PROC. ENTOMOL. SOC. WASH.
88(1), 1986, pp. 127–130

A NEW NEARCTIC SPECIES OF *CONTARINIA* (DIPTERA: CECIDOMYIIDAE) RECENTLY INTRODUCED INTO HAWAII ON *CUPRESSUS* (CUPRESSACEAE)

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Abstract.—*Contarinia* ***rugosa,*** n. sp., is described from specimens taken from buds of Arizona cypress in Hawaii. The new species was introduced into Hawaii on infested plants from California. The new taxon forces a redefinition of *Contarinia* to include species with short ovipositors.

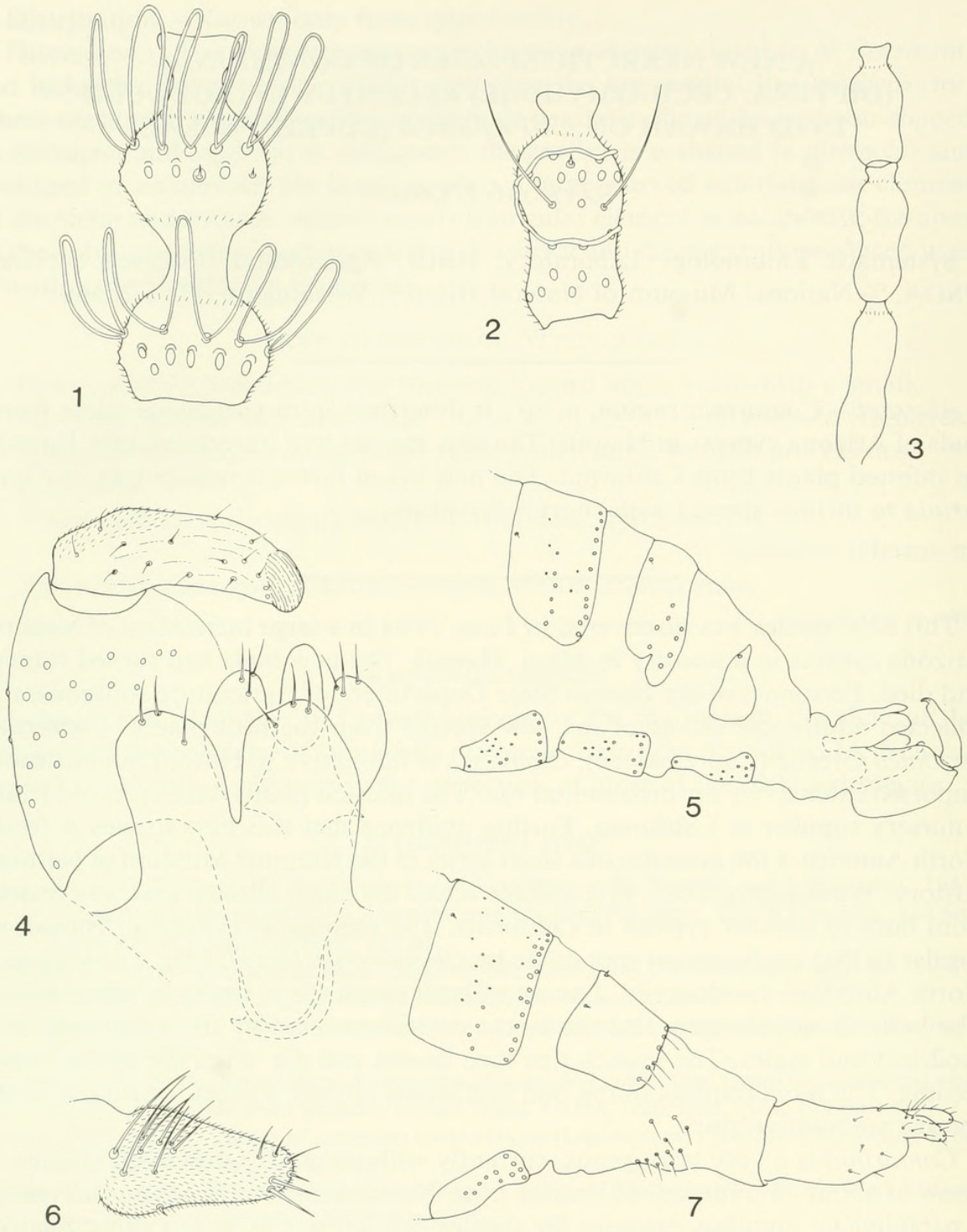
This new species was discovered in June, 1984 in a large infestation of buds of Arizona cypress in a nursery in Maui, Hawaii. The new buds had turned brown and died. Personnel of the Hawaii State Department of Agriculture subsequently collected adults and larvae of the new species from the host plants, *Cupressus arizonica* Greene (Cupressaceae). *Cupressus* is not native to Hawaii but has been imported extensively for ornamental use. The infested plants were received from a nursery supplier in California. Further evidence that this new species is from North America is the presence of a short series in the National Museum of Natural History, Washington, D.C., of a similar if not the same species that was reared from buds of another cypress in California. The damage to cypress in Hawaii is similar to that on *Juniperus* spp. made by *Oligotrophus betheli* Felt, a widespread North American cecidomyiid. Larvae of both species live singly in apical buds. The buds do not elongate and the larvae remain covered by the apparently unmodified bud scales. The branch tips turn brown and die when the larvae cease feeding. The larva pupates in the bud and adults emerge a short time later. Both species are multivoltine.

Contarinia is a very large genus, currently with about 275 described species. I know of about 45 undescribed species from North America. The genus serves as a paraphyletic omnibus category for species that do not fit in any other related genus. The short ovipositor and rugose larval integument make this new species unique in *Contarinia.*

Contarinia rugosa Gagné, NEW SPECIES

Figs. 1–9

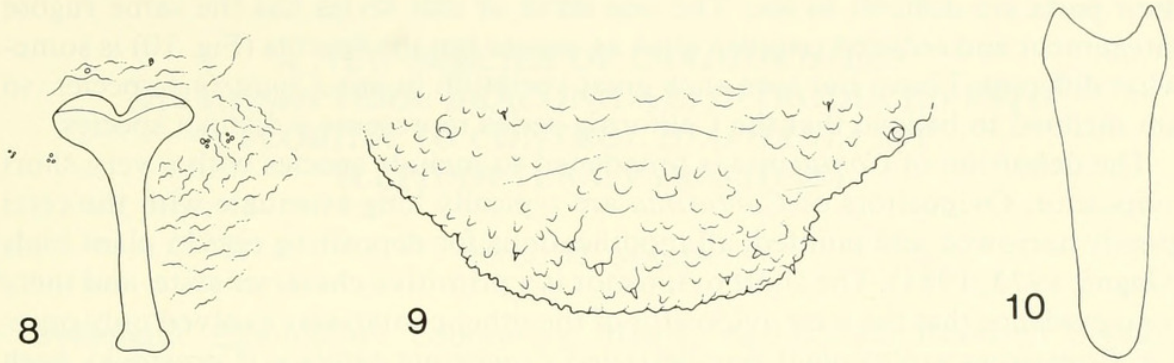
Adult.—*Head:* Eyes large, about 7 facets long at vertex, facets circular, contiguous except near midheight of eye where they are up to ⅓ facet diameter apart. Occiput rounded, without peak. Frontoclypeal setae 3–4 per side. Labella hemispherical in frontal view, each with 3–4 setae. Palpus 4-segmented. Male antennal flagellomeres binodal, bicircumfilar, the circumfilar loops attaining the next distal



Figs. 1–7. *Contarinia rugosa.* 1, Male third flagellomere. 2, Female third flagellomere. 3, Female first through third flagellomeres. 4, Male terminalia (dorsal). 5, Male abdominal segments 6 to end (lateral). 6, Female abdominal segments 7 to end (dorsolateral). 7, Female cercus (dorsolateral).

node (Fig. 1). Female antennal flagellomeres 1–3 as in Fig. 3; circumfilar loops appressed (Fig. 2).

Thorax: Scutum with sparse setae placed mostly in a single row that is interspersed with few scales. Mesanepisternum with few scattered scales on dorsal half. Mesepimeron with 7–10 setae. Wing length: male, 1.7–2.0 mm (1.8, avg. of 4);



Figs. 8–10. *Contarinia rugosa.* 8, Larval spatula and adjoining papillae. 9, Larval terminal segments (dorsal). 10, *Contarinia* sp., larval spatula.

female, 1.7–2.3 (2.0, avg. of 6). Rs slightly bowed apically, joining C behind wing apex; C broken at juncture with Rs. Claws slightly shorter than empodia.

Male abdomen (Figs. 4–5): Tergites 1–6 rectangular with basal pair of trichoid sensilla, a single uninterrupted caudal row of setae, 4–10 lateral setae, and sparse, scattered scales; tergite 7 weakly sclerotized mesocaudally, with basal pair of trichoid sensilla, 3–5 caudal setae laterally, 4–5 lateral setae in separate group, and 0 to 2 scales laterally; tergite 8 sclerotized only laterally, usually bare except for basal pair of trichoid sensilla. Sternites 2–6 rectangular, with pair of closely approximated, basal trichoid sensilla, a mostly single, caudal row of setae, and with mixed setae and setiform scales grouped near midlength; sternites 7 and 8 as for preceding except with 2 caudal rows of setae. Terminalia (Fig. 4): cerci broadly rounded; hypoproct deeply divided, its lobes broad, rounded at apex, with several setae apically and ventrally; aedeagus broad, rounded at apex, slightly longer than hypoproct; gonopod stout, apodeme rounded anteriorly; gonostylus narrowing slightly from base to apex, mostly striate, setulae present basolaterally and basoventrally, evenly setose throughout.

Female abdomen (Figs. 6–7): Tergites 1–7 and sternites 2–7 generally as for male but tergal scales and caudal setae more numerous. Tergite 7 about .56 length of distal half of ovipositor. Tergite 8 about as long as 7, with pair of trichoid sensilla and single, sparse, caudal row of short setae. Ovipositor short, barely protrusible, proximal half anteriorly with scattered lateral and ventral setae, distal half posteriorly with scattered short setae, completely setulose, unstriated; cerci broad, rounded at apex, completely setulose, setae concentrated at base and apex.

Larva (last instar).—Length, ca. 2 mm. Integument rugose. Anterior margin of spatula divided into 2 rounded projections (Fig. 8). Full complement of papillae typical of *Contarinia* present including corniform pair of terminal setae (Fig. 9); all setae very short and difficult to see because of general rugosity of integument.

Holotype.—♂, ex *Cupressus arizonica,* Olinda, Maui, Hawaii, 2600′, 6 June, 1984, M. Miyahira. Paratypes: 2 ♂, 5 ♀, same data; ♀, same locality, 10 July, 1984; ♂, ♀, and 5 larvae, same locality, 19 August, 1984; larvae, same locality, January, 1985.

This species is similar to a series of poor specimens from buds of *Cupressus macrocarpa* Hartw. collected in 1947 at Stinson Beach, California. The adults of that series might well be included with *rugosa,* but they are poorly mounted and

their parts are difficult to see. The one larva of that series has the same rugose integument and reduced papillar setae as *rugosa* but the spatula (Fig. 10) is somewhat different. I have not seen such great variation in any *Contarinia* species, so am inclined to believe that the California series represents a distinct species.

The definition of *Contarinia* is broadened to include species with a very short ovipositor. Ovipositors of *Contarinia* are typically long-attenuate with the cerci greatly narrowed and pointed, all modifications for depositing eggs in plant buds (Gagné, 1973, 1981). The short ovipositor is a primitive character state, and there is no evidence that the long ovipositor of the other contarinias evolved only once. E.g. *Contarinia sorghicola* (Coquillett) and *Contarinia catalpae* (Comstock), both species with long ovipositors, are not necessarily more closely related to one another than they are to *rugosa*. Other character states of *rugosa* besides the short ovipositor that I consider primitive in *Contarinia* are the setulose and broad female cerci, the broader lobes of the male hypoproct, and the broader aedeagus (the last two presumably correlated with the shorter and therefore broader ovipositor). Derived character states of *rugosa*, not necessarily synapomorphous with the same states found in other contarinias, are: bifilar male flagellomeres; lack of a postvertical peak; rounded eye facets; relatively few setae of the frontoclypeus and thorax; empodia slightly longer than claws; and the mostly bare gonostylus.

Acknowledgments

I thank B. Kumashiro, P. Conant, and M. Miyahira of the Hawaii State Department of Agriculture, and G. Paulson of the Maui Cooperative Extension Service for the information they provided regarding this species and for the collections they made; K. M. Harris, Commonwealth Institute of Entomology, London, R. V. Peterson, Systematic Entomology laboratory, Washington, D.C., and K. Valley, Pennsylvania Department of Agriculture, Harrisburg, for reviewing the manuscript; and L. H. Lawrence, Systematic Entomology Laboratory, for inking the drawings.

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