

A REVISION OF THREE GENERA OF DELPHACINE FULGORIDS FROM AMERICA NORTH OF MEXICO.

(Homoptera-Fulgoridae-Delphacinae)

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The genera *Pissonotus* Van Duzee (1897), *Phyllodinus* Van Duzee (1897), and *Phyllodictus* Ball (1926), resemble each other externally quite closely. *Pissonotus* and *Phyllodictus* have internal male genitalia of the same general character; that is, the aedeagus is long and slender, often with slender, retrorse processes on the dorsal margin of the outer third; the styles are sinuately curved with overhanging apices and there is at least one pair and sometimes two pairs of processes ventrad to the styles. *Phyllodinus*, however, has an entirely different type of internal male structure, lacking the above characters. *Pissonotus* and *Phyllodinus* are, therefore, considered good genera and *Phyllodictus* a subgenus of *Pissonotus*. They may be separated by the following key:

Crown broader than long; head wider than pronotum and pronotal carinae following curve of eye, not nearly reaching hind margin of pronotum *Phyllodinus*
Crown usually considerably longer than broad, head usually narrower than pronotum and pronotal carinae almost straight and reaching or almost reaching the hind margin of pronotum . . . *Pissonotus*

KEY TO SUBGENERA OF PISSONOTUS

Front tibiae distinctly flattened laterally *Phyllodictus*
Front tibiae not distinctly flattened laterally *Pissonotus*

Genus *Phyllodinus* Van Duzee

Phyllodinus Van Duzee, E. P. Bull. Buff. Soc. Nat. Sci., p. 240, 1897.

Form short and stout, square before. Head wider than the pronotum. Vertex quadrangular, a little wider than long, passage to the front strongly rounded. Front broad, base and apex nearly equal, the sides feebly convex; median carina forked opposite the middle of the eyes. Clypeus tricarinate. Checks narrow, broad at apex, the edges almost parallel below the inner angle of the eyes. Eyes large, transverse, deeply excavated below. Antennae stout, the two basal joints about equal in length. Pronotum short, anterior edge straight between the eyes, posterior very feebly excavated, lateral carinae following the contour of the eyes. Scutellum short. Elytra in brachypterous form with strong reticulated nervures. Anterior and intermediate feet with the posterior coxae strongly flattened, the femora deeply sulcate within. Posterior tibiae bispinose."

Genotype *Phyllodinus nervatus* Van Duzee.

1. *Phyllodinus nervatus* Van Duzee

Phyllodinus nervatus Van Duzee, E. P. Bull. Buff. Soc. Nat. Sci., p. 241, 1897.

Form oblong, broad and short. Head wider than pronotum, vertex nearly square, a little transverse, the edges nearly rectilinear, the anterior

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fova long-triangular, reaching over the rounded anterior edge of the head. Front oblong, a little expanded opposite the lower angle of the eyes; middle keel distinct for its whole length on the front but obsolete on the base of the clypeus. Pronotum shorter than the vertex, the fore and hind margins nearly straight and parallel, lateral carinae much curved. Sides of the large scutellum concave, the lateral carinae straight and oblique; near the basal angles. Elytra short and broad, covering the fifth abdominal segment, rounded behind. Pygofers of the male compressed laterally, the aperture narrow, forming a rounded pocket below to enclose the short slender curved styles, which are approximated but do not quite touch at their tips. Wall of the anal aperture square and produced on the ventral aspect, the lower angles acute and nearly touching one another. Femora and tibiae of the anterior and intermediate feet thin and broadly expanded. Length $2\frac{1}{2}$ to 3 mm.

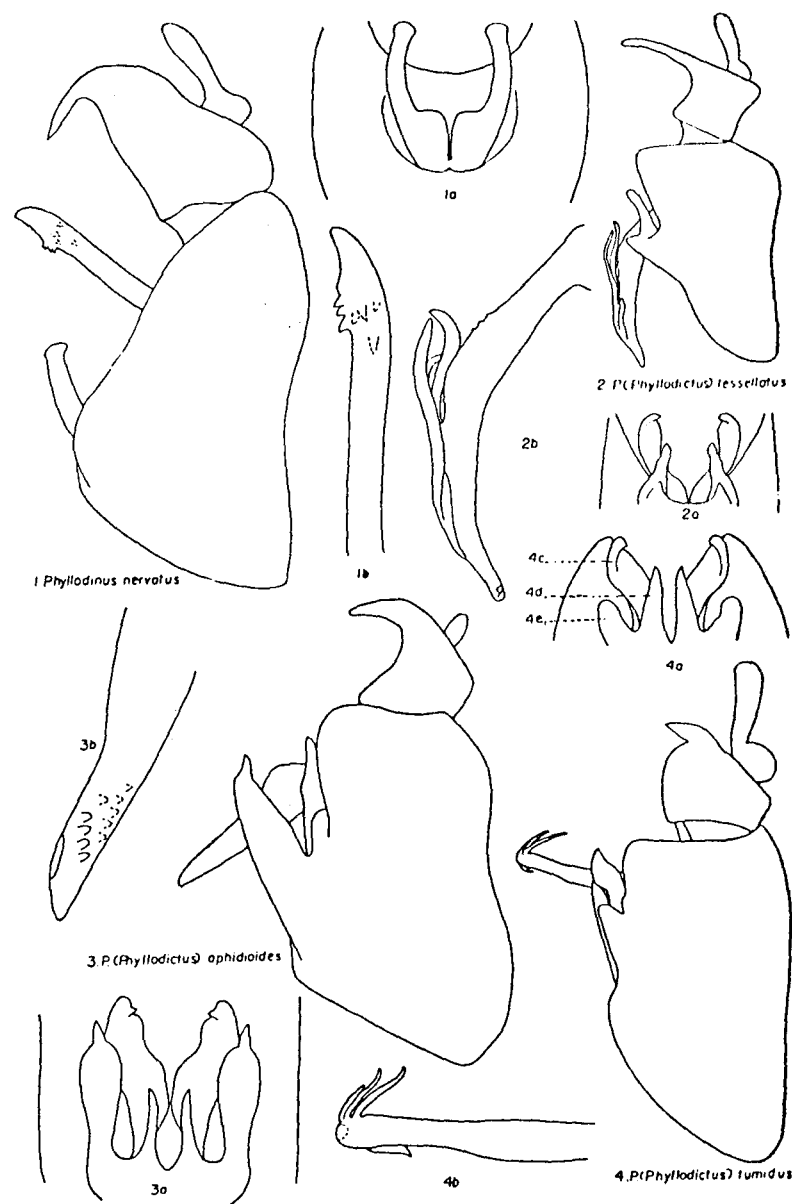
"Color piceous brown. Vertex pale, a short anterior median line and a row of dots on either side brown; disc of the pronotum and its carinae pale; scutellum pale with the basal angles and double median line brown. Elytra subhyaline, smoky, with numerous heavy ramous white nervures. Front blackish with the carinae and a double row of dots on either side pale. Carinae of the clypeus in part, rostrum, excepting its tip, edges of the femora, and tips of the tibiae, some marks on the pleural pieces, sternum and coxae below, and the apical joint of the antennae, pale. Disc of the tergum in the female tinged with reddish with a more or less complete double row of pale spots on either side. Tip of the genital pieces and the oblong plates at the base of the oviduct in the females whitish. Deflexed sides of the pronotum expanded into a large white plate at the base of the elytra.

"New York and Canada. Not uncommon near Buffalo on damp seepy meadows in June. Also taken in Welland Co., Ont., and at Muskoka Lake in July. This is our largest northern Delphacid. Its square form and brown color with the strongly ramosely veined elytra will distinguish it."

Genitalia: In lateral view pygofer more or less triangular, dorsal margin almost pointed; styles protruding from caudal margin with sides almost parallel to knobbed apices; aedagus long and slender, sides almost parallel to slight enlargement near outer third, with about four sharp teeth on each margin at this point; anal segment with a pair of sharp processes directed ventrally. In ventral view styles widest at base, shaft strongly narrowed on inner margin before middle, slightly curved into knobbed apices; aedeagal brace not extended dorsally.

PLATE I

- 1 *Phyllodinus nervatus* Van Duzee, lateral view of ♂ genital capsule; 1a, ventral view of styles in position; 1b, lateral view of aedeagus.
 2 *P. (Phyllodictus) testellatus* (Ball), lateral view of ♂ genital capsule; 2a, ventral view of styles and processes in position; 2b, lateral view of aedeagus.
 3 *P. (Phyllodictus) aphidoides* (Van Duzee), lateral view of ♂ genital capsule; 3a, ventral view of styles and processes in position; 3b, lateral view of aedeagus.
 4 *P. (Phyllodictus) tumidus* n. sp., lateral view of ♂ genital capsule; 4a, ventral view of styles and processes in position; 4b, lateral view of aedeagus; 4c, ventral view of styles; 4d, median processes; 4e, lateral processes.



Oman (Iowa State College Jour. Sci., p. 216, Sept. 30, 1946) designated a lectotype ♂, Muskoka, Ont., July, 1888, E. P. V. Coll., and lists six females, Iowa, which belong to the original Van Duzee series.

Types are in the Iowa State College Collection.

Additional specimens were studied from the following states: New York, Michigan, South Dakota, Wyoming, Colorado and Manitoba, Canada.

Subgenus *Phyllodictus* Ball

Phyllodictus Ball, E. D. Florida Ent., p. 18, 1926.

"Resembling *Pissonotus* in size and form but with expanded tibiae as in *Phyllodinus*. Head definitely narrower than the thorax, the vertex narrower than the long diameter of the eye. Front somewhat broader than long. The carinae of the vertex and front as in *Pissonotus*. Lateral carinae of the pronotum straight divergent, becoming obsolete before the posterior margin. Middle and anterior femora and tibiae expanded, the anterior tibiae broad and foliaceous, sometimes as broad as the front. Brachypterous elytra short, as wide or wider than long. Venation reticulate or obscure. Macropterous elytra hyaline, venation simple as in *Pissonotus*, not more than 5 apical veinlets."

The statement "venation reticulate" should be deleted from the generic description.

"Type of the genus *P. tessellatus* n. sp."

KEY TO THE SPECIES OF *PISSONOTUS* (*PHYLLODICTUS*)

1. Dorsum without white crossband on elytra 2
 - Dorsum with white cross-band on elytra 4
 2. Venation of elytra of brachypterous form densely reticulate
 *tessellatus* (Ball) (2)
 - Venation of elytra of brachypterous form not reticulate 3
 3. Veins of elytra of brachypterous form light *aphidioides* (Van, D.) (3)
 - Veins of elytra of brachypterous form dark *tumidus*, n. sp. (4)
 4. Dorsum of abdomen with rows of pustules on each side
 *flabellatus* (Ball) (5)
 - Dorsum of abdomen without pustules on sides 5
 5. With a distinct white band between clypeus and clypellus ^{59-50-57, 52}
 *spooneri* new name (6)
 - Without a distinct white band between clypeus and clypellus 6
 6. First segment of antennae twice as long as wide *nitens* (Van, D.) (7)
 - First segment of antennae not twice as long as wide
 *basalis* (Van, D.) (8)
2. *Pissonotus* (*Phyllodictus*) *tessellatus* (Ball) new comb.

Phyllodictus tessellatus Ball, E. D., Florida Ent., p. 19, 1926.

"Superficially resembling *Phyllodinus nervatus* but smaller with shorter elytra and strikingly different venation. Brownish heavily tessellated above with pale, except for the abdomen. Length 2 mm.

"Head narrow, vertex longer than wide, about equalling the pronotum, rounding over to the broad retreating front; carinae obscure, the fork

long and narrow. Front very broad, almost square, weakly tricarinate. Clypeus tumid. Pronotum broad, parallel-margined, the lateral carinae with one or two short spurs on the inner margins. First joint of antennae short, as broad as long, second joint three or more times the first in length. Brachypterous elytra narrow, covering the second segment, closely and evenly reticulate. Macropterous elytra with simple venation as in *flabellatus* except that all the main veins are forked and there may be a few faint reticulations in this region.

"Color: Vertex, pronotum, scutellum and elytra white, irrorate and tessellate with brown. Abdomen brown with a few pale lines. Vertex with a brown band on the anterior margin and a pair of black spots at base, a larger pair on pronotum. Front shining brown, clypeus pitchy, a broad white band on suture. Antennae and anterior legs brown. Macropterous elytra transparent the nervures covered with setigerous black dots and there is a black spot before the apex of clavus.

"Type female, allotype male and 9 paratypes collected in low wet 'flat woods' at Sanford, Fla., by the writer and one paratype female taken at Meridian, Miss. (Drake)."

Genitalia: In lateral view pygofer of male rather triangular with ventral margin shortest, caudal margin with a large V-shaped projection, extended on its dorsal side into a long, round-tipped, median process; aedeagus long and slender, gently curving ventrally, widest near middle with 3-4 retrorse, long slender processes on dorsal margin of outer half, some of processes half as long as shaft; anal segment with a pair of long, almost straight processes with slightly enlarged, rounded apices. In ventral view, styles sinuate, widest on outer third, narrowed to inwardly overhanging apices; median processes widest at base, narrowed on outer margin to rather sharp apices about two-thirds as long as styles; lateral processes almost triangular, less than half as long as median.

Types in the Ball Collection located in the U.S. National Museum.

Numerous specimens are at hand from many localities in Florida, Ocean Springs, Miss., and one female from Barberton, Ohio.

3. *Pissonotus* (*Phyllodictus*) *aphidioides* (Van Duzee) new comb.

Pissonotus aphidioides Van Duzee, E. P., Bull. Buffalo Soc. Nat. Sci., V, p. 190, 1894.

Pissonotus aphidioides Van Duzee, E. P., Bull. Buffalo Soc. Nat. Sci., V, p. 230, 1897.

Brachypterous form:

"Broad oval, widest across the abdomen. Elytra reaching on to second abdominal segment, the nervures prominent. Color wood-brown inclined to yellowish on the legs and discs of tergum; pleural pieces and sides of the abdomen obscurely marked with picous; pronotum and usual transverse band on face, whitish; the latter followed by a broad picous band across the base of the clypeus and anterior coxae. Checks marked with an oval black spot below the antennae. Front with about three transverse pale lines two of which are nearer the base, the other may be reduced to two points adjoining the whitish apical band. Base of the scutellum irrorated more or less with whitish, tibiae and tips of the tarsi brown. Elytra brown, sub-opaque, with paler nervures. In one example the vertex

is white with the foveae and a dot on either side at apex black; and the base of the tergal segments are brownish yellow. Length 3 to 3½ mm."

"New York. Described from two female examples, one taken at Salamanca, August 2, 1889, the other at Colden a few days earlier. The latter is a larger and darker specimen bearing a striking resemblance to some of our brown plant lice."

Structure: Basal segment of antennae slightly more than one half as long as second segment; dorsum of abdomen covered with numerous fine, white hairs.

Color: General body color varies from light to dark brown, spots on cheeks irregular in shape, darker brown than surrounding areas; pronotum varies from white to deep brown in color.

Genitalia: In lateral view pygofer of ♂ more or less rectangular, widest near venter with a lateral process about as large as a style, projecting dorsally; aedeagus widest at base, sides almost parallel, dorsal margin rapidly narrowing near middle to fairly sharp apex, shaft with a diagonal row of short teeth on each side just before tip; styles widest at base, almost as long as aedeagus, suddenly narrowing on outer half to sharp apices; anal segment with a pair of short, blunt processes. In ventral view styles widest near middle, strongly narrowed on inner margin to more or less avicephaliform apices; lateral processes of pygofer almost as long as styles; greatly enlarged on outer third but extreme apices very slender and sharp; median pair of processes widest at base, curved in on outer third, about half as long as styles.

Lectotype ♀, Salamanca, N.Y., August 2, 1889, E. P. Van Duzee, designated by Oman, P. W. (Iowa State College Journal of Science, Vol. 21, No. 2, January, 1947, p. 216). Allotype ♂ and 10 paratypes, Otter Lake, N.Y. July 25, 1946, R. H. Beamer; other paratypes: 3 ♂♂, Blue Mt. Lake, N.Y. July 27, 1946, R. H. Beamer; 1 ♂, Storrs, Conn., August 10, 1946, R. H. Beamer; 1 ♂, Swan River, Manitoba, Canada, August 2, 1937, R. H. Beamer.

Allotype and paratypes in Snow Entomological Collections.

Lectotype ♀ in the Iowa State College Collection, Ames, Iowa.

4. *Pissonotus (Phyllodictus) tumidus* n. sp.

Brachypterous form:

Resembles *Pissonotus aphidioides* except veins of elytra marked with brown, dorsum of first antennal segment with dark line and aedeagus of male with several long slender processes at apex. Length ♂ 2.6 mm.; ♀ 3.3 mm.

Structure: Basal segment of antennae one-half as long as second segment; front about twice as long as wide at widest portion, middle portion with sides subparallel, slightly narrowed in middle, carinae present but indistinct; elytra almost rectangular, membranous, veins raised, prominent, elytra hardly covering first visible abdominal segment; dorsum of abdomen set with short white hairs closer together than their length; fore and intermediate femora and tibiae compressed laterally.

Color: General color fuscous; antennae varying from light to dark brown, darker line on dorsum of basal segment; vertex dirty white, with

dark rounded spot in each foveae; front brown, marked with white bars and spots; pronotum dirty white with brown spot on each side of median carina and back of each eye; masonotum usually dirty white, marked with irregular brown spots latered of median carina; elytra hyaline, veins marked with brown, at least on basal half, otherwise whitish; legs more or less dark; clypellus dark brown, almost black.

Genitalia: In lateral view pygofer of ♂ more or less rectangular with caudal margin broken by large blunt tooth located slightly above middle line; aedeagus widest at base, slightly constricted near apical third, apex rounded, slightly enlarged with four recurved slender processes, three on dorsal margin and one on left ventral side; anal segment with a pair of short heavy processes. In ventral view styles widest near outer third, apices roundly narrowed to overhung tips; median processes widest at base, narrowing to sharp apices, more than half as long as styles; lateral processes broad, bluntly rounded, about one-half as long as median.

Holotype ♂, Keld, Manitoba, Canada, August 8, 1937, R. H. Beamer; allotype ♀, Red Deer River, Manitoba, August 3, 1937, R. H. Beamer; Paratypes: 1 ♀, Mafeking, Manitoba, August 3, 1937, R. H. Beamer; 1 ♀, Cedar River, Michigan, August 28, 1937, R. H. Beamer; 1 ♂, Storrs, Conn., August 10, 1946, R. H. Beamer; 1 ♂, Doscawen, New Hampshire, August 12, 1946, R. H. Beamer; 1 ♀, Dingman's Ferry, Pa., August 20, 1946, R. H. Beamer; 1 ♂, Allegheny State Park, New York, July 22, 1946, R. H. Beamer; 1 ♀, Boston, New York, July 28, 1907, E. P. Van Duzee; 1 ♀, Niagara Falls, New York, August 17, 1907, E. P. Van Duzee.

Types and paratypes in Snow Entomological Collections; paratypes in Calif. Acad. Sci. Collections.

5. *Pissonotus (Phyllodictus) flabellatus* (Ball) new comb.

Phyllodinus flabellatus Ball, E. D., Can. Ent., 34, p. 232, 1902.
Phyllodinus koehleri Osborn, Herbert, Ohio Nat., 4, p. 46, 1903.
Phyllodinus fuscous Osborn, Herbert, Ohio Nat., 4, p. 46, 1903.

"Larger and lighter colored than *nervatus*, and with a longer vertex. Testaceous brown, with the posterior half of the vertex, the scutellum and the tips of the short wing pads milky white. Length, brachypterous ♀, 3 mm., width 2 mm. Head slightly narrower than pronotum, vertex nearly quadrate, rounding in front. Front parallel-margined, much longer than wide. Elytra about as long as head and pronotum, truncate behind, venation simple, indistinct. Colour: vertex and face dark brown, with about seven narrow interrupted transverse white bands. A light stripe across the apex of front, extending on across the genae to join the stripe on the reflexed portion of pronotum. Clypeus piceus, pronotum with the anterior half piceous brown, posterior half and scutellum milky white. Elytra brown, the posterior margin milky white, broadest towards the costal margin. Abdomen above brown, a median and three lateral rows of white dashes, the anterior ones reduced to dots. Below dark brown or pitchy. Two anterior pairs of femora dirty straw, their foliaceous tibiae fuscous, the tarsi white, tipped with black.

"Described from two females, one from Washington, D.C., from the collection of Otto Heidemann, and the other from Riverton, N.J., collected

by C. W. Johnson, and sent by E. P. Van Duzee. Another female from the District of Columbia apparently belongs here, but is immature and not fully coloured. This is a pretty species, and might be mistaken for a *Pissonotus* but for the foliaceous tibiae."

The brachypterous ♀ specimen from Washington, D.C., is here designated lectotype. The types are in the E. D. Ball Collection in the U.S. National Museum.

Genitalia: In lateral view pygofer of ♂ more or less triangular, narrowest on ventral margin; median processes and styles usually not visible; aedeagus long and slender, slightly curved ventrally, sides almost parallel to outer third where it narrows to rounded apex, usually three retrorse, slender processes on dorsal margin of outer third, longest more than half as long as shaft; anal segment with a pair of short, almost triangular, processes. In ventral view styles sinuate, shorter than median processes, widest near outer third, narrowed to rounded overhanging apices; median processes widest at base, narrowed to sharp incurving apices.

Allotype ♂ and 2 ♂ paratypes Lancaster, N.Y., July 25, 1946, R. H. Beamer; other paratypes: 3 ♂♂, Woolwine, Va., Sept. 1, 1946, R. H. Beamer; 1 ♂, Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 ♂, Fredonia, N.Y., July 21, 1946, R. H. Beamer; 1 ♂, Onarga, Ill., July 13, 1946, R. H. Beamer; 18 ♂♂, Douglas Co., Kans., 1944, R. H. Beamer; 2 ♂♂, Ponce de Leon, Fla., March 7, 1947, R. H. Beamer; 2 ♂♂, Palatka, Fla., March 10, 1947, R. H. Beamer; 1 ♂, Zolfo Springs, Fla., March 12, 1947, R. H. Beamer.

Macropterous form:

Like the brachypterous form except with flight wings about one-third their length longer than abdomen, generally darker in color with tip of scutellum light and with a dark spot on elytra at apex of clavus.

Holomorphotype ♂, Woolwine, Va., Sept. 1, 1946, R. H. Beamer; allomorphotype ♀ and 6 ♀ paramorphotypes, Lawrence, Kansas, Sept., 1944, R. H. Beamer; other paramorphotypes: 3 ♀♀, Douglas Co., Kansas, Nov. 3, 1945, R. H. Beamer; 1 ♀, Medora, Kansas, Aug. 5, 1945, R. H. Beamer.

Types in Snow Entomological Collections.

The types of *Phyllodinus fuscus* Osb. and *Phyllodinus Koebelei* Osb. were checked Jan. 20, 1949, and the above synonymy found to be correct.

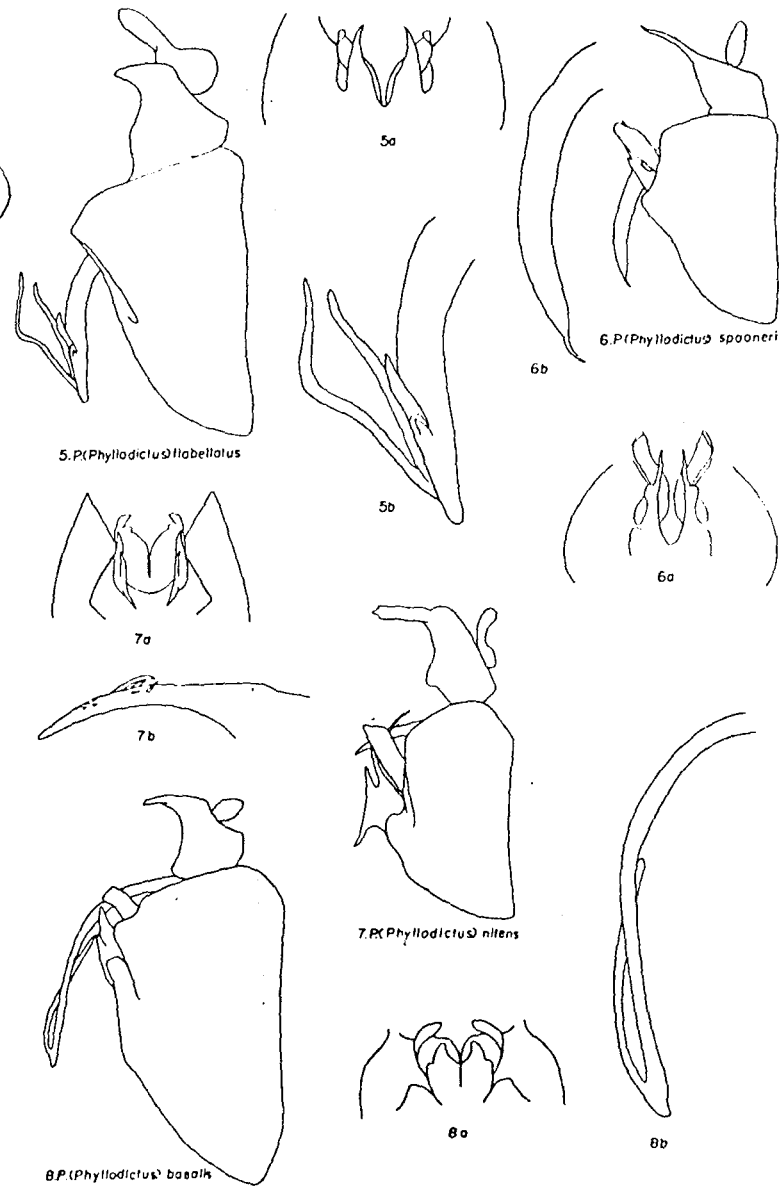
6. *Pissonotus (Phyllodictus) spooneri*, new name and comb.

Pissonotus picus Spooner, Can. Ent., 44, p. 238, 1912.

"Brachypterous ♀. A small species slightly smaller than *P. brunneus* and not so stout. Head short, very slightly curved in front. Eyes slightly indented below to receive the antennae; colour light gray around margins.

PLATE II

- 5 P. (*Phyllodictus*) *flabellatus* (Ball), lateral view of ♂ genital capsule; 5a, ventral view of styles and processes in position; 5b, lateral view of aedeagus.
6 P. (*Phyllodictus*) *spooneri* n. name, lateral view of ♂ genital capsule; 6a, ventral view of styles and processes in position; 6b, lateral view of aedeagus.
7 P. (*Phyllodictus*) *nifens* (Spooner), lateral view of ♂ genital capsule; 7a, ventral view of styles and processes in position; 7b, lateral view of aedeagus.
8 P. (*Phyllodictus*) *basalis* (Van Duzee), lateral view of ♂ genital capsule; 8a, ventral view of styles and processes in position; 8b, lateral view of aedeagus.



black in the centre; vertex about as deep as wide in front, sides curving between the eyes, narrower behind the eyes than before; all the carinae present, but all rather weak, foveae not very deep, colour deep shiny black.

"Front rather wide and short, sides nearly straight, median carina very faint; anterior three-fourths deep shiny black, posterior one-fourth pure white.

"Clypeus uniformly black; median carina but a mere suggestion; the black band carried across the anterior coxae as usual; posterior of this a band of white and towards the tip of the abdomen, black.

"Basal segment of the antennae about one-third as long as the second segment; basal segment brown, second segment honey-yellow spotted with white, tuberculate.

"Prothorax about as deep as the head, posterior margin very slightly concave, median carina practically indistinguishable, lateral carinae distinct for about two-thirds of their length and then fading out; colour pure white.

"First and second pairs of legs with the coxae light brown, shading through black on the femora and tibiae to white on the first two tarsal segments, the last tarsal segment black, tibiae of the first and second pairs of legs foliaceous; third pair of legs shading from dark brown at the base of the femora to honey-yellow on the tibiae to white on the tarsi, tips of the tarsi black.

"Scutellum triangular, sides straight, not visible for its entire breadth, covered by the prothorax on its outer edges; median carina indistinct, lateral carinae short, curved outward, poorly defined; colour uniform deep shiny black.

"Elytra short, not quite covering the first abdominal segment, coriaceous, polished, veins indistinct; colour, basal three-fourths deep shiny black, posterior one-fourth pure white.

"Abdomen uniform shiny black; genitalia deep reddish brown, almost black; pygofer tapering to a blunt point, plates very short, extending only one-fourth of the length of the pygofers, only a small edge visible; style white. Length, 2.5 mm.

"A very pretty and delicate insect. The foliaceous tibiae recall *Phyllo-dinus*, but the carinae of the prothorax are straight and the other characters agree with *Pissonotus*; it may deserve to be placed in a new genus, but for the present I prefer to place it in *Pissonotus*. The species is very easily identified by the white thorax and white margin of the elytra and by the deep shiny black of the rest of the body. Described from a specimen taken by the author at Middletown, N.Y., July 11, 1910. Two other specimens were taken at the same locality July 18 and 21, 1910. Type in the author's collection."

Genitalia: In lateral view male pygofer more or less rectangular, ventral margin narrowest; median process long and sharp with a notch near middle of outer margin; style club-shaped; aedeagus widest near base, gently curved ventrally, gradually narrowed to unguate tip; anal segment with a pair of very long, slender, scarcely curved, processes. In ventral view styles long,

sinuate, with rounded, slightly overhanging apices; median processes widest at base, almost as long as styles, sharply narrowed just beyond middle to long, slender, finger-like process on inner margin; lateral processes very short, mere angular projections.

The name *Pissonotus piccus* Spooner 1912 is preoccupied by *Pissonotus piccus* (Van. D.) 1893, (*Megamelus*). The name is therefore changed to *Pissonotus (Phyllodictus) spooneri*, new name and combination.

7. *Pissonotus (Phyllodictus) nitens* (Van Duzee)

Phyllodinus nitens Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 9, p. 198, 1909.
Phyllodictus nitens (Van Duzee) Ball, E. D., Florida Ent., p. 20, July 1926.

"Somewhat allied to *Koebelei* but with much the aspect of *Pissonotus ater* or *delicatus*. Brachypterous female: head distinctly narrower than the pronotum; vertex quadrate; front moderately wide, slightly convex, highly polished and feebly carinate. Pronotum short, scarcely carinate. Elytra reaching onto the second abdominal segment, without visible venation. Anterior tibiae very broad; foliaceous, about twice the width of the femora. Length 2½ mm.

"Color rufo-piceous, darker on the abdomen and anterior tibiae. Elytra clear rufous with a sharply defined white apex; pronotum, except anteriorly, and the posterior tibiae testaceous white. Front concolorous.

"Macropterous female: Elytra longer than the abdomen, whitish hyaline, narrowly infuscated at base; nervures slender, concolorous, the marginal brown becoming whitish on base of the commissure. Color piceous black, paler beneath; base of the pronotum white; tip of the scutellum fulvous. In both forms the antennae are pale with the basal joint rufous. In this as in the allied species the scutellum is much larger in the macropterous form.

"Described from two female examples: one brachypterous from St. Petersburg and one macropterous from Estero. This species may be distinguished from all its congeners by its uniformly colored front. With *Koebelei* Osb., *fuscous* Osb. and *flabellatus* Ball, it forms a group of species closely resembling *Pissonotus* and distinguished from the typical species *nervatus* by the much narrower head. The present species is peculiar in being highly polished all over."

Genitalia: In lateral view pygofer of male almost oval, caudoventral corner with slight projection (lateral process); median process extending ventrally in a sharp point and dorsally in two sharp processes; styles almost parallel-sided with blunt apices; aedeagus widest at base, slightly curved ventrally, narrowed to sharp apex with a number of retrose spines on dorsal margin of outer half, usually not more than one of which is longer than width of shaft at that point; anal segment with a pair of long, almost straight processes whose sides are almost parallel. In ventral view styles widest near middle, narrowed to inward curving apices which are slightly overhanging; median processes long and narrow, sharp pointed at both ends, bifid dorsally; lateral processes very short, more than a right angle.

The brachypterous ♀, St. Petersburg, Fla., April 28, 1908, E. P. Van

Duzee, described above is here designated lectotype. It is type No. 3057 in the Collection of the California Academy of Science.

Allotype ♂ Daytona, Fla., May 22, 1926, E. D. Ball; paratypes: ♂ Sanford, Fla., June 17, 1926, E. D. Ball; 1 ♂ same place and collector, Sept. 6, 1926; 1 ♂ same place and collector, March 10, 1927; 3 ♂♂, Venice, Fla., April 13, 1928, on *Helianthus*.

Allotype and paratypes in E. D. Ball collection in U. S. Nat. Mus.; paratype in Snow Entomological Collections.

8. *Pissonotus (Phyllodictus) basalis* (Van Duzee)

Pissonotus basalis Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5, p. 190, 1894. (Listed (Nom. nud.))

Pissonotus basalis Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5, pp. 227, 238, 239, 1897. *Dicranotropis marginatus* Crawford (nec. Van Duzee). Mon. Delphacidae, p. 596, pl. 46, figs. P, Q (described, illustrated); 594 (key), 1914.

Pissonotus crawfordi Metcalf, Z. P., Jour. Elisha Mitchell Soc., 38, p. 148, 1923. Nom. nov. for *Dicranotropis marginatus* Crawford (nec. Van Duzee), p. 170; pl. 69, fig. 674.

Pissonotus basalis Oman, P. W., Iowa State Jour. Sci., 21, No. 2, Jan. 1947, pp. 217-221.

"Macropterous form. Allied to *marginatus* but differs in having the scutellum much larger, about as in *Liburnia pellucida* which this species much resembles. It is however a much stouter insect than the latter and the hind edge of the pronotum is straight. Front narrower than in *P. marginatus*, the median carina distinct. Color piceous black, hind edge of the pronotum broadly white, extreme tip of the scutellum and narrow apex of the front yellowish; front, cheeks and vertex rufapiceous, breast from the apex of the anterior coxae to the base of the abdomen, and the coxae, femora, and hind tibiae honey-yellow; tarsi whitish at base, the base of the tergum obscurely marked with paler. Elytra and wings whitish-hyaline, smoky at base and slightly clouded at apex. Marginal nervure brown, the others nearly concolorous. Antennae soiled honey-yellow. Length 3½ mm.

"Described from one female taken at Lancaster, N.Y., July 4, 1888."

Type in the collection of Iowa State College, Ames, Iowa.

Brachypterous form:

Structure: First segment of antennae slightly more than half as long as second; front about twice as long as wide, widest near apical third, slightly narrowed toward each end, more so toward base, tricarinate but median carina not too distinct; crown about as wide as long, carinae indistinct; elytra almost as wide as long, apices almost truncate, outer angles broadly rounded, veins indistinct, not reaching apices.

Color: General color fulvous, scutellum, femora and dorsum of abdomen often darker; pronotum and apices of elytra with a fairly broad white band.

Genitalia: In lateral view pygofer of ♂ more or less triangular, caudal margin with a V-shaped notch; lateral process about as broad as long; median process twice as long; as lateral, sides almost parallel, apex more or less bifid; aedeagus very long and slender, curved ventrally, with one long, retrorse, slender process on dorsal margin at apex about half as long as shaft; styles narrowing and curving caudally; anal segment with a pair of short, heavy processes. In ventral view styles widest near middle, apices narrowed, long, incurved, overhanging; median processes widest near outer third, rounded notch on outer margin near outer third, apices

rounded, narrowed, directed out, then in; lateral processes wider than long, rounded at apices.

Holomorphotype ♂, allomorphotype ♀, 9 ♂ and 17 ♀ paramorphotypes, Fredonia, N.Y., July 21, 1946, R. H. Beamer; other paramorphotypes: 10 ♂♂ and 2 ♀♀, Peck's Pond, Pa., August 20, 1946, R. H. Beamer; 1 ♀, Heart Lake, N.Y., July 30, 1946, R. H. Beamer; 1 ♀, Morris, Manitoba, August 10, 1937, R. H. Beamer; 1 ♀, Malone, N.Y., July 29, 1946, R. H. Beamer; 2 ♀♀, Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 ♀, Summit Co., Ohio, July 9, 1937, L. J. Lipovsky.

Types in Snow Entomological Collections.

A study of the male holotype of *Pissonotus crawfordi* Metcalf shows it to be a synonymy of *Pissonotus basalis* Van Duzee.

The Genus *Pissonotus*, Van Duzee.

Pissonotus Van Duzee, Bull. Buff. Soc. Nat. Sci., p. 236, 1897.

"Head narrower than the pronotum; vertex hardly prominent before the eyes; front narrow above, much expanded below, the sides arcuated, median carina forked about one third its length below the apex of the head, the two branches subparallel, closely approximated for most of their length. Thorax broad across the middle, convex, narrowed anteriorly; pronotum nearly straight across the hind edge, lateral carinae rather widely divergent at their apex a little incurved, hardly attaining the posterior edge.

"This genus seems to be intermediate between *Megamelus* and *Dicranotropis*. *P. marginatus* and its allies are highly polished little insects, broadest across the base of the elytra which in the brachypterous examples are small, truncate behind, smooth and polished with the nervures nearly obsolete, and the scutellum is unusually small. *P. basalis* has a large scutellum and has much the appearance of a *Kormus*, but the lateral carinae do not follow the posterior curve of the eyes and the front is much wider below with its median carina distinctly forked some ways below the apex of the head. *P. aphidioides* and its allies are dull brown insects widest across the abdomen, at least in the brachypterous examples which alone are known to me, giving them a strong resemblance to some of the subterranean plant-lice near *Rhizobius*. All the species have the apex of the front pale, and a broad black band crosses the clypeus and the anterior and intermediate coxae. Some of the species, especially *brunneus*, bear a strong resemblance to members of the genus *Dicranotropis*, and it may be necessary to modify that genus so as to include them when their winged forms are known. For the present these may be distinguished by having a broader front with the forks of its median carina closely approximated below the apex of the head. The brachypterous forms of *brunneus*, *aphidioides* and their allies have strong pale elytral nervures.

"The type of this genus is *Pissonotus marginatus*." To the above description should be added some general characteristics of the male genitalia such as a long, narrow, almost parallel-sided, aedeagus in lateral view, usually with some retrorse processes on the dorsal margin; styles in ventral view usually with margins sinuate and with rounded, overhanging apices, supplemented by some form of median processes arising on pygofer ventrad

to style opening and often with some form of lateral processes flanking the bases of these.

KEY TO SPECIES OF PISSONOTUS (PISSONOTUS)

- 1 Veins of elytra plainly extending to hind margin 2
- Veins of elytra not plainly extending to hind margin 9
- 2(1) With two distinct, round, black, dots in foveae of crown 3
- Without two distinct, round, black dots in foveae of crown 4
- 3(2) In ventral view lateral processes of pygofer of ♂ at least twice as long as wide *frontalis* (Crawf.) (9)
- In ventral view lateral processes of pygofer of ♂ about as wide as long *exiguus* n. sp. (10)
- 4(2) Veins of elytra lighter in color than membrane 5
- Veins of elytra concolorous with membrane 6
- 5(4) Clypeus spotted with light *albovenosus* Osb. (11)
- Clypeus not spotted with light color *brunneus* Van. D. (12)
- 6(4) General body color pitchy black, elytra dark rufous 7
- General body color light red through dark brown 8
- 7(6) Genital capsule of male with large ventral U-shaped flap longer than wide *niger* n. sp. (13)
- Genital capsule of male with short U-shaped flap, not more than half as long as wide *nigriculus* n. sp. (14)
- 8(6) Body usually light brown; dorsum of abdomen with rows of pustules; basal segment of antennae light *4-pustulatus* (Van D.) (15)
- Body dark reddish brown, without pustules; basal segment of antennae black *rubrilatus* n. sp. (16)
- 9(1) With distinct white band on both hind margin of pronotum and elytra 10
- Without distinct white band on both hind margin of pronotum and elytra 15
- 10(9) Basal segment of antennae stramineous 11
- Basal segment of antennae brown or black 12
- 11(10) Head and usually anterior half of pronotum much darker in color than remainder of body *guttatus* Spooner (17)
- Head and anterior half of pronotum same color as body *venosus* n. sp. (18)
- 12(10) Frontal carinae and metathorax marked with white *albitarsis* n. sp. (19)
- Florida & Hudson* *albitarsis* n. sp. (19)
- 13(12) Frontal carinae and metathorax not marked with white 13
- With distinct white, transverse band on apex of clypeus *agrestis* n. sp. (20)
- Without distinct white, transverse band on apex of clypeus 14
- 14(13) Bases of legs and venter yellow, never white; aedeagus in lateral view larger apically than at base; four processes on dorsum of aedeagus near apex *merides* n. sp. (21)
- Legs practically white; aedeagus in lateral view widest at base with two processes near apex *paludosus* n. sp. (22)
- 15(9) Basal segment of antennae black 16

Some
Delicatus
Stenonotus

Florida & Hudson

111 *minor* (AZ)
Less
19
17
24
18
25
26
25
20
21
22
27
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29
30

- Basal segment of antennae not black 19
- 16(15) In ventral view median processes of ♂ pygofer as long as or longer than styles *lactofascius* n. sp. (23)
- In ventral view median processes of ♂ pygofer not over one-half as long as styles 17
- 17(16) In ventral view styles of ♂♂ narrowed and bluntly pointed on apical fourth; median processes of pygofer about one-half as long as styles *binotatus* Spooner (24)
- In ventral view styles broad and rounded on apices; median processes one-fourth as long as styles 18
- 18(17) Long apical process on aedeagus bifid *delicatus* Van D. (25)
- Long apical process on aedeagus not bifid but expanded blade-like *delicatus melanurus* Van. D. (26)
- 19(15) Basal segment of antennae more than two-thirds as long as second *delicatus* Van. D. (25)
- Basal segment of antennae less than two-thirds as long as second 20
- 20(19) Elytra with setae-bearing tubercles on veins 21
- Elytra without setae-bearing tubercles on veins 22
- 21(20) Aedeagus with 2-3 tooth-like processes on each side near apex *dentatus* n. sp. (27)
- Aedeagus without tooth-like processes on each side near apex *piccus* Van. D. (28)
- 22(20) Body dark brown with broad longitudinal light stripe on dorsum of abdomen *dorsalis* Van. D. (29)
- Body reddish, without broad longitudinal stripe on dorsum of abdomen *marginatus* Van. D. (30)

9. *Pissonotus (Pissonotus) frontalis* (Crawford)

Dicranotopsis frontalis Crawford, David L., Monograph Delphacidae, p. 597, pl. 46, fig. 1, 1914.

Brachypterous form:

This species was described from one brachypterous pair, the male from Claremont, California, and the female from Oregon (Baker). The female was designated holotype and is in the U.S. National Museum and the male is in the collection of Pomona College, Claremont, California. Unfortunately this pair represents two species. The male belongs to the following new species, *P. exiguus*. Crawford's original description follows:

"Length of body, 2.6 mm.; width of frons, 0.27; antennae I, 0.18, II, 0.32. General color brown; abdomen brown, with light blotches, lighter at base elytra light brown, veins light; scutellum brown, pronotum dirty white with brown blotches; vertex dirty white with a black spot in each fovea; frons light brown with several transverse white bands, as in *aphidioides*; clypeus black; forecoxae black, femora and tibiae light brown striated with black.

"Somewhat similar to *aphidioides*. Head short; vertex weakly carinate, rather broad in female, as broad as long, but in male slightly longer than broad; frontal carina forked well down from apex of head, indistinct on

apex; antennae as long as frons, I half as long as II. Lateral carinae of pronotum disappearing near hind margin. Hind tibia longer than femora (one abnormal tibia has three lateral spines); calcar more than half as long as basal tarsus, margin finely dentate. Male genitalia in general similar to *bakeri*, but with genital styles sinuate, clavate-spatulate at tip; pygofer at base of styles with one pair of short, rounded processes; anal tube produced ventrad into a pair of very long, acute processes, extending almost to base of styles."

This description fits very well except where he states "but in the male slightly longer than broad."

This is the character which helps separate this species from *Pissonotus exiguus*, n. sp.

Genitalia: In lateral view pygofer of ♂ much wider in middle than at either end, rounded posterior margin broken by the large lateral process; aedeagus very long and slender, curving ventrally, sides almost parallel on basal half, slightly narrowing on outer third to sharp apex, with from 3-4 slender retrorse processes arising on dorsal margin and left side of outer half; anal segment with pair of sharp, stout processes. In ventral view styles widest near apices, narrowing slightly to more or less bifid apices; median processes broadly rounded, extending dorsally to tips of styles; lateral processes of pygofer twice as long as wide with rounded apices.

Holotype ♀, No. 15980, in U.S. National Museum.

Macropterous form:

Like brachypterous form but head and thorax darker brown, and flight wings fully developed. Elytra extending about one-third their length beyond tip of abdomen, semihyaline, veins concolorous with membrane.

Holomorphotype ♂, allomorphotype ♀, Niles Canyon, Alameda Co., Calif., June 13, 1917, W. M. Giffard; paramorphotypes: 1 ♂ and 1 ♀, Niles Canyon, Calif., May, 1916, W. M. Giffard; 1 ♀, same place and collector, July, 1916; 4 ♂♂ and 1 ♀, Santa Cruz Co., Calif., June 7, 1917, W. M. Giffard; 2 ♀♀, Santa Cruz Co., Calif., June 22, 1921, W. M. Giffard.

Types and paramorphotypes in collection of Calif. Acad. of Sci.; paramorphotypes in Snow Entomological Collections.

Material studied (Brachypterous): Over 100 specimens from Alameda, Santa Clara, Santa Cruz, San Joaquin, San Mateo and Contra Costa Counties, Calif., collected by W. M. Giffard.

10. *Pissonotus (Pissonotus) exiguus* n. sp.

Brachypterous form:

Resembles *Pissonotus frontalis* but smaller, the crown longer than wide

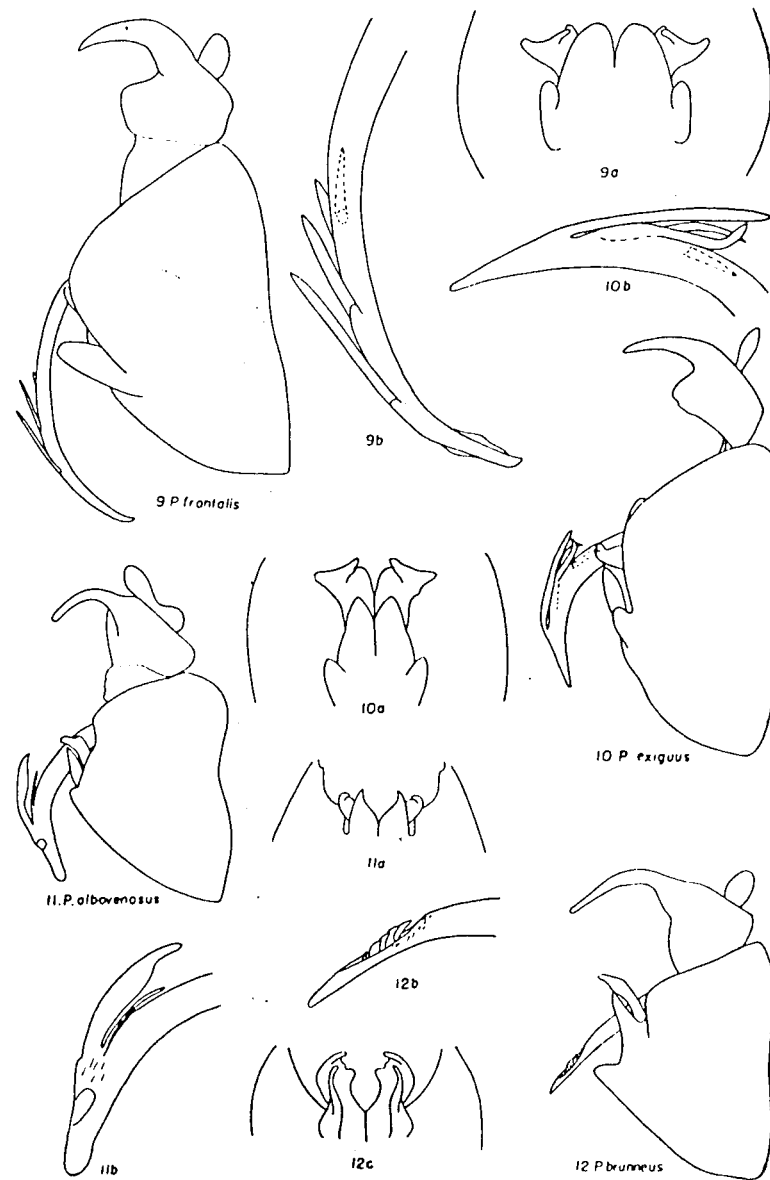


PLATE III

- 9 P. (*Pissonotus*) *frontalis* (Crawford), lateral view of ♂ genital capsule: 9a, ventral view of styles and processes in position; 9b, lateral view of aedeagus.
 10 P. (*Pissonotus*) *exiguus* n. sp., lateral view of ♂ genital capsule: 10a, ventral view of styles and processes in position; 10b, lateral view of aedeagus.
 11 P. (*Pissonotus*) *albovenosus* Osborn, lateral view of ♂ genital capsule: 11a, ventral view of styles and processes in position; 11b, lateral view of aedeagus.
 12 P. (*Pissonotus*) *brunneus* Van Duzee, lateral view of ♂ genital capsule: 12a, ventral view of styles and processes in position; 12b, lateral view of aedeagus.

and the lateral processes on male pygofer only about as wide as long. Length ♂ 2.2 mm.; ♀ 3.2 mm.

Structure: Second segment of antennae twice as long as first; front about twice as long as wide, slightly narrowed toward each end, carinae distinct; crown slightly longer than wide, rounded in front, carinae present but indistinct; apices of elytra truncate with corners rounded, extending on to second visible abdominal segment, veins of elytra conspicuously raised above membrane, attaining hind margin; abdomen set with fine white hairs, about their length apart.

Color: General body color dark brown; legs darker with tarsi whitish; antennae reddish brown, basal segment often darker than second; vertex light reddish brown, with two distinct, round, dark dots in foveae; clypeus more or less dark, with narrow, whitish transverse line at apex; elytra semi-hyaline, brownish, with veins prominent and white.

Genitalia: In lateral view pygofer of ♂ broadly rounded caudally with lateral process forming a distinct tooth below middle of caudal margin, this tooth slightly longer than wide; aedeagus with margins subparallel on basal half, strongly narrowed on outer half to sharp apex, dorsal margin of outer third with 3-4 slender processes about half as long as shaft; anal segment with a pair of strong processes, about as long as segment. In ventral view styles widest near apices, more or less aviccephaliform; median processes widest at base, tapering to broadly pointed apices which reach to outer third of styles; lateral processes about as wide as long, rather sharp pointed.

Holotype ♂, allotype ♀, 19 ♂ and 6 ♀ paratypes, Potrero, Calif., July 21st, 1947, R. H. Beamer; 1 pair paratypes, San Diego Co., Calif., April 22, 1913, E. P. Van Duzee.

Types and paratypes in Snow Entomological Collections; paratypes in collection of California Academy of Science.

11. *Pissonotus (Pissonotus) albovenosus* Osborn

Pissonotus albovenosus Osborn, Herbert, Jour. Dept. Agr. Porto Rico, 13, p. 110, 1929 (note). (Nom. nud.).
Pissonotus albovenosus Osborn, Herbert, Sci. Surv. Porto Rico and Virgin Islands, 14, p. 247, 1935, fig. 68.

Brachypterous form:

"Robust, vertex longer than pronotum with prominent carinae and deep foveae; three carinae of pronotum and scutellum strong; elytra reaching on to basal abdominal segment, apical border broadly rounded; frontal carinae strong; clypeus somewhat tumid, polished. **Genitalia:** Female with broad pygofer reaching nearly to tip of ovipositor, male pygofer opening circular, open below, with margin and processes of anal segment paralleling the inner margin; diaphragm broad emarginate; armature concealed; styles short, blunt, polished; aedeagus slender, tapering.

"Dark fuscous, with carinae of vertex and front, carinae of pronotum and scutellum, postero-lateral border of mesonotum, veins and hind margin of elytra, a median series and some short lines on fourth segment and fifth segment of abdomen and border of last segment of abdomen whitish. A black bar across clypeus and cheek.

"Length: Female, 2.75 mm.; male, 1.75 mm.

"Described from fourteen specimens. Thirteen females (holotype and paratypes) and one male from Cameron, La., Aug. 14-23 and June 20-30, 1905, J. S. Hine (collector) and one male (paratype) collected at Rio Piedras, P. R., Feb. 9, 1930 (H. Osborn). A specimen from 'Jamaica, L. Id.' seems also to belong here but lacks the short white bars on base of front.

"The name *Pissonotus albovenosus* was used in my article on Porto Rican Homoptera under the impression that the description had been printed, but no reference to such description was found and Doctor Dozier informs me that his manuscript, including this species, has not been printed. The name *albovenosus* has been retained since it seems to involve less chance of confusion."

Genitalia: In lateral view pygofer of ♂ quite rounded caudally, almost no evidence of the lateral process so striking in other species; aedeagus slender, widest near apex with two retrorse processes on dorsal margin just before tip, first process about half as long as aedeagus and half as wide, the second less than half as wide and about two-thirds as long as first; anal segment with two long, almost parallel-sided processes with rounded apices. In ventral view styles widest near outer third, apices rounded, more or less aviccephaliform; median processes wider and longer than styles, rapidly narrowed on inner margin near outer half to sharp apices; lateral processes not visible.

Numerous specimens studied from southern California, through Texas, Florida, Maryland, Connecticut and New Hampshire.

Macropterous form:

Like the brachypterous form, but body much darker brown, and with fully developed flight wings. Wings hyaline, veins darker and set with dark spine-bearing tubercles.

Holomorphotype ♂ and allomorphotype ♀, Brownsville, Texas, Dec. 29, 1945, R. H. Beamer; paramorphotypes: 4 ♂♂ and 4 ♀♀, Hidalgo, Texas, Dec. 28, 1945, R. H. Beamer; 1 ♂ and 1 ♀, Aransas Pass, Texas, Jan. 2, 1946, R. H. Beamer; 1 ♂, Harris Co., Texas, August 13, 1928, R. H. Beamer; 1 ♀, Norfolk, Va., Sept. 4, 1943, R. H. Beamer; 1 ♂, Sanford, Fla., March 11, 1947, L. D. Beamer; 1 ♂, Brownsville, Texas, June 29, 1938, R. L. Sailer.

Morphotypes and paramorphotypes in Snow Entomological Collections. This species is taken commonly on *Lygodesmia grandiflora* (Nutt.).

12. *Pissonotus (Pissonotus) brunneus* Van Duzee

Pissonotus brunneus Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5, p. 190, 1894. (L.f.f.c.h.). (Nom. nud.).
Pissonotus brunneus Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5 pp. 239, 1897.
Pissonotus divaricatus Spooner, Canadian Ent., 44, p. 236, 1912. (new synonymy).

Brachypterous form:

"Allied to *P. aphidioides* but much smaller. Color piccous brown tinged with rufous on the front; breast soiled yellowish white, marked by the usual broad piccous band which crosses the clypeus and curving backward on either side covers the anterior and intermediate coxae and terminates in a cloud on the postpleura. Carinae paler than the adjacent

surface, narrow apical margin of the front and outer edge of the cheeks whitish. Elytra fuscous with prominent whitish nervures. Disc of the tergal segments sometimes paler and there may be a longitudinal row of pale spots, more or less continuous, on either side of the middle of the venter, edge of the plates and a line on the oviduct pale. Antennae brown, the basal joint black. Eyes edged with pale. Length 2½ mm.

"New York. Described from six female examples, four taken near Buffalo in September, and two from New York City taken by Mr. E. B. Southwick in June. One of the latter is unusually dark with the pale markings much reduced in extent and the legs black.

"Superficially this insect resembles *Phyllodinus nervatus* but the head is narrower than the pronotum, the legs are not strongly flattened, the cheeks are narrower toward their apex and the lateral carinae of the pronotum do not reach the hind margin."

Genitalia: In lateral view pygofer of ♂ almost triangular, caudal margin with a very deep excavation which leaves a strong tooth at its ventral side; aedeagus about twice as wide at base as width just before apex; anal segment with pair of sharp, very long, slender, ventrally pointing, processes. In ventral view styles narrowed at base, widest near outer third, rounded and narrowed on apices; median processes of pygofer widest at base, narrowed to sinuate outer half, ending just before apices of styles; lateral processes practically absent.

Lectotype ♀, top specimen of three mounted on same pin, Grand Isd., N.Y. 9-11-92, E. P. Van Duzee. (Oman, Iowa State College Jour. Sci., Vol. 21, No. 2, Jan. 1947, p. 217.). Van Duzee specimens in collection of Iowa State College.

Allotype ♂ and 5 ♂ paratypes, Storrs, Conn., August 5, 1946, R. H. Beamer; other paratypes: 1 ♂, same place and collector, August 3, 1946; 3 ♂♂, same place and collector, August 4, 1946; 2 ♂♂, same place and collector, August 15, 1946; 1 ♂, Danbury, Conn., August 16, 1946, R. H. Beamer.

Allotype and paratypes in Snow Entomological Collections.

Macropterous form:

Like the brachypterous form but with fully developed flight wings which are about one-third their length longer than abdomen and with carinae of dorsum usually much darker.

Holomorphotype ♂, and 1 ♂ paramorphotype, Storrs, Conn., August 2-3, 1946, R. H. Beamer; allomorphotype ♀, Plymouth, Mass., July 15, 1934, M. W. Sanderson; other paramorphotypes: 1 ♀, Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 ♂, Old Ocean, Texas, January 3, 1946, R. H. Beamer; 2 ♂♂, Holland, N. Y., July 22, 1946, R. H. Beamer; 1 ♂, August 16, 1 ♂, August 23, Barberton, Ohio, 1936, L. J. Lipovsky; 2 ♂♂, Tallahassee, Fla., March 7, 1947, R. H. Beamer and L. D. Beamer; 1 ♂, Ponce de Leon, Fla., March 7, 1947, R. H. Beamer; 1 ♀, Arlington, Va., August 24, 1946, R. H. Beamer; 1 ♀, Cherokee Co., Kansas, Sept. 18, 1945, R. H. Beamer; 1 ♂, Raleigh, N.C., August 31, 1946, R. H. Beamer; 1 ♂ Peck's Pond, Pa., August 20, 1946, R. H. Beamer; 1 ♂, Summit Co., Ohio, July 9, 1937, L. J. Lipovsky.

Types in Snow Entomological Collections.

Additional material studies: About 300 specimens were studied from the following localities: (Alabama) Semmes; (Connecticut) Storrs, New Haven, Mystic; (Florida) Lamont, Sanford, Jacksonville, Daytona, Hilliard; (Illinois) Urbana, Elizabethtown, Metropolis, Havana, N. Milford; (Iowa) Ames; (Kansas) Douglas Co., La Cygne, Cherokee Co., Welda, Leavenworth; (Louisiana) Ramsey; (Maryland) Piney Point, Branchville, Plummers Id., Ashtown; (Massachusetts) Plymouth, Watertown; (New Hampshire) Durham; (Mississippi) Meridian, Port Gilbert, Vicksburg; (New York) Holland, Lancaster, Elba, Ithaca; (North Carolina) Chapel Hill, Raleigh; (Ohio) Barberton, Summit Co., Rome, Dayton, Columbus; (Pennsylvania) Peck's Pond, Ashland; (Texas) Dallas, Old Ocean, Benchley; (Virginia) Arlington, Woodbridge, Bluemont; (Washington, D.C.); (Wisconsin) Osceola.

Pissonotus divaricatus Spooner 1912, is suppressed as a synonym of *Pissonotus brunneus* Van Duzee 1897, on the basis of the following note taken from Beamer's records: "August 24, 1946, Oman and Beamer cleared and studied the macropterous male of the type of *P. divaricatus* Spooner. It is a synonym of *P. brunneus* Van Duzee."

13. *Pissonotus (Pissonotus) niger* n. sp.

Brachypterous form:

Resembles *Pissonotus brunneus* but slightly larger, veins of elytra concolorous with membrane and venter of genital capsule with a large open flap. Length ♂ 2.4 mm.; ♀ 2.9 mm.

Structure: Basal segment of antennae one-half as long as second; front about twice as wide as long at greatest width, slightly tapered toward each end, carinae distinct; crown slightly longer than wide, widest at apex; elytra almost truncate, corners slightly rounded, coriaceous, veins only slightly raised above membrane, continuous to hind margin; abdomen set with fine white hairs, about their length apart; genital capsule of male with large, U-shaped flap located ventrally.

Color: General body color pitchy black; carinae of vertex stramineous; basal segment of antennae and sometimes base of second segment dark, nearly black, remainder of second segment lighter; legs dark brown, to stramineous.

Genitalia: In lateral view pygofer of male narrowed on dorsal margin, caudal margin with huge, blunt tooth at middle and long slender edge of flap at ventral corner; aedeagus widest at base, almost parallel-sided to outer third where dorsal margin sharply converges to apex, with two slender retrorse processes on dorsal margin beyond middle; anal segment with a pair of very long slender processes. In ventral view pygofer with median flap, almost square in shape with outer margin made up of four lobes, another pair of rounded lobes and an inner pair of smaller ones; styles widest near broadly rounded, overhanging apices; median processes widest near middle with a sharp notch on outer margin at this point, then narrowed and curved into rounded apices.

Holotype ♂, allotype ♀, 7 ♂ and 9 ♀ paratypes, Orland Park, Ill., July 13, 1946, R. H. Beamer; other paratypes: 5 ♂♂ and 3 ♀♀, Storrs,

Conn., August 15, 1946, R. H. Beamer; 1 ♂, Danbury, Conn., August 16, 1946, R. H. Beamer; 1 ♂, Dolson, Ill., July 24, 1936, DeLong and Mohr; 1 ♂, Paxton, Ill., July 30, 1916; 1 ♂ and 1 ♀, Chittenango, N.Y., July 25, 1946, R. H. Beamer; 2 ♀♀, Douglas Lake, Mich., August 23, 1937, R. H. Beamer; 1 ♀, Mafeking, Manitoba, August 3, 1937, R. H. Beamer; 2 ♀♀, Deepdale, Manitoba, August 1, 1937, R. H. Beamer; 2 ♀♀, and 1 ♂ Keld, Manitoba, August 8, 1937, R. H. Beamer; 3 ♀♀, Swan River, Manitoba, August 2, 1937, R. H. Beamer; 1 ♂, Onarga, Ill., July 13, 1946, R. H. Beamer; 2 ♀♀ Douglas Lake Mich., Aug. 8, 1937, R. H. Beamer.

Types and paratypes in Snow Entomological Collections and paratypes in Illinois Natural History Survey Collection.

Macropterous form:

Like the brachypterous form except with flight wings developed which extend about one-third their length beyond the abdomen and the tip of the scutellum light in color.

Holomorphotype ♂, Keld, Manitoba, August 8, 1937, R. H. Beamer.

Type in Snow Entomological Collections.

14. *Pissonotus (Pissonotus) nigriculus* n. sp.

Brachypterous form:

Resembles *Pissonotus niger* except much smaller and males lack the large flap on venter of genital capsule. Length ♂ 1.7 mm; ♀ 2.1 mm.

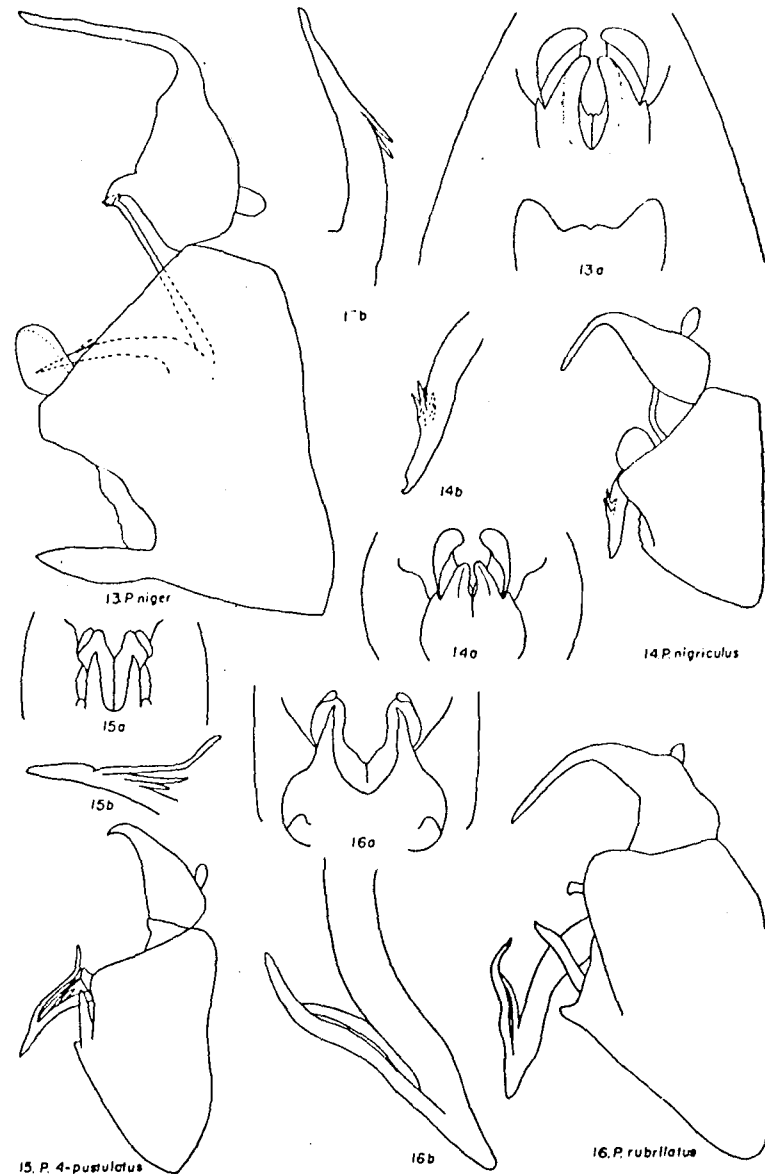
Structure: Basal segment of antennae about one-half as long as second segment; front about twice as long as wide, widest just before apex, narrowed toward each end, distinctly tricarinate; crown longer than wide, apex widest and rounded, carinae discernible but not distinct; elytra broadly rounded, covering first abdominal segment, veins indistinct; dorsum of abdomen sparsely set with short, white hairs.

Color: General body color deep pitchy black throughout; carinae of crown varying from light brown to black; basal segment of antennae black, second segment lighter; legs more or less dark; venter including clypeus and clypellus black.

Genitalia: In lateral view pygofer of male extended on posterior margin into a broad tooth just below median line; aedeagus widest at base, sides almost parallel to slightly beyond middle, then evenly narrowed to fairly sharp apex, shaft with several thin, retrose processes, some of them about as long as median width of shaft, located in region of constriction; anal ~~sharp apex, shaft with several thin, retrose processes, some of them about~~ segment with a pair of very long slender processes. In ventral view styles widest near base, slightly narrowed and twisted to broadly rounded, over-

PLATE IV

- 13 *P. (Pissonotus) niger* Van Duzee, lateral view of ♂ genital capsule; 13a, ventral view of styles and processes in position; 13b, lateral view of aedeagus.
 14 *P. (Pissonotus) nigriculus* n. sp., lateral view of ♂ genital capsule; 14a, ventral view of styles and processes in position; 14b, lateral view of aedeagus.
 15 *P. (Pissonotus) 4-pustulatus* (Van Duzee), lateral view of ♂ genital capsule; 15a, ventral view of styles and processes in position; 15b, lateral view of aedeagus.
 16 *P. (Pissonotus) rubrilatus* n. sp., lateral view of ♂ genital capsule; 16a, ventral view of styles and processes in position; 16b, lateral view of aedeagus.



hanging apices; median processes widest at base, with sharp tooth on outer margin just beyond middle, sharply narrowed at this tooth to end in incurving more or less rounded apices just beyond widest portion of styles.

Holotype ♂, allotype ♀, 71 ♂ and 61 ♀ paratypes, Sanford, Fla., March 11, 1947, R. H. Beamer; other paratypes: 7 ♂♂ and 10 ♀♀, Sanford, Fla., March 11, 1946, L. D. Beamer; 2 ♂♂ and 5 ♀♀, Royal Palm State Park, Fla., March 16, 1947, R. H. Beamer; 2 ♀♀, La Belle, Fla., July 16, 1939, P. W. Oman; 1 ♀, Sanford, Fla., Feb. 22, 1921, E. D. Ball; 1 ♀, Sanford, Fla., April 25, 1926, E. D. Ball.

Types and paratypes in Snow Entomological Collections; paratypes in U.S. National Museum and collection of E. D. Ball.

The specimens taken by Beamer at Sanford, Fla., were collected inside a grove of large palm trees in deep shade. This grove was about 7 miles southeast of the city of Sanford.

(To be continued in the October issue)