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NEW SPECIES OF NEOBORUS AND XENOBORUS (HEMIPTERA, MIRIDAE).

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Neoborus wileyae n. sp.

Distinguished by the short, robust form, black color and prominent, sericeous, recumbent silvery white pubescence.

♂. Length 3.4 mm., width 1.8 mm. Head: width 1 mm., vertex .47 mm.; yellowish brown, tylus black. Rostrum, length 1.2 mm., reaching posterior margins of hind coxae, dark brown to blackish. Antennae: segment I, length .31 mm.; II, 1.12 mm.; III, broken; black. Pronotum: length .83 mm., width at base 1.49 mm.; basal margin sinuate at middle and between there and basal angles; lateral margins nearly straight, roughly carinate.

Black, the dorsum in part dark brownish black; head except tylus, propleura, anterior third of disk surrounding the black calli, yellowish brown; ostiolar peritreme white, tips of coxae somewhat brownish, otherwise the legs uniformly black; membrane black. Dorsum rather uniformly, coarsely and rather closely punctate; clothed with prominent, sericeous, recumbent silvery white pubescence. Embolar margins moderately arcuate, the edge finely but distinctly carinate.

♀. Length 4.4 mm., width 2.1 mm.; embolar margins strongly arcuate. Head: width 1.1 mm., vertex .56 mm. Antennae: segment I, length .30 mm.; II, .96 mm.; III, .38 mm.; IV, .27 mm.; black. Pronotum: length .90 mm., width at base 1.64 mm. More robust and embolar margins more arcuate than in the male, but very similar in coloration, pubescence and puncturation.

¹ Contribution from the Department of Zoology and Entomology, Iowa State College, Ames, Iowa.

Holotype: ♀, April 20, 1921, Eastland Co., Texas (Grace O. Wiley); author's collection. *Allotype*: same data as the type, *Paratypes*: 15 ♀ ♂, taken with the types "on Hawthorn blossoms" according to Mrs. Wiley's records. It is not positive that this species breeds on hawthorn (*Crataegus*) but the record is very suggestive. I take pleasure in naming this interesting species after the collector, Mrs. Grace O. Wiley, who collected this and other interesting species of Mirids for me.

***Neoborus atratus* n. sp.**

Allied to *wileyae* but distinguished by the shorter rostrum and pale marks on the scutellum.

♂. Length 3.2 mm., width 1.6 mm. Head: width .96 mm., vertex .42 mm. Rostrum, length 1.05 mm., reaching to middle of hind coxae, brownish black. Antennae: segment I, length .29 mm.; II, 1.02 mm.; III, broken; black. Pronotum: length .75 mm., width at base 1.45 mm.; basal margin only very slightly sinuate at middle; lateral margins slightly sinuate, roughly, unevenly carinate.

Color black; head yellowish to brownish black, tylus and basal carina black, a brownish black circle on frons joining below with tylus; pronotum black, basal edge, median line, collar, and ray behind outer margin of each callus, yellowish; scutellum with basal angles, apex, and fine median line pale to yellow. Clothed with sericeous, recumbent, silvery pubescence. Pronotum and scutellum coarsely and closely punctate, more finely so on hemelytra. Membrane uniformly brownish black.

Holotype: ♂, June 7-17, 1916, Jemez Springs, New Mexico (J. Woodgate); author's collection.

***Neoborus adeliae* n. sp.**

Runs to *palmeri* Reut. in my key (Hem. Conn., 1923, p. 561) but differs in several respects; the black clavus, median vitta on scutellum, and broad black rays on pronotum will distinguish it. Coloration suggestive of *illitus* Van D. but the long first antennal segment will distinguish this species.

♂. Length 4.3 mm., width 1.9 mm. Head: width 1.03 mm., vertex .46 mm.; vertex and frons sharply declivent; yellowish, tylus black, frons more or less brownish black. Rostrum, length 1.03 mm., reaching upon intermediate coxae, yellowish, apex black. Antennae: segment I, length .62 mm., black, sometimes yellowish beneath; II, 1.9 mm., black; III,

.68 mm., black; IV, .35 mm., black. Pronotum: length .96 mm., width at base 1.7 mm.; lateral margins straight, angulate, but scarcely carinate.

Dorsal surface nearly glabrous, a minute short hair arising on anterior edge of each puncture; punctate nearly as in *palmeri*, but calli less convex. Coloration pale to yellowish and marked with black; calli, wedge-shaped ray behind each callus extending to basal margin of disk, median vitta on scutellum, clavus, embolium and apical area of corium, apex of cuneus, two subapical bands on hind femora, band near base and on middle of hind tibiae, black. Venter and pleura dark brownish. Membrane and veins rather uniformly blackish.

♀. Length 4.7 mm., width 2.4 mm. Head: width 1.11 mm., vertex .58 mm. Antennae: segment I, length .53 mm.; II, 1.27 mm.; III, .62 mm.; IV, .38 mm.; brownish black. Pronotum: length 1.09 mm., width at base 1.98 mm. Slightly more robust than the male but very similar in coloration, pubescence and puncturation.

Holotype: ♂, April 17, 1928, College Station, Texas (H. G. Johnston); author's collection. *Allotype*: taken with the type; returned to Mr. Johnston. *Paratypes*: ♂ ♀, April 12, 40 ♂ ♀, April 17, taken with the types on swamp privet (*Adelia parvifolia*) where Mr. Johnston found the species breeding, but only in shaded situations.

***Neoborus adustus* n. sp.**

Allied to *glaber* Kngt., but distinguished by the more prominent pubescence, different color, and by the shorter first antennal segment which in length (♂) does not exceed width of vertex.

♂. Length 3.9 mm., width 1.66 mm. Head: width .98 mm., vertex .40 mm.; brownish yellow, tylus except base, and spot above base of antenna, blackish. Rostrum, length 1.06 mm., reaching to middle of intermediate coxae. Antennae: segment I, length .34 mm., yellowish brown, blackish on anterior aspect; II, 1.09 mm., brownish black, III, .38 mm., black; IV, .37 mm., black. Pronotum: length .80 mm., width at base 1.46 mm.; coarsely and more sparsely punctate than *glaber*, especially on anterior half of disk; lateral margins of disk slightly sulcate, rounded and obsoletely carinate, the carinate line bordered by closely set coarse punctures; yellowish to brownish, dark brown on propleura, basal half of

disk, and on inner half of calli. Scutellum slightly convex, coarsely and unevenly punctate; dull yellowish, a brow area each side of median line which contrasts only very slightly with the paler yellowish color on basal angles, apex and median line.

Dorsum clothed with fine, short, sericeous pubescence although obsolete on the pronotum; moderately shining. Color yellowish to brownish, darker brown on clavus and corium; cuneus uniformly pale yellowish translucent. Membrane and veins pale, tinged with brownish, a fuscous spot behind apex of cuneus and on middle of larger areole. Legs light yellowish brown, coxae pale yellowish, hind femora with two subapical dark brown marks, sometimes obsolete, tips of tarsi fuscous.

♀. Length 4.1 mm., width 1.9 mm. Head: width 1.02 mm., vertex .52 mm. Antennae: segment I, length .35 mm.; II, 1.03 mm., III, .40 mm.; IV, .36 mm. Pronotum: length .86 mm., width at base 1.6 mm. Very similar to the male in pubescence, puncturation and coloration, although usually slightly paler and more uniformly colored.

Holotype: ♂, July 15, 1915, Springfield, Missouri (H. H. Knight); author's collection. *Allotype*: taken with the type. *Paratypes*: 26 ♂ ♀, taken with the types on ash (*Fraxinus* sp.) 5 ♂ ♀, July 18, 1915, topotypic. 3 ♂ 2 ♀, April 12, 1928, College Station, Texas (H. G. Johnston), on *Fraxinus americana*.

Neoborus populi n. sp.

Runs to *canadensis* Van D. in my key (Hem. Conn., 1923, p. 561), but looks more like *pubescens* Knegt.; distinguished from the latter by the longer pubescence and black antennae.

♂. Length 4.2 mm., width 1.7 mm. Head: width 1.05 mm., vertex .40 mm.; frons and tylus rather prominent; yellowish, tylus, spot above each antennal socket, and mark each side of median line on frons, black. Rostrum, length 1.06 mm., nearly attaining hind margin of sternum, yellowish, apex black. Antennae: segment I, length .63 mm., black, somewhat paler on base; II, 1.75 mm., black; III, .92 mm., brownish; IV, .32 mm., yellowish. Pronotum: length .92 mm., width at base 1.5 mm.; calli prominent, black, surrounded by yellowish, becoming black on posterior half of disk but not joining with black on calli; lateral margins of disk slightly sinuate, not distinctly carinate.

Clothed with prominent, erect, pale pubescence, longer and more prominent than in *pubescens*. Coloration pale to yellowish and shaded with black, scutellum yellow, without indication of any vitta; calli, posterior half of pronotal disk but usually paler on median line, mesoscutum, inner half of clavus although paler basally, embolium except apex, outer margin of corium exterior to radial vein and extending obliquely across apical area of corium to inner angles, pleura and sternum, black. Cuneus clear, membrane and veins blackish. Legs yellowish, apical half of hind femora and base of tibiae becoming blackish.

♂. Length 4.6 mm., width 1.9 mm. Head: width 1.02 mm., vertex .49 mm. Antennae: segment I, length .53 mm., blackish, paler on one side; II, 1.35 mm., black, paler beneath on basal half; III, .90 mm., yellowish; IV, .38 mm., pale. Pronotum: length .95 mm., width at base 1.75 mm. Very similar to the male in pubescence and coloration except the areas of black somewhat reduced; hind femora with two incomplete, subapical black annuli; membrane fuscous to blackish.

Holotype: ♂, July 19, 1926, Brownfield, Illinois (Vera G. Smith); author's collection. *Allotype*: same date as type. *Paratypes*: 4 ♂ 1 ♀, July 20, Urbana, Illinois: "on cottonwood."

Neoborus vittifrons n. sp.

Allied to *adustus* but distinguished by the narrower calli with black cephalic margins and the more closely punctate pronotal disk.

♂. Length 3.9 mm., width 1.6 mm. Head: width .98 mm., vertex .36 mm.; median line of and arcuate line around frons, and vertex except smooth spot next to the eye, with coarse closely set punctures, yellow; tylus and median line of frons blackish. Rostrum, length 1.12 mm., nearly attaining hind margins of middle coxae, yellowish, apex black. Antennae: segment I, length .34 mm., blackish, yellowish beneath; II, 1.06 mm.; III, .34 mm.; IV, (broken); black. Pronotum: length .82 mm., width at base 1.42 mm.; disk coarsely and closely punctate, more closely about calli than in *adustus*, also the calli narrower with cephalic margins black, more broadly black at inner angles; yellowish, basal half of disk more brownish, basal edge and collar white. Scutellum slightly convex, flat on apex, coarsely punctate; pale yellowish, basal half more brownish each side of median line.

Dorsum clothed with fine, short, sericeous pale pubescence. Color uniformly pale yellowish and tinged with brown; cuneus and outer half of corium yellowish translucent. Membrane pale, veins blackish, anal area and transverse mark behind apex of cuneus, fuscous; an opaque, pale callus bordering apex of larger areole. Legs pale to yellowish, knees and tips of tarsi fuscous.

♀. Length 4.2 mm., width 1 mm. Head: width 1.02 mm., vertex .49 mm. Antennae: segment I, length .34 mm., yellowish, blackish line above; II, .92 mm., yellowish brown to black, darker apically; III, .38 mm., black; IV, .34 mm., black. Pronotum: length .86 mm., width at base 1.6 mm. Very similar to the male in pubescence, puncturation, and coloration, but black marks on frons and calli frequently reduced to dark brown.

Holotype: ♂, April 26, 1926, Santa Catalina Mts., alt. 3,200 ft., Arizona (A. A. Nichol); author's collection. *Allotype*: same data as the type. *Paratypes*: 2 ♂ 2 ♀, taken with the types on *Fraxinus arizonicus* by Mr. Nichol. 10 ♂ ♀, April 19, 5 ♂ ♀, May 31, 2 ♂ 1 ♀, June 7, 1924, Tucson, Arizona (A. A. Nichol), taken on *Fraxinus arizonicus*. 2♂, July 20, 1917, Texas Pass, Arizona (H. H. Knight).

***Neoborus vittifrons umbratus* n. subsp.**

Structurally very similar to *vittifrons* but the dorsum and body largely brownish black.

♂. Length 4.4 mm., width 1.7 mm. Head: width .99 mm., vertex .40 mm. Rostrum, length 1.09 mm., nearly attaining hind margins of middle coxae. Antennae: segment I, length .33 mm.; II, 1.03 mm.; III, .31 mm.; IV, .29 mm.; black, first segment brownish on one side. Pronotum: length .83 mm., width at base 1.51 mm.

Color dark brownish black, more black on basal half of pronotum and inner half of corium; each side of vertex bordering eye, arcuate spot each side of frons, and juga bordering tylus, yellowish; collar and basal edge of pronotum whitish, outer half of calli except cephalic edge and extending as a short ray just behind, narrow median line of disk, dorsal and ventral margins of propleura, yellowish; scutellum dark fuscous brown, narrow median line, apex, basal angles and extending along lateral margins, pale or whitish; hemelytra dark brownish black, an elongate area on outer half of corium, a similar area on middle of clavus, and the

cuneus, yellowish translucent; cuneus becoming dark brownish bordering smaller areole. Membrane pale, anal area and veins fuscous; disk of larger areoles and spot behind cuneus, pale fuscous. Sternum, pleura, and sides of venter, dark brownish to black, genital segment dark brown. Legs pale to yellowish, femora with apical half dark brownish, bianulate with pale at apex; tibiae yellowish, a dark brown line at base on dorsal aspect, tips of tarsi fuscous.

Holotype: ♂, June 1, 1926, Chiricahua Mts., alt. 6,000 ft., Arizona (A. A. Nichol); author's collection. *Paratype*: ♂, taken with the type.

***Neoborus rufivenosus* n. sp.**

Distinguished by the short rostrum, blackish hemelytra, yellow scutellum, reddish cuneus and red veins in the membrane.

♂. Length 4.7 mm., width 1.8 mm. Head: width .99 mm., vertex .415 mm.; reddish brown, frons yellowish, coarsely punctate on vertex, sides and median line of frons, a small smooth spot each side of vertex bordering the eye. Rostrum, length .98 mm., extending somewhat behind middle of sternum, yellowish, apex blackish. Antennae: segment I, length .45 mm., brownish black; II, 1.36 mm., brownish, becoming blackish apically; III, .45 mm., black; IV, (broken). Pronotum: length .87 mm., width at base 1.57 mm.; disk coarsely but not closely punctate; brownish black, collar and basal edge pale, calli yellowish and darkened more or less with brown, before and behind more yellowish. Scutellum yellow, rather coarsely and irregularly punctate.

Dorsum clothed with rather prominent, sericeous, whitish pubescence, longer and thicker on hemelytra. Hemelytra uniformly dark brownish black, with a tinge of red distally; cuneus pale translucent, becoming more or less pigmented with red. Membrane pale, veins red, anal area, disk of areoles, and transverse area behind cuneus, fuscous. Body beneath yellowish to dark brown, sides of sternum, pleura, sides of venter and genital segment becoming dark brown. Legs uniformly pale yellowish, tips of tarsi fuscous.

♂. Length 4.2 mm., width 2 mm. Head: width 1.03 mm., vertex .55 mm. Antennae: segment I, length .40 mm., yellowish; II, 1.09 mm., yellowish; III, .47 mm., fuscous; IV, .38 mm., fuscous. Pronotum: length .90 mm., width at base 1.66 mm. Very similar to the male in pubescence and puncturation, but coloration more uniformly yellowish;

dorsum yellowish to brown, subbasal area of pronotal disk and the pleura, dark brownish. Cuneus and veins only tinged with reddish.

Holotype: ♂, June 7-17, 1916, Jemez Springs, alt. 6,400 ft., Arizona (J. Woodgate); author's collection. *Allotype*: same data as the type. *Paratypes*: 18 ♂ ♀, taken with the types.

***Neoborus fasciolus* n. sp.**

Allied to *vittifrons* but larger, distinguished by the black bands on tibiae and the uniformly yellowish frons.

♂. Length 4.7 mm., width 1.98 mm. Head: width 1.04 mm., vertex .445 mm.; yellow, distal half of tylus, basal half of juga and lora, and spot on dorsal margin of antennal socket, black. Rostrum, length 1.24 mm., reaching to near hind margins of middle coxae, yellowish, apex blackish. Antennae: segment I, length .39 mm., black; II, 1.15 mm.; III, .42 mm.; IV, .30 mm.; black. Pronotum: length .95 mm., width at base 1.67 mm.; coarsely punctate, basal margin more strongly sinuate near basal angles than at middle, lateral margins slightly sinuate, carina obsolete; brownish black, calli and anterior half of disk yellow, inner half of calli black. Scutellum very slightly convex, coarsely and rugosely punctate; yellow, a brown spot each side of middle.

Dorsum clothed with moderately prominent, sericeous, silvery white pubescence, shorter on scutellum and pronotum. Hemelytra rather uniformly brownish black, embolium and outer half of corium somewhat translucent; cuneus pale yellowish translucent, a fuscous spot on margin by apex of areole. Membrane pale, anal area fuscous, veins brownish to dusky; a pale fuscous area behind cuneus and within distal half of areoles. Venter blackish, margins of segments yellowish along middle third, basal half of genital segment yellowish. Pleura dark brown to black, sternum yellowish brown. Legs pale yellowish, femora with two incomplete subapical black bands; tibial knees black, with two interrupted black bands, one on middle and the other near base; apical segment of tarsi fuscous.

♀. Length 4.8 mm., width 2.2 mm. Head: width 1.08 mm., vertex .49 mm. Antennae: segment I, length .32 mm., yellowish brown, black above; II, 1.21 mm., black, more or less yellowish on basal half; III, .45 mm., black; IV, (broken). Pronotum: length .98 mm., width at base 1.85 mm. Very similar to the male in pubescence and coloration, but the dorsum becoming paler; however, the black on calli, head, and legs is equally distinct.

Holotype: ♂, April 27, 1915, Arboretum near cactus garden, Stanford University, California (Harold Morrison); author's collection. *Allotype*: same data as the type. *Paratypes*: 12 ♂ ♀, taken with the types.

***Neoborus flaviceps* n. sp.**

Suggestive of *pacificus* Van D., but frons more convex and with a blackish line above on first antennal segment; differs from *fasciolus* in the more convex frons and the uniformly pale yellowish legs.

♂. Length 4.3 mm., width 1.8 mm. Head: width 1.03 mm., vertex .47 mm.; frons distinctly convex median line, sides, and middle of vertex with moderately coarse punctures. Rostrum, length 1.23 mm., reaching to near hind margins of middle coxae, yellowish, apex black. Antennae: segment I, length .40 mm., yellowish, with blackish line above; II, 1.21 mm., brown to fuscous, blackish apically; III, .38 mm., black; IV., .30 mm., black. Pronotum: length .90 mm., width at base 1.63 mm.; coarsely punctate, calli prominent; lateral margins slightly sulcate, slightly rounded and obsoletely carinate. Scutellum slightly convex, coarsely punctate.

Clothed with fine, short, yellowish pubescence, only slightly sericeous. Color uniformly yellowish, calli with black spot on inner angles, corium with a brownish cloud on apical field; cuneus, outer half of corium, and the embolium, yellowish translucent; collar and basal edge of pronotum whitish; scutellum whitish and tinged with yellow. Membrane pale fumate, veins scarcely darker but edges indicated by fuscous. Legs uniformly yellowish, tips of tarsi fuscous.

Holotype: ♂, June 1, 1926, Chiricahua Mts., alt. 6,000 ft., Arizona (A. A. Nichol); author's collection.

***Neoborus amoenus floridanus* n. subsp.**

Differs from typical *amoenus* Reuter in the larger eyes, narrower vertex, and shorter rostrum; coloration suggestive of variety *scutellaris* Reut., but the structural characters mentioned will separate the forms.

♂. Length 4.4 mm., width 2.2 mm. Head: width 1.06 mm., vertex .32 mm., not equal to one-third the width of head; black, lower half of face pale, basal half of jugal black. Rostrum, length 1.06 mm., not attaining hind margin of sternum, length just equal to width of head across eyes.

Antennae: segment I, length .66 mm., brownish; II, 1.57 mm., pale, apex black; III, .50 mm., pale; IV, (broken). Pronotum: length .95 mm., width at base 1.76 mm.; calli prominent, subconfluent, lateral carina of disk distinct, white; shining black, lower margin of the propleura pale. Scutellum convex, sparsely punctate, yellow, median line and basal margin black, mesoscutum also black.

Hemelytra black, spot near middle of corium, embolium, and cuneus, pale translucent; membrane and veins pale, anal area black. Ventral surface pale, pleura, sides of sternum, and obsoletely on sides of venter, blackish. Legs pale, apical fourth of hind femora reddish, tips of tarsi brownish.

Holotype: ♂, April 29, 1928, Ocala, Florida (E. D. Ball); author's collection.

***Neoborus amoenus atriscutis* n. var.**

♂. Length 5 mm. Structurally very similar to typical *amoenus* Reut., but differs in the uniformly black color including the scutellum. Differs from *geminus* Say in the clear membrane, veins, and cuneus; anal area and basal angle of larger areole only infuscated.

Black, collar, obsolete dashes behind calli, frons except median line, antennae except apex of second segment, and the legs, pale; hind femora with subapical reddish band.

Holotype: ♂, July 13, 1924, Rainy River District, Ontario, Canada (J. F. Brimley); author's collection. *Paratypes*: 2 ♂, June 14, 1920, Ottawa, Ontario (J. McDunnough).

***Xenoborus selectus* n. sp.**

Allied to *pettiti* Reuter, but differs in the narrower vertex and the longer second antennal segment which exceeds the width of pronotum at base; coloration suggestive of *neglectus* Kngt., but the genital claspers are more nearly the form of *pettiti*.

♂. Length 4.9 mm., width 2.2 mm. Head: width 1.12 mm., vertex .34 mm.; the width of vertex less than one-third the width of head. Rostrum, length 1.12 mm., not attaining hind margin of sternum, yellowish, apex blackish. Antennae: segment I, length .92 mm., black, pale at base; II, 1.98 mm.; III, .95 mm.; IV, .48 mm.; black. Pronotum: length .95 mm., width at base 1.72 mm.; calli prominent, subconfluent, lateral margins of disk slightly sulcate, rounded, ecarinate; coarsely punctate, scutellum with finer punctures.

Color pale to yellow with black; head yellowish, tylus and frons black; pronotum yellowish, a triangular black area each side on basal half of disk; scutellum yellow, mesoscutum fuscous; hemelytra black, cuneus, embolium, basal half of corium except bordering clavus and outer margin on apical field, clear to pale yellowish; membrane and veins fuscous black; venter and pleura blackish, sternum yellowish brown; legs pale yellowish, femora with two blackish subapical bands, tibiae and tarsi fuscous. Dorsum clothed with prominent, suberect, pale pubescence.

Holotype: ♂, May 30, 1916, Charleston, Missouri (E. H. Gibson); author's collection.

What Attraction?—From the Framingham sewage filter beds a small odoriferous stream runs between two hillocks on its way to the Sudbury River. Along this stream I found small piles of partly dried grass and weeds left by the workmen. Though it was October 12 the sun beat down his rays into this little valley with such fervor that I had removed both my coat and vest while shaking the piles of hay over my sifting cloth and picking up the numerous beetles that ran about in all directions. Presently I heard a humming about me but attributed it to large flies which are often attracted to sifting operations. Then I saw a small black moth alight on my white shirt, then another fluttered down to me, while a third flew around my head. After many attempts I managed to bottle two of the elusive but persistent little fellows and the third escaped; I saw no more during the three hours I was there. On comparison with the two specimens in the collection of the Boston Society of Natural History (one of which I took in Sherborn, Mass.) it proved to be *Pseudanaphora arcanella* Clem.—C. A. FROST, Framingham, Mass.



Knight, Harry H. 1929. "New species of Neoborus and Xenoborus (Hemiptera, Miridae)." *Bulletin of the Brooklyn Entomological Society* 24, 1-11.

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