

THE GENUS *KELISIA* IN AMERICA NORTH OF MEXICO (Homoptera - Fulgoridae - Delphacinae)

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The genus *Kelisia* was described by Fieber in 1866 (Verh. Zool. Bot. Ges., Wein 16: 519) with the European species *Delphax guttula* Germar as haplotype. Z. P. Metcalf, in his *Catalogue of Fulgoroidea*, Fascicle IV, Part 3, Araeopidae, lists the following species as occurring in America north of Mexico: *axialis* Van Duzee, *crocea* Van Duzee, *parvula* Ball, and *salina* Ball. The types of all these species have been studied with the exception of *K. parvula* Ball, and drawings of this species and comments on it were made by Doctor J. S. Caldwell of the United States Bureau of Entomology and Plant Quarantine. *Kelisia axialis* Van Duzee is the only species of the four that belongs to this genus. *Probekisia*

A cotype male of *Kelisia crocea* Van Duzee, collected at Ames, Iowa, by Professor Herbert Osborn, was studied. It belongs to that group of species placed in *Liburnia* by Metcalf in his recent catalogue not only by the characters of the internal male genitalia, but also by the external characters of both sexes. It is therefore placed in that genus and the specimen mentioned above designated lectotype. *Probekisia*

An examination of four pairs of cotypes of *Kelisia salina* Ball revealed two species. Four specimens from Fort Collins, one from Wray, and one from Animas, Colorado, are *Megamelanus frontalis* Crawford. One female from Grand Junction and one male from Lamar, Colorado, are *Kelisia salina* Ball. The above two species are very closely related in external characteristics as well as in the internal male genitalia. *Kelisia salina* Ball is therefore placed in *Megamelanus*, and the female from Grand Junction, Colorado, is here designated lectotype.

Kelisia parvula Ball is a *Delphacodes*, near *Delphacodes wetmorei* Muir and Giffard. This leaves *Kelisia axialis* Van Duzee and seven new species to be considered in this paper.

I wish to thank Doctor L. D. Tuthill of the Department of Zoology and Entomology, Iowa State College, Ames, Iowa, and Doctors C. F. W. Muesebeck, and J. S. Caldwell of the United States Bureau of Entomology and Plant Quarantine for their very helpful cooperation in the study of type material. I am also indebted to Mrs. Alberta Mosier for help with the drawings.

Kelisia Fieber

Calcar foliaceous with coarse black teeth; front tibia normal; antennae terete, first segment about as wide as long; front much longer than wide, sides not parallel, narrowest at base, widest beyond middle, one median

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carina forked at apex; vertex longer than width at base, slightly protruding beyond eyes; pronotum with lateral carina straight, not reaching hind margin.

KEY TO SPECIES OF *KELISIA*

1. Elytra with a brown or black, longitudinal stripe of regular width from base to tip 2
Elytra usually without such a stripe 5
2. Dark mark of elytra continued across front *flagellata* n. sp. 3
Dark mark of elytra not continued across front 3
3. Black spot on front beneath each ocellus and one on lateral margin of pronotum above coxae *pectinata* n. sp. 4
Without black spot in either of these positions or only a very light one on margin of pronotum 4
4. Stripe on elytra very broad, occupying two thirds area *spinosa* n. sp. 7
Stripe on elytra narrow, occupying about one third area *curvata* n. sp. 7
5. Black spot beneath each ocellus and on lateral margin of pronotum above front coxae *bimaculata* n. sp. 6
Without black spots 6
6. Black markings of elytra confined to a triangular shaped spot in elytra or none at all 7
Black markings of elytra heavy at apex and base of elytra and usually narrowly following the second sector *axialis* Van D. 7
7. Dark stripe on either side of abdomen continued over pronotum *retrorsa* n. sp. 7
Dark stripe of abdomen, when present, usually not continued over pronotum *hyalina* n. sp. 7

1. *Kelisia axialis* Van Duzee

The original description of this species is a very good one. It is as follows: "Form of *K. guttula*; above piceous brown, beneath pale dull testaceous. A wide yellow vitta extends from near the apex of the vertex to the second dorsal segment of the abdomen. Elytra hyaline with anaxial brown vitta. Length 4 mm.

"Vertex tinged with testaceous on the anterior margin; entire face testaceous, obscurely marked with darker on the front next the lateral carinae; antennae yellow, paler toward their tips; eyes rufous; pronotum dark brown from the dorsal vitta to below the lateral margins; meta-, and mesonotum piceous brown with a broad median vitta extending onto the two basal segments of the tergum; lower surface and legs pale dull testaceous; mesonotum with a large brown spot; tarsal spines tipped with black; abdomen blackish brown, the sides of the venter varied with testaceous. Elytra hyaline, with a conspicuous, brown vitta from the base to the extreme apex following the line of the second sector; first sector and the two first apical nervures white, the others brown or mostly so; apical nervures four, the interior forked.

"This species may be distinguished from its European congeners by its glassy elytra marked with a conspicuous longitudinal vitta, by the uniformly

testaceous inferior surface, and the absence of the black spots on the cheeks. Described from two examples representing both sexes, taken at Lancaster, New York, in August, 1886."

Male genitalia, lateral view: Styles widest at base, slightly S-curved, tapering gently to outer third, then rapidly to sharp apices. Aedeagus very long and slender with a slight flange before apex ventrally and a pair of short teeth dorsally almost at tip, tip bent ventrally and back basally in a slightly enlarged semihyaline apex. A pair of hairlike processes with enlarged apices arise laterally near base of anal ring and extend slightly beyond tip of aedeagus. Anal tube long and slender without hooks or spines.

The two cotype specimens have been studied. The male is here designated lectoholotype and the female the lectoallotype.

2. *Kelisia flagellata* n. sp.

Brachypterous Form

Resembling *K. axialis* but much smaller with black band of elytra continuous through eyes and across front to tip of elytra and processes on aedeagus without enlargements at tips. Length of male 2.25-2.5 mm.; female 3 mm.

Structure: Elytra widest near apex of scutellum, narrowing to slightly out-curved apices, extending beyond end of abdomen. Wings tiny oval pads.

Color: General color stramineous with a black stripe on elytra from apices to bases between first sector and first claval vein, crossing pronotum and connecting eyes over apex of front, curving slightly toward costal margin near apices of elytra. A dark spot on sclerite above coxae of middle leg. Styles and aedeagus brown, anal ring black. Female ovipositor brown.

Genitalia: Styles about as in *K. axialis*, somewhat wider at base, and sharply narrowed nearer apices. Aedeagus in lateral view long and slender but without the flange on venter and dorsal apical teeth. Processes coiled whip-like, thickest at bases, not enlarged at apices, as long or longer than the aedeagus.

Holotype male, allotype female, and four pairs of paratypes, Douglas Co., Kansas, October 24, 1944, R. H. Beamer; other paratypes, same place and collector; two males and eight females, October 18, 1944; one female, October 19, 1944; four pairs, October 24, 1944; five males and thirteen females, October 26, 1944; twelve males and thirty-five females, November 2, 1944.

Types in Snow Entomological Collections.

3. *Kelisia spinosa* n. sp.

Resembling *K. flagellata* but dark band of pronotum not connected through the eyes and across the front, and anal ring of male with a ventral spine near its base. Length 3.4 mm.

Macropterous Form

Structure: Elytra extending about one third their length beyond abdomen, widest just beyond apex of clavi, apices evenly rounded.

Color: General color buff to brownish, stripe on vertex, pronotum, mesal and costal margins of elytra, white. Elytra brown except very narrow mesal border and area outside of first sector semihyaline to white, brown band extending to eyes but not through them and across front as in *K. flagellata*. Black spot on lateral margin of pronotum just above base of front coxae. Front and clypeus evenly buff colored, remainder of venter mottled with darker. Ovipositor of female and genital segment of male evenly dark brown.

Genitalia in lateral view: Male style slightly S-curved, almost parallel margined on basal three fourths, suddenly contracted on outer fourth to sharp point. Aedeagus long and slender with a lateral notch just before tip, apex coiled backward and slightly enlarged; pair of lateral processes arise near base of anal ring, whiplike, as long as aedeagus, widest at base. Anal ring with a short sharp spine either side near base, at right angles to it.

Holotype male, allotype female, and three male paratypes, Brule, Wis., Aug. 16, 1937, R. H. Beamer; other paratypes: one male, same place and date, C. L. Johnston; one male and one female, New Haven, Conn., Aug. 20, 1934, R. H. Beamer; one male and one female, Rib Mountain State Park, Wis., Aug. 27, 1937, R. H. Beamer; one male, Cedar River, Mich., Aug. 26, 1937, R. H. Beamer; two males, Florence, Wis., Aug. 19, 1937, C. L. Johnston; five males, same place and date, R. H. Beamer; two pairs, Morris, Wis., Aug. 27, 1937, R. H. Beamer; one male, Thompson, Mich., Aug. 25, 1937, R. H. Beamer; one female, Gogebic, Mich., Aug. 18, 1937, R. H. Beamer.

Brachypterous Form

Like the former except the elytra are shorter, widest near base, gradually narrowed to almost pointed apices and the wings are reduced to tiny pads not one fifth as long as elytra. Length 2.5-3 mm.

Holomorphotype male, allomorphotype female and 6 male and 2 female paramorphotypes, Brule, Wis., Aug. 16, 1937, R. H. Beamer; other paramorphotypes: one male, same place and date, C. L. Johnston; one male, Keld, Manitoba, Canada, Aug. 8, 1937, R. H. Beamer; one male, Cowan, Manitoba, Canada, Aug. 7, 1937, R. H. Beamer; one male and two females, New Haven, Conn., Aug. 20, 1934, R. H. Beamer; six males and one female, Florence, Wis., Aug. 19, 1937, C. L. Johnston; three males and one female, same place and date, R. H. Beamer; one pair, Rib Mountain State Park, Wis., Aug. 27, 1937, R. H. Beamer; one pair, Morris, Wis., Aug. 27, 1937, R. H. Beamer; one female, Swan River, Manitoba, Canada, Aug. 2, 1937, R. H. Beamer.

Types in Snow Entomological Collections.

4. *Kelisia retrorsa* n. sp.

Brachypterous Form

Resembling *K. spinosa* but elytra not darkened except a wedge-shaped

mark at apex, anal segment of male without spines, and processes on aedeagus about half as long as shaft. Length of male 3.25 mm.; female 4.75 mm.

Structure: Elytra longer than body, broadest near tip of scutellum, narrowed at apex, almost sharp pointed, mesal margin rounded toward costal on outer third. Hind wings tiny pads, smaller than one eye.

Color: Stramineous, darker on the sides of the pro- and mesonotum, extended caudally on sides of abdomen as a dark stripe showing through hyaline elytra. Elytra hyaline except wedge-shaped dark spot between two branches of second sector at apex. Ovipositor, outer third of genital segment of male, ventral half of anal ring, dark, and more or less fumose marks on venter.

Genitalia in lateral view: Styles broadest at base, more or less S-shaped, narrowed and sharply bent caudad near outer third, ending in sharply pointed, dorsally curving apices. Aedeagus broadest on basal half, sharply narrowed just before a broad retrorse ventral tooth, beyond, less than half as wide as basal portion, apex turned ventrally and cephalad. A pair of processes arise laterally near base of anal ring, about half as long as aedeagus, whiplike, and widest on basal two thirds.

Holotype male, allotype female, and one pair of paratypes, Cedar River, Mich., Aug. 26, 1937, R. H. Beamer; other paratypes: one male, Itasca Park, Minn., Aug. 11, 1937, H. T. Peters; one male, same place and date, C. L. Johnston; one male, Brule, Wis., Aug. 17, 1937, R. H. Beamer; one male, Bath, N.H., Aug. 21, 1934, P. W. Oman.

Macropterous Form

Like the above but elytra with apices rounded, widest beyond tip of clavus. Hind wings longer than abdomen. Color of tip of elytra tending to extend up the second sector and on clavi from mesonotum.

Holomorphotype male, Eveleth, Minn., Aug. 13, 1937, H. T. Peters; paramorphotype male, Itasca Park, Minn., Aug. 11, 1937, H. T. Peters.

Types in Snow Entomological Collections; paratypes in United States National Museum.

5. *Kelisia hyalina* n. sp.

Brachypterous Form

Resembling *K. retrorsa* but aedeagus in lateral view much narrower, middle retrorse process with additional parts and lateral processes much thicker and heavier to their apices. Length 3.25-4.00 mm.

Structure: Elytra broadest near tip of scutellum, narrowing to rather sharp apices, extending about a fourth their length beyond abdomen. Wings reduced to tiny pads less than half as large as an eye.

Color: General color very light brown with a lighter stripe from tip of ver-

tex to apex of abdomen, on abdomen bordered by an irregular-sided fuscous area on either side. Elytra semihyaline, usually with a dark triangular spot occupying the area between the branches of the second sector, sometimes absent.

Genitalia in lateral view: Styles widest on basal third, slightly S-shaped, rapidly narrowing on outer third to dorsally curving apices. Aedeagus very long and narrow with a peculiar triangular process near middle ventrally, also a pair of lateral processes arising near base of anal ring, about as wide as shaft of aedeagus at middle and carrying this width well toward their apices.

Holotype male, allotype female, sixty-one males and thirty-five females, Douglas Co., Kansas, October 26, 1944, R. H. Beamer; other paratypes: ten males and seven females, Douglas Co., Kansas, October 18, 1944, R. H. Beamer; one pair, Douglas Co., Kansas, Nov. 2, 1944, R. H. Beamer; two females, Lawrence, Kansas, Aug. 23, 1944, R. H. Beamer; one male, Sumner Co., Kansas, Nov. 19, 1925, E. P. Breakey.

Macropterous Form

Like the brachypterous form except elytra longer, widest near apex of abdomen and wings fully developed. Length 4.25-5.25 mm.

Holomorphotype male, allomorphotype female, and one male paramorphotype, Douglas Co., Kansas, October 26, 1944, R. H. Beamer.

Types in Snow Entomological Collections.

6. *Kelisia bimaculata* n. sp.

Brachypterous Form

Resembling *K. hyalina* but with black spot of elytra faded to a smoky line and with two lateral black spots, one on face beneath ocellus and one on side of mesonotum above front coxa. Length 4-4.5 mm.

Structure: Elytra widest near tip of scutellum, tapering to sharp apices about one fourth their length beyond the abdomen. Hind wings tiny pads smaller than an eye.

Color: General color buff with median line from tip of vertex to apex of abdomen lighter. Elytra semihyaline with a semblance of a smoky line from bases to apices, slightly heavier at tips and extending across pronotum to eyes. Lateral margin of front with a sizable black spot beneath ocellus and a black dash on lateral margin of pronotum above base of front coxae.

Genitalia in lateral view: Styles widest at base, rapidly narrowing on outer third to sharp apices, slightly S-shaped. Aedeagus long and slender with a pair of very short lateral teeth about one fourth distance from tip, a three or more pronged process on ventral side near middle and a pair of processes arising near base of anal ring about as long as ring and rather thick throughout.

Holotype male, allotype female and one male paratype, Bath, N.H., Aug. 21, 1934, R. H. Beamer; one male and 2 female paratypes, same place and time, P. W. Oman; one male, Trout Lake, Wis., Aug. 13, 1936, D. M. DeLong.

Types in Snow Entomological Collections; paratypes in United States National Museum and Illinois State Natural History Survey.

7. *Kelisia curvata* n. sp.

Brachypterous Form

Resembling *K. bimaculata* but lacking the black mark beneath the ocellus and on the margin of the pronotum, and with a very distinct black curving band on elytra. Length 3.25-3.75 mm.

Structure: Elytra widest near apex of scutellum, slightly narrowing toward tip, but not nearly so sharp pointed as others in the genus, extending about one fourth their length beyond abdomen. Hind wings reduced to tiny pads about half the size of an eye.

Color: General color stramineous with a light stripe from apex of vertex to tip of abdomen. Dorsum with a black stripe from hind margin of eye and of the same width, to tip of elytra, curving slightly toward costal margin on outer portion to conform to margin of wing. More or less darkening of lateral sclerites above coxae, the larger and more definite one just above the hind coxae.

Genitalia in lateral view: Styles widest near base, slightly S-curved, rapidly narrowing on outer third to sharp apex. Aedeagus long and slender, widest at base, curved ventrally near middle with a peculiar process (see Fig. 7) located ventrally at about basal third, apex slightly swollen and twisted. Basal processes flat, blade-like, more than twice as broad at base as at middle, less than half as long as shaft of aedeagus, curved laterally and dorsally on apical third, with short, sharp process between them at their base.

Holotype male, allotype female, six male and seven female paratypes, Douglas Co., Kansas, October 26, 1944, R. H. Beamer; other paratypes: thirty-seven males and thirty-three females, same place and collector, October 24, 1944; twelve males and three females, Douglas Co., Kansas, Nov. 2, 1944, R. H. Beamer; one pair, Douglas Co., Kansas, July 13, 1944, R. H. Beamer; four males and one female, Okefenokee Swamp, Ga., Billy's Island, July 27, 1939, R. H. Beamer; one male, Columbus, Ohio, Oct. 4, 1940, Parker; one male, Bowie, Md., Oct. 31, 1941, P. W. Oman; one male, Dorchester Co., near Lloyds, Md., July 10, 1907, H. S. Barber.

Macropterous Form

Like the above but with flight wings. Elytra almost parallel-sided to apex of clavi, apices rounded; hind wings longer than abdomen. Length 4-5 mm.

Holomorphotype male, allomorphotype female and one male and four female paramorphotypes, Douglas Co., Kansas, Oct. 24, 1944, R. H. Beamer;

two pairs, same place and collector, Nov. 2, 1944; three males, Washington, D.C., Oct. 5, 1941, P. W. Oman; one male, Dorchester Co., near Lloyds, Md., July 10, 1907, H. S. Barber.

Types in Snow Entomological Collections; paratypes in United States National Museum.

8. *Kelisia pectinata* n. sp.

Brachypterous Form

Resembling *K. curvata* but with a fairly large dark spot on face below each ocellus and another rectangular spot on lateral margin of pronotum just above front coxae. Length 4-4.5 mm.

Structure: Elytra widest near apex of scutellum, tapering to long, almost sharp apices. Hind wings tiny pads, smaller than an eye.

Color: General color stramineous with a light stripe from apex of vertex to tip of abdomen. Elytra hyaline with a median longitudinal brown stripe about as wide as eye running from tip to base and crossing pronotum to eye. Front with an angular black spot below each ocellus. Rectangular black spot on lateral margin of pronotum above front coxae, and two more lighter brown spots in a line caudad of this. Margin of abdomen with a row of more or less definite light brown spots on either side.

Genitalia in lateral view: Styles widest at base, slightly S-shaped, rapidly narrowed on a little more than outer third to sharp apices. Aedeagus very long and narrow, widest at base, narrowed near middle, usually with a pectinate ventral process with five teeth just before this contraction, shaft widened on outer third, in dorso-ventral view apex broadened with a short sharp diverging process on either side of a swollen middle portion from which the ejaculatory duct protrudes; pair of processes at base of anal ring widest near their middle, wider than aedeagus, narrowed and curved ventrally on outer third, set with short sharp teeth in this region.

Holotype male, allotype female and one male and three female paratypes, Douglas Co., Kansas, Oct. 26, 1944, R. H. Beamer; other paratypes: two males and four females, Douglas Co., Kansas, Oct. 19, 1944; five males and one female, Douglas Co., Kansas, Nov. 2, 1944; one male, Douglas Co., Kansas, Oct. 18, 1944; one pair, Lawrence, Kansas, Aug. 23, 1944; two females, Lawrence, Kansas, Sept. 1, 1944, all collected by R. H. Beamer; five males and five females, Meade Co., Kansas, Sept. 13, 1944, R. H. Beamer; one female, Sand Dunes, Medora, Kansas, June 21, Don Wilbur.

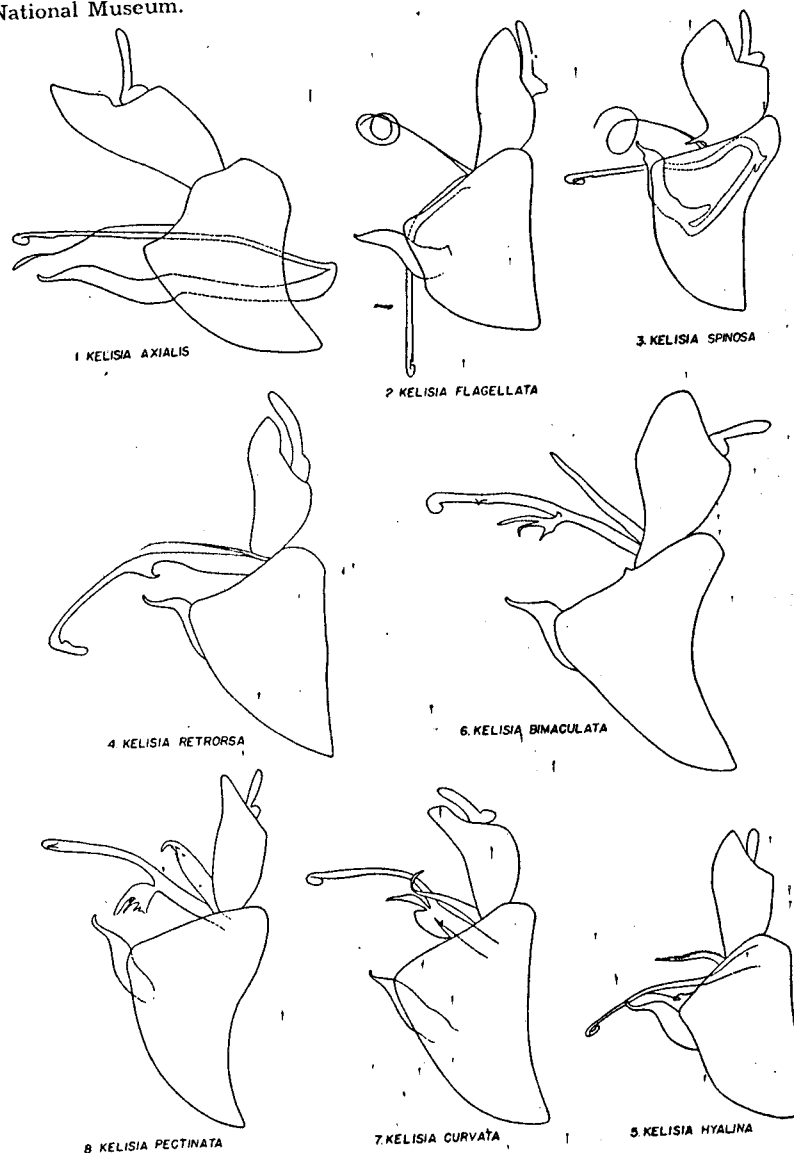
Macropterous Form

Just like the above except elytra widest near apices of clavi, tips more broadly rounded, extending one third their length beyond abdomen and the hind wings fully developed. Length 4.5-4.75 mm.

Holomorphotype male and three paramorphotype males, Douglas Co.,

Kansas, Oct. 19, 1944, R. H. Beamer; allomorphotype female, same place and collector, Oct. 18, 1944.

Types in Snow Entomological Collections; paratypes in United States National Museum.



SIPHONAPTERA: A NEW SPECIES OF CONORRHINO- PSYLLA FROM KANSAS¹

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Several collections of fleas from the nests of wood rats, *Neotoma floridana*, taken near Lawrence, Kansas, by R. H. Beamer and his associates in biology at the University of Kansas, represent an undescribed species of *Conorhinopsylla*.

Conorhinopsylla is a very distinct genus of fleas and so far is known only from North America. It is known only by the genotype *C. stanfordi* Stewart, of which both sexes have been described and figured by Stewart (1), Jordan (2), and Ėwing and Fox (3).

Conorhinopsylla nidicola, n. sp.

This species is closely related to *C. stanfordi* but is readily distinguished by the modified abdominal segments of the male which are figured. In *C. stanfordi* the finger (F) and process (P) of the claspers are projected posteriorly on a much elongated lobe. This is not prominent in *C. nidicola*. In *C. stanfordi* the finger of the clasper is almost covered by the broad oval process as figured by Jordan (1937). In *C. nidicola* the process covers only a small basal portion of the finger. In *C. stanfordi* the posterior arm of sternite IX is long and tapering and exceeds sternite VIII. It ends in a posteriorly directed point. In *C. nidicola* the posterior arm of sternite IX is short and broad and does not equal sternite VIII. It terminates with the apex turned dorsally in a short hook. The posterior arms of sternite VIII are shorter in *C. nidicola* than in *C. stanfordi* but, like *C. stanfordi*, are ornamented with two rows of pale spinelets and a row of fine setae.

There are no conspicuous differences in the modified segments or receptaculi of the females of the two species.

The general characters as the shape of the head, number of pronotal spines, number and arrangement of apical spinelets on abdominal tergites, and the conspicuous long bristles on segments I and II of the hind tarsus appear much the same in both species. The eye is distinctly less pigmented in *C. nidicola* and the labial palpi have 8 or more segments in contrast to 5 or 6 in *C. stanfordi*.

The following specimens collected about 6 miles north of Lawrence, Kansas, from the nests of wood rats, *Neotoma floridana*, constitute the type series. Holotype male and allotype female, 64 paratype males and 92 paratype females collected November 11, 1944. Thirty-five paratype males and 41 paratype females collected March 1945. Types are deposited in the collection of the Rocky Mountain Laboratory. Paratypes are deposited in the

¹From the Rocky Mountain Laboratory (Hamilton, Mont.), National Institute of Health.