WEEVILS WHICH AFFECT IRISH POTATO, SWEET POTATO, AND YAM

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INTRODUCTION

In a previous article the writer discussed three important Andean weevil pests of the potato tuber (Solanum tuberosum). In the present paper a fourth potato tuber weevil is described and notes are presented on three weevils which attack the tubers of sweet potato (Ipomoea batatas) and one which attacks the tubers of the yam (Dioscorea batatas).

WEEVILS WHICH AFFECT IRISH POTATO TUBERS

The native home of the Irish potato is the west coast of South America, and here we find that the crop has a series of characteristic pests which may be easily disseminated in shipments of potatoes. As stated above, the writer has described three of these species in a previous paper. The description of the larva of one of them is now added and a new species described. In order that these weevils may be easily distinguished one from another by the man in the field the following table has been constructed:

<table>
<thead>
<tr>
<th>TABLE OF IRISH POTATO TUBER WEEVILS</th>
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</thead>
<tbody>
<tr>
<td>1. Prosternum grooved for reception of beak; mandibles without deciduous piece; pronotum with a deep median furrow widened angularly at middle and also behind.............................. <em>Rhipopsidius tucumanus</em> Heller.</td>
</tr>
<tr>
<td>2. Prosternum not grooved for reception of beak; mandibles with deciduous piece.</td>
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<tr>
<td>3. Mandibles with tooth beneath; scrobes abruptly and broadly terminated, not extending beneath. .........................................................</td>
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<tr>
<td>4. Mandibles without tooth beneath; scrobes narrowing and extending beneath; prothorax not as wide as elytra, angulate and broadest in front of base. ........................................</td>
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<tr>
<td>5. Prothorax broader than elytra, subquadrate, with sides parallel to apical third, thence strongly narrowed; sides of elytra smooth. <em>Trypoptremnon latithorax</em> Pierce.</td>
</tr>
<tr>
<td>6. Prothorax acutely angulate at sides, widest before base; sides of elytra tuberculate, <em>Trypoptremnon sanfordi</em>, n. sp.</td>
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FAMILY PSEUDURIDAE PIERCE (1914)

Rhigopsidius tucumanus Heller (1906)

This weevil has been recorded by the writer from Tucuman, Argentina; Cuzco, Temuco, and Arequipa, Peru; Oruro, Bolivia; and Ancud or San Carlos and Castro Islands, Chile. The weevil belongs to the subfamily Rhytirhininae and the tribe Rhytirhinini.

FAMILY PSALIDIDAE PIERCE (1916)

Premnotrypes solani Pierce (1914)

This weevil was described from the mountain districts of Peru. It belongs to the subfamily Entiminae and the tribe Ophryastini.

Trypopremnon latithorax Pierce (1914) (Pl. 29, 30)

This weevil was described from Cuzco, Peru. It belongs to the same tribe as Premnotrypes. The ventral tooth of the mandible does not belong to the deciduous piece as stated in the original description.

On June 11, 1914, Mr. H. L. Sanford found several larvae of this species in potatoes from La Paz, Bolivia, collected by Mr. H. T. Knowles, under Federal Horticultural Board No. 2475. On June 20–26 pupae were noticed, and an adult emerged on June 26.

This enables the writer to describe these stages.

LARVA (Pl. 29).—Length 12.5 mm. when crawling, 10 mm. when slightly curved. It is typically rynchophorid in form, white, with light reddish brown head and dark mandibles. The essential diagnostic characters are illustrated by the author in Plate 29.

From the base of the head a median pale line passes forward. This is the epicranial suture. It divides behind the frons and forms the two frontal sutures. The frons is subtriangular, rounded behind and margined in front by the epistoma. The epicranial areas are the two large areas at each side of the epicranial suture, further bounded by the frontal suture, the pleurostoma, and the hypostoma. In front of the frons is the clypeus, and in front of this is the labrum. The clypeus and labrum partly overlap the mandibles which arise at the side of the clypeus based on the pleurostoma. Below the hypostoma at the sides of the mandibles arise the maxillae, of which the cardo is a very large basal area. Located on the median line below the mouth opening, which is covered by labrum and mandibles, is a shield-shaped area known as stipes labii. Below and around this is the large basal area consisting of mentum and submentum.

There is a small abortive branch of the frontal suture extending back on the epicranium, on each side of and not far from the epicranial suture. It is terminated by a setigerous puncture. On the epicranium there are setae arranged as follows on each lobe: One at terminus of branch of frontal suture, one on the frontal suture, two opposite middle of frons, one basal, two discal, one opposite base of mandible, two on hypostoma. On the frons there are three pairs of setae, the two posterior pairs being about equidistant, the anterior close to the antennae. At base of clypeus there are four tiny hairs. On labrum are four subbasal, six subapical, and six marginal hairs. The mandibles have one hair each. The maxillae are provided with two-jointed palpi (Pl. 29, F), and a very broad setose lacinia, two setae near base of palpi and one near base. Some of the hairs are clavate as shown in the illustration, but this is not always true, some specimens having normal hairs. The stipes labii has one pair of hairs. Each lobe of the mentum has one pair.

The pronotum is simple, undivided; the mesonotum and metanotum are composed of praescutum and scutoscutellum. The first six abdominal sclerites are composed of a spindle-shaped praescutum, a transverse scutum terminated by the spiracles, a spindle-shaped scutellum, and a transverse postscesscutellum very greatly narrowed on the dorsum. The praescutum has a few hairs. The scutellum has a row of hairs. Just above each spiracle is a tiny hair. On each epipleural lobe beneath the spiracles there is one hair. There are eight abdominal spiracles and one on the mesothorax. The seventh and eighth segments are more crowded than the preceding. The ninth and tenth are small and reduced.

**Pupa (Pl. 30).—**Length 10 mm., white. The most interesting features of this pupa are the rudimentary wing pads seen only when the elytra are spread. The elytral pads are not as large as often found in weevil pupae. The antennae are not geniculate. The beak is short. There are five pairs of hairs located on the head and beak as illustrated. On the thorax, which is subquadrate with truncate angles, there are setigerous tubercles as follows: Four on anterior margin, two antemedian and two postmedian on the disc, two pairs of antemedian and two pairs of postmedian on lateral margin. Mesonotum and metanotum with one pair of setae each. The first abdominal segment has two pairs of setae, and the remaining segments have a long line of setigerous tubercles. Each femur has two apical hairs, and a few ventral hairs are found as illustrated. It is interesting to note that the processes of the ninth segment are acute but reduced almost to the size of the tubercles. The tenth segment is ventral to the ninth.

**Trypopremnon sanfordi, n. sp. (Pl. 28)**

Described from a single specimen collected in quarantine by Mr. H. L. Sanford September 24, 1915, from a potato tuber sent by Mr. O. F. Cook from Cuzco, Peru. The excellent illustrations of the type (Pl. 28) were made under the writer’s supervision by Mr. H. B. Bradford.

Length 8 mm., greatest breadth 4.5 mm. Beak longer than head and narrower than eyes; the dorsal squamose portion being gradually narrowed from eyes to nasal plate. Alae strongly flared, making the scrobes open above. Head tumid above the eyes. Median line slightly depressed on head, strongly in frontal fovea, and very faintly on beak except just behind nasal plate. Lateral depressions on beak strong. Apex of beak brownish black, with nasal plate polished, convexly raised around margin, emarginate at apex. Mandibles shining brownish black; deciduous piece reddish brown, lightest at tip, moderately long, arcuate, with sharp edges; the ventral tooth is not as acute as in *T. latithorax*; there is a slight denticle on the right deciduous piece, and the left mandible is denticulate as shown in the figure. The antennal scrobes are strongly flexed downward, very much broadened and evanescent below; scape clavate; funicle with first two joints elongate, the others progressively shorter, the last moniliform; club as long as the four preceding joints. Head, beak, and scape densely clothed with fine silky-bronze scales, and with scattered white setae; funicle sparsely setose; club minutely pubescent, sparsely setose.

Prothorax basally truncate, slightly broadly emarginate at middle; apically sinuate; with very strong supraocular lobes, which have vibrissae on the inner surface; surface coarsely irregularly punctured, finely densely squamose with golden metallic scales, sparsely setose with white curved setae; surface very uneven, with median depression bordered by antemedian ridges and two postmedian tubercles; sides prominently produced by two angulate tubercles; widest at posterior tubercles. Elytra at base narrower than thorax; humeri tuberculate; sides subparallel but very roughly tuberculate, abruptly narrowed at posterior declivity which is nearly perpendicular. Scutellum triangular. Surface densely minutely squamose, sparsely

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1 Recorded under Federal Horticultural Board No. 4348.
setose; striae irregular, with strong isolated punctures; entire surface covered with tubercles which are largest on the third, fifth, and seventh intervals.


Type.—Cat. No. 21613, United States National Museum.

**WEEVILS WHICH AFFECT SWEET-POTATO TUBERS**

At least four species of weevils attack the tubers of the sweet potato—namely, *Euscepes batatae* Waterhouse, *Cylas formicarius* Fabricius, *C. turcipennis* Boheman, and *C. femoralis* Faust. The adults of *Euscepes* and *Cylas* can not be confused. Those of *Cylas* are differentiated as shown in the "Table of sweet-potato weevils of the genus *Cylas*," p. 605. The pupae of *Cylas* can be recognized from the fact that the direction of the appendages is anteriad, while in *Euscepes* it is posteriad. Reference to the illustrations will be of great assistance in separating them. The larvae can not be so easily distinguished, as both are of the same general shape. It will be noticed, however, that they have quite a different system of abdominal folds. The larva of *Euscepes* is more compact. That of *Cylas*, when alive, is often attenuate and tightly drawn so that no folds can be distinguished. When killed in a liquid which shrinks it slightly, however, it will be noticed that the praescutal areas are proportionately larger and often subdivided transversely. The praescutum of *Euscepes* is not subdivided. This sclerite is the anterior sclerite of a segment and almost always has a few tiny hairs. The only other dorsal sclerite with hairs is the scutellum. In *Cylas* the scutellum adjoins the praescutum, and the scutum is only lateral. In *Euscepes* the scutellum is separated from the praescutum by the scutum.

**FAMILY APIONIDAE**

**LE CONTE (1876)**

**SUBFAMILY CYLADINAE PIECE (1916)**

**GENUS CYLAS LATREILLE (1802)**


Type.—*Cylas brunneus* Fabricius, monotypic.

This genus contains twenty named species, of which two are widely known under the names *formicarius* and *turcipennis*. There is considerable confusion about these two species, due in part to the claims of Le Conte and Faust that they are synonymous. Fabricius described a piceous-brown Indian species with reddish thorax as *formicarius*; Olivier illustrated the species as almost pink but described it as brownish; Schönerr cited it as piceous; Gyllenhal described a species from Java with greenish-blue elytra, red thorax, and black head as *turcipennis*; Labram and Imhoff illustrated a blue species under this name. Finally Wagner presented an illustration of a species with green elytron as *turcipennis*, and he probably is right. The bluish species was named *elgàntulus* by Summers. It is a common sweet-potato weevil. If it
should prove to be a variety of *formicarius* as here treated, after examination of the type, it must still be considered very distinct specifically from *turcipennis*. The National Museum collection contains six species. Sketches have been made of the side view of the head and thorax of the three species which presumably attack sweet potato, *formicarius* variety *elegantulus* (Pl. 31, A), *femoralis* (Pl. 31, F), and *turcipennis* (Pl. 31, B), and also of *brunneus* (Pl. 31, C-E), which was erroneously recorded by the writer from sweet potato in the Manual of Dangerous Insects.¹

**Table of Sweet Potato Weevils of the Genus Cylas**

1. Male club twice as long as funicle or longer; antennae as long as head and thorax; head not more than one-fifth shorter than beak; elytra greenish, thorax red, head black, legs red with dark band (Pl. 31, B) ............ *turcipennis* Boheman.

2. Male club half to three-fourths longer than funicle; female club almost one-third shorter than funicle; male antennae almost as long as head and thorax; head one-fourth to one-third shorter than beak; elytra bluish, thorax red, head black, legs red (Pl. 31, A) ............ *formicarius* Fabricius, var. *elegantulus* Summers.

3. Male club half longer than funicle; head as long as beak; antennae as long as thorax plus head behind eye; elytra black with blue or green luster, suture piceous; thorax black, margins piceous; head black; legs dark red with black ring on femora (Pl. 31, F) ........................................... *femoralis* Faust.

**Cylas formicarius** Fabricius (1798)

*Brentus formicarius* Fabricius, 1798, Sup. Ent. Syst., p. 174, no. 5.

Fabricius² gave the following description:

Habitat Tranquebariae.


In altero sexu antennarum clava brevior, ovata.

Olivier and Schönherr described the species as piceous with ferruginous thorax, antennæ, and legs. It hardly seems possible that this can be the same species as the common sweet potato weevil with shiny blue-black elytra, red thorax and appendages, and black head and beak.

For this reason it is considered best to apply to the sweet-potato weevil a name which certainly applies to it—*elegantulus* Summers. In order that economic entomologists may not be inconvenienced greatly, and in deference to the many writers who have assigned Fabricius's name to the sweet-potato weevil, *elegantulus* may be considered as a variety of *formicarius* until there can be an examination of the type.

**Cylas formicarius elegantulus** Summers (1875), the Sweet Potato Weevil (Pl. 31, A; Pl. 32, A, B; Pl. 33, E-H; Pl. 34, A–D)


¹ Pierce, W. D. A Manual of dangerous insects ... p. 209. 1917. Published by the United States Department of Agriculture, Office of Secretary.

² Fabricius, J. C. Systema eleutheratorum ... v. 2, p. 549. Kiliae, 1801.
This is the common sweet-potato weevil (Pl. 31, A; 32, A, B) with bluish elytra, red thorax and appendages, and black head. The illustration of the adult is drawn from a New Orleans specimen. The side view of head and thorax is from a Hawaiian specimen. There is quite a range of difference in measurements of the species but the analysis of these differences is reserved for a more technical paper now in preparation. The immature stages are described from specimens collected at Victoria, Texas.

**Larva.** (Pl. 34, A-D).—The larva of this species measures from 5 to 8 mm. in length and is white, with light brownish head and darker brown mandibles. The head shield is slightly angulate emarginate behind. From the center of the emargination on the median line the epicranial suture passes forward, separating the epicranium into two parts; this suture divides behind the frons and forms the two frontal sutures. The frons is subtriangular, emarginate at anterior angles for antennae, and emarginate along epistoma for attachment of clypeus. The median line is impressed and darkened. The frons has three pairs of large setae, the posterior pair being closest and the median pair but little more separated. The anterior pair are located very close to the antennal fossae. A tiny pair of setae are located in such a way as almost to form an equilateral triangle with the posterior and median setae.

The epicranial areas are located on each side of the epicranial suture. Each lobe bears the following setae: One very close to the apex of frons, one slightly posterior to this and farther from the median line, one opposite the middle of the frons, one a little farther from the median line on the same line as the preceding, one toward the base of the frons, one opposite the middle of the mandible, one opposite the hypostomal angle of mandible, one on hypostoma near base of mandible, one opposite but distant from mandible, and three forming a triangle on disc of epicranium.

The antenna is a fleshy, two-jointed appendage located at the lateral angle of the frons. The mandibles are very bluntly bidentate. Each mandible has a tiny hair about the middle. The clypeus is attached in front of the frons and is broadly transverse. It bears on the epistomal margin four tiny hairs. The labrum is not as broad, is rounded in front, and has a row of four setae behind the middle, a seta on each side in front and closer than the outermost setae, and four marginal setae. The maxillae are elongate, terminated by a two-jointed palpus and a setose lacinia. The maxillae are provided with four setae, two near palpus, one at middle, and one at base. The *stipes labii* is cordate, bearing two-jointed palpi and a single pair of setae. Each lobe of the mentum is provided with two pairs of setae.

The entire surface of the body is covered with tiny pubescence. The prothorax is dorsally not divided but has the prescutal and scutal areas indicated by rows of setae. The mesothoracic spiracle is located on a lobe very close to the prothorax. The prescutum of the prothorax and that of the mesothorax are provided with a few small hairs. The scutellum is marked with a row of hairs.

The first eight abdominal segments are normal and each bears a spiracle. The prescutal area is more or less transversely divided, and its posterior lobe is marked with a few tiny setae. The scutellum is large and prominent and provided with a row of setae. The scutum is only lateral and has just above the spiracle a tiny seta. Each epipleural lobe is provided with a single seta, and each hypopleural lobe with two setae. The coxal lobes of the thorax bear several setae, and those of the abdomen a single seta each. The last two abdominal segments are simple and provided with a number of setae.

**Pupa** (Pl. 33, E-H). Elongate, about 6 mm. long, white. This pupa is especially characterized by the nongeniculate antennae which lie parallel to the legs. The antennae and two anterior pairs of legs are directed cephalad instead of posteriad,
Mar. 4, 1918

Weevils Affecting Potatoes 607

as in the Curculionidae. Another characteristic is that the femora and tibiae of the posterior pair, being directed in the same manner, are completely covered by the wings. The head and beak are elongate and provided with setigerous tubercles as follows: One pair between the eyes at base, one pair immediately behind eyes, two tiny pairs between eyes, and two pairs on beak; the posterior pair being close to the eyes, and the anterior behind the middle. The antennæ are roughly tuberculate.

The prothorax is margined anteriorly by four pairs of setigerous tubercles and has one pair of discal setæ. The mesothorax has two pairs of large setigerous tubercles and a lateral pair of tiny setæ. The femora bear two or three setæ. The knees of the posterior femora are visible dorsally only.

The mesothorax bears three pairs of small setæ between the bases of the elytra. The metathorax is provided with two rows of setæ on tiny tubercles, the anterior row having two pairs and the posterior row six pairs. The abdominal segments have dorsally five pairs of setigerous tubercles near the posterior margin, a pair of tiny setæ near the middle of the segment, and lateral setigerous tubercles.

The ninth segment is provided with two large curved processes. The tenth segment is ventral to the ninth.

Cylas turcipennis Boheman (1833) (PL 31, B)


The brief preliminary diagnosis of the species presented by Boheman is as follows:

Elongatus, viridi-cœrulescens, nitidus, antennis thorace pedibusque rufis, capite cruciatim impresso, rostro punctulato, elytris modice convexus, subtiliter striato-punctatis. Habitat in Java, in India orientali.

The following dimensions are included in the detailed description: Length 3 lines (6 mm.); antennæ as long as thorax and head; club of male antenna longer than preceding joints; beak not longer than head; elytra twice as wide as thorax at base, and twice longer than wide. The color description is as follows: Head obscurely viridi-cœrulescens; beak almost black; antennæ rufo-ferruginous; thorax shining rufous; elytra cœrulescent-virescent; thorax beneath rufous, remainder of body beneath cœruleo-virescent; legs rufous; tarsi beneath fulvous, spongy; female with femora in middle annulate virescent.

Two specimens from Palembang, Sumatra, collected by Mr. M. Knappert, are here considered as this species. They differ only in having the beak slightly longer than the head, and a statement to this effect might have been made if the description had been based on examination with a low-power lens. Two other specimens are at hand from Bay Laguna Province, Philippine Islands, collected by Mr. P. L. Stangl. A part of a body of a weevil from Guatemala, collected by Mr. D. G. Eisen, is also undoubtedly this species. Pascoe records the species from Sarawak, Java, and India.

Cylas femoralis Faust (1898) (PL 31, F)


This species was collected by Mr. Rolla P. Currie at Mount Coffee, Liberia, in February to April, 1897, and he has informed the writer that it was a serious sweet-potato pest in that country. It is described from Kamerun. In the Manual of Dangerous Insects ¹ this species was referred to as C. brunneus by mistake.

¹ Pierce, W. D. A MANUAL OF DANGEROUS INSECTS ... p. 209. 1917. Published by the United States Department of Agriculture, Office of Secretary.
FAMILY ORBITIDAE PIERCE (1916)

SUBFAMILY ORBITINAE PIERCE (1916)

GENUS EUCEPES SCHÖNHERR (1844)


_Eucuspes_ Lacordaire, 1866, Gen. Coleop., v. 7, p. 100-101. Type.—_porcellus_ Boh.


_Eucuspes_ Champion, 1905, in Biol. Centr.-Amer., Coleopt., v. 4, pt. 4, p. 496-498. Type.—_porcellus_ Boh.

Lacordaire caused a confusion of genera by wrongly interpreting the number of funicular joints, of which there are seven. This error was corrected by Champion. The two genera _Eucuspes_ and _Hyperomorpha_ are strictly congeneric; in fact, the two type species differ principally in size. A large series of _porcellus_ from various parts of Central America is at hand. These have been carefully compared with Blackburn's description of _Hyperomorpha_, but no generic difference can be found.

The rostral canal extends along the prosternum and ends in a mesosternal pocket. The beak when at rest fits tightly into this canal. The prothorax is lobed to cover the eyes when at rest. The body is elongate.

_Eucuspes batatae_ C. O. Waterhouse (1849), the Scarabée of the Sweet Potato (Pl. 32, C, D; Pl. 33, A-D; Pl. 34, E-H)


This weevil (Pl. 32, C, D) is one of the most serious cosmopolitan pests of the sweet potato, although hitherto it has been recorded only from Barbados, St. Vincent, and Antigua, St. Kitts, Nevis, and Hawaii. In all of these places, however, it is reported as damaging sweet potatoes. The receipt of two specimens from Dr. Da Costa Lima, of Brazil, with the statement that they were injuring sweet potatoes at Rio de Janeiro, caused the writer to make a search through the undetermined collections of the National Museum with the result that the known distribution of the species is hereby greatly extended. Specimens are at hand from Barbados, injuring sweet potatoes May 22, 1900, and more recent material; Hope, Kingston, Jamaica, on sweet potatoes, Mr. S. F. Ashby; Campinas, Brazil, injuring sweet potatoes, August, 1913, Mr. A. Hempel (No. 100); Rio de Janeiro, Brazil, injuring sweet potatoes, July, 1917, Carlos Moreira; Honolulu, Oahu, Hawaii, bred from sweet potato; Kaimuki, Oahu, Hawaii, bred from sweet potato; Guam, on sweet potato, Mr. D. T. Fullaway; Norfolk Island, New Zealand, March, 1883, Mr. P. H. Metcalfe; Mayaguez, Porto Rico, injuring sweet potatoes, 1912, 1914, 1917, Mr. C. W. Hooker, Mr. R. H. Van Zwaluwenburg.

This extensive distribution indicates that there are probably many other countries where sweet potatoes are grown that may have the weevil. If, fortunately, it should prove to be absent in other countries, rigid quarantines should be put into effect, such as that recently estab-
lished by the United States. In fact it has been only because of the excellent system of quarantine inspection in California that the species has not already come into the United States with Hawaiian potatoes. Many shipments of infested sweet potatoes have already been intercepted at the California ports.1

The following is a description of the species redrawn to include all the material at hand. The variations of color will be mentioned in subsequent paragraphs.

Length about 4 mm. Brown, mottled with lighter areas, especially by a transverse, irregular, postmedian band on the elytra. Squamose, bristling with upright setae. Beak curved, carinate and laterally bifurcate. Front foveate. Front and beak bristling with erect scales. Vertex provided with more decumbent scales. Prothorax constricted in front, laterally impressed on disk behind, mottled with erect scales, except on posterior margin which is provided with smaller, more decumbent scales. Elytral striae composed of rather distant punctures, each bearing a small scale; surface closely set with overlapping scales and each interspace with a single series of elongate squamiform setae. Undersides more sparsely clad with semierect scales. Legs provided with scales and setae. Rostral canal deep, terminating in a prominent pocket of the mesosternum. Intercoxal process broad, angulate on anterior margin. First segment behind coxae subequal to the second, which is but slightly longer than the subequal third and fourth segments. The femora are minutely toothed.

Mr. Bradford's excellent illustrations will be very helpful in identifying this weevil. His illustration of the adult is from Hawaiian material.

The species varies from very light brown to almost black and on the darkest specimens the mottling and the postmedian vitta have practically disappeared.

On light specimens the scales of the thorax are mostly dark brown, with flecks of pale scales and with the basal scales orange colored. The scales of the elytra are mottled in many shades of brown. The postmedian fascia extends to the fifth interspace and is bordered by very dark scales and divided by a wavy dark line. The erect setae are mixed dark and white. The ventral scales are pale, but on the legs they are mottled dark brown and pale. This description fits best some of the Jamaican, Barbados, and Brazilian specimens. Almost black material comes from Brazil, Jamaica, and Guam. The Hawaiian specimens are a duller brown, and the New Zealand material is the lightest of all. There is, however, no doubt of the specific identity of the entire series.

In order that the immature stages may be readily distinguished from those of *Cylas formicarius* a series of very careful drawings of the essential characters of the larva and pupa have been made by Mr. Harry Bradford under the writer's direction. The drawings of the vertex and face are by the writer. Barbados material was used for these drawings.

**Larva** (Pl. 34, E-H). The larva of this species measures about 5 mm. in length and is white, with a yellowish head and reddish brown mandibles tipped with black. The maxillae and labium are slightly tinged with brown.

The head shield is broadly, angulately emarginate behind; from the center of the emargination on the median line the epicranial suture passes forward, separating the epicranium into two parts. This suture divides behind the frons and forms the two

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frontal sutures. The frons is subtriangular, rounded at anterior angles, and slightly emarginate for antennae; its front margin is the epistoma. There are three pairs of large setae on the frons, the posterior pair being located rather close together and near the apex of the triangle. The second pair are farther apart and halfway to the front. The anterior pair are located near the lateral angles just behind the antennae. A tiny pair of setae are located just in front of the posterior pair of large setae. A tiny pair are located slightly behind and outside of the median pair of large setae. The median line of the frons is impressed from the posterior angle almost to the middle.

The epicranial areas are the two large areas on each side of the epicranial suture further bounded by the frontal suture, the pleurostoma, and the hypostoma. The following setae occur on each lobe of the epicranium: One opposite the apex of the frons, one on the disk of the epicranium in the line with the preceding; one opposite the middle of the frons and near the frontal suture; one near the hypostoma toward the base of the mandible; one as close to the hypostoma and opposite the base of the maxilla; one near the pleurostoma; the last three forming a triangle. Forming a semicircular line with the setae opposite the frons are a tiny seta, a longer one opposite the antenna, and a long one opposite the pleurostomal seta.

The antenna is a small, fleshy, two-jointed appendage at the angle of the frontal suture and pleurostoma. The mandibles are bluntly bidentate and have two small setae. The clypeus is attached in front of the frons and is broadly transverse. It bears on the epistomal margin four tiny hairs. The labrum is not as broad; it has a pair of median setae and three pairs of marginal setae. The maxillae attached at the side of the mandibles are terminated by a two-jointed palpus and a setose lacinia. The maxillae are provided with three setae, two near the palpi and one toward the base. The stipes labii is appendiculate, bilobed, bearing two-jointed palpi and a single pair of posterior setae. Each lobe of the mentum is provided with one seta. The thoracic segments are simple, being composed of only prescutum and scutocutellum. In the prothorax there is no separation of these parts, but they are indicated by the arrangement of the setae. The abdominal segments are dorsally composed of four single sclerites, namely, prescutum, scutum, scutellum, and postscutellum.

The thoracic spiracle is located on a lobe of the mesothorax, very close to the head. The abdominal spiracles are located on a small lobe at the side of the scutum on the first eight segments. The ninth and tenth abdominal segments are smaller and considerably modified.

Setae are arranged as follows: Four pairs of tiny hairs on anterior margin of prothoracic prescutal area; a row of longer hairs on the scutal area of the prothorax; each segment from the mesothorax back with two pairs of long lateral setae, near which are located smaller and inconspicuous setae; each prescutum with a single pair of setae; on each segment of the abdomen the lateral lobe of the scutellum is provided with a tiny seta, behind and close to the spiracle; each epipleural lobe below the spiracle with two setae; each coxal lobe with several setae which are more conspicuous on the prothorax.

PUPA (Pl. 33, A–D).—Length 4 mm., white. This is a normal, characteristic curculionid pupa with geniculate antennae and legs turned posteriad. Head oval, beak short. The head bears four pairs of basal setigerous tubercles, two pairs of interocular tubercles, and one pair of tiny setae at base of beak. Prothorax with two pairs of antero-marginal setigerous tubercles; one pair of antero-lateral and one pair of postero-lateral setigerous tubercles; four pairs of dorsal tubercles and one pair of ventral. The femora are apically armed with two setae. Mesonotum and metanotum each provided with two pairs of setae. Each abdominal segment bears four dorsal and one or more lateral setae. The ninth segment is armed with two very large processes. The tenth segment is very small and located on the venter of the ninth.
A WEEVIL WHICH ATTACKS THE TUBERS OF YAMS

Palaeopus dioscoreae, n. sp. (Pl. 32, E, F)

Described from two specimens reared from tubers of Dioscorea batatas, Hope, Kingston, Jamaica, by Mr. S. F. Ashby in April, 1914. Belongs in the same subfamily as Euscepes.

Length 4.5 mm., breadth 1.75 mm. Piceous black, with reddish brown appendages. It is sparsely clad with dark brown or whitish oblong decumbent scales and erect, longer truncate scales of variable color. The punctuation is very coarse.

Head smooth, beak separated from head by strong transverse constriction. Beak longitudinally five-striate and bristling in basal half with erect brown scales; apical half smoother, with confluent punctures and flat scales. Scrobes beginning beyond middle, diagonal, reaching eyes beneath. Eyes lateral, separated by width of beak, covered when at rest by pronotal lobes. Antennal funicle seven-jointed, first joint a little longer than second. Prothorax broad, depressed, convexly rounded on sides, bisinuate at base, lobed over eyes, truncate at apex which is about half as wide as base; median line broadly elevated; punctuation very coarse. Elytra rostriate, the tenth striae abbreviated; strial punctures large, rounded, well separated, and setigerous; interspaces not wider than striae, clad with a single row of erect squamose setae of variable color. Scutellum indistinct. Elytra broader at base than thorax; with distinct humeri.

Sternal canal deep, sharply margined, limited by a cuplike depression of the mesosternum. Posterior coxae very broadly separated. Metasternum at middle as long as first abdominal segment behind coxae. Intercoxal piece of first abdominal segment angulate at middle. Second segment not as long as third and fourth together.

Femora dentate and canalicate beneath. Tibiae curved at base, strongly hooked at the apex. Tarsal claws simple.

Type.—Cat. No. 216 Message, United States National Museum. 38324°—18—7
PLATE 28

Trypopremnon sanfordi: Adult from Cuzco, Peru

A.—Dorsal view. Actual length 8.025 mm.
B.—Face of same. Actual length of head and beak 3.5 mm.
C.—Side view of thorax and head.
D.—Ventral view of adult.
Drawn by Mr. H. B. Bradford.

(612)
Weevils Affecting Potato and Yam

PLATE 28

Journal of Agricultural Research
Vol. XII, No. 9
PLATE 29

Trypopremnon latilorax: Larva from La Paz, Bolivia

A.—Prothoracic spiracle.
B.—Larva, lateral view.
C.—Lateral view of head.
D.—Right side view of apex of labium.
E.—Corresponding hair on left side.
F.—Maxillary palpiger and palpus, lateral view.
G.—Face.

Drawn by the author.
PLATE 30

Trypopremnon latithorax: Pupa from La Paz, Bolivia

A.—Dorsal view.
B.—Ventral view.
C.—Enlarged sketch of eighth, ninth, and tenth abdominal segments.

Drawn by Mr. H. B. Bradford.
PLATE 31
Species of the genus Cylas:

A.—Cylas formicarius elegantulus from Honolulu, Hawaii, side view of head and thorax.
B.—Cylas turcipennis from Sumatra, side view of head and thorax.
C.—Cylas brunneus from East Africa, dorsal view of thorax.
D.—Cylas brunneus, side view of head and thorax.
E.—Cylas brunneus, ventral view of thorax.
F.—Cylas femoralis, side view of head and thorax.

The abbreviations used on this plate are as follows: pr, Presegmental ring; sc, scutum; sl, scutellum; psl, postsegmental ring; pl, pleurum; tn, trochantin; c, coxa; bs, basisternite; stl, sternellum; cstl, centrosternellum.

Drawn by the author.
PLATE 32

Sweet-potato and yam weevils:

A.—*Cylas formicarius elegantulus*, female, from sweet potatoes, New Orleans, La.
B.—Same, head of male.
C.—*Euscepes batatae*, from sweet potatoes, Hawaii.
D.—Same, side view of head.
E.—*Palaeopus dioscoreae*, from yams (*Dioscorea batatas*), Jamaica.
F.—Same, side view of head.

Drawn by Mr. H. B. Bradford.
PLATE 33

Pupae of sweet-potato weevils:

A.—*Euscepes batatae*, Barbados, venter (length 4 mm.).
B.—Same, latero-ventral view of fifth to tenth segments.
C.—Same, dorsal view.
D.—Same, venter of seventh to tenth segments (length of this portion 1 mm.).
E.—*Cylas formicarius elegantulus*, Victoria, Texas, ventral view of sixth to tenth segments (length of this portion 1 mm.).
F.—Same, ventral view (length 6 mm.).
G.—Same, latero-ventral view.
H.—Same, dorsal view.

Drawn by Mr. H. B. Bradford.
PLATE 34

Larvae of sweet-potato weevils:

A.—*Cylas formicarius elegantulus*, Victoria, Texas, lateral view.
B.—Same, dorsum of head.
C.—Same, face.
D.—Same, side of head.
E.—*Euscepes batatae*, Barbados, dorsum of head.
F.—Same, face.
G.—Same, side of head.
H.—Same, lateral view of larva.

Drawn by Mr. H. B. Bradford.
PLATE 34

Weevils Affecting Potato and Yam

Journal of Agricultural Research
Vol. XII, No. 9