

Revision of the Plant Bug Genus *Noctuocoris* Knight (Heteroptera: Miridae: Orthotylinae)

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Abstract.—The orthotyline genus *Noctuocoris* Knight is diagnosed and redescribed. The type species, *fumidus* (Van Duzee), is redescribed and a male dorsal habitus is provided. Two new species, *autlan* and *conspurcatus* are described from central Mexico and the western United States, respectively. The male genitalia of all species are described and illustrated. Scanning electron micrographs of the scale-like setae and pretarsus of *fumidus* are presented.

Knight (1923) described the genus *Noctuocoris* to receive a single species, *Orthotylus fumidus* Van Duzee, 1916, from Colorado. This species was subsequently reported from Massachusetts, Michigan, Minnesota, New York, Pennsylvania, South Dakota, and Utah (Knight, 1923, 1941, 1968), and from Manitoba, Ontario, and Quebec, Canada (Kelton, 1980). Our study has revealed additional records of *fumidus* from Iowa, North Dakota, Oklahoma, and British Columbia, as well as two new species, *autlan* from Jalisco, Mexico and *conspurcatus* from Arizona and Colorado.

All measurements are in millimeters. Abbreviations for specimen depositories correspond to institutions listed in the acknowledgments.

Noctuocoris Knight

Noctuocoris Knight, 1923:510, 523 (new genus); 1941:82, 105; 1968:94, 109, fig. 141. Kelton, 1980:197, 246, 247, map 79.

Diagnosis.—Recognized by the elongate, parallel-sided hemelytra and uniformly dark rufous brown to nearly black general coloration (Fig. 1); dorsal vestiture possessing both black and white scale-like setae with broad converging ridges (Fig. 2); lorum strongly swollen; and male genitalia with the following characteristics: right paramere short, 'T' shaped (Figs. 9–11, 20–22, 33–35); posterodorsal margin of genital capsule between right paramere socket and apex with solitary spine-like process (Figs. 4, 6, 16, 17, 27, 28); phallotheca with deep circular notch on right basal margin (Figs. 31, 32); and vesica with two distally flattened, strongly serrate spiculae (Figs. 7, 8, 18, 19, 29, 30); left spicula bifurcate, dextral branch with strong basal spine.

Description of male.—**GENERAL ASPECT.** Macropterous. Length 5.20–6.98. Fuscous brown to grayish black; surface shagreened and slightly shining; dorsal vestiture with short appressed scale-like white and black setae intermixed with longer, suberect black simple setae. **HEAD.** Elliptical with frons very slightly projecting beyond anterior margin of eyes; posterior margin of head ecarinate or

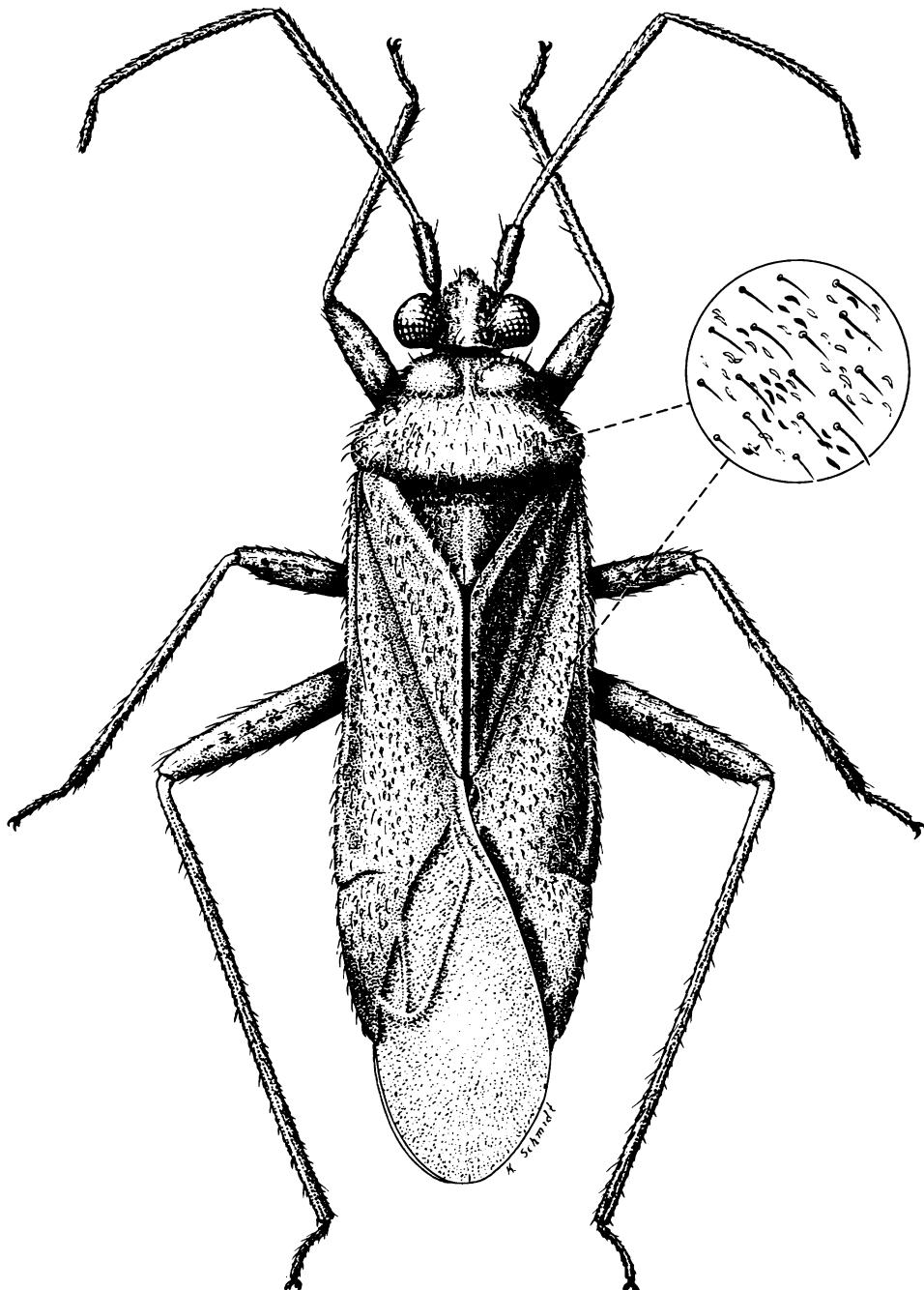
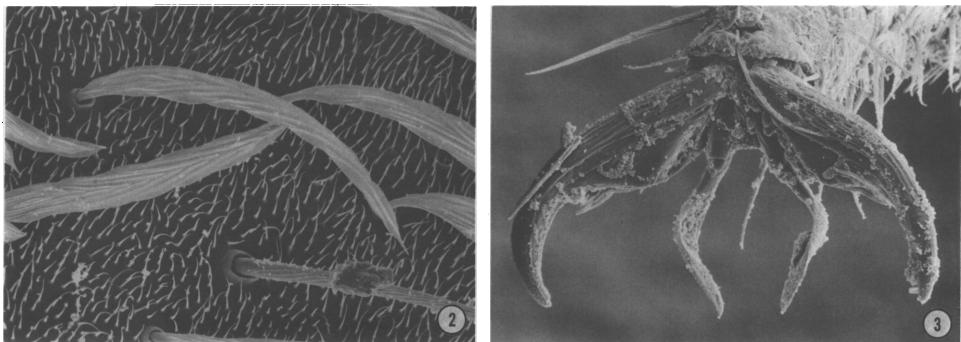


Figure 1. *Noctuocoris fumidus*, dorsal habitus of male.



Figures 2, 3. *Noctuocoris fumidus*. 2. Scale-like setae on dorsum. 3. Pretarsal structures.

with very slightly elevated carina, and with transverse row of erect black bristle-like setae; temporal areas glabrous; frons flattened or slightly convex anteriorly, tylus prominent, junction with frons shallowly or very shallowly depressed; eyes large occupying more than half of head height; posterior margin of eye straight, narrowly removed from anterior margin of pronotum; antennal fossa nearly contiguous with anterior margin of eye, lower margin of fossa situated above ventral margin of eye; eye emarginate near fossa; juga weakly protruding, lora more strongly so; width of genae less than or equal to diameter of antennal segment I; bucculae sometimes extending posteriad of margin of antennal fossa in lateral view; gula obsolete; antennae brown or black; segment I with densely distributed suberect black simple setae and several large erect black bristle-like setae; segment II with densely distributed suberect pale setae, sometimes also with black setae; labium reaching apex of mesosternum or base of mesocoxae. PRONOTUM. Lateral margins slightly concave, posterior margin broadly rounded, anterior margin concave medially, calli weakly differentiated, attaining anterolateral margins of pronotum; mesoscutum narrowly exposed; scutellum weakly arched, antero-medial region transversely flattened. HEMELYTRA. Elongate, parallel-sided, broadest anterior to cuneal fracture; claval, cubital and radial veins weakly elevated; embolium uniformly narrow; cuneal incisure sharp; cuneal fracture distinct, angled anteriad; cuneus longer than broad; membrane uniformly fuscous or conspurcate, veins pale at apex and brachium. LEGS. Black or brown; tibiae with several longitudinal rows of minute black spinules, tibial spines black, without dark spots at bases. GENITALIA. *Genital capsule*: Large, subtriangular, length subequal to width in ventral view; slightly produced posteriad of paramere sockets, apex broadly rounded; posterodorsal margin between right paramere socket and apex with solitary spine-like process; posteroventral surface sometimes with erect black bristles set in large sockets; aperture of moderate size, 'U' shaped, lateral margin dorsad of left paramere with very small spine-like process, or tubercle. *Left paramere*: Sensory lobe prominent, rounded and set with bristle-like setae; lateral lobe or arm laterally flattened, slightly curved, abruptly tapered and recurved distally; apex narrow and rounded. *Right paramere*: Somewhat 'T' shaped in lateral view; shaft narrow in comparison to expanded distal end, dorsal lobe of distal end more produced than ventral lobe; interodistal surface minutely wrinkled; apex broadly sunken. *Phallotheca*: Conical in ventral view; dorsal edge of opening broad, sinuate and narrowing to posterior end, and with deep circular

notch basally on right side. *Vesica*: Ductus seminis simple, cylindrical, flexible, with ribs; secondary gonopore horseshoe-shaped, with long well sclerotized base; two posteriorly directed vesical spiculae, broadly attached right and left of midline of ductus adjoining base of gonopore and ductus, curving laterad even with opening of gonopore; right spicula smaller than left spicula, broad basally, flattened and strongly serrate distally, sometimes with large spine at base of flattened portion; left spicula broad basally, tapering to flattened, bifurcate, strongly serrate distal half, dextral branch with variously shaped large basal spine.

Female.—Macropterous. Similar to male in color, vestiture, and structure, except usually slightly larger with smaller eyes and much broader vertex. GENITALIA. Following the terminology of Slater, 1950. *Sclerotized rings*: Small, widely separated; lateral margin of ring strongly folded dorsomesad, extending across ring to mesal margin. *Posterior wall*: K structures very large, subquadrate, concealing J structures, narrowly separated basomedially, inner margin moderately concave; L structure narrowly visible in anterior view.

Type species.—*Orthotylus fumidus* Van Duzee, 1916:127, designated by Knight, 1923:523.

Distribution.—Widely distributed in the northern United States and southern Canada from New York and Quebec, west to British Columbia, and south in the Intermountain Region to Colorado and Arizona (Fig. 39). A single specimen of the new species, *autlan*, is known from the state of Jalisco in Mexico.

Discussion.—Stonedahl and Schuh (1986) recognized *Noctuocoris* as belonging to a complex of six genera that share the following defining characters: (1) antennal segment I longer than width of vertex; (2) very prominent tylus; (3) large antennal fossae; (4) phallotheca broadly opened dorsally; (5) posterodorsal margin of genital capsule between right paramere socket and apex with sclerotized ridge and/or 1–3 spine-like process(es); and (6) vesica with two, distally branched, recurved, and usually strongly serrate spiculae. *Noctuocoris* can be distinguished from the other members of this group by the characters given in the generic diagnosis.

The host plant associations of *Noctuocoris* species are not well known. In Canada, *fumidus* has been collected on *Quercus* and *Carya*. Kelton (1980) gave *Quercus macrocarpa* Michx. as the habitat for this species in eastern Canada. A single female of *conspurcatus* was taken on *Pinus contorta* Dougl. in north-central Colorado. All three species of this genus have been collected at light.

***Noctuocoris autlan*, NEW SPECIES**
(Figs. 4–14, 39)

Diagnosis.—Distinguished from *conspurcatus* and *fumidus* by the following characteristics of the male genitalia: posteroventral region of genital capsule with long black setae but lacking stout bristles (Fig. 6); dorsal lobe of right paramere strongly produced, subtruncate apically (Figs. 9, 10); sunken region between dorsal and ventral lobes of right paramere deeply angulate (Fig. 11); base of flattened portion of right spicula of vesica without strong, solitary spine (Figs. 7, 8); dextral branch of left spicula with large, bifurcate, basal spine (Figs. 7, 8). Further differentiated from *fumidus* by the conspurcate hemelytral membrane, and from *conspurcatus* by antennal segment II only slightly longer than posterior width of pronotum.

Description of male.—GENERAL ASPECT. Total length 5.78; grayish black with frons, anterior portion of pronotal disk, and cuneus dark rufus brown; an-

tennae, posterolateral region of pronotum, pair of patches either side of midline of mesoscutum, lateral portion of scutellum, corium near commissure, antero-medial region of cuneus, mesosternum, epimeron, and legs black; posteromedial patch of pronotum, lateral corners of mesoscutum, and apex of scutellum faintly white; mesosternum with broad polished patches; black scale-like setae densely distributed above blacker portions of dorsal aspect. HEAD. Width across eyes 1.00, width of vertex 0.29; length of antennal segment I 0.56, segment II 1.77; posterior margin of head ecarinate; frons slightly convex, junction with tylus very shallow; eyes large occupying three-quarters of head height; lora protruding; width of genae equal to diameter of antennal segment I, bucculae small, extending slightly posteriad of posterior margin of antennal fossa; gula obsolete; length of labium 1.41, reaching apex of mesosternum; antennae black, segment II with densely distributed pale and black suberect setae. PRONOTUM. Posterior width 1.68. HEMELYTRA. Cuneus 1.5 times as long as broad; membrane conspurcate. LEGS. Uniformly black. GENITALIA. *Genital capsule*: Tuberclae dorsad of left paramere; ventral surface without black bristles. *Right paramere*: Somewhat elongated in distal view; dorsal lobe greatly produced; sunken region between dorsal and ventral lobes deep; ventral lobe produced and wrinkled. *Vesica*: Right spicula. Strongly serrate, without large solitary spine at base of flattened portion; surface without serrations; apex truncate. Left spicula. Sinistral branch with flattened portion strongly serrate and wide medially, tapering to pointed apex. Dextral branch with large bifurcate basal spine, narrowed distally and with truncate apex.

Female.—Unknown.

Etymology.—Named for the type locality; a noun in apposition.

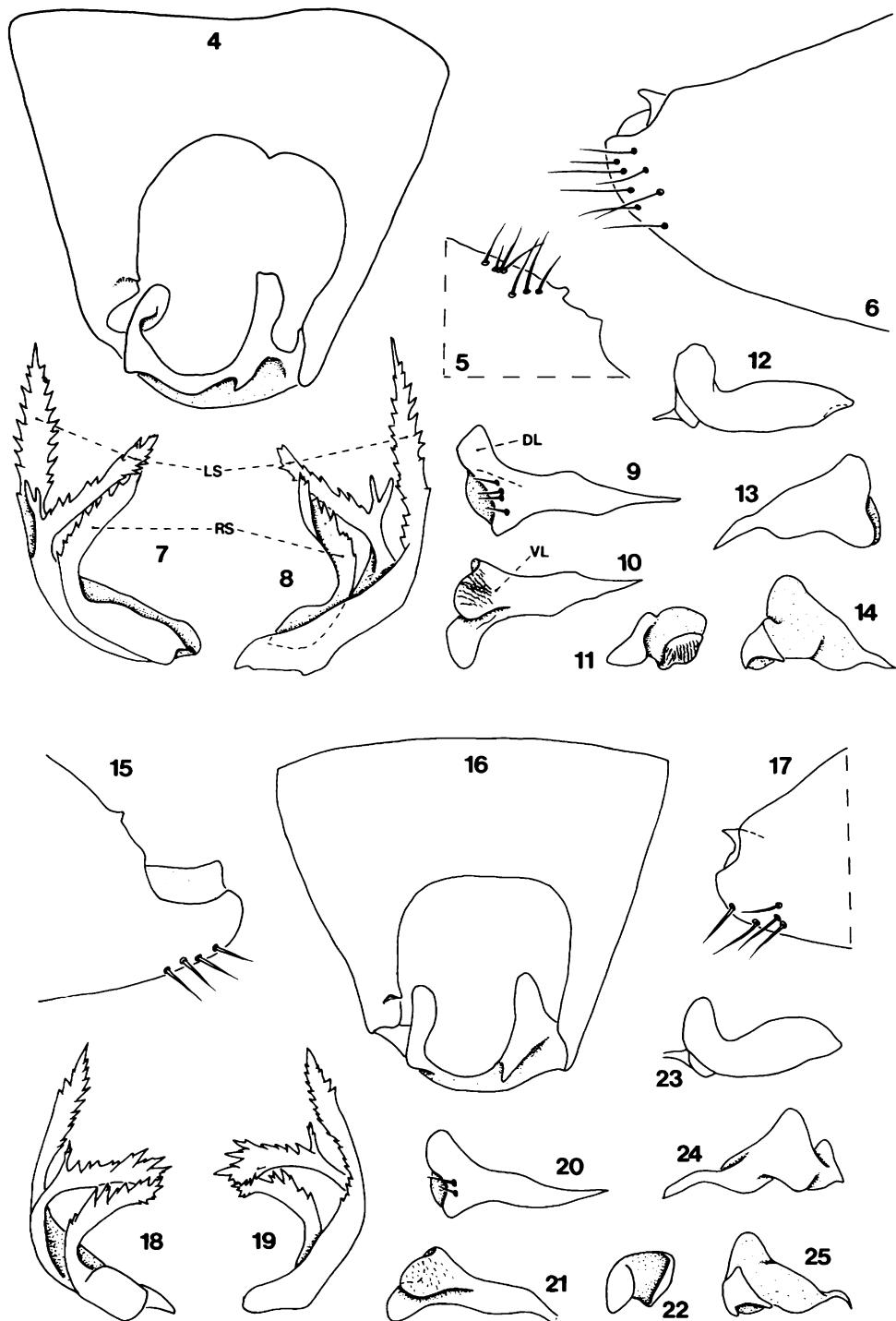
Holotype ♂.—MEXICO: Jalisco. 16 km N of Autlan, July 12–14, 1983, at black light, Kovarik, Harrison, and Schaffner (TAM), deposited at American Museum of Natural History.

Distribution.—Jalisco, Mexico (Fig. 39).

***Noctuocoris conspurcatus*, NEW SPECIES**
(Figs. 15–25, 39)

Diagnosis.—Recognized by the conspurcate hemelytral membrane, length of antennal segment II much greater than posterior width of pronotum, and by these characteristics of the male genitalia: posteroventral region of genital capsule with very stout, dark bristles (Figs. 15, 17); dorsal lobe of right paramere less strongly produced, rounded apically (Figs. 20, 21); sunken region between dorsal and ventral lobes of right paramere shallowly rounded (Fig. 22); base of flattened portion of right spicula of vesica without strong, solitary spine (Figs. 18, 19); dextral branch of left spicula with solitary, finely serrate, basal process (Figs. 18, 19).

Description of male.—GENERAL ASPECT. Total length 6.98; dark brown; juga, anterior margin of pronotum, and diffuse patches of frons, pronotal disk, clavus, corium and cuneus lighter brown; pair of patches either side of midline of mesoscutum, faint midline of scutellum, and apex of scutellum almost white; mesosternum with broad polished patches. HEAD. Width across eyes 0.98, width of vertex 0.31; length of antennal segment I 0.59, segment II 2.00; posterior margin ecarinate; frons slightly convex, junction with tylus shallow; eyes large, occupying slightly more than two-thirds of head height; lora prominent; width of genae greater than diameter of antennal segment I; bucculae large, extending slightly



Figures 4-25. Male genitalic structures. 4-14. *Noctuocoris autlan*. 4-6. Genital capsule. 4. Dorsal view. 5. Left lateral view. 6. Right lateral view. 7, 8. Spiculae of vesica (LS, left spicula; RS, right spicula). 7. Right lateral view. 8. Left lateral view. 9-11. Right paramere. 9. Outside lateral view (DL,

posteriad of posterior margin of antennal fossa; gula obsolete; length of labium 1.54, reaching slightly beyond apex of mesosternum; antennae black, segment II with densely distributed pale recumbent and black suberect setae. PRONOTUM. Posterior width 1.48. HEMELYTRA. Cuneus 2.2 times as long as broad; membrane conspurcate. LEGS. Uniformly black. GENITALIA. *Genital capsule*: Very small pointed process dorsad of left paramere; ventral surface with several black bristles. *Right paramere*: Somewhat rounded in distal view; dorsal lobe not greatly produced; sunken region between dorsal and ventral lobes shallow. *Vesica*: Right spicula. Without large solitary spine at base of flattened portion, but with pair of large serrations; surface with several serrations; apex truncate. Left spicula. Sinistral branch with flattened portion somewhat wide medially, tapering to pointed apex. Dextral branch with finely serrate basal spine, expanded distally and with truncate apex.

Female.—Length 6.12; width of head across eyes 0.97, width of vertex 0.41; length of antennal segment I 0.62, segment II 2.01; length of labium 1.49; posterior width of pronotum 1.50. Measurements from Colorado specimen.

Etymology.—Named for its conspurcate hemelytral membrane.

Holotype ♂.—ARIZONA. Coconino Co., 2 mi SW of Jacob Lake, August 16, 1958, at light, W. L. Nutting (UAZ), deposited at American Museum of Natural History.

Paratypes.—ARIZONA. Cochise Co., Chiricahua Mts., Tex Canyon, September 16, 1927, J. A. Kusche, collector, ♀ (CAS) [head missing]. COLORADO. Grand Co., St. Louis Creek Campground, 3.4 mi W of Fraser, August 16, 1980, 9000 ft, G. M. Stonedahl, ex *Pinus contorta* Dougl., ♀ (AMNH).

Distribution.—Colorado and Arizona (Fig. 39).

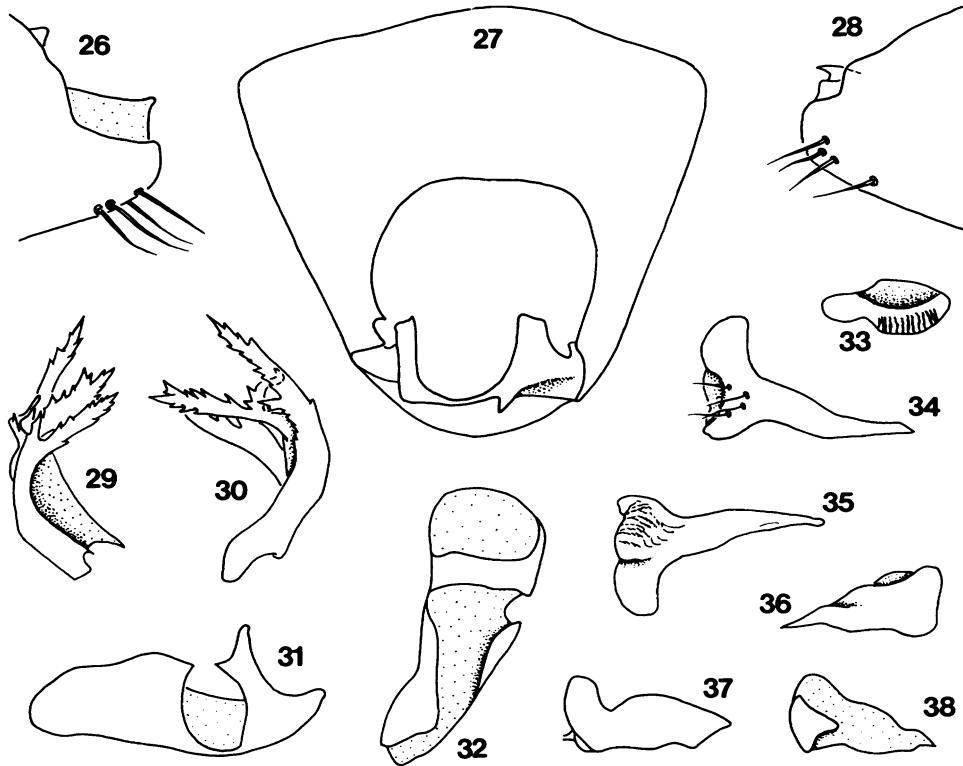
Noctuocoris fumidus (Van Duzee) (Figs. 26–39)

Orthotylus fumidus Van Duzee, 1916:127 (new species).

Noctuocoris fumidus, Knight, 1923:523, 524, fig. 96 (new combination); 1941: 105 (distribution); 1968:109, fig. 141 (distribution). Kelton, 1980:246, 247, map 79 (description, distribution).

Diagnosis.—Differs from *autlan* and *conspurcatus* by the uniformly fumose hemelytral membrane (Fig. 1), and smaller spiculae of the vesica with large spine or strong serration at base of flattened portion of right spicula (Figs. 29, 30). Further differentiated from *autlan* by the stout bristles on the posteroventral region of the genital capsule (Figs. 26, 28), shallowly rounded sunken region between dorsal and ventral lobes of right paramere (Fig. 33), and the undivided single spine at base of dextral branch of left spicula (Figs. 29, 30). The length of antennal segment II of *fumidus* is equal to or considerably greater than the posterior width of the pronotum.

←
dorsal lobe). 10. Inside lateral view (VL, ventral lobe). 11. Distal view. 12–14. Left paramere. 12. Lateral lobe, lateral view. 13. Sensory lobe, lateral view. 14. Inside posterolateral view. 15–25. *Noctuocoris conspurcatus*. 15–17. Genital capsule. 15. Left lateral view. 16. Dorsal view. 17. Right lateral view. 18, 19. Spiculae of vesica. 18. Right lateral view. 19. Left lateral view. 20–22. Right paramere. 20. Outside lateral view. 21. Inside lateral view. 22. Distal view. 23–25. Left paramere. 23. Lateral lobe, lateral view. 24. Sensory lobe, lateral view. 25. Inside posterolateral view.



Figures 26–38. Male genitalic structures of *Noctuocoris fumidus*. 26–28. Genital capsule. 26. Left lateral view. 27. Dorsal view. 28. Right lateral view. 29, 30. Spiculae of vesica. 29. Right lateral view. 30. Left lateral view. 31, 32. Phallotheca. 31. Right lateral view. 32. Dorsal view. 33–35. Right paramere. 33. Distal view. 34. Outside lateral view. 35. Inside lateral view. 36–38. Left paramere. 36. Sensory lobe, lateral view. 37. Lateral lobe, lateral view. 38. Inside posterolateral view.

Description of male.—GENERAL ASPECT. Male. Total length 5.20–6.65; fuscous brown with frons, anterior portion of pronotal disk, mesoscutum, scutellum, cuneus, epimeron, coxae, tarsi, apex of tibiae, and venter dark rufus brown; apex of scutellum faintly white. HEAD. Width across eyes 0.96–1.03, width of vertex 0.29–0.33; length of antennal segment I 0.46–0.54, segment II 1.50–1.91; posterior margin of head with very slightly elevated carina; frons flattened, weakly convex anteriorly, junction with tylus shallow; eyes large, occupying four-fifths of head height; juga and lora weakly protruding; genae narrower than diameter of antennal segment I; bucculae very small, not extending posteriad of margin of antennal fossa; length of labium 1.29–1.40, reaching apex of mesosternum or slightly beyond; antennae fuscous brown, segment II with densely distributed suberect pale setae. PRONOTUM. Posterior width 1.41–1.62. HEMELYTRA. Cuneus almost twice as long as broad; membrane uniformly fuscous. LEGS. Fuscous brown, femora of some specimens with lighter ground color and with row of variously shaped fuscous patches. GENITALIA. *Genital capsule:* Pointed process dorsad of left paramere; ventral surface with several or many black bristles. *Right paramere:* Somewhat elongated in distal view; dorsal lobe produced; sunken region between dorsal and ventral lobes shallow. *Vesica:* Right spicula. Long and narrow,

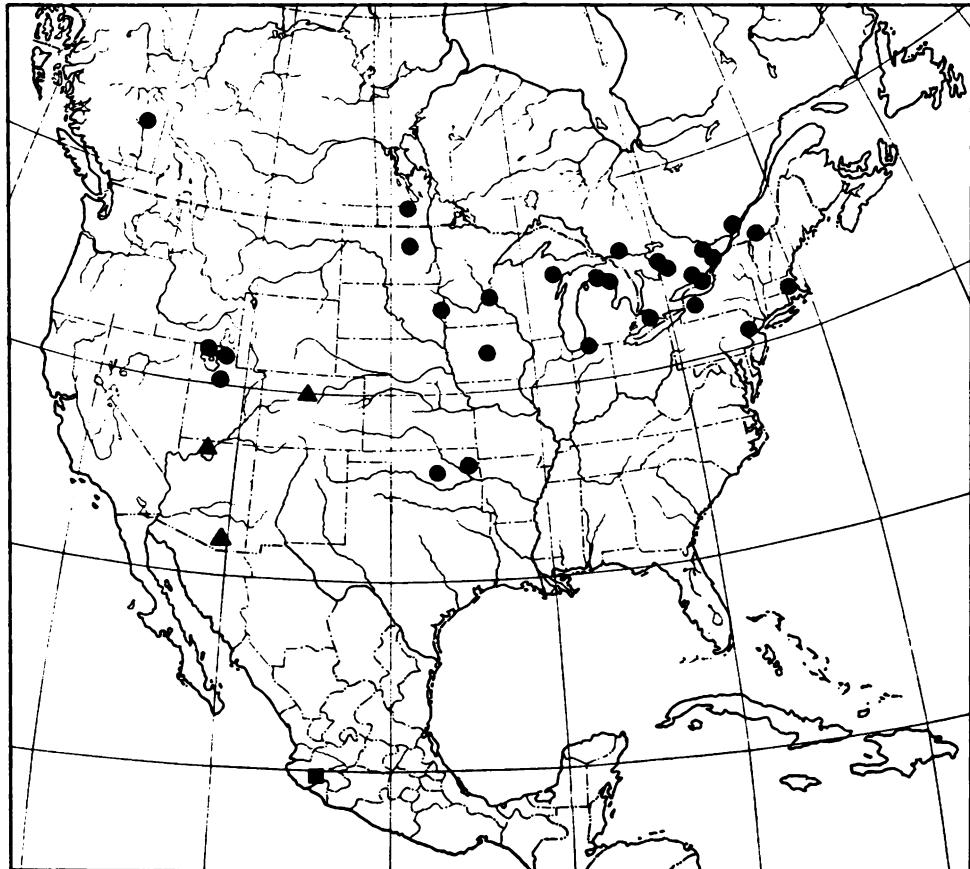


Figure 39. Distribution of *Noctuocoris autlan*, ■; *Noctuocoris conspurcatus*, ▲; *Noctuocoris fumidus*, ●.

or shorter and finely serrate, with spine at base of flattened portion, sometimes only weakly differentiated from marginal serrations; surface with several serrations; apex pointed. Left spicula. Sinistral branch with flattened portion narrow over entire length, apex pointed. Dextral branch with long narrow spine at base of flattened portion, spine sometimes finely serrate, or recurved; expanded or tapered distally, with apex truncate or pointed.

Female.—Length 5.20–6.62; width of head across eyes 0.95–1.01, width of vertex 0.39–0.41; length of antennal segment I 0.55–0.61, segment II 1.58–1.93; length of labium 1.32–1.52; posterior width of pronotum 1.33–1.63.

Type.—HOLOTYPE ♀ [head missing]: COLORADO. Larimer Co., Ft. Collins, July 28, 1898, E. P. Van Duzee (CAS).

Distribution.—Widely distributed in the northern United States and southern Canada; south to Utah, Colorado, and Oklahoma (Fig. 39).

Discussion.—This species was described from a single female specimen and placed in the genus *Orthotylus* by Van Duzee (1916). Knight (1923) correctly recognized it as distinct from other North American species of that genus and moved it to the new genus, *Noctuocoris*, at the same time designating a male

allotype from Batavia, New York, July 7, 1913 (USNM). Although slight differences in external morphology and male genitalia are found between populations east and west of the Rocky Mountains, we agree with Knight that both of these populations are conspecific.

Material examined.—Fifty specimens with collection dates from June 5 to September 1. CANADA: BRITISH COLUMBIA: *Caribou*, Soda Creek (UBC). MANITOBA: *Prairie Const.*, Carberry (CNC). ONTARIO: *Algoma District*, Biscotasing, *Carleton Co.*, Ottawa. *Elgin Co.*, St. Thomas (all CNC). *Genville Co.*, Ventor (TAM). *Hastings Co.*, Marmora, and Hastings Co. (CNC). *Muskoka District*, Muskoka (USNM). *Parry Sound District*, Otter Lake. *Prince Edward Co.*, Palmer Rapids. QUEBEC: *Brome Co.*, Knowlton. *Champlain Co.*, Lac Mondor, Ste. Flore (all CNC). UNITED STATES: IOWA: *Story Co.*, Ames (TAM). MASSACHUSETTS: *Middlesex Co.*, Framingham (USNM). MICHIGAN: *Berrien Co.*, Three Oaks (CNC). *Cheboygan Co.* (USNM). *Dickinson Co.* (USNM). *Alpena Co.*, Alpena (USNM). MINNESOTA: *Ramsy Co.*, and St. Anthony Park (USNM). NEW YORK: *Genesee Co.*, Batavia (USNM). NORTH DAKOTA: *Ramsey Co.*, Devil's Lake (USNM). OKLAHOMA: *Payne Co.*, Stillwater (USNM). *Rogers Co.*, Claremore (CNC, USNM). PENNSYLVANIA: *Monroe Co.*, Delaware Water Gap (USNM). SOUTH DAKOTA: *Brookings Co.*, Brookings (USNM). UTAH: *Box Elder Co.*, Snowville (USU). *Cache Co.*, Logan (USU, USNM). *Utah Co.*, Provo (USNM).

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LITERATURE CITED

- Kelton, L. A. 1980. The insects and arachnids of Canada, Part 8. The plant bugs of the prairie provinces of Canada. Heteroptera: Miridae. Agric. Canada Publ. 1703, 408 pp.
- Knight, H. H. 1923. Family Miridae (Capsidae). Pp. 422–658 in W. E. Britton (ed.), Guide to the insects of Connecticut, Part IV. The Hemiptera or sucking insects of Connecticut. Conn. St. Geol. Nat. Hist. Surv. Bull. No. 34, 807 pp.
- . 1941. The plant bugs, or Miridae, of Illinois. Bull. Illinois Nat. Hist. Surv., 22(1):1–234.
- . 1968. Taxonomic review: Miridae of the Nevada test site and the western United States. Brigham Young Univ. Sci. Bull., Biol. Ser., 9(3):1–282.

- Slater, J. A. 1950. An investigation of the female genitalia as taxonomic characters in the Miridae. *Iowa St. J. Sci.*, 25(1):1–81.
- Stonedahl G. M., and R. T. Schuh. 1986. Revision and cladistic analysis of *Squamocoris* Knight (Hemiptera: Miridae: Orthotylinae) with the description of five new species from Mexico and the western United States. *Amer. Mus. Novitates*, 2852, 26 pp.
- Van Duzee, E. P. 1916. Monograph of the North American species of *Orthotylus* (Hemiptera). *Proc. California Acad. Sci.*, Series 4, 6(5):87–128.