THE

ENTOMOLOGICAL SOCIETY

OF WASHINGTON

ORGANIZED MARCH 12, 1884

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Entomological Society of Washington
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PROCEEDINGS.—Published quarterly beginning with March by the Society at Washington, D.C. Members in good standing are entitled to the *Proceedings* free of charge. Nonmember subscriptions are $10.00 per year, both domestic and foreign (U.S. currency), payable in advance. All remittances should be made payable to *The Entomological Society of Washington*.

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STATEMENT OF OWNERSHIP

Title of Publication: Proceedings of the Entomological Society of Washington.
Frequency of Issue: Quarterly (March, June, September, December).
Location of Office of Publication, Business Office of Publisher and Owner: The Entomological Society of Washington, c/o Department of Entomology, Smithsonian Institution, Washington, D.C. 20560.
Editor: Dr. Lloyd Knutson, same address as above.
Managing Editor and Known Bondholders or other Security Holders: none.

This issue was mailed February 12, 1974

Second Class Postage Paid at Washington, D.C. and additional mailing office.

ALLEN PRESS, INC. LAWRENCE, KANSAS 66044

PROCEEDINGS OF THE

ENTOMOLOGICAL SOCIETY OF WASHINGTON

Vol. 75 DECEMBER 1973 No. 4

REVISION OF THE AMERICAN PLANTHOPPERS OF THE GENUS STOBAERA (HOMOPTERA: DELPHACIDAE) WITH NEW DISTRIBUTIONAL DATA AND HOST PLANT RECORDS

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ABSTRACT—This paper presents the first inclusive key to the 11 known species of *Stobaera* Stål. Two new species are described, *S. caldwelli* from the Southwest and *S. muiri* from coastal California. *Stobaera minuta* Osborn is synonymized with *S. concinna* (Stål), and *S. nigripennis* Crawford is synonymized with *S. tricarinata* (Say). *Stobaera testacea* (Fowler) is transferred to *Neoperkinsiella* Muir. All critical diagnostic structural features are illustrated. Many new distributional and host plant records are included. The economic significance of the included species rests on the fact that most feed on *Ambrosia* spp., ragweeds.

Species of the genus *Stobaera* Stål are common in North America, and almost any general collection of delphacids contains a scattering of specimens. Until now, their biological role was obscure at best. We now know, largely through the careful fieldwork of R. D. Goeden and D. W. Ricker at the University of California, Riverside, that *Stobaera* spp. are feeders on *Ambrosia* spp., ragweeds. What role these planthoppers may play in biological control is not yet known, but some may well transmit plant viruses useful in controlling ragweeds. Some of the *Ambrosia* spp. recorded here are usually found in *Franseria* in standard botanical references, but I am following the names provided by Drs. Goeden and Ricker. The purpose of this study, then, is to provide a tool for the separation of species and to expand the distributional knowledge and host/food plant relationships of the species.

A survey of the existing taxonomic literature reveals no work treating all the described species of *Stobaera*. Thomas Say described the first species in 1825 and Edward P. Van Duzee, the last in 1917. Eight different taxonomists contributed species descriptions to the genus through the years, but there is no evidence in the literature that any of them ever studied types of earlier or contemporary workers.

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Crawford (1914a: 571–576) attempted the only revision of *Stobaera* and keyed 4 species of which one, *quadripustulata* Van Duzee, was later correctly transferred to *Pissonotus* Van Duzee (see Morgan and Beamer 1949, Journ. Kansas Ent. Soc. 22(3): 121–122). Except for *pallida* Osborn, the most easily recognized species in the genus, Crawford lumped all the names under *tricarinata* (Say). This action cleared a jumble of names from the existing literature, but Crawford unfortunately lumped together taxa that have since proved to be distinct species. He recognized the variation in size and color pattern in his version of *tricarinata* (Say) but then proceeded to describe a new species, *nigripennis* Crawford, on the basis of color and wing length. Van Duzee (1914b: 164) mildly objected to Crawford's list of syns. under *tricarinata* (Say) but presented no real evidence to refute this treatment. Two other keys to species exist: Van Duzee (1923b: 51) and Metcalf (1923a: 166). Van Duzee's key separates only *tricarinata* (Say) and *pallida* Osborn; this is no real task. Metcalf's key is probably the best of the lot but in it *concinna* (Stål) is erroneously identified, color of the frons is too heavily weighted, and references to figures do not always agree with the verbal statement. His figures of the male genitalia (fig. 622, *pallida* Osborn; 624, *tricarinata* (Say); and 625, *minuta* Osborn) are not detailed enough and appear to have been made from dry specimens. Even so, they are more useful than his fig. 623, *concinna* (Stål), which is obviously the female genitalia and not the male genitalia as labeled. Metcalf's key covered only the species of eastern North America.

Stobaera Stål

Stobaera Stål 1859a: 327. Type-species, *Delphax concinna* Stål.
Goniolcium Fowler 1905a: 132. Type-species, *Goniolcium granulosum* Fowler.

The genus can be recognized, at least in the North American fauna, by the following combination of characters. In dorsal view, vertex but slightly produced in front of eyes with frontal carina distinct, lateral carinae of pronotum bowed and usually fading before reaching hind margin, veins of forewings studded with dark pustules or granules often bearing setae. In facial view, frons strongly tricarinate for entire length, central carina not forked before reaching vertex, scape and pedicel large, scape flattened, subtriangular, its distal edge oblique, pedicel terete and papillate, eyes deeply indented ventrally. Ground color of head, thorax, and legs varies from straminecous to light brown, marked, mottled, shaded, or washed with contrasting hues of tan to fuscus or black; legs usually ringed with fuscus, face usually appearing bicolored or tricolored with shades of tan to black, forewing hyaline and typically with dark, more or less crescent shaped marking from costal margin on distal crossveins to apex of clavus and curving around distal margin of apical cells. Male genitalia with variably setose style having more or less porrect basal ventral process, diaphragm poorly developed, aedeagus extruded through a ringlike structure suspended from anal

segment, aedeagus at least partly asymmetrical with much intraspecific variation in dentation. Distribution: Southern Canada, United States, Mexico, Central America, and West Indies. Host/food plants usually *Ambrosia* spp., ragweeds.

Key to species of *Stobaera*

1. Lateral carinae of frons distinctly bowed; frons tan, marked with creamy flecks. Atlantic Coast, Fla., Mexico ..... *pallida* Osborn
— Lateral carinae of frons straight or nearly so; frons not marked as above ... 2
2. Pro- and mesonotum strongly bicolored, central area yellow to orange and lateral areas fuscus to black. Southwestern U. S. ... *caldwelli* Kramer, n. sp.
— Pro- and mesonotum not strongly bicolored, general color yellowish brown to fuscus with variable shading 3
3. Style with lateral margin near apex smoothly rounded (fig. 21). So. Calif. ..... *bilobata* Van Duzee
— Style with lateral margin near apex angular or angularly produced 4
4. Style with keel near base (fig. 33) 5
— Style without keel near base 6
5. Antennae, eyes, and interocular portion of frons predominately fuscus to black. Found on silver beachweed, *Ambrosia chamissonis*, in California ..... *muiri* Kramer, n. sp.
— Antennae, eyes, and interocular portion of frons predominately tan to medium brown. Found on *Ambrosia confertiflora* and widespread ..... *concinna* (Stål)
6. Style with outer apical angulation much shorter than inner apical angulation (fig. 48, 51) 7
— Style with outer apical angulation equal to or longer than inner apical angulation (fig. 64, 73), Mexico, Cent. Am. 9
7. Style broadest across middle with inner basal projection minute (fig. 43). Calif., Oregon ..... *giffardi* Van Duzee
— Style broadest across apex with inner basal projection long 8
8. Inner basal projection of style slender, acute apically, and appearing to arise near base (fig. 52), aedeagus broad, stout, and acute or subacute at apex (fig. 50). Widespread. ..... *tricarinata* (Say)
— Inner basal projection of style not so slender, blunt or subacute apically, and appearing to arise above base (fig. 48); aedeagus elongate and broadly capitate at apex (fig. 45). Florida. ..... *affinis* Van Duzee
9. Process of anal segment in posterior view broad at tip, bearing 1 or more acute projections on each side of central prolongation (fig. 67, 69) ..... *granulosa* (Fowler)
— Process of anal segment in posterior view narrow at tip, lacking acute projections or with only exceedingly minute ones on each side of acute central prolongation 10
10. Process of anal segment in posterior view slender and without distinct preapical constriction (fig. 74–76), in lateral view not sharply bent ventrally (fig. 74–76) ..... *azteca* Muir
— Process of anal segment in posterior view broad with distinct preapical constriction (fig. 79, 80), in lateral view sharply bent ventrally (fig. 79, 80) ..... *koebelt* Muir

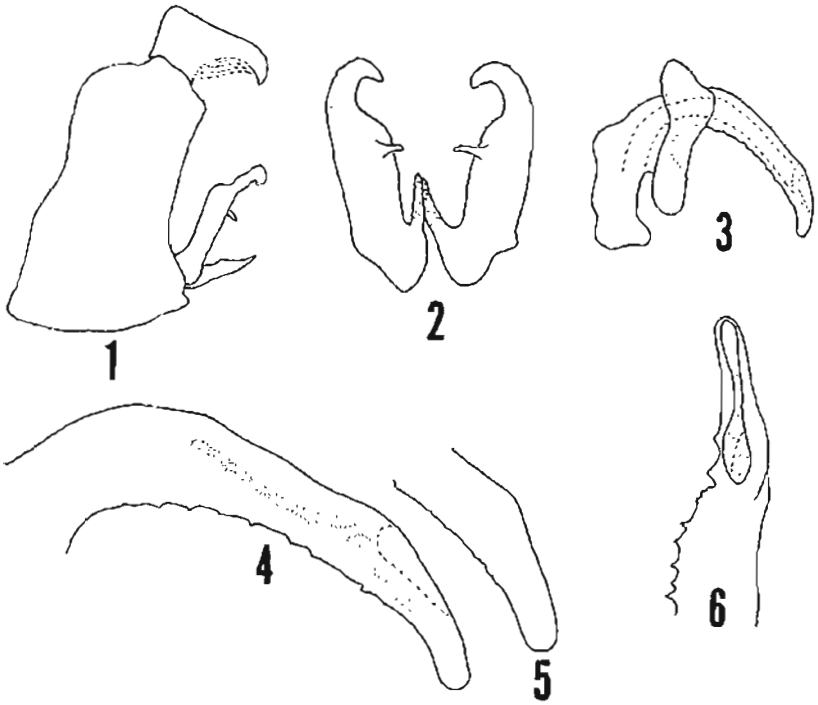


Fig. 1–6, *Stobaera pallida*. 1, male genital capsule in lateral view; 2, styles in posterior view; 3, aedeagus in lateral view; 4, distal portion of aedeagal shaft in lateral view (Piney Point, Md.); 5, aedeagal apex in lateral view (La Belle, Fla.); 6, aedeagal apex in dorsal view.

Stobaera pallida Osborn
fig. 1–6

Stobaera pallida Osborn 1905b: 375.

Salient features: Males, 3.2–4.0 mm; females, 3.5–4.8 mm. The frons with its bowed lateral carinae and tan ground color marked with creamy flecks makes *pallida* the most easily recognized species in the genus. The flecks may be transverse or round. Unlike other species in the genus, except *bilobata*, the interocular portion of the frons is not conspicuously darker than the rest of the frons, and the legs are not ringed with brown. The dark markings of the forewings are usually absent in females but distinct in males. No specimens with conspicuously shortened forewings were seen.

Male genitalia: Style in posterior view (fig. 2) with slender mesally directed process near midpoint of inner margin, apex narrowed and curved inward to pro-

duce a large hook, inner basal process moderately long. Aedeagus in lateral view (fig. 3) comparatively slender and in form of inverted "U" with ventral margin dentate. Gonopore (fig. 6) large and irregular at the dorsal apex. Process of anal ring in lateral view (fig. 1) appears as a moderately stout hook.

Type: No lectotype selected. Three males and 3 females (O.S.U.), Cold Spring Harbor, N. Y., Aug. 18, 1904 with red paratype labels were studied. These were not mentioned in the original description.

Specimens studied: UNITED STATES: FLORIDA, Cape Sable, Dade Co., Daytona, Ft. Myers, Gainesville, Homestead, Key West, La Belle, Sanford, Tampa, Venice; MARYLAND, Chesapeake Beach, Piney Point; NEW YORK, Bayville, Cold Spring Harbor, Nassau, Oyster Bay, Riverhead; VIRGINIA, Cape Henry, Chincoteague Island, Deep Creek. MEXICO: DISTRITO FEDERAL; MEXICO, Toluca; PUEBLA, Huauchinango. Total specimens studied, over 200.

Host data: The host plant of *Stobaera pallida* is *Baccharis halimifolia*, groundsel-bush. Many of the specimens studied were collected from this plant in New York, Maryland, and Florida. Although most specimens were collected without host data, we can safely assume that they were associated with groundsel-bush because the distribution of the insect and plant coincide in large part. *Baccharis halimifolia* is known from Massachusetts south to Florida and west to Texas and south to Mexico in shore hammocks, sea beaches, salt marshes, and low ground inland.

Notes: *Stobaera pallida* stands well apart from its congeners on the basis of the characters noted above and in the key. The shape of the aedeagus in lateral view (fig. 3) resembles that of the Pacific coastal *bilobata* (fig. 18); but in other characters, the 2 species differ markedly. The Mexican records are new to the literature, and additional new state records for both the United States and Mexico will undoubtedly be added with further collecting.

Stobaera caldwelli Kramer, new species
fig. 7–17

Salient features: Males, 3.0–3.5 mm; females, 3.2–3.9 mm. The characteristic which distinguishes *caldwelli* at once from all its congeners is the coloration of the pro- and mesonotum. The areas mesad of the outer carinae are unmarked yellow to deep orange, and the areas laterad of the carinae are darkly fuscus to black. The dark markings of the forewings, typical of the genus, are distinct in both sexes. The frons is darkened between the eyes, the central portion stramineous, at times washed vaguely with pink, and basally unmarked or with a small touch of fuscus on each side of central carina. The clypeus varies from lightly fuscus to almost black. The legs are banded with fuscus. No specimens with conspicuously shortened forewings were seen.

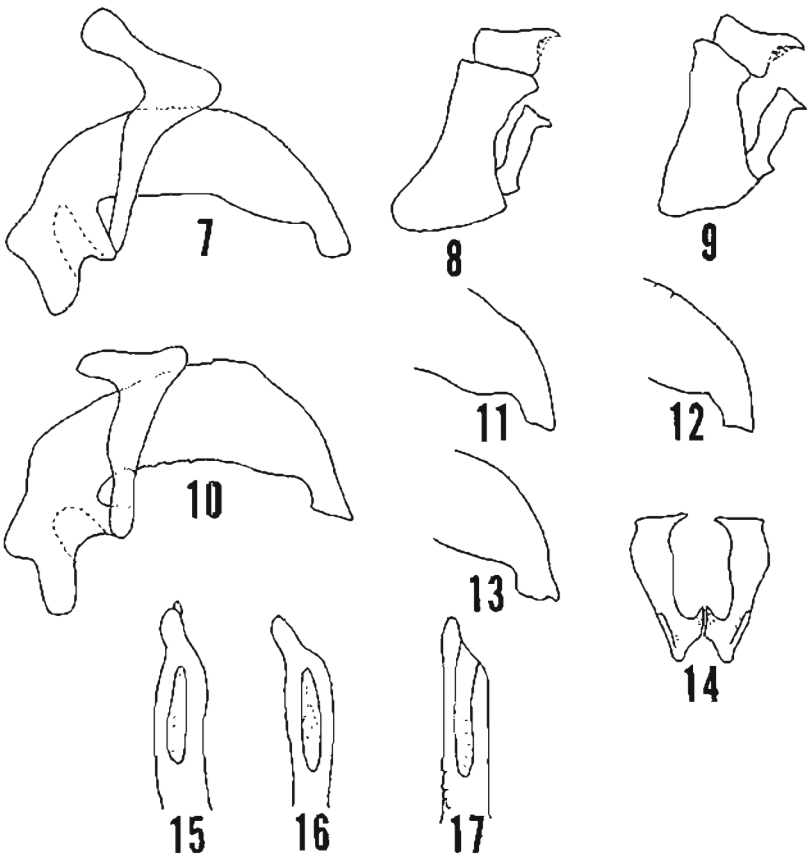


Fig. 7–17. *Stobaera caldwelli*. 7, aedeagus in lateral view (Twin Pines, Calif.); 8, male genital capsule in lateral view (Ariz.); 9, same (Nev.); 10, aedeagus in lateral view (Borrego Springs, Calif.); 11, aedeagal apex in lateral view (Nev.); 12, same (Nev.); 13, same (Ariz.); 14, styles in posterior view; 15, aedeagal apex in dorsal view (Ariz.); 16, same (Calif.); 17, aedeagal apex in dorso-anterior view (Nev.).

Male genitalia: Style in posterior view (fig. 14) with apex subtruncate, outer apical angulation minute, inner apical angulation moderately long and distinct, with narrow keel on lateral margin near base, inner basal process short. Aedeagus in lateral view (fig. 7, 10) moderately stout and somewhat decurved with apex quadrately produced. Shape of aedeagal apex in lateral view (fig. 11–13) variable. Dorsal and ventral margins of aedeagus in lateral view smooth or sparsely dentate. Gonopore (fig. 15–17) of moderate size at dorsal apex. Process of anal ring in lateral view (fig. 8–9) appears as a short hook.

Type: Male (USNM type no. 72355) Palm Desert, California, Riverside County, 14 May 1970, R. D. Goeden and D. W. Ricker, field collected on *Ambrosia dumosa*, burrow-weed or bur-sage.

Specimens studied: UNITED STATES: ARIZONA, Ashfork, Atascosa Mt., Baboquivari Mts., Bisbee, Chiricahua Mts., Congress Junction, Dome, Ft. Huachuca, Galiuro Mt., Gila Bend, Glendale, Granite Dell, Huachuca Mts., Hualpai Mt., Kaibab, Kirkland Junction, Littlefield, Mustang Mt., Nogales, Patagonia, Phoenix, Prescott, Sabino Canyon, Santa Rita Mts., Sedona, Tinajas Atlas, Tombstone, Tumacacori Mt., Tuscon, Wickenburg, Yuma; CALIFORNIA, Borrego Springs, Boulevard, Cabazon, Cedar Canyon, Desert Center, Fillmore, Indio, Jacumba, Joshua Tree Nat. Mon., Kelso, Lake View Terrace, Lytle Creek, Mohave, Morongo Valley, Needles, Niland, Oak Grove, Ocotillo, Palm Desert, Palm Springs, Riverside, San Diego, Twentynine Palms, Twin Pines, Victorville, Yucca Valley; NEVADA, Glendale, Mercury, Mesquite, Overton, Las Vegas, Riverside; NEW MEXICO, Carlsbad Cavern, Las Cruces, Mesilla Park; TEXAS, Alpine, Ft. Davis, Davis Mts.; UTAH, Modena, St. George. MEXICO: BAJA CALIFORNIA NORTE, Tijuana; SONORA, Hermosillo. Total specimens studied, 589.

Host Data: Most specimens were collected without plant associations. The following list includes the plants and numbers of specimens of *caldwelli* collected from them: *Ambrosia dumosa*, burrow-weed or bur-sage, 49 (16♂♂, 33♀♀); *Hymenoclea salsola*, a burrowbrush, 11 (8♂♂, 3♀♀); *Ambrosia confertiflora* 9 (7♂♂, 2♀♀); *Ambrosia eriocentra* 8 (1♂, 7♀♀); *Ambrosia acanthicarpa*, *sandbur*, 2 (2♂♂); *Ambrosia psilostachya*, western ragweed, 1 (1♀). If we can assume that the greatest number of specimens were collected on the primary host, then the distribution of the insect and host plant coincide quite well. *Ambrosia dumosa* is known from southern California, Arizona, Utah, Lower California, and Sonora. *Stobaera caldwelli* is known from So. California, Arizona, New Mexico, W. Texas, Sonora, Nevada, and Utah. *Stobaera caldwelli* may be catholic in its host/food plant choices with other factors of the environment limiting its distribution.

Notes: Color pattern, as noted in the key, separates this most common Southwestern species at once from its congeners. The styles are close to those of *concinna* and *muiri*. In *caldwelli* the stylar keel is narrow (fig. 14), but in those 2 species it is wider (fig. 25, 33). However, the aedeagus in lateral view (fig. 7, 10) is not greatly different from that of *muiri* (fig. 22) and some of the varients of *concinna* (fig. 32). This species in named for Dr. John S. Caldwell whose general studies of the fulgoroids and all the auchenorhynchous Homoptera of Puerto Rico comprise major contributions to the taxonomy of this order of insects.

Stobaera bilobata Van Duzee
fig. 18–21

Stobaera bilobata Van Duzee 1914a: 44.

Salient features: Males, 2.0–3.3 mm; females, 2.5–3.8 mm. Normal longwinged and shortwinged forms occur in both sexes. The shorter winged form appears more common in the series at hand. In males, the forewings are largely dark except for irregular hyaline areas in the outer apical cells and central portions of the costal and preapical cells. In females, the forewings vary from nearly unmarked except for a dark spot distally on costal cell to marked like males. The interocular portion of the frons is not conspicuously darker than the rest of the frons, and the legs are not ringed with brown. The head tends to be more acute apically and generally narrower than in its congeners.

Male genitalia: Style in posterior view (fig. 21) stout and somewhat sigmoid in outline, apex smoothly turned inward to acute tip, inner basal process obscure. Aedeagus in lateral view (fig. 18) comparatively slender and in form of inverted "U" with dentation on dorsal and lateral margins. Gonopore (fig. 19) at apex of aedeagal dorsum. Process of anal segment in lateral view (fig. 20) acute apically with ventral tooth.

Type: Lectotype male (labeled but unpublished by Van Duzee) with labels "San Diego Co., California, 6-6-14, E. P. Van Duzee" and "LECTOTYPE bilobata" (red label); and "E. P. Van Duzee Collection" (yellow label). Repository of lectotype: California Academy of Sciences.

Specimens studied: UNITED STATES: CALIFORNIA, Del Mar, La Jolla, Niles Canyon, San Diego Co. Total specimens studied, 68, including lectotype and 12 specimens labeled paratypes.

Host data: Several of the specimens seen were taken on *Hazardia squarrosus* now *Haplopappus squarrosus*.

Notes: *Stobaera bilobata* is best distinguished by the shape of the styles. It is known only from San Diego County in southernmost California.

Stobaera muiri Kramer, new species
fig. 22–26

Salient features: Males, 2.0–3.0 mm; females, 2.7–3.8 mm. Normal longwinged and shortwinged forms occur in both sexes. All but 1 male and 4 females of the series before me are of the shorter winged form. The forewings are similarly marked in both sexes. The color of the forewing varies from darkened apically in the form of a crescent along the inner margin and an irregular mark on outer apical cells with additional dark areas at center of corium and on clavus to unmarked except for a dark spot distally on costal cell and irregular infuscations on inner apical cells. In facial view the antennae, eyes, and

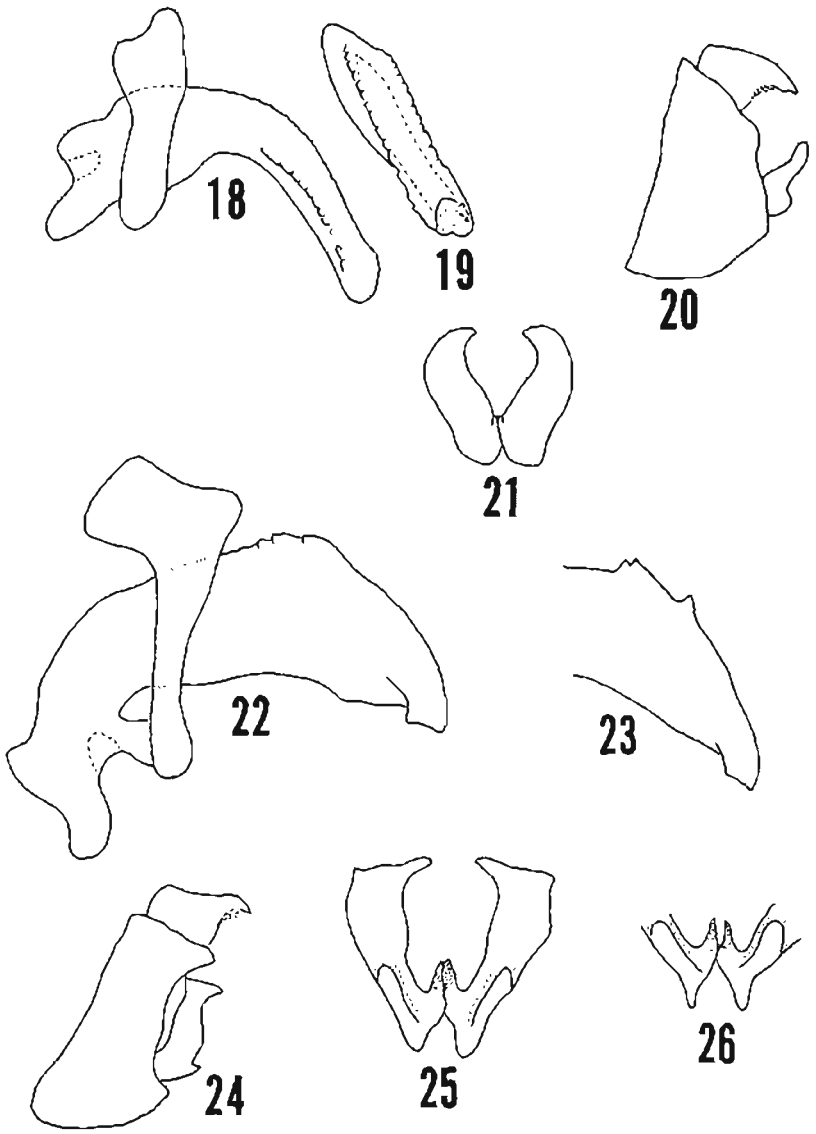


Fig. 18–21, *Stobaera bilobata*. 18, aedeagus in lateral view; 19, aedeagus in dorso-anterior view; 20, male genital capsule in lateral view; 21, styles in posterior view. Fig. 22–26, *Stobaera muiri*. 22, aedeagus in lateral view (Oceanside, Calif.); 23, apical portion of aedeagus in lateral view; 24, male genital capsule in lateral view; 25, styles in posterior view; 26, basal portion of styles in posterior view, variation.

interocular portion of the frons appear nearly a unicolorous fuscus to black. However, there are pale spots in the interocular portion of the frons, and the bases of the antennal segments are sometimes paler. The rest of the frons is either unmarked or has fuscus areas on each side of central carina at the base. The clypeus is variably infuscated, and the legs are ringed with brown or fuscus.

Male genitalia: Style in posterior view (fig. 25) with apex subtruncate, outer apical angulation minute, inner apical angulation moderately long, with broad keel on lateral margin near base, and inner basal process fairly short. Aedeagus in lateral view (fig. 22–23) moderately stout and somewhat decurved with apex quadrately produced, dorsal margin variably dentate. Process of anal segment in lateral view (fig. 24) appears as a short hook.

Type: Male (USNM type no. 72356) Sunset Beach, California, Orange County, 2 Feb. 1970, R. D. Goeden & D. W. Ricker, insectary reared on *Ambrosia chamissonis*, silver beachweed.

Specimens studied: UNITED STATES: CALIFORNIA, Goleta, Imperial Beach, Long Beach, Malibu River, Newport Beach, Oceanside, San Clemente, San Diego, Santa Barbara, Sunset Beach, Ventura. Total specimens studied, 98.

Host data: Except for 4 specimens taken without data, all examples of *muiri* were collected on or reared from *Ambrosia chamissonis*, silver beachweed. Because the distribution of silver beachweed includes all of coastal California and scattered points northward to British Columbia, *muiri* more than likely has a greater distribution than here recorded. Silver beachweed occurs on coastal dunes and sandy beaches from sea level to 50 ft.

Notes: *Stobaera muiri* is structurally close to both *caldwelli* and *concinna* but differs from these species in color pattern, as noted in the key, and host/food plants. It is a littoral species of the U.S. Pacific coast. The species is named for Frederick A. G. Muir whose collected works form the major contribution to our knowledge of the Delphacidae.

Stobaera concinna (Stål)
fig. 27–40

Delphax concinna Stål 1854b: 246.
Stobaera concinna (Stål), Stål 1859a: 327.
Stobaera minuta Osborn 1905b: 376. N. Syn.

Salient features: Males, 2.5–4.0 mm; females, 3.2–4.5 mm. Normal longwinged and shortwinged forms occur in both sexes, and the longer winged form is more common. The forewing is marked like that of *muiri* except the brown or fuscus crescent is usually more strongly developed across the distal crossvein to the costal margin. In facial view the antennae, eyes, and interocular portion of the frons appear

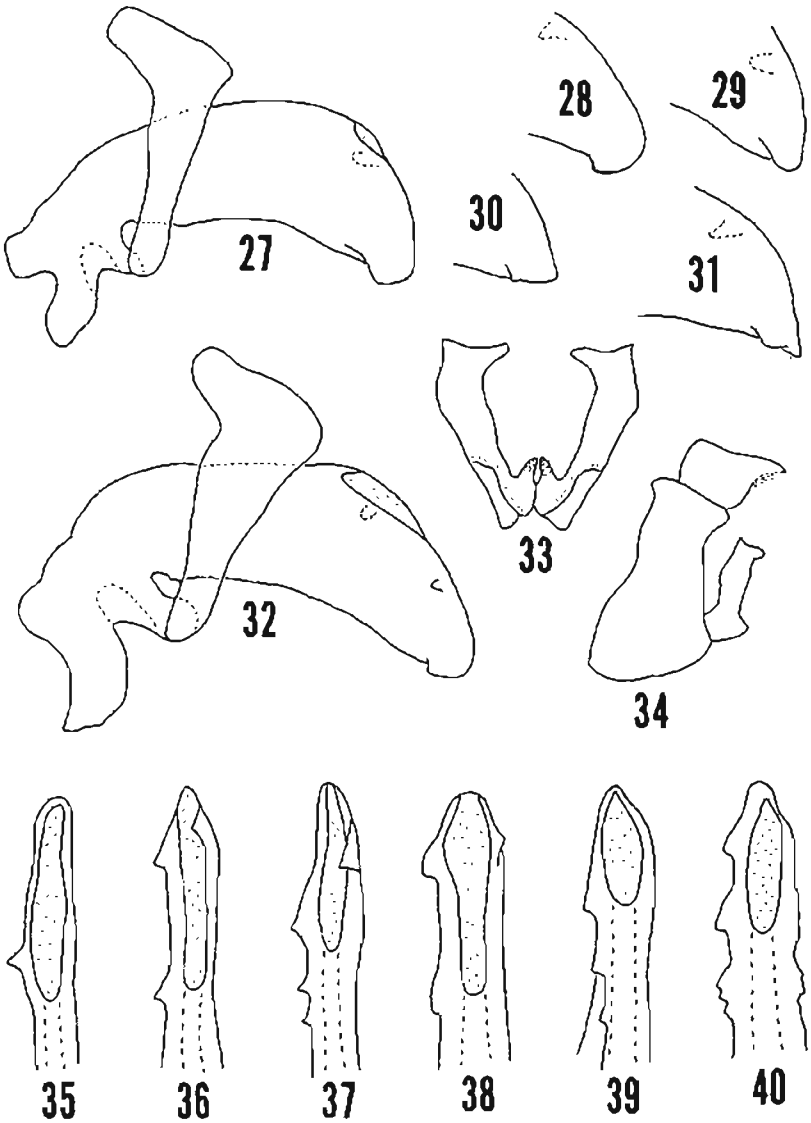


Fig. 27–40, *Stobaera concinna*. 27, aedeagus in lateral view (Sanford, Fla.); 28, aedeagal apex in lateral view (Superior, Ariz.); 29, same (Sanford, Fla.); 30, same (Brownsville, Tex.); 31, same (Haiti); 32, aedeagus in lateral view (Arcadia, Calif.); 33, styles in posterior view; 34, male genital capsule in lateral view; 35, aedeagal apex in dorsal view (Superior, Ariz.); 36, same (Ariz.); 37, same (Sanford, Fla.); 38, same (Miami, Fla.); 39, same (Fla.); 40, same (Sanford, Fla.).

tan to medium brown. However, there are pale spots in the interocular portion of the frons, and the edges of the antennal segments are variably paler. The rest of the frons is either unmarked or has variable embrowning on each side of the central carina at the base. The clypeus is unmarked or variably infuscated, and the legs are ringed with brown or fuscus.

Male genitalia: Style in posterior view (fig. 33) similar to that of *muiri* with a broad keel on lateral margin near base. Aedeagus in lateral view (fig. 27–32) moderately stout, somewhat decurved, broadest in distal half, venter at apex with a variably developed tooth, dorsal and ventral margins largely smooth. Distal portion of aedeagus in dorsal view (fig. 35–40) highly variable in number and development of lateral teeth, gonopore large. Process of anal segment in lateral view (fig. 34) appears as a short hook.

Type: Lectotype male with labels: "Mexico" (handwritten) and "concinna" (handwritten) and "255 72" (red label) and "Riksmuseum Stockholm" (green label). Repository of lectotype: Riksmuseum, Stockholm. A lectotype male is also selected here for *Stobaera minuta* Osborn with labels: "Cameron, La., Aug. 14–28, 1903" and "Herbert Osborn Collection" and "PARATYPE" (red label). Repository of lectotype: Department of Entomology, Ohio State University, Columbus, Ohio.

The lectotype of *concinna* is in nearly perfect condition but the left antenna is missing and the form is somewhat distorted by the pin through the mesonotum. It is the longer winged form (3.75 mm): the base of the frons is lightly embrowned; the clypeus is tan and lightly embrowned distally and vaguely laterally. The lectotype of *minuta* is in perfect condition and represents the shorter winged form (2.5 mm) of *concinna* and differs only in its smaller size and in the pale unmarked basal portion of the frons.

Specimens studied: UNITED STATES: ARIZONA, Ajo Mts., Atascosa Mt., Baboquivari Mts., Benson, Catal Spring, Chiricahua Mts. Congress Junction, Ft. Huachuca, Globe, Granite Dell, Huachuca Mts., Nogales, Patagonia, Phoenix, Sabino Canyon, Sta. Catarina Mts., Tankent, Tempe, Tinajas Altas, Tucson; CALIFORNIA, Arcadia, Chula Vista, Hollywood, Indio, Los Angeles, Oakgrove, Oxnard, Palomar Mt., Refugio Canyon; COLORADO, Ft. Collins; FLORIDA, Belle Glade, Cedar Keys, Coco, Elfers, Ft. Myers, Gainesville, Islamoranda, La Belle, Miami, New Port Ritchy, Orlando, Ormond Beach, Palm Beach, Sanford, Tampa; LOUISIANA, Cameron; TEXAS, Brownsville, Catarina, Comstock, Cotulla, Edna, Ft. Davis, Laredo, Sanderson, Tyler, Uvalde Co., Webb Co.; UTAH, Leeds. MEXICO: OAXACA, Santa Engracia; SONORA, Guaymas; VERACRUZ, Fortin. WEST INDIES: CUBA, Ermita, Havana, Jobabo; DOMINICAN REPUBLIC, La Romana; HAITI, Port-au-Prince. Total specimens studied, 441.

Host data: Only 47 of the specimens studied have data which show plant associations. The following are Californian records of the host/food plant with the number of specimens of *concinna* collected from them: *Ambrosia confertiflora* 28 (9♂♂, 19♀♀) field collected; and *Ambrosia psilostachya*. Western ragweed, 11(5♂♂, 6♀♀) insectary reared. Eight specimens from Florida are labeled "Amb" [rosia] or "rag w" [eed]. Judging from the data at hand, it appears that *Ambrosia confertiflora* is the host plant of *S. concinna* with *A. psilostachya* an alternate host or food plant. *Ambrosia confertiflora* occurs mainly in dry plains and wastelands from So. California eastward to Kansas, Texas, Tennessee, and probably Florida. It is known from Puerto Rico and as far south as the Mexican state of Guerrero. The records for *S. concinna* (So. California, Utah, Arizona, Colorado, Texas, Louisiana, Florida, and Vera Cruz) coincide reasonably well with the distribution of *A. confertiflora*.

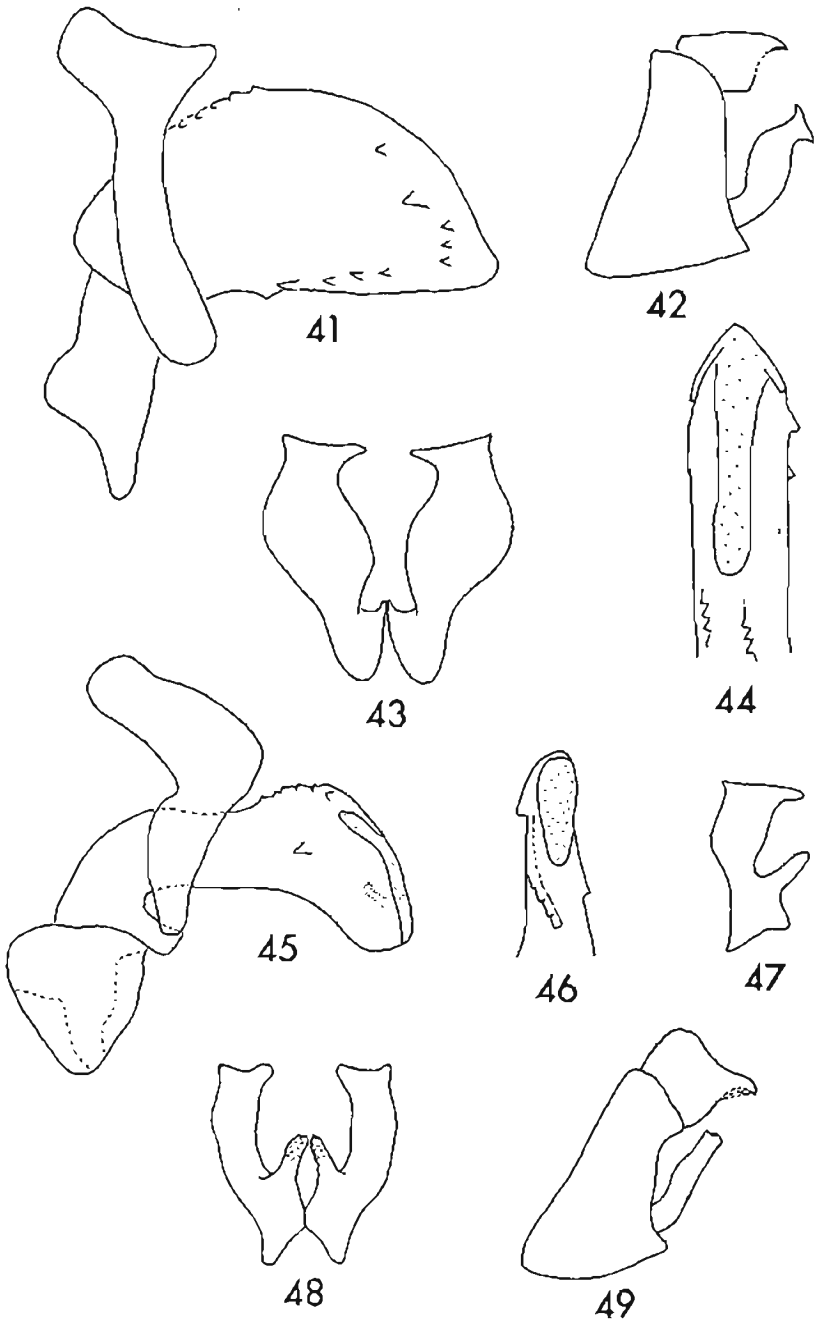
Notes: *Stobaera concinna* is structurally close to both *caldwelli* and *muiri* but can be separated from those species by the characters noted in the key and by host plants. Information gleaned from the literature and from determined specimens in collections shows that no one since the original description has correctly determined the species.

Stobaera giffardi Van Duzee
fig. 41–44

Stobaera giffardi Van Duzee: 1917a: 313.

Salient features: Males, 2.4–2.8 mm; females 3.0–3.5 mm. No truly longwinged form occurs in the series before me. The forewing is lightly marked and bears a fuscus patch distally on the costal cell and on the first apical cell from the inner margin. Some specimens have irregular infuscations at the middle of the forewing. In still others, the entire proximal half of the forewing is largely dark. The intercocular portion of the frons is often darker than the rest of the frons and bears pale spots. There is at times a distinct pale band across the frons just below the eyes with the lower portion of the frons lightly or heavily mottled with tan to fuscus. In other specimens, the band is absent and all of the frons below the eyes is mottled. The clypeus is either essentially unmarked or clearly infuscated, and the legs are ringed with brown or fuscus.

Male genitalia: Style in posterior view (fig. 43) similar to that of *tricarinata* but convexly expanded at middle on both margins with inner basal process exceedingly short. Aedeagus in lateral view (fig. 41) not clearly distinguishable from that of *tricarinata*. Gonopore (fig. 44) elongate and apical at aedeagal dorsum. Process of anal segment in lateral view (fig. 42) appears as a short hook.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Type: Male (No. 379) Niles Canyon, California, Alameda Co., 11 May 1916, Wm. Gifford, on wormwood. Respository of type: California Academy of Sciences.

Specimens studied: UNITED STATES: CALIFORNIA, Alameda Co. (Leona Hts); San Mateo Co. (Portola Valley); Santa Clara Co. (Los Altos, Saratoga); Santa Cruz Co.; Tuolumne Co. (Yosemite); OREGON, Jackson Co. (near Siskiyou Pass). Total specimens studied, 162.

Host data: The original type series was collected on wormwood or sagebrush, *Artemisia* sp., and there are no additional data to add at this time.

Notes: *Stobaera giffardi* is structurally closest to *tricarinata* but differs in characters of the style as noted in the key. Additional field work is needed to establish its host/food plants and distribution. These are presently known as *Artemisia* sp. and central California to southern Oregon.

Stobaera tricarinata (Say)
fig. 50–62

Delphax tricarinata Say 1825a: 337.
Delphax bifasciata Provancher 1890b: 337.
Stobaera nigripennis Crawford 1914a: 376. N. Syn.

Salient features: Males, 2.8–4.6 mm; females 2.9–4.8 mm. Normal longwinged and shortwinged forms occur in both sexes. The longer wing form outnumbers the shorter wing form about 10:1. The forewing varies from nearly immaculate to strongly marked with fuscus like *concinna* or rarely nearly entirely fuscus. The interocular portion of the frons is tan to fuscus with pale spots; the central portion of the frons is pale and unmarked; the basal portion of the frons on each side of the central carina is almost always darkened with fuscus or black. The clypeus is either unmarked or lightly marked with fuscus. The legs are ringed with fuscus to black.

Male genitalia: Style in posterior view (fig. 51, 52) similar to that of *giffardi* but only slightly convex on inner and outer margins at middle and with inner basal process long. Aedeagus in lateral view (fig. 50, 55, 58) approximately hemicircular in outline with variable number of teeth on or near dorsal and ventral margins. Conopore (fig. 59–62) elongate and apical at aedeagal dorsum. Process of anal segment in lateral view (fig. 54) somewhat variable in length but usually appearing as a slender hook.

←

Fig. 41–44, *Stobaera giffardi*. 41, aedeagus in lateral view; 42, male genital capsule in lateral view; 43, styles in posterior view; 44, aedeagal apex in dorsal view. Figs. 45–49, *Stobaera affinis*. 45, aedeagus in lateral view; 46, aedeagal apex in dorsal view; 47, right style in broad view; 48, styles in posterior view; 49, male genitalia capsule in lateral view.

Type: The type locality of *tricarinata* is Missouri, but Say's specimen is lost. No neotype is selected because there is no problem in recognizing this species. The type of *nigripennis* (USNM type no. 15975) from the Argus Mts. of California was found to be a short and fuscus winged form of *tricarinata*.

Specimens studied: UNITED STATES: ALABAMA, Selma; ARIZONA, Flagstaff, Grand Canyon, Granite Dell, Oak Creek Canyon, Phoenix, Prescott, Sedona, White Mts., Yarnell Mts.; CALIFORNIA, Alpine, Argus Mts., Beaumont, Carpinteria, Chatsworth, Chino, El Toro, Encinitas, Fillmore, Goleta, Jamul, La Mesa, Los Angeles, Mill Creek Park, Oakgrove, Ontario, Palm Canyon, Palm Springs, Pasadena, Pela, Pine Valley, Piru, Poway Rainbow, San Bernadino, San Juan Capistrano, Santa Barbara, South San Gabriel, Valley Center, Ventura, Wildomar, Yorba Linda, Yosemite; COLORADO, Ft. Collins, Grand Junction, Gunnison, Palisade, Palmer Lake, Snyder, Sterling; FLORIDA, Florida Caverns St. Park (Jackson Co.); GEORGIA, Athens, DeWitt, Thomasville; IDAHO, Crater of the Moon Nat. Mon.; ILLINOIS, Algonquin, Elgin, Havanna, Muncie, Nord, Rocky Branch; INDIANA, Indianapolis, Lafayette, Martinsville; IOWA, Ames; KANSAS, Baldwin, Garnett, Onaga, Popenoe, Topeka, Wellington; LOUISIANA, Opelousas, Shreveport, Tallulah; MARYLAND, Bell, Beltsville, Glen Echo Park, Hyattsville, Lakeland, Laurel, Plum Point; MASSACHUSETTS, Chicopee; MINNESOTA, Chisago Co., Washington Co.; MISSOURI, Langdon, Wellston; MISSISSIPPI, State College; NEBRASKA, Beemer, Omaha, Schurler; NEVADA, Caliente, Dixie, Las Vegas, Overton; NEW JERSEY, Angelsea, Fort Lee, Lakehurst, Riverton; NEW MEXICO, Albuquerque, Espanola, Mesilla Park; NEW YORK, Babylon, Ithaca; NORTH CAROLINA, Rutherford Co.; NORTH DAKOTA, Tower City; OHIO, Cedar Swamp, Columbus, Cuyahoga Falls; OREGON, Bend, Silver Lake, Unity; PENNSYLVANIA, Philadelphia, State College; SOUTH CAROLINA, Columbia; TENNESSEE, Nashville; TEXAS, Clifton, Cotulla, Lubbock, Plano, San Antonio, Spur, Uvalde; UTAH, Cedar, Dixie, Fish Lake, Hurricane, Kanab, Logan, Marysvale, Moab, Monroe, Orderville, Promontory, Provo, Richfield, St. George, St. Clara, Salt Lake City, Sigurd, Smithfield, Soldier; VIRGINIA, Arlington, Falls Church, Great Falls, Herndon, Peach Grove Hill. MEXICO: BAJA CALIFORNIA NORTE, Tijuana. Total specimens studied, 627.

Host data: Most specimens were collected without plant associations. The following list includes the plants and number of specimens of *tricarinata* collected from them: California—*Ambrosia psilostachya*, western ragweed, 36 (10♂♂, 26♀♀); *Ambrosia confertiflora* 2 (2♂♂); *Ambrosia chamissonis*, silver beachweed, 1 (1♀); Maryland—*Helianthus argophyllus*, silverleaf sunflower, 5 (5♀♀). If, as before, we assume the favored host is the plant species from which most of the insects were collected, then the distribution of the insect and its probable host plant coincide well. Western ragweed occurs in uncultivated land and is recorded for most of the United States and southern Canada and all of the 32 states from which *tricarinata* is known.

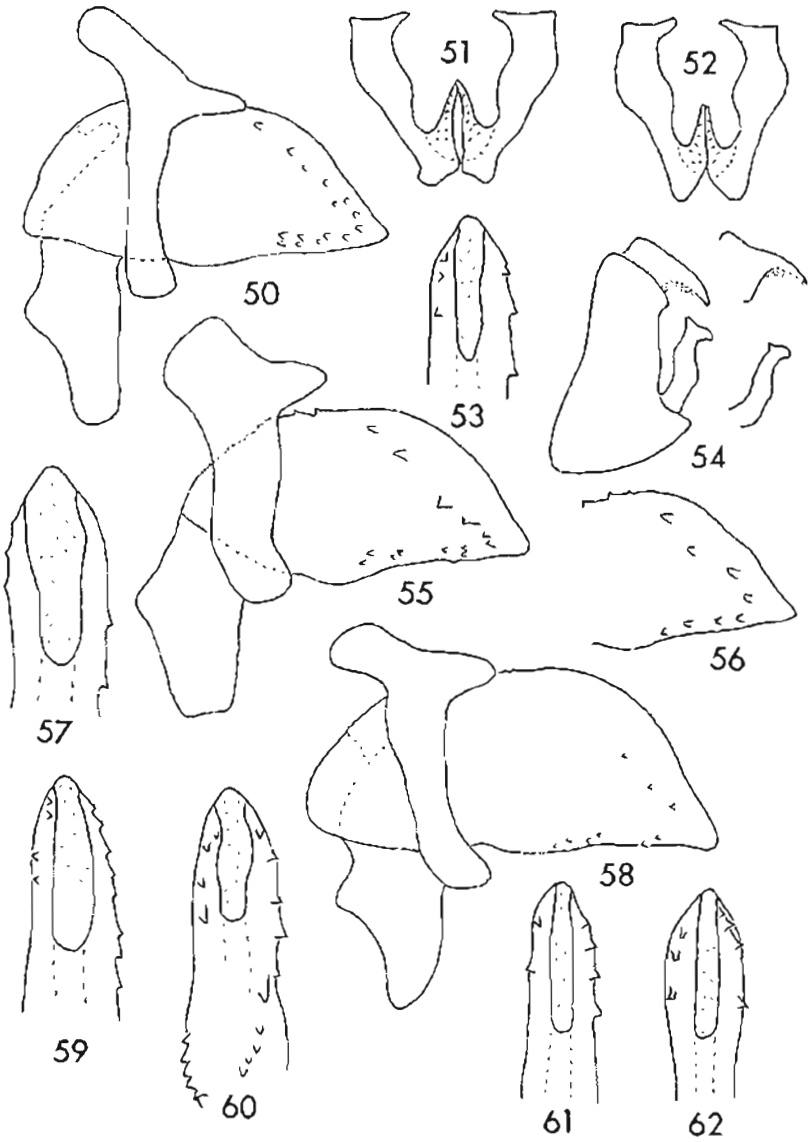

Fig. 50–62, *Stohaera tricarinata*. 50, aedeagus in lateral view (Peach Grove Hill, Va.); 51, styles in posterior view (Va.); 52, same (Oregon); 53, aedeagal apex in dorsal view (Calif.); 54, male genital capsule in lateral view, with variations of anal process and style; 55, aedeagus in lateral view (Tijuana, Mex.); 56, distal portion of aedeagus in lateral view (Palmer Park, Colo.); 57, aedeagal apex in dorsal view (Oregon); 58, aedeagus in lateral view (Silver Lake, Oregon); 59, aedeagal apex in dorsal view (Va.); 60, same (Colo.); 61, same (Ind.); 62, same (Minn.).

Notes: This is the most common species of *Stobaera* in the United States, based on the records at hand. We have studied specimens from upper New York south to western Florida and westward to California and Oregon. Structurally *tricarinata* is closest to *giffardi* (see notes under this species).

Stobaera affinis Van Duzee
fig. 45–49

Stobaera affinis Van Duzee 1909a: 199.

Salient features: Males, 3.0–3.4 mm; females, 3.0–3.9 mm. Because of damage to the distal portions of the forewings in some of the specimens at hand, it is difficult to state the total length of these specimens and to ascertain their true wing length. However, all seem to be of the longer winged form. The forewing is marked like that of *tricarinata*. The frons is similar in markings to that of *tricarinata* except for the central portion which is usually, but not always, mottled with brown. The markings of the clypeus and legs are not distinguishable from those of *tricarinata*.

Male genitalia: Style in posterior view and broad view (fig. 47, 48) similar to that of *tricarinata* except for inner basal process arising above base, process usually broader and blunter as well. Aedeagus in lateral view (fig. 45) elongate, decurved, and distinctly capitate, variably toothed marginally and submarginally distally. Conopore (fig. 46) elongate at aedeagal apex dorsally. Process of anal segment in lateral view (fig. 49) produced as a moderately short hook.

Type: Lectotype male with labels: "Crescent City, Fla., Apr. '08, Van Duzee" and "LECTOTYPE affinis" (red label), and "E. P. Van Duzee Collection" (yellow label). Repository of lectotype: California Academy of Sciences.

Specimens studied: UNITED STATES: FLORIDA, Cedar Keys, Crescent City, Dunedin, Ft. Myers, Gadsden Co., Gainesville, Miami, New Smyrna, Reddick, St. Augustine, Sanford. Total specimens studied, 80.

Host data: Only 1 specimen, a male from Sanford, was taken on "Amb" [rosia] sp.

Notes: The aedeagus of *affinis* is unlike that of any other species in *Stobaera*, and the form of this structure distinguishes it at once from its congeners. *Stobaera affinis* is presently known only from Florida on *Ambrosia* sp.

Stobaera granulosa (Fowler)
fig. 63–69

Gontolcium granulosa Fowler 1905a: 132.

Salient features: Males, 4.3–4.5 mm; females, 4.8–5.0 mm. Only longwinged forms of this species were seen. The forewing is marked

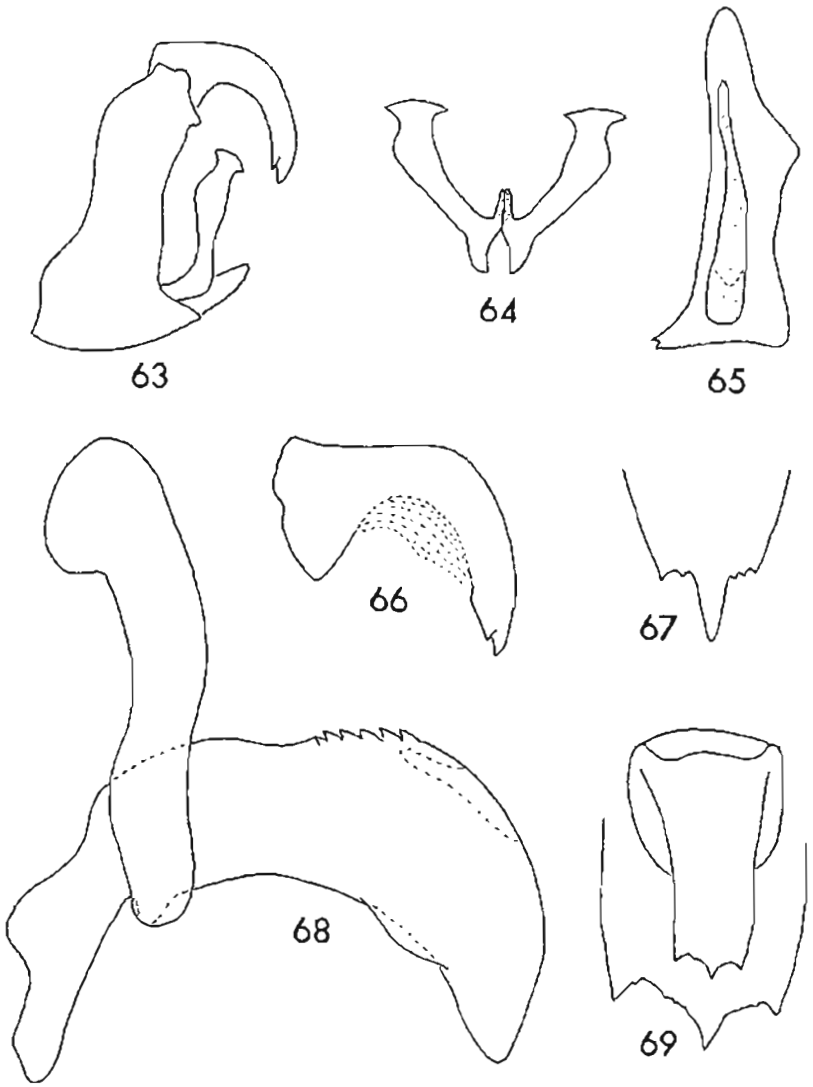

Fig. 63–69, *Stobaera granulosa*. 63, male genital capsule in lateral view; 64, styles in posterior view; 65, aedeagus in dorsal view; 66, male anal segment in lateral view; 67, apex of process of male anal segment in posterior view (Guatemala); 68, aedeagus in lateral view; 69, male anal segment in posterior view, with enlarged apical portion below (Mexico).

like that of *concinna*. The frons, clypeus, and legs are marked like those of *tricarinata*.

Male genitalia: Style in posterior view (fig. 64) with both outer and inner apical angulations distinctly produced, acute, and approximately of the same size, inner basal process of moderate length. Aedeagus in lateral view (fig. 68) stout, decurved, apically subacute, and with a partly toothed crest on dorsal margin. Gonopore (fig. 65) irregularly elongate and seeming to occupy most of aedeagal dorsum. Process of anal segment in posterior view (fig. 67, 69) broad apically with 1 or more teeth on each side of longer central tooth, in lateral view (fig. 66) strongly decurved and broad for most of length with both preapical and apical tooth.

Type: Lectotype male with labels: "♂" and "Type H. T." and "Coniolcium granulosum Fowler" (handwritten) and "Chilpancingo, Guerrero, 4600 ft, June, H. H. Smith" and "B. C. A. Hompt. I Coniolcium granulosum, Fowl." This appears to be the specimen illustrated with the original description (Fowler 1905a: Pl. 13, figs. 7 & 8). Repository of lectotype: British Museum (Nat. Hist.).

Specimens studied: MEXICO: GUERRERO, Chilpancingo; OAXACA, Santa Engracia; VERACRUZ, Jalapa, Cordoba, Orizaba. GUATEMALA, Chichicastenango. Total specimens studied, 22.

Host data: None.

Notes: The shape of the anal process of the male provides the best characters for the identification of *granulosa*, a species known from southern Mexico and Guatemala.

Stobaera azteca Muir
fig. 70–76

Stobaera azteca Muir 1913b: 242.

Salient features: Males, 4.0–4.2 mm; females, 4.2–4.8 mm. Only longwinged forms of this species were seen. Markings of forewings, frons, clypeus, and legs like those of *granulosa*.

Male genitalia: Style in posterior view (fig. 73) similar to that of *granulosa* except with a slight convexity on inner margin below inner apical angulation. Aedeagus in lateral view (fig. 70) essentially like that of *granulosa* except slightly blunter apically. Gonopore (fig. 71) irregularly elongate and occupying most of aedeagal dorsum. Process of anal segment in posterior view (fig. 74–76) smoothly tapering to acute apex or tapering broadly at apex, in lateral view (fig. 74–76) not strongly decurved but variably tapering to acute apex.

Type: Lectotype male with label: "Mexico, Morelos, Koebele 07". Repository of lectotype: Bernice P. Bishop Museum.

Specimens studied: MEXICO: GUERRERO, Chilpancingo; MORELOS; PUEBLA, Necata; SAN LUIS POTOSI, Valles; VERACRUZ, Orizaba, Pueblo Viejo. GUATEMALA, Yepocapa. NICARAGUA, San Marcos. Total specimens studied, 13.

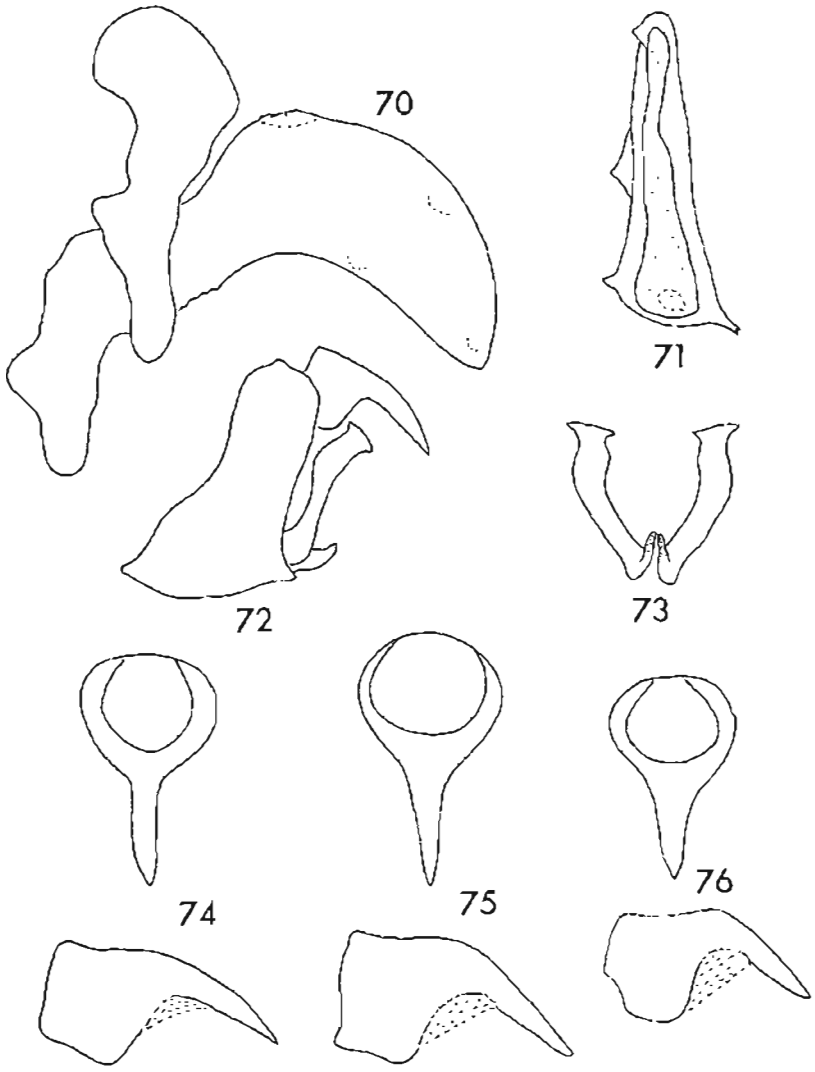

Fig. 70–76, *Stobuera azteca*. 70, aedeagus in lateral view; 71, aedeagus in dorsal view; 72, male genital capsule in lateral view; 73, styles in posterior view; 74, male anal segment in posterior view above and lateral view below (Veracruz); 75, same (Guerrero); 76, same (San Luis Potosi).

Host data: None.

Notes: The shape of the anal process of the male provides the best character for the recognition of *azteca*, a species known from central Mexico south to Nicaragua. It is closely related to both *granulosa* and *koebeli*.

Stobaera koebeli Muir
fig. 77–81

Stobaera koebeli Muir 1913b: 242.

Salient features: Males, 4.0–4.3 mm; females, 4.3–5.1 mm. Only longwinged forms of this species were seen. Markings of forewing, frons, clypeus, and legs like those of *granulosa*.

Male genitalia: Style in posterior view close to that of *azteca* except without convexity on inner margin below inner apical angulation. Aedeagus in lateral view (fig. 81) similar to that of *azteca* except distinctly broader in middle third. Gonopore (fig. 77, 78) elongate and occupying most of aedeagal dorsum. Process of anal segment in posterior view (fig. 79, 80) broadly tapering to near apex where sharp constriction produces acute apical tooth, at times edges of constriction sharp and asymmetrical, in lateral view (fig. 79, 80) strongly decurved and variably tapering to acute apex.

Type: Lectotype male with labels: "Morelos" and "Tantepec" and "A. Koebele Collector". Repository of lectotype: Bernice P. Bishop Museum.

Specimens studied: MEXICO: DISTRITO FEDERAL, Mexico City; MORELOS, Tantepec, Yautepec; VERACRUZ, Cordoba, Orizaba. GUATEMALA, Guatemala City. Total specimens studied, 12.

Host data: None.

Notes: The shape of the anal process of the male provides the best characters for the recognition of *koebeli*, a species known from southern Mexico and Guatemala.

Species removed from *Stobaera*

Neoperkinsiella testacea (Fowler), New Combination

Coniolcium testaceum Fowler 1905a: 133.
Stobaera testaceum (Fowler), Crawford 1914a: 576.
Neoperkinsiella williamsi Muir 1926b: 17. N. Syn.

Dr. R. G. Fennah of the Commonwealth Institute of Entomology most kindly informed me of the new synonymy above. Fowler published an excellent habitus illustration with the original description,

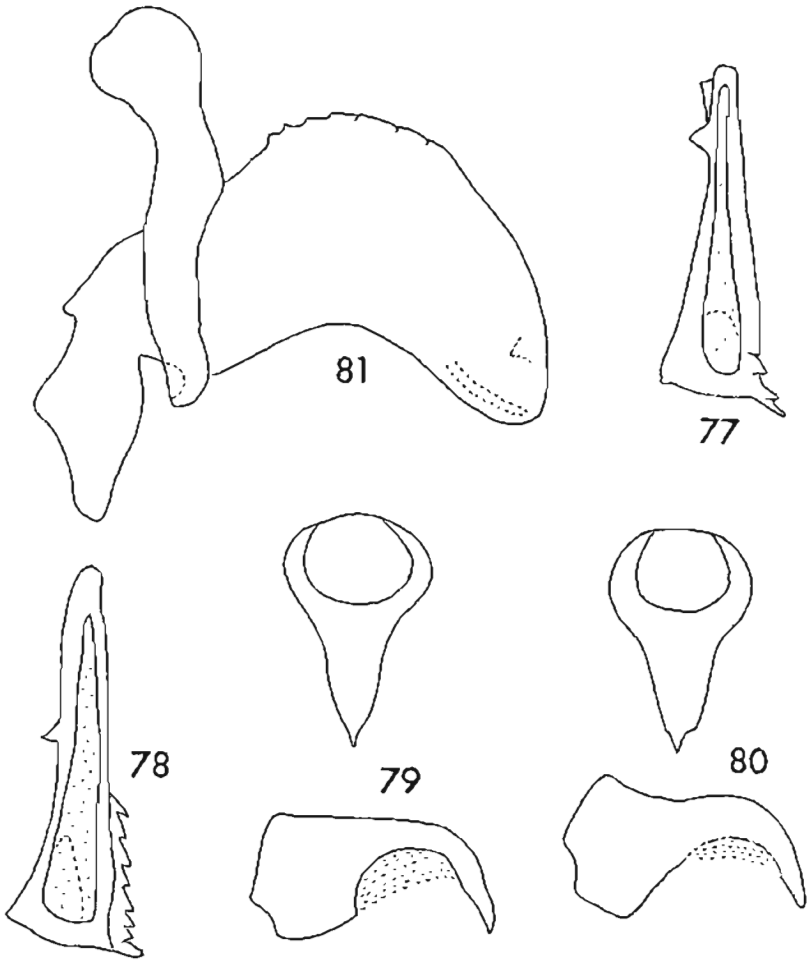

Fig. 77–81, *Stoboera koebeli*. 77, aedeagus in dorsal view (Orizaba); 78, same (Yautepec); 79, male anal segment in posterior view above and lateral view below (Yautepec); 80, same (Orizaba); 81, aedeagus in lateral view (Orizaba).

and Muir provided fine figures of the critical features of the male genitalia with his description of *N. williamsi*.

Type: Lectotype male with labels: "♂" and "Cerro Zunil" and "B. C. A. Homopt. I. Goniolcium testaceum, Fowl." and "Goniolcium testaceum" (handwritten). Repository of lectotype: British Museum (Nat. Hist.).

ACKNOWLEDGMENTS

Without the most generous cooperation of the persons and their institutions listed here, this study would not have been possible. To all of them I express my sincere thanks and deep gratitude for loans of type material and information vital to this study. Dr. Paul H. Arnaud, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California; Drs. R. D. Goeden and D. W. Ricker, Department of Entomology, Division of Biological Control, University of California, Riverside, California; Dr. J. Linsley Gressitt and Mrs. Carol Higa, Entomology Department, Bernice P. Bishop Museum, Honolulu, Hawaii; Dr. W. J. Knight and Dr. R. G. Fennah, Department of Entomology, British Museum (Nat. Hist.), London; Dr. Per Inge Persson, Department of Entomology, Swedish Museum of Natural History, Stockholm; and Dr. Charles A. Triplehorn, Department of Entomology, Ohio State University, Columbus, Ohio.

REFERENCES

All citations can be found in Metcalf, Z. P. 1944. Author's list, A–Z. A bibliography of the Homoptera (Auchenorhyncha) 1: 1–886.

SAWFLIES OF CHILE: A NEW GENUS AND SPECIES AND KEY TO GENERA OF TENTHREDINIDAE (HYMENOPTERA: SYMPHYTA)

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ABSTRACT—**Ucona acaenae**, new genus and new species, is described from Chile. This species was recorded under the name "*Antholcus varinervis* (Spinola)" in the literature relating to its importation into New Zealand where it was used as a biological control agent for *Acaena* spp. A key to the six genera of the family Tenthredinidae known from Chile is also included.

The sawfly family Tenthredinidae is not well represented in Chile. About 10 species are known, 3 of which are very similar in size and coloration and have often been confused. These species have the head and thorax shining black and most of the abdomen a contrasting red or orange. One species has long, erect black hairs covering the head, thorax and legs and has trifid tarsal claws. This is the species I am treating as *Trichotaxonus coquimbensis* (Spinola) (Smith, 1973). The other two species, both with short, inconspicuous hairs and bifid tarsal claws, are the main subject of this paper.

In 1851, Spinola described *Tenthredo varinervis* from Chile, a species

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which Konow (1904) recognized as belonging to a distinct genus which he called *Antholcus*. Konow also emended the species name to *varinervis*. In the late 1920's, a sawfly was found in Chile feeding on *Acaena*, a troublesome weed in New Zealand. This sawfly was imported to New Zealand for use as a biological control agent under the name *Antholcus varinervis* (Spinola). (The species name *varinervia* is an adjective and in combination with *Antholcus* it should be *A. varinervius*.)

While studying certain South American sawflies and attempting to identify some collections from Chile, I found that the name *varinervis* was incorrectly applied to the *Acaena*-feeding species. Though I was unable to locate the type of *varinervia* Spinola, it is evident from Spinola's description that the *Acaena*-feeding species is not the species he described. In *varinervia*, the abdomen is orange, the legs are orange except for each coxa, trochanter, and hindtarsus, the clypeus is emarginated, the third antennal segment is longer than the fourth segment, and, in the forewing, the second cubital cell receives both recurrent veins. In the *Acaena*-feeding species, the apex of the abdomen is black, the legs are mostly black except for the reddish hindtibia, the clypeus is truncated, the third antennal segment is the same length as the fourth segment, and, in the forewing, the second and third cubital cells each receive 1 recurrent vein. The only character mentioned by Spinola not in perfect agreement with my interpretation of *varinervia* is the petiolate anal cell of the forewing. However, after examining a number of specimens, I found that this character could apply to both species, but less so to *varinervia*. In the forewing of *varinervia*, vein 2A & 3A is complete, connected to 1A by an oblique crossvein, but, in some specimens, the portion of 2A & 3A basal to the crossvein is partially obliterated and the anal cell appears petiolate. Spinola may have seen specimens in which this vein was not evident. The *Acaena*-feeding species always has a petiolate anal cell in the forewing and vein 2A & 3A is atrophied with only the basal stub present, and this is curved up at its apex.

The sawfly imported into New Zealand represents a new genus and species and is described below. All references to the species feeding on *Acaena* and its importation into New Zealand apply to this new species.

Ucona Smith, new genus

Antenna long, slender, filiform, length about 3 times head width; first and second segments each longer than broad; third segment subequal in length to fourth segment; segments beyond third gradually decreasing in length. Clypeus truncate; malar space short, less than ½ diameter of front ocellus; no genal carina; postocellar area broader than long; each mandible bidentate; eyes small, far apart, scarcely converging below; distance between eyes below much greater than length of an eye. No prepectus; cenchri separated by distance greater than breadth of one.