

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. Cheeks 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. Pygofer 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.

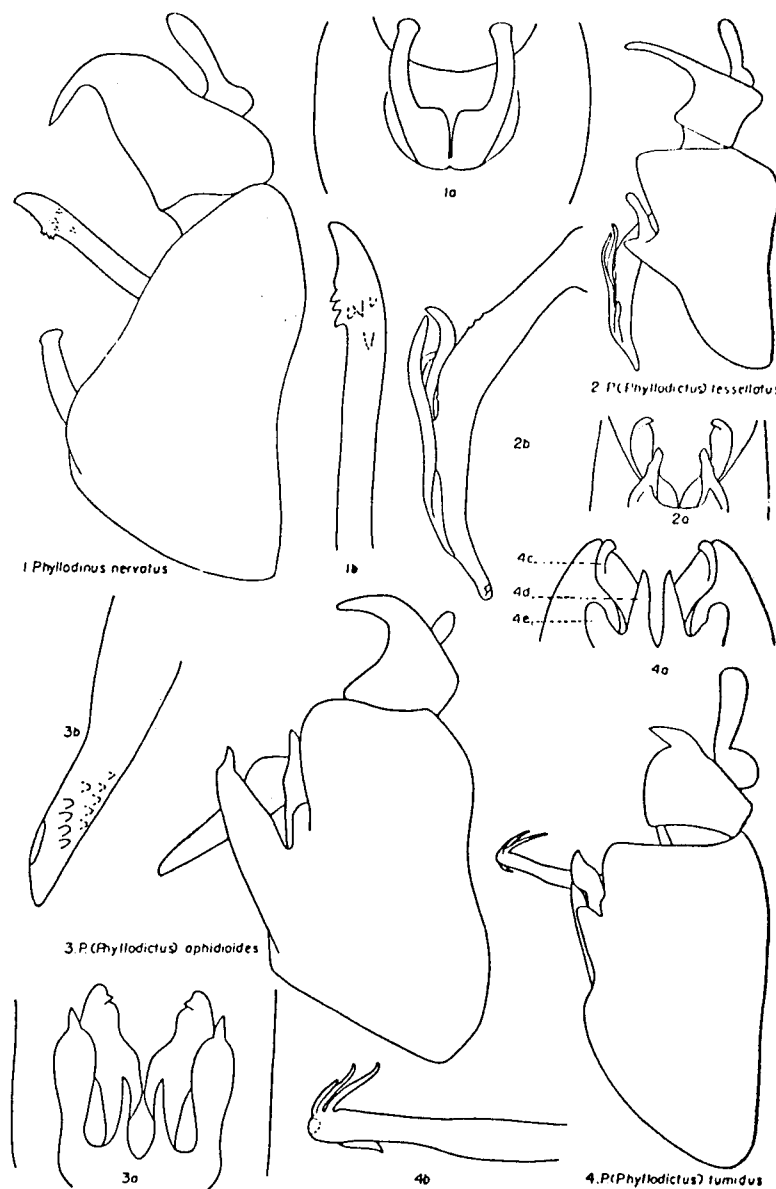
"Color piceous brown. Vertex pale, a short anterior median line and a row of dots on either side brown; disc of the pronotum and its carinae pale; scutellum pale with the basal angles and double median line brown. Elytra subhyaline, smoky, with numerous heavy ramous white nervures. Front blackish with 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 ramously 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; aedeagus 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 σ^7 genital capsule; 1a, ventral view of styles in position; 1b, lateral view of aedeagus.
- 2 *P. (Phyllodictus) testellatus* (Ball), lateral view of σ^7 genital capsule; 2a, ventral view of styles and processes in position; 2b, lateral view of aedeagus.
- 3 *P. (Phyllodictus) aphidioides* (Van Duzee), lateral view of σ^7 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 σ^7 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 *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 Barborton, 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. 239, 1897.

Brachypterous form:

"Bread 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 piecous; pronotum and usual transverse band on face, whitish; the latter followed by a broad piecous 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; mesonotum 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 kochelei Osborn, Herbert, Ohio Nat., 4, p. 46, 1903.
Phyllodinus fuscus 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 fuscous* Osb. and *Phyllodinus Koebelei* Osb. were checked Jan. 20, 1949, and the above synonymy found to be correct.

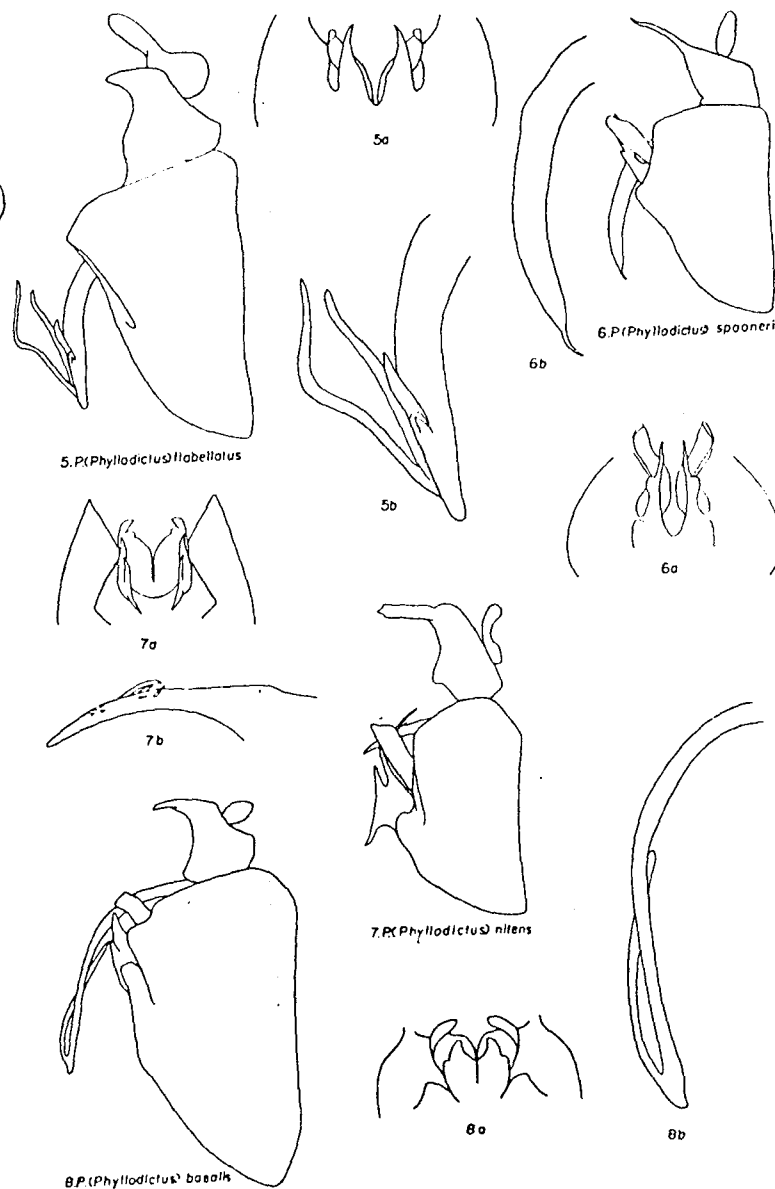
6. *Pissonotus (Phyllodictus) spooneri*, new name and comb.

Pissonotus piceus 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*) *nitens* (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 pygofer, only a small edge visible; style white. Length, 2.5 mm.

"A very pretty and delicate insect. The foliaceous tibiae recall *Phyllodinus*, 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 ungulate 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 piceus* Spooner 1912 is preoccupied by *Pissonotus piceus* (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 neurulation. 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* Osh., *fuscous* Osh. 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 retrorse 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 3
- 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 δ at least twice as long as wide 4
In ventral view lateral processes of pygofer of δ about as wide as long 5
- 4(2) Veins of elytra lighter in color than membrane 5
Veins of elytra concolorous with membrane 6
- 5(4) Clypeus spotted with light 6
Clypeus not spotted with light color 7
- 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 9
Genital capsule of male with short U-shaped flap, not more than half as long as wide 10
- 8(6) Body usually light brown; dorsum of abdomen with rows of pustules; basal segment of antennae light 11
Body dark reddish brown, without pustules; basal segment of antennae black 12
- 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 11
- 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 13
Head and anterior half of pronotum same color as body 14
- 12(10) Frontal carinae and metathorax marked with white 15
Frontal carinae and metathorax not marked with white 16
- 13(12) With distinct white, transverse band on apex of clypeus 17
Without distinct white, transverse band on apex of clypeus 18
- 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 19
Legs practically white; aedeagus in lateral view widest at base with two processes near apex 20
- 15(9) Basal segment of antennae black 21

- Basal segment of antennae not black 19
- 16(15) In ventral view median processes of δ pygofer as long as or longer than styles 20
In ventral view median processes of δ pygofer not over one-half as long as styles 21
- 17(16) In ventral view styles of δ δ narrowed and bluntly pointed on apical fourth; median processes of pygofer about one-half as long as styles 22
In ventral view styles broad and rounded on apices; median processes one-fourth as long as styles 23
- 18(17) Long apical process on aedeagus bifid 24
Long apical process on aedeagus not bifid but expanded blade-like 25
- 19(15) Basal segment of antennae more than two-thirds as long as second 26
Basal segment of antennae less than two-thirds as long as second 27
- 20(19) Elytra with setae-bearing tubercles on veins 28
Elytra without setae-bearing tubercles on veins 29
- 21(20) Aedeagus with 2-3 tooth-like processes on each side near apex 30
Aedeagus without tooth-like processes on each side near apex 31
- 22(20) Body dark brown with broad longitudinal light stripe on dorsum of abdomen 32
Body reddish, without broad longitudinal stripe on dorsum of abdomen 33

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 vertex, 0.22; 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

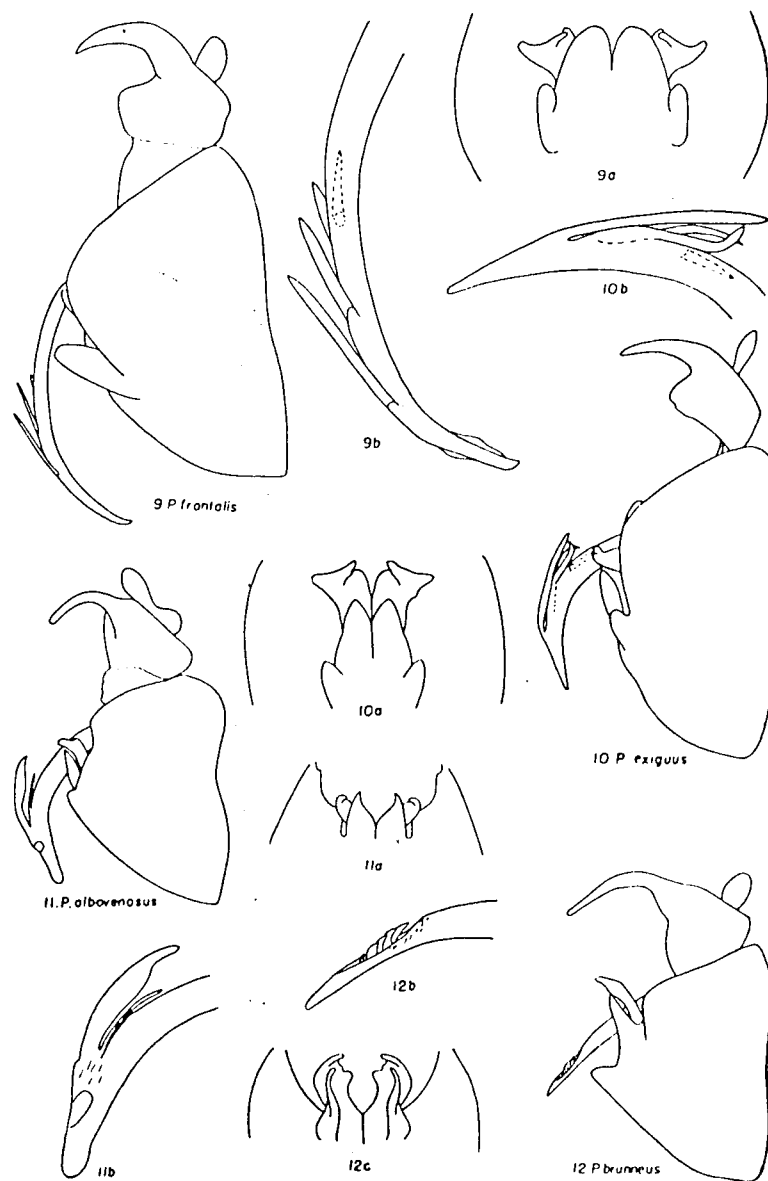


PLATE III

- 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. Bull. Soc. Nat. Sci., 5, p. 190, 1891. (Lined). (Nom. nud.).
Pissonotus brunneus Van Duzee, E. P., Bull. Bull. Soc. Nat. Sci., 5 pp. 239, 1897.
Pissonotus divaricatus Spooner, Canadian Ent., 41, p. 236, 1912, (new synonymy).

Brachypterous form:

"Allied to *P. aphidioides* but much smaller. Color piceous brown tinged with rufous on the front; breast soiled yellowish white, marked by the usual broad piceous 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 $2\frac{1}{2}$ 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 δ 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 η , 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 δ and 5 δ paratypes, Storrs, Conn., August 5, 1946, R. H. Beamer; other paratypes: 1 δ , same place and collector, August 3, 1946; 3 $\delta\delta$, same place and collector, August 4, 1946; 2 $\delta\delta$, same place and collector, August 15, 1946; 1 δ , 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 δ , and 1 δ paramorphotype, Storrs, Conn., August 2-3, 1946, R. H. Beamer; allomorphotype η , Plymouth, Mass., July 15, 1934, M. W. Sanderson; other paramorphotypes: 1 η , Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 δ , Old Ocean, Texas, January 3, 1946, R. H. Beamer; 2 $\delta\delta$, Holland, N. Y., July 22, 1946, R. H. Beamer; 1 δ , August 16, 1 δ , August 23, Barberton, Ohio, 1936, L. J. Lipovsky; 2 $\delta\delta$, Tallahassee, Fla., March 7, 1947, R. H. Beamer and L. D. Beamer; 1 δ , Ponce de Leon, Fla., March 7, 1947, R. H. Beamer; 1 η , Arlington, Va., August 24, 1946, R. H. Beamer; 1 η , Cherokee Co., Kansas, Sept. 18, 1945, R. H. Beamer; 1 δ , Raleigh, N.C., August 31, 1946, R. H. Beamer; 1 δ Peck's Pond, Pa., August 20, 1946, R. H. Beamer; 1 δ , 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 δ 2.4 mm.; η 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 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 δ , allotype η , 7 δ and 9 η paratypes, Orland Park, Ill., July 13, 1946, R. H. Beamer; other paratypes: 5 $\delta\delta$ and 3 $\eta\eta$, 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.

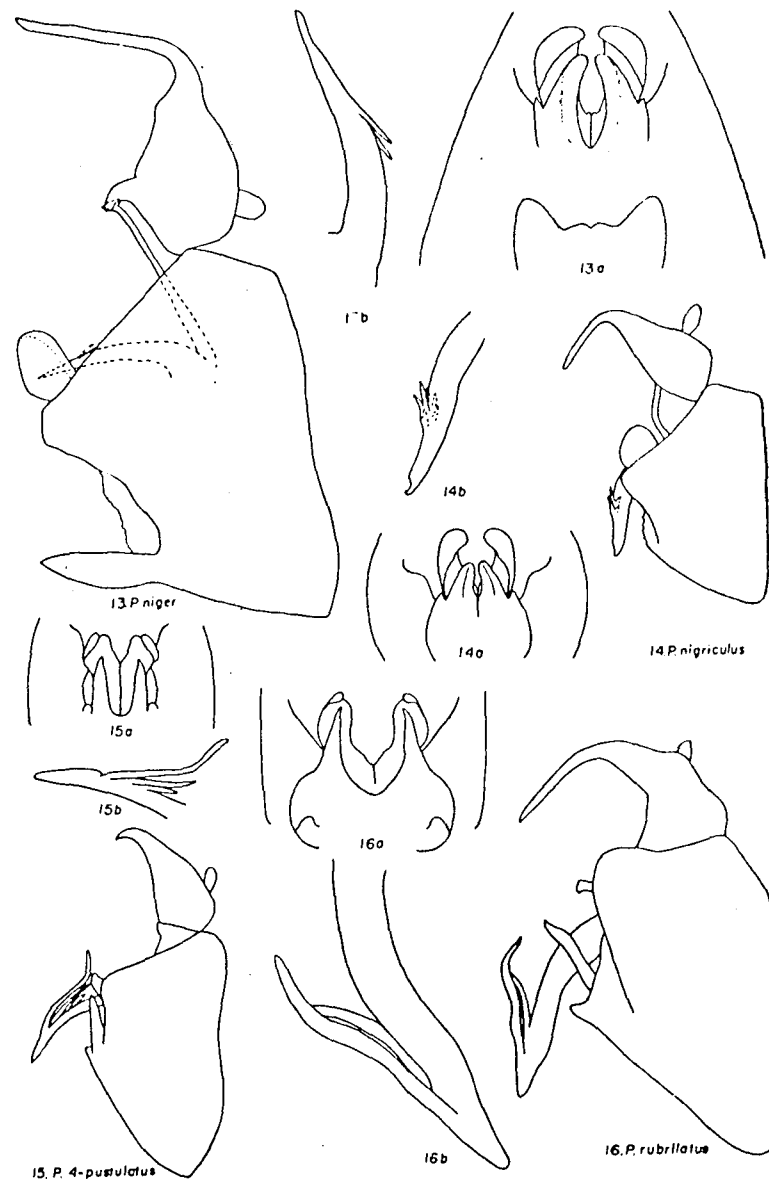
Structure: Basal segment of antennae about one-half as long as second segment; front about twice as long as wide, widest just before apex, narrowed toward each end, distinctly tricarinate; crown longer than wide, apex widest and rounded, carinae discernible but not distinct; elytra broadly rounded, covering 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, retrorse processes, some of them about as long as median width of shaft, located in region of constriction; anal sharp apex; shaft with several thin, retrorse 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)

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

(Homoptera-Fulgoridae-Delphacinae)

L. W. MORGAN and R. H. BEAMER

(Continued from July issue)

15. *Pissonotus* (*Pissonotus*) *4-pustulatus* (Van Duzee)

Stobaera 4-pustulata Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 9, p. 200, 1909.
Pissonotus variegatus Spooner, Canadian Ent., 44, p. 235, 1912.
Pissonotus foveatus Spooner, Canadian Ent., 44, p. 234, 1912.

"Brachypterous form: Pale yellowish testaceous, obscurely varied with darker, marked with a broken black band which crosses the base of the clypeus and sides of the pleural pieces, and with two black pustules on either side of the fourth tergal segment. Length: male 2½; female 3 mm.

"Vertex broader and more quadrate with the carinae weaker than in *tricarinata*. Front long ovate, broader than in *tricarinata*, regularly narrowed at base and apex. Antennae but moderately flattened, almost as in *Liburnia*. Pronotum short, carinae rather weak, the lateral almost attaining the hind margin. Elytra reaching the first tergal segment, arcuated at apex. This segment with two polished, blunt tubercles on either side placed lengthwise of the segment and near the margin. Pygofer of the male deeply excavated below and showing on either side a longitudinal ridge above the base of the stiles. These stiles slender, sinuated and but little divergent.

"Color pale yellowish testaceous, obscurely varied or maculated with a darker shade on the abdomen and marked with black as follows: a spot on the cheeks below the eyes, a band on the tumid base of the clypeus which is continued along either side as a row of large blotches on the pleural pieces, a dot or broken line on the front of the first antennal joint and a heavier line behind, a spot near the apex of the femora and another on the base of the tibiae, the stiles of the male and the oviduct of the female, and the four polished tubercles on the fourth tergal segment. Elytral nervures dotted with fuscous. Eyes brown. Front with a few dark dots or marks above but not transversely brown at base as in *tricarinata*.

"Described from one male and nine female examples, all brachypterous, taken at Estero. This species is somewhat anomalous in any genus. It has the frontal characters and general aspect of *Stobaera* while in the characters of the antennae and pronotal carinae it is intermediate between that genus and *Liburnia*. Genus *Stobaera* seems to have been redescribed as *Gonolium* by Fowler in the *Biologia*. His *G. granulatum* is perhaps the same as *Stobaera concinna* Stal."

Genitalia: In lateral view pygofer of male more or less triangular with a shallow excavation in caudal margin; aedeagus widest at base, sides more or less parallel, gently curving ventrally, with about four, retrorse, slender processes of different lengths on dorsal margin of outer third; anal segment with a pair of processes quite wide at base and about half as long

as segment. In ventral view styles widest at outer third, apices rounded, overhanging, curved out; median processes stout at base, slightly diverging, outer margin curved to meet inner in sharp point, about two-thirds as long as styles; lateral processes barely noticeable as rounded knobs.

Material studied: Numerous specimens from the following localities: Florida, Tampa, Lower Matecomba Key, Cedar Keys, Key West, La Belle, Yankeetown, Punta Gorda, Homestead, Daytona; Georgia, Tybee Beach; Texas, Brownsville, Corpus Christi, Sinton, Sarita, Boca Chica.

Types in the Collection of the California Academy of Science.

A letter from Doctor E. S. Ross of the Calif. Acad. of Sci., in regard to the Van Duzee type specimens reads in part as follows: "Van Duzee has selected and catalogued a lectotype (No. 3036) and an allotype (No. 3036) for *Stobaera 4-pustulata*. Both specimens are labeled Estero, Fla., May 6-12-08." These specimens are here designated.

16. *Pissonotus (Pissonotus) rubrilatus* n. sp.

Brachypterous form:

Resembles *Pissonotus niger* but smaller, reddish brown in color and males lack large U-shaped flap on venter of genital capsule. Length ♂ 2.2 mm.; ♀ 2.8 mm.

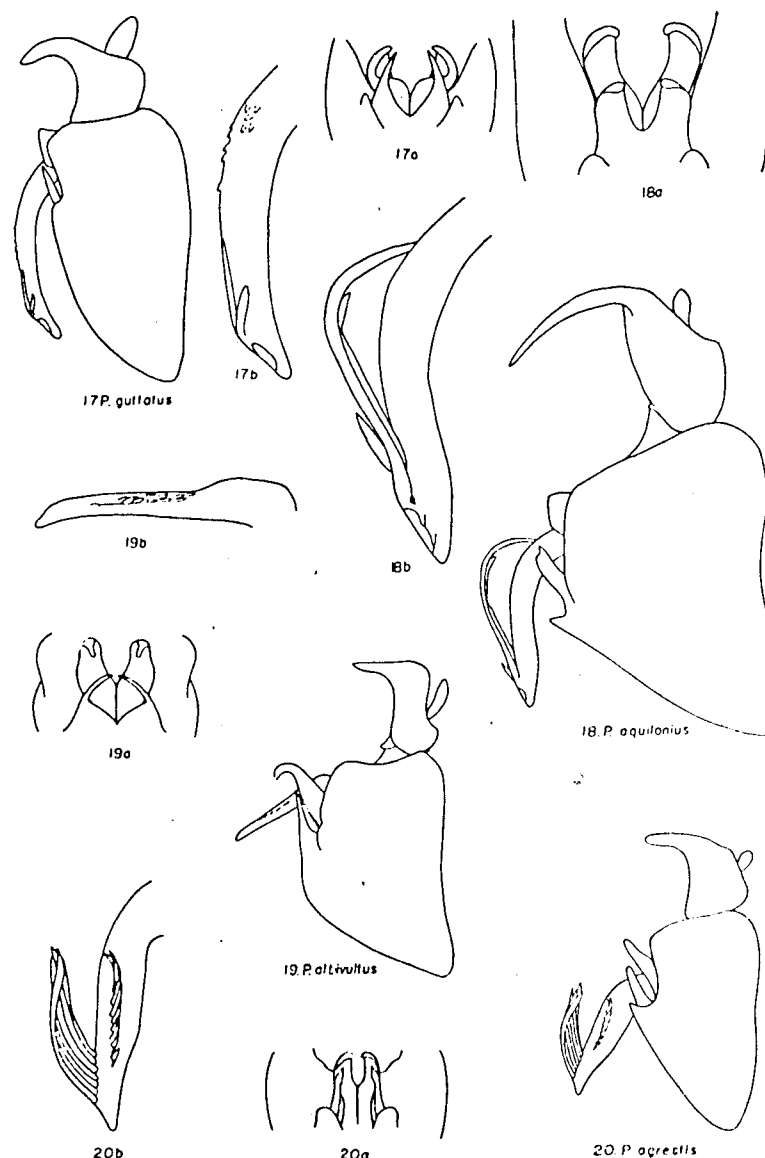
Structure: Second segment of antennae about twice as long as first; front about twice as long as greatest width, narrowed toward each end, more so toward base, carinae distinct; crown almost one-fourth longer than basal width, widest at apex, carinae indistinct; elytra almost quadrate, apices nearly truncate, corners rounded, veins raised; dorsum of abdomen covered with very short white hairs set more than their own length apart; genital segment of male conspicuous from above, about two-thirds width of preceding segment.

Color: Head, thorax and elytra reddish brown, fading to deep brown on abdomen; basal segment of antennae dark brown, almost black, second segment lighter; genital capsule of male light brown above, shading to darker below; legs more or less dark brown with reddish cast basally, light yellow apically.

Genitalia: In lateral view pygofer of male greatly narrowed on caudal margin with a small tooth at ventro-caudal corner; median processes long and slender, slightly sinuate, apices sharp; aedeagus widest at base, tapering gradually to narrow rounded apex, ventral margin slightly swollen near outer third, two slender retrorse processes on dorsal margin near apex, first slightly longer than second, about half as long as shaft of aedeagus; anal segment with pair of long slender processes. In ventral view styles constricted near middle, broadest just before small, overhang-

PLATE V

- 17 P. (*Pissonotus*) *guttatus* Spooner, lateral view of ♂ genital capsule; 17a, ventral view of styles and processes in position; 17b, lateral view of aedeagus.
18 P. (*Pissonotus*) *aquilonius* n. sp., lateral view of ♂ genital capsule; 18a, ventral view of styles and processes in position; 18b, lateral view of aedeagus.
19 P. (*Pissonotus*) *albivittatus* n. sp., lateral view of ♂ genital capsule; 19a, ventral view of styles and processes in position; 19b, lateral view of aedeagus.
20 P. (*Pissonotus*) *agrestis* n. sp., lateral view of ♂ genital capsule; 20a, ventral view of styles and processes in position; 20b, lateral view of aedeagus.



ing apices; median pair of processes widest at base, narrowed to sharp apices, converging slightly, ending short of apices of styles; lateral pair of processes of pygofer small, about as wide as long.

Holotype ♂, allotype ♀, 16 ♂ and 3 ♀ paratypes, Rabbit Ear Pass, Colo., Aug. 3, 1947, R. H. Beamer.

Types in Snow Entomological Collections.

17. *Pissonotus (Pissonotus) guttatus* Spooner

Pissonotus guttatus Spooner, Canadian Ent., 44, p. 233, 1912.

"Brachypterous ♀. Eyes oval, deeply indented below to receive the antennae, colour grey; vertex considerably longer than wide, slightly rounded in front, projecting slightly before the eyes; carinae of the vertex all present, rather indistinct; vertex uniformly black except the caudo-lateral angles which are slightly yellowish. Carinae meeting on the front just below the curve of the vertex, extending distinctly from this point throughout the length of the front, indistinct on the vertex; front considerably constricted between the eyes, deep pitchy black above, becoming gradually lighter until it is white at the base; clypeo-frontal suture curved, the clypeus deep uniform black with the median carina distinct; the black colour of the clypeus extends as a band across the anterior coxae as is characteristic of the genus.

"The second segment of the antennae about one-fourth as long again as the first, with a few protuberances; antennae uniform pale honey-yellow.

"The length of the prothorax from the anterior to the caudal margins about equal to that of the vertex; caudal margin slightly concave, carinae distinct; anterior portion deep, shiny black; narrow band on posterior margin dirty white.

"Legs normal, pale honey-yellow except tips of the tarsi which are black and two slender brown lines on the outer sides of the tibiae.

"Scutellum triangular, sides very slightly arcuate; median carina distinct; lateral carina inconspicuous, reaching the posterior margin; colour uniform honey-yellow.

"Elytra short, extending to the middle of the first abdominal segment, coriaceous, highly polished, veins almost obliterated; colour pale honey-yellow with an oval blotch of white in the centre of the apical margin; abdomen honey-yellow but slightly darker than the scutellum and elytra.

"Genitalia uniform honey-yellow, paler than the tergum; pygofer tapering to a rounded point; plates extending about one-third the length of the pygofer; anal style white. Length 3.5 mm.

"Described from a single female taken at Ithaca, N.Y., Aug. 1st, 1896. Type in collection of Cornell University.

"Very close to *P. delicatus* Van Duzee but easily separable from it by the black front, vertex and prothorax. The prothorax lacks the foveae so conspicuous in *delicatus* and the shape of the front is quite different."

In the series studied, the black color is not always present on the thorax as stated in the original description, and in a few instances even the posterior portion of the vertex is light colored. Length ♂, 2.2 mm.

Genitalia: In lateral view pygofer of male much wider than long, longest on dorsal margin, slight excavation near dorsum of caudal margin exposing apex of median process and tip of style; aedeagus widest at base, sides subparallel, slightly narrowed almost to apex where dorsal margin is suddenly narrowed to rounded apex, shaft gently curved ventrally throughout, dorsal margin and left side more or less set with processes and short teeth, processes usually so close to shaft as to often be invisible except in high power compound microscope; anal segment with a pair of heavy processes of medium length. In ventral view styles with both margins sinuately curved, apices broadly rounded with outer margin overhanging; median processes widest at base, narrowed throughout, curved, apices broadly rounded with outer margin overhanging; lateral processes of pygofer vestigial.

Allotype ♂ and 14 ♂ paratypes, Storrs, Conn., August 5, 1946, R. H. Beamer; other paratypes: 3 ♂♂, Boscawen, N.H., August 12, 1946, R. H. Beamer; 3 ♂♂, Rome, Ohio, July 19, 1946, R. H. Beamer; 8 ♂♂, Lancaster, N.Y., July 25, 1946, R. H. Beamer; 1 ♂, Fredonia, N.Y., July 21, 1946, R. H. Beamer; 1 ♂, Washington, D.C., October 10, 1941, P. W. Oman; 1 ♂, Annapolis Md., June 24, 1937, P. W. Oman; 1 ♂, Toronto, Ontario, Canada, August 8, 1924, E. D. Ball.

Allotype and paratypes in Snow Entomological Collections; paratypes in U.S. National Museum.

Macropterous form:

Similar to brachypterous form but with head and anterior half of thorax black and band of white at base of clypeus only about one-half as wide as in brachypterous specimens. Flight wings fully developed, elytra extending about one-third their length beyond tip of abdomen, widest beyond cross-veins; elytra hyaline, with veins and base smoky in color.

Holomorphotype ♀ and 2 ♀♀ paramorphotypes, Lancaster, N.Y., July 25, 1946, R. H. Beamer; other paramorphotypes: 2 ♀♀, Fredonia, N.Y., July 21, 1946, R. H. Beamer.

Types in Snow Entomological Collections.

18. *Pissonotus (Pissonotus) aquilonius* n. sp.

Brachypterous form:

Resembles *Pissonotus guttatus* Spooner but anterior half of pronotum and crown of same color as remainder of body instead of much darker. Length, ♂ 2.3 mm.; ♀ 2.8 mm.

Structure: Second segment of antennae about twice as long as first; clypeus not quite twice as long as greatest width, sides subparallel for most of their length, narrowed toward each end, more so toward base, tricarinate, median carina fading out toward base; crown longer than wide, widest at apex, apex rounded; elytra about as long as broad in ♀, longer than broad in ♂, apices truncate with corners rounded, veins slightly raised, not distinctly reaching hind margin; dorsum of abdomen set with fine white hairs, less than their length apart.

Color: Body color piceous, antennae soiled yellow with smoky cast on basal segment; clypeus lighter at apex; posterior half of pronotum white;

veins of elytra same color as membrane, broad white band across apices of elytra; legs yellow with brown markings.

Genitalia: In lateral view pygofer of male strongly narrowed on caudal margin; lateral and median processes form a more or less pediform process on ventral corner of this margin; aedeagus long and slender, sides almost parallel, curved gradually toward venter, apical fifth bent slightly dorsad, dorsal margin of apex with 3-4 slender, retrorse processes, one of which is more than half as long as shaft; anal segment with a pair of very long, slender, processes. In ventral view styles about twice as long as median processes, sinuate, apices rounded and overhanging slightly more than in median processes; median processes considerably longer than wide, apices broadly rounded, overhanging; lateral processes of pygofer but slightly produced, about as long as wide.

Holotype ♂, allotype ♀, 1 ♂ and 1 ♀ paratypes, Brule, Wis., August 16, 1937, R. H. Beamer.

Types in Snow Entomological Collections.

19. *Pissonotus (Pissonotus) albivultus* n. sp.

Brachypterous form:

Resembles *Pissonotus aquilonius* but first segment of antennae black, carinae of clypeus and crown light colored and scutellum with at least some light color. Length ♂ 1.9 mm.; ♀ 2.4 mm.

Structure: First segment of antennae two-thirds as long as second; clypeus about twice as long as greatest width, widest near apical fourth, narrowed toward each end, more so toward base, carinae distinct; crown longer than wide, carinae very prominent; elytra about as wide as long, apices broadly rounded, veins slightly raised, indistinct, not distinctly reaching hind margin; abdomen with a few long white hairs along lateral margins.

Color: General color usually dark brown although some specimens are lighter; first segment of antennae dark brown, second segment lighter; clypeus dark brown, with narrow transverse band at apex and carinae much lighter; crown with foveae dark brown and carinae quite light; apical portion of pronotum white, mesonotum varying from dark brown to almost white; elytra brownish-semihyaline with broad white band across apices, this band sometimes almost bisected by brown spot in center; abdomen dark brown with light spot at apex and in some specimens a more or less light longitudinal stripe.

Genitalia: In lateral view pygofer of male more or less rectangular, caudal margin broken by the dorsally projecting, long, slender, median process; aedeagus widest near base, shaft almost straight with sides narrowing to rather sharp apex, dorsal margin on about middle half more or less covered with short ridges or serrations; styles visible for most of their length, widest at base, narrowing rapidly to sharp apices; anal segment with a pair of rather sharp, scarcely curving, fairly short, processes. In ventral view styles widest near middle, narrowed to rounded apices which overhang in a sharpened point; median processes very wide at base, greatly narrowed at middle to very long, slender, inwardly directed apices.

Holotype ♂, allotype ♀, 13 ♂ and 8 ♀ paratypes, Otter Creek, Fla., March 9, 1947, R. H. Beamer; other paratypes: 7 ♂ and 6 ♀, same date and place, L. D. Beamer; 28 ♂ and 16 ♀, La Belle, Fla., March 13, 1947, R. H. Beamer; 1 ♀, Royal Palm Park, Fla., March 16, 1947, R. H. Beamer. Types in Snow Entomological Collections.

20. *Pissonotus (Pissonotus) agrestis* n. sp.

Brachypterous form:

Resembles *Pissonotus paludosus* but with a distinct, rather broad, transverse, white band across apex of clypeus and male aedeagus with a series of from 8-10, very closely set, retrorse processes on dorsal margin of apex. Length ♂ 1.8 mm.; ♀ 2.3 mm.

Structure: First antennal segment a little more than half as long as second; clypeus not quite twice as long as wide, widest near apical third, strongly narrowed toward each end, more so toward base, distinctly tricarinate; crown longer than wide, carinae indistinct; elytra about as long as wide, almost truncate, corners broadly rounded, veins indistinct, slightly raised, not reaching apices; median longitudinal carina of dorsum of abdomen present.

Color: General color dark brown to black; dorsum of pronotum, broad band on apices of elytra and fairly broad band on apex of clypeus white; first segment of antennae almost black, second lighter; legs stramineous with darker markings on femora.

Genitalia: In lateral view pygofer of male almost triangular with a broad excavation in caudal margin; median process and outer half of style rather slender, tapering to pointed apices and more or less converging dorsally; aedeagus widest near basal third, bent ventrally in same region, sides narrowed slightly to apex, 8-10 long, slender, retrorse processes on dorsal margin at apex, about same number of shorter retrorse spines or processes on right side beginning near apical third and reaching to basal third; anal segment with a pair of short, stout processes with rounded apices. In ventral view styles long and rather slender, sinuate, apices rounded with apical portion overhanging; median processes almost as long as styles, slender, tapering to sharp apices; lateral processes rounded humps, as broad as long.

Holotype ♂, and allotype ♀, Marianna, Fla., March 3, 1947, R. H. Beamer; paratypes: 1 ♀, Storrs, Conn., August 4, 1946, R. H. Beamer; 3 ♂ and 3 ♀, New Port Ritchey, Fla., October 7, 1938, P. W. Oman; 1 ♂, Waycross, Ga., October 5, 1938, P. W. Oman; 1 ♀, Sanford, Fla., September 10, 1925, E. D. Ball; 1 ♀, Sanford, Fla., November 9, 1926, E. D. Ball; 1 ♀, Sanford, Fla., Feb. 2, 1926, E. D. Ball.

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

21. *Pissonotus (Pissonotus) merides* n. sp.

Brachypterous form:

Resembles *Pissonotus albivultus* but frontal carinae and metathorax not marked with white and aedeagus of male enlarged on outer third and

with four retrorse processes on dorsal margin of apical third. Length ♂ 2.1 mm.; ♀ 2.8 mm.

Structure: First segment of antennae about one-half as long as second; clypeus about twice as long as wide, widest near middle, narrowed toward each end, more so toward base, distinctly tricarinate; crown longer than wide, widest at apex, apex rounded, carinae not distinct; elytra coriaceous, about as long as broad, apices almost truncate with corners rounded, veins slightly raised, not distinctly reaching hind margin; lateral margin of abdomen with a few long white hairs, more numerous on male genital segment; dorsum of abdomen with a distinct longitudinal carina.

Color: General body color pitchy black, apical margins of pronotum and elytra white; antennae varying from dark brown to black; legs dark, venter, clypeus and clypellus black with faint, light transverse line at apex of clypeus.

Genitalia: In lateral view pygofer of male more or less rectangular with lateral process forming a sharp tooth near middle of caudal margin and median process extending dorsally from lateral tooth in a much sharper and longer projection; style visible for almost whole length, widest near outer third, narrowed to sharp apex on inner margin; aedeagus widest on outer third, gradually curved ventrally, dorsal margin of apical third with four retrorse processes, first at least twice as broad as any other and about half as long as shaft, second and fourth about one-third as wide as first and nearly as long, the third about one-half as wide as second and less than half as long; anal segment with a pair of long, slender, sinuate processes. In ventral view styles narrowest near middle, slightly widened to broadly rounded apices, overhanging on outer margin; median processes widest at base, more or less avicephaliform with long, slender, inward pointing, beak; lateral processes mere projections about as long as wide.

Holotype ♂, allotype ♀, 6 ♂ and 2 ♀ paratypes, Mobile, Ala., March 20, 1947, R. H. Beamer; other paratypes: 1 ♀, same place and date, L. D. Beamer; 2 ♂ and 1 ♀, Pearlinton, Miss., March 3, 1947, R. H. Beamer; 1 ♂, Ocean Springs, Miss., March 5, 1947, R. H. Beamer; 3 ♂ and 2 ♀, Mariana, Fla., March 7, 1947, R. H. Beamer.

Types in Snow Entomological Collections.

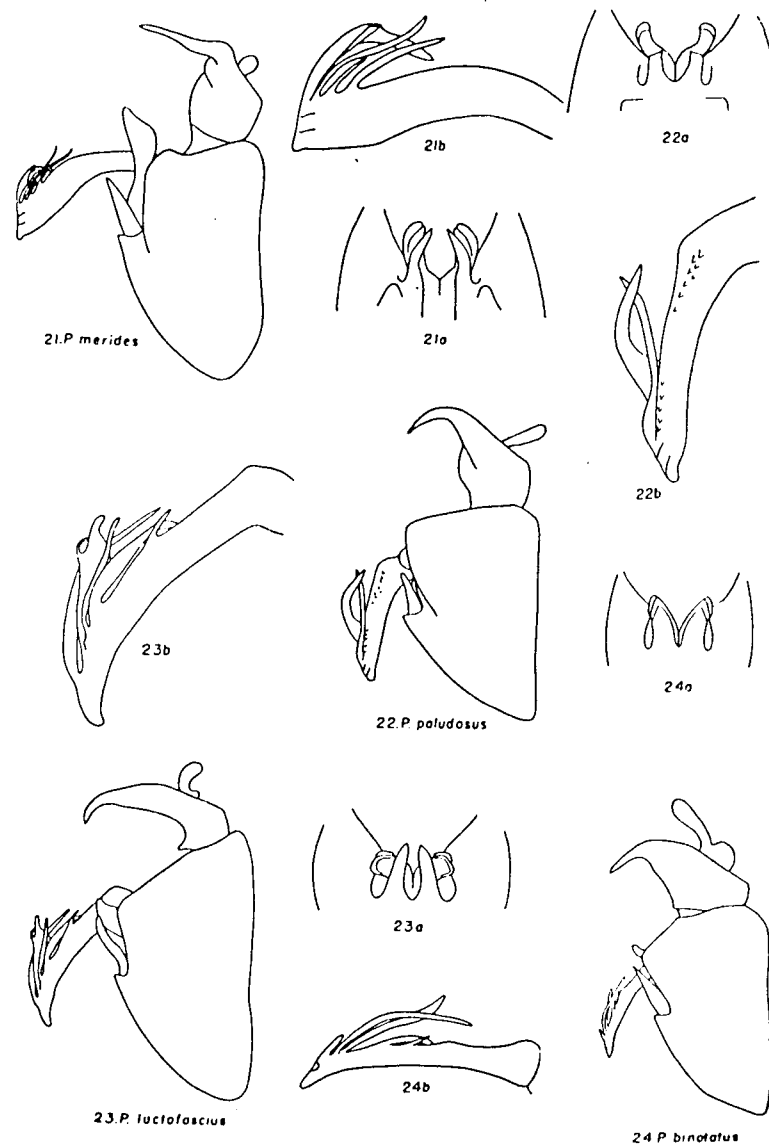
22. *Pissonotus (Pissonotus) paludosus* n. sp.

Brachypterous form:

Resembles *Pissonotus merides* but legs light fulvous to white instead of brown and aedeagus narrower at apex than at base. Length ♂ 2.1 mm.; ♀ 2.8 mm.

PLATE VI

- 21 *P. (Pissonotus) merides* n. sp., lateral view of ♂ genital capsule; 21a, ventral view of styles and processes in position; 21b, lateral view of aedeagus.
 22 *P. (Pissonotus) paludosus* n. sp., lateral view of ♂ genital capsule; 22a, ventral view of styles and processes in position; 22b, lateral view of aedeagus.
 23 *P. (Pissonotus) lactofascius* n. sp., lateral view of ♂ genital capsule; 23a, ventral view of styles and processes in position; 23b, lateral view of aedeagus.
 24 *P. (Pissonotus) binotatus* Sponer, lateral view of ♂ genital capsule; 24a, ventral view of styles and processes in position; 24b, lateral view of aedeagus.



Structure: First segment of antennae about one-half as long as second; clypeus not quite twice as long as wide, widest near outer third, narrowed toward each end, slightly more so toward base, distinctly tricarinate; crown longer than wide, carinae indistinct; elytra about as broad as long, apices almost truncate with outer corners broadly rounded, veins indistinct, slightly raised, not distinctly reaching the apices; dorsum of abdomen sparsely covered with short white hairs, distinct, median, longitudinal carina on dorsum of abdomen.

Color: General body color black; posterior half of pronotum and broad band on apices of elytra, white; antennae brown to light fulvous; legs stramineous to almost white.

Genitalia: In lateral view pygofer of male more or less rectangular, narrowed on caudo-ventral corner; caudal margin broken by lateral process forming a sharp tooth and median process forming a long slender tooth projecting dorsally; only rounded apex of style visible; aedeagus widest near base, curving ventrally, dorsal margin of apex with two retrorse processes, more than half as long as shaft; anal segment with a pair of long slender, curved processes. In ventral view styles widest near middle, sinuately curved to rounded, overhanging apices; median processes widest at base, overall shape more or less rectangular; lateral processes barely visible.

Holotype ♂, allotype ♀, 6 ♂ and 7 ♀ paratypes, Marianna, Fla., March 7, 1947, R. H. Beamer; other paratypes: one pair, same place and date, L. D. Beamer; 3 ♂ and 3 ♀, Saucier, Miss., March 5, 1947, R. H. Beamer; 1 ♀, Mobile, Ala., March 20, 1947, R. H. Beamer; 1 ♂, Ocean Springs, Miss., March 5, 1947, L. D. Beamer; 2 ♂, Pearlinton, Miss., March 3, 1947, R. H. Beamer; 2 ♂ and 1 ♀, Melbourne, Fla., March 17, 1947, R. H. Beamer; 3 ♂ and 2 ♀, Woodville, Fla., March 7, 1947, R. H. Beamer; 2 ♂, Ponce de Leon, Fla., March 7, 1947, R. H. Beamer; 2 ♂ and 1 ♀, same place and time, L. D. Beamer; 1 ♀, Lamont, Fla., March 7, 1947, R. H. Beamer; 1 ♀, same place and time, L. D. Beamer; 1 ♂, Covington, La., March 3, 1947, R. H. Beamer; 2 ♂, Slidell, La., March 3, 1947, R. H. Beamer; 1 ♂, Hilliard, Fla., July 6, 1939, R. H. Beamer.

Types and paratypes in Snow Entomological Collections.

23. *Pissonotus (Pissonotus) lactofascius* n. sp.

Brachypterous form:

Resembles *Pissonotus binotatus* but general color practically black and median processes of male in ventral view as long as or longer than styles. Length ♂ 2 mm.; ♀ 2.4 mm.

Structure: First segment of antennae one-half as long as second; clypeus not quite twice as long as broad, broadest near apical third, narrowed toward each end, very slightly more so toward base, definitely tricarinate; crown slightly longer than broad, carinae indistinct; elytra about as broad as long, apices almost truncate, outer corner rounded, veins indistinct, slightly raised, not definitely passing through white apical border; dorsum of abdomen with sparsely set, short, white, hairs.

Color: General color very dark brown to black, with broad white band on apices of elytra and narrow, transverse, white band at apex of clypeus; basal segment of antennae dark, almost black, second segment lighter; legs variable from light yellow to dark brown.

Genitalia: In lateral view pygofer of male almost triangular, with a broad shallow notch in posterior margin; median process extending dorsally as a slender, sinuate, sharp pointed process; style exposed for about half its length, widest near outer third, narrowed to rounded apex; anal segment very short, greatly extended caudally into a pair of sharp processes; aedeagus with shaft bent ventrally near base, sides almost parallel, dorsal margin with numerous retrorse processes of varying widths, one even forked. In ventral view styles bent outward near middle, apices broadly rounded, narrowly overhanging; median processes as long as or longer than styles, slightly converging with apices pointed.

Holotype ♂, allotype ♀, and 4 ♂ and 3 ♀ paratypes, Rabbit Ear Pass, Colo., August 3, 1947, R. H. Beamer; other paratypes: 4 ♂ and 7 ♀, Pingree Park, Colo., August, 1924, Beamer and Lawson; 1 ♂ and 1 ♀, same place and collectors, August, 1925; 4 ♀, Northgate, Colo., August 20, 1931, R. H. Beamer; 1 ♀, Poudre Canyon, Colo., August 22, 1925, Beamer and Lawson; 1 ♀, Yellowstone Park, Wyo., Frying Pan Lake, August 15, 1931, R. H. Beamer.

Types in Snow Entomological Collections.

24. *Pissonotus (Pissonotus) binotatus* Spooner

Pissonotus binotatus Spooner, Canadian Ent., 44, p. 239, 1912.

"Brachypterous ♀. Form and general appearance of *P. marginatus*, but considerably smaller.

"Eyes oval, deeply indented below to receive the antennae; colour dark gray, almost black, with a yellow margin; vertex about as long as wide, very slightly produced before the eyes, anterior margin slightly curved; carinae all present, very pronounced, posterior foveae very deep; colour uniform dark reddish brown.

"Front about one and one-third times as long as broad, widest below the eyes, sides slightly arcuate; clypeo-frontal suture straight, median and lateral carinae quite prominent, median carina forked just below the apex of the head; colour uniform reddish-brown, except a very narrow band along the clypeo-frontal suture, which is light yellow.

"Clypeus of the form of a truncated triangle; median carina fairly prominent; colour black, the black band extending across the anterior coxae.

"Basal segment of the antennae a little less than one-half the length of the second; the second segment lacks the protuberances so often found; basal segment reddish brown, second segment light yellow.

"Prothorax a little deeper than the head, caudal margin almost straight, very slightly emarginate on the sides and a suggestion of an emargination in the centre; median carina very prominent, lateral carinae strong on proximal two-thirds of the prothorax, fading out before reaching the posterior margin; colour uniform reddish brown.

"Anterior legs yellow, lineated with brown; second and third pairs of legs with yellow coxae, femora and proximal half of tibiae brown, the tibiae becoming gradually lighter in colour toward the distal end, the distal end of the tibiae and first two tarsal segments light yellow, almost white; last tarsal segment dark brown; tarsal spur rather small, light yellow, almost white.

"Scutellum triangular, about one and one-third times as deep as the prothorax, sides straight, median and lateral carinae prominent, the latter attaining the posterior margin; colour uniform reddish brown.

"Elytra short, practically covering the first abdominal segment, highly polished, veins indistinct; colour reddish brown, with two yellowish white dots on the apical margin of each elytron.

"Abdomen uniformly reddish brown, a prominent carina extending along the middle of each tergum; genitalia reddish brown, pygofers ending in rather a sharp point; plates short, extending only one-third the length of the pygofers, a little lighter in colour; style white. Length, 2 mm.

"Brachypterous ♂. Form and markings the same as that of the female, considerably smaller in size. Genitalia, aperture of the pygofers quite long and narrow, superior wall of the anal tube produced in long outcurving horns, these rest on projecting points of the ventral margins of the pygofers; styles small; anal style light yellow, rest of the genitalia dark reddish brown. Length 1.5 mm.

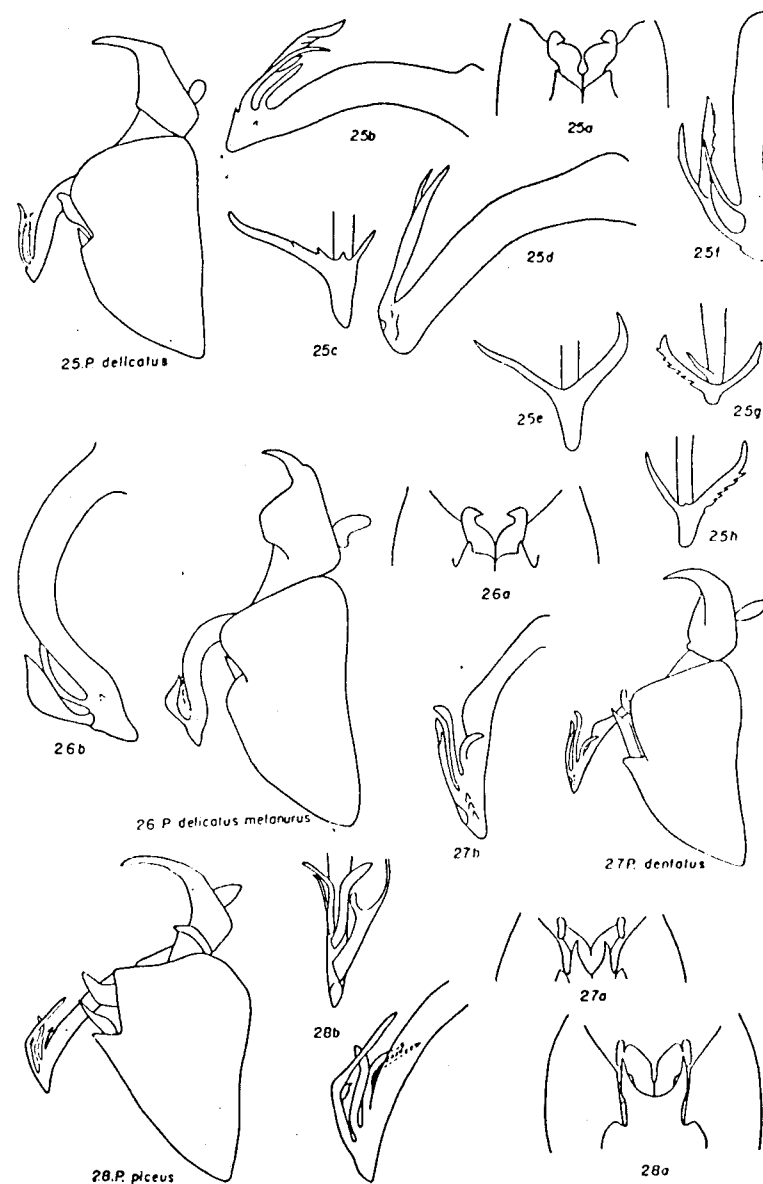
"This species resembles *P. marginatus* quite closely. It is a much smaller species, there are distinct differences in the proportions of the front and antennae, the spur is smaller proportionally. There are also differences in the genitalia and some noticeable colour differences. *P. binotatus* lacks the white on the prothorax, the front is much darker, and has two white spots on the apical margin of the elytra instead of a full white band as in *marginatus*.

"Types of the male and female taken at De Witt, Mitchell Co., Ga., April 6, 1912, by the author. Types in the author's collection."

The body color of this species varies greatly with the season in which they are collected. The summer forms are usually honey-colored and those taken during winter or early spring are almost black. The yellowish dots on the apical margin of the elytra vary from very small to large, which may fuse together and form a white, unbroken band along the apical margin in some specimens.

PLATE VII

- 25 *P. (Pissonotus) delicatus* Van Duzee, lateral view of ♂ genital capsule; 25a, ventral view of styles and processes in position; 25b, lateral view of aedeagus of ♂ from California; 25c, dorso-ventral view of tip of aedeagus from California; 25d, lateral view of aedeagus from Douglas, Co., Kans.; 25e, dorso-ventral view of tip of aedeagus from Douglas, Co., Kans.; 25f, lateral view of aedeagus from Medora, Kans.; 25g, dorso-ventral view of tip of aedeagus from Medora, Kans.; 25h, dorso-ventral view of tip of aedeagus from Florida.
- 26 *P. (Pissonotus) delicatus melanurus* Van D., lateral view of ♂ genital capsule; 26a, ventral view of styles and processes in position; 26b, lateral view of aedeagus.
- 27 *P. (Pissonotus) dentatus* n. sp., lateral view of ♂ genital capsule; 27a, ventral view of styles and processes in position; 27b, lateral view of aedeagus.
- 28 *P. (Pissonotus) piceus* (Van Duzee), lateral view of ♂ genital capsule; 28a, ventral view of styles and processes in position; 28b, dorso-ventral view of tip of aedeagus above and lateral view of aedeagus below.



Genitalia: In lateral view pygofer of male more or less triangular with a long sloping notch near the middle of the caudal margin; median process forming a long sharp-pointed projection visible in this notch; style barely visible at its apex; anal segment with a pair of rather short, sharp, processes; aedeagus widest at base, dorsal margin more or less sinuate with usually five, slender, retrorse processes on apical half, first quite short, second and third about half as long as shaft and other two shorter. In ventral view styles short, more or less parallel-sided, diverging on outer half, apices rather blunt, slightly over-hanging; median broad with sharp apices, almost as long as styles.

Types in collection of Doctor Spooner.

Macropterous form:

Like brachypterous form, but with flight wings, elytra extending beyond end of abdomen by about one-third their length, whitish, hyaline, veins darker. Apex of scutellum usually light colored and whole pronotum often mottled in color.

Holomorphotype ♂, allomorphotype ♀, 1 ♂ and 3 ♀ paramorphotypes, Billys Id., Okefenokee Swamp, Ga., July 27, 1939, R. H. Beamer; other paramorphotypes: 6 ♀♀, Okefenokee Swamp, Ga., July 27, 1939, D. E. Hardy; 1 ♀, same time and place, A. T. Hardy; 3 ♀♀, La Belle, Fla., July 16, 1939, P. B. Lawson; 1 ♂, Suwanee Springs, Fla., August 2, 1939, A. T. Hardy; 1 ♂, Cocanut Grove, Fla., August 9, 1930, P. W. Oman; 1 ♀, Woolwine, Va., Sept. 1, 1946, R. H. Beamer; 1 ♀, Raleigh, N.C., August 30, 1946, R. H. Beamer.

Morphotypes in Snow Entomological Collections.

25. *Pissonotus (Pissonotus) delicatus* Van Duzee

Pissonotus delicatus Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, pp. 227, 237, 1897.
Pissonotus pallipes Gillette and Baker, Hemip. Colorado, p. 69, 1895, (listed) (Nom. nud.).
Pissonotus pallipes Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, pp. 227, 238, 1897.
Pissonotus giffardi Van Duzee, Proc. Calif. Acad. Sci., (4) 14, p. 407, 1925. (New synonymy).
Pissonotus pallipes Oman, Iowa State Jour. Sci., 21, No. 2, Jan. 1947, pp. 217, 220.

Brachypterous form:

"Form of *P. marginatus*, but smaller with the front a little narrower. Color pale honey-yellow; face marked with the usual piecous band which covers the base of the clypeus and crosses the anterior coxae. Apical margin of elytra white; apex of the front whitish; knees, tips of the tarsi, a streak on the outer surface of the anterior and intermediate tibiae, and the extreme point of the oviduct dark brown. Length 2½ mm.

"California. Described from a single female specimen received from Mr. D. W. Coquillett and captured near Los Angeles."

Structure: First segment of antennae about half as long as second; clypeus not quite twice as long as greatest width, widest near basal third, tapering toward both ends, strongly tricarinate; crown longer than wide, strongly carinate; elytra almost as wide as long, apices almost truncate with corners rounded, veins slightly raised, not definitely reaching hind margin.

Color: General color honey-yellow, darker stripe across front coxae and clypellus and another across clypeus and pleura; first segment of antennae usually dark brown, second segment stramineous; sides of pronotum often darker; legs usually longitudinally lineate with darker; elytra with a broad white stripe on apices.

Genitalia: In lateral view pygofer quite rounded on caudal margin with a broad V-shaped notch in which the sharp pointed tip of the median process and the rounded apex of the style is visible; aedeagus with shaft widest at base, slightly sinuate, narrowed somewhat to just before apex where it is widened, dorsal margin of apex with 2-3 retrorse processes, apical one very short and often absent, second the longest, about half as long as shaft, divided near middle, left-hand portion much longer and heavier, often with one margin more or less serrated (there is apparently a great deal of variation in the number and form of these processes, specimens from the same locality may have opposite symmetry); anal segment with a pair of rather narrow sharp-pointed processes. In ventral view styles widest near middle, narrowed to more or less aviccephaliform apices, also narrowed basally; median processes broad at base, narrowed on inner margin to sharp apices.

Holotype ♀ designated by Oman, in collection at Iowa State College, Ames, Iowa; allotype ♂, Huntington Beach, Calif., July 30, 1932, R. H. Beamer; paratypes: 1 ♂, Bonsall, Calif., August 6, 1935, R. H. Beamer; 1 ♂, Carlsbad, Calif., August 6, 1935, R. H. Beamer. Allotype and paratypes in Snow Entomological Collections.

This species seems to be one of the most common in this genus. The 800 specimens studied represent many localities in California, Arizona, Colorado, Texas, Kansas, Florida, and New York. The specimens from Arizona were on *Grindelia* sp. and those from Kansas on *Prionopsis ciliata* Nutt.

A comparison of the paratypes of *Pissonotus giffardi* Van Duzee with the type of *Pissonotus delicatus* Van Duzee revealed the fact that they represent but a single species. Therefore, *Pissonotus giffardi* (1925) becomes a synonym of *Pissonotus delicatus* (1897).

26. *Pissonotus (Pissonotus) delicatus melanurus* Van Duzee

Pissonotus delicatus melanurus Van Duzee, Proc. Calif. Acad. Sci., 7, p. 311, 1917.

"Like the typical form in every respect except that the fulvous portions are deepened to piecous in the female or black in the male. The genital characters are obscure but do not seem to differ in any respect from those of the species. This is a pretty form of a piecous or deep black color with the head, pronotum and broad apical margin of the elytra white; the base of the tergum beneath the white margin of the elytra is pale or fulvous. Mr. Giffard took a long series in San Joaquin Co., near Tracy, the last of May, 1917, on *Grindelia camporum*. About one-fourth of those taken were males. Some of the females are as deeply colored as are the males, but some are nearly as pale as some examples of *delicatus* from Florida now in my collection. The darker males have the femora mostly black and a black

line on the base of the tibiae above, the basal segment of the antennae is black and the front is infuscated below.

"Holotype (No. 378), male, from San Joaquin Co., in collection of the California Academy of Sciences.

"Allotype, female, from San Joaquin Co., in collection of M. Giffard."

Brachypterous form:

Structure: First segment of antennae definitely more than half as long as second; clypeus about twice as long as wide, sides almost parallel on apical two-thirds, slightly narrowed toward base, almost not at all toward apex, strongly tricarinate; crown longer than width at base, slightly wider at apex, carinae indistinct over anterior half; elytra about as wide as long, veins indistinct, not reaching hind margin.

Color: General color light brown; band across front coxae and clypellus, first segment of antennae and most of lateral portion of pronotum, almost black; broad band on apices of elytra white.

Genitalia: In lateral view pygofer of male more or less triangular with rather deep V-shaped notch in caudal margin; sharp pointed median process barely visible; styles usually hidden; aedeagus widest at base, strongly arcuate ventrally, slightly bent dorsally at apex, dorsal margin of apex with two retrorse processes, about one-third length of shaft, apical one greatly flattened and widened on outer two-thirds; anal segment with a pair of short, sharp processes. In ventral view styles widest on basal two-thirds, narrowed into more or less aviccephaliform apices; median processes broad at base, extended into sharp point on outer corners.

Material Studied: 51 specimens, with paratype labels, San Joaquin Co., Calif., May 30-31, 1917, W. M. Giffard; 74 specimens, Tracy, Calif., June, 1920, W. M. Giffard. Types in California Academy of Science Collections except one pair of paratypes from which the above description was made, in Snow Entomological Collections.

27. *Pissonotus (Pissonotus) dentatus* n. sp.

Brachypterous form:

Resembles *Pissonotus piceus* but smaller, crown extends perceptibly less in front of eyes and aedeagus with several sharp teeth placed laterally near apex. Length ♂ 2.25 mm.; ♀ 2.7 mm.

Structure: First segment of antennae about one-half as long as second; clypeus slightly more than twice as long as wide, widest near apical third, narrowed toward each end, slightly more so toward base, definitely tricarinate; crown about one-fourth longer than wide, widest at apex, carinae distinct; elytra about as broad as long, apices almost truncate with corners rounded, veins raised, not definitely reaching hind margin, with few setae on raised pedicels on veins; dorsum of abdomen with a few, very short, fine, thinly scattered, white hairs.

Color: General color brown; legs usually stramineous; elytra usually with a white spot on outer apical corner with sometimes a smaller one on inner apical corner and occasionally the two connected.

Genitalia: In lateral view pygofer of male with caudal margin of pygofer narrowed with a large V-shaped notch in which is visible a rather long,

sharp-pointed median process and the dorsally curving apex of style; aedeagus with quite long shaft with a raised hump near middle of dorsal margin; three long, slender, retrorse processes on apical third of dorsal margin and three short, sharp teeth on each side of shaft opposite ejaculatory duct; anal segment with a pair of curving, sharp-pointed processes. In ventral view styles widest near middle, curved outward and slightly narrowing to more or less pediform apices; median processes widest at base, narrowed to very sharp apices, about two-thirds as long as styles; lateral processes visible but very short.

Holotype ♂, allotype ♀, 43 ♂ and 15 ♀ paratypes, Inglis, Fla., March 9, 1947, R. H. Beamer; other paratypes: 18 ♂♂ and 6 ♀♀, same place and time, L. D. Beamer; 7 ♂♂, Otter Creek, Fla., March 9, 1947, R. H. Beamer; 3 ♀♀, La Belle, Fla., March 13, 1947, R. H. Beamer; 1 ♂, Melbourne, Fla., March 17, 1947, R. H. Beamer; 1 ♂, Lamont, Fla., March 7, 1947, R. H. Beamer; 1 ♂, Royal Palm State Park, Fla., March 16, 1947, R. H. Beamer.

Types in Snow Entomological Collections.

Macropterous form:

Like the brachypterous form but general color much darker with apex of scutellum white and with flight wings which extend beyond the abdomen by about one-third their length.

Holomorphotype ♂, allomorphotype ♀, 1 ♂ and 2 ♀ paramorphotypes, Inglis, Fla., March 9, 1947, R. H. Beamer; other paramorphotypes: 1 ♂, Sanford, Fla., March 11, 1947, R. H. Beamer; 1 ♂, same place and time, L. D. Beamer; 1 ♂ and 1 ♀, Otter Creek, Fla., March 9, 1947, R. H. Beamer; 2 ♀♀ and 1 ♂, same place and time, L. D. Beamer; 1 ♂, Zolfo Springs, Fla., March 12, 1947, L. D. Beamer.

Morphotypes in Snow Entomological Collections.

28. *Pissonotus (Pissonotus) piceus* (Van Duzee)

Megamelus piceus Van Duzee, Bull. Mich. Agr. Exp. Sta., 102, p. 8, pl. 1, figs. 5, 5a, 1894.
Pissonotus fulvus Metcalf, Jour. Elisha Mitchell Soc., 38, pp. 206, pl. 61, fig. 448; pl. 69, fig. 678, 1923. (New synonymy).

"Piceous" black; base of the vertex, keels and narrow hind edge of the pronotum, disc of the mesonotum, or at least its carinae, disc of the tergum, especially toward its base and apex, and the edge of the dorsal keel; the genital segments and sometimes the base of the center, brownish yellow. Face pale, shaded to brown above, clypeus deep black. Antennae, rostrum, tylus, and legs pale, soiled yellow, the latter lineate with brown. Elytra reaching to the second abdominal segment in the brachypterous form, with the apex truncated, piceous-brown, or even black, with the apical edge white more or less broadly interrupted with black at the middle; nervus strong, granulated. In the macropterous form the elytra extend considerably beyond the tip of the abdomen about as in *Liburnia pellucida*; they are smoky with pale granulated nervures, the exterior and interior of which are forked at about three-fourths their length. Pygofers of the male cylindrical, on their ventral aspect cut out for about one-half their length and carrying on the broad base of this incisure a broad and short projection

extended into a short conical divergent tooth at each angle, beyond this are the incurved spine-like stylets included between the long slender ventral projections of the plates. Length 2.5-3 mm.

"New York and Michigan. Described from many examples of both sexes taken in western New York on grass in low swampy meadows in August and September, and one female taken on celery at Kalamazoo, Mich., August 26, 1893, by Mr. G. C. Davis.

"In this species the vertex is shorter and broader, the pronotum shorter and the mesonotum longer with more divergent carinae than in *M. notulus*. The yellowish markings above vary much in extent, some specimens being almost entirely of a dull piceous black while some are pitchy brown with the pale markings much extended. The characters of the head, the pale face and the black vertex and clypeus seem quite constant as does also the color of the tylus, rostrum, legs and elytra."

Genitalia: In lateral view pygofer of male more or less triangular with a large V-shaped notch in caudal margin in which is visible the long, sharp-pointed median process and the narrowing, dorsally bent outer portion of the style; aedeagus with shaft almost parallel-sided, slightly curving ventrally and with usually four, retrorse processes on the dorsal margin of the apical third, apical processes longest, about half as long as shaft and divided; anal segment with a pair of fairly long, curving processes. In ventral view styles widest near outer third, narrowed to more or less rounded slightly overhanging apices; median processes widest at bases with inner margin narrowing to long sharp apices which end just short of apices of styles; lateral processes mere rounded bumps.

Lectotype ♂, Clarence, N.Y., Sept. 4, 1892, E. P. Van Dyke, designated by Oman, (Iowa State College Jour. Sci., Vol. 21, No. 2, Jan., 1947, p. 220) in collection of Iowa State College, cotypes in Cornell Collection, Ithaca, N.Y.

Material Studied: Over 700 specimens were at hand from many localities from Tucson, Arizona, eastward over the United States.

Dissected specimens of *Pissonotus fulvus* Metcalf were compared with a dissected cotype male of *Pissonotus piceus* (Van Duzee) November, 1945, and found to be identical. The former is therefore a synonym of the latter.

Host Plants: Ross and Mohr collected this species from *Jussiaea diffusa* in Illinois. The authors have collected it from *Rumex crispus* and *Polygonum* sp. in Kansas and Arizona.

29. *Pissonotus (Pissonotus) dorsalis* Van Duzee

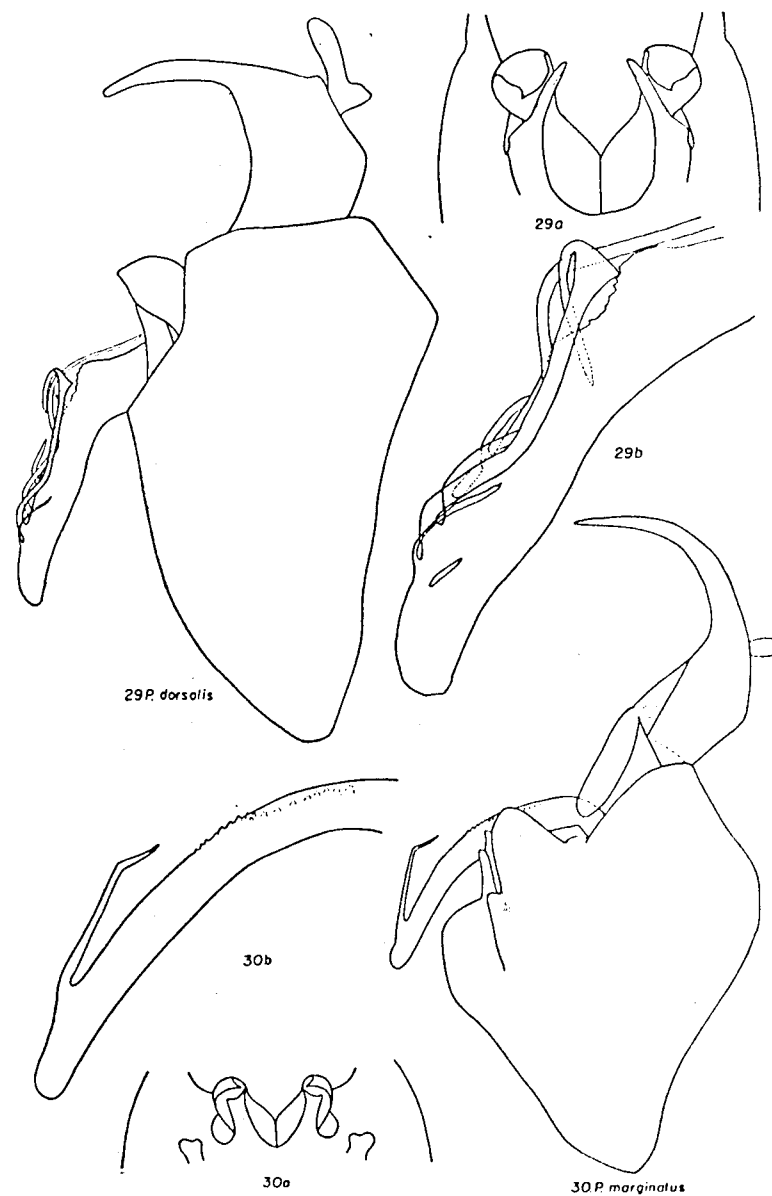
Pissonotus dorsalis Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, p. 190, 1894, (Listed). (Nom. nud.).

Pissonotus dorsalis Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, p. 239, 1897.

"Closely allied to the preceding. Dull yellowish brown, paler beneath; broad lateral margin of the tergum, some marks on the connexivum and the base and apex of the pygofers in the female, piceous or blackish. Clypeus

PLATE VIII

29 P. (*Pissonotus*) *dorsalis* Van Duzee, lateral view of ♂ genital capsule; 29a, ventral view of styles and processes in position; 29b, lateral view of aedeagus.
30 P. (*Pissonotus*) *marginatus* Van Duzee, lateral view of ♂ genital capsule; 30a, ventral view of styles and processes in position; 30b, lateral view of aedeagus.



deep black with some obscure spots opposite the pleural pieces indicating a transverse band; claws of the anterior and intermediate feet blackish, front paling toward the base of the clypeus, immaculate above. Disc of the tergum quite obviously tinged with yellow. In the male the front, vertex and elytra have a reddish cast with the apical margins of the latter whitish, the nervures concolorous. Aperture of the pygofer in the male broadest below the middle, the styles short and curved, their slender acute points approximated above, their base surrounded by the long curved ventral prolongation of the outer superior angles of the pygofer. Length about 3 mm.

"New York. Described from one pair captured in July, at Lancaster and Golden. This species may be distinguished from the preceding by the paler yellowish dorsum, and the brown, almost immaculate, front."

Genitalia: In lateral view pygofer of male broadly rounded on caudal margin with a shallow excavation at the middle in which the almost parallel-sided median process and the more or less rounded apex of the style is visible; aedeagus widest at base, bent ventrally before middle, with about five sinuous processes on dorsal margin on outer half; anal segment with a pair of long almost parallel-sided processes. In ventral view styles about as wide on outer third as at base, narrowed near middle with apices broadly rounded and overhanging; median processes widest at base, sharply narrowed near middle on outer margin to less than half basal width, gently converging to sharp apices.

Lectotype ♂, Lancaster, N.Y., July 12, 1889, E. P. Van Duzee, designated by Oman (Iowa State College Jour. Sci., Vol. 21, No. 2, 1947, p. 218).

Types in collection of Iowa State College.

Studied from about 100 specimens mostly from various localities in New York State. A few specimens are at hand from Wisconsin, Connecticut and Manitoba, Canada.

Macropterous form:

Like the brachypterous form, but with fully developed flight wings. These usually extend about one-third their length beyond the abdomen. The thorax is often much darker in this form, sometimes nearly black and the tip of the scutellum almost white.

Holomorphotype ♂, Otter Lake, N.Y., July 25, 1946, R. H. Beamer; allomorphotype ♀, 1 ♂ and 1 ♀ paramorphotype, Holland, N.Y., July 22, 1946, R. H. Beamer; 1 ♂ paramorphotype, Heart Lake, N.Y., July 30, 1946, R. H. Beamer.

Morphotypes in Snow Entomological Collections.

30. *Pissonotus (Pissonotus) marginatus* Van Duzee

Pissonotus marginatus Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, 190, 1894. (Listed). (Nom. nud.).

Pissonotus marginatus Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, pp. 236, 237, 238, 1897.
Pissonotus ater Van Duzee, Bull. Buff. Soc. Nat. Sci., 5, pp. 237, 227, 1897. (New synonymy).

Brachypterous form:

This species was named by Van Duzee from a single pair taken at Lancaster, N.Y., one in July and the other in September sometime before 1894. On or about June 20, 1923, these specimens were sent to W. M. Giffard in

Honolulu, Hawaii, by Carl Drake, then in charge of the insect collection at Iowa State College, Ames, Iowa. A paragraph in a letter from W. M. Giffard to E. P. Van Duzee, dated January 12, 1928, reads as follows: "I think I wrote you before that the genotype, *P. marginatus* had been badly man-handled and repaired by some one before it was sent me and I had so informed Drake at the time. One elytra entirely gone and the other badly frayed—most legs broken off and the abdomen had been glued back onto the thorax of the insect—the head and thorax, however, were in good shape for study and if the genitalia has not already been damaged the abdomen can be freed and placed in the card cell together with the genital organs. The specimen would then be of far more value than it is now." In 1946, when Oman designated the above male lectotype, there was only the male genitalia mounted in a cardboard cell, left of this specimen. It is therefore upon this male genitalia that the identification of this species is based.

Structure: Basal segment of antennae about one-half as long as second; front twice as long as greatest width, slightly narrowed toward each end, carinae distinct; vertex slightly longer than wide, broadly rounded in front, carinae barely visible; veins of elytra scarcely visible, but little raised above membrane, not attaining hind margin; abdomen set with white hairs, less than their length apart; genital segment of male one-half as wide as greatest width of abdomen; when viewed laterally, processes on anal segment of male produced beyond posterior margin of genital segment, their apices curved inward, resting on genital segment below.

Color: General body color dark reddish brown, legs and antennae soiled yellow; apex of clypeus lighter than basal portion; elytra very slightly hyaline, reddish brown, veins concolorous with membrane, hind margin of elytra of males with narrow white band, which is wanting in females.

Genitalia: In lateral view pygofer of male more or less rectangular with large tooth on caudal margin; aedeagus widest at base, tapering to rounded apex with one slender process on dorsal margin just before apex about one-third length of shaft and a row of short teeth arising on dorsal margin near middle and winding to left side toward base; anal segment produced into pair of long slender processes, longer than basal portion of segment. In ventral view width of styles uniform until just before acutely pointed, overhanging apices; median pair of processes extending almost to tip of styles, sides subparallel, apices more or less truncate with inner margin more or less sharply extended; lateral processes of pygofer truncate apically, slightly longer than wide.

Lectotype male in Collection of Iowa State College.

Material studied: 75 specimens from the following states: Florida, Virginia, Kansas, Ohio, Michigan, Illinois and Manitoba, Canada.

A comparison of numerous males and females with the holotype female of *Pissonotus ater* Van Duzee and the male lectotype of *Pissonotus marginatus* Van Duzee proves them to be identical. *Pissonotus ater* Van Duzee is therefore placed as a synonym of *Pissonotus marginatus* Van Duzee.