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NEW SPECIES OF SMINTHURIDAE FROM NORTH AMERICA (COLLEMBOLA: SYMPHYPLEONA)

Richard J. Snider¹

This account is the result of efforts by Drs. Kenneth Christiansen and Peter Bellingier to amass and examine the major collections of North American Collembola. Their work will culminate in a descriptive monograph on the Collembola-fauna of North America. The author agreed to describe part of the new species of Sminthuridae extracted from those collections. The analysis of specimens justifies erection of 17 species new to science.

Sminthurinus (Polykatianna) polygonius n.sp.

Plate I: Figs. 1-13

Antennae light purple, darkest distally. Head with purple polygons of pigment strongly expressed from the bases of the antennae to the apex; with a dark inter-antennal spot and light dusting of purple on the genae. In some specimens only the inter-antennal spot and genal pigmentation occurs. Thorax and abdomen with purple pigment in an irregular pattern of polygons on a light yellow background; some specimens lack purple pigment entirely.

Eyes 8+8; ocellus C smaller than H. Antennal segments in the ratio of 1:2:3:6. ANT IV subannulated into 12-13 intermediates; median apical bulb not present, but with lateral apical papilla. ANT III with subapical sense rods lying in shallow depressions; lateral sensory papilla may or may not be visible. Thoracic segmentation evident. Metatrochanter with D₂ modified into a trochanteral organ. Inner margins of the metatibiae with 11-12 heavy setae; tibiotarsi with 10-11 strongly clavate tenent hairs; pretarsus with an anterior inner and posterior setula. Unguis lanceolate with an outer tooth midway between the base and apex; inner margin with a weak (sometimes absent) tooth slightly more than halfway distant from the base. Unguiculus with a distinct inner corner tooth and short apical needle. Sacs of the ventral tube smooth. Rami of the tenaculum quadridentate; anterior corpus with one subapical and one apical setula. Manubrium with 10 dorsal setae. Dens with 3+3 ventral subapical setae; dorsally with seven and laterally with five subapical setae. Mucro with rachis obliquely recurved, inner lamella serrate, outer lamella smooth. Dorsal anal lobe without a median, bifid seta. Female subanal appendage fimbriate. Bothriotrix D situated on a low papilla; body setae on the posterior half of the abdomen twice as long as those on the thorax. Maximum length 1.4 mm.

HOLOTYPE and four **PARATYPES** from Shades State Park, Montgomery County, Indiana, 14 March, 1957 (E. L. Mockford). Holotype and paratypes deposited at the Illinois Natural History Survey. **ADDITIONAL LOCALITIES:** Illinois, Thebes, 7 December, 1934, beach woods, H. H. Ross; Geff, 25 January, 1947, Burks et al.; Vienna, 25 January, 1947, debris in woods, Burks et al.; Union County, slide 479 and 16, J. W. Hart. Indiana, 3 mi. E. Hillsboro, Fountain County, 27 December, 1956, under rock outcropping, J. Kingsolver.

In many aspects, *S. (Polykatianna) polygonius* resembles *S. (Metakatianna) macgillivrayi*. However, it lacks the tuberculate form of bothriotrix D characteristic of that subgenus. In addition, the subannulations of ANT IV are transverse, while in *macgillivrayi* they are oblique.

Sminthurinus (Polykatianna) intermedius n.sp.

Plate I: Figs. 14-27

Antennae purple, darker distally. The rest of the body is yellow overlaid with purple (sometimes blackish-purple). The head has slightly more dusting of pigment from the

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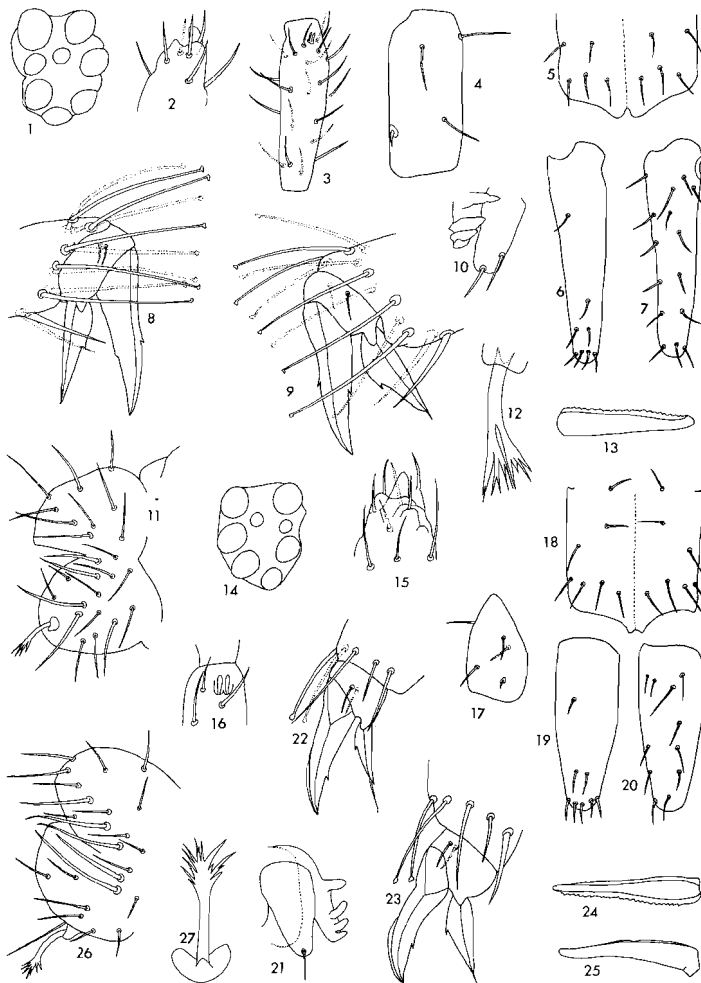


PLATE I. Figs. 1-13. *Sminthurinus (Polykatianna) polygonius* n.sp. (Illustrations from holotype, Ind., except where indicated.) 1. Right eyepatch (Thebes, Ill.); 2. Apex of ANT IV (Hillsboro, Ind.); 3. ANT III (Hillsboro, Ind.); 4. Metatrochanter; 5. Dorsum of manubrium (Hillsboro, Ind.); 6. Ventral surface of dens (Hillsboro, Ind.); 7. Dorsal surface of dens (Hillsboro, Ind.); 8. Fore foot complex; 9. Hind foot complex; 10. Tenaculum (Union Co., Ill.); 11. Female anal papilla; 12. Female subanal appendage; 13. Mucro (Vienna, Ill.). Figs. 14-26. *Sminthurinus (Polykatianna) intermedius* n.sp. (Illustrations from paratype, Md., except where indicated.) 14. Left eyepatch (holotype, Md.); 15. Apex of ANT IV (holotype, Md.); 16. Subapical sense rods of ANT III (holotype, Md.); 17. Metatrochanter; 18. Dorsum of manubrium; 19. Ventral surface of dens; 20. Dorsal surface of dens; 21. Tenaculum; 22. Fore foot complex; 23. Hind foot complex; 24. Mucro, dorsal view; 25. Mucro, lateral view; 26. Female anal papilla (Jackson Co., Iowa); 27. Female subanal appendage.

apex, down the frons, to the mouthparts; the inter-antennal spot may be faint or darker than the rest of the pigment, but never blackish and well demarcated. Purple pigment appears as a wash over the thorax and abdomen; in some specimens the pigment is concentrated slightly more on the posterior-lateral regions of the abdomen; the pigment surrounding bothriotrix A, B, C, and D appears almost black. The legs and furcula, in all cases, are yellow.

Eyes 8+8; ocelli C and D reduced in diameter, C .66 to .75 as large as ocellus H. Antennal segments in the ratio of 1:1.5:2:4; ANT IV not subannulated; median apical bulb not present, but with a lateral apical papilla. ANT III with subapical sense rods lying in shallow depressions; with a lateral sensory papilla. Thoracic segmentation evident. Metatrochanters with seta D_2 modified into a trochanteral organ. Inner margins of the metatibia with 11-12 heavy setae; tibiotarsi with two strongly clavate tenent hairs; pretarsus with an anterior and posterior setula. Unguis curving lanceolate with an inner tooth (sometimes not well developed) two-thirds of the distance from the base; a tunica is usually present. Unguiculus with a distinct corner tooth and short apical needle (however, on the proleg, the needle is half the length of the unguiculus). Sacs of the ventral tube smooth. Rami of the tenaculum quadridentate; anterior corpus with a single apical setula. Manubrium with 14 dorsal setae. Dens with 2+2 ventral subapical setae; dorsally with six and laterally with three subapical setae. Mucro with rachis obliquely recurved, inner lamella finely serrate, outer lamella smooth, ventral surface curved rather than straight. Dorsal anal lobe without a median, bifid seta. Female subanal appendage fimbriate. Bothriotrix D located on a prominent papilla (very clear on specimens in alcohol); body setae uniformly short and curving. Maximum size 0.75 mm.

HOLOTYPE and five **PARATYPES** on a single slide from Green Ridge Mountain, Maryland, along HWY 40, in woodland, 16 December, 1946, H. H. Ross et al. An additional 49 paratypes are preserved in alcohol. Holotype slide and 39 paratypes deposited at the Illinois Natural History Survey. Additionally five paratypes each deposited at the U.S. National Museum and the Museum of Comparative Zoology, Harvard University. **ADDITIONAL LOCALITIES:** Connecticut, Middlesex County, Middlefield, 10 April, 1951, humus under White pine, 30 January, 1951, humus under Red pine. Illinois, Champaign County, Urbana, March-April, 1951, Trelease and Brownfield Woods, woody and leafy debris, R. K. Benjamin; Edwards County, Albion, 30 April, 1888, S. A. Forbes; Vermillion County, Oakwood, 21 January, 1934, T. H. Frison, soil cover in woods; Highland Lake, 25 November, 1946, H. H. Ross and Burks, under logs; Geff, 15 January, 1947, Burks et al., debris in oak woods. Iowa, Jackson County, Hunter's Cave, 15 December, 1957, S. Peck; and 1 June, 1960, color unknown, leaf litter.

This species is questionable in its placement. It displays a papilla on ANT III and has the ventral surface of the mucro curved. In many respects, it resembles the subgenus *Sminthurius*. However, it clearly lacks the bifid seta of the anal lobe common to that subgenus.

Sminthurinus (Sminthurinus) atrapallidus n.sp.

Plate II: Figs. 28-38

Antennae white with a light dusting of blue, ANT I dark blue-black, ANT II-IV with dark blue-black pigmentation distally. The head and trunk black with dark blue highlights; ventrally with posterior light area. Legs and furcula with a dusting of blue over white.

Eyes 8+8; ocellus C half the diameter of H. Antennal segments in the ratio of 1:2:3:6. ANT IV not subannulated, with setae whorled, and apical bulb present. ANT III with subapical sense rods lying in shallow depressions; with a lateral sensory papilla; setae not outstanding. Thoracic segmentation evident. Metatrochanters with seta D_2 modified into a trochanteral organ. Inner margins of metatibia with 9-11 heavy seta; tibiotarsus with five-six clavate tenent hairs; pretarsus with an anterior and posterior setula. Unguis curving lanceolate with a small inner tooth two-thirds distance from the base, an inner and outer pseudonychium is present, a tightly appressed tunica present (seen in some

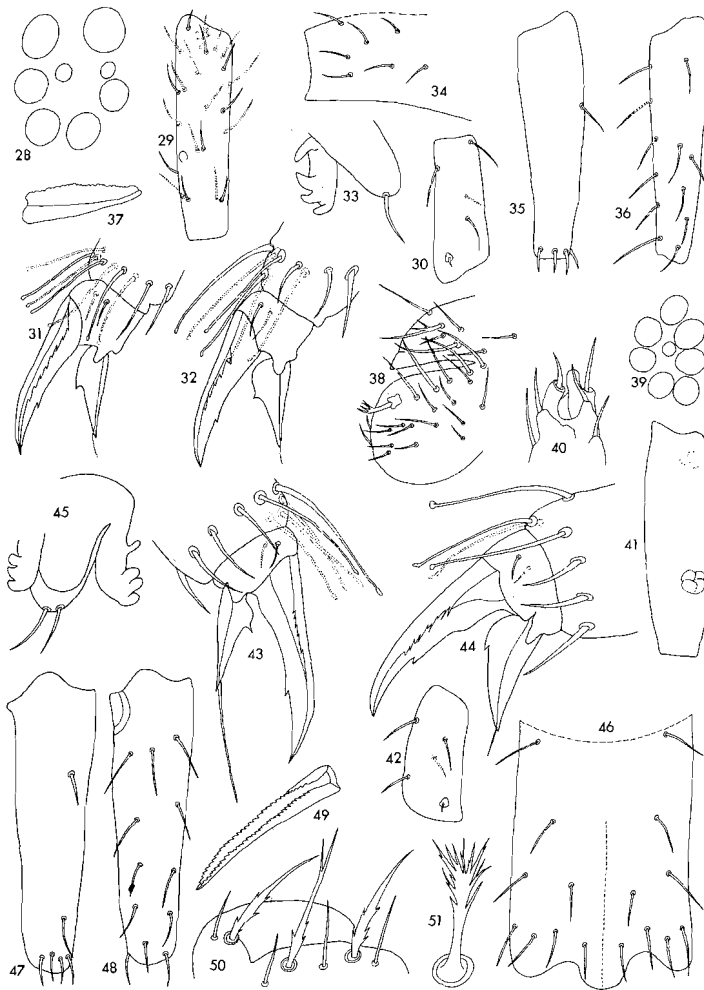


PLATE II. Figs. 28-38. *Sminthurinus (Sminthurinus) atrapallidus* n.sp. 28. Left eyepatch (Adams Co., Miss.); 29. ANT III (holotype, La.); 30. Metatrochanter (Ouachita Par., La.); 31. Fore foot complex (holotype, La.); 32. Hind foot complex (holotype, La.); 33. Tenaculum (holotype, La.); 34. Manubrium, dorso-lateral view (Ouachita Par., La.); 35. Manubrium, ventral view (Ouachita Par., La.); 36. Dorsal surface of dens (Ouachita Par., La.); 37. Mucro (Jackson Co., Miss.); 38. Female anal papilla (holotype, La.). Figs. 39-51. *Sminthurinus (Sminthurinus) conchylatus* n.sp. (All illustrations from the holotype, Burksville Cave, Ill.) 39. Right eyepatch; 40. Apex of ANT IV; 41. ANT III; 42. Metatrochanter; 43. Fore foot complex; 44. Hind foot complex; 45. Tenaculum; 46. Dorsum of manubrium; 47. Ventral surface of dens; 48. Dorsal surface of dens; 49. Mucro; 50. Female anal papilla, dorsal valve; 51. Female subanal appendage.

mounting media better than others). Unguiculus with a corner tooth and apical needle (somewhat longer in the proleg). Sacs of the ventral tube smooth. Rami of the tenaculum quadridentate, anterior corpus with a single apical setula. Manubrium with 14 dorsal setae. Dens with 0+0 ventral subapical setae; dorsally with five and laterally with six subapical setae. Mucro with rachis distally upturned, inner lamella finely denticulate, outer lamella smooth. Median bifid seta present on dorsum of anal lobe. Female subanal appendage palmate. Bothriotrix D short, on a low papilla; body setae very short and curving. Maximum size 1.25-1.5 mm.

HOLOTYPE and one **PARATYPE** on a single slide from Tangipahoa Parish, Louisiana, 16 March, 1951, Cockerham and Harrison, under mulch. Holotype slide deposited at the U.S. National Museum. **ADDITIONAL LOCALITIES:** Louisiana, Ouachita Parish, slides 0006.001, 0012.001, 115.001, 003.001, J. Cancellare; Baton Rouge Parish, Baton Rouge, 21 February, 1963, Mississippi, Adams County, 5 mi S. Natchez, 5 March, 1957, on vetch; Jackson County, 5 mi. N. Ocean Springs, 21 February, 1956, on rye grass and Ocean Springs, same date, on white clover, George Decker.

This species is one of the largest of the genus *S. (Sminthurinus) atrapallidus* keys out to *S. mime* Börner in Stach (1956). The brief description given refers to the pseudonychium as finely serrate for *mime*. This is not the case for *atrapallidus* which has coarse serrations.

Sminthurinus (Sminthurinus) conchylitatus n.sp.

Plate II: Figs. 39-51

Antennae uniformly purple. Head and trunk purple-brown with scattered dots and lines of lighter pigment. Frons darker than genal areas, interantennal spot present with a small colorless bar-like line beneath it, light areas occur around the inner dorsal edge of the eye patches. Abdomen with many light spots and polygons of pigment; anal papilla with two dorsal pale spots in the shape of a comma. Legs dusted with purple, becoming lighter distally.

Eyes 8+8; ocellus C and H subequal, ocellus D half the diameter of the others. Antennal segments in the ratio of 1:2:3:6. ANT IV not subannulated, with setae whorled, and apical bulb present. ANT III with subapical sense rods lying in shallow depressions; with four lobed lateral sensory papilla; setae not outstanding; Thoracic segmentation evident. Metatrochanters with seta D₂ modified into a trochanteral organ. Inner margins of metatibia with 10-11 heavy setae; pro- and meso-tibiotarsi with five clavate tenent hairs, metatibiotarsus with four; pretarsus with an anterior and posterior setula. Unguis curving lanceolate with a small inner tooth two-thirds distance from the base, an anterior and posterior pseudonychium is weakly developed, a tightly appressed tunica is present. Unguiculus with a corner tooth and apical needle (the proleg apical needle is slightly over half the length of the unguis). Sacs of the ventral tube smooth. Rami of the tenaculum quadridentate, anterior corpus with two apical setulae. Manubrium with 16 dorsal setae. Dens with 1+1 ventral subapical setae; dorsally with five and laterally with four subapical setae. Mucro tapering with both lamellae serrate. Median bifid seta present on dorsum of anal lobe; circumanal setae expanded basally and irregularly serrate. Female subanal appendage fimbriate. Maximum size 1.2 mm.

HOLOTYPE and three **PARATYPES** on a single slide from Illinois, Burksville Cave, 4 January, 1958, on wood, Mockford and Bouseman. Additional four paratypes in alcohol, same location. Holotype slide and paratypes deposited at the Illinois Natural History Survey.

S. (Sminthurinus) conchylitatus keys out to *S. quadrimaculatus* (Ryder) in Stach (1956). It differs from that species with respect to the ANT III lateral sense papilla; *quadrimaculatus* is simple, *conchylitatus* is four-lobed. Also *quadrimaculatus* may have as many as two to three teeth on the inner margin of the unguis, while *conchylitatus* has one.

Sminthurinus (Sminthurinus) maculosus n.sp.

Plate III: Figs. 52-65

This species varies in color from the west to the east coast. Specimens from Oregon and California are mottled with bluish-purple pigment. Antennae light purple, becoming darker distally. Head dorsally darker than lower frons and genae. inter-antennal spot clearly visible. Dorsum of the thorax and abdomen generally darker than lateral areas; California specimens with pale area surrounding manubrium; two dorsal pale spots on the anal papilla in some individuals. Legs pigmented basally, becoming lighter distally. The Louisiana specimens are uniformly pale yellow, except for purple dusting on the last two segments of the antennae. Sometimes a very light dusting of purple occurs laterally on the body in these individuals.

Eyes 8+8; ocelli C and D half the diameter of the others, B and H widely separated. Antennal segments in the ratio of 1:1.5:2:5. ANT IV not subannulated, setae whorled, apical bulb not present, latero-apical papilla present. ANT III with subapical sense rods lying in shallow depressions; lateral sensory papilla very low or absent; setae not outstanding. Thoracic segmentation evident. Metatrochanters with seta D₂ modified into a trochanteral organ. Inner margins of metatibia with 10-11 heavy setae; tibiotarsi with six-seven weakly clavate tenent hairs; pretarsus with an anterior and posterior setula. Unguis lanceolate with a weak tooth two-thirds distance from the base, tunica present. Unguiculus with a weak corner tooth and apical needle (longer on the proleg). Sacs of the ventral tube smooth. Rami of the tenaculum quadridentate, anterior corpus with a single apical setula. Manubrium with 12 dorsal setae. Dens with 6+6 ventral subapical setae; dorsally with six and laterally with six subapical setae. Mucro with inner lamella finely denticulate, outer lamella smooth. Median bifid seta present on dorsum of anal lobe; circumanal setae expanded basally; female subanal appendage fimbriate. Body sparsely clothed with short curved setae. Maximum size 1 mm.

HOLOTYPE and **PARATYPE** on a single slide from Oregon, Jackson County, Griffin Creek, 5 December, 1950, on water and debris of an irrigation canal, H. H. White. Additional paratypes on two slides from the same date. A vial containing 40 additional specimens from the type locality of the same date was examined. However, all of the specimens mounted were identified as *S. elegans*. Therefore, the 40 specimens in addition to the holotype and one paratype slide, are deposited at the Illinois Natural History Survey. It is hoped that future investigators will mount and determine these dubious specimens when the need arises. A paratype slide is deposited in the Entomology Museum, Michigan State University. **ADDITIONAL LOCALITIES:** California, Stanislaus County, 5 mi N. of Turlock Lake, N.W. of La Grange, Mima mound and rocky outcrop, 9 and 11 March, 1976, J. Collins. Florida, Alachua County, 9 mi W. of Gainesville, Warrens Cave, 24 December, 1965, S. Peck. Louisiana, Madison Parish, Tallalah, 26 November, 1935, J. W. Folsom.

This species keys out in Stach (1956) closest to *S. megoculatus* Maynard. Upon examination of *megoculatus* we find that it is a synonym of *Sminthurinus henshawi* (Folsom). *Sminthurinus (Sminthurinus) maculosus* appears closely related to *henshawi*. However, it can be separated from that species by the differences in ventral subapical setae of the dens; lack of the pseudonygium; 12 dorsal setae on the manubrium (specimens of *henshawi* from Michigan have 14); and possibly the female subanal appendage (*henshawi* is greatly dissected, while *maculosus* has few branches).

Bourletiella (Bourletiella) christianseni n.sp.

Plate III: Figs. 66-72

Antennae blue, becoming darker distally. Inter-antennal spot present; below the eye patches and midway between the vertex of the head and mouthparts is a broken blue band that extends across the frons and extends over the genae to the posterior. Body with blue pigment on light yellow, forming a broad lateral band on each side of the abdomen and a narrower dorsolateral band which runs from the head to the posterior of the great abdomen, where these bands join together dorsally on the anal papilla; sometimes with a median dorsal line. Legs and furcula without markings.

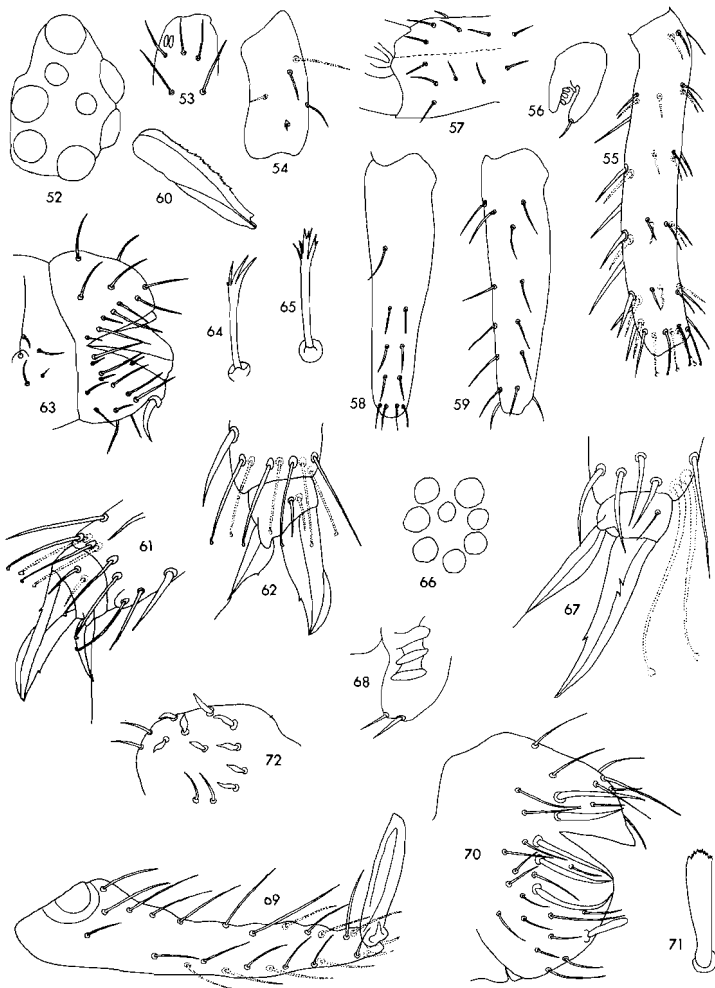


PLATE III. Figs. 52-65. *Sminthurinus* (*Sminthurinus*) *maculosus* n.sp. 52. Right eyepatch (holotype, Ore.); 53. ANT III, distal portion (Stanislaus Co., Calif.); 54. Metatrochanter (Stanislaus Co., Calif.); 55. Metatibia, posterior view (Stanislaus Co., Calif.); 56. Tenaculum (Stanislaus Co., Calif.); 57. Manubrium, right dorsal-lateral view (Stanislaus Co., Calif.); 58. Ventral surface of dens (Tallalah, La.); 59. Dorsal surface of dens (Tallalah, La.); 60. Mucro (holotype, Ore.); 61. Fore foot complex (holotype, Ore.); 62. Hind foot complex (holotype, Ore.); 63. Female anal papilla (Stanislaus Co., Calif.); 64-65. Female subanal appendage (Stanislaus Co., Calif.). Figs. 66-71. *Bourlettiella* (*Bourlettiella*) *christianseni* n.sp. (All illustrations from holotype, Ill., except where indicated) 66. Left eyepatch; 67. Hind foot complex; 68. Tenaculum; 69. Dorsal-lateral view of dens and mucro; 70. Female anal papilla; 71. Female subanal appendage, dorsal view; 72. Male dorsal organ (paratype, Ill.).

Eyes 8+8; ocellus C smaller than H. Specimens so shriveled that the ratio between segments of the antenna cannot be determined. ANT IV subannulated into seven-eight intermediates; apical bulb present. ANT III with subapical sense rods lying in shallow depressions; setae normal. Thoracic segmentation not distinct. Metatrochanters with oval organs. Tibiotarsus of the pro- and mesotibia with three appressed clavate tenent hairs, metibia with two. Pretarsus with an anterior setula. Unguis lanceolate with lateral teeth and an inner tooth two-thirds distance from the base; first pair of legs with an outer tooth one-third the distance from the base. Unguiculus tapering, without a corner tooth, with a short apical needle. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with two apical setulae. Dens with seven dorsal and nine lateral setae. Mucro with rachis fused with lateral lamellae into a spoon-shape. Anal papilla with upper valve bearing two large setae with expanded bases on either side, lower valve with three; female subanal appendage truncate with apical fringe. Male dorsal organ with short subovate seta. Maximum size 1 mm.

HOLOTYPE and eight **PARATYPES** on one slide from Illinois, Champaign County, Illinois State University campus, 8 August, 1951, grass sweeping, W. R. Richards. An additional slide with three paratypes taken on the same day. The type and paratypes are deposited at the Illinois Natural History Survey. **ADDITIONAL LOCALITY:** Illinois, Williamson County, Carterville, 2 August, 1952, grass sweeping, L. Stannard and W. R. Richards.

B. christianseni appears to be unique among the members of the subgenus for North America by having the male dorsal organ with subovate spines. This characteristic alone separates it from other species. It gives me great pleasure to name this species for Dr. Kenneth Christiansen of Grinnell College.

Bourletiella (Deuterostminthurus) lipponi n.sp.

Plate IV: Figs. 73-92

FEMALE: Antennae light brown, segments I and II with dark purple pigment. Head with mosaics of pigment forming patches and bands; midway between antennae and mouthparts an alternating light and dark brown band extends to the genae; lower frons to mouthparts dusted with yellow-orange; deep orange interantennal spot surrounded with yellow, brown “?” mark lines connect the interantennal spot with the bases of the antennae; brown mosaic patches posterior to eyepatches extend to occiput; the rest of the head white. Body with a brown-purple lateral band becoming darker as it extends and converges over the base of the anal papilla; dorso-lateral band of orange and brown mosaics extending half the length of the abdomen before becoming dark blackish-purple and converging with the lateral band at the base of the anal papilla; parafurcular lobes with two dark purple maculae; and papilla with dorsal blackish-purple pigment with a white macula on either side. The rest of the body and appendages white.

MALE: The same as for the female except that the ground color is more yellow; the lateral bands are expanded both to the anterior and dorsum, leaving only the dorso-lateral bands free for half their length, forming a blackish-purple pattern over three-quarters of the great abdomen. It should be noted that in both male and female, at the apex of the great abdomen, white enamel-like patches appear between the two bands. These are formed from deposition of ureate by-products and are best seen in adult specimens.

Eyes 8+8; ocelli D and G reduced to half the diameter of H. Antennal segments in the ratio of 1:1.5:2:5. ANT IV subannulated into five intermediates; apical bulb present. ANT III with subapical sense rods lying in shallow depressions; an accessory sense rod lies slightly oblique and posterior to the pair of sense rods; setae normal. Thoracic segmentation not distinct. Metatrochanters with oval organs; five anterior and one posterior setae. Metafemora with two posterior setulae. Tibiotarsi of the pro- and mesolegs with three heavy, appressed, clavate tenent hairs; meta-tibiotarsi with two tenent hairs. Pretarsus with an anterior setula. Unguis lanceolate with a basal outer tooth and a weak inner tooth one-half to three-quarters the distance from the base. Unguiculus of the prolegs shaped like a strong bristle, tapering to a strong knob; meso- and metalegs with lamellae developed, with stout apical filament, ending in a knob. Sacs of the ventral tube

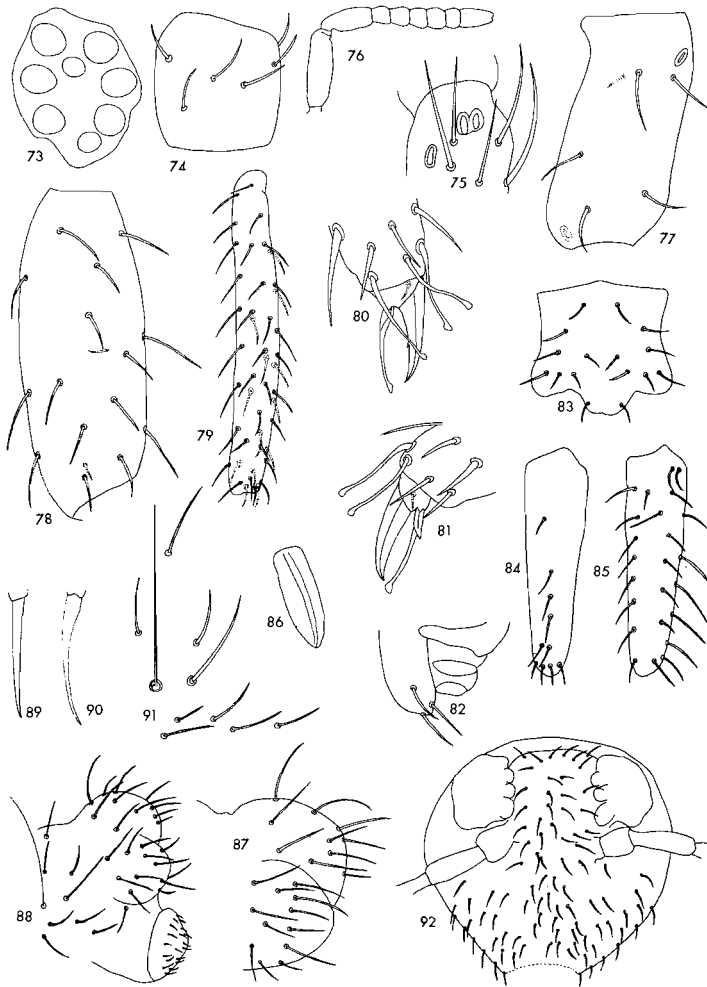


PLATE IV. Figs. 73-92. *Bourletiella (Deuterosminthurus) lipsoni* n.sp. (All illustrations from holotype, Md., except where indicated) 73. Right eyepatch; 74. ANT I; 75. ANT III, distal portion; 76. Antennal segments III and IV; 77. Metatrochanter; 78. Metafemur; 79. Metatibia; 80. Fore foot complex; 81. Hind foot complex; 82. Tenaculum; 83. Dorsum of manubrium; 84. Ventral surface of dens; 85. Dorsal surface of dens; 86. Mucro; 87. Female anal papilla; 88. Anal papilla of male (allotype, Md.); 89. Female subanal appendage, dorsal view; 90. Female subanal appendage, lateral view; 91. Bothriotrix D complex; 92. Setal pattern of head.

tuberculate. Rami of the tenaculum tridentate; anterior corpus with three apical setulae. Manubrium with 16 dorsal setae. Dens with six ventral setae; six lateral setae and 16 dorsal setae. Mucro with rachis fused with lateral lamellae into a spoon-shape. Anal papilla with normal curving setae; female subanal appendage setiform. Setae of the head and body, short and curving; heavily concentrated between the eye patches and sparsely distributed on the abdomen. Maximum size of female 0.7 mm and male 0.5 mm.

HOLOTYPE (female) and **ALLOTYPE** (male) from Maryland, Talbot County, Easton, 5 September, 1975, grass sweepings, R. J. Snider. **PARATYPES**: 29 in alcohol taken on the same date. The types and paratypes are deposited in the Entomology Museum, Michigan State University. **ADDITIONAL LOCALITIES**: Maryland, Talbot County, Oxford, 5 September, 1975, dry basin grass sweepings, R. J. Snider. Florida, Dade County, Miami, 27 December, 1956, grass lawn, G. C. Decker.

B. (Deuterosminthurus) lippsoni may be easily recognized by the unique heavily knobbed unguiculus. Other members of the subgenus, while exhibiting this feature, do not have such a thick filament. It gives me pleasure to name this species for my friend and colleague, Dr. Robert L. Lippson, Research Coordinator, National Marine Fisheries Service, Oxford, Maryland, in whose backyard I first made its acquaintance.

Bourletiella (Deuterosminthurus) lurida n.sp.

Plate V: Figs. 93-111

Uniformly pale yellow; appendages almost colorless; the only outstanding color is the black pigment surrounding the ocelli. In some large adults, very faint purple markings occur on the dorsum of the abdomen.

Eyes 8+8; ocelli C and H subequal, D slightly reduced in diameter. Antennal segments in the ratio of 1:2:3:6. ANT IV subannulated into six-nine intermediates; apical bulb present. ANT III with subapical sense rods lying in shallow depressions; an accessory sense rod lies slightly oblique and posterior to the pair of sense rods; setae normal. Thoracic segmentation not evident. Metatrochanters with oval organs; five anterior and one posterior setae. Metafemora with two posterior setulae. Tibiotarsi of the pro- and mesolegs with three heavy, appressed clavate tenent hairs; meta-tibiotarsi with two tenent hairs. Pretarsus with an anterior setula. Unguis lanceolate with a weak outer tooth half the distance from the base; inner tooth one-third the distance from the apex. Unguiculus of the proleg shaped like a strong bristle; meso- and metalegs with lamellae developed, tapering to a sharp filament. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with two setulae. Manubrium with 20 dorsal setae. Dens with six subapical ventral setae. Mucro with rachis fused to lateral lamellae forming a spoon-shape. Anal papilla with normal curving setae; female subanal appendage spatulate (appearing setiform in lateral view). Setae of the head and body normal curving; heaviest concentration between the eye patches and frons, and posterior half of the abdomen. Maximum size of female 1 mm and male 0.7 mm.

HOLOTYPE (female) and **ALLOTYPE** (male) from California, Monterey County, Monterey, Linsdale #64. **PARATYPES**: from the same location and date, a single slide of ten specimens and 37 in alcohol. Types and 25 paratypes are deposited at the Illinois Natural History Survey; six paratypes at the Museum of Comparative Zoology, Harvard University; six paratypes at the Entomology Museum, Michigan State University. **ADDITIONAL LOCALITIES**: California, Fresno County, Coalinga, ex. *Erodium cicutarium*, 26 February; *Monalopia major*, 25 March; juniper leaf mould, 30 April, 1957, H. L. Wilson. Modoc County, Knox Mountain, 1 and 2 July, 1964, drop cloth collections, Don Dahlster.

B. (Deuterosminthurus) lurida keys out in Stach (1956) to *D. russata* Maynard based on the length and shape of the unguiculus. While the two species are close, they can be separated by the number of ventral subapical setae on the dens; *russata* has three, and *lurida* has six.

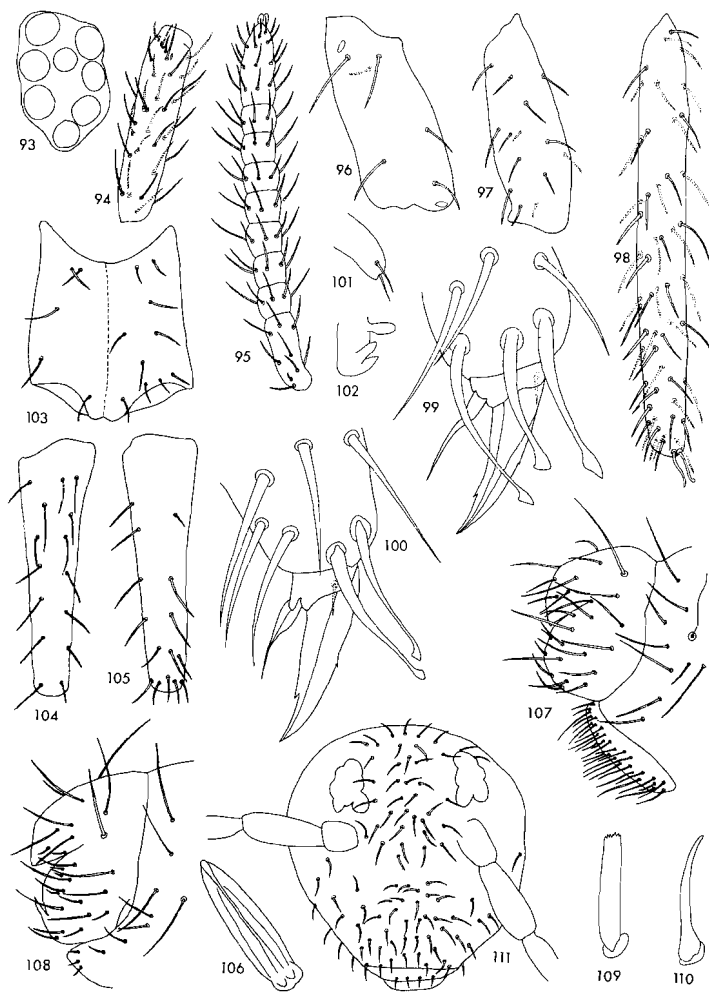


PLATE V. Figs. 93-111. *Bourletiella (Deuterosminthurus) lurida* n.sp. (Illustrations from holotype, except where indicated.) 93. Right eyepatch (Modoc Co., Calif.); 94. ANT III (Modoc Co., Calif.); 95. ANT IV; 96. Metatrochanter; 97. Metafemur; 98. Metatibia; 99. Fore foot complex; 100. Hind foot complex; 101. Corpus of tenaculum; 102. Ramus of tenaculum; 103. Dorsum of manubrium; 104. Dorsal surface of dens; 105. Ventral surface of dens; 106. Mucro-dorsal view; 107. Male anal papilla (Fresno Co., Calif.); 108. Female anal pupilla; 109. Female subanal appendage, dorsal view; 110. Female subanal appendage, lateral view. 111. Setal pattern of head.

Bourletiella (Deuterosminthurus) validentata n.sp.

Plate VI: Figs. 112-127

The condition of the specimens, in all of the material, is so poor that a valid color description is impossible. Based on examination of four individuals preserved in alcohol, the following pattern is offered. Frons and lower genae with pigment; bands of pigment behind each eye patch leading to the occiput. The body has lateral and dorsal bands converging at the anal papilla; the dorsal band has a lighter line running through the middle from anterior to posterior. This pattern is best seen in the male. The female appears to have a confluence of the pigment bands over much of the abdomen, leaving a light area at the anterior apex of the dorsum. Legs with blotches of color on the tibia, femur, and trochanter. Manubrium with dorsal and ventral blotches of pigment; dens with basal blotches on proximal to the integumentary ridges. From slide material, it is possible to see the pigment laid down as mosaics. Some individuals have a scattering of pigment, while others have heavy concentrations. The slide material registers the pigment color as blue.

Eyes 8+8; ocellus C is three-quarters the diameter of H. Antennal segments in the ratio of 1:2:2.5:5.5. ANT IV subannulated into 9-10 intermediates; apical bulb present. ANT II with subapical sense rods lying in shallow depressions; an accessory sense rod lies slightly oblique and posterior to the pair of sense rods; setae numerous, normal. Thoracic segmentation not evident. Metatrochanters with oval organs; five anterior and one posterior setae. Metafemora with two posterior setulae. Tibiotarsi of the pro- and mesolegs with three heavily appressed, clavate tenent hairs; meta-tibiotarsi with two tenent hairs. Pretarsus with an anterior setula. Unguis curving lanceolate with strong inner tooth one-quarter the distance from the apex; an outer tooth occurs one-half the distance from the base. Unguiculus setiform with a heavy subapical needle tapering into a knob. Sacs of the ventral tube tuberculate. Rami of tenaculum tridentate; anterior corpus with three apical setulae. Manubrium with 14 dorsal setae. Dens with six subapical ventral setae. Mucro with rachis fused to lateral lamellae forming a paddle. Anal papilla with 14 heavy, broad based circumanal setae and normal curving setae; female subanal appendage spatulate (blunt setiform in lateral view). Setae of the head and body short and curving, most heavily concentrated between the eyes and lower frons, and posterior half of the abdomen. Maximum size for female 1.25 mm and male 0.8 mm.

HOLOTYPE (female) and **ALLOTYPE** (male) from Arizona, Pima County, Quijotoa, 28 August, 1927, J. D. Hood. Holotype and allotype in alcohol, four paratypes of same date deposited at the Illinois Natural History Survey, one paratype deposited at the Entomology Museum, Michigan State University. **ADDITIONAL LOCALITIES:** Oklahoma, Pawnee County, 9 May, 1971, on cow pats, slide #2855. Texas, Presidio County, Presidio, 22 April, 1928, on greasewood; West Texas, October 1961, E. Huddleston.

This species can be recognized by the large inner tooth of the unguis. The unguiculus has a shape that is very similar to that of *Bourletiella (Prorastropes) coalingaensis* n.sp.

Bourletiella (Deuterosminthurus) xeromorphus n.sp.

Plate VI, VII; Figs. 128-130, 131-146

Antennae light purple, darkest distally on segments I-III, segment IV uniformly darker. Head with a purple band of pigment extending between the eye patches to behind the head; dorsum of head without purple pigment between the eyes; pigment does not extend below the eye patches onto the genae or frons. Thorax and great abdomen with purple pigment extending halfway down, laterally lighter on the dorsal area of the first two to three abdominal segments, a light "V" sometimes appears clearly in that region; anal papilla purple dorsally with a lateral spot on either side, papilla of bothriotrix D surrounded by purple pigment. The rest of the body and legs bright yellow to pigmentless.

Eyes 8+8; ocellus C smaller in diameter than H. ANT IV segmented in the ratio 1:2:2.8:5.2 in females and 1:2:2.5:4.4 in males; subannulated into seven-eight intermediates with the basal portion elongate, intermediates ringed with eight curved setae;

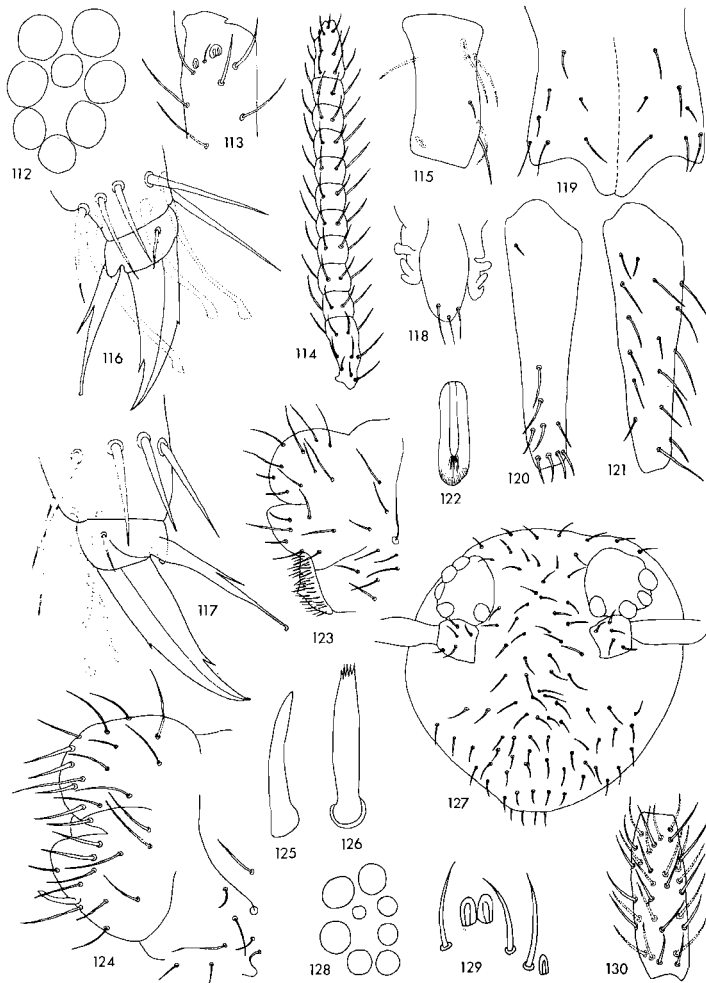


PLATE VI, Figs. 112-127. *Bourletiella* (*Deuteriosminthurus*) *validentata* n.sp. (Illustrations from Pawnee Co., Okla.; except where indicated.) 112. Left eyepatch (W. Tex.); 113. ANT III, distal portion; 114. ANT IV; 115. Metatrochanter; 116. Fore foot complex; 117. Hind foot complex; 118. Tenaculum; 119. Dorsum of manubrium (Presidio Co., Tex.); 120. Ventral surface of dens (holotype, Arz.); 121. Dorsal surface of dens (holotype, Arz.); 122. Mucro, dorsal view (Presidio Co., Tex.); 123. Male anal papilla (W. Tex.); 124. Female anal papilla; 125. Female subanal appendage, lateral view; 126. Female subanal appendage, dorsal view (W. Tex.); 127. Setal pattern of head. 128-130. *Bourletiella* (*Deuteriosminthurus*) *xeromorphus* n.sp. (Illustrations from holotype, allotype, and paratypes, Shiawassee Co., Mi.) 128. Right eyepatch; 129. Sense rods of ANT III; 130. ANT III.

apical retractile bulb present along with three-four rods. ANT III with subapical sense rods situated in shallow depressions; situated slightly below and posterior to the primary sense organ is a second sense organ consistency of a simple rod-shaped papilla in a depression; setae of the third antennal segment numerous and evenly distributed from base to apex. Segmentation of the thorax not evident. Metatrochanters with oval organs; five anterior and one posterior setae present. Femora with two posterior setulae. Tibiotarsi with heavy spine-like setae on the posterior margin, most evident in the distal half of the segment; pro- and mesotibiotarsi with three appressed; strongly clavate and two nonclavate tenent hairs; metatibiotarsis with two appressed, strongly clavate and two nonclavate tenent hairs; pretarsus with an anterior setula. Unguis of all legs curving lanceolate, with one outer tooth midway between base and apex, and an inner tooth midway between base and apex. Unguiculus lanceolate with a narrow outer lamella and broad inner lamella, with a strong subapical filament ending in a knob. Rami of the tenaculum tridentate; anterior lobe of corpus with three setulae. Sacs of the ventral tube tuberculate. Manubrium with 14 dorsal setae. Dens with 14 dorsal setae and six ventrally. Mucro with rachis fused to lamellae in a spoonshape; mucronal seta lacking. Anal papilla with numerous setae, female subanal appendages smooth and curving. Body setae short, curving and serrate, concentrated from mid-dorsum to posterior. Maximum size for female 0.75 mm and male 0.60 mm.

HOLOTYPE (female) and **ALLOTYPE** (male) from Michigan, Shiawassee County, T.5N, R.1W, S.21, Rose Lake State Game Area, pet trap, 21-28 May, 1967, R. T. Schuh. Holotype and allotype slides deposited in the Entomology Museum, Michigan State University. **PARATYPES** taken on the same date deposited as follows: 10 alcohol and three slide specimens, Michigan State University; 10 alcohol specimens, Illinois Natural History Survey; four alcohol and three slide specimens, Museum of Comparative Zoology, Harvard University; seven slide specimens undesignated.

This species is in many ways very similar to *B. (Deuterosminthurus) wexfordensis* Snider. It can be separated from that species on the basis of circumanal setae; ocellus C is smaller than H, in *wexfordensis*, they are subequal; finally the setae pattern of the dens is in a different configuration, the dorsal setae of *wexfordensis* is more uniform.

Bourletiella (Deuterosminthurus) nonfasciata n.sp.

Plate VII, VIII: Figs. 147-153, 154-169

Head and body entirely white except for the black pigment surrounding the ocelli and a very light dusting of purple pigment on the distal segments of the antennae.

Eyes 8+8; ocellus C with a diameter slightly less than H. Antennal segments in the ratio of 1.5:3:4:9. ANT IV subannulated into 14-15 intermediates, distal intermediates have a subapical setula, basal portion with two setulae, apical bulb present. ANT III with subapical sense rods lying in shallow depressions; an accessory sense rod lies slightly oblique and posterior to the pair of sense rods; setae numerous and normal. Thoracic segmentation not evident. Metatrochanters with oval organs; five anterior and one posterior setae. Metafemora with two posterior setulae. Tibiotarsi of the pro- and mesolegs with three heavily, appressed, clavate tenent hairs; metatibiotarsi with two tenent hairs; inner margin with heavy but not outstanding setae. Pretarsus with an anterior setula. Unguis lanceolate with a weak inner tooth one-quarter the distance from the apex; an outer tooth is sometimes evident half way between the base and apex. Unguiculus of the proleg setiform; meso- and metaleg have an apical needle. Sacs of the ventral tube tuberculate. Rami of tenaculum tridentate; anterior corpus with three setulae. Manubrium with 12 dorsal setae. Dens with six subapical ventral setae. Mucro with rachis fused to lateral lamellae forming a spoon-shape. Anal papilla with normal curving circumanal setae; female subanal appendage spatulate (setiform in lateral view). Setae of head and body short and curving; heaviest concentration between the eye patches and posterior half of abdomen. Maximum size for female 1 mm and male 0.8 mm.

HOLOTYPE (female) and **ALLOTYPE** (male) from California, Modoc County, Manzanita Mountain, 24 June, 1974. Holotype and allotype on slides deposited in the

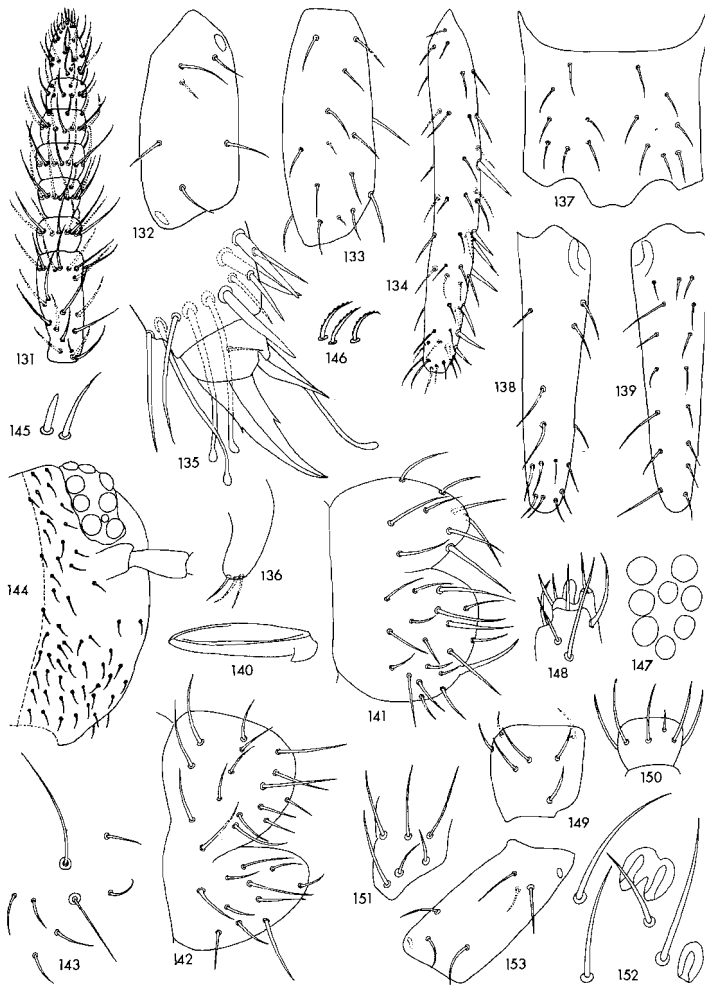


PLATE VII. Figs. 131-146. *Bourletiella (Deuterosminthurus) xeromorphus* n.sp. (Illustrations from holotype, allotype, and paratypes, Shiawassee Co., Mi.) 131. ANT IV; 132. Metatrochanter; 133. Metafemur; 134. Metatibia; 135. Hind foot complex; 136. Corpus of tenaculum; 137. Dorsum of manubrium; 138. Ventral surface of dens; 139. Dorsal surface of dens; 140. Mucro, lateral view; 141. Female anal papilla, holotype; 142. Male anal papilla, allotype; 143. Bothriotrix D complex; 144. Setal pattern of head; 145. Apical seta and sense rod, ANT IV; 146. Body setae. Figs. 147-153. *Bourletiella (Deuterosminthurus) nofasciata* n.sp. (Illustrations from holotype, allotype, and paratypes, Modoc Co., Calif.) 147. Right eyepatch; 148. ANT IV, apical portion; 149. ANT I; 150. Subsegment of ANT IV; 151. ANT IV, basal portion; 152. Sense rods of ANT III; 153. Metatrochanter.

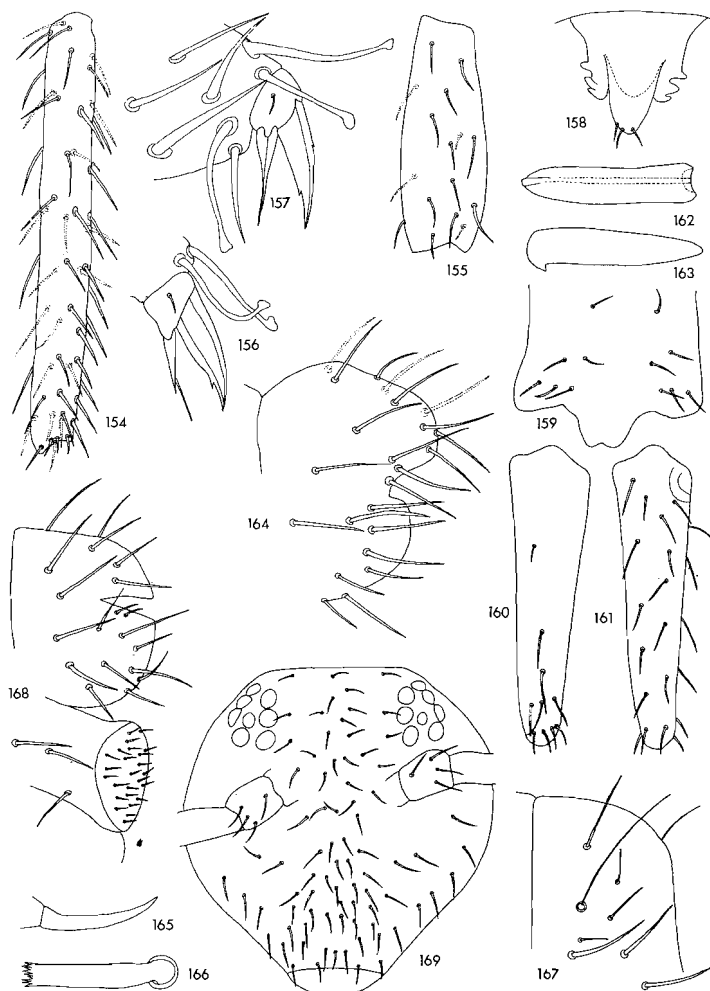


PLATE VIII. Figs. 154-169. *Bourletiella (Deuterosminthurus) nonfasciata* n.sp. (Illustrations from holotype, allotype, and paratypes, Modoc Co., Calif.) 154. Metatibia; 155. Metafemur; 156. Hind foot complex; 157. Fore foot complex; 158. Tenaculum; 159. Dorsum of manubrium; 160. Ventral surface of dens; 161. Dorsal surface of dens; 162. Mucro, dorsal view; 163. Mucro, lateral view; 164. Female anal papilla; 165. Female subanal appendage, lateral view; 166. Female subanal appendage, dorsal view; 167. Borthriotrix D. complex; 168. Male anal papilla; 169. Setal pattern of head.

Museum of Comparative Zoology, Harvard University. **PARATYPES** on the same date: two slides and three alcohol specimens deposited in the Museum of Comparative Zoology, Harvard University, two slides and three alcohol specimens deposited in the Entomology Museum, Michigan State University; one slide and two alcohol specimens deposited at the Illinois Natural History Survey.

This species keys out in Stach (1956) to *Heterosminthurus cornutus* Stach. It differs from that species by having a tooth on the unguis; three instead of two setae on the corpus of the tenaculum; lacking a four bristle complex on the frons of the male.

Bourletiella (Prorastropes) coalingaensis n.sp.

Plate IX: Figs. 170-183

All specimens were cleared before mounting, making it impossible to provide a color description at this time.

Eyes 8+8; ocellus C is smaller in diameter than H. Antennal segments in the ratio of 1:3:4:8. ANT IV subannulated into eight-nine intermediates, apical bulb present. ANT III with subapical sense rods lying in shallow depressions an accessory sense rod lies slightly oblique and posterior to the pair of sense rods; setae numerous and normal. Thoracic segmentation not evident. Metatrochanters with oval organs; five anterior and one posterior setae. Metafemora with two posterior setulae. Tibiotarsi of the pro- and mesolegs with three heavy, appressed, clavate tenent hairs; metatibiotarsi with two tenent hairs; tibiae with inner setae differentiated and truncate. Pretarsus with an anterior setula. Unguis curving lanceolate with an inner tooth ? Unguiculus setiform lamella not developed, apical needle tapering to a knob. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with three setulae. Dens with six subapical ventral setae. Mucro with rachis fused to lamellae forming a spoon-shape. Anal papilla with normal curving setae; female subanal appendage not observed. Setae of the head and body short and curving; concentrated between the eye patches and frons; sparse on the anterior half of the abdomen; concentrated on the posterior half, the setae being longer and more dense. Maximum size 0.75 mm.

HOLOTYPE (female) and **ALLOTYPE** (male) from California, Fresno County, Coalinga, ex. *Plantago insularis*, 16 June, 1958, H. L. Wilson. Holotype and allotype deposited at the Museum of Comparative Zoology, Harvard University. **PARATYPES**: two at the Entomology Museum, Michigan State University, two at the Illinois Natural History Survey, one at the Museum of Comparative Zoology, Harvard University.

This species bothers me in that I cannot describe the female subanal appendage. The adult stage may have not been reached. Therefore, this species must remain tentative until better specimens can be examined. This species keys out in Stach (1956) to *D. quinquefasciatus* (Krausbauer). It differs from that species by having a toothed unguis and more subannulation of the ANT IV.

Sphyrotheca confusus n.sp.

Plate IX, X: Figs. 184-196, 197

The small series of specimens available do not allow an accurate color description. However, the slides examined indicate that the antennae are blue; an interantennal spot is present; with pigment posterior to the eye patch and vertex of the head. Body with blue pigment in irregular oblique bands with many dots and lines; legs with blue mottlings on the femur and tibia.

Eyes 8+8; ocellus C and H subequal, one-half the diameter of other ocelli. ANT IV subannulated with 11-12 intermediates; apical bulb not present, with a slightly subapical papilla. ANT III with subapical sense rods lying in a shallow depression; with five-six straight, strong setae, others curving and normal. Thoracic segmentation not evident. Metatrochanters with oval organs; five anterior setae and posterior trochanteral spine. Tibiotarsal tenent hairs acuminate. Pretarsus with an anterior and posterior setula. Unguis lanceolate, with an inner tooth one-quarter the distance from the apex, tunica present. Unguiculus with well developed lamellae and corner tooth; subapical needle of proleg

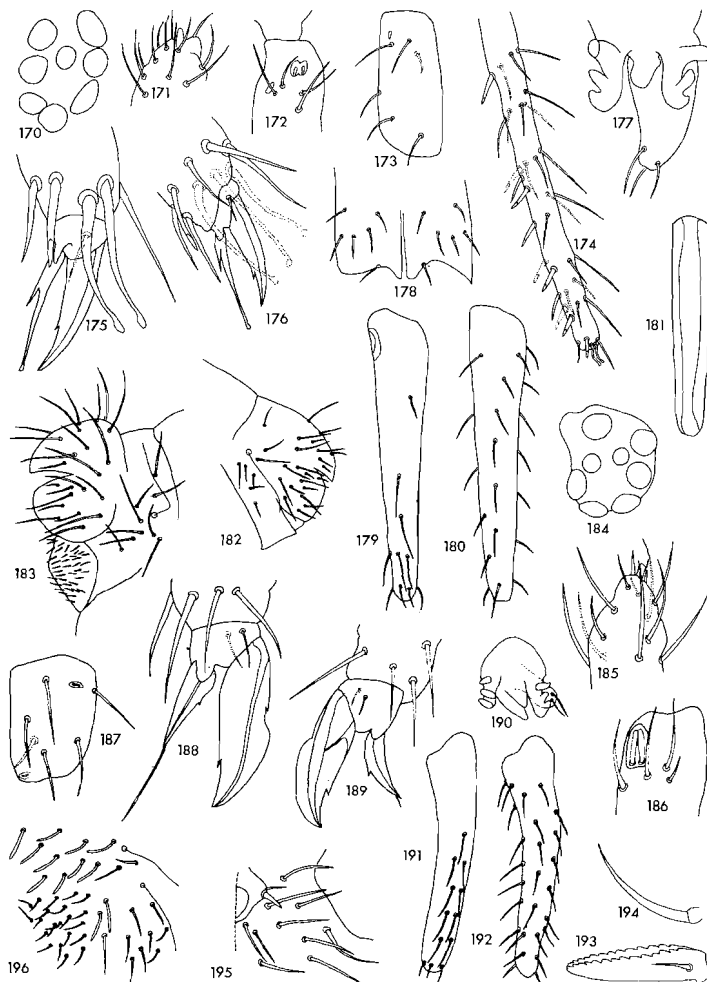


PLATE IX. Figs. 170-183. *Bourletiella (Prorastropes) coalingaensis* n.sp. (Illustrations from holotype, allotype, and paratypes, Fresno Co., Calif.) 140. Right eyepatch; 171. ANT IV, apical portion; 172. ANT III, distal portion; 173. Metatrochanter; 174. Metatibia; 175. Hind foot complex; 176. Fore foot complex; 177. Tenaculum; 178. Dorsum of manubrium; 179. Ventral surface of dens; 180. Dorsal surface of dens; 181. Mucro, dorsal view; 182. Female anal papilla. Figs. 184-196. *Sphyrotheca confusus* n.sp. (Illustrations from holotype, except where indicated.) 184. Right eyepatch; 185. ANT IV, apical portion; 186. ANT III, distal portion; 187. Metatrochanter; 188. Fore foot complex; 189. Hind foot complex; 190. Tenaculum (Tulare Co., Calif.); 191. Ventral surface of dens (Tulare Co., Calif.); 192. Dorsal surface of dens (Tulare Co., Calif.); 193. Mucro, lateral view; 194. Female subanal appendage; 195. Interocular setae; 196. Setae from posterior portion of abdomen.

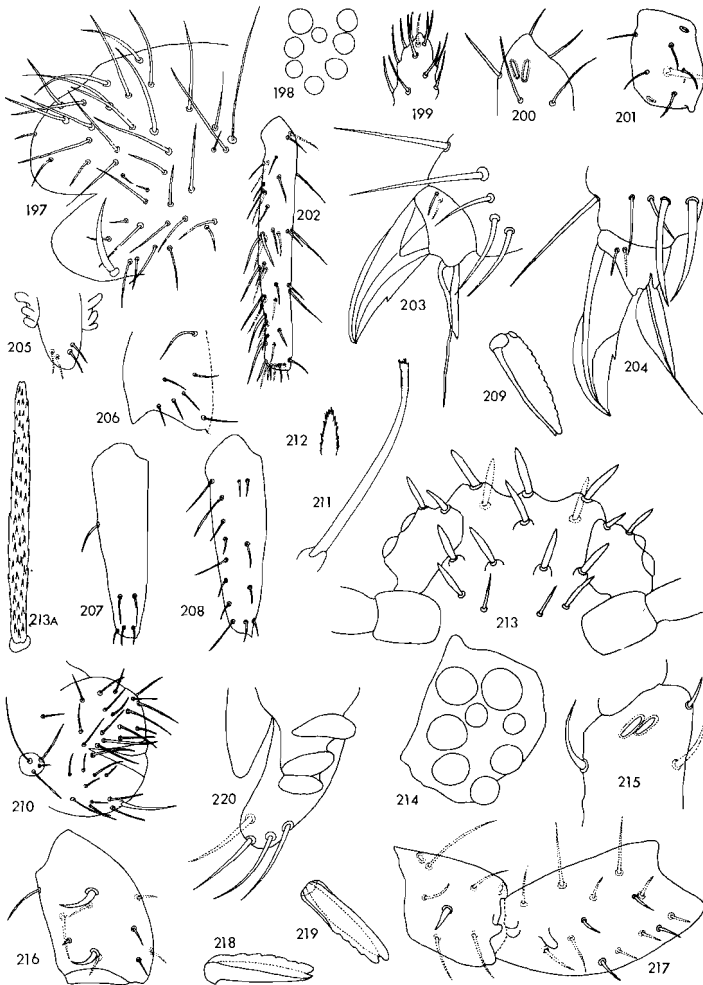


PLATE X. Fig. 197. *Sphyrotheca confusus* n.sp.; Female anal papilla. Figs. 198-213. *Sphyrotheca mucroserratus* n.sp. 198. Right eyepatch (Dade Co., Fla.); 199. ANT IV, apical portion (Lee Co., Fla.); 200. ANT III, distal portion (Lee Co., Fla.); 201. Metatrochanter (holotype, Fla.); 202. Metatibia (holotype, Fla.); 203. Fore foot complex (Dade Co., Fla.); 204. Hind foot complex (Dade Co., Fla.); 205. Tenaculum (holotype, Fla.); 206. Manubrium, dorso-lateral view (holotype, Fla.); 207. Ventral surface of dens (Dade Co., Fla.); 208. Dorsal surface of dens (Dade Co., Fla.); 209. Mucro (Dade Co., Fla.); 210. Female anal papilla (holotype, Fla.); 211. Female subanal appendage, lateral view (Dade Co., Fla.); 212. Female SAA, dorsal view; 213. Dorsal interocular setae (holotype, Fla.); 213A. Serrate body seta (holotype, Fla.). Figs. 214-220. *Neosminthurus bakeri* n.sp. (Illustrations from paratypes, Ky., except where indicated.) 214. Left eyepatch (holotype, Ky.); 215. ANT III, distal portion (Bath Co., Ky.); 216. Proleg femur; 217. Metatrochanter and femur; 218. Mucro, lateral view; 219. Mucro, dorsal view; 220. Tenaculum.

almost as long as unguiculus, short on the meso- and metalegs. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with two setulae. Dens with nine subapical ventral setae. Mucro with both lamellae serrate; spine present. Anal papilla numerous long curved setae; female subanal appendage curved, setiform. A single interocular spine-like seta associated with each eye patch. Dorsal body setae heavy, spine-like; posterior with short curving setae. Maximum length 1 mm.

HOLOTYPE (female) from California, Three Rivers, #3611. **PARATYPES**: one on same slide as holotype; Lakeside, 11 October, 1969; Sequoia National Park, Tulare County, Rt. 0198, 6 mi. above wood level, 16 April, 1974, P. Bellinger. Holotype and paratypes are deposited at the Museum of Comparative Zoology, Harvard University.

This species has many characteristics common to the genus *Sminthurus*. The stout setae of the body are smooth; the head lacks spines; both edges of the mucro are serrate; and the ventral setae of the dens are similar. However, it does exhibit a trochanteral organ and has exposed sense rods on ANT III.

Sphyrotheca mucroserratus n.sp.

Plate X: Figs. 198-213

Antennae purple, uniform throughout. Head with purple on lower frons, with purple band between bases of the antennae; a band from the frons, extends across the gena to the occiput. The body with weak purple bands extending laterally to the posterior; most of the posterior of the abdomen purple; legs and furcula with purple pigment. Background color yellow.

Eyes 8+8; ocellus C smaller in diameter than H. ANT IV subannulated with 9-10 intermediates; apical bulb weakly developed. ANT III with subapical sense rods lying in shallow depressions; with six spine-like setae, others curving and normal. Thoracic segmentation not evident. Metatrochanters with oval organs; five anterior setae and posterior spine. Tibiotarsal tenent hairs acuminate. Pretarsus with an anterior and posterior setula. Unguis lanceolate, with an inner tooth half the distance from the base, tunica present. Unguiculus with lamellae developed and lacking a corner tooth; apical needle of proleg; as long as unguiculus, short on meso- and metalegs. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with four setulae. Dens with three subapical ventral setae. Mucro with outer lamella smooth, inner serrate; mucronal seta absent. Anal papilla with normal setae; female subanal appendage truncate, weakly serrate apically. Intercocular setae spine-like, uniform in size and shape, serrate. Body with stout, spine-like serrate setae, interspersed with curving, normal setae. Maximum size of female 0.85 mm and male 0.75 mm.

HOLOTYPE (female) from Florida, Dade County, Miami Beach, Fisher Island, 9 September, 1952, ex. Australian pine needles, J. E. Porter. **PARATYPES**: three on the same slide as holotypes, two in alcohol, one on slide, taken on the same date. Holotype and paratypes are deposited at the Illinois Natural History Survey; one paratype at the Entomology Museum, Michigan State University. **ADDITIONAL LOCALITIES**: Florida, Monroe County, Long Pine Key, 24 December, 1951, leaf mould, W. R. Richards and L. Stannard. Everglades National Park, Royal Palm Ranger Station, 27 December, 1951, debris, W. R. Richards and L. Stannard. Lee County, Sanibel Island, 26 April, 1927, M. D. Leonard. Texas, Cameron County, Brownsville, 8 February, 1959, forest debris, H. H. Ross and L. Stannard.

This species resembles *S. minnesotensis*, but lacks that species' definite color pattern. The cephalic spines of *mucroserratus* are uniform in size and shape, whereas *minnesotensis* varies in size and shape.

Neosminthurus bakeri n.sp.

Plate X, XI: Figs. 214-220, 221-234

Antennae with blue pigment, darkest on apical regions of each segment. Head dark blue to purple with light areas near the inner margins of the ocellar patches, mouthparts

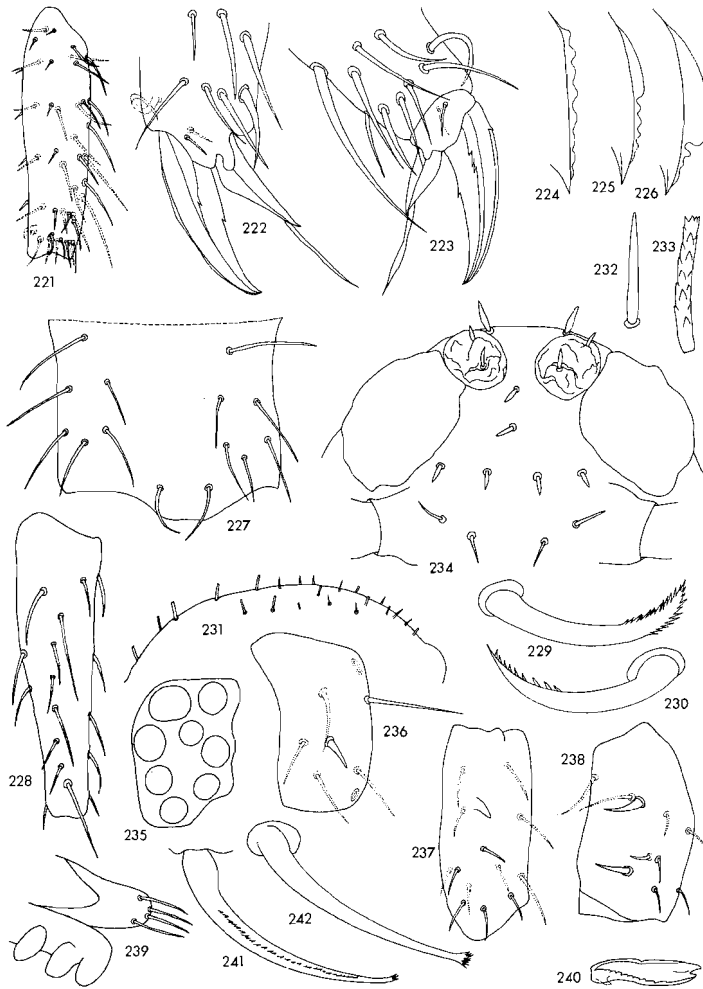


PLATE XI. Figs. 221-234. *Neosminthurus bakeri* n.sp. (Illustrations from paratypes, Ky.) 221. Metatibia; 222. Hind foot complex; 223. Fore foot complex; 224-226. Outer edge of unguis showing effects of mounting medium on tunica; 227. Dorsum of manubrium; 228. Dorsal surface of rt. dens; 229. Female subanal appendage, dorsal view; 230. Female SAA, lateral view; 231. Setae of the abdomen; 232. Normal body seta; 233. Serrate body seta; 234. Interocular setae of head. Figs. 235-242. *Neosminthurus richardsi* n.sp. (Illustrations from holotype, Conn., except where indicated.) 235. Right eyepatch; 236. Metatrochanter (Putnam Co., Fla.); 237. Metafemur; 238. Femur of the fore leg; 239. Tenaculum; 240. Mucro, lateral view (Lee Co., Ill.); 241. Female subanal appendage, lateral view; 242. Female SAA, dorsal view.

white. Body generally dark blue to purple, numerous pale spots and lines occur throughout, especially between segments. Legs and furcula with light blue pigment.

Eyes 8+8; ocelli C and H subequal, smaller in diameter than others. ANT IV not annulated, without an apical bulb, 1-1.4 times as long as ANT III. ANT III with subapical sense rods lying in deep depressions; setae short and stout. Thoracic segmentation evident. Metatrochanters with oval organs; posterior spine and 15 anterior setae. Metafemora (and mesofemora) with a posterior "finger-like" process, and two setulae. Profemora with two appressed posterior spines. Metatibia with six short setae on the posterior surface, outer edges with four; inner surface with four-five long setae; outer tenent hair acuminate, curving laterally around apex. Pretarsus with an anterior and posterior setula. Unguis curving lanceolate, with an inner tooth one-third the distance from the base; tunica present, with lateral serrations. Unguiculus lamellate, with a minute corner tooth or absent; apical needle tapers and then widens into a lanceolate form. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with four setulae. Manubrium with 14 dorsal setae. Dens without ventral setae, with five inner lateral setae. Mucro trough-shaped, appearing bifid; inner lamella with low serrations. Female subanal appendage finely serrated apically. Interocular setae short smooth, acuminate and spine-like. Body setae in the anterior half cylindrical, scaled; in the posterior half the cylindrical setae appear shorter and are mixed smooth acuminate setae. Maximum length 1.2 mm

HOLOTYPE (female) and **ALLOTYPE** (male) from Kentucky, Edmonson County, Mammoth Caves State Park, Filloyd Collins Crystal Cave, 19 April, 1963. **PARATYPES**: one on slide with types, three additional specimens on two slides, six in alcohol, all on same date as holotype. Holotype, one paratype slide, and three alcohol specimens deposited at the Museum of Comparative Zoology, Harvard University. One paratype slide and three alcohol specimens deposited in the Entomology Museum, Michigan State University. **ADDITIONAL LOCALITIES**: Kentucky, Filloyd Collins Crystal Cave, 19 February, 1963; Bath County, Salt Lick, 11 March, 1949, forest debris, Ross and Ross; Pine Ridge, 9 May, 1947, Rickert and Sanderson; 4 mi E. of Haus Cave, H. E. McClure. North Carolina, Buncombe County, Asheville, 1937, Jacot. Tennessee, Great Smoky Mountains National Park, Newfound Gap, 14 October, 1951, J. Sayers.

This species is easily recognized from *Neosminthurus clavatus* and *Neosminthurus richardsi* n.sp. on the basis body setae shape, and the number and position of dorsal setae on the dens. It gives me pleasure to name this species for Dr. Rollin H. Baker, Director of The Museum, Michigan State University.

Neosminthurus richardsi n.sp.
Plate XI, XII: Figs. 235-242, 243-250

Head and body blue to blue-black. Pigment laid down in mottlings separated by pale spots. Antennae blue, darkest distally on each segment. Legs and furcula with blue pigment in irregular mottlings.

Eyes 8+8; ocellus C smaller in diameter than H. ANT IV without an apical bulb; 1.25-1.35 times as long as ANT III. ANT III with subapical sense rods lying in deep depressions; setae short and stout. Thoracic segmentation evident. Metatrochanters with oval organs; posterior spine and five anterior setae. Metafemora (and mesofemora) with a posterior "finger-like" process, and five short setae. Profemora with two appressed posterior spines. Metatibia with four short setae on the posterior surface, outer edge with five; outer tenent hair acuminate, curving laterally around apex. Pretarsus with an anterior and posterior setula. Unguis curving lanceolate, with an inner tooth half the distance from the base; tunica present, with lateral serrations. Unguiculus lamellae, without a corner tooth; apical needle longer than unguiculus. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with four setulae. Dens without ventral setae, with four inner lateral setae. Mucro trough-like, inner lamella with low serrations, outer smooth or with an indentation. Female subanal appendage curved, with lateral cilia, apex blunt with fine fringe. Interocular setae smooth, short and blunt,

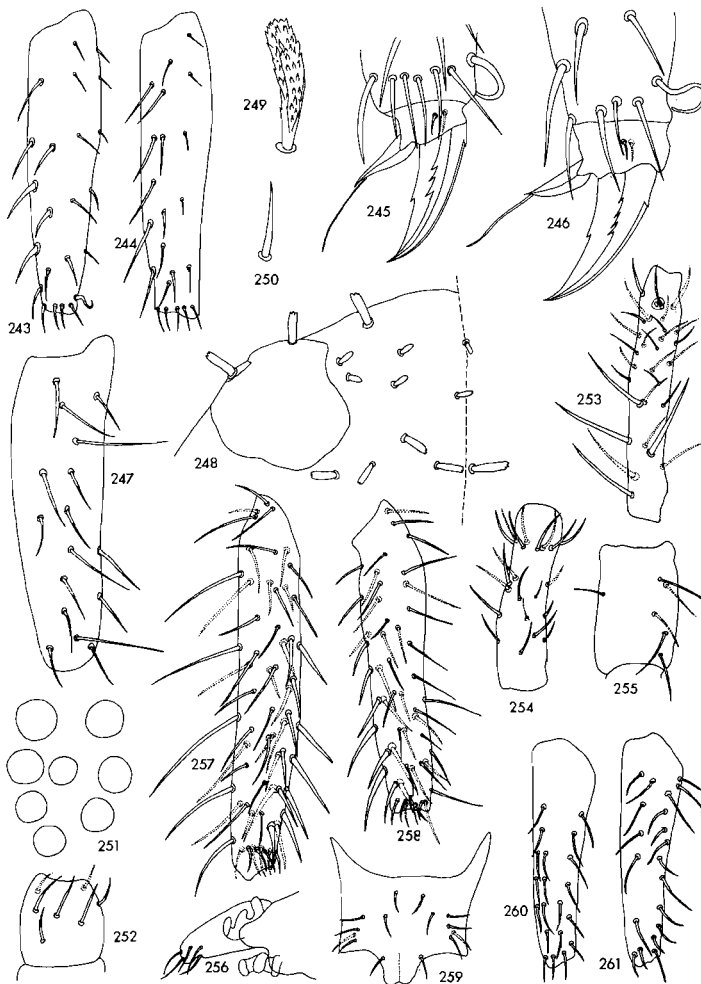


PLATE XII. Figs. 243-250. *Neosminthurus richardsi* n.sp. (Illustrations from holotype, Conn.) 243. Anterior surface of metatibia; 244. Posterior surface of metatibia; 245. Fore foot complex; 246. Hind foot complex; 247. Dorsal surface of dens; 248. Interocular setae; 249. Body seta; 250. Normal body seta. Figs. 251-261. *Sminthurus incisa* n.sp. (Illustrations from paratype, Chandler Lk, Alaska, except where indicated.) 251. Right eyepatch; 252. ANT I (Footprint Lk., Alaska); 253. ANT III; 254. ANT II; 255. Metatrochanter; 256. Tenaculum; 257. Hind tibia; 258. Fore tibia; 259. Dorsum of manubrium; 260. Ventral surface of dens; 261. Dorsal surface of dens.

arranged in two rows of five. Body setae short, palmate scaled or serrate interspersed with short curving types. Maximum size 1.2 mm.

HOLOTYPE (female) from Connecticut, Litchfield County, Cathedral Pines, 27 July, 1952, soil sample under white pine and hemlock, P. Bellinger. **PARATYPES**: four slides from Illinois, Lee County, Dixon Springs, 20 August, 1951, under bark and leaves, H. H. Ross and W. R. Richards. Holotype and one paratype deposited at the Illinois Natural History Survey; one paratype at the Entomology Museum, Michigan State University; one paratype at the Museum of Comparative Zoology, Harvard University; one paratype to W. R. Richards. **ADDITIONAL LOCALITIES**: Florida, Putnam County, Welaka, 1 October, 1949, K. Christiansen. Indiana, Tippecanoe County, Purdue, 9 October, 1974.

This species is very similar to *N. clavatus* but differs in the shape of the body setae as well as claw and leg features. It is my pleasure to name this species for Dr. W. Robin Richards, whose work has helped clarify many systematic problems associated with the Sminthuridae.

Sminthurus incisa n.sp.

Plate XII, XIII: Figs. 251-261, 262-269

Antennae purple, becoming darker distally. Background color yellow with brownish-purple or purple pigment. Head in some specimens without purple or sometimes a light dusting; others with broken lines on the frons, forming a circle below the bases of the antennae. Body with light dusting of purple to lines and irregular mottled bands; sometimes very dark pigmentation broken by spots and light lines.

Eyes 8+8; ocellus D about half the diameter of B. ANT IV subannulated into 17-18 intermediates; apical bulb present; as well as a small lateral apical papilla. ANT III with subapical sense rods lying in an invaginated pocket; with five outstanding heavy setae on the basal half. ANT II with subapical ring of eight setae. ANT I with two posterior subapical setulae. Metatrochanters with oval organs; posterior seta normal and five anterior setae. Metatibia with long outer and heavy inner setae; a single acuminate tenent hair (proleg of similar structure). Pretarsus with an anterior and posterior setula. Unguis lanceolate, with a large inner tooth, pseudonychium and tunica. Unguiculus with a corner tooth and lamellae developed; apical needle of the proleg as long as the unguiculus; metaleg with needle only one-third as long. Sacs of the ventral tube tuberculate. Rami of the tenaculum tridentate; anterior corpus with five setulae. Manubrium with 12 dorsal and one ventral setae. Dens with 17 subapical ventral setae. Mucro with rachis fused to lamellae forming spoon-shape, edges of lamellae smooth (in older mounts the edges

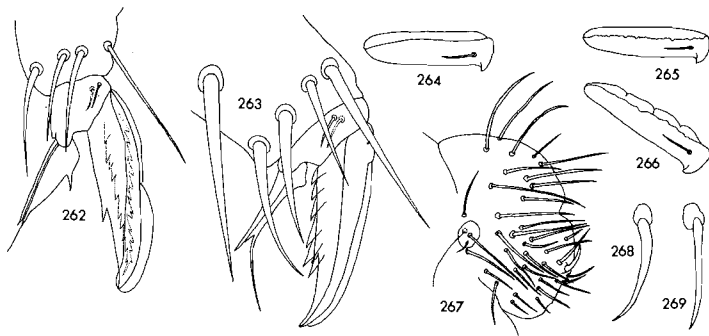


PLATE XIII. Figs. 262-269. *Sminthurus incisa* n.sp. (Illustrations from paratype, Chandler Lk., Alaska, except where indicated.) 262. Hind foot complex (Footprint Lk., Alaska); 263. Fore foot complex; 264. Mucro, newly mounted; 265-266. Mucro, older mounts showing crenulations; 267. Female anal papilla; 268. Female subanal appendage, lateral view; 269. Female SAA, dorsal view.

become crenulated or indented); mucronal seta present. Anal papilla with long, fine setae; female subanal appendage curving acuminate. Setae of the head and body moderately long; a short spine-like seta between the eye patch and base of the antenna. Maximum length 2 mm.

HOLOTYPE (female) from Alaska, Utrikok River, 1-7 August, 1952, driftwood, P. F. Bellinger. **PARATYPES**: four specimens on same slide as holotype; 21 specimens in alcohol from Alaska, Chandler Lake, Brooks Mountains, 21 July, 1952, P. F. Bellinger. Holotype and four paratypes deposited at the Museum of Comparative Zoology, Harvard University; five paratypes at the Entomology Museum, Michigan State University; five paratypes at the Illinois Natural History Survey; seven paratypes to K. Christiansen, Grinnell College, Iowa. **ADDITIONAL LOCALITIES**: Alaska, Umiat, Colville River, 31 July, 1952, P. F. Bellinger; Footprint Lake.

This species keys out to *S. viridis* (L.) in Stach (1956). It differs from that species in lacking a strong rib supporting the female subanal appendage; by having five setae on the tenacular corpus, *viridis* has three; the pseudonygium of the metalegs extends almost to the apex, and is double.

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