

CHRYSOMELIDAE OF WIND CAVE NATIONAL PARK
SOUTH DAKOTA

by

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INTRODUCTION

Wind Cave National Park is located in the Southwest corner of South Dakota where it occupies some 28,000 acres in Custer County. It ranges in altitude from 5,013 feet at Rankin Ridge to 3,600 in the southeast corner. It is about three-fourths grassland and one-fourth Ponderosa pine, Pinus ponderosa Dougl., forest. The grassland areas are dominated by the bluestems and other prairie grasses. Several species of sumac, Rhus, along with goldenrod, Solidago, sedge, Artemisia, and sunflower, Helianthus petiolaris Nutt., occur also. No ponds or lakes are present in the park. The main water source is Beaver Creek, a small stream which flows part way through the park before sinking underground. Most of the rain occurs in May and June and the remainder of the summer is hot and dry.

The National Park Service is always interested in the acquisition of more knowledge concerning the areas under their administration. They are continually promoting the historical and biological studies which lead to this understanding. The suggestion has recently been made that an entomological study be carried on at Wind Cave National Park; with this in mind the current investigation was organized so that it might be used as a basis for a future enlarged study of the insects of the area.

Very little work had been done in previous years in this particular section of the United States. Earlier information relating to this family was available mainly from the collections of Kansas and Kansas State Universities and from the literature pertaining to the group. A small amount of actual collecting had been done in the area; this was by M. W. Sanderson in 1935, by R. H. Beamer in 1937 and by H. C. Severin in 1947.

It was hoped that some of the biology of these beetles could be learned in connection with determining the species present in the park. However,

since the study was made over a relatively short period, the chief accomplishment along this line was the association of certain species with their host plants.

LITERATURE REVIEW

The literature pertaining to the Chrysomelids of this area was widely scattered. The Leaf Beetles of Ohio (Wilcox, 1954) was the most valuable single piece. It not only contained keys and descriptions but was the newest monograph treating the entire family. The generic monographs published by Blake at various times (1927 to 1955) afforded valuable help in species records as well as in providing keys; Blatchley (1910) included in Coleoptera of Indiana some species which were not recorded by Wilcox.

Another help was the unpublished work, The Keys to North American Species of Chrysomelidae, compiled by Wilcox, who has attempted here to bring together all the keys pertinent to the family. Some occur as they have been previously published in other papers, some he modified and brought up to date by including new species which had been described after the keys were published and still others are keys which he formulated out of his own observations and work with the Chrysomelidae.

Leng's catalogue (1920) and supplements were useful in providing species records as well as in being the source for locating the descriptions of some of the species scattered throughout the literature on Coleoptera.

METHODS AND MATERIALS

Collections were made in the summer of 1959. Most of the specimens were taken without the use of a net in order that beetle-host relationships could also be established. Less precise, but more strenuous methods, such as

sweeping, might have yielded a few additional species.

It was felt at first that the occurrence of a given species could be definitely established only by collecting it within the park boundary. However, due to limitations imposed by collecting methods and unusually poor climatic conditions, other sources of information were needed. Species records in literature as well as collections at the University of Kansas and Kansas State University were examined; an effort was made to obtain collecting records from other institutions but positive results in these attempts were not forthcoming. On the basis of comparable vegetational and environmental areas surrounding the park, species recorded in the literature as occurring in nearby areas have been included.

Identification was carried out later in the laboratory by making use of existing keys to the Chrysomelidae and of identified material in the Kansas State University collection. In some groups, particularly the Alticinae (flea beetles), adequate keys do not presently exist and certain species could be determined only to genus. In others, where only one or two individuals were collected, positive determination was difficult because of the individual variations which normally occur within species.

The keys used most extensively were the ones set up by Wilcox (1954). Where these keys did not work or in order to compare the results of the first identification three other sources were employed. These were The Keys to North American Species of Chrysomelidae (Wilcox, unpublished); Coleoptera of Indiana (Blatchley, 1910); and Doris Blake's series of generic monographs published by the United States National Museum (1927 to 1955). The keys included in the present paper have been modified and adapted from the above sources to fit the species found in Wind Cave National Park.

LIST OF SPECIES

The following list is of the 24 genera and 36 species which are included in this paper. It contains those which have been collected in the park as well as those which should be found there. The species marked with an asterisk (*) are those which are presently known to occur in the park.

CHRYSOMELIDAE

Criocerinae

Lema*trilineata Oliv.

Clytrinae

Anomoalaticlavie (Forst.)Coscinopteravittigera Lec.*dominicana Fab.

Cryptocephalinae

Cryptocephalus*confluentus SayPachybrachysothonus (Say)

Eumolpinae

Nodonota*tristis (Oliv.)Myochroussquamosus

Chrysomelinae

Leptinotarsadecemlineata (Say)Zygogramma*exclamationis (Fab.)Gastrophysacyanea MelshChrysomelacrotchii BrownCalligraphelunata (Fab.)

Galerucinae

Diabrotica*atripannis (Say)*fossata (Say)Galerucella*integra (Lec.)*americana (Fab.)*cribrata (Fab.)

Galerucella (con't)nymphaeae (L.)Trirhabda*canadensis (Kby)adela Blakeattenuata (Say)convergens Lec.Acalymmavittata (Fab.)

Aiticineae

Disonycha*punctigera Lec.triangularis (Say)Alticaovulata Fall

Aiticineae (con't)

Orthaltica*copalina (Fab.)Chaetocnema*subviridis Lec.

Hispineae

Microrhopala*vittata (Fab.)

Cassidineae

Chelymorpha*cassidea (Fab.)Jonthonotanigripes

Four species could not be identified beyond the genus. These included one each in Monoxia, Altica, Coscinoptera, and Diabolia.

KEY TO THE SUBFAMILIES OF CHRYSOMELIDAE

1. Front normal, mouth anterior 2
 - Front inflexed, mouth turned caudad 11
2. Intermediate sternites not narrowed; no exposed pygidium 3
 - Intermediate sternites narrowed medially; a pygidium usually present . 6
3. Pronotum without lateral margin 4
 - Pronotum with a lateral margin 8
4. Antennae separated by the entire width of the front 5
 - Antennae somewhat approximate; first sternite as long as all the others Donaciinae
5. Elytral punctation confused, or if in rows, pronotum has small teeth on sides; prosternum distinct Orsodacninae
 - Elytral punctation in regular rows, pronotum without lateral teeth, prosternum very narrow Criocerinae (p. 7)
6. Prosternum with antennal grooves Chlamisinae
 - Prosternum without antennal grooves 7
7. Antennae filiform or clavate Cryptocephalinae (p. 8)
 - Antennae dentate or pectinate from beyond the third or fourth segment Clytrinae (p. 7)
8. Antennae separated by entire width of front 9
 - Antennae approximate at base 10
9. Anterior coxal cavities circular Eumolpinae (p. 10)
 - Anterior coxal cavities transversely oval Chrysomelinae (p. 11)
10. Hind femora slender, lacking apodeme Galerucinae (p. 12)
 - Hind femora swollen, with inner sclerotized organ Alticinae (p. 17)

11. Head free; margins of prothorax not explanate Hispinae (p. 19)
 Head concealed; or margins of prothorax explanate Cassidinae (p. 19)

CRIOCERINAE

Lema

- Elytra unicolorous blue or black collaris
 Elytra yellow, with longitudinal stripes trilineata

Lema collaris Say

Journal Academy Natural Science Philadelphia, 3:430, 1823

Elytra shining dark blue; pronotum shining yellow, very finely and sparsely punctate; length, 4-5 mm., width, 2-2.2 mm.

Although this species has not been collected from the park, it does occur in areas to the south and east. The host plant is spiderwort, Tradescantia virginiana L., and is found from spring to fall in the park.

Lema trilineata (Oliv.)

Entomologie, VI, Paris, p. 739, 1808

Yellow, robust; elytra with sutural and submarginal stripes black, pronotum with two small black spots; antennae, tibiae, and tarsi black; length, 6-7.5 mm., width, 2.8-3.5 mm.

L. trilineata feeds on solanaceous plants.

CLYTRINAE

- Front coxae contiguous Anomoea
 Front coxae separated Coscinoptera

Anomoea

Anomoea laticlavata (Forst.)

Chrysomela laticlavata Forster 1771, Nov. Sp. Ins. 1:27

Yellow, subcylindrical; tibiae, antennae and sutural stripe black; the one occurring in the park area also has the apical half of the lateral margin black; length, 6-8 mm., width, 3-4 mm.

Coscinoptera

Disc of thorax evenly and regularly convex; punctation dense and even; a smooth median line, no humeral spot; blackdominicana

Disc of thorax uneven and irregularly convex, the punctation unevenly disposed and rather coarse, no well defined smooth median line, elytra vittate .

vittigera

Coscinoptera dominicana Fab.

Syst. El. II, p. 34.

Cylindrical, robust; black with white pubescence denser on ventral surface than on dorsal; length, 4-6 mm., width, 2.3-3.5 mm.

This species was taken from the skunk brush, Rhus trilobata Barkley, which apparently was its food plant.

Coscinoptera vittigera Lec.

Proc. Acad. N. S. Phila. 1861, p. 357

Less robust than dominicana, piceous black; body black beneath, not densely pubescent; legs black, sparsely pubescent; each elytron with a yellow vitta of variable width, usually starting at epipleural lobe, curving upward without including the entire umbone, passing parallel with the side margin to the apex and curving into the suture; length, 3-5.5 mm., width, 2.5-3 mm.

C. vittigera was also taken on skunk brush, Rhus trilobata Barkley.

CRYPTOCEPHALINAE

Prothorax not margined at base, crenulate 2
 Prothorax margined at base, not crenulate 3

2. Front edge of prothoracic flanks sinuous or toothed Bassareus
 Front edge of prothoracic flanks straight Cryptocephalus
3. Prosternum flat in front, depressed behind Griburius
 Prosternum feebly channelled, smaller Pachybrachys
- Cryptocephalus
1. Elytra with two vittae venustus
 Elytra trilineate 2
2. Inner line confluent with suture confluentus
 Inner line not confluent with suture but merging with other vittae
 before apex ♂. sp.

Cryptocephalus confluentus

Rufous; elytra yellow, trilineate with black; with inner line confluent with the suture beyond the middle; elytra with punctured striae; thorax impunctured, polished, with anterior and lateral margins lighter; scutellum black.

This beetle although not collected in the park should occur there as it has been collected in the immediate vicinity.

Cryptocephalus sp.

Smaller and darker than ♂. confluentus; the three vittae converge, not reaching apex; length, 3.5-4 mm., width, 1.7-2 mm.

This species was taken in the park on skunk brush, Rhus trilobata Barkely.

Pachybrachys

- Elytra vittate..... othonus
 Elytra not vittate praeclearus

Pachybrachys othonus (Say)

Cryptocephalus othonus Say 1825, Amer. Ent. 2

Black, robust; legs part of face, margins and two discal stripes on each

elytron yellow; black area of pronotum coarsely and densely punctate; length, 3.5-4 mm., width, 1.7-2.3 mm.

Pachybrachys praeclarus Weiss

P. elegans, Coleoptera of Indiana, Blatchley, p. 1127

Shining black; subcylindrical, robust; thorax with narrow ivory white line near side margins, edge black; elytra each with similar line, upper portion of epipleural lobe white from humerus to middle, punctation coarse, deep and in regular rows becoming confused near the sutures.

EUMOLPINAЕ

Anterior margin of the prothorax arcuate beneath, forming postocular lobes, body pubescent; front tibiae toothed Myochrous
Anterior margin of prothorax straight Nodonote

Myochrous

Myochrous squamousus (Lec.)

Smithsonian Contr. Knowl. 11:24, 1895

Oblong; shining black with a bronzy, sometimes bluish luster; covered by wide flat, brown-and-white scales; in many specimens these form a white lateral elytral vitta; prothorax not definitely toothed but with anterior angularity; elytral punctation not round but angular; length, 5 mm.

According to Blake (1950), this species should occur in the park.

Nodonote

Nodonote tristis (Oliv.)

Colapsis tristis Oliver 1808, Ent. 6:889

Oblong, oval; dark metallic green; elytral punctation slightly striate; sides of metasternum finely punctate; length, 3.3-4 mm., width, 1.9-2.5 mm.

CHRYSOMELINAE

Last segment of maxillary palpi oval, attenuate toward apex, at least as long as the penultimate Chrysomelini

Last segment of maxillary palpi subquadrangular or dilated, broadly truncate at the extremity Zygogrammini

Zygogrammini

1. Last palpal segment shorter than the preceding, truncate Leptinotarsa

Last palpal segment not shorter than the preceding, dilated 2

2. Tarsal claws parallel, connate at base, tarsal segment dentate beneath Zygogramma

LeptinotarsaLeptinotarsa decemlineata (Say)

Chrysomela decemlineata Say 1824, Jour. Acad. N. S. Phila. 3:453

Broadly oblong oval, very convex; dull yellow with elytral suture and five narrow discal stripes black; pronotum with numerous black spots, the two near the center elongate; punctures in irregular rows.

L. decemlineata, the common potato beetle, probably occurs sparsely on the buffalo bur, Solanum rostratum Dunal, its native food plant.

ZygogrammaZygogramma exclamations (Fab.)

Supp. Ent. Syst. 1798 p. 86

Oval, convex; brown, with yellow elytra, each having four brown vittae with the fourth interrupted; punctures bordering vittae in regular rows; prothorax with broad yellow band across anterior margin, wider at margins.

This species was taken on sunflower, Helianthus petiolaris Nutt., on which it was feeding.

CalligraphaCalligrapha lunata (Fab.)Chrysomela lunata Fabricius 1787, Ment. Ins.

Oblong oval, very convex; reddish brown, with lateral margins of elytra and vittae on third and fifth intervals yellowish white; length, 7-9 mm., width, 4.5-5.5 mm.

Chrysomelini

Prosternum produced posteriorly as a distinct process; third tarsal segment scarcely or not at all emarginate Chrysomela

Prosternum not produced behind as a process Gastrophysa

ChrysomelaChrysomela crotchii Brown

n. sp. Can. Ent. 83(3):24. 1956

Elongate oval; dark metallic green; elytra entirely pale yellowish brown; sides of apical ventral segment always pale; length, 7.5-9 mm., width, 4.5-5.5 mm.

This beetle feeds on quaking aspen, Populus tremuloides Michx.

GastrophysaGastrophysa cyanea Walsh

Proc. Acad. N. S. Phila. 3:175, 1847

Oblong oval, moderately convex; color varies from dark metallic green to blue; upper surface coarsely and closely punctate; length, 4-5.5 mm., width, 2.2-3.2 mm.

This beetle feeds on dock, Rumex spp.

GALERUCINAE

1. Tibiae without terminal spurs 3

- At least some of the tibiae with terminal spurs 2
2. Punctuation of elytra confused Diabrotica
 Punctuation of elytra in regular rows Acalymna
3. Third segment of antennae shorter than the fourth Trirhabda
 Third segment of antennae longer than the fourth 4
4. Elytra testaceous, may be spotted or mottled with black; antennae short,
 not reaching beyond humerus; pronotum longer and more deeply impressed
 along median line; abdomen of male usually with a deflexed pygidium;
 2.3-5.3 mm. long Monoxia
 Elytra yellow, red or testaceous, often with black stripes, may be en-
 tirely black or black with pale lateral margins, rarely mottled or spotted;
 antennae longer, usually reaching nearly to middle of elytra; pronotum
 broader, width is twice length; abdomen without pygidium;
 6.5 mm. long Galerucella
- Trirhabda
1. Occipital and pronotal spots and elytral vittae piceous or black without
 metallic luster 2
 Occipital or pronotal spots or vittae or entire elytra except for margin
 dark with metallic luster 3
2. Occipital spot small; vittae united at apex; punctuation fine, dense
canadensis
 Occipital spot large extending across occiput, vittae not united; punc-
 tation coarse adela
3. Pronotum conspicuously pubescent; pronotal spots small, median one situated
 nearer base of pronotum than anterior margin; lateral and sutural vittae
 usually coalescing behind middle, rarely the attenuated, median pale vitta
 extending much below middle attenuata

Pronotum either entirely glabrous or very inconspicuously and sparsely pubescent; alutaceous. Elytra entirely green except for margin. Lateral and sutural vittae united at apex in vittate forms; densely pubescent; body dark convergens

Trirhabda canadensis (Kby)

Galleruca canadensis Kirby 1837, Fauna Bor. Amer. 4:219

Elongate; brownish yellow, with vittae and pronotal spots black; occipital spot small; vittae usually united at apex; elytral punctation very fine and dense; size variable, 7-10 mm. long, 3-4 mm. wide.

This species feeds on goldenrod, Solidago spp., from which it was taken.

Trirhabda adela Blaka

Proceedings of U. S. Nat. Museum 79:14-15, 1931

Appearance similar to T. canadensis but with a broad black plage extending across occiput and larger, rounded spots on pronotum; elytral vittae not united; scutellum black and a little more coarsely punctate, densely and finely pubescent; length, 6-10 mm., width, 2.8-5.5 mm.

T. adela feeds on thistle, Cirsium sp. and tall goldenrod, Solidago altissima L.

Trirhabda attenuata (Say)

Galleruca attenuata Say, Jour. Acad. Nat. Sci. Phila. 3:459, 1824

Elongate, finely punctate and lightly pubescent; pale yellow with a wide black plage over occiput; elytra have wide blue or green lateral and sutural vittae usually coalescing at middle and leaving only an attenuated pale vitta, wider at base; scutellum bicolored; length, 5-8 mm., width, 2-3.8 mm.

The food plants include sagebrush, Artemisia, and goldenrod, Solidago.

Trirhabda convergens Lec.

Proceed. Acad. Nat. Sci. Phila. 17:220, 1865

Pale, with a wide dark basal plage across the head and large black pronotal spots; elytra either entirely metallic green except for the margin or else with narrow pale vittae; sides subparallel, faintly shining with metallic luster; length, 5-6.5 mm., width, 2.3-3 mm.

This species feeds on goldenrod, Solidago.

Galerucella

- | | |
|---|------------------|
| 1. Front coxae distinctly separated | <u>nymphaeae</u> |
| Front coxae contiguous | 2 |
| 2. Elytra vittate | 3 |
| Elytra immaculate | 4 |
| 3. Broadly oval and convex | 4 |
| Body more depressed and elongata | <u>integra</u> |
| 4. Elytra pubescent | <u>americana</u> |
| Elytra glabrous | <u>cribata</u> |

Galerucella nymphaeae (L.)

Chrysomela luteola Muller 1766, Mel. Soc. Roy. Turin 3:187

Oblong; dark brown; the legs, pronotum and elytral margins paler; elytral punctation irregular in size and finely pubescent; length, 4.5-6 mm., width, 2.6-3 mm.

Galerucella integra (Lec.)

Gallaruca integra Leconte 1865, Proc. Acad. Nat. Sci. Phila. 17:218

Elongate oval; light brown; alytra with subsutural and first discal vittae joining at apex; area between converging vittae sometimes dark, length, 3.5-5.8 mm., width, 1.7-3.3 mm.

Galerucella americana (Fab.)Galleruca americana Fabricius, Syst. Eleut. 1:489, 1801

Oval, convex, pubescent; yellowish brown, elytra often with three black vittae on each; vittae do not occur in the specimen collected in the park; elytral punctation coarse; length, 4.5-6 mm., width, 2.3-3.2 mm.

The food plant of this species is goldenrod, Solidago.

Galerucella cribrata (Lec.)Galleruca cribrata Leconte, Proc. Acad. Nat. Sci. Phila. 17:215, 1865

Similar in form and color to G. americana but is slightly larger; upper surface glarous rather than pubescent; length, 5-6.5 mm., width, 3-3.5 mm.

It also feeds on goldenrod, Solidago.

Diabrotica

Thorax and abdomen yellowish brown atripennis

Thorax and abdomen black var. fossata

Diabrotica atripennis (Say)Galleruca atripennis Say, Journ. Acad. Nat. Sci. Phila. 3:461, 1824

Elongate oval; black with thorax and abdomen yellowish brown; elytra irregularly and closely punctate with prominent submarginal plica; length, 5-6 mm., width, 2-2.5 mm.

D. atripennis was taken from prairie clover, Petalostemon purpureum Rydb., and other flowers.

Diabrotica atripennis fossataGalleruca atripennis Say 1824, Jour. Acad. Nat. Sci. Phila. 3:641

Resembles D. atripennis except variety fossata is entirely black.

The two were found together.

AcalymnaAcalymna vittata (Fab.)

Syst. Ent. 1775, p. 122

Oblong oval; pale yellow above with the head, scutellum, one common sutural, and a discal striæ on each elytron, black; thorax smooth but with two deep foveae.

This, the common striped cucumber beetle, is one of the very limited number of economic species of Chrysomelidae which may exist in the park; it feeds on cucumber and related plants and should be found on the wild cucumber, Micranthella lobata (Michx.) Greene.

ALTICINAE

1. Anterior coxal cavities open behind 2
 Anterior coxal cavities closed behind 3
2. Prothorax without transverse antebasal impression Disonyche
 Prothorax with a feeble transverse antebasal impression Altica
3. Posterior tibiae sinuate near apex Gaetocnema
 Posterior tibiae without sinuation or tooth 4
4. Pronotum with distinct antebasal transverse impression, not interrupted
 by longitudinal impression Orthaltica
 Pronotum without antebasal impression 5
5. Spur of posterior tibia small and slender, form oval convex ... Tanygaster
 Spur of posterior tibia broad, emarginate or bifid at apex Dibolia

Disonyche

Elytra dark; unicolorous; thorax yellow with three small black spots

triangularis

Elytra vittate; submarginal and sutural vittae not uniting at apex. punctigera

Disonyche triangularis (Say)Aitica triangularis Say Journ. Acad. Nat. Sci. Phila. 3:84, 1824

Oblong oval; generally black but may have a faint blue or green luster; prothorax brownish yellow with three small black spots; length, 5.2-6.5 mm., width, 2.8-3.8 mm.

Disonyche punctigera Lec.

Smithsonian Contr. Knowl. 11:24, 1859

Broadly oblong oval; pale and feebly shining; occiput darkened; specimens from Wind Cave have four spots on pronotum and three elytral vittae, black; a striking orange vitta is located between the sutural and median vittae; submarginal and sutural vittae not united at apex; length, 6.3-7.6 mm., width, 3.3-4.4 mm.

OrthalticaOrthaltica copeline (Fab.)Crioceris copeline Fabricius, Syst. Eleut. 1:466, 1801

Elongate, parallel; brown, with antennae and tibiae lighter; antennae nearly as long as body; elytral punctation in rows, these confused near scutellum; length, 2-2.2 mm., width, 0.9-1.1 mm.

This is a common species on sumac and poison ivy. It was taken in the park on skunk brush, Rhus trilobata Barkley.

ChaetocnemaChaetocnema subviridis Lec.

Smith. Cont. Knowl. 11:27, 1859

Oval, robust; surface shining green bronze or slightly bluish; head finely alutaceous; a punctured fovea near each eye; outer seven antennal joints, tibiae (In Part), and tarsi, piceous; thorax with an entire basal marginal line not defined by punctures.

AiticaAitica ovulata Fall

Trans. Am. Ent. Soc. 36:89-197, 1910

Elongate oval, blue, shining; upper surface finely alutaceous and sparsely, finely punctate; elytral punctures scarcely coarser than those of the prothorax; antennae piceous, longer than one-half the body, segments 2-3-4 gradually longer; prothorax unusually elongate, feebly arcuate, narrowly margined, and with basal margin bisinuate, basal groove faint; length, 4.3 mm., width, 1.8 mm.

HISPINAE

MicrorhopalaMicrorhopala vittata (Fab.)Mispa vittata Fabricius, Suppl. Ent. Syst. p. 117, 1798

Elongate oval, wider posteriorly; elytra black or brown, each with an indefinite red vitta; thorax reddish brown; intervals between rows of punctures slightly raised; length, 5.2-7 mm., width, 2.4-3.4 mm.

The food plant is a species of goldenrod, Solidago.

CASSIDINAE

Head visible from above Chelymorpha

Head covered by the front margin of the pronotum; claws simple; form oval

or circular Jonthonota

ChelymorphaChelymorpha cassidea (Fab.)Cassida cassidea Fabricius, Syst. Ent. p. 82, 1775

Oblong oval; dark red or yellow; pronotum usually with six small black

spots and with one common to both; legs and body beneath black; length, 8-11 mm., width, 6.5-8mm.

This beetle feeds on the bush morning glory, Iponoea leptophylla Torr.

Jonthonota

Jonthonota nigripes (Oliv.)

Cassida nigripes Olivier, Ent. 6:959, 1790

Broadly oval, convex; dark red; each elytron with three small spots; scutellum at least margined with black; body black beneath; length, 6-8 mm., width, 5-6.2 mm.

SUMMARY

Two plant species appeared to yield more species of Chrysomelids than any others. These were skunk brush, Rhus trilobata Barkley (four species) and the goldenrods, Solidago sp. (four species). Other plants on which the Chrysomelids occurred included the sunflower, Helianthus petiolaris Nutt., prairie clover, Plealostemon purpureus Rydb. and bush morning glory, Iponoea leptophylla Torr. Altogether, 17 species were found on the various plants in the park.

Another 19 species should be found there according to information in the literature and in collections. Goldenrod should also be a host plant for a major part of these; other plants on which Chrysomelids should be found are the buffalo bur, Solanum rostratum Dunal, spiderwort, Tradescantia virginiana L., dock, Rumex sp., sagebrush, Artemisia sp. and wild cucumber, Micranthella lobata (Michx.) Greene.

One noticeable absence from the species list is that of the subfamily, Donaciinae. As was noted in the Introduction there is very little, if any, standing water in the park. Larvae of the members of this subfamily are

aquatic, feeding on the roots of various species of water lilies. Because these plants do not occur in the park it is very doubtful that any member of the subfamily occurs there. However, some species of Donacia occur in the surrounding area and should the one pond in the park, known as Norbeck Lake, be managed so as to hold water permanently, a habitat beneficial for the Donacinae would probably develop.

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BIBLIOGRAPHY

- Barber, H.S. 1916. A review of North American tortoise beetles. Proc. Ent. Soc. Washington 18:113-127.
- Beller, S., and M.H. Hatch. 1932. Coleoptera of Washington: Chrysomelidae. Univ. of Washington Publ. Biol. 1:65-144.
- Blake, Doris H. 1927. A revision of the beetles of the genus Oedionychis occurring in America north of Mexico. Proc. U.S.
- _____. 1931. Revision of the species of beetles of the genus Trirhabda north of Mexico. Proc. U.S. Nat. Mus. 79:1-36. Illus, key.
- _____. 1933. Revision of the beetles of the genus Disonycha occurring in America north of Mexico. Proc. U.S. Nat. Mus. 82:1-66. Illus, keys.
- _____. 1936. Altica bimarginata Say, with descriptions of new species and varieties. Proc. Ent. Soc. Washington. 38(2):13-24.
- _____. 1939. A study of Leconte's types of the beetles in the genus Monoxia, with descriptions of new species. Proc. U.S. Nat. Mus. 87: 145-171. Illus, keys.
- _____. 1950. A revision of the beetles of the genus Myochrous. Proc. U.S. Nat. Mus. 101:1-64. Illus, key.
- _____. 1954. Chrysomelid beetles of the Oedionychus minutus complex (Coleoptera). Proc. Ent. Soc. Washington 56(3):139-147. Illus.
- _____. 1955. A study of Leconte's species of the Chrysomelid genus Graphops with descriptions of some new species. Bul. Mus. Comp. Zoo. Harvard Univ. 113(4):261-301. Illus.
- Blatchley, W.S. 1910. Coleoptera or beetles known to occur in Indiana. Indianapolis: Nature Publishing Co. 1095-1233. Illus, keys.
- Brown, W.J. 1956. The New World species of Chrysomela L. (Coleoptera:Chrysomelidae). Canad. Ent. 88:5-54.
- _____. 1945. Food plants and distribution of the species of Calligrapha in Canada, with description of new species (Coleoptera:Chrysomelidae). Canad. Ent. 77:117-133.
- Edwards, J. Gordon. 1953. Species of the genus Syneta of the world. (Coleoptera:Chrysomeloidea). Wasmann Jour. Biol. 11(1):23-82. Illus.
- Essig, E.O. 1929. Insects of western North America. Macmillan Co. New York.
- Fabricius, J.C. 1801. Systema Eleutheratorum. 2 vols.

- Felt, E.P. 1906. Insects affecting park and woodland trees. N.Y. State. Mus. Mem. 8 p. 333-877.
- Forster, J.R. 1771. Novae species insectorum, centuria I. B. White, London.
- Hincks, W.D. 1952. The genera of the Cassidinae (Coleoptera:Chrysomelidae). Trans. Roy. Ent. Soc. London 103(10):327-358 key to tribes.
- Horn, G. 1892. The Eumolpinae of boreal America. Trans. Amer. Ent. Soc. 19:195-234.
- _____. 1892. Modonota tristis Oliv. Trans. Amer. Ent. Soc. 19:231.
- _____. 1889. A synopsis of the Halticini of boreal America. Trans. Amer. Ent. Soc. 14:163-320. illus.
- _____. 1893. The Galerucini of boreal America. Trans. Amer. Ent. Soc. 20:57-136.
- Jolivet, P. 1957. Chrysomelidae:Orosodacninae. Coleopterorum Cat. Sup. 51(3). 16 p.
- Knab, F. 1909. Some species of Calligrapha. Proc. Ent. Soc. Washington. 11:83-87.
- Leconte, John L. 1859. List of Coleoptera of Kansas and New Mexico. Smithsonian Contr. Knowl. 11:1-58.
- Leng, C.W. 1920. Catalogue of the Coleoptera of America north of Mexico. John D. Sherman, Jr. Mount Vernon, New York.
- Melshelmer, F. 1874. Descriptions of new species of Coleoptera of the United States. Proc. Acad. Nat. Sci. Philadelphia 3:158-181.
- Monros, F. 1955. On some new genera of Nearctic Chrysomelinae (Chrysomelidae). Coleopterist's Bul. 9(4):53-63. illus.
- Olivier, A. 1808. Entomologia. Vol. VI.
- Papp, Charles S. 1953. The Hispinae of America (Coleoptera). Protugallie Acta Biol. Ser. B. 4(1/2):1-147. cat, ref to lit and distr.
- Posell, E.F. 1932. The Chrysomelidae of Nebraska. Ent. News 43:92-97.
- Say, T. 1824. Descriptions of coleopterous insects collected in the late expedition to the Rocky Mountains. Jour. Acad. Nat. Sci. Philadelphia 3:403-462.
- Schaeffer, Charles. 1920. Synonymical and other notes on some of the family Chrysomelidae and descriptions of new species. Jour. N.Y. Ent. Soc. 27:307-340.

- Schaeffer, Charles. 1925. Revision of the New World species of the tribe Donacini of the coleopterous family Chrysomelidae. Brooklyn Mus. Sci. Bul. 3(3):45-164. keys.
- _____. 1925. New species and varieties of North America Cassidini. Jour. N.Y. Ent. Soc. 33:233-237.
- _____. 1931. New species of Disonycha and notes (Coleoptera:Chrysomelidae). Jour. N.Y. Ent. Soc. 39:283-84.
- Varma, B.K. 1955. Phylogenetic study of the family Chrysomelidae:Coleoptera. Current Science 24(1):18-19.
- Welse, J. 1916. Coleopterorum catalogus. 68, Chrysomelinae. W. Junk, Berlin.
- Wilcox, John A. 1954. Leaf beetles of Ohio (Chrysomelidae:Coleoptera). Ohio Biol. Sur. Bul. 43. 8:353-506. illus, keys.
- _____. 1957. A revision of the North American species of Paria Lec. (Coleoptera:Chrysomelidae). N.Y. Mus. and Sci. Ser. Bul. 365. 45 p. illus.
- _____. Unpublished. Keys to North American species of Chrysomelidae.
- Woods, W.C. 1918. The biology of Maine species of Aitica. Maine Agr. Expt. Sta. Bul. 273.

CHRYSOMELIDAE OF WIND CAVE NATIONAL PARK
SOUTH DAKOTA

by

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AN ABSTRACT OF A THESIS

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This study of the Chrysomelidae was made in the Wind Cave National Park, South Dakota, which is under the administration of the National Park Service. The primary purpose was to determine the species of Chrysomelids and their host plants which occur in the park and to organize the investigation so that it might serve as a basis for a future enlarged study of other insects of the area.

Most of the specimens actually collected in the park during this study were taken without the use of a net in order that beetle-host relationships might be established. Sweeping might have yielded more species but less information about them. Altogether 17 species of Chrysomelids were found on the various plants in the park. Skunk brush, Rhus trilobata Barkley and goldenrod, Solidago sp., were the chief host plants with four species being taken on each.

According to the literature and collection records obtained from the University of Kansas and Kansas State University, another 19 species could occur in the park. These records have been included as a part of the current paper.

Donaciinae, the subfamily in which the larvae are aquatic, is apparently absent from the park area because of a lack of a suitable aquatic habitat.