum 25:1-57.

United States Department of Agriculture, Forest Service. 1979. A guide to common insects and diseases of forest trees in the northeastern United States. United States Departemnt of Agriculture Forest Service State and Private Forest Publication NA-FR-4. 123 pp.

Van Dyke, E. C. 1925. Notes and descriptions of new species of west American Hispinae (Coleoptera- Chrysomelidae). Pan Pacific Entomologist 1:170-173.

Vaurie, P. 1956. **Octotoma gundlachi** mining **Lantana** leaves in Cuba. Coleopterists Bulletin 10:80.

Vigors, N. A. 1826. Descriptions of some rare, interesting, or hitherto uncharacterized subjects of zoology. Zoological Journal of London 2:234-242.

Villacis Santos, J. 1968. Algunas características biológicas y etológicas del **Alurnus humeralis** Rosenberg "gusano chato o cogollero' de la palma africana. Turrialba 18:115-128.

Voet, J. E. 1806. Catalogus systematicus coleopterorum. Vol. 2. La Haye.
Voigt, F. S. 1838. Lehrbuch ber Zoologie. Stuttgart. 459 pp.
Wade, J. S. 1935. A contribution to a bibliography of the described immature stages of North American Coleoptera. United States Department of Agriculture Bureau of Entomology E-358. 114 pp.
Ward, C. R. et al. 1977. Annotated checklist of New World insects associated with **Prosopis** (Mesquite). United States Department of Agriculture Technical Bulletin 1557. 115 pp.
Waterhouse, C. O. 1879. Descriptions of new Coleoptera from Medellin, Colombia, recently added to the British Museum Collection. Cistula Entomologica 2:421-429.
Waterhouse, C. O. 1881. On the Coleopterous insects belonging to the family Hispidae collected by Mr. Buckley in Ecuador. Proceedings of the Zoological Society of London 260-269.
Watson, J. R. 1922. Some beetles new to Florida. Florida Entomologist 5:67-68.
Weaver, J. E. & C. K. Dorsey. 1965. Parasites and predators associated with five species of leaf-mining insects in black locust. Annals of the Entomological Society of America 58:933-934.
Weaver, J. E. & C. K. Dorsey. 1967. Larval mine characteristics of five species of leaf-mining insects in black locust, **Robinia pseudoacacia**. Annals of the Entomological Society of America 60:172-186.
Webb, D. W. 1980. Primary insect types in the Illinois Natural History Survey Collection, exclusive of the Collembola and Thysanoptera. Illinois Natural History Survey Bulletin 32(2):55-191.
Weber, F. 1801. Observationes entomologicae, continentes novorum quae condidit generum characteres, et nuper detectarum specierum descriptiones. 116 pp. Kiliae.
Weber, P. W. 1956. Recent introductions for biological control in Hawaii- 1. Proceedings of the Hawaiian Entomological Society 16:162-164.
Weise, J. 1885. Beitrag zur Chrysomeliden- und Coccinelliden-Fauna Portorico's. Archiv für Naturgesichte 51:144-168.
Weise, J. 1893. **Demothispa angusticollis** Weise. Deutsche Entomologische Zeitschrift 1893:16.
Weise, J. 1900. Eine neue **Alurnus**-Form. Deutsche Entomologische Zeitschraft 1900:218-219.
Weise, J. 1904. Einige neue Cassidinen und Hispinen. Deutsche Entomologische Zeitschraft 1904:433-452.
Weise, J. 1904. Über bekannte und neue Chrysomeliden. Archiv für Naturgeschite 70:157-158.
Weise, J. 1905. Beschreibung einiger Hispinen. Archiv für Naturgeschite 71:49-104.
Weise, J. 1905. Aufzählung mexicanischer Hispinen. Deutsche Entomologische Zeitschraft 1905:130-135.
Weise, J. 1905. Bemerkungen über Hispinen. Deutsche Entomologische Zeitschraft 1905:317-320.
Weise, J. 1905. Aufzahlung von Hispinen aus Nicaragua. Annali del Museo Civico Storia Naturale di Genova (3)2:237-242.
Weise, J. 1906. Hispinae, Coccinellidae et Endomychidae Argentina et Vicinitate e Collectione Bruchiana. Revista del Museo La Plata 12:219-231.
Weise, J. 1907. Hispinen aus Arizona. Archiv für Naturgeschite 73:205-209.
Weise, J. 1910. Beitrag zur Kenntnis der amerikanischen Hispinen. Archiv für Naturgeschite 76:67-127.
Weise, J. 1910. Zweiter Beitrag zur Kenntnis der Hispinen. Verhandlungen des Naturforschenden Vereines in Brünn. 48:115-162.
Weise, J. 1911. Dritter Beitrag zur Kenntnis der Hispinen. Annales de la Société Entomologique de Belgique 55:39-78.
Weise, J. 1911. Coleopterum Catalogus, Chrysomelidae: Hispinae. W. Junk. Berlin. Pars 35:1-94.
Weise, J. 1911. Coleoptera Phytophaga fam. Chrysomelidae, subfam. Hispinae. in P. Wytsman, Genera Insectorum. fasc. 125:1-123. Brussels.
Weise, J. 1913. Über Hispinen und Coccinelliden. Archiv für Naturgeschite 78:101-120.
Weise, J. 1916. Synonymische Mitteilungen. Deutsche Entomologische Zeitschrift 1916:37-41.
Weise, J. 1921. Amerikanische Hispinen. Archiv für Naturgeschite 87A:263-274.
Weise, J. 1921. Wissenschaftliche Ergebnisse der Schwedischen entomologischen Reise des Herrn Dr. A. Roman in Amazonas 1914-1915. 6. Chrysomelidae. Arkiv für Zoologi 14:171-191.
Weise, J. 1922. Coleoptera e collectione Bruchiana. Anales de la Sociedad Científica Argentina 94:30-40.
West, A. S. & T. M. Lothian. 1948. The basswood leafminer, **Baliosus ruber** (Weber), (Chrysomelidae, Hispini), in the Rideau Lake region. 78th Annual Report of the Entomological Society of Ontario. pp. 62-65.
Westwood, J. O. 1842. Insectorum novorum centuria. The Annals and Magazine of Natural History (1)8:203-205.
Wheeler, A. G., Jr. 1980. Japanese pagodatree: A host of locust leafminer, **Odontota dorsalis** (Thunberg) (Coleoptera: Chrysomelidae). Coleopterists Bulletin 34:95-98.
Wheeler, A. G., Jr. 1987. Locust leafminer, **Odontota dorsalis** (Thunberg) Coleoptera: Chrysomelidae. Regulatory Horticulture Entomology Circular 115, 3pp.
Wheeler, A. G., Jr. & W. A. Snook II. 1986. Biology of **Sumitrosis rosea** (Coleoptera: Chrysomelidae), a leafminer of black locust, **Robinia pseudoacacia** (Leguminosae). Proceedings of the Entomological Society of Washington 88:521-530.
White, B. E. 1939. A new **Anisostena** (Coleoptera: Chrysomelidae) from Owens Valley, California. Bulletin

of the Brooklyn Entomological Society 34:55-56.
White, R. E. 1981. The genus **Uroplata**, type-species and authorship (Coleoptera: Chrysomelidae). Proceedings of the Entomological Society of Washington 83:713-715.
White, R. E. 1983. A field guide to the beetles of North America. Houghton Mifflin Co., Boston. 368 pp.
Wickham, H. F. 1888. A list of the Coleoptera of Iowa City and vicinity. Bulletin from the Laboratories of Natural History of the State University of Iowa. 1:81-96.
Wickham, H. F. 1890. Regarding **Stenopodius flavidus**. Entomologia Americana 6:52.
Wickham, H. F. 1902. The Coleoptera of Colorado. Bulletin from the Laboratories of Natural History of the State University of Iowa 5:217-310.
Wilcox, J. A. 1954. Leaf beetles of Ohio (Chrysomelidae: Coleoptera). Ohio Biological Survey Bulletin 43:353-506.
Wilcox, J. A. 1975. Checklist of the beetles of Canada, United States, Mexico, Central America and the West Indies. Vol. 1, pt. 7. The Leaf Beetles. Biological Research Institute of America, Latham, NY. 166 pp.
Wilcox, J. A. 1979. Leaf beetle host plants in northeastern North America (Coleoptera: Chrysomelidae). Biological Research Institute of America Latham, NY. 30 pp.
Wille, J. E. 1940. Uebersicht der landwirtschaftlich wichtigen Inseckten von Peru (Südamerika). Zeitschrift zur Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz 50:378-379.
Williams, C. E. 1989. Damage to woody plants by the locust leafminer, **Odontota dorsalis** (Coleoptera: Chrysomelidae), during a local outbreak in an Appalachian oak forest. Entomological News 100:183-187.
Winder, J. A. et al. 1984. **Uroplata lantanae** Buzzi & Winder (Coleoptera: Chrysomelidae: Hispinae), a potential biological control agent of **Lantana camara** in Australia. Bulletin of Entomological Research 74:327-340.
Wolcott, G. N. 1948. The insects of Puerto Rico: Chrysomelidae. Journal of Agriculture of the University of Puerto Rico 32:225-416.
Yadav, J. S. & R. K. Pillai. 1974. Cytology of two species of Australian leafminers (Hispinae, Chrysomelidae). Cytobios 11:75-79.

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Status of *Rhinocyllus conicus* (Coleoptera: Curculionidae) in Maryland

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Abstract

The distribution and abundance of *Rhinocyllus conicus* in Maryland were determined in a survey of eight counties. This beneficial weevil was introduced into Maryland in 1975 as part of a classical biological control program on *Carduus* spp. thistles. Large numbers of *R. conicus* were commonly found infesting *C. thoermeri*, and to a lesser extent *C. acanthoides*, in areas with high thistle populations. In counties with scattered populations of thistles, *R. conicus* was frequently absent. No significant decline in thistle populations was detected at selected sites where *R. conicus* and other beneficial insects were present. However, surveying these sites began eleven years after *R. conicus* was released, and the sites suffered constant disturbance from mowing and spraying.

A seed destroying weevil, *Rhinocyllus conicus* (Froelich) (RC), was first introduced into Canada from Europe in 1968 for the control of musk (= nodding) thistle, *Carduus nutans* L. and *C. thoermeri* Weinm. (Harris and Zwolfer 1971). Subsequent releases were made in 1969 in Virginia and Montana (Surles et al. 1974, Hodgson and Rees 1976).

RC was released in Maryland in 1975 and reported as established in 1978 (Batra 1980). Since then, there have been no extensive studies on RC in Maryland. The present paper reports on the current distribution and abundance of RC in Maryland.

Materials and Methods

Distribution and abundance of RC. Eight Maryland counties were sampled for the presence of RC in 1988: Anne Arundel, Baltimore, Carroll, Frederick, Harford, Howard, Prince George's, and Washington. However, 86% of all sample sites were in the "thistle-belt" counties of Carroll, Frederick, and Washington. Each county was divided into five, square-mile quadrats, with a single sample site in each quadrat. A suitable sample site was one that was infested with either musk (*C. thoermeri*) or plumeless (*C. acanthoides*) thistle, or both. Sampling consisted of clipping five primary and five secondary seed heads from different thistle plants.

A primary seed head on *C. thoermeri* was defined as the terminal seed head on the main stem, or the terminal seed head from one of the top three branches. These three or four seed heads were the largest, earliest developing, and contained the most viable seeds on the plant (McCarty and Lamp 1982). Secondary heads were terminal seed heads on lower branches or lateral seed heads on any branch. These heads were typically smaller and developed later in the year.

The earliest appearing seed heads were sampled for *C. acanthoides*. This species flowers later in the year than *C. thoermeri*, and the seed heads tend to be uniform in size throughout the growing season.

The seed heads were dissected, and the numbers of RC larvae, pupae, and adults were recorded. A total of 81 sites was sampled and 925 seed heads dissected. Sampling began on June 14 and ended on July 27, 1988.

Impact of RC on thistles. In 1983, thirteen sites were selected for the release and evaluation of the impact of various biological control agents on thistles. Most of these sites were on the Interstate-70 right-of-way. However, it was not until 1986 that quantitative, comparable measurements were taken of the thistle populations located at nine of these sites. The sites were surveyed again in 1987 and 1989.

The surveys were conducted using a belt transect sampling method. Ten transects, each 15 m x 0.4 m, were made at eight of the sites, while 15 transects, each 10 m x 0.4 m, were used at one of the sites that was less than 15 m in width. All reproductive (bolting) stages of *C. thoermeri* and *C. acanthoides* were counted.

Results and Discussion

RC was present in those areas where *Carduus* thistles have been a problem for many years: Carroll, Frederick, and Washington Counties. In these counties, RC was present in large numbers, averaging 6.7, 15.2, and 15.5 weevils per primary head, respectively (Table 1). Secondary seed heads in these counties were also infested, as were the primary seed heads of *C. acanthoides*. In Frederick and Washington Counties, RC was consistently found at high levels on *Carduus* thistles. These two counties supported the highest populations of *Carduus* thistles (P. W. T., unpublished data). The distribution of RC in Carroll County was more spotty. This was probably a reflection of the lower density of thistle populations in the county. RC is known to favor areas where *C. thoermeri* populations are high (L. T. Kok, pers. comm. 1988) The reasons for this are unclear but, in the presence of a stable food supply, populations of RC can build to large numbers.

Table 1. Mean number (±SD) of *Rhinocyllus conicus* found infesting primary and secondary seed heads of *Carduus thoermeri* and *C. acanthoides*.

County	Type[1]	N[2]	Insects / seed head
Anne Arundel	M1	10	0.0 (±0.0)
	M2	5	0.0 (±0.0)
Baltimore	M1	25	2.4 (±1.4)
	M2	25	0.2 (±0.2)
Carroll	M1	85	6.8 (±4.2)
	M2	85	1.6 (±1.4)
	P1	5	1.4 (±2.2)
Frederick	M1	155	15.2 (±6.4)
	M2	155	4.8 (±2.5)
	P1	30	1.4 (±0.9)
Harford	M1	10	0.0 (±0.0)
	M2	10	0.0 (±0.0)
Howard	M1	5	0.0 (±0.0)
	M2	5	0.0 (±0.0)
	P1	5	3.4 (±1.7)
Prince George's	M1	5	0.2 (±0.4)
	M2	5	0.0 (±0.0)
Washington	M1	95	15.5 (±7.7)
	M2	95	4.9 (±4.2)
	P1	110	1.4 (±0.8)

[1] M1 = primary seed head, *C. thoermeri*. M2 = secondary seed head, *C. thoermeri*. P1 = earliest available seed head, *C. acanthoides*.
[2] Number of seed heads sampled.

As expected, those areas with scattered populations of *C. thoermeri* did not support large populations of RC. This was characteristic of parts of Carroll, Baltimore, Harford, Howard, Anne Arundel, and Prince George's Counties. Although populations of *C. thoermeri* in these counties were locally heavy in some cases, they frequently escaped attack by RC.

Another impediment to the establishment of RC in these areas may be a lack of sufficient "buffer" areas containing thistles which would not be affected by local control measures, such as the eradication of a small field infestation by herbicides.

Despite a general lack of synchronization with *C. acanthoides*, RC did attack this species. Rowe and Kok (1984) noted a delayed ovipositional period for RC in pure stands of *C. acanthoides*, suggesting the development of a strain that can take advantage of this thistle species by shifting its activity to later in the year. If true, the same may occur in Maryland.

Impact of RC on thistles. The densities of the two thistle species fluctuated during the course of this study (Fig. 1). There were no obvious trends and no significant changes in the populations of *Carduus* thistle species at any site, despite the presence of RC. Also present at some of the sites were *Trichosirocalus horridus* (Panzer), a rosette feeding weevil, and *Cassida rubiginosa* (Muller), a leaf feeding beetle.

It is not known why the thistle populations, primarily *C. thoermeri*, did not decline. The most obvious reason is because data on thistle densities were not collected until 1986, eleven years after RC was released. The interval may have been sufficient for RC to reduce significantly the density of *C. thoermeri* to its present level, despite the fluctuations that were noted during this study. Kok and Surles (1975) found that RC reduced significantly the density of *C. thoermeri* four years after it was introduced.

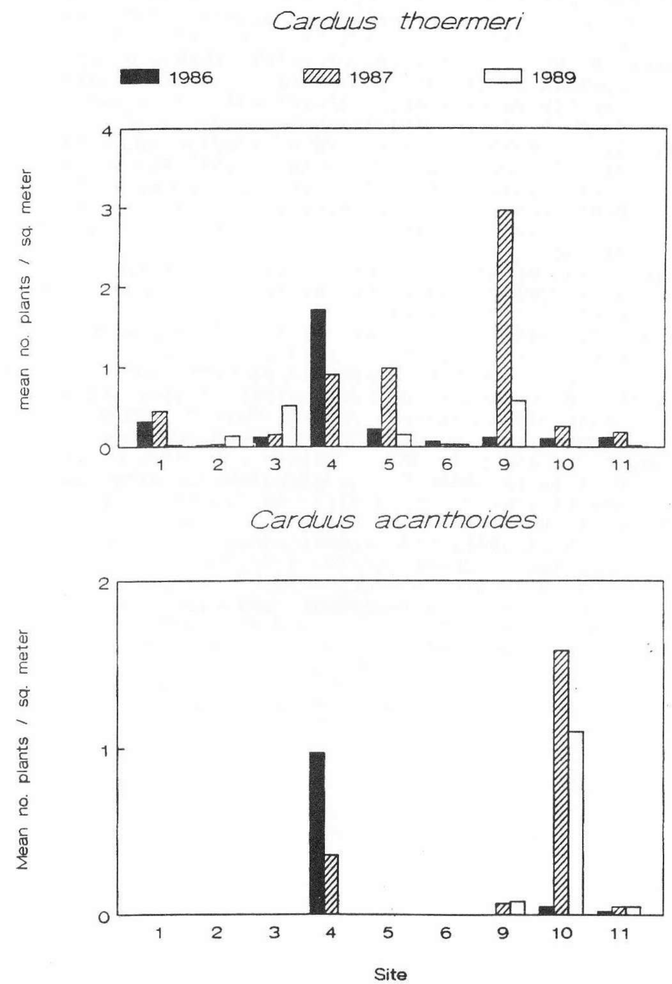
Another problem encountered at the sites was the interference caused by the routine mowing or spraying of the study areas. Annual broadcast treatments of broadleaf herbicides were applied to roadsides, usually killing the crown vetch, *Coronilla varia* L., that had been planted to control erosion. Often these areas were quickly colonized by thistles that persisted for several years until grasses became established. Those sites most severely disturbed by spraying were not included in the results.

Without pre-release information on thistle populations, it is impossible to document quantitatively the beneficial impact of RC in Maryland. However, the results in nearby Virginia, as well as in other states and countries, provide ample evidence of their efficacy.

In 1988, populations of RC in primary seed heads of *C. thoermeri* were high, with up to 45 weevils per head. Although no data were gathered on the number of viable seeds per plant remaining after RC attack, it appeared that a large portion of the most viable seed in the "thistle-belt" was destroyed in 1988. This conclusion is based on our observations and evidence provided by other researchers. Surles and Kok (1978), found that 6.8 weevils per seed head reduced the amount of seed by 75%. McCarty and Lamp (1982) found that an average of 2.3 and 11.5 weevils per seed head reduced the total number of the most viable seeds per plant by 28.2% and 77.9%, respectively.

RC is well established in the "thistle-belt" area of Maryland. The weevil destroys a large portion of the seed produced by *C. thoermeri*, as well as a smaller portion of *C. acanthoides* seed. However, there are still areas of the State with isolated but heavy populations of *C. thoermeri* that thus far have escaped attack by this weevil.

Fig. 1. Density of *Carduus thoermeri* and *C. acanthoides* at selected release sites in Central Maryland from 1986 to 1989.



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References Cited

Batra, S. W. T. 1980. First establishment of *Rhinocyllus conicus* (Froelich) in Maryland and Pennsylvania for thistle control (Coleoptera: Curculionidae). Proc. Entomol. Soc. Wash. 82: 511.

Harris, P. and H. Zwolfer. 1971. *Carduus acanthoides* L., welted thistle and *C. nutans* L., nodding thistle (Compositae), pp 76-79. *In*: Biological Control Programmes Against Insects and Weeds in Canada, 1959-1968. Tech. Commun. Commonw. Inst. Biol. Control 4. 266 pp.

Hodgson, J. M. and N. E. Rees. 1976. Dispersal of *Rhinocyllus conicus* for biocontrol of musk thistle. Weed Sci. 24: 59-62.

Kok, L. T. and W. W. Surles. 1975. Successful biocontrol of musk thistle by an introduced weevil, *Rhinocyllus conicus*. Environ. Entomol. 4: 1025-1027.

McCarty, M. K. and W. O. Lamp. 1982. Effect of a weevil, *Rhinocyllus conicus*, on musk thistle (*Carduus thoermeri*) seed production. Weed Sci. 30: 136-140.

Rowe, D. J. and L. T. Kok. 1984. Potential of *Rhinocyllus conicus* to adapt to the plumeless thistle, *Carduus acanthoides*, in Virginia. Va. J. Sci. 35: 192-196.

Surles, W. W., L. T. Kok, and R. L. Pienkowski. 1974. *Rhinocyllus conicus* establishment for biocontrol of thistles in Virginia. Weed Sci. 22: 1-3.

Surles, W. W. and L. T. Kok. 1978. *Carduus* thistle seed destruction by *Rhinocyllus conicus*. Weed Sci. 26: 264-269.

Cover illustration: The logo of the Maryland Entomological Society features the Maryland Shield and a specimen of Euphydras phaeton (Drury), the Baltimore checkerspot, which is the offical insect of the state of Maryland.

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