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A Review of the Jamaican Species of the Genus *Exophthalmus* (Coleoptera, Curculionidae, Otiorhynchinae)

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INTRODUCTION AND ACKNOWLEDGMENTS

The present study is restricted to the four species of this genus (tribe Phyllobiini) which are endemic to Jamaica. They are black, leaf-feeding weevils, attractively scaled with red, blue, green, yellow, or white stripes or spots, the larvae of which bore in the roots of citrus and other hosts. Three species in Jamaica are large (15 to 31 mm.), brightly colored, and well known to the natives as "fiddler beetles." The fourth is smaller, less colorful, and is described as new. The name "fiddler" presumably reflects the popular belief that these short-nosed weevils resemble an old-fashioned fiddle (figs. 9–16, 33).[2]

The genus *Exophthalmus* is not restricted to Jamaica, as it includes perhaps as many as 40 species in Mexico, Central America, and South America, as well as 50 or more additional species in other islands of the Antilles. This large group is certainly in need of revision, but if the

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[2] Other smaller weevils of the genus *Pachnaeus* in the subfamily Brachyderinae are also called "fiddlers" in Jamaica, and, according to Dixon (1954, p. 166), the larger species of *Exophthalmus* have also local names. Thus in St. Elizabeth Parish in the western part of the island, "policeman" is used for individuals with bright red lateral stripes, "my lady" for those with yellow lateral and greenish or blue-green median stripes, and "lady bug" for those with yellow lateral and white median stripes.

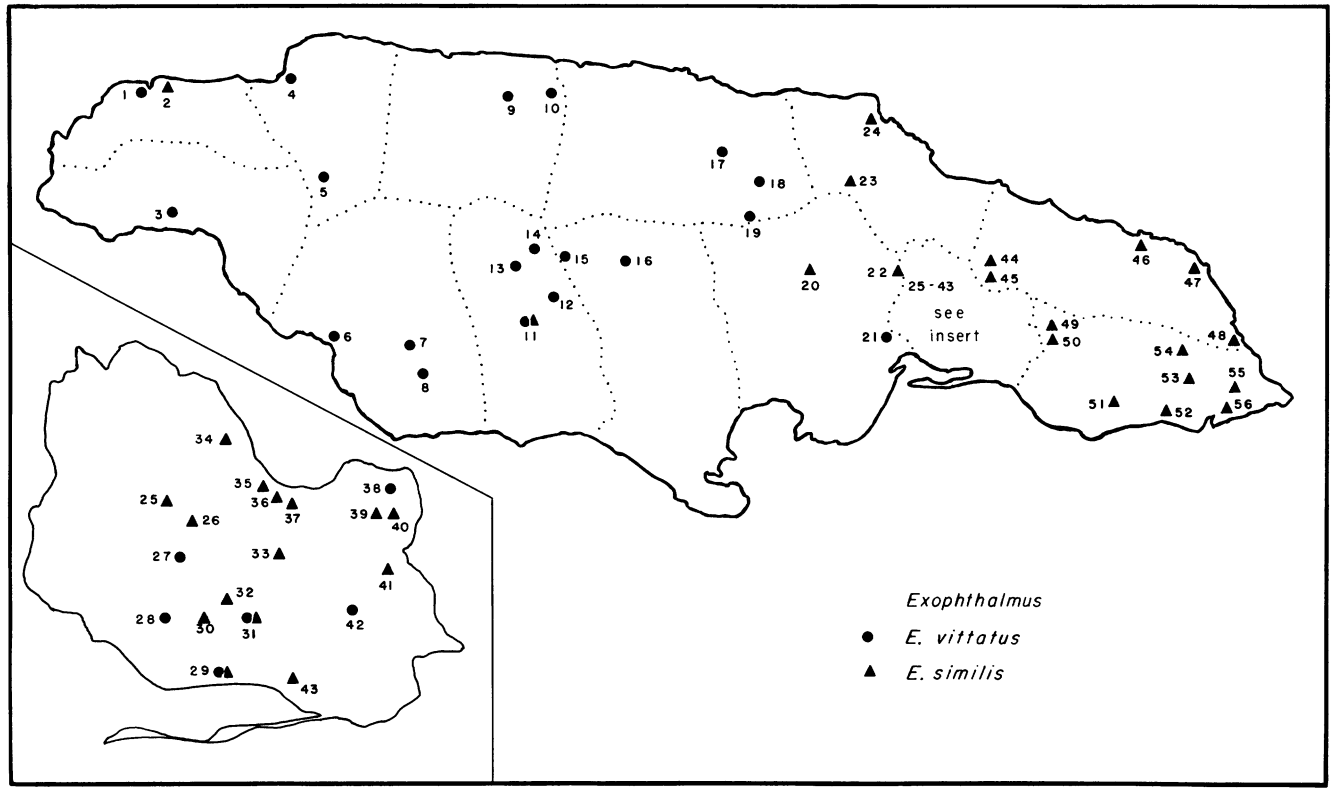


FIG. 1. Distribution of *Exophthalmus vittatus* and *E. similis* in Jamaica, with enlargement of St. Andrew Parish. (See list of localities on opposite page.)

KEY TO LOCALITIES AND PARISHES IN FIGURE 1 (OPPOSITE PAGE)

1. Lucea, Hanover
2. Jericho, Hanover
3. Torrington, Westmoreland
4. Montego Bay, St. James
5. Station 16, between Mocho and Catadupa, St. James
6. Black River, St. Elizabeth
7. Santa Cruz Mountains, St. Elizabeth
8. Malvern, St. Elizabeth
9. Windsor Estate, Trelawny
10. Baron Hill, Trelawny
11. Mandeville, Manchester
12. Williamsfield, Manchester
13. Grove Place, Manchester
14. Christiana, Manchester
15. Spaldings, Clarendon
16. Trout Hall, Clarendon
17. Claremont, St. Ann
18. Moneague, St. Ann
19. Mt. Diablo, St. Ann
20. Linstead, St. Catherine
21. Ferry, St. Catherine
22. Above Rocks District
23. Carron Hall, St. Mary
24. Port Maria, St. Mary
25. Stony Hill, St. Andrew
26. Hermitage Reservoir, St. Andrew
27. Constant Spring, St. Andrew
28. Half Way Tree, St. Andrew
29. Kingston, St. Andrew
30. Upper Mountain View, St. Andrew
31. Hope Gardens, St. Andrew
32. Liguanea Plain, St. Andrew
33. Strawberry Hill, St. Andrew
34. Second Breakfast Spring, St. Andrew
35. Hardwar Gap, St. Andrew
36. Woodcutter's Gap, St. Andrew
37. Newcastle, St. Andrew
38. Morce's Gap, St. Andrew
39. Clydesdale, St. Andrew
40. Cinchona, St. Andrew
41. Mavis Bank, St. Andrew
42. Bellevue, St. Andrew
43. Middleton Estate, St. Andrew
44. Cedar Valley, Portland
45. Green Hills, Portland
46. Port Antonio, Portland
47. Priestman's River, Portland
48. Hector's River, Portland
49. Whitfield Hall, St. Thomas
50. Arntully, St. Thomas
51. Yallah's Hill, St. Thomas
52. Morant Bay, St. Thomas
53. Bath, St. Thomas
54. Cuna Cuna, St. Thomas
55. Golden Grove, St. Thomas
56. Pleasant Hill, St. Thomas

extralimital species vary as much individually as do those of Jamaica, such a revision would present a formidable task. A huge amount of material would be necessary to reach an understanding of the species characters and this amount of material simply is not available, especially from the West Indies. A revision must also take into account the status of the genus *Diaprepes* (21 + species), which may be synonymous with *Exophthalmus,* and *Lachnopus* (50 + species), which Hustache (1929, p. 191) considered a subgenus of *Prepodes* (= *Exophthalmus*), as well as other related genera. The generic limits of many of these brilliantly colored tropical or Neotropical weevils are variable, inconstant, and confusing, a fact that may, with the lack of material, account for there being no modern revisions. Even in 1863, when the number of described species was far fewer than it is at present, Lacordaire said (p. 120) that he could not find appreciable limits among *Exophthalmus, Diaprepes,* and *Prepodes*, and that many species would not agree with the generic specifications set down by their author, Schoenherr.

Variations among these colorful Jamaican weevils have been discussed or enumerated by nearly everyone who has written about them, but generally without relation to the exact locality from which they came, and generally without relation to any character except size and color, Waterhouse (1878) being the first author to mention any structural characters. Cockerell, who was curator of the Science Museum of the Institute of Jamaica at the end of the last century and who reviewed the species of *Prepodes* (= *Exophthalmus*) of Jamaica, said (1892, p. 96), "It would be extremely interesting to collect series of *P. vittatus* and its varieties in every part of the island, and map out the distribution of the several forms." Such is what I attempt to do in the present paper with three of the species, though my choice of what constitutes a variety is not necessarily the same as Cockerell's or anyone's else (see fig. 1 and tables 2 and 3). I attempt also to clarify the status of the four Jamaican species, to which 16 names have been given in the past, and of which I have examined about 500 specimens, more than 300 of which were collected personally in 1960, with the aid of Charles Vaurie and Thomas Farr, for the American Museum of Natural History. Although I have not seen any of the types, I have little doubt as to their identity because of the correlation of their descriptions, colored illustrations, and locality with the large quantity of material on hand.

According to Cundall (whose fold-in map of Jamaica was used for my fig. 1), "Jamaica is 4,450 square miles in extent, having an extreme length of 144 miles, and an extreme width of 49 miles" (1928, p. 14). It is 90 miles south of Oriente Province, Cuba, about 115 miles west of

Haiti, from 110 to 150 miles southeast of the Cayman Islands, and 400 miles northeast of the nearest point on the American continent, which is Cape Gracios à Dios between Honduras and Nicaragua. Virtually all the island is mountainous, especially in the east where Blue Mountain Peak in the Blue Mountains rises to 7420 feet. The only lowlands are in the extreme east, the extreme west, narrowly on the northern coast, around the Black River in St. Elizabeth Parish in the southwest, and in the south from the Kingston area west to the southern part of Clarendon Parish. That the majority of specimens of *Exophthalmus* in Jamaica are found in the plateau or high regions is only because this type of terrain dominates, as these weevils occur also in low or sea-level areas.

I extend especial thanks to Dr. Thomas H. Farr, entomologist of the Science Museum of the Institute of Jamaica, not only for giving his time and energy to the collecting of material in the island in the summer of 1960, but also for his continued invaluable help by correspondence in answering questions about localities in Jamaica, the status of some species in Jamaica, the names of plants, and other matters. The director of the Institute, Dr. C. B. Lewis, was also most cordial to us during our stay on the island. Miss D. Powell, botanist, was kind enough to identify some of the vegetation, and Dr. Ronald P. Bengry, assistant curator at the Institute, has provided me with useful information on some specimens. Drs. Farr and Bengry were also kind enough to read the manuscript. A search for the type of *pulcher* Brown was made by Dr. J. Balfour-Browne.

For the loan of specimens I wish to thank Dr. J. Balfour-Browne and the British Museum (Natural History); Dr. I. J. Cantrall and the University of Michigan; Dr. P. J. Darlington, Jr., of the Museum of Comparative Zoölogy, Cambridge; Dr. Thomas H. Farr of the Institute of Jamaica, Kingston; and Miss Rose Ella Warner of the United States National Museum.

BIOLOGY

As long ago as 1801 Fabricius (p. 532) knew of the association of *Exophthalmus* with citrus because he has a notation under the name *vittatus* that the larvae destroy the roots of *Citrus medica.* In material collected personally in July, 1960, all the examples of *vittatus* from Christiana, Moneague, and Windsor Estate, as well as a few examples of *similis* from Hermitage Reservoir road, north of Kingston, were collected on the leaves of citrus trees, most of the beetles mating at the time. Many examples of *similis,* on the other hand, were taken on a le-

guminous, feathery-like tree called *Gliricidia sepium,* or quickstick, at Golden Grove in St. Thomas Parish, and those from Hermitage Reservoir road, as well as some individuals of *E. impressus*, were shaken from maiden plum, or *Comocladia.* Other information from labels on specimens include "on European Apple Tree" for a specimen of *similis* from Cinchona, "on Hibiscus" for four specimens of *similis* from Strawberry Hill, both places in St. Andrew Parish, and "on coffee leaves" for a *similis* from Pleasant Hill in St. Thomas; five specimens of *vittatus* from near Chapelton, Clarendon Parish, were taken on grapefruit and orange leaves; the majority of specimens of a new species were collected on *Acacia macracantha,* or thorn scrub.

Dixon, in his article on the large fiddler beetles (1954, p. 166), says that they are "the most important local pests of citrus" and attack the trees either as larvae or adults. The larvae, however, do the most serious damage, because they work in the roots and "when in sufficient numbers may completely girdle the main roots with the effect of arresting the flow of mineral salts to the higher parts of the host plant. The leaves of such plants develop a chloritic appearance, turn yellow and wilt" (Dixon, *loc. cit.,* p. 167).

Dixon describes the larvae, which hatch in about a week from egg clusters laid by the adult between two leaves of the host plant. The larvae fall to the ground, burrow their way into the roots, and feed for seven or eight months, undergoing up to 16 molts, until they are about one inch long and ready to pupate. They pupate at a depth of about two feet. In the spring (March), when the rains come, the adults fly up from the ground just at the time when the citrus trees are putting out their shoots, and they are active feeders on the young leaves throughout the summer, even, in some localities, until October and November, and during this time they lay their eggs between the leaves. Dixon says the eggs are often parasitized by wasps of various species, a fact recorded also by Wolcott (1929, p. 22) who found that over half of the scores or hundreds of eggs laid by *Exophthalmus quadrivittatus* Olivier, a closely related species in Haiti, were parasitized by a wasp, *Tetrastichus haitiensis* Gahan.

The Haitian weevils were observed by Wolcott in the spring of 1927 in a citrus nursery near Port-au-Prince "feeding on the tender leaves or resting in clusters in rolled-up leaves . . . the females . . . depositing eggs between the leaves." He mentions an eight- to 10-day incubation period and that the larvae in emerging wiggle between the leaves without burrowing through them. "The larvae crawl over the surface of the leaf with a galloping motion, but quickly drop to the earth beneath when the leaf slopes steeply from the horizontal" (p. 24). He found the tender leaves of

the citrus often "most attractive to the adults" of this species, as well as to those of *Diaprepes abbreviatus* Linnaeus, the notorious sugar-cane weevil.

Dixon (*loc. cit.*) gives "a list of the known host plants in Jamaica other than the *Citrus* spp. which are attacked by *Prepodes* [= *Exophthalmus*] spp." He does not say which plants are attacked by which species, or which plants are preferred. He gives a tabulation of the scientific and vernacular names in the dozen families involved, as follows: quickstick, or St. Vincent plum (*Gliricidia sepium*); Congo pea (*Cajanus cajan*); lima or sweet bean (*Phaseolus lunatus*); peanut (*Arachis hypogea*); locust (*Inga vera*); dogwood (*Piscidia piscipula*); bastard cabbage (*Andira inermis*); coco plum (*Chrysobalonus icaco*); maiden plum (*Comocladia pinnatifolia*); mango (*Mangifera indica*); hog plum (*Spondias monbin*); Jew plum (*Spondias purpurea*); avocado (*Persea americana*); tropical almond (*Terminalia catappa*); Jamaica satinwood (*Zanthoxylum flavum*); papaw (*Carica papaya*); cassava (*Manihot utilissima*); sugar cane (*Saccharum officinale*); breadfruit (*Artocarpus incisa*); pimento (*Pimenta officinalis*); guinep (*Melicocca bijuga*); cacao (*Theobroma cacao*); bastard cedar (*Guazuma ulmifolia*); and red bullet (*Dipholis nigra*). Dixon observes that only half of these plants are native to Jamaica.

Some methods of combating the citrus weevil are given by Dixon. "In the past, and even today, the adult 'fiddlers' may be hand-picked from citrus foliage during the flight-season from March to October. If the trees are tall or thickly foliated the beetles may easily be shaken onto a piece of cloth placed on the ground below." More effective methods include the application of paradichlorobenzene or modern synthetic insecticides of the chlorinated hydrocarbons to the soil at the foot of the trees so that the young larvae are killed or at least kept away from the roots.

HISTORY OF THE JAMAICAN SPECIES

The Jamaican fiddler weevils were well illustrated in earlier days when tropical insects were apparently more popular. In the beginning they were placed in the genus *Curculio* and since 1823 in the genus *Exophthalmus* or *Prepodes*. The names *Exophthalmus* and *Prepodes* were proposed on the same page of the same work (*Prepodes* as a subgenus of *Diaprepes*), the type of *Exophthalmus* being *Curculio quadrivittatus* Olivier, and that of *Prepodes, Curculio vittatus* Linnaeus, which I consider are congeneric. We have thus to select between *Exophthalmus* and *Prepodes,* and it seems wiser to follow the practice of the modern catalogues (Gemminger and Harold, 1871; Junk, 1938; Blackwelder, 1947), and use *Exophthalmus,* synonymizing *Prepodes* with it.

The first account of these weevils was published over 200 years ago, by Sloane, in a book on his voyage to the New World in which he mentioned

and illustrated (1725, p. 210, pl. 237, fig. 35) a striped weevil from Jamaica. He described also, but without giving them names, two other weevils from the island, one smaller and with white spots (probably the *impressus* of Fabricius), and one with the stripes "yellow and whitish-green" instead of yellow and plain white (probably the *similis* of Drury with green sutural stripes). The weevil with yellow and white stripes was later described by Linnaeus (1767, p. 610) as *Curculio vittatus* "elytris lineis albis luteisque" (elytra with white and yellowish or rosy lines), and Linnaeus made reference to Sloane's book.

In 1773 Drury (index and pp. 61–62, pl. 33, figs. 4, 5) described, in English and French, two additional species of *Curculio* from Jamaica, one speckled with golden green (*similis*) and one coppery (*rufescens*). Three years later, Peter Brown (1776, pp. 125, 126, pl. 49, fig. 6), at the end of a book on birds, described in English and French, and illustrated unmistakably, the Jamaican *Curculio* that is black with six white stripes on the elytra (*pulcher*) [= *vittatus*]. Fabricius (1781, p. 192) added *impressus* to the Jamaican list and mentioned also Brown's *pulcher*. (Sherborn, 1902, p. 785, attributes *pulcher* to Fabricius, 1781, instead of to Brown.)

Patrick Browne (1789, p. 429, pl. 43, fig. 9), in a book on the natural history of Jamaica, illustrated, but did not mention by name, Linnaeus' *vittatus,* calling it a "streaked shining *Curculio* . . . beautiful insect . . . about an inch in length" with the "elytra splendidly and variously striped."

Olivier (1790, pp. 542–544), in his encyclopedia of natural history, described *cameleon* (= *similis*) and discussed other Jamaican species of *Curculio,* giving them French vernacular names: "Charanson à-bandelettes" (*vittatus*), "Charanson superbe" (*pulcher*), "Charanson Caméléon" (*similis* and *rufescens*), and "Charanson imprimé" (*impressus*). Most of these species were figured in 1795 by Herbst (pls. 67, 85), and in 1808 by Olivier (pls. 10, 12, 13, 15).

In the nineteenth and twentieth centuries, two new species were described, one by Waterhouse in 1878 (*Prepodes amabilis*) [= *vittatus*], and one by Bovie in 1907 (*Exophthalmus jamaicensis*) [= *vittatus*]. Cockerell in 1893 gave names to three varieties of *vittatus* and two of *similis*. He also inadvertently became the author (*loc. cit.*, p. 374) of two unpublished names of Jekel which he cited with a short description, one (*rubrovittatus*), which is a color variant of *vittatus,* and the other (*viridipupillatus*), in another subfamily, the Leptopinae. These names of Cockerell have been overlooked by all the cataloguers, however, as well as by Sherborn and Neave.

Although *Exophthalmus* is a colorful genus and although a few species have been described between 1907 and 1934 (by Bovie, Champion, Hu-

stache, and Marshall), there has been no revision of the genus as a whole, and only Champion (1911) for Central America and Hustache (1929) for Guadeloupe have as much as discussed the genus in general terms or given keys to its species.

MORPHOLOGY OF THE JAMAICAN SPECIES

The head, mentum, antennae, thorax, abdomen, legs, and general shape are nearly similar in all species or are subject to the same kind of variation, but the beak differs somewhat in one of the species (*farr*). The size varies greatly within the species in both sexes, some individuals being twice the size of others. The sexes can be differentiated by the shape of the last segment of the abdomen (rounded in males, pointed in females).

Color

The color and color pattern vary greatly, both interspecifically and individually. Some of the variability of pattern is shown in figures 9 to 16 and figure 33 and is explained in tables 2, 3, and 4, as well as in the discussion of each species. The color is not a part of the integument, which is black, fading to brownish, but is due to the presence of fine or dense hairs or scales which vary enormously from rosy, red, coppery, or pink to tawny, yellow, orange, or white, to blue, green, blue-white, blue-green, or golden green. Some of these hairs or scales are arranged in longitudinal stripes or spots, and some cover the surface, in all or in part. This polychromatic vestiture is of three kinds.

1. With the exception of the green-blue scaly stripes characteristic of one of the varieties of *similis,* the colored lateral dorsal and lateral ventral longitudinal stripes of the elytra (the latter on the deflexed sides and not visible from above) are composed of extremely dense scales (rosy, orange, yellow, or tawny), the majority of which point upward from the surface and resemble, under magnification, the crowded fibers of a colored turkish towel. The large spots of *impressus* in the same positions on the elytra, as well as additional dorsal stripes in some *vittatus,* are also of this type. These spongy areas, which are characteristic not only of the Jamaican species but also of species from other islands (Cuba, Puerto Rico, Haiti) are actually impressed in most specimens. The scaly vestiture, when scratched with a pin, sloughs off readily, exposing the black ground color underneath it. The rosy or yellow color may become faded or drained out and appear whitish, but if the spongy texture remains or is even slightly tinted or darkened, the typical spots or stripes can be recognized.

2. Rather round, occasionally elongate, dense, overlapping, white, blue, or green scales, often of a metallic luster, compose the central, or sutural, stripe of the elytra (as well as the lateral dorsal stripes in one of the varieties of *similis*). They are present also on the ventral surface, either in an irregular stripe on the sides from the beak to the apex of the abdomen, or, as in *farr* and the few of *vittatus* and *similis* that are completely hairy-scaly dorsally, covering the entire venter. (Ventral scales of the latter two species are elongate.) These scales may be present also on the edges of the dorsal colored stripes or within the depths of the elytral punctures, and in *farr* they are on parts of the pronotum.

3. Fine, scarcely visible, colored or white hairs, and golden, green, or bluish, thicker, more scale-like hairs may be present on any area of the body. This vestiture is dense and covers the surface in some individuals (gold, green, or gray varieties of *similis* or *vittatus*), but is so sparse in others that the black ground color and the impressed colored stripes or spots of the elytra, if present, show through in varying degrees. These fine hairs are evidently lightly applied, as all stages of pubescence are present in the material of *vittatus* from Christiana, for example. The wearing off of the fine hairs causes some of these weevils to appear black and glabrous, others mottled or unevenly striped, and others clearly trivittate.

It is difficult to understand why these insects vary to so great a degree in both the color and the pattern of the scales. Although a few of the populations of *vittatus* or *similis* examined from certain localities seem to have a fairly constant pattern, this pattern can be found again in localities in another part of the island, and many patterns may occur in the same locality in specimens taken at the same time and in the same grove of trees (a large series of *vittatus* showing the greatest amount of variation were collected personally in two days in one spot at Christiana as they were mating on the leaves of citrus). Therefore, it appears that the variability is not phenotypic, nor does it depend on the size or development of the host plant. It has been suggested that the bright-colored stripes or spots might be warning colors, but the predators are not obvious. I believe that these weevils are too big to be preyed upon in large numbers by the insectivorous birds of Jamaica which are chiefly small species. As to lizards, when some crested lizards (*Anolis cristatellus*) that were being reared at the Rio Piedras Station in Puerto Rico were fed the very much smaller weevil, *Cosmopolites sordidus,* they "ate the hard black weevils in considerable numbers, at first, but a steady and exclusive diet of them caused constipation, promptly relieved when other, softer and more readily digested insects were supplied" (Wolcott, 1948, p. 414).

In a number of the Antilles the introduced Surinam toad, *Bufo marinus,*

is credited with helping to keep down the numbers of some weevils, and this toad occurs on Jamaica. Even so, the species of *Exophthalmus* are not nocturnal, but the toad is.

In attempting to explain somewhat the same kind of variation in the sugar-cane weevil, *Diaprepes abbreviatus,* in some of the other Antilles, Wolcott (*loc. cit.,* p. 391) suggests that the variation "of the adults . . . may be only a reflection of the variation in duration of the stages of the immature forms resulting from intense parasitization by *Tetrastichus haitiensis* Gahan of the eggs . . . " so that very few larvae survive from eggs laid when the wasp parasite is abundant and the species continues from eggs laid at other times of year by "a comparatively few exceptional and abnormal females."

Genitalia

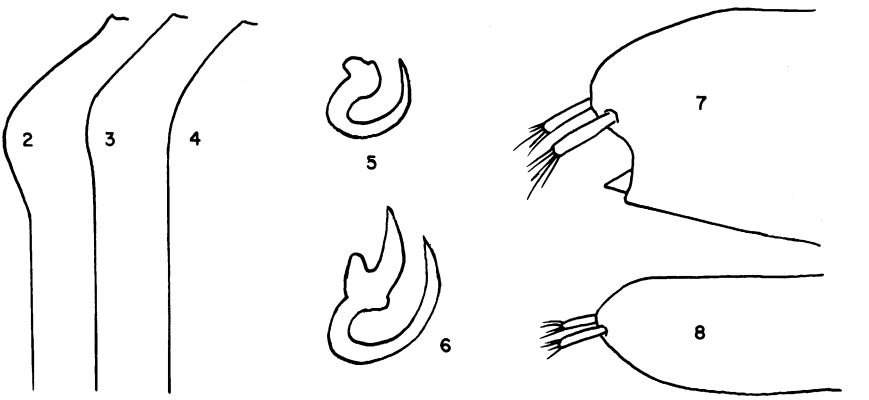
The male and female genitalia (figs. 5–8, 17–31) are of the same general type in the four species studied, as well as in a number of other species of the genus examined, and in *Diaprepes abbreviatus,* the sugar-cane weevil. The number of specimens of *Exophthalmus* dissected by me are as follows: *vittatus,* 10 males, six females; *similis,* 11 males, 11 females; *impressus,* three males, three females; *farr,* three males, two females. The only other illustrations of the genitalia of *Exophthalmus* that I know of are those by Marshall (1922, p. 192) of the female genitalia of his *E. parentheticus* from Ecuador. Pereira (1954, pp. 265, 266; 1956, p. 126), however, gives some excellent detailed drawings, showing also internal structures, of the quite similar male and female genitalia of *Entimus imperialis* and *Entimus nobilis*, large, colorful, short-nosed, South American weevils of the family Leptopinae (pronotum lobed near the eyes).

The strongly sclerotized male organ of *Exophthalmus* (figs. 17–25) is nearly as long as, and slightly thicker than, the hind tibia, at least in the species from Jamaica. In two species (*vittatus* and *similis*) it is keeled dorsally from the base to the apical orifice; in the other two species (*impressus* and *farr*) it is tubular, except for the impression of the orifice. The orifice is longer and extends farther back in *impressus* (fig. 22) than in the other species; it is somewhat longer in *farr* (fig. 25) than in either *vittatus* or *similis* (figs. 17, 21). The triangular apex is more sharply pointed in *impressus* and *farr* than in the other two species; the distance from the apex to the opening is shorter in *impressus* than in *vittatus* and *similis,* and shorter in *similis* than in *vittatus.* The type of the genus (*quadrivittatus*) and *Diaprepes abbreviatus* have a tubular, not carinate, penis.

The external genitalia of the female, as of the male, are very large and strongly sclerotized. The ovipositor in repose is hidden within the ninth

tergite and sternite, which close over it like knife blades and are in turn covered by the hairy envelope of the eighth tergite, the tergites and sternites being flattened, apically acuminate plates (fig. 26 shows them half open, with the ovipositor between them).

The ovipositor (figs. 30, 31) is strongly compressed laterally and appears to be a flattened, somewhat sclerotized membrane that is lightly divided in front of the middle, and has two hairy palps apically. This organ is distinctly longer and narrower in *impressus* than it is in the other



FIGS. 2–4. Angle of left elytral humerus in *Exophthalmus*. 2. *E. similis*. 3. *E. similis* and *E. vittatus*. 4. *E. vittatus*.

FIGS. 5, 6. Spermatheca, profile view. 5. *E. vittatus;* characteristic also of *E. similis* and *E. impressus*. 6. *E. farr*.

Figs. 7, 8. Apex of ovipositor, lateral view. 7. *E. vittatus;* characteristic also of *E. similis* and *E. farr*. 8. *E. impressus*.

species investigated (*E. vittatus, similis, farr, quadrivittatus,* and *Diaprepes abbreviatus*); *impressus* differs further by having the apex rounded off, not emarginate as in the other species (figs. 7, 8).

The ninth tergite (figs. 27–29) varies among the species under discussion in size and shape. *Exophthalmus impressus,* although about as large as *E. vittatus* and *similis,* has this tergite proportionately smaller, and *impressus,* as well as *farr* and *quadrivittatus,* differs from *vittatus, similis,* and *Diaprepes abbreviatus* by having the sides of this tergite open at the apex, not pressed together as in the other species. (The ninth sternite is open apically in the same species.) Another difference in the shape of the tergite is found in *vittatus* which differs by having the upper edge, viewed in profile, not evenly sloping as in the other species but more or less turned down and truncate at the apex (figs. 27, 29).

The sclerotized spermatheca were dissected from females of the four species in Jamaica. They appear to be similar in size and shape in *vittatus, similis,* and *impressus* (fig. 5), but larger in size in the smaller form (*farr*), which differs further by having an acuminate "arm" (fig. 6).

GENUS *EXOPHTHALMUS* SCHOENHERR

Exophthalmus SCHOENHERR, 1823, col. 1140. Type, by monotypy, *Curculio quadrivittatus* Olivier.

Prepodes SCHOENHERR, 1823, col. 1140. Type, by monotypy, *Curculio vittatus* Linnaeus.

Praepodes SCHOENHERR, 1840, p. 348. Emendation of *Prepodes.*

Exophthalmodes PIERCE, 1916, p. 464. New name for *Exophthalmus* Schoenherr.

RANGE OF THE GENUS: Greater and Lesser Antilles, Central America, Mexico, and northern South America.

DESCRIPTION OF THE GENUS IN JAMAICA: Length, 10 to 31 mm. Body winged, oblong oval, narrowing before apex, furnished with hairs or scales. Beak and head more or less cylindrical, beak horizontal (but bent down apically in *farr*), flattened or slightly convex on top and vaguely longitudinally carinate in some specimens (but transversely carinate between points of insertion of antennae in *farr*), beneath with three elongate depressions that are not noticeable when heavy scales are present, sides (viewed from above) parallel, except for widened apical part where antennal trench or scrobe projects outward, sides of beak on top rounded and smooth (but rather angular and with elongate depression in front of each eye in *farr*). Eyes large, round, rather bulging. Antennae about as long as to reach to hind edge of pronotum, 12-segmented, scape (or first segment) widened gradually to apex and extending nearly to hind edge of eye, funicle seven-segmented, club four-segmented; antennal scrobes deep, sinuous, descending from insertion of antennae to, or just in front of, lower edge of eye. Pronotum flattened (slightly convex in *farr*), truncate in front and sides of front where ocular lobes and vibrissae are lacking, base bisinuate. Scutellum distinct. Elytra oblong, narrowed apically, wider at base than pronotum, base obliquely truncate or somewhat bisinuate, shoulders angular, apices with hairy, pointed processes in females, and in males of *impressus* and *farr,* elytra with 12 punctate striae that are irregular in some specimens and difficult to count because of heavy scaling. Metasternum between middle and hind coxae as long as first segment of abdomen at middle, base of metasternum medially with deep, small impression. Front and middle coxae round or conical, prominent, front coxae contiguous, middle coxae separated by one-third or one-half of diameter of a coxa, hind coxae transverse, corbels of hind tibiae glabrous; femora unarmed, bulbous; tibiae denticulate on inner

edge, middle and front tibiae slightly curved apically, tibiae mucronate at inner apical angle; tarsi very long and wide, hairy above, spongy below; claws free. (For genitalia, see figs. 17 to 31, and discussion above under Morphology.)

SECONDARY SEXUAL CHARACTERS: Males with last segment of abdomen broadly rounded or truncate-rounded, females with this segment slightly to strongly acuminate.

DISCUSSION AND SYNONYMY

The correct date for Schoenherr's genera, *Exophthalmus, Diaprepes, Prepodes* (as subgenus of *Diaprepes*), and *Tropirhinus* (later changed by its author to *Callizonus*) is 1823, not 1826 as is nearly always cited. Although the detailed description of these genera appeared in 1826, a valid species was cited for each genus in 1823.[1] The only works I have found that give the 1823 date are Sherborn (1925–1926, p. 2278), Neave (1939, p. 392), and Blackwelder (1947, p. 803). Blackwelder, however, cites 1826, the later date, for *Prepodes,* which is incorrect. Pierce (1916) was not only mistaken in citing 1826 for *Exophthalmus,* but he thought this name was preoccupied by a name for a Palearctic elaterid bettle mentioned by Latreille in 1825, so proposed a new name, *Exophthalmodes.* Latreille, however, gave only a French vernacular name ("Le g. Exophthalme"), not a scientific name, to Linnaeus' *Elater mesomelas.* As pointed out by Marshall (1922, p. 189), who nevertheless accepted Pierce's new name, Pierce's action was also invalid because he selected *Eustales opulentus* Boheman, 1850, as a new genotype, a species that was not included in the original genus.

Although Gemminger and Harold (1871, p. 2232), evidently following Lacordaire (1863), synonymized *Prepodes* with *Exophthalmus* (an action with which I agree), these genera have been considered as distinct by many subsequent authors (Waterhouse, 1878; Champion, 1911; Leng and Mutchler, 1914; Gowdey, 1926; and Dixon, 1954). There is little agreement among authors, however, as to which "genus" includes which species. Thus *pictus* (Cuba), which was described by Guérin in the genus *Diaprepes,* was placed by Marshall in *Prepodes* and by Blackwelder (1947) in *Exophthalmus.* A number of other species have also been changed from genus to genus.

The type species of the genus *Prepodes* (*vittatus* Linnaeus from Jamaica) and that of the genus *Exophthalmus* (*quadrivittatus* Olivier from Santo Do-

[1] Article 25 of the International Rules of Zoological Nomenclature states that a generic name is valid on condition that (prior to January 1, 1931) this name was published and accompanied by an indication, or a definition, or a description; "indication" to be construed as "the citation or designation of a type species."

mingo) are quite similar except for the fact that *quadrivittatus* has the bases of the elytra rather strongly lobed or drawn forward, and the base of the pronotum with two little angles at the center, whereas *vittatus* has the bases more or less oblique and the pronotum more or less bisinuate at the base. *Exophthalmus quadrivittatus,* however, is evidently not typical of most members of the genus, because the lobed elytral bases are not present, to my knowledge, elsewhere in the genus except in *E. pictus* and *E. mannerheimi,* and the angulate base of the pronotum is a character not present in other species that I have seen except in *mannerheimi,* a species often confused in collections with *quadrivittatus.* The number of elytral striae are supposed to distinguish *Prepodes* (12 striae) from *Exophthalmus* (12 plus), but even if there were a distinct difference, this character seems hardly of sufficient importance to distinguish genera, especially in insects that are so covered with scales or hairs that the striae cannot always be counted. Champion (1911, p. 249) says that *Exophthalmus* has "two or more abbreviated supplementary rows of punctures on the exterior portion of the disc of the elytra," and Hustache (1929, p. 191) says these rows are behind the shoulders ("derrière les epaules"). It is true that the type of *Prepodes* (*vittatus*) seems to have 12 quite regular striae, but the striae are not so regular in some examples of *similis* and *impressus,* which are always associated with *vittatus,* and the "supplementary rows" are certainly extremely variable in the species examined that were described as *Exophthalmus.*

Relations with Other Genera

Some genera allied to *Exophthalmus* (which have been placed either in the subfamily Otiorhynchinae or Brachyderinae by authors) differ from it in a number of ways, but there is no one character by which *Exophthalmus* can be distinguished from them. Even a combination of characters is of doubtful value on the generic level, because these weevils fail to show any significant structural differences, and, furthermore, every generic character that has been selected varies intraspecifically. By exclusion, we may say, therefore, that other genera differ from *Exophthalmus* as follows: by having the eyes more oval, more elongate, or flat, not so round and bulbous; the sides of the pronotum in front with vibrissae (as in most species of *Diaprepes*), or with ocular lobes (as in some *Pachnaeus*); the beak distinctly unicarinate, tricarinate, or longitudinally rugose (as in some examples of *Diaprepes*); the beak constricted in front of the eyes and the head constricted behind the eyes (as in *Tetrabothynus*); the base of the pronotum virtually truncate (as in some *Diaprepes*); the metasternum short (it is rather short in some individuals of *Exophthalmus* outside Jamaica); a much longer third antennal segment (as in *Diaprepes*); and 10 punctate

striae on each elytron (as in *Lachnopus* and *Tetrabothynus*) instead of 12 or more (but two paratypes of Marshall's *humeridens* from Cuba appear to have fewer than 10 striae, and *humeridens* was described as *Prepodes*).

Of the above genera, *Diaprepes* and *Tetrabothynus* do not occur on Jamaica. Of *Pachnaeus* and *Lachnopus*, both of which occur also in some of the other Antilles, *Pachnaeus*, with three species in Jamaica, differs from *Exophthalmus* by having an angulation or a small lobe and/or long vibrissae on the front of the pronotum under the eye and by being generally smaller (under 15 mm.) and generally solidly covered with green or white scales, not striped or spotted. Of *Lachnopus*, Lacordaire (1863, p. 122) has said that, even though the species appeared very different from those of *Exophthalmus,* they did not actually differ by any important or constant generic characters. He recognized it as a separate genus, however, although he united both *Diaprepes* and *Prepodes* with *Exophthalmus.* (Blackwelder, 1947, placed both *Pachnaeus* and *Lachnopus* in another subfamily, the Brachyderinae, but Hustache, 1929, considered *Lachnopus* a subgenus of *"Prepodes".*) The few species I have seen of *Lachnopus* have a very convex and proportionately larger pronotum than do species of *Exophthalmus,* as wide in some species as the base of the elytra.

There is in Jamaica (I have seen specimens from Guanaboa Vale, St. Catherine Parish, collected on *Acacia macracantha* and *Pisonia aculeata,* and from Long Mountain, and Hope [Gardens?], St. Andrew) a medium to large (15 to 20 mm.), dark species with white scales that might be confused with *Exophthalmus,* but I do not know to what genus it belongs. It is distinguished from the other genera in Jamaica, however, by having ocular lobes, with vibrissae, on the front margin of the pronotum (a character that places it in the subfamily Leptopinae), long, oval-shaped eyes, short antennal scape that reaches only to the front edge of the eye, and a very short metasternum (at middle only one-half of the length of the first abdominal segment). Cockerell became the author of what is probably this species (1893, p. 472) by using one of Jekel's unpublished names, *"Praepodes viridipupillatus."* (There is a *Hypsonotus viridipupillatus* Jekel from Brazil, also in the subfamily Leptopinae, but it is said to have the beak tricarinate.) There are no members of the Leptopinae recorded from Jamaica either in Gowdey (1926) or in Blackwelder (1947), and only three are recorded by Blackwelder from the other Antilles (*Hypoptus insularis* and *H. macularis; Hypsonotus latus*).

I mention above that some of these allied genera are at present in different subfamilies. Kuschel (1955, p. 305) has commented on this situation as follows: "It is unquestionable that *Diaprepes, Exophthalmus, Rhinospathe* and *Callizonus* on one side, and *Pachnaeus, Naupactopsis, Chauliopleu-*

rus, Decasticha, Tetrabothynus, Lachnopus, Ischionoplus and *Apotomoderes* on the other, form one systematic unity, nevertheless, they have been distributed in two different subfamilies."

KEY TO THE SPECIES OF *Exophthalmus* IN JAMAICA[1]

1. Pronotum with six or more impressed colored or white spots ..... *impressus*
   Pronotum without spots 2
2. Size small, 10 to 15 mm., sides of beak with small depression in front of each eye; pronotum vittate ..... *farr*
   Size large, 15 to 31 mm., sides of beak smoothly rounded, without depressions; pronotum immaculate 3
3. Deflexed sides of elytra with colored or white lateroventral stripe 4
   Deflexed sides of elytra uniform, not striped 5
4. Lateroventral stripe long, extending from base nearly to apex of elytron, often confluent with dorsal stripe ..... *similis*
   Lateroventral stripe short, extending from base to hind edge of metasternum or at most to second segment of abdomen ..... *vittatus*
5. Elytral shoulders right-angled, bulging; punctures of striae usually with green or blue scale in centers ..... *similis*
   Elytral shoulders obliquely angled; strial punctures usually without green or blue scale in centers ..... *vittatus*

Exophthalmus vittatus Linnaeus

Figures 1, 3–5, 7, 9–12, 14, 17–19, 26, 29, 30

Curculio vittatus LINNAEUS, 1767, p. 610 ("Europa"; type probably in Sweden).

Curculio pulcher BROWN, 1776, p. 126, pl. 49, fig. 6 ("Madeira and Jamaica," here restricted to Jamaica; location of type not known, see below). New synonymy.

Praepodes vittatus Mut. *musae*, COCKERELL, 1893, p. 374 (Jamaica; no type designated). New synonymy.

Praepodes vittatus Mut. *virescens* COCKERELL, 1893, p. 375 (Jamaica; no type designated). New synonymy.

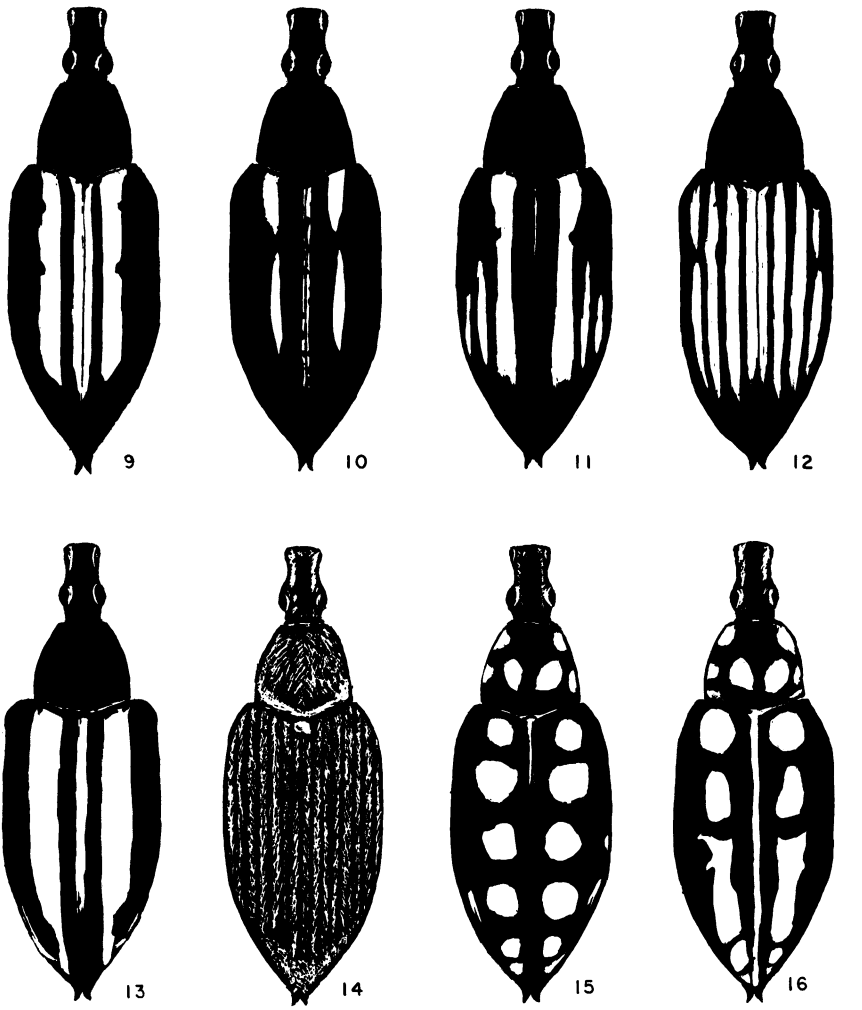
Praepodes vittatus Mut. *inornatus* COCKERELL, 1893, p. 375 (Jamaica; no type designated). New synonymy.

Praepodes vittatus subsp. *rubrovittatus* "Jekel" COCKERELL, 1893, p. 375 (Jamaica; no type designated). New synonymy.

Exophthalmus jamaicensis BOVIE, 1907, p. 69 (Jamaica; type in the United States National Museum). New synonymy.

DIAGNOSIS: Closely resembling *similis* in some of its varietal phases, but striped or vittate specimens of either species distinguishable by length of lateroventral stripe on deflexed sides of elytra (see table 1 for further comparisons). Differing from *impressus* by having pronotum smooth, granular, or pubescent, but without impressed pubescent spots, by having prosternal process rather flat, not bulbous, mesosternal process narrower, and different genitalia.

[1] A key to a few of the smaller species from the other Antilles is given under the species *farr*.



FIGS. 9–16. Dorsal patterns of varieties (see also tables 2–4) of *Exophthalmus*. The areas shown as white are actually colored except for those in figures 12 (white scales) and 14 (white hairs). 9. *E. vittatus,* variety A, typical. 10. *E. vittatus,* variety A, broken vittae. 11. *E. vittatus,* variety D, additional stripes. 12. *E. vittatus,* variety E, *"pulcher."* 13. *E. similis,* variety B, showing also angular humeri. 14. *E. vittatus,* variety E, or *E. similis,* variety D. 15. *E. impressus,* variety A, typical. 16. *E. impressus,* variety C.

RANGE: Most of the island of Jamaica (fig. 1) except for the extreme east, east of the Kingston area. (See below for data on the 247 specimens examined.)

DESCRIPTION: Length (measured with the beak horizontal), 15 to 31 mm. Ground color black, elytra usually with colored longitudinal dorsal and lateroventral stripes of dense pink, rosy, green, yellow, tawny, or white hairs or scale-like hairs, but dorsal stripes may be lacking or abbreviated; additional variously colored hairs may be present on pronotum, head, beak, or elytra (see figs. 9–12, 14). Color pattern ventrally consisting of a stripe of white, green, or blue hairs along sides of body from under eye to apex of abdomen (hairs often worn off completely), or entire venter hairy.

Beak finely, densely punctate, gently sloping at apex, hairy or with scattered hairs, sides of beak rounded off. Antennae with second segment of funicle slightly or distinctly longer than first, third segment longer than any of following segments. Pronotum with surface varying from nearly smooth to slightly or strongly granular, some specimens with narrow median impression. Scutellum variable, but generally wider than long and depressed at middle. Elytra with dorsal stripes lacking on 22 of 212 specimens, lateroventral stripes on deflexed sides not extending far beyond metasternum (absent in one of 212 specimens), humeri oblique (fig. 4), but rather bulging and nearly right-angled in a few specimens (fig. 3), sides of elytra rounded off, not carinate, apices in male scarcely acuminate or projecting. Prosternum with process between front coxae rather flat. Mesosternum with process not more than one-third of diameter of a middle coxa. Genitalia of male as in figures 17–19; of female, as in figures 5, 7, 26, 29, and 30.

DISCUSSION: Adam White (1858, p. 358), after his description of a species from Central America, remarks on the beauty of some of the other species of the genus. He says, "A jeweller lately took a design for a pair of ear-drops for a lady, from a specimen of . . . *Praepodes vittatus,* a beautiful dark-coloured species with bright longitudinal bands of white and rich red on its elytra; the insect was represented hanging from an orange-blossom, while rubies and other jewels formed its body."

This handsome, candy-striped, black weevil with its pink, yellow, or tawny dorsal stripes, the type of the genus *Prepodes,* was called "Charanson à bandelettes" by Olivier (1790). It is so similar to *E. similis* that the two forms might be considered subspecies except for the fact that both occur in St. Andrew Parish (*vittatus* at Kingston, Hope Gardens, Constant Spring, Morce's Gap, and Half Way Tree; *similis* at Kingston, Hope Gardens, and 18 or more other localities); that a few individuals of *similis* occur within the range of *vittatus;* and that both species have been seen from Mandeville, farther west in the island than Kingston. To some extent, however, the two species represent each other geographically, as can

TABLE 1

COMPARISON OF TWO SPECIES OF *Exophthalmus*

	E. vittatus	*E. similis*
Elytra		
Humeri	Obliquely angled (figs. 3, 4)	Right-angled, bulging (figs. 2, 3)
Strial punctures	Rarely with green or blue scales within	Almost always with green or blue scales within
Lateroventral spongy stripe	Narrow, short, less than two-thirds of length of dorsal stripe; rosy or tawny	Wide, as long as dorsal stripe, in some specimens merging with it; rosy, tawny, or green-blue
Dorsal spongy stripes	Center (or sutural) stripes usually white, occasionally green; two lateral stripes usually rosy, but yellow in 11 of 207 specimens; additional colored stripes or part of stripes in some specimens	Center stripes green or blue, not white; two lateral stripes usually rosy or tawny, not yellow, but blue or green in 17 of 175 specimens; additional stripes lacking
Last abdominal segment of female	Apex strongly raised in broadly rounded keel	Apex only slightly raised
Genitalia of male	Sclerotized apex of penis rather more elongate (fig. 17)	Sclerotized apex of penis rather broader (fig. 20)
Ninth tergite of female	In profile somewhat truncate to apex (fig. 29)	In profile evenly acuminate to apex (fig. 27)
Host plant	Chiefly citrus trees	Chiefly non-economic plants
Distribution	St. Andrew Parish westward	Chiefly St. Andrew Parish eastward, but occurs sparingly in west

be seen on the map (fig. 1). There does seem also to be a difference in the choice of food plant, at least in the examples collected personally in 1960, most of our specimens of *vittatus* (many in copulating pairs) having been taken on the leaves of citrus trees, and our *similis* chiefly from other plants of no economic importance. However, some specimens of a series of *similis* we collected at Hermitage Reservoir were on citrus and two *vittatus* from Torrington and Lucea were taken on unknown vegetation, but not citrus, and no doubt both forms feed on a variety of plants (see Biology above).

The differences between the male genitalia of *vittatus* and those of *similis* are slight and relative, but quite constant; they are, however, of a less degree than are the differences between them and either *impressus* or *farr.* (See discussion above on Morphology of the Jamaican Species; also figs. 17–25.) Females of *vittatus* have the upper edge of the ninth tergite, viewed in profile, somewhat more abruptly, less gradually, sloping to the apex (figs. 27, 29) than have females of *similis.* This character may be difficult to judge, and it is not always constant, as one of two females of *similis* from Clydesdale, although agreeing with *similis* in other characters, has this edge more as in *vittatus.* The ovipositor and spermatheca in both species are virtually alike (figs. 5, 30).

Typically striped individuals of *vittatus* and *similis* (and typical ones of both forms have essentially the same dorsal pattern, although some specimens of *similis* have green stripes) can be distinguished readily by the fact that the spongy pink or green lateroventral stripe on the deflexed sides of the elytra (not visible when viewed from above) is long in *similis* and short or doubled in *vittatus;* it is the same length and width as the dorsal stripes in *similis,* but extends in *vittatus* from the base of the elytra only so far as the metasternum or as the first or second abdominal segment. (This is perhaps the most reliable of the character differences given in table 1.) All but one of the 247 specimens of *vittatus* I have examined, whether with or without the dorsal stripes, have at least a trace of a lateroventral stripe, but about 14 of 254 *similis* lack it (variety D in table 3). Therefore, when this lateral stripe is absent, other characters in table 1 must be used.

Table 2 gives the description and distribution of the varietal phases found in all the specimens of *vittatus* examined, but first I wish to make a few general remarks on the variability in color, striping, and vestiture of the specimens recently collected by C. Vaurie, T. Farr, and myself. The series from Christiana (67 males and 52 females) presents many color combinations on the elytra: a white center stripe and two pink dorsal stripes; a white center stripe and yellow dorsal stripes; a white center stripe and no dorsal stripes; a green center stripe and pink dorsal stripes;

TABLE 2

DISTRIBUTION OF THE VARIETIES OF *Exophthalmus vittatus*

Parish (see Fig. 1)	Locality	Variety and Number of Specimens
Hanover	Lucea	E (1)
Westmoreland	Torrington	E (1)
St. James	Mocho to Catadupa ("Sta 16")	A (1), C (2)
	Montego Bay	A (2), E (1)
	Windsor	C (1)
St. Elizabeth	Black River	D (1)
	Malvern	C (1)
	Santa Cruz Mts.	C (1), D (2)
Trelawny	Baron Hill	C (3), D (3)
	Windsor Estate	A (22), C (21)
Manchester	Christiana	A (51), B (19), C (31), E (18)
	Grove Place	E (2)
	Mandeville	A (2), C (4), D (2), E (3)
	Williamsfield	D (7)
Clarendon	Cumberland District	C (1)
	Spaldings	B (1), C (1)
	Trout Hall	C (5)
St. Ann	[No locality]	D (1)
	Claremont	D (1)
	Mt. Diablo	D (2)
	Moneague	D (24)
St. Catherine	Ferry	C (1)
St. Andrew	Bellevue	C (1)
	Constant Spring	C (1)
	Half Way Tree	A (1), C (2)
	Hope Gardens	C (1)
	Kingston	C (1)
	Morce's Gap	B (1)

Variety A; 79 specimens; fig. 9: Each elytron with one rosy, spongy stripe on all or part of intervals 3, 4, 5, extending to or beyond subapical declivity, and with white (or green) sutural stripe of about same length. (Rosy stripe, as in fig. 10, may be shortened, or constricted at sides, or split in two, or, as in 10 specimens, may consist of only a cluster of scales at one place along area of normal stripe.)

Variety B; 21 specimens: Same as A, but with one or more additional intervals hairy-scaly with white, blue-green, or gold hairs, and pronotum hairy.

Variety C; 78 specimens: Same as A, but additional spongy spot of rosy scales (yellow in four specimens, white in three) on sides of ninth interval behind middle, just visible from dorsal view. (Fewer than a dozen specimens with white hairs on intervals or pronotum.)

Variety D; 43 specimens; fig. 11: Same as A, but with two additional rosy, spongy stripes (yellow in six specimens) of unequal length on eighth and ninth intervals. (Three specimens have three additional stripes; two have hairy intervals.)

Variety E; 26 specimens: Elytra without trace of dorsal, colored, spongy stripes but with white scaly sutural stripes or (fig. 12) with many white stripes. (Eleven specimens have one or more intervals with white or gold scales or hairs; a few have hairs on pronotum [fig. 14]; one lacks lateroventral rosy stripe.)

three greenish white stripes, three bluish stripes. All the specimens from Windsor Estate (27 males, 12 females), not far from Falmouth on the north coast, on the other hand, have a green center stripe and pink dorsal stripes, and all from Moneague (15 males, nine females) have a white center stripe (but mostly worn off) and pink (six have yellow) dorsal stripes. The lateroventral stripes are pink or yellow in all the above specimens.

The series from Moneague differs constantly from the other series by having two additional short pink stripes of varying lengths on each elytron near the apex. The specimens from Windsor Estate and from Christiana either have only one very short additional pink stripe or they have no additional stripes. The colored dorsal stripes are found in all stages of development or obsolescence in the Christiana series. The stripes may be full and regular for their entire length, or they may be thinned or obliterated in part along their edges, or they may be considerably shortened, or broken, or represented by a few dashes. In whatever way they are modified, they are the same on each elytron. Only a small proportion of the individuals from Christiana have the scaly hairs on the entire dorsum so dense that the black ground color is hidden; these weevils appear green if the pubescence is green (one specimen), golden if the pubescence is yellow or tawny (three specimens), and gray if the pubescence is white and not very dense (12 specimens). The 16 densely hairy specimens from Christiana happen to be females, many of which we collected mating with scarcely hairy males. The typical rosy dorsal stripes show through the hairs in the majority of these individuals, but in a few no dorsal stripes are present.

In table 2, the males and females are not given separately, as there is apparently no correlation between sex and coloration, or sex and striping.

It will be noticed from table 2 that some varieties include (in the parentheses) still other varieties and, of course, a different choice of characters would create different varieties.

SYNONYMY: I have not seen the types of either *jamaicensis* Bovie or *pulcher* Brown. The former is in the United States National Museum. The latter probably no longer exists; it is not in the British Museum nor, according to J. Balfour-Browne of the British Museum who kindly pursued the matter for me, is it in the Hunter collection in Glasgow where supposedly some of the Yeats collection were sent. (Brown's specimen was from the collection of Yeats.) However, the descriptions by both Bovie and Brown, as well as the colored illustrations by Brown (1776), Herbst (1795), and Olivier (1808), are of a large black weevil with six long, white, scaly, discal stripes on the elytra on alternate intervals, the inter-

vening intervals being bare and black, and a double sutural white stripe. There is no mistaking this "charanson superbe" (Olivier, 1790) in its typical dress (fig. 12), but it seems to me to be only a variety of *vittatus* (variety E in table 2). Of three white-striped specimens of this phase, all have the short, rosy, lateroventral stripe as in typical *vittatus,* also a short dash of white scales subapically on the ninth elytral interval (Olivier, 1808, pl. 12, fig. 150, shows both the stripe and the dash), and clumps of white scales on the sides of the body below. Two of these specimens (from Torrington on the southwestern coast and from Montego Bay on the northwestern coast) are typical of the figures of Brown, Herbst, and Olivier, but the third specimen (from Lucea on the northwestern coast), although of the same size and color as the other specimens and with similar male genitalia, differs by having white scales covering nearly the entire elytral disc, with 12 instead of six discal intervals white and only the black of the striae separating them. The white stripes of these weevils appear solidly white because their scales are dense and overlapping (fig. 12), whereas some of the more sparsely clothed weevils appear gray because the black ground color is exposed through the white hairs or scales (fig. 14).

The "mutant" or "subspecies" names used by Cockerell (*musae, virescens, inornatus, rubrovittatus*) were, he says (1893, pp. 374–375), "based on specimens in the British Museum, but a good series of varieties is to be found in the Museum of the Institute of Jamaica." These appear to be merely color varieties for which no types were designated; the "subsp. *rubrovittatus* Jek.," is evidently a manuscript name representing individuals with two additional short stripes on each elytron, as in specimens that I collected at Moneague and Claremont (see variety D, table 2, and fig. 11).

Specimens Examined: *Hanover:* Lucea, July 21, 1960 (P. and C. Vaurie), one male. *Westmoreland:* Torrington, July 18, 1960 (P. and C. Vaurie), one male. *St. James:* Snug Harbor, Montego Bay, August 1, 1910 (E. A. Andrews), one male, two females; Sta[tion]. 16 [between Mocho and Catadupa, according to Blackwelder, 1943], July 19, 1935 (Chapin and Blackwelder), three males; Windsor [Lodge or Castle?], August 11, 1941 (Lynn), one male. *St. Elizabeth:* Black River, September, 1913, one female; Santa Cruz Mountains, 1500 feet, October, 1899 (C. B. Taylor), one male, two females; Malvern (Petrunkevitch), one male. *Trelawny:* Windsor Estate, 12 miles south of Falmouth, August 23, 1955 (Farr), three males, one female, July 20, 1960 (P. and C. Vaurie), 27 males, 12 females, on citrus trees; Baron Hill, four females, November 9 (L. Perkins), two males. *Manchester:* Mandeville, 2250 feet, November, 1919,

January, 1920, two males, one female, April, 1937 (C. Roys), two males, May, 1958 (F. S. Coon), one female; (A. E. Wight), two males, three females; Williamsfield, June 12, 1931 (M. Kisliuk), four males, three females "on citrus leaves"; Grove Place, June 24–25, 1960 (T. Farr), one male, one female; Christiana, 3000 feet, July 15–17, 1960 (P. and C. Vaurie), 67 males, 52 females, mating on citrus trees. *Clarendon:* Spaldings, Knox College, June 11, 1949 (L. A. Jones), two females; Trout Hall, near Chapelton, June 12, 1931 (M. Kisliuk), four males, one female "on grape fr. & orange leaves"; Cumberland District, 3000 feet, December, 1919, one female. *St. Ann:* Claremont, July 2, 1960 (P. and C. Vaurie), one male; 3 miles south of Moneague, July 23, 1960 (P. and C. Vaurie), 15 males, nine females, mating on citrus; Forest Reserve, Mt. Diablo, May 24, 1956, June 18, 1960 (T. Farr), two males. *St. Catherine:* Two miles west of ferry, Red Hills Road, October 1, 1957 (T. Farr), one male. *St. Andrew:* Constant Spring, 650 feet, February, 1920, one female; Half Way Tree, Ellesmere Road, September 27, 29, October 3, 1946 (C. Lawrence), two males, one female; Kingston, one male; Hope [Gardens], April (A. H. Ritchie), one male; Morce's Gap, June, 1948 (Goin), one female; Bellevue, September 10, 1928 (C. R. Orcutt), one female.

Specimens located as to parish only: *St. Ann:* September 14, 1917 (H. Morrison), one male.

Exophthalmus similis Drury

Figures 1–3, 5, 7, 13, 14, 20, 21, 27, 30

Curculio similis DRURY, 1773, index and p. 62, pl. 33, fig. 5 (Jamaica; type in the British Museum).

Curculio rufescens DRURY, 1773, index and p. 61, pl. 33, fig. 4 (Jamaica; type in the British Museum).

Curculio Cameleon OLIVIER, 1790, p. 543 (Jamaica; type probably in Paris).

Prepodes amabilis WATERHOUSE, 1878, p. 309 (Jamaica; type in the British Museum). New synonymy.

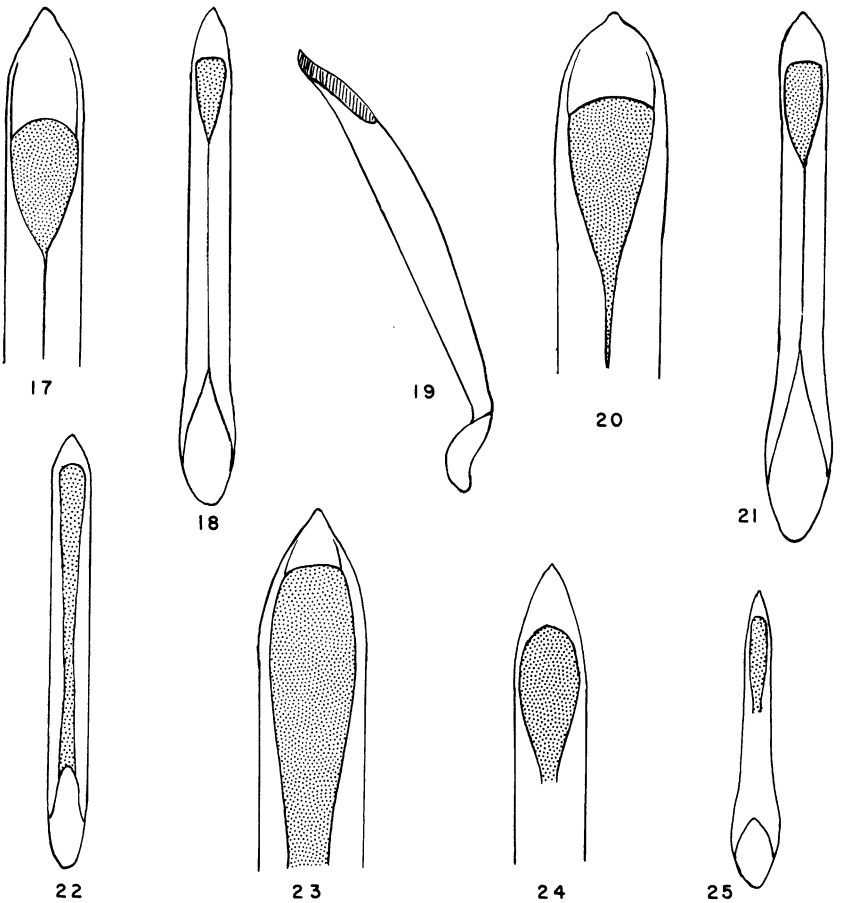
Praepodes vittatus subsp. *amabilis* Mut. *bicolor* COCKERELL, 1893, p. 375 (Jamaica; no type designated). New synonymy.

DIAGNOSIS: Differs from the otherwise very similar *vittatus* by having a broader, much longer, lateroventral, spongy stripe of green, tawny, or rosy hairs, and from *impressus* by having an unspotted pronotum, more bulbous prosternal process, wider mesosternal process, and different genitalia (see also table 1).

RANGE: The island of Jamaica (fig. 1), chiefly in the eastern end. (See below for data on the 254 specimens examined.)

DESCRIPTION: Length, 15 to 31 mm. Ground color black, elytra usually with colored longitudinal dorsal and lateroventral stripes of metallic

green, tawny, or rosy hairs or scale-like hairs, but stripes may be lacking; additional variously colored hairs may be present on pronotum, head, beak, and elytra.



FIGS. 17–25. The penis in *Exophthalmus,* showing enlargement of apical half; dorsal views except for figure 19. Shaded parts represent apical orifice. 17–19. *E. vittatus.* 20, 21. *E. similis.* 22, 23. *E. impressus.* 24, 25. *E. farr.*

Venter, beak, antennae, pronotum, scutellum, prosternum, and mesosternum as in *vittatus.* Elytra with dorsal and lateroventral stripes lacking in 12 of 178 specimens, lateroventral stripe, when present, extending as far as fourth or fifth abdominal segment, or convergent with dorsal stripe, humeri right-angled and bulging (fig. 2), but scarcely bulging in some

specimens (fig. 3), sides and apices of elytra as in *vittatus*. Genitalia of male as shown in figures 20 and 21; of female, in figures 5, 7, 27, 30.

DISCUSSION: A number of errors are associated with the names used for this form. In the first place, Drury's two names (*similis* for specimens speckled with golden green, and *rufescens* for those of a dull, coppery color), although properly proposed, and the species described and illustrated, were considered for many years to be synonyms of *cameleon,* a form that was actually described nearly 20 years later by Olivier. Olivier illustrated *cameleon* as having green dorsal stripes, and before his description (1790, p. 543) gave reference to both of Drury's forms as if they were synonyms of *cameleon.* Herbst (1795, pl. 67, figs. 8–10) repeated Olivier's figure of *cameleon,* also what appear to be Drury's figures of *similis* and *rufescens* (although turned in the opposite direction on the page), and he also considered the latter two as varieties of *cameleon.* We can only surmise that these authors thought the name *cameleon* was more appropriate for such a variably colored beetle.

The second error was made by Herbst (1795), Fabricius (1801), and Schoenherr (1834), all of whom attributed the name *cameleon* to Fabricius, 1792, instead of to Olivier, 1790, and this combination has been followed by others, including Gemminger and Harold (1871), Lona (*in* Junk, 1938), and Blackwelder (1947). Even Olivier himself in 1807 referred to Fabricius but this reference may have been bibliographical. I see no reason why the name *cameleon* should be attributed to Fabricius, and agree in this instance with Sherborn (1902, p. 199) who gives Olivier, 1790.

The third nomenclatorial complication is that the name *Curculio rufescens* Drury was, for some reason, dropped by many authors, although it appears in Gemminger and Harold (1871, p. 2232) and in Sherborn (1902, p. 846). The modern catalogues (Junk, Blackwelder), make no mention of *rufescens* Drury, but list an *Exophthalmus rufescens* Boheman, 1840, from Guadeloupe, described originally in the genus *Diaprepes.* There are now, therefore, actually two forms named *rufescens* in the genus *Exophthalmus,* but, pending a revisional study of *Diaprepes* and allied genera, it would be unwise at this time to give a new name to Boheman's species.

Of 254 specimens of *similis* examined, none has been found with truly yellow markings as in *vittatus* (the marks may be tawny or ochraceous). Furthermore, no specimens have been seen with additional colored stripes or spots on the outer intervals of the elytra, nor any with the suture white-scaled as in most *vittatus.* Green-striped individuals, on the other hand, which are common in *similis,* are evidently rare in *vittatus.*

TABLE 3

DISTRIBUTION OF THE VARIETIES OF *Exophthalmus similis*

Parish (see Fig. 1)	Locality	Variety and Number of Specimens
Hanover	Jerico	A (1)
Manchester	Mandeville	A (17)
St. Catherine	Linstead	A (1)
St. Mary	Carron Hall	C (11)
	Port Maria	C (1)
St. Andrew	Cinchona	A (1)
	Clydesdale	D (2)
	Hardwar Gap	D (1)
	Hermitage Reservoir	A (6), B (23), C (1)
	Hope Gardens	A (1)
	Kingston	C (1)
	Liguanea Plain	B (1)
	Mavis Bank	D (1)
	Middleton Estate	A (1)
	Newcastle	D (1)
	Newcastle Road	C (1)
	Second Breakfast Spring	C (1)
	Stony Hill	A (7), B (2)
	Stony Hill (Belmont)	C (1)
	Strawberry Hill	D (4)
	Strawberry Hill (Irish Town)	D (3)
	Upper Mountain View	B (1)
	Woodcutter's Gap	C (1)
St. Andrew or St. Catherine	Above Rocks District	C (5)
Portland	Cedar Valley	A (1)
	Green Hills	D (1)
	Hardwar Gap to Dicks Pond	B (1)
	Hector's River	A (3)
	Port Antonio	A (16), B (1)
	Priestman's River	A (1)
	[No locality]	A (1)
St. Thomas	Arntully	A (1)
	Bath	A (30)
	Cuna Cuna	A (2)
	Golden Grove	A (91), B (2)
	Morant Bay	A (1)
	Pleasant Hill	D (1)
	Road to Corn Puss Gap	A (2)
	Whitfield Hall, Blue Mts.	A (1)
	Yallahs Hill	A (1)

Variety A; 186 specimens: Each elytron with dorsal and lateroventral spongy stripes tawny or rosy, and with a green or blue sutural stripe; all stripes of about same length. (White or gold

When Waterhouse (1878, p. 309) described the green-striped *amabilis* [= *similis*], he said, "If this species varies as much in colour as does *P. vittatus,* there will be little to separate it but the more prominent shoulders and the stronger punctuation." With many more specimens available, I find no significant difference in punctuation, but the angulation of the shoulders is quite unmistakable in the majority of specimens (fig. 2), although in a few the angle is rather oblique as in *vittatus* (fig. 3). Waterhouse was the first author to mention any differences between these weevils besides color. He noticed also that "*amabilis*" always (except where worn) had little blue or green scales in the depths of the elytral punctures which were lacking in *vittatus.* I have, however, seen pale orange or whitish scales in *vittatus.* The differences in the male and female genitalia are discussed above under *vittatus.*

The majority of specimens collected personally are of the rosy-striped variety that resembles *vittatus,* only one specimen being black with green stripes (from Hermitage Reservoir, St. Andrew Parish), although the stripes are not so bright a red as in some individuals of *vittatus.* It will be noticed in table 3 that the majority of all specimens examined are also of the rosy-striped variety (variety A). This variety, probably because it has been confused with *vittatus* in the past, is mentioned in the literature only twice among the varieties of *similis,* once by Waterhouse as a variant of his *amabilis* [= *similis*], and once by Cockerell as his variety *bicolor.* All but a few of the specimens collected personally were taken on quick stick (*Gliricidia*) or maiden plum (*Comocladia*). The others (some from Hermitage Reservoir) were collected on citrus, and a single female from Hardwar Gap, St. Andrew, was taken from an unknown weedy shrub in the woods. This last specimen is covered with white hairs and resembles a female of *vittatus* from Christiana, Manchester Parish, but differs by having the shoulders more bulging and the elytral punctures metallic green within their centers. Specimens collected by other people from different localities show additional variations which are described and tabulated in table 3.

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hairs also present in seven specimens; green color on suture is faded to whitish in some specimens; suture with gold scales in one specimen.)

Variety B; 30 specimens: Same as A, but dorsal stripe prolonged and convergent with prolonged lateroventral stripe, as in figure 13.

Variety C; 23 specimens: Each elytron with dorsal, sutural, and lateroventral stripes of metallic green, or green-blue, or gold scales. (One specimen also covered with green and gold hairs.

Variety D; 14 specimens; figure 14: Elytra without trace of either dorsal or lateroventral spongy stripes, but with white or white-gold hairs in all but five specimens, these five being bare and black.

SYNONYMY: Much of the synonymy is explained above. Of the remaining names, *amabilis,* although I have not seen Waterhouse's type, is evidently my variety C (table 3), with green stripes. Cockerell's *bicolor* is my variety A, with rosy stripes, and his *concolor* is my variety D, without stripes. Cockerell, however, placed his two varieties as mutations of *amabilis,* which he considered a subspecies of *vittatus.* It is curious that Waterhouse does not mention either of Drury's species (*similis* and *rufescens*); perhaps he knew of them but did not consider them because they had no stripes.

SPECIMENS EXAMINED: *Hanover:* Jericho (R. Bengry), one female. *Manchester:* Mandeville (A. E. Wight), 11 males, six females. *St. Catherine:* Linstead, September 14, 1917 (H. Morrison), one male. *Border of St. Catherine and St. Andrew:* Above Rocks District, September 16, 1917 (H. Morrison), two males, three females; *St. Mary:* Carron Hall, July 9, 1952 (W. St. John), four males, seven females; Port Maria, September, 1946 (L. Perkins), one female. *St. Andrew:* Stony Hill, 1937 (M. Bovell), five males, two females, October 16, 1946 (G. Thompson), one female, July 5, 1957 (R. Bengry), one female; Stony Hill, Belmont, May 24, 1942 (B. Fletcher), one female; Hermitage Reservoir, July 24, 1960 (P. and C. Vaurie), 17 males, 13 females, on *Comocladia* and on *Citrus;* Kingston, September 8, 1917 (H. Morrison), one female; Upper Mountain View, September 26, 1947 (C. B. Lewis), one female; Hope [Gardens], July 2, 1935 (Blackwelder), one female; Liguanea Plain, November–December, 1911 (C. T. Brues), one male; Strawberry Hill, Irish Town, August, 1952 (L. Bird), one male, two females; Strawberry Hill, July 25, 1951 (H. K. Henry), four males "on Hibiscus"; Second Breakfast Spring, September, 1954 (T. Farr), one male; Hardwar Gap, July 13–15, 1960 (P. and C. Vaurie), one female; Hardwar Gap to Dicks Pond, April 22, 1948 (R. Bengry), one female; Woodcutter's Gap, July 15, 1951, one male; Newcastle, one male; Newcastle Road, May 24, 1960 (Farr), one male; Clydesdale, July 27, 1941 (B. Lewis), one female, August 20, 1942 (Perkins), one female; Cinchona, August, 1884, one male "on European Apple"; Mavis Bank, August 8, 1949 (D. McCord), one male; Middleton Estate, Hope River, October 30, 1956 (Farr and Bengry), one female. *Portland:* Cedarhurst [now Cedar Valley], July 30, 1905, one female; Green Hills, June, 1952 (I. Sibley), one female; Port Antonio, March, 1955 (B. Heineman), two males, two females, December (A. E. Wight), eight males, three females, January to April, 1906 (Van Duzee), two males; Pristman's River, January 18, 1952 (A. Rugless), one female; Hector's River, April, June, 1951 (I. Sibley), one male, two females. *St. Thomas:* Whitfield Hall, Blue Mountains, 4500 feet, Aug-

ust 13–20, 1934 (P. J. Darlington), one female; Arntully (Orcutt), one male; Yallah's Hill, April 7, 1956 (Farr), one male; Morant Bay, January12, 1950 (Bengry), one female; Bath, 170 feet, February, July, August, 14 males, 16 females; Cuna Cuna, 1600 feet, July 26, 1941 (W. G. Lynn), two females; Golden Grove, July 26, 1960 (P. and C. Vaurie), 46 males, 47 females, on *Gliricidia sepium;* Pleasant Hill, Coffee Mills, June 13, 1931, one male "on coffee leaves"; road to Corn Puss Gap, August 5, 1960 (Farr), two males.

Specimens located as to parish only: *Portland:* July 1, 1960 (Farr), one female.

Exophthalmus impressus Fabricius

Figures 5, 8, 15, 16, 22, 23, 28, 31, 32

Curculio impressus FABRICIUS, 1781, p. 192 (Jamaica; type probably in Europe).

Praepodes impressus Mut. *albescens* COCKERELL, 1893, p. 374 (Jamaica; type not designated). New synonymy.

Praepodes impressus Mut. *roseomaculatus* COCKERELL, 1893, p. 374 (Jamaica; type not designated). New synonymy.

DIAGNOSIS: Distinguishable in its typical spotted form from most other West Indian species by having five pairs of large, round, distinct, impressed spots (pink, white, or yellow) on the black or reddish elytra. If the spots are fused into longitudinal stripes, *impressus* still differs by having at least six impressed colored spots on the pronotum. Differs further from *vittatus* and *similis* from Jamaica by having slightly different processes betwee the coxae and different male and female genitalia.

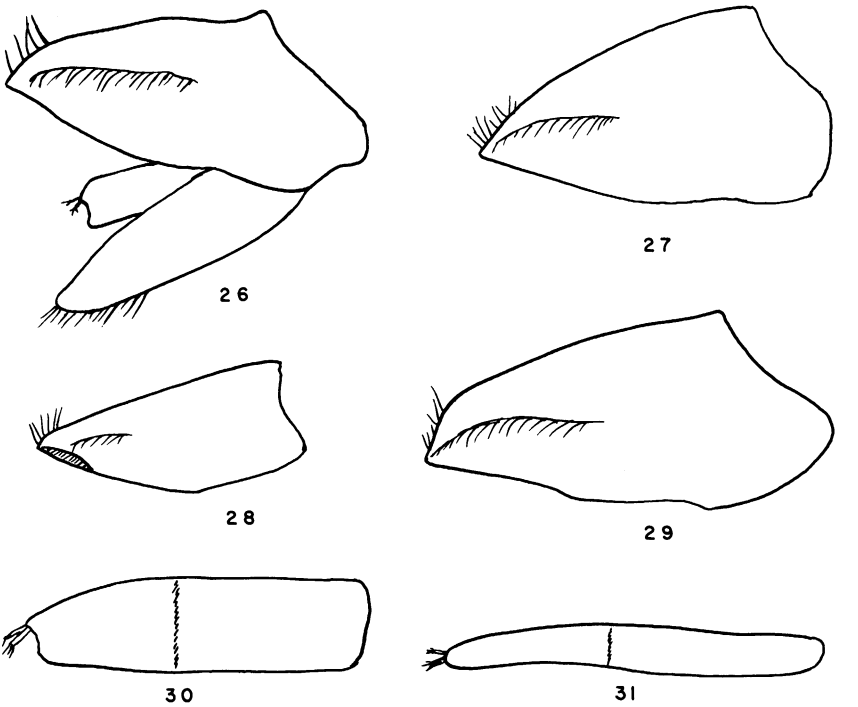
RANGE: Jamaica, probably most of the island (fig. 32). (For the 28 specimens examined, see below.) Thomas Farr (personal communication) reported three examples from Brixton, near Mocho, Clarendon Parish, and from Innswood, St. Catherine Parish, which I have not examined.

DESCRIPTION: Length, 18 to 25 mm. Ground color black, with densely hairy, pink, white, or yellow dorsal spots on pronotum and elytra and on sides below, or with the elytral spots merged into a solid line of color.

For general pattern, see figures 15 and 16. Pattern below consisting of a colored, longitudinal, hairy stripe on sides of prosternum, spots or stripes on metasternum and on sides of abdomen, especially on first segment; deflexed sides of elytra with five or six large, round spots and occasional smaller spots, or spots merged into entire or broken stripe; sides of head, legs, parts of venter, sides of elytra and/or sutural area with bluish or whitish hairs.

Beak as in *vittatus,* but white or bluish hairs usually confined to a lon-

gitudinal shallow furrow extending from each eye to near apex of beak. Antennae with second segment of funicle distinctly longer than first, third segment of same length as each of following segments. Pronotum shallowly, finely punctate, narrowly impressed at middle or impressed at



FIGS. 26–31. Parts of female genitalia and abdominal segments of *Exophthalmus,* lateral views, left side. 26. *E. vittatus,* ninth tergite (above) and ninth sternite (below) enclosing ovipositor. When tergite and sternite are closed, ovipositor is hidden. 27. Ninth tergite of *E. similis;* characteristic also of *Diaprepes abbreviatus.* 28. Ninth tergite of *E. impressus;* characteristic also of *E. farr* and *E. quadrivittatus,* showing open instead of compressed apical portion. 29. Ninth tergite of *E. vittatus.* 30. Ovipositor of *E. vittatus;* characteristic also of *E. similis* and *E. farr* (but *farr* is smaller). 31. Ovipositor of *E. impressus.*

middle near apex and at base, with four impressed, hairy spots across center and two on sides of apex (some specimens have a cluster of scales on the hind angles which give appearance of additional spots). Scutellum as in *vittatus.* Elytra with humeri oblique, sides rounded off, not carinate, apices in males more acuminate than in males of *vittatus.*

Prosternum with large process between coxae rather bulbous, not so flat as in *vittatus.* Mesosternal process between middle coxae broader than in *vittatus,* as broad at its apex as nearly one-half of diameter of each coxa. Genitalia of male as shown in figures 22 and 23; of female, as in figures 5, 8, 28, 31.

DISCUSSION: The impressed spots of this colorful "polka-dot" weevil are a beautiful rosy pink in freshly collected individuals, although the type was described as having them white, and I have seen other, probably faded, specimens that are white. Some individuals (from Greenwood,

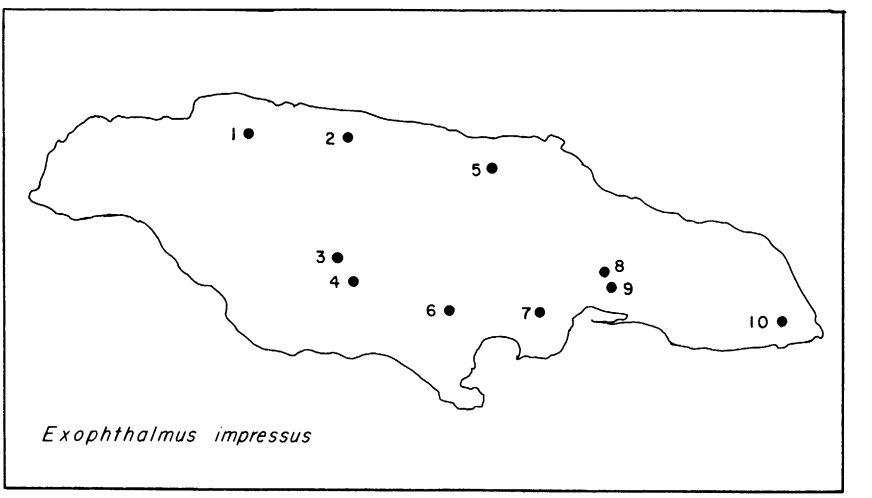


FIG. 32. Distribution of *Exophthalmus impressus* in Jamaica. 1. Greenwood, St. James. 2. Stewart Town, Trelawny. 3. Mile Gully, Manchester. 4. Mandeville, Manchester. 5. Lodge, St. Ann. 6. Brixton, Clarendon. 7. Innswood, St. Catherine. 8. Stony Hill, St. Andrew. 9. Hermitage Reservoir, St. Andrew. 10. Bath, St. Thomas.

Mandeville, Stewart Town) have the impressed portions yellow, a color phase found also in *E. vittatus, quadrivittatus, pictus, mannerheimi,* and probably others of the genus. Although all examples of *impressus* examined have the typical six (or eight) spots on the pronotum, some have the elytra not spotted, but striped as in *similis,* that is, with a broad dorsal and a broad lateroventral stripe on each elytron, the stripes confluent apically. One of two females from Stewart Town shows a transition from spots to stripes, or vice versa, because this specimen has four basal spots on the elytra, but the remainder of the elytra striped. (See table 4 for varieties.)

A series of 10 males and eight females were collected July 24, 1960, by C. and P. Vaurie and Thomas Farr on the road to Hermitage Reservoir north of Kingston (between Constant Spring and Stony Hill) on a species of *Comocladia,*[1] or maiden plum, of the cashew or sumac family (Anacardiaceae). Many of the weevils were mating on the pinnate leaves in the crowns of these slim trees which were about 15 feet high. We either bent the trees over until we could reach the beetles by hand

TABLE 4

DISTRIBUTION OF THE VARIETIES OF *Exophthalmus impressus*

Variety	Description	Locality[a] and Number of Specimens
A	Each elytron with five or more rosy dorsal spots, faded to white in some specimens (fig. 15)	Mandeville, Manchester (2); Brixton, Clarendon (1); Innswood, St. Catherine (2); Stony Hill, St. Andrew (2); Hermitage, St. Andrew (18)
B	Each elytron with a dorsal tawny or yellow solid stripe	Greenwood, St. James (1); Stewart Town, Trelawny (1); Mile Gully, Manchester (1); Lodge, St. Ann (1); Bath, St. Thomas (1)
C	Each elytron with two yellow dorsal spots at base and a yellow stripe to the apex (fig. 16)	Stewart Town, Trelawny (1)

[a] The parishes are listed from west to east, as on map (fig. 32).

or by net, or, if the tree was too high, we shook it vigorously, at which the weevils either fell to the ground or flew off. A week or so later (about the end of July), the "polka-dots," according to information received from Farr, were no longer in the area. A specimen from the collection of the Department of Agriculture in Jamaica was found on citrus, the preferred food plant of *vittatus,* at Lodge, St. Ann Parish.

At least two other Antillean species may be spotted, although their spots are usually partly merged or indistinct. These species are *hieroglyphicus* Chevrolat and *sphacelatus* Olivier, both from the island of Haiti (often called Hispaniola). They differ from *impressus,* however, by hav-

[1] Identified by Miss Dulcie Powell, botanist at the Institute of Jamaica.

ing the humeri of the elytra right-angled, not oblique, the scutellum elongate and not impressed, the pronotal spots fewer in number, not impressed, or the spots fused into vittae. Leng and Mutchler (1914, p. 469), Gowdey (1926, p. 25), and Blackwelder (1947, p. 804) list *sphacelatus* as occurring in Jamaica as well as in Haiti, but I believe such listing an error that probably arose from the inclusion by Herbst (1795, pl. 67, figs. 11, 12) of two colored illustrations of *impressus* from Jamaica, one of which (fig. 12) is unmistakably *sphacelatus.* Olivier himself (1807, p. 319) says that he had at first confused his *sphacelatus* with *impressus,* and it may be that he had so told Herbst, as he and Herbst used some of the same illustrations in their respective works. A smaller species that might have been confused with *sphacelatus* does occur in Jamaica, however, and it is described below. Olivier gives "Saint-Domingue" and "Porto-Rico" as localities for *sphacelatus,* but I have seen specimens from Haiti and the Dominican Republic only.

The genitalia of *impressus* are discussed under Morphology.

SYNONYMY: The "colour mutations" named by Cockerell are apparently synonyms of *impressus.* One is *albescens* with white spots; the other is *roseomaculatus* with pink spots. According to Fabricius' original description, the type of *impressus* has white spots, but Cockerell thought the "typical form" had yellow spots.

SPECIMENS EXAMINED: *St. James:* Greenwood, August 10, 1950 (B. Williams), one female. *Trelawny:* Stewart Town, "V-XI-1937," two females. *Manchester:* Mile Gully, 1955, one female; Mandeville (A. E. Wight), one male, one female. *St. Ann:* Lodge, April 8, 1949 (W. B. Dixon), one female. *St. Andrew:* Stony Hill, 1937 (M. Bovell), two males; Hermitage Reservoir, July 24, 1960 (P. and C. Vaurie), 10 males, eight females, mating on *Comocladia. St. Thomas:* Bath (C. R. Orcutt), one male.

Exophthalmus farr Vaurie, new species

Figures 6, 7, 24, 25, 28, 30, 33

TYPE MATERIAL: Type, male, Kingston [St. Andrew Parish], Jamaica, July 25, 1960, P. and C. Vaurie, collectors, taken on thorn scrub, *Acacia macracantha,* deposited in the collection of the American Museum of Natural History. Paratypes: Seven males and six females with same data as the type, deposited in the American Museum, the United States National Museum, and in the British Museum (Natural History). One male and four females from Washington Boulevard [Kingston], April 24, 1960, T. H. Farr, collector, on *Acacia macracantha,* deposited in the Institute of Jamaica, Kingston.

OTHER SPECIMENS EXAMINED: St. Catherine Parish: Guanaboa Vale, November 13, 1960 (T. H. Farr), one female, "Ex *Acacia macracantha.*" Clarendon Parish: Halse Hall [3 miles south of May Pen], November, 1954 (W. B. D.), one female, April 18, 1956, one male; Hayes, July 20, 1954 (W. B. Dixon), one male.

DIAGNOSIS: This species differs from others of the genus in Jamaica by being smaller, by having the pronotum vittate, not spotted or immaculate, and more convex, and the elytra proportionately shorter, stouter, and more convex, more the shape of the elytra of *Diaprepes abbreviatus.* It differs further in the beak, which has a depression in front of the eye, a transverse ridge subapically, and the front portion bent downward rather abruptly. In the beak, general pattern, and size, it resembles *E. scalaris* Boheman from Cuba, but the male genitalia of *scalaris* are shorter and wider.

RANGE: Known so far from three of the southern parishes of the island of Jamaica (St. Andrew, St. Catherine, and Clarendon). In addition to the type and 18 paratypes, four specimens have beeen examined (see above).

DESCRIPTION OF TYPE, MALE: Length, 14 mm. Ground color black; dorsum with two broad, impressed, longitudinal stripes of lemon yellow, spongy scales extending from front of pronotum to apex of elytra, interrupted on elytral disc in front of middle by two bare, black, triangularly shaped spots; each elytron with white-scaled sutural stripe and with green scales on sides (fig. 33).

Body below entirely covered with white scales except for yellow scales on sides of prosternum in front and for green-blue scales on legs; deflexed sides of elytra with broad, yellow-scaled stripe extending from base to apex of elytra where confluent with dorsal stripe; lateroventral stripe interrupted at basal third and at basal two-thirds by invading bare black ground color; beak, head, pronotum, and elytra with scattered white and blue-green scales through which the ground color shows.

Beak impunctate in center, elsewhere finely punctured, strongly declivous in front of transverse ridge extending across top of beak between points of insertion of antennae; sides of beak angulate and with depression in front of each eye. Antennae with first two segments of funicle of about the same length, segments 3–7 of equal length. Pronotum rather convex, slightly impressed medially, bivittate, surface granular, base bisinuate. Scutellum about as long as wide, rather convex. Elytra with humeri nearly right-angled, sides of disc towards apex slightly carinate, apices projecting as in male of *impressus.* Prosternal and mesosternal

processes about as in *impressus*. Genitalia of male as shown in figures 24 and 25; of female, in figures 6, 7, 28, and 30.

VARIATIONS FROM TYPE: Specimens range in length from 10 to 15 mm. Two specimens have the ground color brown instead of black, and in some the elytral scales are more white than blue-green. In specimens that have some of the colored scales denuded, the general appearance of the insect is darker, less gray. In three specimens examined from Clarendon Parish, the glabrous black spot on each elytron carries over to the edge of the elytra, thus dividing the longitudinal yellow spongy

FIG. 33. Dorsal pattern of *Exophthalmus farr* Vaurie, new species.

stripe into two parts, a variation that occurs also in *E. pictus* from Cuba. In one of the paratypes, the black spot is entirely within the yellow stripe, as is typical of *E. scalaris* from Cuba. The bare spot may be larger or more circular, less triangular in shape, in some specimens, but for weevils of this genus the pattern is remarkably constant. The process between the middle coxae seems narrower in some specimens than in the type, possibly owing to heavier scaling in the type. There is also some variation in the relative lengths of the first two antennal segments, the first segment appearing a trifle longer or shorter in some specimens.

DISCUSSION: It gives me great pleasure to name this form for Thomas H. Farr, entomologist at the Institute of Jamaica, in recognition of his interest in the "fiddlers," and without whose aid this paper probably would not have been written.

As shown in the diagnosis (see also fig. 33), this species differs rather more from the preceding three species than they do from one another. It appears, however, to belong to this genus. The apically bent and basally impressed beak is almost the same as that of *scalaris,* and the vittate pronotum is found in *scalaris,* as well as in *laetus, quadrivittatus,* and *sphacelatus.* I have not examined all the species from the other Antilles, and it is possible, though not probable, that *farr* has already been described from some other island. The fact, however, that the other species of the genus in Jamaica are endemic and that the exceedingly similar *scalaris* from nearby Cuba is nonetheless distinct from *farr* leads me to believe that *farr* does not occur on any other island.

Pending a revision of the genus and an examination of the types, I give below a tentative key to some of the small Antillean species which are readily confused in collections.

KEY TO SOME SPECIES OF *Exophthalmus* FROM THE GREATER ANTILLES

1. Sides of beak in front of eye with elongate depression (between eye and insertion of antennae) 2
   Sides of beak smooth, not depressed in front of eye 5
2. Sides of pronotum and of elytra carinate and undercut by lateral yellow stripes; eastern Cuba ..... *pictus* Guérin
   Sides of pronotum, at least, not carinate (elytra may be slightly carinate) 3
3. Pronotum at center base with two sharp little angles extending backward towards scutellum, each side of disc with two tiny clusters of white scales, one in front of the other; venter with dense scales along center and sides; Dominican Republic; Haiti ..... *mannerheimi* Boheman (in part)
   Pronotum at center base rounded or truncate, each side of disc with a broad yellow or white stripe from base to apex; venter entirely densely scaly (green, white, or yellow scales); Cuba; Jamaica 4
4. Cuba; sides of prosternum with yellow stripe that is visible from above; elytra with glabrous black spots surrounded by yellow scales; deflexed sides of elytra with scaly stripe wide, entire; male genitalia shorter, stouter, more acuminate ..... *scalaris* Boheman
   Jamaica; sides of prosternum without yellow stripe; elytra with glabrous black spots not entirely enclosed by scales; deflexed sides of elytra with scaly stripe broken into two or three pieces; male genitalia as in figures 24 and 25 ..... *farr* Vaurie
5. Pronotum with narrow, impressed, median line that is filled with scales from base to apex, and two entire, longitudinal, lateral vittae; Dominican Republic; Haiti ..... *laetus* Olivier
   Pronotum impressed, if at all, at base only and with two entire, longitudinal, lateral vittae, or with from two to four spots 6
6. Elytra at base with glabrous bare spot surrounded partially or entirely by yellow scales, and on sides near apex (vicinity of ninth interval) with

spot or stripe of scales; Dominican Republic; Haiti; Cuba?; Puerto Rico? ..... *sphacelatus* Olivier[1]

Elytra at base without bare spot among the scales and without additional scaly spots or stripes on sides near apex 7

7. Scape of antennae covered with coarse bristles and appearing very wide; scrobes of antennae ending in front of eye; elytra with sides carinate; pronotum appearing longer than wide, flat; sides of beak below scrobes finely hairy; male genitalia, dorsal view, inclined to left side; Dominican Republic; Haiti ..... *quadrivittatus* Olivier

Scape of antennae normally hairy and of normal width; scrobes reaching to lower edge of eye; elytra with sides rounded off; pronotum wider than long, convex; sides of beak below scrobes hairy and scaly; male genitalia straight; Dominican Republic; Haiti..... *mannerheimi* Boheman (in part)

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[1] Chevrolat's *hieroglyphicus* may be a synonym.

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