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Konothrips polychaeta sp.n. from Delaware, North America, with a key to the three species of this genus

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The genus *Konothrips* was erected by Bhatti (1990) for a single species, *tuttlei*, that was described from Arizona in the genus *Chirothrips* by zur Strassen (1967). The new genus was distinguished by the longitudinally orientated sculpture on the abdominal terga and sterna, the fore wing costa with only a single seta, and the ovipositor lacking teeth (Bhatti 1990). Subsequently, Nakahara and Foottit (2012) described in *Konothrips* a second species, *colei*, from Texas. However, those authors indicated that there is variation in these characters, with *colei* intermediate in structure between *tuttlei* and members of *Arorathrips*. In the new species described below, the abdominal tergal and sternal sculpture is weakly developed, transverse medially with some reticles in the pleurotergites slightly orientated longitudinally, the ovipositor is reduced and smooth, and costal setae are present on the fore wing. This new species is described in *Konothrips* because antennal segment I is enlarged (more than 3 times wider than base of segment II), antennal segment II is strongly produced laterally, and the mesosternal furcal invaginations are widely separated. These characters are also shared with the species of *Arorathrips*, and distinguish this pair of genera from *Chirothrips*. However, the new species, together with *tuttlei* and *colei*, is distinguished from species placed in *Arorathrips* by the presence of more than 6 stout conical setae on the median area of the mesonotum, and the anterior abdominal tergites with D1 and D2 setae spine-like (conical and stout).

There is an interesting pattern in the association between body structure and distributions of these three genera. *Chirothrips* is essentially Old World and Holarctic, with no more than 10 species native to North America (Nakahara & Foottit 2012), out of the total of 42 species listed in this genus (ThripsWiki 2017). In contrast, the 16 species of *Arorathrips* and three species of *Konothrips* are all native to the New World, with seven *Arorathrips* species presumably native to the Neotropics (Mound & Marullo, 1996; ThripsWiki, 2017). These distributions, together with the intermediate structure of this new species described below, suggest that separation of three species into a genus *Konothrips* may have limited phylogenetic significance.

The Ashland Natural Park has different ecosystems like fresh water marsh, grassy meadows, and decidious forest and the biodiversity of the area is not well known, especially in small insects and microorganisms (Delaware Wildlife Action Plan 2015-2025). The aim of this paper is to describe a third species of *Konothrips*, and contribute to studies on the insect biodiversity of the grasslands of Delaware.

Konothrips polychaeta sp.n. (Figs 1–11)

Female macroptera. Body brown (Fig.1), head darker than thorax; abdomen pale brown but darker at anterior; tarsi yellow, tibia and femora brown with distal and proximal parts yellow, fore tibiae mostly yellowish brown, femora and mid and hind tibiae brown dorsally, yellow ventrally. Setae of head and pronotum brown. Fore wing brown with pale anterior margin. Antenna brown, segment I darkest, II light brown with produced part yellowish brown, III light brown basally.

Head longer than wide from interantennal process (Fig. 5), lateral margin of vertex anterior of compound eye 18–20 microns long, slightly converging to broad angle formed with anterior margin of vertex; eyes about twice as long as occiput; vertex smooth without transverse sculpture lines, with 72 short, stout setae; ocellar setae similar to setae anterior to fore ocellus, in the middle of ocellar triangle; postocular setae minute, 1 near anterior margin of eye, 2 near posterior

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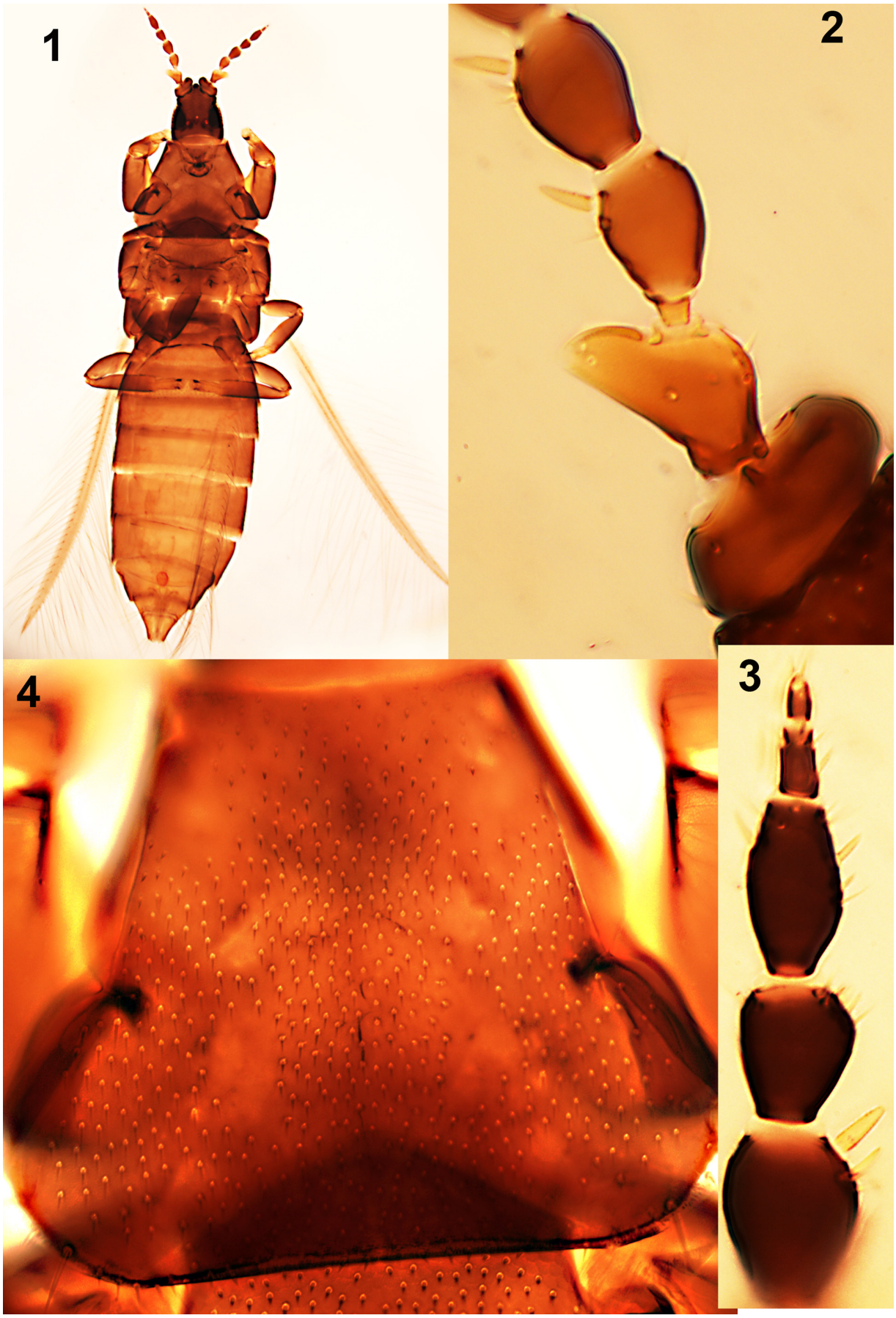
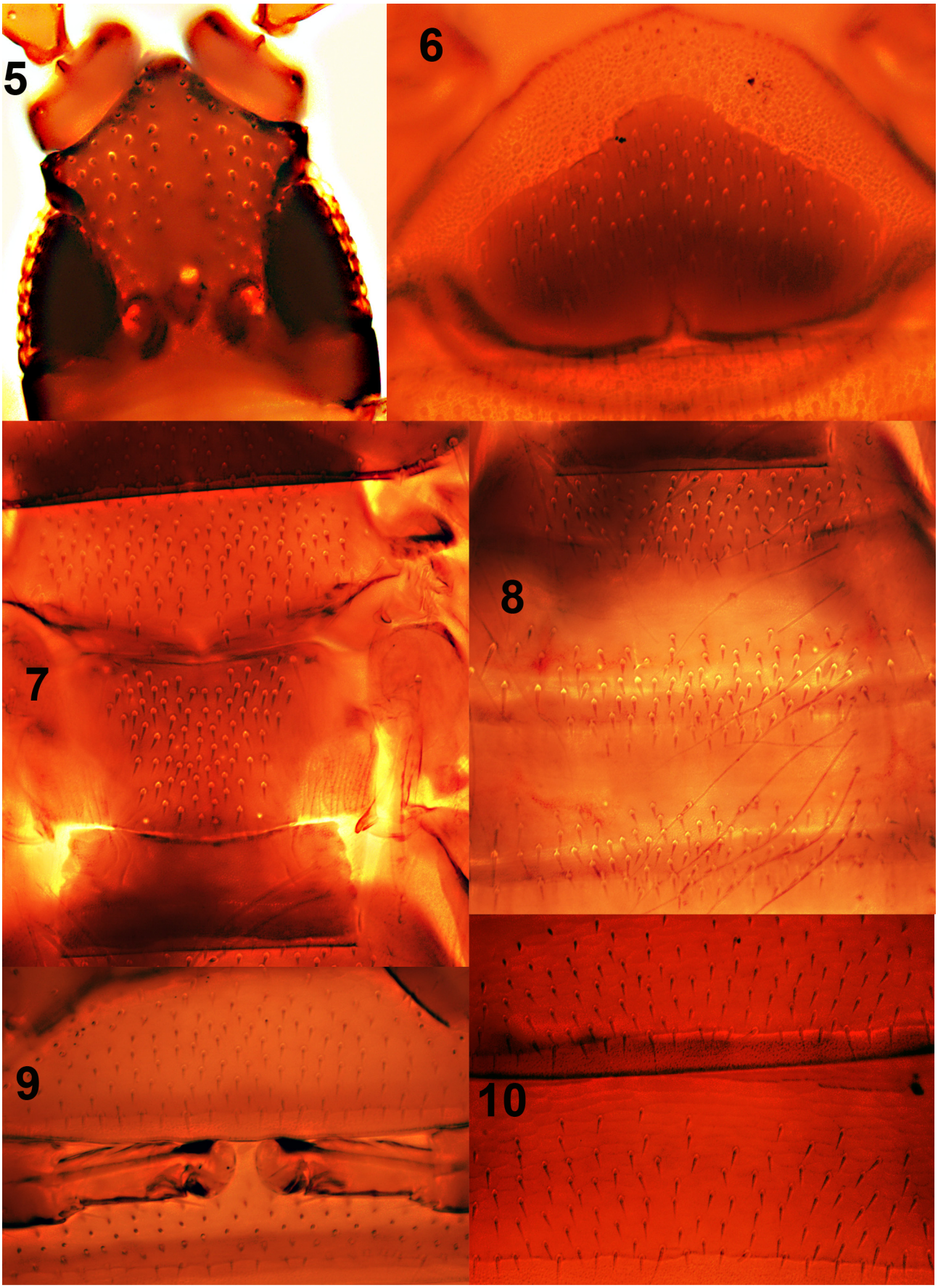


FIGURES 1–4. *Konothrips polychaeta* **sp.n.** (1) Habitus; (2) Antennal segments I–IV; (3) Antennal segments IV–VIII; (4) Pronotum.



FIGURES 5–10. *Konothrips polychaeta* **sp.n.** (5) Head; (6) Prosternum; (7) Mesonotum and Metanotum; (8) Abdominal tergites I–IV; (9) Sternites I–II; (10) Sternites IV–V.

margin of eye; mouth cone broadly conical, shorter than head. Maxillary palp with 3 segments. Antennal segment I broad, 3.1–3.5 times wider than base of II without tranverse dorsal ridge (Figs 2–3); II with inner margin rather straight, outer margin diverted laterally from base to blunt process, apex of process with a distinct gland; segment II with 1 subapical sense cone slightly extended beyond apical gland, 1 short dorsal and 1 ventral seta just mesad of sense cone, 1 short dorsal seta near outer margin but not on the margin, 1 dorsal seta on inner upper margin, 1 small dorsal seta medially on inner upper margin, 1 long ventral seta medially; segment III with convex outer margin, longer than wide; III and IV each with simple sense cone; inner sense cone of segment VI equal in length to outer sense cone. Pronotum about as long as broad (Fig. 4), without transverse sculpture lines medially; 520 short, spine-like setae in medial and two submarginal bands; one pair of posteroangular setae 15 microns long, with 28 short, spine-like setae on posterior margin. Prosternum (Fig. 6) without sclerotized basantra in posteromedial part, completely covered with stout setae and finely granulose sculpture. Mesonotum with light transverse lines of sculpture at posterior (Fig. 7), with 116 short, stout setae; anteromedian campaniform sensilla far apart. Mesofurcal invaginations 35 microns apart. Metanotum with no longitudinal lines of sculpture (Fig. 7), anterior part with pair of bristle like setae (10 microns) and 82 short stout setae; two pairs of campaniform sensilla present, one pair medially the other at posterior. Fore femora with ridge, longitudinal reticles on distal half; outer side of fore tibia slightly longer than inner. Fore wings straight, gradually narrowed distally to blunt apex; 10 short costal setae, about 0.8 as long as width of wing; 29 slightly wavy anterior fringe cilia; first vein with 4 proximal and 3 distal setae; second vein with 1 seta; clavus with 4 marginal setae. Abdominal tergites weakly sculpture (Figs 8–10), only two longitudinal lines in middle, and no reticles; tergites I–VII with spine-like setae, progressively more slender posteriorly, tergite I (Fig. 8) completely covered with 116 stout setae, tergites II–V with 95–100 setae, tergites VI–VII with 56 and 24 setae; tergites with two pairs of campaniform sensilla, tergite IX with 2 pairs of campaniform sensilla, posterior pair near B1 setae; segment X slightly longer than segment IX, with complete dorsal split, pair of campaniform sensilla near B1 setae. Pleurotergites with 6 discal setae. Sternites with longitudinal lines of sculpture, margins of sternites without processes; sternites I–V (Figs 9–10) completely covered with stout short conical setae; VI with 72 setae on posteromedian part; VII with 3 pairs of setae medially, 4 pairs of posteromarginal setae, with median pair in front of margin. Ovipositor about 55 microns long, margin with no teeth.

Male. Unknown.

Measurements of holotype and (paratype). Body length 200 (190). Antenna total length 57 (50) long; length and width of segments: I 6 (5), 12 (10); II 10 (8), 6 (5); III 9 (8), 5 (4); IV 9 (8), 6 (5); V 7 (6), 5 (4); VI 10 (8), 4 (3); VII 4 (4), 1.5 (1.5), VIII 2 (2), 1 (1).

FIGURE 11. *Andropogon virginicus*, entire plant and flowers

Head: Length for interantennal process 28 (26); length from compound eyes to tip of interantennal process 29 (27); length of lateral margin of vertex from compound eye to broad angulation formed with anterior margin of vertex 7, compound eye length 34 (32). Pronotum length 114 (110), width 120 (115). Fore wing length 117 (113), width at midlength 4. Abdominal segments length, IX 17 (15), X 30 (27). Setal lengths: short stout setae on vertex of head 2–3, ocellar setae about 3, pronotal discal setae 3–4, mesonotal setae about 3–4, metanotal setae about 3–5; abdominal tergite IX B1 setae 34 (32), B2 45 (41), B3 45 (43); tergite X B1 setae 77 (75), B2 70 (67).

Type material. Holotype female and paratype female, **United States, Delaware**, New Castle Co, Hockessin, Ashland Nature Center, 3.viii.2015, on flowers of *Andropogon virginicus*, (A.B. Mitchell); in Royal Belgian Museum of Natural Sciences.

Biological Remarks. This species was found inside the flowers of the broom-sedge, *Andropogon virginicus* (Fig. 11). This plant is native to the southeastern United States and as far north as the Great Lakes. The larvae of *Chirothrips* species have atrophied legs and cannot walk, and the larvae and pupal stages are found inside the flowers (Lewis, 1973). *Konothrips polychaeta* probably breeds on grasses and sedges that are abundant in the prairies and marshes in Ashland Natural Reserve.

List of *Konothrips species*

Konothrips polychaeta sp.n.

Distribution: United States (Delaware).

Host Plant: *Andropogon virginicus* (Poaceae)

Konothrips tuttlei (zur Strassen)

Chirothrips tuttlei zur Strassen 1967 : 345.
Konothrips tuttleyi [sic] : Bhatti 1990 : 196.

Distribution: United States (Arizona): [Nakahara & Foottit 2010 also listed Mexico, but no specimens of *tuttlei* from Mexico have been found in any major museum collection]

Host plant: *Aristida glabrata* (Poaceae)

Konothrips colei Nakahara & Foottit 2012 : 21–22.

Distribution: United States (Texas).

Host Plant: Unknown

Key to species of *Konothrips*

1. Invaginations of mesosternal furca separated by distance equal to 0.3–0.4 of the mesothoracic coxae width; ovipositor with sparse teeeth..... *colei*
-. Invaginations of mesosternal furcal arms separated by distance equal to width of mesothoracic coxae; ovipositor without teeth 2
2. Abdominal submarginal sculpture orientated longitudinally; mesonotum and metanotum not completely covered with stout conical setae; abdominal tergites without stout conical setae ..... *tuttlei*
- Abdominal submarginal sculpture not orientated longitudinally; mesonotum and metanotum completely covered with stout conical setae; abdominal tergites with stout conical setae medially .....*polychaeta* **sp.n.**

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