The Thrips (Thysanoptera) Liothrips xanthocerus (Phlaeothripidae) and Neohydatothrips catenatus (Thripidae) Inhabit Leaf Clusters on Pluchea sericea (Asteraceae)

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THE THRIPS (THYSANOPTERA) *LIOTHRIPS XANTHOCERUS* (PHLAEOTHRIPIDAE) AND *NEOHYDATOTHRIPS CATENATUS* (THRIPIDAE) INHABIT LEAF CLUSTERS ON *PLUCHEA SERICEA* (ASTERACEAE)

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Liothrips xanthocerus Hood is the only thrips that has been collected from *Pluchea sericea* (Nutt.) Cov. (Asteraceae) leaves in California (Cott 1956; Bailey 1957; Hoddle et al. 2008). Collections have only found adults, also taken from willow (Salicaceae, *Salix* sp.) and creosote bush (*Larrea tridentata* [DC.] Cov.) (Cott 1956). *Pluchea sericea*, or arrowweed, is an erect, slender-stemmed, willow-like shrub that grows to 4 m in height, frequently in wet soils, and produces silvery leaves 1-4 cm long and 3-6 mm wide (Munz 1974). It occurs at elevations below 1000 m from California to Texas, north into Nevada and Utah and south into northern Mexico (Nesom 2006). Cott (1956) commented that collected *L. xanthocerus* adults may be strays, because larvae of the species have not been found. Here I describe the eggs and larvae of *L. xanthocerus* on *P. sericea* and report a second thrips species, *Neohydatothrips catenatus* (Hood), which also inhabits the plant's leaf clusters.

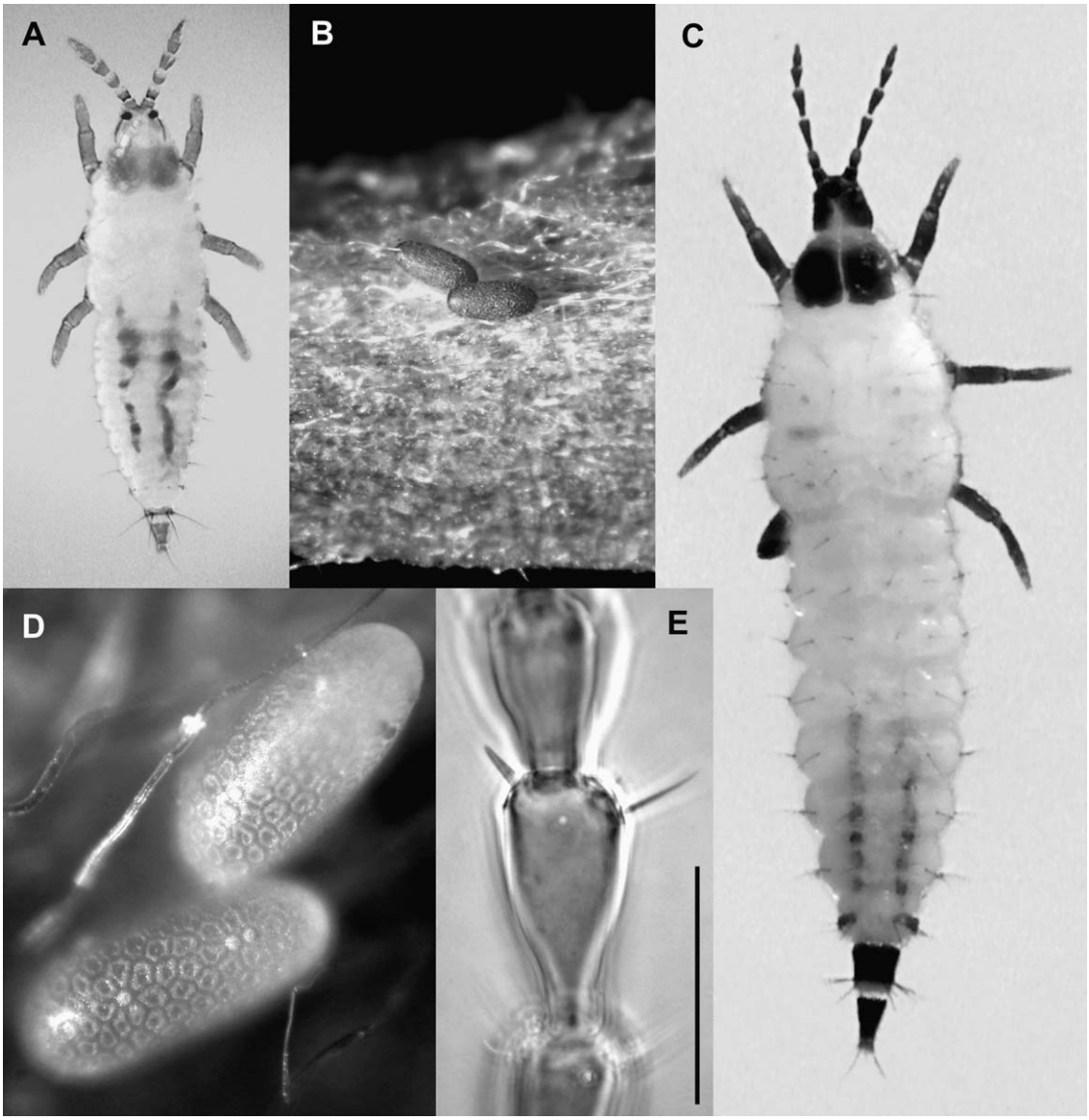
I collected thrips from *P. sericea* at 3 localities during 28 Apr-15 Sep 2010. One locality (34°46'N 114°32'W, 140 m elevation) was near Topock in Mohave County, Arizona. The second locality (33°17'N 114°41'W, 67 m) was 135 km south along the river near Cibola in La Paz County, Arizona. The third locality (35°10'N 114°41'W, 571 m) was at Hiko Springs near Laughlin in Clark County, Nevada. The first two, floodplain localities lie within the Sonoran Desert, whereas the third locality intersects the Sonoran and Mojave Deserts. All 3 sites contain moist soils from shallow groundwater or irrigation. Terminal leaf-clusters on apical and lateral stems were plucked and examined for all life stages of thrips. I mounted adults on slides and identified them as *L. xanthocerus* (Cott 1956; Mound & Kibby 1998) and *N. catenatus* (Hood 1957 [as *Sericothrips catenatus*], Mound & Kibby 1998; Hoddle et al. 2008) with the latter verified by S. Nakahara (USDA-ARS-SEL, Beltsville Maryland; lot no. 1102723). Vouchers of adults of both species and second-instar larvae of *L. xanthocerus* were deposited at the Entomology Museum, University of California, Riverside.

Eggs of *L. xanthocerus* were found on top of the dense trichomes that cover *P. sericea* leaves (Fig. 1B). They were oviposited parallel to the leaf surface. Eggs (n = 10) are 0.35-0.39 mm long and 0.15-0.17 mm wide. The chorion is sculptured with the 4- or 5-sided polygons (Fig. 1D) characteristic of Tubulifera (Heming 1991).

Larvae of *L. xanthocerus* were found within terminal leaf-clusters on apical and lateral stems. Second-instar larvae (Fig. 1C) were differentiated from first instars (Fig. 1A) by their longer antennal segments. First instars (n = 28) are 0.7-1.1 mm long, and second instars (n = 36) are 1.2-2.2 mm long. Both larval instars are mostly yellowish-white with darker sclerotization visible dorsally on the antennae, head, anterior pronotum (in paired plates), legs, and abdominal segments IX-X (Fig. 1A, C). Small, lateral plates on abdominal segment VIII also are sclerotized in second-instar larvae (Fig. 1C). The head, mouth cone, and coxae are sclerotized in ventral view. The mouth cone, coxae, and small sclerotized-plates above the middle and hind coxae are translucent. Remaining sclerotization is brown in first instars and blackish brown in second instars. Black malpighian-tubules are visible in both larval instars (Fig. 1A, C). Overall patterns of sclerotization in first and second instars resemble those on the phlaeothripid *Haplothrips verbasci* (Osborn), and sclerotization on the head and prothorax resembles that on *Liothrips* sp. (Figs. 28.5, 28.10 and 28.94; Heming 1991).

Antennae are 7-segmented in both larval instars of *L. xanthocerus*. The terminal segment on first instars is darkened. The completely dark antennae on second instars (Fig. 1C) contrast with the yellow coloration of segments III-VII on adults (see Hoddle et al. 2008). Antennal sense-cones on second instar larvae, examined on cleared specimens with phase contrast, are arranged similar to those on other tubuliferans (Figs. 28.97-28.99; Heming 1991). They occur apically on the outside, inside, outside, and outside-top of segments III-VI, respectively, with a second, shorter sense cone on the outside of segment IV. The sense cones are straight (Fig. 1E), similar to *Liothrips mikaniae* (Priesner) (Cock 1982) but differing from *Liothrips russelli* (Hood) (Fig. 28.98; Heming 1991).

Larvae and adults of *L. xanthocerus* were observed at Topock on 14 May & 15 Sep 2010, indicating at least 2 generations per year. The absence of life stages within leaf clusters at Hiko Springs on 26 Jan 2011 suggests the species does not overwinter on plants.



Figs. 1. Immature stages of *Liothrips xanthocerus* on *Pluchea sericea*. A, first instar larva; B, eggs on leaf; C, second instar larva; D, close-up of eggs; E, inside sense-cone (at left) on right antennal segment IV of cleared second-instar larva in phase contrast (vertical bar is 50 μm).

Larvae and male and female adults of the terebrantian *N. catenatus* were also found in *P. sericea* leaf clusters. The species was distinctive due to grey patches on the pronota of adult females (Hood 1957; Hoddle et al. 2008). Second instar *N. catenatus* and first instar *L. xanthocerus* larvae were similar in size. Larvae of the 2 species were distinguished by the prominent setae on the terminal abdominal segments in Phlaeothripidae but not Thripidae (Figs. 28.4-28.5 and 28.9-28.10; Heming 1991).

Quiescent instars of *L. xanthocerus* and *N. catenatus* were not found within leaf clusters. Berlese-funnel samples of soil beneath *P. sericea* at Hiko Springs yielded 1 second-instar pupa, recognized by its long wing pads (Fig. 28.17; Heming 1991), of *L. xanthocerus* on 31 May 2010 and abundant second-instar larvae, pupae, and adults of *N. catenatus* on 16 Jun 2010. *Pluchea sericea* may be the primary, if not the only, host of *L. xanthocerus*. The record on willow may have been a misidentification of arrowweed, and development on the co-occurring but dis-

similar *L. tridentata* seems unlikely. *Liothrips* species generally are phytophagous (Cott 1956). *Neohydatothrips catenatus* was first recorded on unspecified desert-shrubs in southern Arizona (Hood 1957) and has been collected on *Hyptis emoryi* Torrey (Lamiaceae) (Hoddle et al. 2008). This Sonoran desert shrub borders the lower Colorado River north into southern Nevada (Turner et al. 1995), and scattered *H. emoryi* occur at Hiko Springs. Both *P. sericea* and *H. emoryi* produce leaves densely covered with trichomes. Different life-histories between thrips species, such as methods of oviposition, may facilitate their coexistence as herbivores within *P. sericea* leaf clusters.

Summary

Larvae of the tubuliferan thrips *Liothrips xanthocerus* Hood and larvae and adults of the terebrantian thrips *Neohydatothrips catenatus* (Hood) are reported for the first time inhabiting terminal leaf clusters on apical and lateral stems of *Pluchea sericea*, a desert riparian plant of southwestern North America. Eggs and first and second instar larvae of *L. xanthocerus* are photographed and described.

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