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## *Scirtothrips perseae* (Thysanoptera: Thripidae), a new species infesting avocado in southern California

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**Abstract:** *Scirtothrips perseae* new species is described. It is a pest of avocado in southern California.

**Key Words:** *Scirtothrips, perseae* n. sp., Thysanoptera, Thripidae, avocado, southern California

During June of 1996, an unknown species of *Scirtothrips* was discovered damaging fruits and foliage of avocado, *Persea americana* Mill., in Saticoy and Oxnard, Ventura County, California. By July of 1997, infestations were found in avocado groves and backyard plantings in seven counties of southern California, from San Diego county adjacent to Mexico and north into San Luis Obispo county.

Two native *Scirtothrips* species in California are infrequently found on avocado trees. Although found on several other plants, *S. aceri* Moulton apparently breeds on oak leaf (*Quercus* spp.), and is not a pest. The polyphagous *S. citri* Moulton is a pest of *Citrus* in California, but there is no evidence that it damages or breeds on avocado. Individuals of *Scirtothrips astrictus* Mound and Marullo were recently found on avocado trees showing signs of damage at Cartago and Zarcerro, Costa Rica. The three species are further discussed and differentiated in the comments for the new species.

All described species and specimens of several undescribed species in *Scirtothrips* were examined in an attempt to locate the origin of this new species. Although none matched the new species, several similar specimens were examined from Mexico and Central America. The species is described here to provide a scientific name for biological and control studies now in progress.

### *Scirtothrips perseae*, new species

Suggested Common Name: Avocado thrips

**Female** (macropterous). Body generally yellow, head with ocellar crescent red, light brown shade present or absent from interocellar area, area of eyes brown; pronotum with brown separate spots or spots coalesced, aligned diagonally posteriorly (Fig. 3); mesonotum brown in anterior 1/2; metanotum with pale brown shade on posterior part of metascutum and anterior part of metascutellum; abdominal tergites II-VIII with antecos-

tal ridges completely brown, shaded light brown anteriorly and posteriorly of ridge, submarginal brown spot on each side on tergites II-VII; a small brown spot on pleurite II; sternal antecostal ridges brown on IV-VII; forecoxa shaded pale brown, all femora light yellow with 2 or 3 pale brown spots dorsally, proximal 1/2 of all tibiae shaded pale brown, distally yellow. Forewings grayish brown, lighter distally, scale completely grayish brown, veins with orange pigments. Setae brown. Antennal segment I pale as head, II-VIII brown except pale in pedicel, basal and subbasal area separated by brown ring on segment III, and subbasal ring on segments IV-V.

Antenna (Fig. 1). About 3 times longer than head; segments with convex sides, III and IV constricted distal of forked sense cones, base of VI not pedicellate; forked sense cones on segments III-IV rather thick, U-shaped, 24  $\mu$ m long, about 3  $\mu$ m thick near base; inner simple sense cone on VI arising at about midlength of segment, 35-37  $\mu$ m long, extending distally to about midlength of VIII.

Head (Fig. 2). About as long as pronotum, 1.5 times broader than long at occiput, slightly broader at eyes, cheeks rather straight or slightly converging caudally posterior of small bulge just behind compound eye, occiput about 2/5 as long as eyes; posterior part of head with close-set transverse striae, interocular area and vertex with striae far apart or reticulated. Compound eyes with 4 pigmented facets in two transverse rows. Diameter of ocellus 11-15  $\mu$ m. Ocellar seta I anterior of fore ocellus, normally longer than other ocellar setae, seta II anterolaterad of fore ocellus near mesal margin of eye, seta III short, posterior of and separated by about diameter of fore ocellus, inside ocellar triangle; 2 pairs of developed postocular setae between compound eyes. Mouthcone conical, reaching posterior margin of prosternum; mandible 100 (90-100)  $\mu$ m long.

Pronotum (Fig. 3). 1.7-1.8 times broader than long; sculpture close-set, transversely aligned.

Discal and marginal setae except those on posterior margin 17(17-22), 5 or 6 setae in medial row, longest 20(20-24)  $\mu\text{m}$ ; posteromarginal setae rather short, B2 setae (Fig. 3b) 0.25-0.32 as long as pronotum, 1.2-1.6 times longer than B1 setae (Fig. 3a), 1.2-1.3 times longer than B3 setae (Fig. 3c), B4 setae shortest. Mesonotum. Transversely sculptured, striae weak anteriorly; median setae far anterior of posterior margin, 20(23-25)  $\mu\text{m}$  long. Metanotum. Sculptured medially with longitudinally aligned elongate reticles followed posteriorly by wider reticles; median setae posterior of anterior margin by 10(7-18)  $\mu\text{m}$ , 20(17-30)  $\mu\text{m}$  long; lateral setae 24(17-33)  $\mu\text{m}$  long.

Forewing. Rather straight, apically pointed; fringe cilia wavy, 22(21-23); costal setae 26(27-29), 37(32-40)  $\mu\text{m}$  long at midlength, about as long as width of wing; forevein with groups of 3-4 and 4-6 setae in proximal 1/2, distal 1/2 with 4 setae, occasionally 3 setae; hindvein with 3 setae; scale with 4 marginal and 1 discal seta.

Abdomen. Pair of median discal setae on tergites II-VI separated usually by less than their length, on tergite IV 17(15-17)  $\mu\text{m}$  long, separated by 0.30(0.30 to 0.66) of their length, on V 18(17-20)  $\mu\text{m}$  long, separated by 0.50(0.25 to about 1.00) of their length; microtrichial field on each side of tergites III-VI with 3 discal setae, about 14 discal rows of microtrichia between D2-D3 setae; tergite VIII without median discal microtrichia (Fig. 4), posteromarginal comb complete, with about 41(35-42) long microtrichia, longest 20-22  $\mu\text{m}$ , minute microtrichia between longer ones; tergite IX without median discal microtrichia, B1 setae longer than tergite X; tergite X shorter than IX, Sternites with microtrichial band extending to level of B2 setae; median sculpture lines and median posterior margin without microtrichia; ovipositor 185(175-198)  $\mu\text{m}$  long.

**Male** (macropterous). Similar to females in color except abdomen without brown antecostal ridges or lateral spots.

Most anatomical characters similar to that of female, but smaller. Head with interocellar area reticulated. Forewing with 23-24 costal setae; fore vein with groups of 3-4 and 3-5 setae in proximal 1/2, 2-3 setae in distal 1/2; hind vein with 3 setae, occasionally 4. Abdominal tergite IX with pair of drepanae curved mesally (cf. Fig. 5a); dorsal setae 3 pairs (cf. Fig. 5b), aligned diagonally posteromesad, median pair 54-62  $\mu\text{m}$  long, next laterad pair subequal to median pair, third laterad pair shortest.

Measurements of holotype and female (paratypes) in  $\mu\text{m}$ . Body length 914-988 compacted, 1082(1044-1092) distended. Antenna: Total length 237(244-257); length and width of segment I 17(17-20), 23(22-24); II 35(35-40), 25(24-30); III 45(48-50), 20(20-22); IV 42(45-48), 19(18-20); V 37(35-40), 16(16-17); VI 42(42-48), 17(15-17); VII 7(7), 7(7); VIII 12(11-12), 5(4-6).

Length of head from apex of vertex (91-96), length of compound eye 62(62-69), length of occiput posterior of compound eye 24(24), width at compound eye 151(146-163), width between compound eyes 62(54-69), width at cheeks 146(136-165). Length of pronotum 98(100-104). Forewing length 669(679-756), width at midlength 37(37-40). Length of abdominal tergite IX 69(67-74), tergite X 45(42-50). Length of setae: Ocellar setae I 21(17-24), II 18(15-20), III 16(15-20); POi 22(17-22), POii 20(17-20); pronotal B1 setae 20(17-20), B2 setae 24-28(27-32), B3 setae 20(17-25), B4 setae about 11(10-12); abdominal tergite IX B1 setae 67(57-64), B2 setae 62(62-64), tergite X B1 setae 59(62-70).

Measurements of male paratypes in  $\mu\text{m}$ . Body length 783-865 long, distended. Antenna: total length 224-230 long; length of segment I 17, II 35, III 42-48, IV 40, V 35-1137, VI 37-38, VII 7, VIII 11. Forewing length 595; width at midlength 30.

**Larva.** Second instar larva generally white; head with pale anteromedian gray band running from vertex to venter between bases of antennae; abdominal tergite IX with pale gray band from D1 setae (Fig. 6a) to laterad of D2 setae; tergite X with pale gray band from D1 setae laterad; legs partially gray and white. Antennal segment I gray with apex white, II and III gray with bases and apices white, IV-VII gray.

Sense cone on antennal segment IV about as long as segment VII. Head not reticulated; with D1, D3 and D5 setae apically pointed, D2 and D4 setae apically expanded; pronotum not reticulated; dorsal setae apically pointed, except D6 setae thicker, longer and apically expanded. Forefemur with medio-dorsal setae pointed apically (Fig. 7a); mid- and hindfemur each with 1 subapical setae, thicker, expanded apically. Abdominal tergite IX with D2 setae apically expanded (Fig. 6b), longer than apically pointed D1 setae (Fig. 6a); tergite X with D1 setae acuminate, longer than acuminate D2 setae.

First instar larva generally white. Dorsal chaetotaxy similar to second instar larva except 1 medio-dorsal seta apically expanded on forefemur

and D1 setae on abdominal tergite X apically expanded.

**Type Material.** Holotype ♀, 11 ♀ and 8 ♂ paratypes, Oxnard, Ventura Co., California, *Persea americana* Mill., 15-VIII-96, Penrose, Asakawa, Bronson, Laird (96-06000) (USNM). Other paratypes from California: 3 ♀, 2 ♂, 10 larvae, Saticoy, Ventura Co., *Persea americana*, 24-VI-96, T. Dimock and C. Gribble (452689); 2 ♀, 1 ♂, Irvine, Orange Co., 14-VIII-96, R. Penrose, N. Nisson (96-06001); 17 ♀, 2 ♂, Highway 118, Ventura Co., Hass avocado, 6-VII-97, M. Hoddle; 6 ♀, La Loma Rd., Ventura Co., Hass avocado, 6-VII-97, M. Hoddle. Paratypes deposited in British Museum of Natural History, London; Bohart Museum, University of California, Davis; California Department of Food and Agriculture, Sacramento; Department of Entomology, University of California, Riverside; Florida Collection of Arthropods, Gainesville; Forschungsinstitut un Naturmuseum Senckenberg, Frankfurt am Main, Germany; and U.S. National Museum of Natural History (USNM).

**Distribution:** California (Los Angeles, Orange, Riverside, San Diego, San Luis Obispo, Santa Barbara and Ventura Counties).

**Collected from:** *Persea americana* Mill.

**Etymology:** Species is named after the generic name of its recorded host, *Persea*.

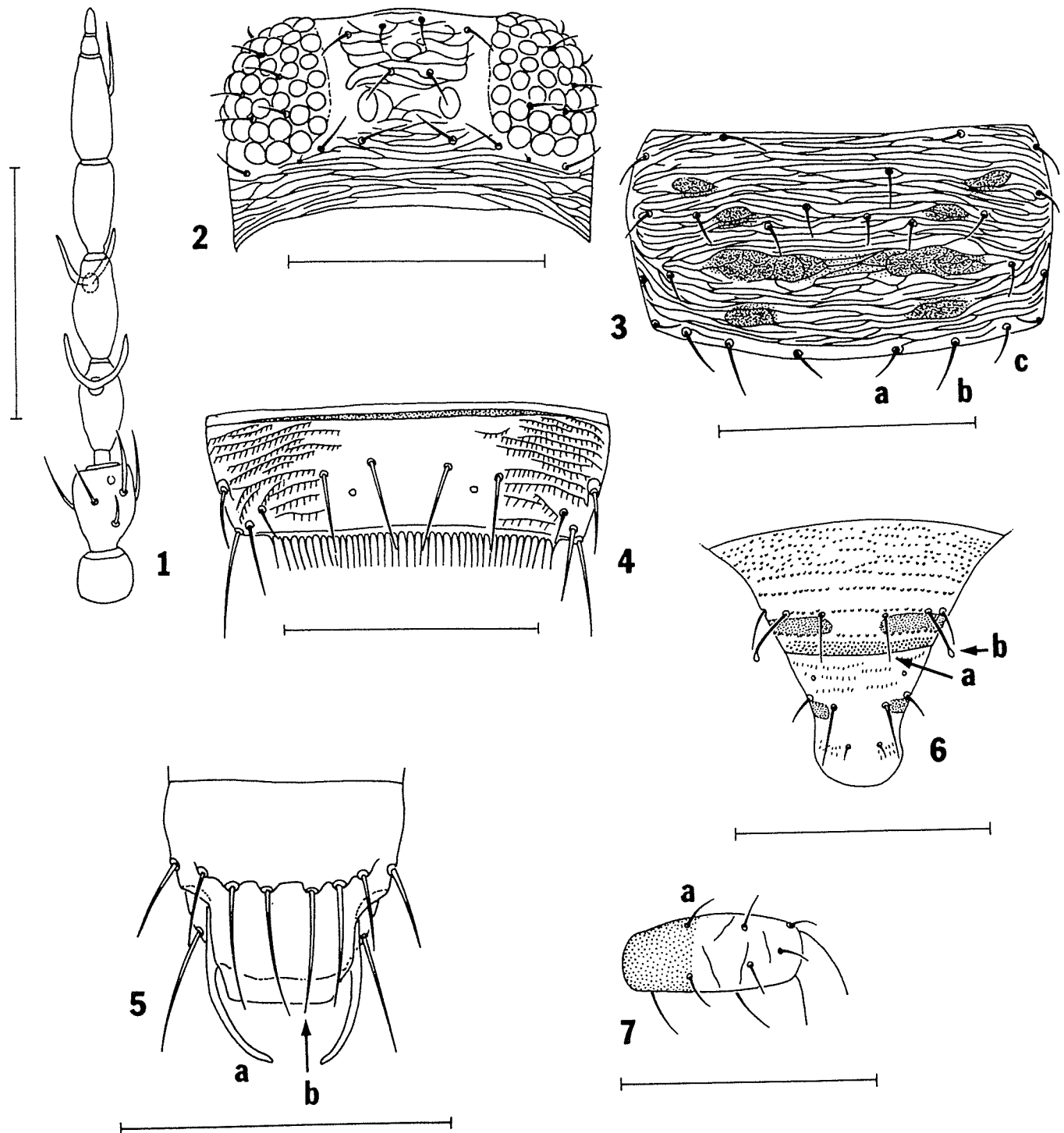
**Economic Importance.** This species feeds on avocado foliage and immature fruits. Lightly damaged immature fruits mature but the quality is reduced because of the scarring blemish on the skin. Heavily scarred immature fruits do not develop. The leaves become cup-shaped and bronzed. (M. Hoddle, pers. comm.).

**Comments.** In the Nearctic Region, this species is similar to *S. aceri* in coloration and most anatomical characters. The distinguishing characters of *S. aceri* are the short (5-7 µm) median setae on abdominal tergites III-VI whose bases are separated by more than 3 times their length, the interocellar area lacks sculpturing, and slight differences in coloration of basal antennal segments and brown maculation on the abdomen. In contrast, the median setae of *S. perseae* are 15-20 µm long on tergites III-VI and whose bases are separated at most by about their length but usually are closer, and the interocellar area is sculptured (Fig. 2). *Scirtothrips citri* has a pale yellow body without brown maculation. It usually has 5-8 discal setae on each side of abdominal tergites III-VII in contrast to 3 discal setae in *S. perseae* and *S. aceri*. The brown maculations of *S. astrictus* from Costa Rica is similar but

more extensive than in *S. perseae*. It has ocellar seta III positioned between the posterior ocelli and a row of median discal microtrichia is present along the posterior margin of abdominal tergite VIII. In *S. perseae* the ocellar seta III is positioned between the anterior and posterior ocelli, and abdominal tergite VIII lacks discal microtrichia in the median area (Fig. 4).

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Figures 1-4. *Scirtothrips perseae*. Adult. 1. Antenna. 2. Head. 3. Pronotum; a. B1 seta, b. B2 seta, c. B3 seta. 4. Abdominal tergite VIII. Figure 5. *Scirtothrips aceri*. Abdominal tergite IX and X; a. drepana, b. dorsal seta. Figures 6-7. *Scirtothrips perseae*. Larva. 6. Abdominal tergites IX and X; a. D1 seta, b. D2 seta. 7. Forefemora and part of tibia; a. middorsal seta. Scale: = 0.1 mm.