

6. THE DODDER AND ITS INSECTS

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To those who are familiar with the leafless yellow or orange tendrils of dodder which entwine and strangle vegetation, no plant would seem less likely to have insect enemies than it.

In fact there is very little in the literature on insects affecting this interesting genus of plants.

We are able to report at this time on a number of insects taken in flowers, or bred from the flowers of *Cuscuta californica* on the El Segundo, California, sand dunes. The material was all collected on different occasions by the writer, Mrs. Dorothy Pool and Mrs. Pierce in 1938.

Up to date all of the insects taken were in the flowers, and we found several species breeding in these interesting little flower clusters. Working among the flowers in a flower head one frequently encounters little caterpillars, the adult of which is described as a new species and genus by August Busck in a succeeding paper.

These larvae and the weevils discussed in this paper have a very decided part in checking the reproductive activity of this parasite, as they are seed destroyers.

Among the insects collected in the dodder flowers were four specimens of *Scymnus marginicollis* Mann. probably to prey on aphids and thrips, which so far have been very sparingly found.

Eight specimens were taken of a new species of Mycetophagidae, *Berginus californicus*, one of them being found inside of a cell in a dodder flower, possibly as a scavenger.

The other species taken on the dodder are probably not characteristic of it and will be discussed more appropriately in connection with other host plants. These include a species of *Tanaops*, one or two species of *Melanophthalmus*, a *Trichochrous*, and a tiny *Bruchus*, probably all here as flower visitors, and pollen feeders.

Quite in accord with the minute nature of the flowers, and the hair-like tendrils, not an insect has been taken which measures over two millimeters in length. These tiny insects offer considerable difficulty in identification.

Up to the present writing no gall makers attacking the tendrils have been taken, although such injuries have been noted by the writer in Southern California.

THE DODDER WEEVILS OF THE SMICRONYCHINI

Dietz, 1894, revised the genera making a primary separation on the basis of the relative contiguity of the eyes beneath, which would appear to be a very valid basis, necessitating however either careful spreading or dissection of one specimen of each species. It would seem that those species in which the eyes are contiguous must be more closely related to each other than to species in which the eyes are separated. Champion in 1902 discarded the separation of the eyes as a generic character but did not give his reasons.

In view of the fact that only a relatively few of the world species have been studied in this respect, we may follow Champion in holding them in *Smicronyx* and reduce *Synertha* to a subgenus in which the eyes of one or both sexes are contiguous beneath. This means that the entire genus must be restudied in regard to this character. The genus *Pachyphanes* is also reduced by Champion, but might conveniently be saved as a subgenus. The genera *Desmoris* and *Promecotarsus* appear to be sufficiently distinct to hold. This reinterpretation of generic limits requires a new key.

KEY TO GENERA OF SMICRONYCHINI

1. Fourth tarsal joint shorter than the three preceding joints combined 2
 Fourth tarsal joint about as long as the three preceding joints; form subcylindrical; eyes widely separated; claws connate at base only *Promecotarsus* Casey
2. All tibiae unguiculate—*Smicronyx* Schönherr 3
 Posterior tibiae mucronate; antennal club small, ovoidal; eyes more widely separated *Desmoris* LeConte
3. Subgenera of *Smicronyx*:
 Eyes not contiguous beneath in either sex 4
 Eyes contiguous beneath in at least one sex
 sg. *Synertha* Dietz
4. Antennal club large, elongate, usually distinct from the funicle sg. *Pachyphanes* Dietz
 Antennal club small, ovoidal, often subcontinuous with the funicle; eyes narrowly separated beneath 5

5. Tarsal claws very small, generally stout, usually not divergent, connate at least to middle
 sg. *Smicronyx* Schönherr

Tarsal claws moderate; generally slender and evidently not strongly divergent, connate in their basal third only, rarely to middle sg. *Pseudromicronyx* Dietz

In this tribe several species are recorded from dodder, *Cuscuta* spp.

In Europe *Smicronyx jungermanniae* Reich forms long spherical or spindle-shaped galls in the stems of *Cuscuta europaea* L. The larvae pupate in the ground.

In Cuba *Smicronyx albosignatus* forms galls in the stems of *Cuscuta*.

Smicronyx tychoides LeConte was recorded by the writer in 1907, as forming odd-shaped galls in the stems of *Cuscuta arvensis*, at Victoria, Texas, collected July 1, 1906. The larvae pupate in the ground. On reexamination of specimens of this series the Texas specimens at least must be transferred to *Synertha*.

Weiss and West in 1921 recorded *Smicronyx sculpticollis* Casey as forming galls on *Cuscuta cephalanthi* in New Jersey. The larvae pupate in the galls. Zabriskie bred from *Cuscata gronovii* weevils probably of this species, according to Weiss and West. On examination of a ♀ from Stirling, New Jersey, and a ♂ from Washington, D. C., it appears that this species also must be transferred to *Synertha*.

Pachyphanes amoenus Say has been taken on dodder in the East.

On the El Segundo sand dunes we found a species, *Sm.* (*Syn.*) *cuscutiflorae* which breeds in the ovaries of the flowers and pupates in situ. In coloration it resembles *Sm.* (*Syn.*) *tychoides* and *Sm.* (*Syn.*) *sculpticollis* in having the red vittae on the elytra, but is separated by the following key.

Two other species were also bred from the flowers, which we assign to the subgenus *Pachyphanes*.

KEY TO THE SPECIES OF SUBGENUS SYNERTHA

1. Elytra with broad reddish stripes at sides 2
 Elytra without reddish stripes 6
2. Elytra fully one-half wider than thorax 3
 Elytra two-fifths wider than thorax 4

3. Prothorax with indications of a smooth, raised, median line; dorsum sparsely clothed with coarse, decumbent, white, piliform scales. Length 1.75-2.0 mm. Mexico *S. (Syn.) tenuisquamis* Champion

Prothorax with no indication of smooth, raised, median line; body densely clothed throughout with broad oval scales and linear scale-like setae; beak sparsely scaly; second funicular joint not or hardly longer than third; prothorax distinctly constricted at apex; elytral striae distinct, not concealed by scales. Tarsi with fourth joint scarcely projecting the length of the preceding joint; claws connate two-thirds of their length. Length 1.67-2.4 mm. So. California *S. (Syn.) cuscutiflorae* n. sp.

4. Scaly vestiture not uniformly dense above, condensed in spots or transverse fasciae or lines; beak strongly curved 5

5. Fourth tarsal joint projecting the length of the third; beak strongly curved near the base; prothorax not strongly convex, nearly straight on the sides behind the middle. Second funicular joint nearly as long as the next two. Length 2.5 mm. Kansas, Texas
..... *S. (Syn.) tychoides* LeConte

Fourth tarsal joint projecting less than the length of the third; prothorax not strongly convex, sides rounded. Second funicular joint much shorter than the next two. Length 2.1-2.25 mm. Virginia, Indiana, Texas *S. (Syn.) sculpticollis* Casey

6. Prothorax not wider than long 7
Prothorax wider than long 11

7. Setae of elytral interstices procumbent, scarcely visible 8

Setae of elytral interstices conspicuous, decumbent, curled 10

8. Tarsi slender, fourth joint projecting much more than the length of the preceding joint; claws connate at the base only 9

Tarsi stout, fourth joint scarcely projecting the length of the preceding joint; claws connate two-thirds of their length. Beak densely scaly; second funicular joint a little longer than third; prothorax not evidently constricted at apex; elytral striae fine, concealed by scales. Length 2.75 mm. Arizona
..... *S. (S.) hornii* Dietz

9. Scales of upper surface very large, broadly oval. Length 2.25-2.75 mm. California, Arizona *S. (S.) imbricatus* Casey
Scales of upper surface smaller and narrower, elongate oval. Length 1.4-1.7 mm. Arizona *S. (S.) silaceus* Casey
10. Vestiture of grayish, oval scales. Length 2.5-2.8 mm. Mexico *S. (S.) thoracatus* Champion
Vestiture of brownish, oval, imbricate scales, with a few white ones intermixed. Length 1.9 mm. Mexico *S. (S.) tenuirostris* Champion
11. Elytra about one-fourth wider at base than thorax; setae suberect, conspicuous. Length 2.0 mm. Arizona *S. (S.) wickhami* Dietz
Elytra about one-half wider than thorax 12
12. Elytral interstitial setae coarse. Length 3.0 mm. Mexico *S. (S.) tectus* Champion
Elytral interstitial setae fine, inconspicuous 13
13. Elytral vestiture white with a few brownish scales. Length 2.0 mm. Mexico *S. (S.) loricatus* Champion
Elytral vestiture tessellate white and brown, denser and scales not so coarse but more intricate. Length 2.0 mm. Guatemala *S. (S.) cataphractus* Champion

KEY TO THE WEEVILS OF THE AMOENUS GROUP OF THE SUBGENUS
PACHYPHANES, GENUS SMICRONYX

1. Prothorax not wider than long; claws connate at most one-half their length; first and second joints of funicle long and slender; club large, strongly elongate; tarsi slender, first joint elongate 2
Prothorax slightly wider than long; claws connate beyond the middle 3
2. Fifth interspace densely scaly; third tarsal joint less than twice as wide as the preceding. Length 3.25-4 mm.; Texas, Illinois, Missouri *S. (P.) lineolatus* Casey
A broad, irregular stripe of pale scales extending from humerus to the suture behind the middle; third tarsal joint nearly twice as wide as the second. Length 2.75-3 mm.; Texas *S. (P.) triangularis* (Dietz) n. comb.

3. First and second funicular joints elongate, not slender; tarsi stouter, first joint not elongate; elytra tessellate 4
First funicular joint elongate, second and third subequal; vestiture very sparse. Length 1.5-1.8 mm.; Southern California *S. (P.) elsegundinis* n. sp.
4. Club not strongly elongate, ovoid elliptic; first joint of funicle fully one-half longer than the second, the latter less than one-half longer than the third; prosternum distinctly channelled. Length 2.25-2.75 mm.; Dist. Columbia, Pennsylvania, L. Superior, Dakota *S. (P.) amoenus* Say.
Club elongate, longer than the third to seventh inclusive; first joint of funicle about equal to the next three joints together; second longer than third; prosternum feebly transversely impressed. Length 1.5-2.0 mm., So. California *S. (P.) celaenus* n. sp.

KEY TO THE DODDER WEEVILS OF THE DUNES

1. Eyes united beneath the head; prothorax canaliculate; vestiture dense over entire body
..... *Sm. (Synertha) cuscutiflorae*
Eyes separated beneath the head; prothorax flat or lightly transversely sulcate; vestiture irregularly placed 2
2. Interstitial setae elongate scales; broad oval scales in patches on elytra, on pleurae and venter of thorax
..... *Sm. (P.) celaenus*
Interstitial setae very fine hairs; oval scales on third and humeral interspaces at base, and on pleurae; vestiture of venter sparse *Sm. (P.) elsegundinis*

SMICRONYX (SYNERTHA) CUSCUTIFLORAE n. sp.

Holotype ♀, allotype ♂ and paratype series of 22 ♀ ♀ 12 ♂ ♂ from *Cuscuta californica*, taken at El Segundo, California on the sand dunes; first taken May 18, 1938 and subsequently on June 15 and June 19, 1938, and February 25, 1939, by the author, Mrs. Dorothy Pool and Mrs. Clara Pierce, and bred from the flowers July 18-21, 1938.

A minute weevil ranging from 1.67 to 2.4 mm. in length; black with dark reddish stripe on the middle of each elytron, and clad with large oval to elongate, iridescent scales, differing in size and shape on different parts of the body. In many respects

this species resembles *Smicronyx* (*Syn.*) *sculpticollis* Casey of the Eastern States.

Female: 1.67 to 2.9 mm. The female differs from the male by the more slender beak with the antennae attached about opposite the middle of the lower edge of the beak. When not abraided the vestiture is dense over the entire body and appendages, except the apical half of the beak. The pattern is mottled with white and dark scales. The dorsum of the thorax is covered with dark oval scales interspersed with slightly lighter, elongate scales; there are four flecks of white scales, two on the collar, and two opposite the widest portion of prothorax; the scales of the lateral margin form a lighter line especially at the posterior angles; in some specimens there are a few white scales on the median line in front of the scutellum. The elytral pattern is distinctive; the scales form a short white line at the base of the third intervals; several indistinctly delineated bands of white scales cross the elytra, one at the middle, two in front of this, and two behind it (the last apical). The scales over the red stripes on the elytra appear pinkish, and those over the black portions darker; the curved decumbent setae in single rows on the elytral intervals are very inconspicuous. The scales of the underside are evenly and closely placed over the entire surface.

The general body color is black, with a reddish band at base of elytra, and a stripe on the middle of each elytron, a reddish tinge to the venter and to the legs and antennae. The beak is moderately slender, more strongly curved dorsally than ventrally, deeply transversely separated at base from head, with a cluster

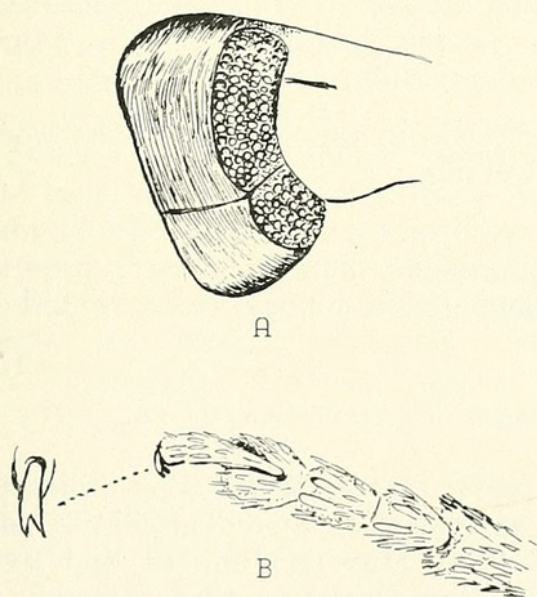


PLATE 12

- A. Under side of head of *S. (Syn.) cuscutiflorae*, showing contiguous eyes.
B. Fore tarsus and claws of the same.

of scales on each side intensifying the separation; the scrobes are descending reaching the underside before the eyes; antennae inserted only a little beyond the middle of the underside of the beak. Scape slender, funicle 7-jointed, the first stout and about as long as second and third combined; second joint a little longer than third, the last joint slightly widened in conformity with outline of club, the funicle is clad with bristles; the four-jointed club is very finely pubescent.

Eyes coarsely faceted, meeting on median line beneath (Plate 12, fig. A). Prothorax angulate over eyes but not lobate; almost or entirely as long as broad (measurements show the proportions 36:34 and 35:35), basally distinctly narrowed into a collar; rounded at sides, widest behind the middle: surface closely punctate, but when in full vestiture the entire surface is concealed. Elytra abruptly and squarely wider by half than thorax at widest point (by actual measure 28:18); scutellum minute but distinct; even when in full vestiture the striae are evident, and when denuded, are seen to be sharp and deep between wide interspaces with elongate punctures; humeri prominent; behind humeri sides almost parallel to beyond middle, thence rounded to apex. Prosternum medianly sulcate. Femora clavate; tibiae straight and shorter than femora; tarsi with third joint deeply bilobed, but not much wider than second joint; fourth joint slender surpassing third by its length; claws connate to apical third (Plate 12, fig. B). Posterior margins of second, third and fourth abdominal segments arcuate, with posterior angles acute; second segment as long as the two following segments; fifth segment not impressed.

Male: 1.87 to 2.25 mm. Differs from the female in stouter beak with antennae attached beyond the middle. Thorax wider than long in the proportion 16:14. Fifth abdominal segment with large round depression.

This weevil breeds in the ovaries of the dodder, causing a slight gall-like swelling.

The larvae are bright orange color and quite active crawlers, so that it is possible that some may enter the ground for pupation, but orange-colored pupae were found in the flowers.

SMICRONYX (PACHYPHANES) CELAENUS n. sp.

Described from 1 ♀ holotype, 1 ♂ allotype, 6 ♀ paratypes and 2 ♂ paratypes, collected at El Segundo, California, on *Cuscuta californica*, May 18, June 13, and June 28, 1938, by W. D. Pierce, Dorothy Pool and Clara Pierce; and bred from *Cuscuta* flowers July 18.

This species runs in the Dietz (1894) *Smicronyx* key to *S. pusillus* Dietz, a California sp.; and in the Casey (1892) key to

S. defricans, also a California sp., but not conforming in vestiture to either.

Female: 1.5-2.0 mm. Elongate-oblong, convex; black; legs dark rufous, lightest on middle of femora; sparsely clad with white and pale ochreous scales to form indefinite patterns. Upper surface clothed unevenly with moderately large oval, whitish scales, generally denser, or at least more persistent, on the median line and sides of the thorax, on the elytra at bases of third and humeral interspaces, in a diagonal irregular fascia between humeri and middle of elytra, in flecks beyond middle of elytra, on thoracic sternum, meso- and metathoracic pleurae and at base of abdomen. The interstitial setae are ochreous, narrower, and more elongate than the white scales, and placed on a single line on each interspace. The same type of setae occur scattered over the dorsum and pleurae of the prothorax, on the abdominal segments, and legs, but are whiter on the legs. On the abdominal segments they are more concentrated at the posterior margins of the third and fourth segments, and on the fifth segment. The beak near base, and the antennal funicle are also clad with elongate scales. The club is softly pubescent.

Beak slender, lightly curved, as long as head and prothorax, finely punctate in apical half, more coarsely in basal half, basal constriction shallow. Scrobes beginning beyond the middle descend diagonally to underside at eyes. Scape attached at middle of beak, reaching eyes; funicle 7-jointed, the first about equal to the next three and stouter; second longer than third and each succeeding joint slightly shorter and broader, the last two transverse; club elongate, longer than the third to seventh joints inclusive, the first club joint not equal to half of the club. Eyes definitely separated beneath, head finely granulate. Prothorax about as long as broad, constricted apically; ocular lobes not very prominent, vibrissae short; laterally convex, widest at about middle. Elytra abruptly two-fifths wider than prothorax at base, almost twice as long as broad, humeri slightly tumid, sides parallel to beyond middle, thence parabolically curved to narrowly rounded apex; scutellum minute; striae fine, not concealed by vestiture. Prosternum almost flat, feebly transversely impressed. Second abdominal segment as long as the two following, posterior lateral angles very slightly produced; fifth segment as long as third and fourth together, broadly rounded in outline and not impressed.

Femora clavate, longer than tibiae; tibiae unguiculate, tarsi moderately slender, third joint broadly bilobed, fourth joint projecting the length of the third, claws connate about two-thirds their length.

Male: 1.5-1.7 mm.; differs from female in stouter beak, with antennae inserted beyond the middle. On a fully clad specimen the white scales form a sort of network of diagonal lines. The

fifth abdominal segment shows a slight median round depression near apex.

SMICRONYX (PACHYPHANES) ELSEGUNDINIS n. sp.

Described from 1 ♀ holotype, 1 ♂ allotype, 12 ♀ paratypes, collected at El Segundo, California on *Cuscuta californica*, June 15 and June 29, 1938 by W. D. Pierce, Clara Pierce and Dorothy Pool.

Female: 1.5-1.8 mm. Elongate oblong, convex; black throughout, sparsely clad with fine, short hairs, with a few scales or thicker hairs at the base of the third and humeral elytral intervals, and occasionally in a spot in the middle of each elytron or at the beginning of the apical declivity; undersides clad with small round scales set in the punctures, not densely placed except on pleurae and apices of abdominal segments.

Beak slender, broadly curved, as long as head and prothorax, finely punctate and very sparsely clothed with scales at base. Scrobes diagonally descending to underside at eyes. Scape attached at middle of beak, reaching eyes; funicle seven-jointed, the first slightly longer than the next two together and stouter, second and third subequal, seventh united with club; club proper as long as five preceding joints (third to seventh) and distinctly wider. Eyes separated beneath. Head finely granulate. Prothorax slightly broader than long, very faintly collared, ocular lobes hardly apparent. Elytra abruptly two-fifths wider than prothorax at widest point, not twice as long as broad (58:34), sides almost parallel, but slightly wider beyond middle. Scutellum minute.

Striae deep; interspaces each with a single row of sparsely placed linear setae, transversely finely rugose.

Second and fifth abdominal segments, each as long as the third and fourth combined; posterior lateral angles slightly produced on second and fourth segments.

Male: 1.6-1.8 mm.; differs from female in stouter beak, with antennae inserted beyond the middle.

MYCETOPHAGIDAE

The genus *Berginus*, placed by LeConte in Mycetophagidae, but arranged with Lyctidae in the Leng catalogue, has been restored to the Mycetophagidae after residing for a while in the Cisidae. Only two species have been recorded from the United States: *B. pumilus* LeConte from Pennsylvania, and the Mexican, Central American *B. nigricolor* Champion, doubtfully recorded from Texas. Leng records *pumilus* from Southern California, but it does not seem likely that the same species occurs on both coasts. In fact the specimens of *Berginus* before the

writer do not answer to LeConte's description and are consequently described as new.

KEY TO SPECIES OF BERGINUS

1. Thorax longer than broad; length 2.0 mm; Pennsylvania
..... *B. pumilus* LeConte
- Thorax not longer than broad; length 1.5-1.75 mm.; California
..... *B. californicus* n. sp.

BERGINUS CALIFORNICUS n. sp.

Holotype and seven paratypes from El Segundo, California sand dunes on *Cuscuta californica*, taken June 15, 1938 (two) and February 25, 1939 (six) by W. D. Pierce, Clara Pierce and Dorothy Pool; three paratypes from Whittier, California, on *Sambucus* and two paratypes from Puente Hills, Whittier, March 24, 1916, L. L. Muchmore; two paratypes from Arch Beach, California, July 2-11, 1925, L. J. Muchmore; one paratype Turnbull Canyon, Whittier, May 12, 1917, L. L. Muchmore; six paratypes, Santa Monica, California, May 1, 1920, L. J. Muchmore, on sunflower; four paratypes, Redondo, California, April, A. Fenyes; all above from Los Angeles County; four paratypes, Mission Beach, San Diego County, November 17, 1932, A. T. McClay.

Size 1.5-1.75 mm. Reddish brown to black with purplish tinge, legs dark reddish; body clothed with clear, elongate, recumbent-curved scales.

Eyes spherical protuberant; head extending forward double the length of the eyes, sharply narrowed so that the apex is only one-half the width between the eyes. Antennae eleven-jointed, finely pubescent, with first joint much wider than second, and this a little wider than the succeeding funicular joints; club of two distinctly separated joints, the first triangular, the second irregularly quadrangular or obliquely truncate.

Thorax minutely wider than long; roughly sculptured, moderately densely clad with linear scales; medianly longitudinally depressed to a transverse elevation slightly behind the middle; laterally sulcate the entire length; broadest behind middle; scutellum transverse. Elytra at base wider than thorax at widest point in proportion of 29:24; striations only indicated by the rows of squamose setae, one row on each of the odd interspaces, which are slightly raised, two rows on the even or depressed interspaces.

Undersides more sparsely clad with finer, hair-like setae. Anterior and median coxae narrowly separated. Metasternum medianly sulcate from middle to apex. Tarsal claws widely separated, angulate at base.



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