Redescription of *Bradysia tritici* and *Bradysia reynoldsi* (Diptera:Sciaridae)

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The nomenclature and identity of *Bradysia tritici* (Coquillett) have been confused ever since Comstock (1882) mistakenly associated an adult sciarid with the larva and gall of *Cecidomyia ocellaris* Osten Sacken, 1862, describing it as the adult of the latter species. Brauer (1883) remarked that the adult was a sciarid and the larva a cecidomyiid. Mik (1884) apparently made the same discovery independently and discussed this problem. He indicated that the species should be named *Sciara ocellaris* Comstock, not *Sciara ocellaris* (Osten Sacken). However, according to the International Code of Zoological Nomenclature (1961, article 49), a "specific name used in an erroneous specific identification cannot be retained for the species to which the name was wrongly applied, even if the two species in question are in, or are later referred to, different genera."

Johannsen (1912) also followed Mik and credited *S. ocellaris* to Comstock and subsequent workers have accepted this usage. Tuomikoski (1960) placed *S. ocellaris* Comstock in *Bradysia,* and listed the following synonyms: *Sciara pectoralis* Staeger, sensu Edwards 1925; *Lycoria (Neosciara) tritici* (Coquillett), sensu Lengersdorf 1930; *Bradysia (Chaetosciara) rubicundula* Frey, 1948, and, provisionally, *Sciara tritici* Coquillett, 1859. Until the European specimens of this complex are examined, I hesitate to include his synonymies under *B. tritici.*

Since *B. ocellaris* could not be used for this species, Steffan (1965) selected the next oldest available name, *S. tritici* Coquillett, 1895, transferred it to the genus *Bradysia* and listed several synonyms, but, as Laffoon pointed out (pers. comm.), did not synonymize *S. johannseni* Shaw and *S. laffooni* Shaw except by inference. These two species were later synonymized by Steffan (1969). In the synonymy listed below, I have included references only to species which I have examined. There are many other references to *S. tritici* and *S. ocellaris* in the literature, but since many of these identifications are doubtful, I prefer not to include them.

The identity of *B. tritici* is further confused in that a very closely related and morphologically similar species, *Bradysia reynoldsi* Metz, 1938, was discovered and described by Metz. Since geneticists are cur-

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rently working with *B. tritici* and possibly closely related forms, clarification of its nomenclatorial status and redescription of both *B. tritici* and *B. reynoldsi* are necessary.

Coquillett (1895) described *S. tritici* from a series of 10 males and 15 females collected at the USDA insectary in Washington, D.C., from a jar containing wheat seedlings. The larvae were reported feeding on the roots and interior of the stems below the soil surface. *B. tritici* is commonly found in greenhouses and apparently has been transported throughout much of the world by man. The origin of this species is unknown and it may be composed of a complex of closely related species. In the Hawaiian Islands it is distributed throughout the lowlands and undoubtedly has been introduced by man.

Bradysia tritici (Coquillett) (Figs. 1a-h).

Sciara tritici Coquillett, 1895: 408, Fig. 48a-f.

Sciara ocellaris: Comstock, 1882: 203-204, Figs. 2, 2a, 2b, 4 (misidentification of *Cecidomyia ocellaris* Osten Sacken, 1862) (in part, not Figs. 1, 3, 3a, 3b, not gall, not reference to Osten Sacken's species); Mik, 1883: 128; 1884: 190-192; Johannsen, 1912: 138, Figs. 263, 265.

Sciara (Lycoriella) garretti Shaw, 1952: 494, Fig. 3; Hardy, 1960: 221-223, Figs. 70a-g (synonymy of *S. (L.) garretti, S. (L.) johannseni* and *S. (L.) laffooni).*

Sciara (Lycoriella) johannseni Shaw, 1952 (not *S. johannseni* Enderlein, 1912): 493, Fig. 1.

Sciara (Lycoriella) laffooni Shaw, 1952: 494-495, Fig. 4.

Bradysia tritici: Steffan, 1965: 290 (synonymy of *S. ocellaris:* Comstock and *S. garretti).*

Bradysia tritici: Steffan, 1969: 723, 725-727, Fig. 22a-i (synonymy of *S. johannseni* and *S. laffooni).*

Male. *Head.* Interfacetal hairs abundant, extending slightly beyond curvature of facets; eye bridge broadly joined, 3 facets wide throughout. Median ocellar bristle well developed. Antenna: setae of scape distinctly longer than those of pedicel, flagellomeres 1 and 2 densely covered with hyaline sensilla, flagellomere 4 (Fig. 1b) about 1.6-1.7 X as long as wide with short neck (about 0.2 X length), flagellar hairs about ½ diameter of segments. Prefrons with 2 long and stout and 12-16 moderately developed setae; clypeus bare with 1 seta. Palpus (Fig. 1c) 3-segmented; segment 1 swollen, distal 2/3 with distinct dorsal sensory pit and 3-6 dorsal setae; 2 with 5-7 distal setae; 3 with 6-7 setae.

Thorax. Acrostichals moderately developed, dorsocentrals distinctly longer. Scutellum with posterior row of long and stout setae, subequal to largest supra-alars with 2-3 rows of shorter setae anteriorly. Posterior pronotum bare; anterior pronotum with 1 stout posteroventral and 3 weaker median setae; proepisternum with 5-7 weaker, scattered setae, roughly arranged in single dorsoventral row. Proepimeron well devel-

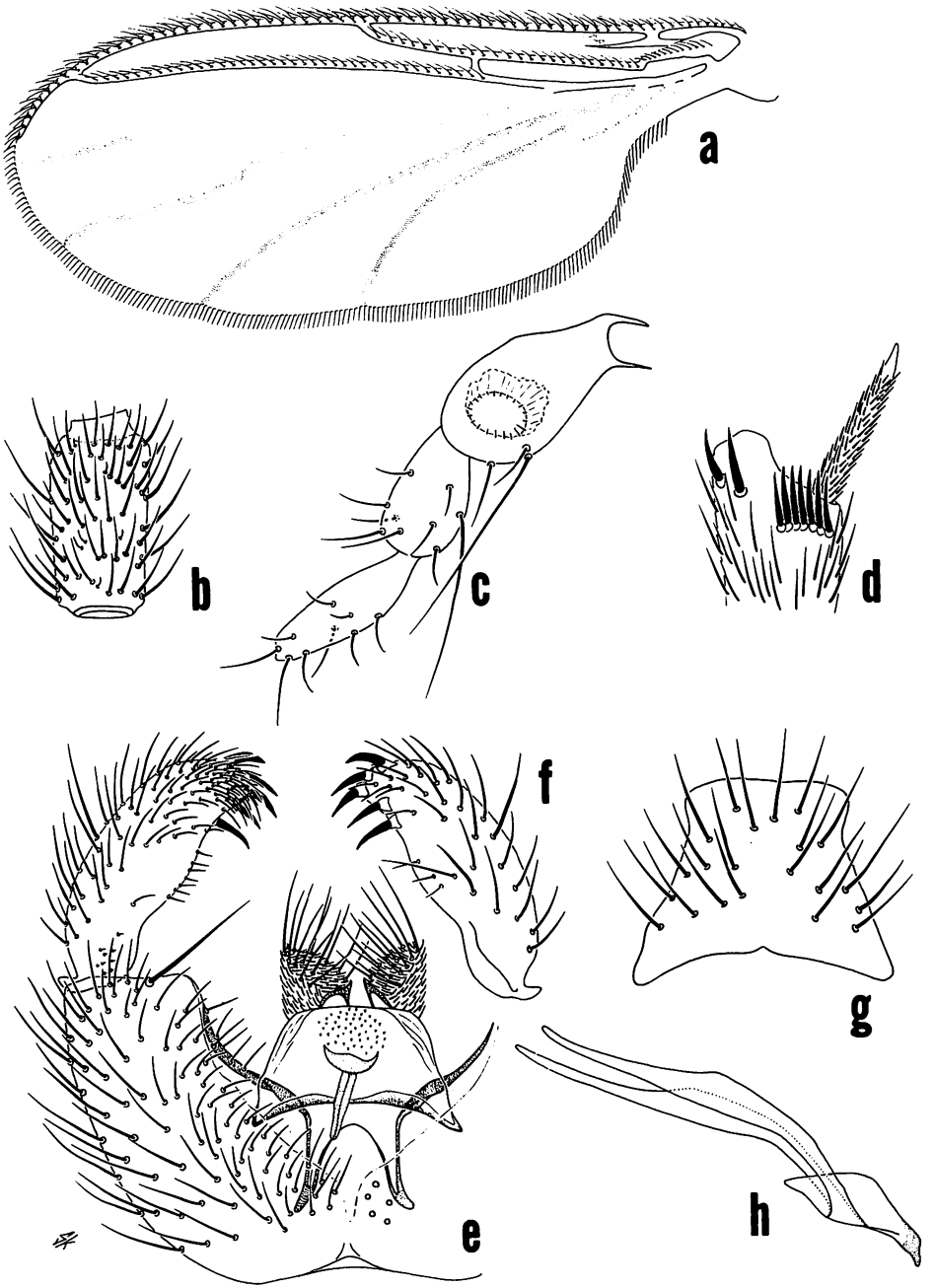

FIG. 1. *Bradysia tritici* (Coquillett), ♂, a, wing; b, flagellomere 4; c, maxillary palpus; d, apex of fore tibia; e, genitalia, ventral view; f, distimere, dorsal view; g, tergum IX; ♀, h, vaginal furca.

oped, wider posteriorly, posterior mesepimeron normal, about 1.25 X longer than wide, posterodorsal angle acute. Katepisternum with dorsal light stripe.

Legs. Foreleg: length of femur 0.54 mm, tibia 0.58 mm, basitarsomere 0.30 mm. Setae of fore and mid tibiae subequal; hind tibia with strong posterodorsal setae along distal half, length about equal to diameter of tibia. Fore tibial comb (Fig. 1d) single-rowed with 5-7 subequal setae distinctly separated from tibial vestiture by bare area. Apex of hind tibia with 9 differentiated setae; spurs distinctly longer than diameter of tibial apex.

Wing (Fig. 1a); length 1.9 mm; width 0.7 mm. R-M index 2.4, C-M index 0.6-0.7. Costa, R_1, R_5 and distal portion of r-m with dorsal setae, other veins bare; r-m subequal in length to bM. Cu 0.5-0.7 X length of bM. M and A evanescent. Halter with single row of dorsal setae.

Abdomen. Tergal setae slightly shorter than scutellars, sternal setae subequal to tergal setae. Sternum VIII with posterior row of setae. Male genitalia (Fig. 1e); tergum IX (Fig. 1g). Tergum X bilobed. Basimere ventrally broadly joined without median protuberance or differentiated setal groups. Mesoapical seta strong, about 2/3 length of distimere. Dorsal apodeme short and slender extending about halfway into genital cavity. Genital rod moderately long, slender and broadly forked. Tegmen (Fig. 1e). Distimere (Fig. 1f) about 0.9 length of basimere, about 3 X longer than wide with dense ventroapical setae and one apical, 2 mesoapical and 2 preapical mesal spines.

Female. Similar to male. *Wing length:* 2.1 mm.

Genitalia: Vaginal furca (Fig. 1h), stem greatly swollen medially, flattened laterally and heavily sclerotized anteriorly; arms joining stem near middle.

MATERIAL EXAMINED: Type series: 2 males, 3 females, labelled "#3627, on wheat, 17.85." This agrees with Coquillett's account in which he stated that the adults were collected 17 March 1885, at the U.S.D.A. insectary, Washington, D.C. One of the males is here designated as the lectotype and the slide is labelled as such. One hundred eight additional specimens were examined from the following localities: Washington, D.C., 25 February 1911 (W.R. Walton); 3 February 1917, on Graminae from Peking, China (F.H.B.). Virginia: Arlington Co.: Arlington: 12 March 1935, on sugarcane in greenhouse (F.W. Poos); 15 February 1940, reared from soil (J.W. Scrivener). Maryland: Prince George Co.: Beltsville: 1 December 1939, from vessel of water, Lot 39-295. Louisiana: Orleans Co.: New Orleans: 15 June 1938, feeding on roots of poinsettias in greenhouse (L.A. Hetrick). Panama Canal Zone: Barro Colorado Island: Harbour House: 30 August 1940 (J. Zetek). From Chile (?): Plant Quarantine, New York, 49083-84, 12 December 1935, in soil around cactus plants. Numerous specimens from Micronesia and the Hawaiian

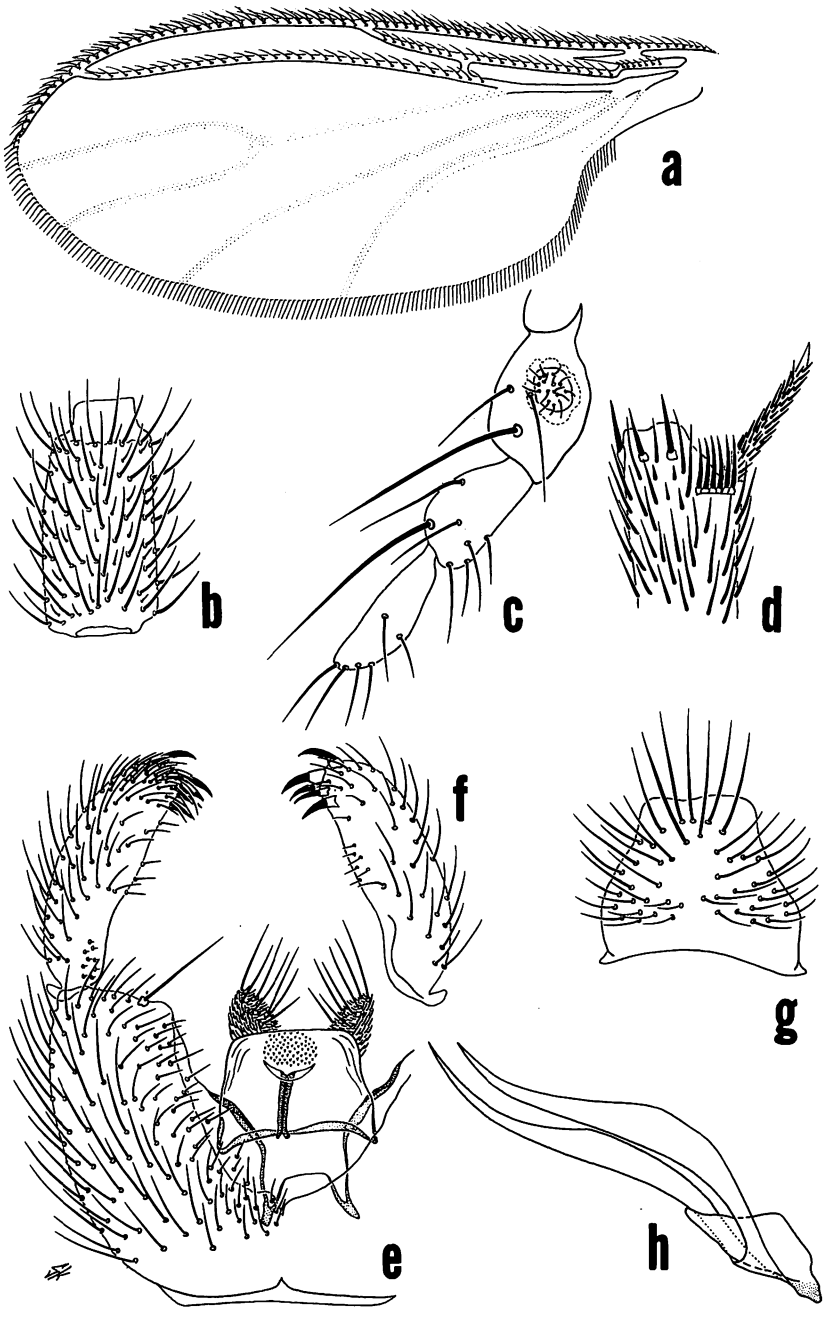

FIG. 2. *Bradysia reynoldsi* (Metz), ♂, a, wing; b, flagellomere 4; c, maxillary palpus; d, apex of fore tibia; e, genitalia, ventral view; f, distimere, dorsal view; g, tergum IX; ♀, h, vaginal furca.

Islands were also studied. Detailed locality records for Micronesia are given in Steffan (1969) and the Hawaii records will be published later.

Specimens from colonies studied by the following geneticists were also examined and identified as *B. tritici:* Dr. Helen V. Crouse, University of Florida, Tallahassee; Dr. Bolton Davidheiser, Johns Hopkins University, Baltimore, Maryland; Dr. Ellen Rasch, Marquette University, Milwaukee, Wisconsin; and Dr. André Perondini, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Discussion

B. tritici is very closely related to *B. reynoldsi,* both on the basis of external morphological characteristics and hybridization studies. Metz (1938) distinguished *B. tritici* (as *Sciara ocellaris*) from *B. reynoldsi* by the following combination of characters: the cubital cell is more prominent and wider in *tritici,* the length of the fore tibial comb in relation to that of the fore tibial spur is longer in *tritici,* and the apical segment of the ovipositor is longer in *tritici.* He also used the relative length of R to R_1 (see Steffan, 1968, for wing vein terminology) in his *tritici* material; R was much longer than R_1 in all his material, while in *reynoldsi,* R was usually only slight longer. These are all characters which are difficult to express accurately, and in a large series of specimens there does not seem to be a significant difference between any of them.

Detailed studies of morphological and chromosomal variation within populations of both species need to be made before any reliable characters can be found to consistently separate these two species. Unfortunately, the colony of *B. reynoldsi* is no longer available.

One character which may be of value is the relative length and shape of the dorsal apodemes in the male genitalia: in *B. tritici* they are long and slender while in *B. reynoldsi* they are shorter and blunter.

In the hybridization studies conducted by Metz and his students (Metz and Lawrence 1938, Rohm 1947, Crouse 1947), only a cross of *B. tritici* (as *S. ocellaris)* females X *B. reynoldsi* males will produce F_1 hybrids. The reciprocal cross yields no offspring. There are two strains of *B. tritici,* a unisexual strain in which chromosome C at metaphase is a rod and a bisexual strain in which it is V-shaped. These strains are interfertile. *B. reynoldsi* is bisexual and chromosome C is also V-shaped. Crouse (1947) postulates that *reynoldsi* is a derivative of bisexual *tritici* (or vice versa).

Bradysia reynoldsi (Mertz) (Figs. 2a-h)

Sciara reynoldsi Metz, 1938: 177.

Male. *Head.* Interfacetal hairs abundant, extending well beyond curvature of facets; eye bridge broadly joined, 3 facets wide. Median ocellar bristles well developed. Antenna: setae of scape distinctly longer

but less numerous than those of pedicel; flagellomeres 1 and 2 densely covered with hyaline sensilla, flagellomere 4 (Fig. 2b) about 2.0-2.4 X as long as wide with short neck (about 0.15 length), flagellar hairs slightly more than 1/2 as long as diameter of segments. Prefrons with 2 long and stout and 12-32 moderately developed setae, clypeus bare or with 1 or 2 median setae. Palpus (Fig. 2c) 3-segmented, segment 1 swollen, distal 2/3 with deep dorsal sensory pit and 2-3 dorsal setae, 2 with 8 distal setae and 3 with 5-6 setae.

Thorax. Acrostichals moderately developed, dorsocentrals strong. Scutellum with posterior row of long and stout setae, with 2-3 rows of shorter setae anteriorly. Posterior pronotum bare, anterior pronotum with 1 stout ventral and 4 weaker median setae; proepisternum with 10 strong setae, with distinct ventral patch of 4 or more setae. Proepimeron well developed. Posterior epimeron of mesothorax generally subequal in width, about 1.6 X longer than wide. Metanotal apodeme moderately long and broad. Katepisternum with dorsal light stripe.

Legs. Foreleg: length of femur 0.52 mm, tibia 0.60, basitarsomere 0.34 (range of femoral length 0.50-0.56 mm). Setae of fore and mid tibia subequal; hind tibia with moderately developed posterodorsal setae along distal half, length about equal to diameter of tibia. Fore tibial comb (Fig. 2d) single-rowed with 7-8 subequal setae. Apex of hind tibia with 12 enlarged setae; spurs distinctly longer than diameter of tibial apex.

Wing (Fig. 2a); length 1.7-1.9 mm, width 0.6-0.7 mm. R-M index 1.9-2.0; C-M index 0.7-0.8. Costa, R^1 and R^5 with macrotrichia, other veins bare; r-m 0.6-0.9 X length of bM. Halter with single row of dorsal setae.

Abdomen. Tergal setae shorter than scutellars, sternal setae slightly shorter than tergal setae. Sternum VIII with 1-3 apicolateral setae; male genitalia (Fig. 2e); tergum IX (Fig. 2g). Basimere ventrally broadly joined without differentiated setal groups. Mesoapical seta strong, about 2/3 length of distimere. Dorsal apodeme short, extending less than halfway into genital cavity, expanded posteriorly. Genital rod moderately long, slender and broadly forked apically. Tegmen (Fig. 2e). Distimere (Fig. 2f) about 0.8 length of basimere, about 3 X longer than wide with dense ventroapical setae and 1 stout apical, 2 mesoapical and 2 preapical spines.

Female. Similar to male. *Wing length:* 2.1-2.4 mm.

Genitalia: Vaginal furca (Fig. 2h) stem greatly swollen medially, flattened laterally and heavily sclerotized anteriorly, arms joining stem near middle.

MATERIAL EXAMINED: Holotype male, Alabama: Jefferson Co.: Birmingham: (J.P. Reynolds). Cornell type No. 2119. O.A. Johannsen Lot 2561-64. Paratypes: 11♂♂, 10♀♀, same data.

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