

NEW SMYNTHURI, INCLUDING MYRMECOPHILOUS AND AQUATIC SPECIES.

BY JUSTUS WATSON FOLSOM, CAMBRIDGE, MASS.

Smynthurus benitus, n. sp.

White everywhere, excepting ferruginous mottlings as specified below, which are absent in young and occasionally in adult specimens. Head free, capped with ferruginous patches, and covered with short, stiff bristles denser on the front; front with two ferruginous patches which are elliptical, oblique and often united above. Eyes absent. Antennæ four-fifths the body in length, geniculate, segments nearly as 1: 2: 3.5: 9; basal segment very stout, naked; second clavate, petiolate, three-whorled; third cylindrical, four-whorled; terminal segment (Plate 10, fig. 5) subpetiolate, about ten-whorled, interrupted just beyond the middle by three distinct subsegments, barrel-shaped and subequal. Body oval from above, anteriorly almost naked, posteriorly with short, recurved bristles, longer upon the small, rounded anal tubercle; posterior of abdomen with a pair of broad, subdorsal stripes composed of ferruginous mottlings; sides mottled with ferruginous. Ventral tube stout, emitting two rounded tubercles. Thoracic rings distinctly visible. Legs stout, bristly. Superior claws of fore-feet slender, well-curved, scarcely tapering; of mid-feet stout, twice the preceding in width; of hind feet also stout, but smaller and more tapering; all these unidentate on the middle of the inside. Inferior claws of fore-feet very slender and tapering, exceeding the opposing claws in length; of mid-feet half as long as the superior claws, stout, almost straight, obliquely truncate; of hind-feet similar to the last, but smaller and more tapering. Tenent hairs absent. Furcula slender, extending to mouth; manubrium exceeding anal tubercle, swollen ventrally; dentes scarcely tapering, with lateral and ventral

rows of stiff bristles at moderate intervals, an extra long ventral bristle beyond the base and another before the apex of each dens; an apical, finger-like process external to the base of each mucro; mucrones nine-tenths dentes in length, slender, tapering, distinctly serrate, with rounded apex. Maximum length, .78 mm. Described from fifteen types.

S. benitus is blind and myrmecophilous. I found it at Arlington, Mass., within a single decaying log in swampy soil, along with a colony of ants of the genus *Formica*. It was common in early June and disappeared in the middle of August of the present year. Easily recognized by the terminal antennal segment and absence of eyes.

S. benitus is quite distinct from any species yet described but must be placed near *S. plicatus* Schött, of California.*

Smynthurus socialis n. sp.

Lemon yellow, with three broad, longitudinal, broken-margined, maroon stripes: a median dorsal and two lateral, the latter continued across the head; all connected above the anal tubercle by a broad transverse band. Median stripe often absent and dorsum greenish. Stripes rarely obsolete or broadening until confluent. Head large, yellow, smooth elongate-ovate in side view, with short, white bristles, especially on the face; oral region, often maroon; a spreading, lobed mark between the bases of the antennæ. Eye spots very large, black, connected by a pale, pandurate swelling. Antennæ of females a little longer than the head, segments

* Schött, Harald. Beiträge zur Kenntniss Kalifornischer Collembola. Bih. Kon. Sven. Vet. Akad. Hand. Bd. 17, Afd. IV. No. 8, p. 13, Taf. II. figs. 2-5, 1891.

as 2 : 2.5 : 4.5 : 7; basal segment yellow, cylindrical, twice as long as broad, almost naked; second yellow or purplish, cylindrical, almost naked; third purple, cylindrical, subpetiolate, with four distant whorls; terminal segment purple, tapering, blunt at apex, not ringed, with eight or nine distant whorls of moderately long hairs behind the apex.

Antennae of males show the following remarkable sexual modification (fig. 4). Segments as 1 : 1.5 : 1 : 2; basal segment cylindrical, twice as long as broad, and nearly twice as broad as the other segments; second petiolate, sparsely hairy, bearing on the distal half a row of three stout cylindrical processes, the proximal of which bears a long, falcate, chitinous hook, and the next a similar, but small, hook; third segment continuing the row with three finger-like processes, the distal of which is two-thirds and the proximal one-third the length of the segment, the remaining process being small; terminal segment simply shorter and stouter than in the female.

Body oval from above, with short bristles, especially posteriorly; anal tubercle small, hemispherical, yellow, with longer bristles; sternum white, swollen at base of manubrium; ventral tube stout, cylindrical, emitting two subpyriform processes. Legs stout, bristly, pale yellow excepting purple apices of tibiae. Superior claws of fore and mid-feet (fig. 1) unusually long, half as long as tibia, a little curved, clearly unidentate beneath, two-fifths from apex, purple internally; inferior claw half as long, purple at base, straight, slender, tapering, with a subapical bristle much exceeding the opposing claw. Superior claws of hind-feet (fig. 3) two-thirds as long as those of fore- and mid-feet, stouter, smoothly curved and tapering, not dentate, purple basally; inferior claw two-thirds as long, white, broad, rounded-triangular, inner edge convex, outer straight, near the latter a stout rib prolonged as far again, as an apical bristle. A conspicuous colorless space on the lower side of the

apex of each hind tibia. Tenent hairs absent throughout. Furcula slender, mostly white, attaining ventral tube; manubrium exceeding anal tubercle; dentes three times as long ventrally, swollen at base, with dorsal, lateral and ventral rows of close, stout bristles; mucrones (fig. 2) four-fifths dentes in length, spoon-like, lanceolate laterally, broadly lanceolate from above, unsymmetrical, with narrowly lanceolate, purple, apically produced midrib from which radiate stout ribs to the inner serrate margin of the colorless limb and shorter weaker ribs to the opposite, entire margin.

Maximum length, .65 mm. Described from fifty types.

I found *S. socialis* abundant at Belmont and Arlington, Mass., from April 19 until May 14, 1896. It is found on the surface of ponds and streams, feeds upon Desmids and skips on the water in a lively manner, for which purpose the furcula is peculiarly adapted. The antennae of the male, modified to encircle and hold those of the female, are strikingly like those of the European *S. elegantulus* Reut.* which Schött, with apparent reason, considers a variety of *S. malmgrenii* Tull. In fact, *socialis* represents *elegantulus* in this country, but is different in the following important respects among others: *socialis* has distinctly unidentate superior claws and lanceolate mucrones with coarsely serrate inner and entire outer margin, with produced midrib and without subapical incision; while *elegantulus** has naked superior claws and elliptical mucrones with both margins dentate, without produced midrib and with a subapical incision.

Smynthurus amicus n. sp.

General color from rose pink to deep rose purple or violet. Head free, with short, dense, deflexed bristles above the mouth.

* Schött, Harald. Zur Systematik und Verbreitung Palaearctischer Collembola. Kon. Sven. Vet. Akad. Hand. Bd. 25, No. 11, p. 35, Taf. II, figs. 20, 21, 26, 1893.

Vertex sparsely bristly, with a median longitudinal purple stripe. A prominent black patch between the bases of the antennae. Eye spots large, black, broadly surrounded by chrome yellow. Antennae purple, often yellow basally, three-fifths the body in length, segments about as 1:1.5:3:5; basal segment stout, almost naked; second twice as long as broad, sparsely hairy; third cylindrical, with four whorls; terminal segment cylindrical, not ringed, with seven or eight distant whorls of hairs. Body from above elongate-ovate with a small reentering angle; body segments distinctly visible. Thorax with intersegmental rows of small, pale yellow dots. Sides of abdomen with pale spots often round. Posterior dorsum with short, erect bristles. Anal tubercle rounded, with long deflexed bristles. Abdomen swollen at base of furcula. Ventral tube stout, as long as a tibia, emitting two rounded tubercles. Legs stout, bristly, pale purple with yellowish patches. Superior claws (fig. 6), except of hind feet, remarkably long, as long as a mucro, slender, tapering, little curved apically, unidentate beneath, one-third from apex, purple up to the tooth; inferior claw less than half as long, narrow, tapering, straight. Superior claws of hind feet (fig. 8) two-thirds as long as those of the other feet, stout, smoothly tapering and well-curved throughout, not toothed; inferior claw half the last in length, broad, rounded-triangular, inner edge concave, outer convex, near the latter a stout rib continued into an apical bristle longer than the claw itself. Tenent hairs absent throughout. Furcula reaching beyond the mouth, purple to almost white, segments ventrally as 1:3.5:1. Manubrium laterally oblong, almost naked; dentes with stout bristles longer and thicker apically; mucrones (fig. 7) spoon-like, elongate-ovate from above, unsymmetrical with a stout, lanceolate, purple midrib from which radiate stout ribs to the inner coarsely serrated margin of the colorless limb and shorter weaker ribs to the outer entire margin of the opposite limb.

Maximum length, .97 mm. Described from fifty types.

S. amicus occurred abundantly with *S. socialis*, last described, to which it is closely related, also having similar habits. I had the good fortune frequently to observe the probable copulation of both and was able to verify in most details the observations made upon the allied European species by Reuter* and Levander.†

S. amicus appears to represent in this country the European *S. aquaticus* Bourl., although it cannot be considered the same species. The body of *amicus* is quite different in form and markings, the superior claws of fore and mid feet are much longer, entirely different in shape‡ and clearly unidentate, the opposing inferior claws having no subapical bristle, tenent hairs being absent while the mucrones have a differently shaped midrib and margins coarsely serrate within and entire without.

Sminthurus remotus, n. sp.

Bluish black. Head free, black, almost naked. Eye spots black, broadly surrounded by yellow, especially within. Antennae short, two-fifths the body in length, stout, subclavate, segments as 1:1.5:3:5; basal segment as broad as long, black, naked; second clavate, petiolate, yellow, with a few minute bristles; third subpetiolate, yellow, with few such bristles; terminal segment subclavate, blunt, black, unringed, with many close whorls of moderate bristles. Body distinctly segmented, from above smoothly oval, posteriorly with scattered minute bristles, sides with several rows of pale, circular spots; anal tubercle visible from above, small, rounded, distinctly of two segments with longer bristles. Ventral tube stout;

*Reuter, O. M. Sur l'accouplement chez deux espèces de l'ordre des Collembolés. Ent. Tidsk. I Årg. p. 159. 1880.

†Levander, K. M. Einige biologische beobachtungen über *Sminthurus apicalis* Reuter. Act. Soc. p. Fauna et Flora Fenn. IX, no. 9, 1894.

‡Schött. Zur. Syst. etc., p. 36, 37, Taf. II, figs. 22-25.

processes three times its length, cylindrical, not papillate, truncate. Legs short, stout, yellow, black basally, with short, sparse bristles, claws small, stout. Superior claw blunt, with straight, untoothed inner edge; inferior claw two-thirds as long, broadly triangular, untoothed. Tenent hairs two. Furcula short and stout; manubrium short, almost naked; mucrones with a few short bristles in lateral and ventral rows, also a long ventral bristle beyond the base and a second before the apex; mucrones one third dentes in length, long triangular, apex down-bent but not hooked, ventral margins usually entire, rarely with a few minute teeth near the base only.

Maximum length .75 mm. Described from ten types.

S. remotus occurred during last May at Belmont, Mass., on dead logs in a peat bog. Its nearest allies are *S. niger* Lubb. and *S. minutus* MacG.

Smynthurus fitchii, n. sp.

Pale, translucent yellowish-green. The contents of the alimentary canal, which show through the skin, give the appearance of a large, blackish, backward pointing triangle, extending the length of the dorsum. Body in largest specimens dusky throughout with large, pale, rounded spots laterally. Head free, pale green, with stout, white, curving bristles. Eye spots black, often pyriform. Antennae over half the length of the body, purplish, paler at base, geniculate, segments as 1:3:6:16, cylindrical; basal segment short, stout, almost naked; second sparsely bristly; third more bristly; terminal segment with seventeen or eighteen distinct subsegments, each with a whorl of moderate bristles. Body oval from above, sometimes strongly angulated behind, with stout recurved bristles denser behind, each often arising from a pale, circular spot; anal tubercle distinctly of two segments, pale green, bristly. Sternum posteriorly with many small, rounded, white spots, closely in

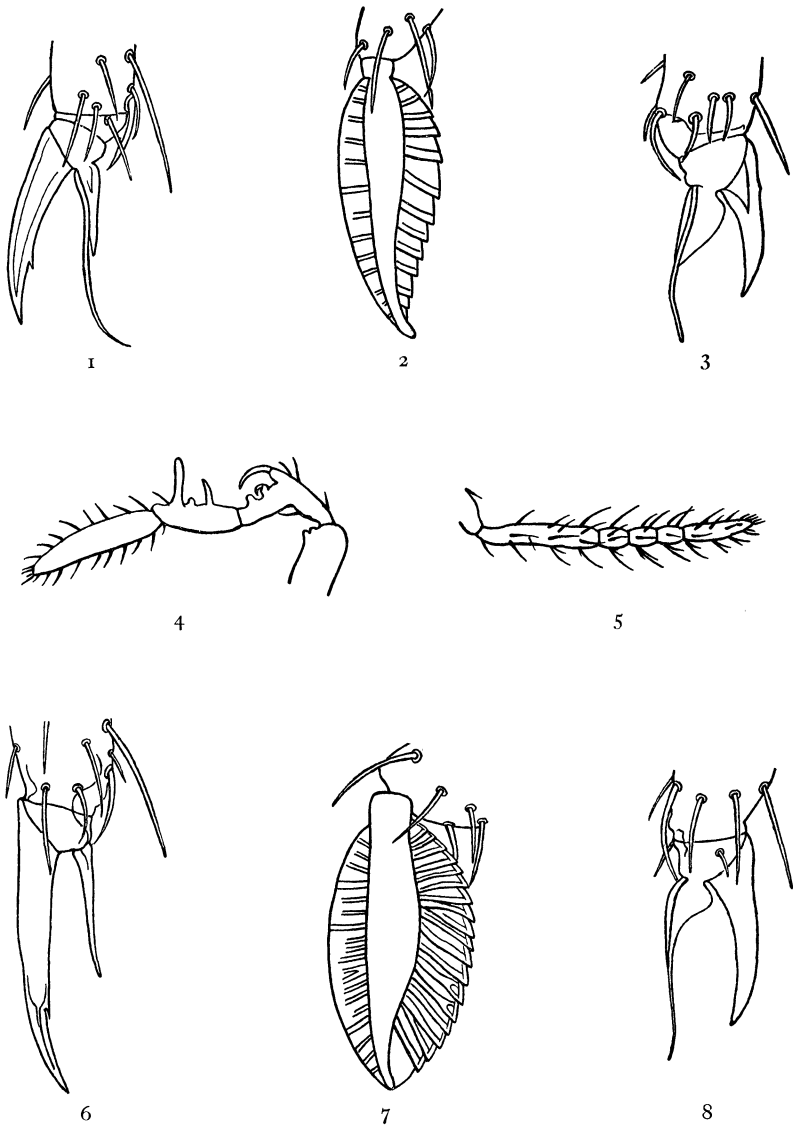
four groups. Ventral tube stoutly cylindrical processes almost as long as the antennae, cylindrical, densely papillate except basally. Legs pale green, bristly, hind claws largest. Superior claws spoon-like; outline, when viewing the concave surface, broadly oblong with rounded apex and a long tooth on the middle of either side; outline in side view finger-shaped. Inferior claws, except hind pair, perfectly distinct, as long as the opposing claws, straight, slender, acuminate, with a projecting angle on the inside near the base; hind pair two-thirds the opposing in length, broadly triangular with straight external edge and obtuse internal angle, the latter bearing a stout tooth. Tibiae apically with two or three long, unknobbed hairs. Furcula pale green, reaching beyond ventral tube; manubrium short, stout, not swollen, with short bristles; dentes each with three long ventral bristles, also ventral and lateral rows of short bristles, eight in a row, not half as long as the width of a dens; mucrones spoon-like, spatulate, crenate on inner edge, in side view tapering and with apex down, bent and obliquely truncate.

Maximum length, 2.2 mm. Described from thirty types.

I found this species common after a rain on dead sticks in pine woods at Arlington, Mass., Aug. 19, 1892. Two days later few could be found. It is nearest to *S. spinatus* MacG. but differs notably in markings, claws and furcula. I take pleasure in dedicating *S. fitchii* to the first careful student of North American Thysanura.

Smynthurus henshawii, n. sp.

Orange. Dorsum dusky in large specimens. Head free, moderately clothed with short, stiff bristles. Eye spots black, a large buff spot against the inner side of each and a small, black, ocellus-like spot in front of and between them. Face strongly gibbous above the mouth. Antennae three-fifths the body in length, outer half blackish, segments as 1:2:3:6; basal segment stout, naked;



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second subclavate, petiolate, sparsely bristly; third cylindrical, bristly; terminal segment subpetiolate, rather blunt, unringed, with about ten separated whorls of bristles. Body ovate from above, anteriorly almost naked, posteriorly with short, sparse bristles; anal tubercle small, bristly, composed of two segments. Both the ventral tube and its processes are cylindrical and stout. Legs stout, bristly; tibio-tarsal articulation constricted. Superior claw finger-shaped, almost straight, not dentate; inferior claw two thirds as long, triangular with straight outer edge. Tenent hairs two. Furcula short and stout; manubrium not exceeding the anal tubercle, sparsely bristly; dentes scarcely tapering, with lateral and ventral rows of separated bristles; mucrones two-thirds dentes in length, long-triangular with entire margins and rounded apices.

Maximum length, 1.1 mm. Described from ten types.

I found this uncommon species, especially under the bark of dead oak logs, at Arling-

ton, Mass., this year, from March 26 until April 12, inclusive. With pleasure I name it after Mr. Samuel Henshaw.

Types of all the above species have been given to the Museum of Comparative Zoölogy at Cambridge, Mass.

EXPLANATION OF PLATE 10.

Fig. 1. *Smynthurus socialis*, fore foot, x 472.

Fig. 2. *Smynthurus socialis*, mucro, x 472.

Fig. 3. " " hind foot, x 472.

Fig. 4. *Smynthurus socialis*, modified male antenna, x 171.

Fig. 5. *Smynthurus benitus*, terminal antennal segment, x 116.

Fig. 6. *Smynthurus amicus*, fore foot, x 353.

Fig. 7. *Smynthurus amicus*, mucro, x 353.

Fig. 8. " " hind foot, x 353.

PARTIAL LIFE-HISTORY OF HALISIDOTA CINCTIPES GROTE.

BY HARRISON G. DYAR, NEW YORK, N. Y.

Larva a large *Halisidota*, like *tessellaris*, but dark brown or silver gray brown with all the hair tufts white. Feeding on sea-grape, Lake Worth, Florida.

I assume eight stages, though some of them may be omitted in the actual ontogeny.

Stage IV. Skin orange brownish, a black subdorsal shade on joints 5 to 11, connected dorsally at the ends and most pronounced there (5 and 11); tubercles i to iii black on 5 and 11, elsewhere the warts are brownish. Head round, shining black over apex, brown below, labrum bright white; width 1.3 mm. Hair short, thin, white, with a few black ones, especially on the dark marks and on joints 5 and 11; a short, yellowish subdorsal

pencil on joints 4 and 12; a few longer pale hairs at the anterior end. Wart iv absent on the abdomen, leg plate shining; two warts on joints 3 and 4 above the stigmatal wart, one below it; joint 2 considerably retracted. The subdorsal pencil on joint 4 arises from tubercle i; on joint 12 from iii.

Stage VII. Head red-brown, a little blackish immediately above the white line on labrum and the white bases of the antennae; width 3.5 mm. Hair thinner than in the following stage, the color of the skin visible, violaceous brown with black dorsal shade and spiracular marks or blackish gray, shading darker stigmatically. Hair brown, varying from violaceous brown to chocolate;

