

NOTE

Discovery of *Contarinia agrimoniae* (Diptera: Cecidomyiidae) Larvae in Damaged Blackberry (*Rubus* subgenus *Eubatus* spp.) Flower Buds¹

Herbert D. Stiles², Paul J. Semtner³ and T. David Reed⁴

Virginia Polytechnic Institute & State University
Southern Piedmont Agricultural Research and Extension Center
Blackstone, VA 23824 USA

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Blackberry (*Rubus* subgenus *Eubatus* spp.) fruit-set, drupelet-set and fruit growth or development are influenced by numerous biotic and abiotic factors (Ellis et al. [eds.], Compend. of raspberry and blackberry diseases and insects. APS, 100 pp., 1991; Moore and Skirvin, In Galletta and Himelrick [eds.], Small Fruit Crop Management, Prentice-Hall, pp. 214-244, 1990; Stace-Smith, USDA Handbook 631: 167-192, 1987). During May 1986, while examining a 1.6 h planting that had a history of fruit-set problems in Chesterfield Co., VA, we discovered dipteran larvae in damaged flower buds and newly-opened blossoms of both wild and domesticated blackberries. Pistils and stamens showed more extensive necrosis in buds with more numerous larvae. As many as 29 larvae were counted in a single bud. Infestations were detected a few days later in research plots at Southern Piedmont Agricultural Research and Extension Center (SPAREC) near Blackstone, VA, approximately 55 km southwest of the Chesterfield Co. site. R.J. Gagné, USDA Systematic Entomology Laboratory (SEL), Washington, DC identified our specimens as *Contarinia* species (Diptera: Cecidomyiidae). *Contarinia* had previously not been recorded from *Rubus* buds⁵ in North America, although *C. rubicola* Rübsaamen has been reported to cause somewhat similar damage to blackberries in Europe (Barnes after others, pp. 42-44 In Gall Midges of Economic Importance. Vol 3: Gall Midges of Fruit Crops. Crosby Lockwood & Son, 184 pp., 1948). Another kind of gall midge (*Dasineura rubiflorae* Felt) can destroy *Rubus* flower buds, but this species has

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² Extension Horticulturist.

³ Research Entomologist.

⁴ Extension Agronomist.

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not been reported in North America since its 1886 discovery in Virginia (Gagné, *The Plant Feeding Gall Midges of N. Am.*, Cornell Univ. Press, 356 pp., 1989). The current work was undertaken to obtain adults for specific identification and to learn more about this “new” blackberry pest.

To acquire mature larvae for rearing, we placed freshly-cut, infested inflorescences (i.e., ‘fruiting shoots’) in a growth chamber with 16L:8D photophase (GE F20T12CW 20 watt fluorescent tubes), 65-85% RH, and 21-23°C. Bases of inflorescences were anchored in water-agar-gel-filled 473-ml cups. Buds and blossoms of the inflorescences were suspended over V-shaped aluminum troughs to capture larvae that migrated from maturing flowers. The inflorescences remained healthy and turgid for no more than 4 days. Larvae in the troughs were transferred to rearing chambers with a camel’s hair brush.

Rearing apparatuses (Figs. 1 and 2) were improvised to minimize space requirements and accommodate resources at SPAREC during 1992. While similar in concept to the Gagné apparatus (Gagné, *The Plant Feeding Gall Midges of N. Am.*, Cornell Univ. Press, 356 pp., 1989), our chambers were made from plastic vials (approximately 65-ml capacity) on whose lids we mounted screw-top, plastic test tubes (15 cm X 12 mm). A 6.4-mm diam hole was drilled through both lids to allow passage of adult midges from a chamber’s main body into the test tube. Each rearing chamber contained 15 to 20 ml of ground, moistened sphagnum as a medium for pupation.

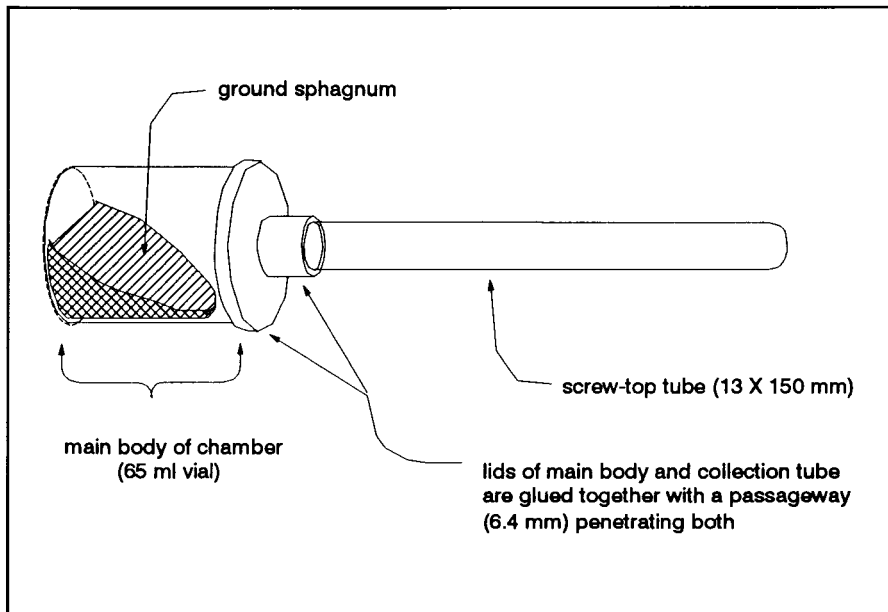


Fig. 1. Rearing chamber for collection of adult midge and wasp specimens during 1992.

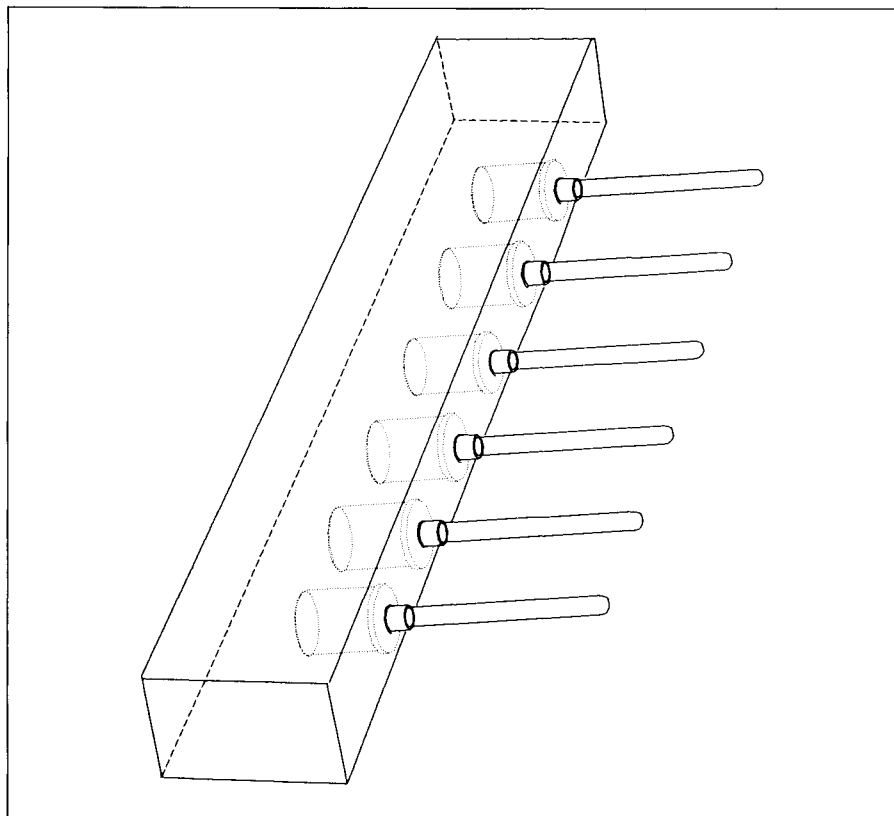


Fig. 2. Six rearing chambers with transparent collection tubes protruding from a cardboard box that was used to darken the chambers' main bodies.

Rearing chambers were placed in a closed cardboard box, but their transparent collection tubes were situated entirely outside the box (Fig. 2). These assemblies were maintained at ambient temperature on a laboratory bench, where collection tubes were exposed to ambient fluorescent light and indirect sunlight. It was assumed that the light would attract adult flies from the rearing chamber into the tube for collection.

When occupied by adult insects, collection tubes were unscrewed from rearing chambers and several ml of 70% ethanol were injected to kill and preserve the specimens. The collection tubes were then used for specimen storage, and new tubes were installed on rearing chambers.

Inflorescences were obtained from wild, erect, thorny (WET) blackberry plants adjacent to SPAREC, and from plants of the semi-erect, thornless, 'Black Satin' cultivar (BS) maintained at SPAREC. Twenty one WET and 23 BS

inflorescences were placed in growth chambers on 16 May 1992, and larvae were collected from aluminum troughs on three dates (1 to 2 day intervals between dates; D_1 = 17 May 1992, D_2 = 18 May 1992; D_3 = 19 + 20 May 1992). Larvae from each source and harvest date were placed in separate rearing chambers. Collection tubes were observed at 1- to 2-day intervals during the first month after larvae were transferred to rearing chambers, and at least monthly thereafter. Adult specimens were submitted to SEL, Washington, DC, for specific determinations.

During 17 to 27 May, the earlier-blooming type (WET) yielded 238 larvae/21 shoots; the later blooming BS yielded 80 larvae/23 shoots. Larval emergence ended after shoots had been in growth chambers for 4 days.

Pupation rates (numbers of adults collected per number of larvae placed in rearing chambers) varied from 0 to 28%. Thirty adult gall midges (81% of the number reared) were collected by 1 June 1992, within 2 weeks after larvae had been placed in rearing chambers. Two adults (5% of the number reared) were collected between 28 February and 5 April 1993, and five (14% of the number reared) emerged by 1 May 1993. Seventeen tiny wasps were collected, along with the two gall midges, during the 28 February to 5 April 1993 interval. No gall midges or wasps emerged between 1 May and the end of October 1993, when monitoring was terminated. Thirty-six of the 37 adult gall midges (94%) and 16 of 17 wasps were obtained from the WET source. At SEL, R. J. Gagné identified the gall midges as *Contarinia agrimoniae* Felt⁶.

Contarinia agrimoniae Felt was described from adults reared from larvae taken in flowers of *Agrimonia striata* Michx., a rosaceous weed, during August 1907 in New York. Adults were reared during September of the same year. The literature contains no additional information on bionomics of this insect (Gagné, 1995 personal communication).

SEL determined the wasps as members of Platygasteridae, a family that includes parasitoids of certain *Contarinia* species (Gagné, The Plant Feeding Gall midges of N. Am., Cornell Univ. Press, 356 pp., 1989). The wasp's genus and species remain to be determined. Confirmation as a parasitoid may lead to its use in biological control of this new blackberry pest.

⁶ December 1994 SEL Identification Report Ref.: TSU Lot 94-10275.