

## NOTES ON COCCINELLIDÆ.—III.

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(PLATE I.)

In the preparation of the following notes, the material in the National Museum, loaned through the favor of Dr. L. O. Howard, has been of the greatest assistance. The fine collections of Prof. H. F. Wickham and Mr. Charles Schaeffer have also supplied series which have been helpful; and examples of several species have been received from Messrs. Blanchard, Fall and Nunnenmacher. I am glad to express my thanks to all these friends for their kindness.

The drawing of the underside of *Anatis 15-punctata* in Vol. XI, December number, was made by Mr. Louis H. Joutel and should have been credited to him in the explanation of the plate.

## Tribe III. CHILOCORINI.

Body very convex, rounded in outline; legs short, femora not extending beyond sides of body; antennæ very short, club with four connate joints; base of antennæ concealed by the broadly dilated epistoma; epipleuræ wide, concave, strongly descending externally; front coxal cavities closed, middle coxæ widely separated; head deeply inserted, pronotum covering part of the eyes; surface glabrous above, finely pubescent beneath; tarsi beneath densely spongy pubescent; abdomen with five segments ♀, six in the ♂, the sixth being very small.

The insects included in this tribe strongly resemble the Coccinellini but they are sharply defined by the form of the epistoma, which is dilated on each side so as completely to margin the eyes in front and conceal the antennæ.

The males can always be distinguished by the presence of the small sixth abdominal segment; the fifth segment also differs in form from that of the females, being either truncate, broadly emarginate or even quite deeply emarginate. In many species the males also differ by the paler color of the head, of the front angles of the thorax and of the legs; but in other species the sexes are alike in color.

Four genera have been proposed, but in these notes one is treated as a subgenus because the characters used for its separation become evanescent in some of the species now known. Three genera may be separated as follows:



Large species ; body very convex, subcompressed above, excavated beneath for the femora ; tibiæ not dentate ; claws strongly toothed, almost bifid.....*Axion*.

Smaller species ; body as in *Axion* ; tibiæ dentate ; claws strongly toothed.

*Chilocorus*.

Still smaller ; body convex above, not excavated beneath ; tibiæ not dentate ; claws variable.....*Exochomus*.

*Exochomus* may be divided into three subgenera as follows :

Body more convex, almost subcompressed ; front tibiæ dilated in front into a keel ; claws strongly toothed.....subgen. *Arawana*.

Body simply convex ; front tibiæ simple ; claws strongly toothed except in the species *fasciatus*.....subgen. *Exochomus*.

Body convex ; front tibiæ simple ; claws at most feebly toothed and absolutely simple in *septentrionis*.....subgen. *Brumus*.

The type of the subgenus *Arawana* is the insect described by Casey as *Exochomus arizonicus*.

### Axion Muls.

Very convex, subcompressed insects with smooth, almost impunctate elytra, black with red spots in our species. Pronotum feebly punctate near the side margins which are not pubescent, apical angles more or less pale. The males have the fifth segment emarginate, and a minute sixth segment, and the legs are paler than the females. In some species part of the head also is pale.

#### SYNOPSIS OF SPECIES.

- |  |                        |
|--|------------------------|
| Abdomen red.....   | I                      |
| Abdomen in great part black.....   | 2                      |
| 1. Elytra each with one large red spot.....  | <i>pilatei</i> .       |
| Elytra each with a basal red spot and a small common sutural spot behind the middle ; epipleuræ thicker..... | <i>tripustulatum</i> . |
| 2. Elytra each with one large red spot.....  | <i>plagiatum</i> .     |

### Axion pilatei Muls.

Broadly oval, very convex, elytra explanate. Black above except for a large red subbasal spot on the elytra. Red beneath except legs and middle of each abdominal segment black. First segment of abdomen and epipleuræ concave for the reception of the legs. Anterior angles of thorax nubilously pale. Epistoma almost encircling the eyes in front and fringed with hair. Glabrous above. Claws strongly toothed. Punctuation of upper surface so fine as to be almost invisible without microscopic examination ; under the microscope finely confluent punctulate with distant larger shallow punctures, the latter more evident on the pronotum and especially at its sides. Beneath more evidently punctured and pubescent especially on the abdomen and legs. Tarsi beneath densely spongy pubescent. Legs strongly contractile. Ventral plate incomplete, not reaching the margin of the segment.

In the male, the usual minute sixth ventral segment is present. The head in



front is yellow, the anterior margin and apical angles of the thorax are also yellow and the legs are quite pale in color.

*Length.* — 6.5–7.0 mm. = .26 to .28 inch.

*Habitat.* — Texas. Crotch gives also N. Mex. and Cal., but on account of some confusion having existed in collections in the identification of this species I consider these localities doubtful.

In some collections *Coccinella plagiata* is placed erroneously under this name. It is less convex, the head is entirely pale and the front of the pronotum is pale. The epistoma does not encircle the eyes as in all Chilacorini.

#### **Axion tripustulatum DeG.**

Similar to the preceding in size, form and structural characters. The elytra each bear a red basal oblique elongate spot and a small red sutural spot behind the middle. Beneath the abdomen, the base of the epipleuræ and the sides of the body are red. The edge of the elytra is much thicker than in the other species of the genus, and the form of the coxal plates is different, as shown in the plate. In the males, the front of the head, the anterior angles of the thorax and a great part of the femora are red.

*Length.* — 6.5 mm. = .26 inch.

*Habitat.* — Texas, La., Fla., Ga., Va., Md., Pa., N. J. (Pine Barrens), occasionally washed up on seabeaches of Coney Island, N. Y., and R. I.

Mr. William T. Davis has observed this species at Lakehurst, in the Pine Barrens of N. J. and the following note is contributed by him.

“*Axion tripustulatum* hibernates and is to be collected at Lakehurst, N. J., early in the spring. In the summer and fall great numbers are often found on the post-oaks (*Quercus minor*) that have been attacked by the scale insect, *Kermes pubescens* Bogue. This scale was determined by Mr. Pergande of Washington, D.C. On July 23, 1904, this *Axion* was found to have just matured in most instances and the elytra were still quite soft. On the same day of July, 1906, the beetles were emerging from the pupæ, but seemed to be several days behind those of 1904 in their development. To illustrate the number that often occur on the post-oaks it may be stated that on July 30, 1905, on one little twig less than six inches long, there were nine pupa skins and many leaves sheltered two or three on their under surface.”

#### **Axion plagiatum Oliv.**

Broadly oval, very convex, elytra explanate. Black above except for a large red subbasal spot on each elytron which (especially in the females) sometimes attains the base. Beneath black; base of epipleuræ and sides of body pale, abdomen entirely black. The legs are pale in the males as in the preceding species, but the head is entirely black in both sexes.

*Length.* — 5.5. to 7.0 mm. = .22 to .28 inch.

*Habitat.* — So. Cal., Ariz., N. Mex., Texas.

Covering a wide range of territory, this species is subject to varia-



tions in size, punctuation and development of the elytral spot which have caused the following varieties to be described :

**Var. plagiatum.**

Larger (6 mm. or over) ; surface shining ; elytral spot ♂ small, not attaining the base, ♀ very large, almost basal. Abundant to the south of our territory and occasionally to be found within our limits.

**Var. texanum Lec.**

Smaller and less shining, elytral spot as in the preceding.  
The usual form in Texas, Arizona and New Mexico.

**Var. alutaceum Casey.**

Smaller (about 6 mm.), surface alutaceous ; elytral spot almost alike in both sexes, small, not attaining the base.  
Occasional specimens that comply with the author's description can be selected from any part of our territory.

**Var. pleurale Lec.**

Smaller (about 6 mm.), surface shining ; elytral spot similar in both sexes, large and almost basal.  
The usual form in southern California.

**Chilocorus Leach.**

Tibiæ obtusely dentate externally near the base ; pronotum pubescent towards the sides ; abdomen and epipleuræ concave for the femora ; claws toothed. Our species are all black above with one red spot on each elytron. The males can be distinguished only by the minute additional sixth abdominal segment.

SYNOPSIS OF SPECIES.

- Sterna in great part red, abdomen red.
  - Larger, elytral spot nubilous.....*tumidus*.
  - Smaller, elytral spot large, sharply defined,.....*cacti*.
- Sterna black, abdomen red.
  - Elytral spot in front of middle, punctuation closer and deeper.....*bivulnerus*.
  - Elytral spot at the middle ; punctuation more shallow and distant, surface more shining.....*similis*.

The species described as *fraternus* Lec. and *orbis* Casey are included with *bivulnerus*, and *confusor* Casey is included with *cacti*.

The ventral plate in *Chilocorus* reaches the posterior edge of the first ventral segment and overlaps slightly the second ventral segment. The fifth ventral is not emarginate in the ♂ as in *Axion* but simply outlined as in the ♀. I have not been able to find any sexual characters in the color of the legs or head and the males can be separated only by the additional ventral segment.



**Chilocorus tumidus, new species.**

Broadly oval, very convex, shining black above with an ill-defined red spot in front of the middle of each elytron; below the abdomen, mouth parts and part of the sterna are red, all other parts black. There are a few hairs at the sides of the pronotum and more on the head, otherwise the entire upper surface is glabrous. The head is closely and conspicuously punctate, the pronotum and elytra bear shallow distant punctures between which the surface is microscopically punctulate. Each elytron is tumid or swollen in the subhumeral region, rather more conspicuously than in other species of the genus. The eyes are entirely surrounded in front by the epistoma; the anterior tibiæ are strongly dentate; the claws are strongly toothed at base, short and stout; the tarsi entirely present a stouter appearance than usual.

*Length.* — 5.5 mm. = .22 inch.

*Habitat.* — Fortress Monroe, Va., April 19.

Described from two specimens in the National Museum.

A specimen in the collection of Professor Fall, Pasadena, Cal., labelled Va., appears to be the same. Professor Fall's specimen is piceous instead of black and the red spot is larger and more distinctly outlined.

**Chilocorus bivulnerus Muls.**

Broadly oval, very convex, shining black above, with a rounded red spot on each elytron in front of the middle and sharply defined; abdomen red beneath, sterna black; sides of pronotum slightly pubescent, head pubescent, upper surface otherwise glabrous; punctuation close and deep over the whole upper surface. The eyes epistoma, claws, anterior tibiæ and ventral segments are as described in the preceding species.

*Length.* — 3.7 to 5 mm. = .15 to .20 inch.

*Habitat.* — Entire U. S. except southern California, extending into Manitoba and Vancouver.

**Var. orbis Casey.**

Black, with bluish reflection; elytral spot larger, transversely oval. Replaces *bivulnerus* in southern California. Casey has retained the name *fraternus* Lee for the specimens from northern California, Oregon and Washington but the characters given are not constant and this name can only be regarded as a synonym.

*Chilocorus bivulnerus* is the most widely distributed and best known member of the tribe Chilacorini and wherever found is reported as feeding on scale insects. Mr. Edgar L. Dickerson, assistant to the State Entomologist of New Jersey, has described the abundance of these beetles on maples attacked by the soft cottony scale.

**Chilocorus similis Rossi.**

To be distinguished without difficulty from *bivulnerus* by the smaller size, elytral spot at the middle instead of in front of the middle, surface more shining, punctuation more shallow and distant.

*Length.* — 3.9 to 4.8 mm. = .15 to .19 inch.



*Habitat.* — Introduced from China and now established in Georgia and possibly other southern states.

The pernicious San Jose scale was accidentally introduced in California and has since spread over our country faster than its native natural enemies can keep it in check, to the great damage of our peach and other fruit trees. In the hope of finding an effective enemy that might also be introduced, the Department of Agriculture sent an agent to China whence the San Jose scale was believed to have come. There *Chilocerus similis* was found to be sufficiently numerous to keep the scale in check. A number were brought alive to Washington and a large number were successfully bred in captivity and distributed to Georgia and New Jersey. In the latter state the winters seem to have been too severe for this species; but in Georgia it appears to have become established and to have been of service in keeping the scale from spreading.

In the larval stage this species differs more from our native *Chilocorus* than in the imago.

#### **Chilocorus cacti Linn.**

Broadly oval, very convex, shining black above with a large red spot on each elytron; beneath the sterna are in great part red, abdomen red. Pronotum slightly pubescent at the sides, deeply impressed apically near the angles in the male, edge there rufescent. Tibiæ armed with a short spine. Claws strongly toothed at base.

*Length.* — 5 mm. = .20 inch.

*Habitat.* — Honduras, Cuba, Mexico, Texas, Porto Rico, Florida (Key West).

#### **Var. confusor Casey**

Smaller, narrower, pronotum not impressed in the male, edge not rufescent.

*Length.* — 4.5. = .18 inch.

*Habitat.* — Arizona, So. Cal.

The specimens usually found in our collections represent this variety.

#### **Arawana, a new subgenus.**

This subgenus has for its type the species described by Casey as *Exochomus arizonicus*. It has all the characters of the tribe *Chilocorini* and of the genus *Exochomus* but differs from the other species of that genus by its form, which is subcompressed, and by its front tibiæ, which are expanded in front into a thin plate, lamina or keel.

#### **Arawana arizonica Casey.**

Broadly oval, very convex, subcompressed; black above, head and pronotum slightly rufescent at apical margin, elytra each with an elongate oval red spot on the median line, extending two fifths from base with its margin rather nubilous and with nubilously red margin; *beneath testaceous throughout*; anterior tibiæ dilated and



arcuately sublamine externally; claws strongly toothed, almost bifid; minutely punctulate, more distinctly toward the margins of the elytra which are evenly declivous to the edge, with a very fine marginal bead.

*Length.* — 3.7 to 3.9 mm. = .15 to .16 inch.

*Habitat.* — Arizona.

Looks at first sight like a small *Axion* but the body beneath is not excavated as in that genus. Easily known by the uniform testaceous color beneath and by the peculiar dilation of the front tibiæ. I regret that I have not seen males and am unable to give the sexual characters.

#### Subgenus **EXOCHOMUS** Redt.

By the removal of *arizonicus* and of the species with comparatively simple claws this subgenus becomes mere compact. All the species are small, rounded and convex, though never subcompressed as in preceding species, with toothed claws, simple tibiæ and variously decorated elytra. The forms differing only in pattern or extent of elytral marking are here treated as varieties.

#### SYNOPSIS OF SPECIES.

Claws strongly toothed.

Males with front of head and front angles of thorax pale.....*marginipennis*.

Males with head and thorax entirely dark.....*californicus*.

Claws feebly toothed at base.

Males with front of head slightly pale; thorax entirely dark.....*fasciatus*.

The females of the first species usually have the front angles of the thorax nubilously pale.

#### **Exochomus marginipennis** LeC.

Broadly oval, convex; head and pronotum black in female or partly pale in male, elytra pale with black markings; glabrous above and shining. Beneath black except the epipleuræ and in the male part of the legs; claws strongly toothed at base; tibiæ simple, coxal plates of the first ventral segment complete, semicircular, distant from the edge of the segment. Males with fifth ventral segment truncate disclosing a small sixth segment.

*Length.* — 2.5 to 3.0 mm. = .10 to .12 inch.

*Habitat.* — South and west from New York; not known to occur in New England or Canada.

This species varies in elytral markings and the following varieties have been described:

#### **Var. childreni** Muls.

Elytra each with one subapical black spot, rarely missing.

Occurs in Fla., La., Tex., Mo., So. Cal.



**Var. *latiusculus* Casey.**

Elytra each with two black spots, sometimes distant, sometimes united at suture forming transverse bands.

Occurs in Fla., La., Tex., Mo.

**Var. *marginipennis* LeC.**

Elytral spots united so as to leave only scutellar spot, lateral margin and sometimes a postmedian sutural spot pale.

Occurs in N. Y., N. J., Pa., D. C., Va., Fla., Ala., Miss., Tenn., Mo.

In the collection of Mr. Charles Schaeffer there is a series of *marginipennis* collected near St. Louis, Mo., in which all the varieties are represented. Except that there is a tendency in the southern states to produce the paler forms, these varietal names scarcely represent more than cabinet varieties.

***Exochomus californicus* Casey.**

Similar to the preceding but the elytra are entirely black, except for an elongate humeral mark, and subapical dot red. The color is identical in both sexes. *Desertorum* Casey, differs only by the humeral mark being extended along the base of the elytra.

*Length.* — 2.8 to 3.8 mm. = .11 to .15 inch.

Occurs in Cal. and Nevada.

***Exochomus fasciatus* Casey.**

Similar to the preceding but differs in the form of the claws which are feebly toothed at base and in the color of the head in the male which is either entirely dark as in the female or at most partly pale in front. The elytral markings in the few specimens examined consist of two transverse black bands but they may prove to be as variable as in *marginipennis*. The plate shows the forms already observed. A larger series is needed to complete the description of this species.

*Length.* — 2.4 to 2.9 mm. = .10 to .12 inch.

*Habitat.* — Southern California.

**? Var. *subrotundus* Casey.**

Known to me only by Casey's description and a few specimens which seem intermediate between this and *fasciatus*. It appears to be a variety in which the black fasciæ expanding leave only an irregular lateral margin pale.

Casey's description is as follows :

"Elytra black on the disk; body in general more broadly rounded; punctures very minute and sparse; head and pronotum black, the apical angles of the latter nubilously paler; elytra black, with a broad pale margin extending, with its inner margin parallel, to nearly three fifths, there obliquely and abruptly narrowed and continued narrowly almost to the apical angles; body smaller and much more broadly rounded than in *marginipennis*, with less obvious punctuation."

*Length.* — 2.2 mm. = .09 inch.

*Habitat.* — El Paso, Texas.



It is unfortunate that no mention is made of the claws in this description, so that an examination of the type is necessary to determine whether the insect is actually an *Exochomus* or a *Brumus*.

### Subgenus *Brumus* Weise.

The type of *Brumus* is *septentrionis* Weise in which the claws are entirely simple. Weise himself has since included the species *æthiops* (formerly placed in *Exochomus*) in which the ♂ claws appear to me to be feebly toothed. We have already seen in *E. fasciatus* a tendency towards the disappearance of the tooth in *Exochomus* and we have in *Brumus orbiculatus* a form in which the claws while not toothed are swollen at base. On account of these forms making a gradual transition from the strongly toothed claw to the simple claw, I have treated *Brumus* as a subgenus, to include all the Chilocorini with simple tibiæ and claws without evident tooth at least in one sex.

#### SYNOPSIS OF SPECIES.

Claws feebly toothed in ♂, simple in ♀.

Entirely black in color.....*æthiops*

Claws feebly swollen at base.

Black above with red markings.....*orbiculatus*.

Claws entirely simple in both sexes.

Elytra orange-yellow with black markings .....*septentrionis*.

Elytra black with humeral and subapical red marks.....*histrio*.

### *Brumus æthiops* Bland.

Broadly oval, convex, elytra explanate; black above and beneath; tibiæ not dentate; claws of tarsi feebly toothed at base ♂, entirely simple ♀; surface shining, punctuation very minute and sparse. The males are distinguished only by the smaller size, fifth abdominal segment truncate and sixth minute additional segment.

*Length*. — 3 to 4 mm. = .12 to .16 inch.

*Habitat*. — Nebraska, Colo., Utah, N. Mex., Arizona.

This species is easily known by the entirely black color.

### *Brumus orbiculatus*, new species.

Broadly oval, very convex; black above, basal margin of elytra, also lateral margin and a large subapical round spot narrowly connected with lateral margin, red; the subapical spot is outlined posteriorly by the black apex. Beneath piceous, the epipleuræ and sides of abdomen fuscous. Shining and glabrous above, microscopically punctulate except the head which is evidently punctulate. Beneath punctulate and slightly pubescent. Tibiæ simple, claws very feebly swollen at base, not toothed. Side margin of elytra explanate.

*Length*. — 4 mm. = .16 inch.

*Habitat*. — Tucson, Arizona, July.



This insect by the markings suggests *E. subrotundus* Casey, but the great difference in size and the peculiar form of the claws seem to indicate an undescribed species.

**Brumus septentrionis Weise.**

Broadly oval, convex, elytra explanate, shining; body black above and beneath, elytra orange-yellow with very variable black markings. Tibiæ and claws entirely simple in both sexes. Punctuation minute and sparse. The male is to be distinguished only by the truncate fifth segment and additional sixth segment.

This species varies greatly in its markings as follows:

**Var. septentrionis Weise.**

Elytra yellow, each with narrow sutural black stripe connected with small apical black space and two small black discal dots. *Högei* is included as an absolute synonym.

*Length.* — 3.5 to 4.5 mm. = .14 to .18 inch.

*Habitat.* — Manitoba, Montana, Washington, Colorado, Utah, N. Mex., Ariz., El Paso, Texas.

**Var. nevadensis, new variety.**

Elytra yellow, each with broad black sutural stripe connected with broad black apical space. No discal black dots in the type but in specimens collected with it one or two small dots appear.

*Length.* — 2.5 to 4.0 mm. = .10 to .16 inch.

*Habitat.* — Reno, Nevada, collected by Professor Wickham, July 18.

This is the only form thus far known from the coniferous forests of the Sierra but it is possible that further collecting may disclose other interesting forms from that region.

**Var. ovoideus Casey.**

Elytra yellow with broad sutural black stripe connected with black apical space and two large discal black spots. The anterior spot is connected with the sutural stripe in front, while the posterior spot is connected with the black apical space. In some specimens these black markings become so extended as to leave only basal and lateral margin and subapical dot pale; the resulting form so closely resembles *E. californicus* in its markings as to require an examination of the claws for its identification.

*Length.* — 3.8 to 4.0 mm. = .15 to .16 inch.

*Habitat.* — Colorado, Arizona.

**Var. davisii, new variety.**

Elytra yellow with broad black sutural stripe connected with broad black apical space and two large black discal spots connected with the sutural stripe in the type but disconnected in other specimens which I associate with it. The spots appear to be all connected in the more northern specimens.

*Length.* — 4.0 to 5.0 mm. = .16 to .20 inch.

*Habitat.* — Lake Superior, Mich., Mass., N. J., Pa., D. C., Va., Ala.



This variety is abundant at Lakehurst, N. J., in the spring, being found on pines infested with plant lice. A few specimens survive until July. I take pleasure in dedicating this insect to my life-long friend, William T. Davis.

### **Brumus histrio Fall.**

Black above and beneath except for the pale humeral parallel mark and subapical dot, it reproduces exactly the coloring of *E. californicus* from which it differs, however, by the simple claws, which make it a species of *Brumus*.

*Length.* — 3 mm. = .12 inch.

*Habitat.* — Southern California.

*Note.* — A few typographical errors in vol. XI, December number, should be corrected, viz.:

Page 200, line 10, for "var." read "C"

" " " 15, " " " "C"

" " " 31, " "C" " "var."

" 207, " 5, " "S" " "A"

" 211, " 40, strike out the words  
"showing metacoxal line on first ventral  
segment at A."

### LIST OF SPECIES OF CHILOCORINI.

Axion Muls.	marginipennis LeC.
pilatei Muls.	var. childreni Muls. [con-
tripustulatum DeG.	striatus Muls.].
plagiatum Oliv.	var. latiusculus Casey.
var. texanum Lec.	californicus Casey [desertorum
var. alutaceum Casey.	Casey].
var. pleurale Lec.	fasciatus Casey.
Chilocorus Leach.	var. subrotundus Casey.
tumidus n. sp.	subgenus <i>Brumus</i> Weise.
cacti Linn.	æthiops Bland.
var. confusor Casey.	orbiculatus n. sp.
bivulnerus Muls. [fraternus Lec.].	septentrionis Weise [Hogei
var. orbus Casey.	Gorh.].
similis Rossi.	var. nevadensis n. var.
Exochomus Redt.	var. ovoideus Casey.
subgenus <i>Arawana</i> n. subgen.	var. davisi n. var.
arizonicus Casey.	histrio Fall.
subgenus <i>Exochomus</i> Redt.	

### EXPLANATION OF PLATE I.

FIG. 1. Front view of *Chilocorus*, showing the convex form and at A, the expanded epistoma, encircling the eyes in front.

FIG. 2. Front leg of *Chilocorus*, showing the tooth on the tibia.



FIG. 3. Front tibia of *Chilocorus* more enlarged.

FIG. 4. Abdomen of *Axion* ♂ showing emarginate fifth segment and additional sixth segment; also incomplete coxal plates on first segment.

FIG. 5. Abdomen of *Axion* ♀.

FIG. 6. Abdomen of *Chilocorus* ♂ showing overlapping coxal plates on first segment and truncate fifth segment.

FIG. 7. Coxal plates of *Axion tripustulatum*.

FIG. 8. Coxal plates of *Exochomus*.

FIG. 8A. Coxal plates of *Brumus*.

FIG. 9. Front tibia of *Arawana* showing the sublunate keel in front.

FIG. 10. Claw of *Axion*.

FIG. 11. Claw of *Chilocorus*.

FIG. 12. Claw of *Exochomus marginipennis*.

FIG. 13. Claw of *Exochomus fasciatus*.

FIG. 14. Claw of *Brumus orbiculatus*.

FIG. 15. Claw of *Brumus septentrionis*.

FIG. 16. Claw of *Brumus aethiops* ♂.

FIG. 17. Elytral marking of *A. pilatei*.

FIG. 18. Elytral marking of *A. plagiatum* ♂.

FIG. 19. Elytral marking of *A. plagiatum* ♀.

FIG. 20. Elytral marking of *A. pleurale*.

FIG. 21. Elytral marking of *A. tripustulatum*.

FIG. 22. Elytral marking of *Arawana arizonica*.

FIG. 23. Elytral marking of *C. cacti*.

FIG. 24. Elytral marking of *C. bivulnerus*.

FIG. 25. Elytral marking of *C. tumidus*.

FIGS. 26 and 27. Elytral marking of *E. childreni*.

FIGS. 28, 29, 30 and 31. Elytral marking of *E. latiusculus*.

FIGS. 32, 33 and 34. Elytral marking of *E. marginipennis*.

FIGS. 35, 36 and 37. Elytral marking of *E. fasciatus*.

FIGS. 38 and 39. Elytral marking of *E. subrotundus*.

FIGS. 40 and 41. Elytral marking of *E. californicus*.

FIG. 42. Elytral marking of *B. septentrionis*.

FIGS. 43, 44 and 45. Elytral marking of *B. davisii*.

FIGS. 46, 47, 48 and 49. Elytral marking of *B. ovoideus*.

FIGS. 50, 51 and 52. Elytral marking of *B. nevadensis*.

FIG. 53. Elytral marking of *B. histrio*.

FIG. 54. Elytral marking of *B. orbiculatus*.

FIG. 55. Pale head marking of *A. pilatei*.

FIG. 56. Pale head marking of *A. tripustulatum*.

FIG. 57. Pale head marking of *E. marginipennis*.

The drawings are to be understood as diagrams indicating size, shape and markings to illustrate the text; and not as being accurate in every detail. The claws present the appearance shown in the drawings from one point of view only. They are like thin plates cut into form indicated and consequently appear quite simple when seen from the side.





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