LINK BETWEEN *SMINTHURINUS* AND *KATIANNA* COLLECTED FROM ALABAMA (COLLEMBOLA: KATIANNIDAE)

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ABSTRACT

A new subgenus and species, *Sminthurinus (Neokatianna) acantholaema* Snider, is described from Auburn, Alabama. This subgenus exhibits morphological characteristics of both *Sminthurinus* and *Katianna*: subsegmented ANT IV, spine-like setae on dorsum of head, clavate tenent hairs, triangular bothriothrix ABC pattern, heel of mucro points straight down, palmate female subanal appendage, and bifid median seta on anal papilla. This species was taken from grass sweepings, Lee County, Auburn University Arboretum.

RESUMEN

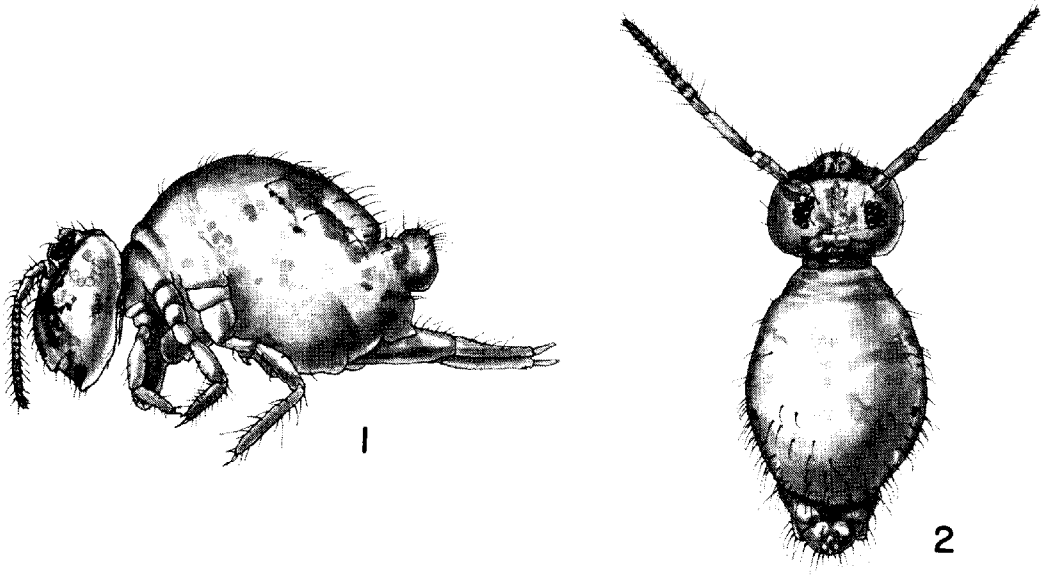
Se describe de Auburn, Alabama, un nuevo subgénero y especie, *Sminthurinus (Neokatianna) acantholaema* Snider. Este subgénero tiene características morfológicas de ambas *Sminthurinus* y *Katianna*: subsegmentada ANT IV, setas como espinas en el dorso de la cabeza, pelos claveteados, patrones triangulares de botriotirix ABC, el talón de los puntos de mucro hacia abajo, el apéndice subanal de la hembra palmado, y bífida la seta media de la papila anal. Esta especie se obtuvo con un esparavel en hierbas en el Condado de Lee, en el Arboretum de la Universidad de Auburn.

During the spring of 1987, Peter H. Carrington made a number of collections while visiting Alabama. Several new species of Collembola were found in those samples. This is the first of several papers that will describe new taxa.

Sminthurinus (Neokatianna), New Subgenus

Eyes 8+8 (Fig. 3). Antennal segment IV weakly subsegmented, with 10-11 intermediates, longer than III, with apical bulb (Fig. 4), ANT III with large simple dorsal papilla (Fig. 5); male without specialized clasping antenna; dorsum of head with spine-like setae located on bosses (Fig. 9); post-occipital spur present (Figs. 11, 12 and 13). Thoracic segmentation distinct; meta-trochanter with 4 anterior setae, D_2 modified (Fig. 27); without oval organs; tenent hairs clavate, 8-7-7; unguiculi with subapical needle, teeth, and corner teeth (Figs. 19, 25 and 31). Collophore with 2+2 subapical setae, sacs smooth (Fig. 32). Retinaculum with rami quadridentate, corpus with 2 apical setulae (Fig. 33). Dens with 2 Ve_2 and 1 Ve_6 setae (Fig. 36). Mucro with inner and outer lamellae subapically detached from rachis, seta lacking, heel pointing straight down (Figs. 37, 38 and 39). Triangular bothriotrichal pattern ABC (Fig. 44). Parafurcular lobes lack neosminthurid seta (Fig. 43). Anal papilla with median bifid seta, female subanal appendage palmate (Fig. 42).

DIAGNOSIS: *Sminthurinus (Neokatianna)*, new subgenus, exhibits many morphological

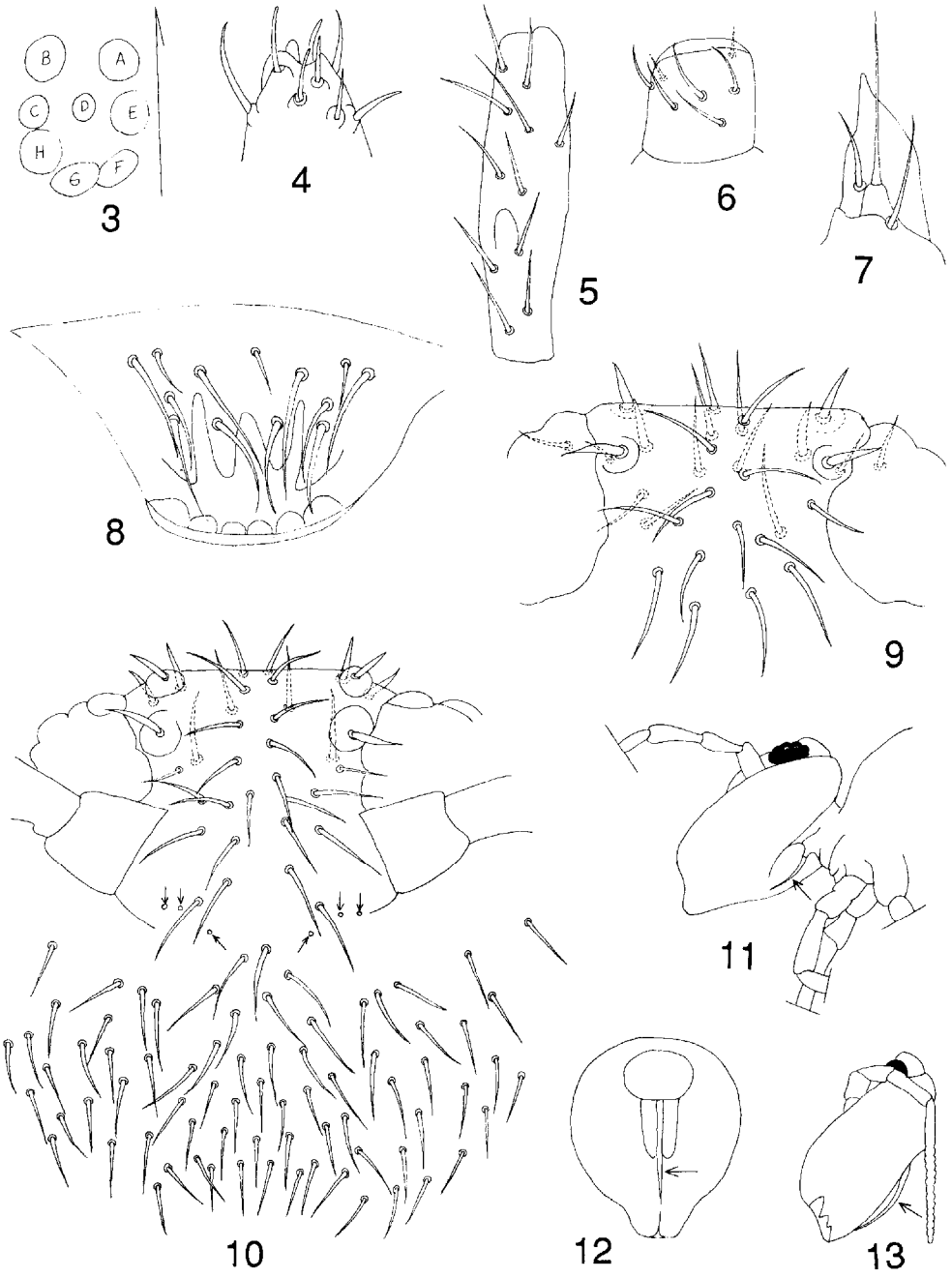


Sminthurinus (Neokatianna) acantholaema n.sg., n. sp.
Fig. 1. Habitus, lateral aspect, female; 2. Habitus, doral aspect, female.

characteristics found in both *Sminthurinus* Börner and *Katianna* Börner as defined by Richards (1968) and Betsch (1980). According to Richards (1968) spine-like setae on the dorsum of the head is primary in separating *Katianna* from *Sminthurinus*. He further points out that *Katianna* lacks the median bifid seta found on the anal papilla of *Sminthurinus*. *Neokatianna* n.sg. exhibits both of these characteristics. Betsch (1980) used the subsegmented ANT IV, lack of a neosmithurid seta on the abdomen, and simple median (A_o) seta on the anal papilla for separation of *Sminthurinus* and *Katianna*. *Neokatianna* n.sg. has the first two characters, but has a bifid median seta. In addition, the post-occipital spur appears as a unique characteristic of the new sub genus. Further, examination of *Sminthurinus henshawi* (Folsom), *Sminthurinus elegans* (Fitch), *Sminthurinus maculosus* Snider and a new species from South Carolina reveal 1+1 facial proprioceptors as opposed to 3+3 for Neokatianna n.sg (Fig. 9). No examples of *Katianna* were examined. In view of these major morphological features, *Neokatianna* n.sg. fits between the two closely related genera.

Sminthurinus (Neokatianna) acantholaema, New Species

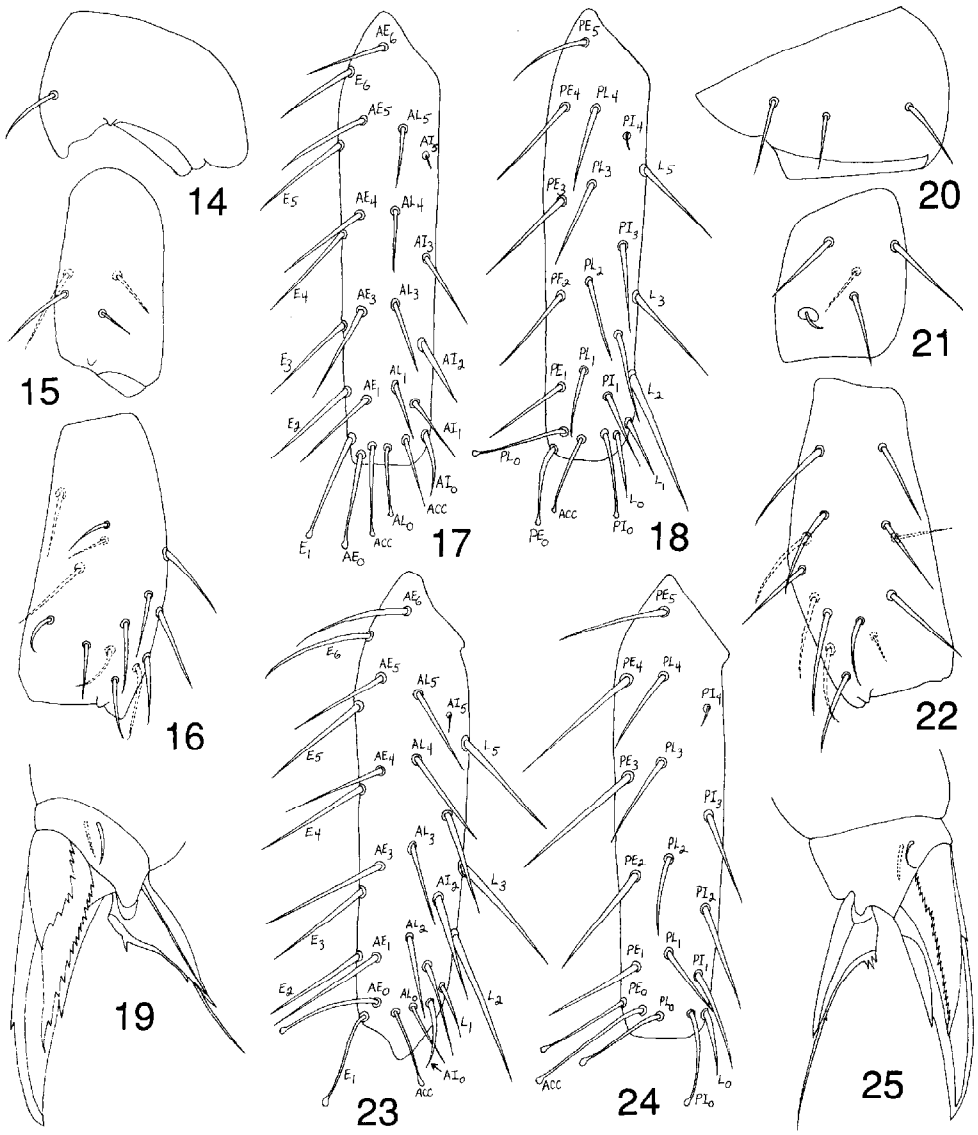
COLOR AND PATTERN: Greenish-yellow pigment distributed in the following pattern. Head with green stripe between black eyepatches; lower frons with green, irregular mosaics; buccal area yellow; antenna dark yellow-green, becoming darker distally. Body light green dorsally, posterior darker, white ventrally; anal papilla with dark green patch dorsally; bothriothrix A B C surrounded with yellow. Legs basally white becoming yellow distally. Furcula yellow in 3/4 distal portion (Figs. 1 and 2).
HEAD: Eyes 8+8; ocelli C and D subequal, C usually larger, ABFGH larger than C and D, subequal (Fig. 3). Mean antennal ratio 1:2:3:6.75; ANT IV with 10-11 intermediate, weak subsegments, with apical bulb (Fig. 4); ANT III with large, dorsal, simple papilla (Fig. 5); ANT I with 5 dorsal and 2 ventral setae (Fig. 6). Outer maxillary lobe with 1 distal seta (Fig. 7). Labrum with 4 lobes and 14 associated setae (Fig. 8). Dorsum with paraocular spine-like setae, located on bosses (Fig. 9 and 10); 3+3 prop-



Sminthurinus (Neokatianna) acantholaema n.sg., n.sp.

Fig. 3. ocelli, left side of head; Fig. 4. ANT IV, distal aspect; Fig. 5. ANT III, dorsal aspect; Fig. 6. ANT I; Fig. 7. outer maxillary lobe; Fig. 8. labrum; Fig. 9. dorsum of head (o); Fig. 10. facial setae (o), arrows indicate proprioceptors; Fig. 11. head, showing post occipital spur; Fig. 12. head, posterior aspect; Fig. 13. head, lateral aspect, arrow indicates spur.

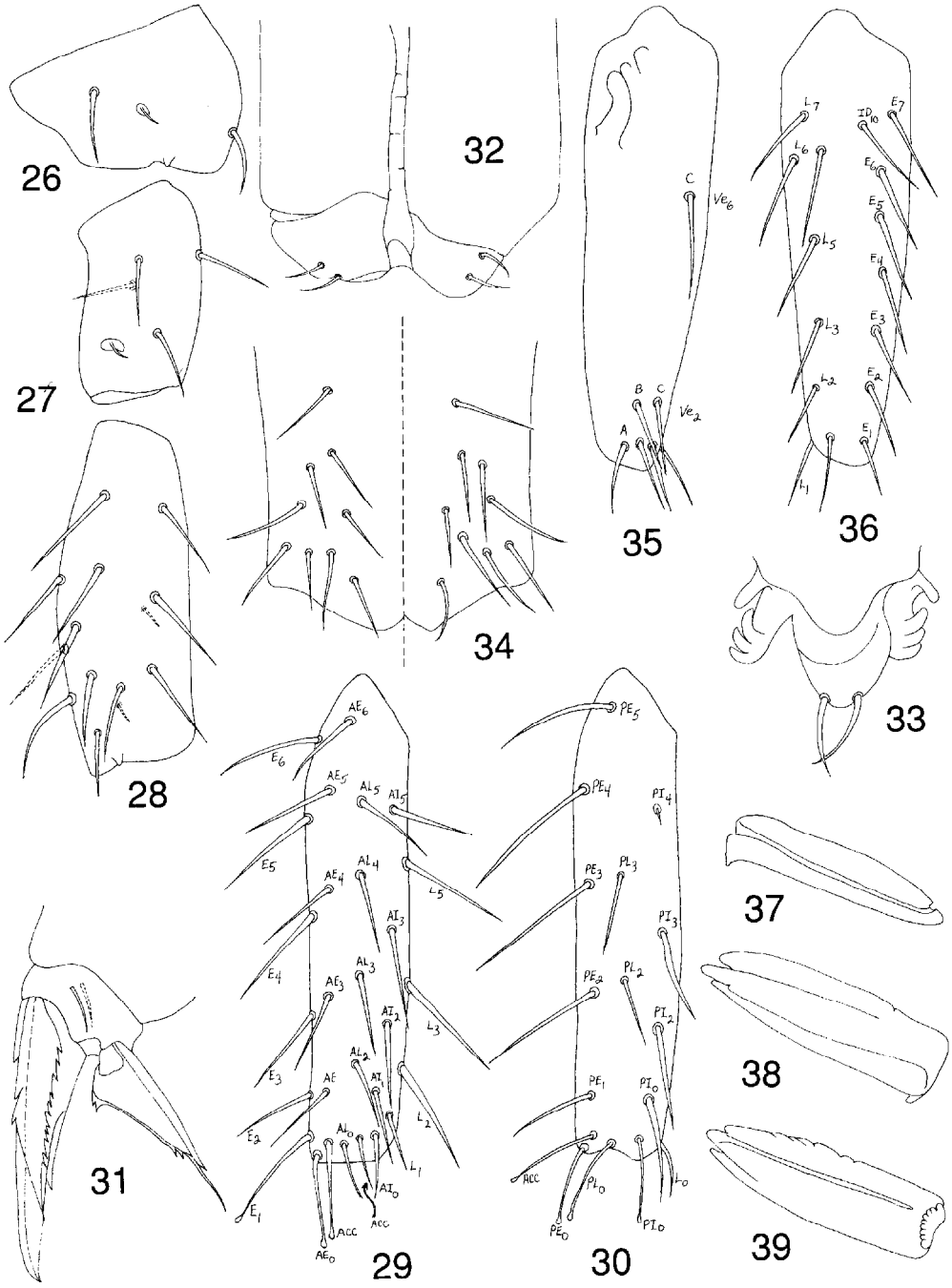
rioceptors on frons at bases of antennae (Fig. 9). Post-occipital spur present (Figs. 11, 12 and 13). FORELEG: Coxa with 1 seta (Fig. 14); trochanter with 2 anterior and 2 posterior setae (Fig. 15); femur with 8 anterior and 5 posterior setae (Fig. 16); anterior



Sminthurinus (Neokatianna) acantholaema n. sg., n. sp.

Fig. 14. foreleg, coxa; Fig. 15. foreleg, trochanter; Fig. 16. foreleg, femur; Fig. 17. foreleg, tibiotarsus, anterior surface; Fig. 18. foreleg, tibiotarsus, posterior surface; Fig. 19. foreclaw; Fig. 20. mesoleg, coxa; Fig. 21. mesoleg, trochanter; Fig. 22. mesoleg, femur; Fig. 23. mesoleg, tibiotarsus, anterior surface; Fig. 24. mesoleg, tibiotarsus, posterior surface; Fig. 25. mesoclaw.

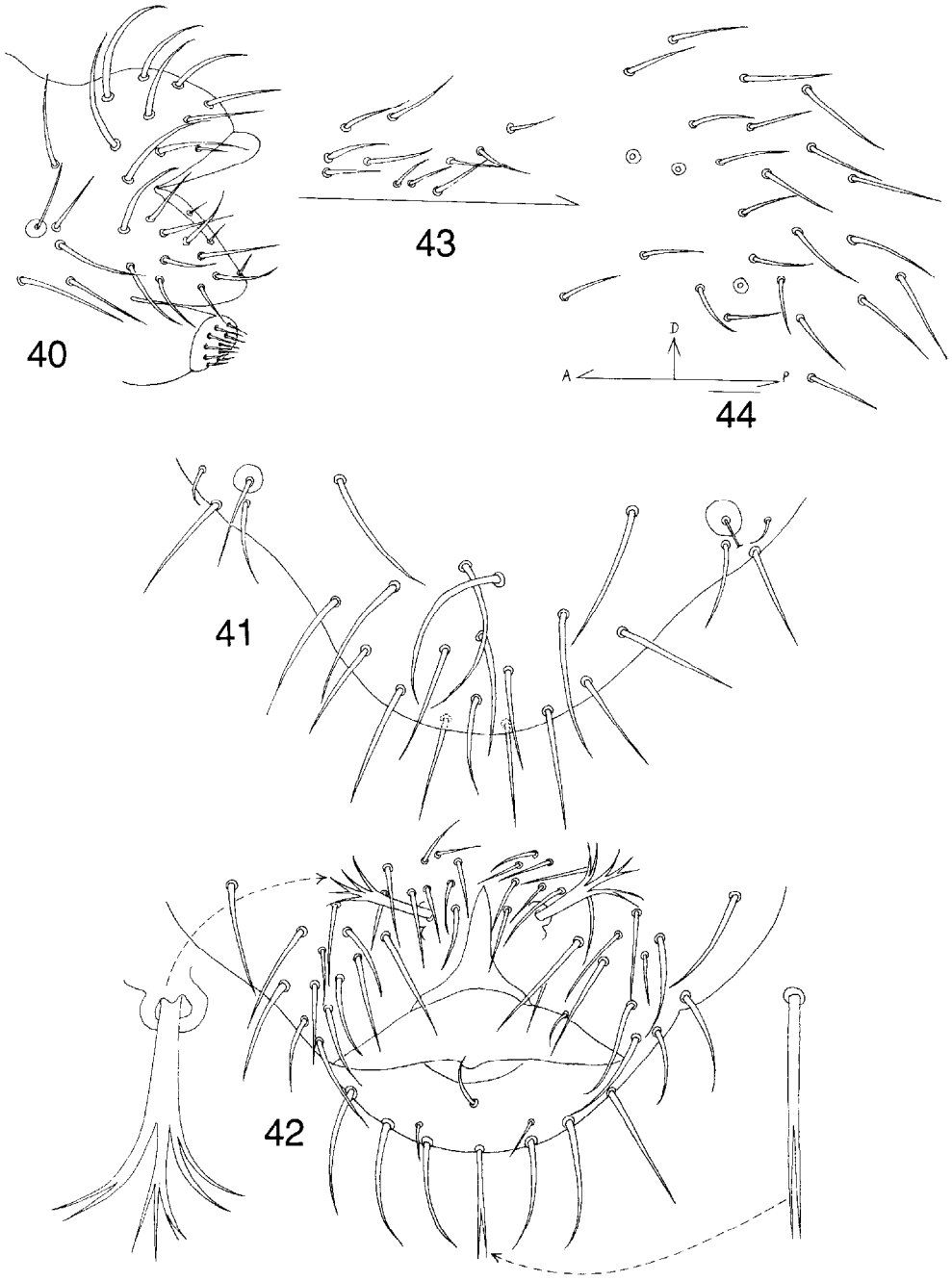
surface of tibiotarsus with AE_2 and AI_4 missing, 2 accessory setae present, AI_5 reduced to a setula (Fig. 17); posterior surface with PL_4 reduced to a setula (Fig. 18); 8 clavate tenent hairs; pretarsus with 1+1 setulae; unguis with anterior and posterior pseudonychia, and strong inner tooth; unguiculus with subapical needle reaching tip of unguis, 2-3 corner teeth and small subapical inner tooth (Fig. 19). MESOLEG: Coxa with 3 setae (Fig. 20); trochanter with 4 anterior and 1 posterior setae (Fig. 21); femur with 9 anterior and 5 posterior setae (Fig. 22); anterior surface of tibiotarsus with AE_2, AL_1, AI_4 missing, 1 accessory seta present, AI_5 reduced to a setula (Fig. 23); posterior surface with L_0 present, PI_4 reduced to a setula (Fig. 24), 7 clavate tenent hairs present;



Sminthurinus (Neokatianna) acantholaema n. sg., n. sp.

Fig. 26. metaleg, coxa; Fig. 27. metaleg, trochanter; Fig. 28. metaleg, femur; Fig. 29. metaleg, tibiotarsus, anterior surface; Fig. 30. metaleg, tibiotarsus, posterior surface; Fig. 31. metaclaw; Fig. 32. collophore; Fig. 33. retinaculum; Fig. 34. manubrium, ventral surface; Fig. 35. dens, ventral surface; Fig. 36. dens, dorsal surface; Fig. 37. mucro, lateral aspect; Fig. 38. mucro, dorsal aspect; Fig. 39. mucro, ventral aspect.

pretarsus with 1 + 1 setulae; unguis with anterior and posterior pseudonychia and strong inner tooth; unguiculus with strong center tooth, distal subapical tooth and needle reaching tip of unguis (Fig. 25). METALEG: Coxa with 3 setae, central seta reduced to a



Sminthurinus (Neokatianna) acantholaema n. sg., n. sp.

Fig. 40. anogenital segments, lateral aspect (o); Fig. 41. anogenital segment, dorsal aspect (o); Fig. 42. anogenital segment, ventral aspect (o); Fig. 43. parafurcular lobe setae; Fig. 44. bothriothrix ABC and associated body setae.

setula (Fig. 26); trochanter with 4 anterior and 1 posterior setae (Fig. 27); femur with 11 anterior setae and 2 posterior setulae (Fig. 28); anterior surface of tibiotarsus with AE_2, AL_1, AI_4 missing, 2 accessory setae present, AI_5 normal (Fig. 29); posterior surface with PI_4 reduced to a setula; 7 clavate tenent hairs (Fig. 30); pretarsus with 1+1 setulae; unguis with anterior and posterior pseudonychia, and inner tooth; un-

guiculus with 1-2 corner teeth, 2 subapical teeth and subapical needle not reaching tip of unguis (Fig. 31). ABDOMEN: Collophore with 2+2 subapical setulae, sacs smooth (Fig. 32). Tenacular rami with 4+4 teeth, corpus with 2 distal setulae (Fig. 33). Manubrium with 9+9 ventral setae (Fig. 34). Dens with $2Ve_2$ and $1Ve_6$ setae, L_4 missing and ID_{10} present (Figs. 35 and 36). Mucro with outer and inner lamellae subapically detached from rachis, heel pointing straight down (Figs. 37, 38 and 39). Male anal papilla with normal setae, bothriothrix d short, seta-like (Fig. 40); female anal papilla with dorsal setae normal, not expanded basally, median circumanal seta (A_0) bifid, female subanal appendages palmate (Fig. 41 and 42). Parafurcular lobes near bothriothrix C without neosminthurid setae (Fig. 43). Bothriothrix ABC in triangular pattern, body setae smooth, slightly curving (Fig. 44). Length up to 1.40 mm.

DIAGNOSIS: The combination of morphological characteristics presented in the description of the subgenus establishes this unique species. The post-occipital spur sets this species aside from other members of the Katiannidae. Examination of the unguiculi among members of the genus *Sminthurinus* s.str. does not show the subapical tooth found in *Neokatianna*. In addition the subgenus *Polykatianna* exhibits circumanal setae basally expanded similar to *Sminthurinus* s.str., while *Sminthurinus (Katiannina) macgillivrayi* (Banks) has the normal type setae found in *Neokatianna acantholaema*. If the disparate characteristics of the new genus are ignored and the species is keyed out in Christiansen & Bellinger (1981), *Sminthurinus (Katiannina) macgillivrayi* is the final product. However, the presence of an enlarged papilla surrounding bothriothrix D, absence of a bifid median circumanal seta, backward pointing mucronal heel, and oblique subsegmentation of antennal segment IV will separate that species from *acantholaema*.

TYPES: Holotype (♀) and 10 paratypes in alcohol; 3 paratypes mounted in PVA on slides. All types deposited in the Entomology Museum, Michigan State University. Collection data: Alabama, Lee County, Auburn, Auburn University Arboretum, grass sweeping, "April 12, 1987" P.H. Carrington, collector.

ACKNOWLEDGMENTS

Thanks are extended to P.H. Carrington for making field collections; Dr. Peter F. Bellinger and Dr. Kenneth A. Christiansen reviewed the manuscript, and their suggestions and criticism are appreciated.

REFERENCES CITED

BETSCH, J. M. 1980. Elements pour une monographie des collemboles symphypleones (Hexapodes, Apterygotes). Mem. Mus. Nat. Hist. Nat., Ser. A (116): 1-227.

CHRISTIANSEN, K. A. AND P. F. BELLINGER. 1981. The Collembola of North America north of the Rio Grande, Part IV. Families Neelidae and Sminthuridae. Grinnell College, Grinnell, Iowa: 1043-1322.

RICHARDS, W. R. 1968. Generic classification, evolution, and biogeography of the Sminthuridae of the World (Collembola). Mem. Entomol. Soc. Can., 53: 1-54.

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