A New Species of *Megaselia* Rondani (Diptera: Phoridae) Reared from a *Macrodiplosis* Kieffer (Diptera: Cecidomyiidae) Gall on Black Oak

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A NEW SPECIES OF MEGASELIA RONDANI (DIPTERA: PHORIDAE) REARED FROM A MACRODIPLOSIS KIEFFER (DIPTERA: CECIDOMYIIDAE) GALL ON BLACK OAK

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Abstract.—*Megaseelia nantucketensis* new species (Phoridae) is described from Nantucket Island, Massachusetts, USA. The single specimen was reared from a leaf gall on black oak (Fagaceae: *Quercus velutina* Lam.) caused by a species of *Macrodiplosis* Kieffer (Cecidomyiidae). The larva of this univoltine fly is presumed to be a predator on larvae of the gall midge.

Key Words: Nantucket, *Quercus ilicifolia, Quercus velutina*, Fagaceae, scuttle fly, Platygastridae, *Metaclisis floridana*, Synopeas

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*Megaseelia* Rondani (Phoridae) is a large fly genus with diverse larval habits including scavenging, predation, parasitism, and herbivory (Disney 1994). Two species, *M. chainensis* Disney and *M. submarginalis* (Malloch), have been recorded as specialized predators in galls induced by other insects (Robinson and Brown 1993). Here, we describe a new species from Nantucket, Massachusetts, whose larvae apparently have similar habits.

**Materials and Methods**

Pouch-shaped leaf galls on black oak (Fagaceae: *Quercus velutina* Lam.) and scrub oak (*Q. ilicifolia* Wangenh.) were collected by CSE and J. A. Blyth from 16 to 20 May, 2012, as part of an ongoing survey of gall-making and leaf-mining insects on Nantucket Island, Massachusetts, USA. Specific collection sites were South Valley Road (41.282426, -70.073017), Squam Farm (41.311504, -69.998502), Coskata Woods (41.347467, -70.015733), Dead Horse Valley (41.276153, -70.101864), and Madequecham Valley (41.254178, -70.048161). Each collection entailed filling one or two 12- or 15-dram plastic vials with galls. As larvae emerged on 22 and 23 May, they were transferred to small jars containing a moistened 1:1 mixture of sand and peat, into which they burrowed. These jars were stored in a refrigerator at 1–3 °C from mid-December 2012 to 15 April 2013.

After removal from refrigeration, lids were removed from the jars, which were placed in sealed plastic bags and were checked daily. Emerging insects were preserved in ethanol. Cecidomyiids (specimens CSE296, CSE320, CSE333) were deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC. The phorid (LACM ENT 329318) was slide mounted and
deposited in the Natural History Museum of Los Angeles County, Los Angeles, California. Platygastrids (CSE327, CSE362) were deposited in the Museum of Zoology, Lund University, Sweden.

RESULTS

A total of at least 25 cecidomyiid larvae emerged from the galls collected at South Valley Road, Coskata Woods, and Dead Horse Valley. At least one from each site emerged as an adult *Macrodiplosis* Kieffer between 17 and 23 April 2013. R. J. Gagné examined the specimens (all of which were females) but reported (in litt.) that they cannot be placed to species until an intensive study of eastern oak gall-inducing *Macrodiplosis* is undertaken. The gall of this species (Fig. 1) closely matches that of *M. niveipila* (Osten Sacken) (Gagné 1989).

Male platygastrid wasps emerged from the Dead Horse Valley and South Valley Road jars on 20 and 28 April 2013, respectively. P. N. Buhl determined the former (from black oak) as *Synopeas cf. pubescens* (Ashmead) and the latter (from scrub oak) as *Metaclisis floridana* (Ashmead). There are no previous host records for either species. A single male *Megaselia* emerged from the Dead Horse Valley jar on 1 May (Fig. 2). EAH determined that it belongs to a new species, which is described below, using the streamlined method introduced by Hartop and Brown (2014).

*Megaselia nantucketensis*, new species

(Figs. 3, 4)

Diagnosis.—Male. In the group II key of Borgmeier (1964), *M. nantucketensis* keys out to *M. cirripes* Borgmeier, from which it differs immediately by a number of characters, but most noticeably having unequal supraantennals with the lower SAs 0.6 the length of the upper SAs (subequal on *M. cirripes*), a long seta at the base of R (minute on *M. cirripes*), and shorter costal setae at 0.09 mm (0.15 mm on *M. cirripes*).

Description.—Male. See Table 1.

Distribution.—Known from a single location in Nantucket County, Massachusetts, USA.

Etymology.—Named for Nantucket Island, the type locality.

Biology.—Univoltine; larva developing in a pouch-shaped leaf gall on black oak caused by a *Macrodiplosis* species (see discussion).


DISCUSSION

Unfortunately the larva of *Megaselia nantucketensis* was not observed, so its habits are not known with certainty. They may be like those of *M. submarginalis*, which prey on larvae of *Contarinia negundinis* Gillette (Cecidomyiidae) in similar galls on boxelder (Sapindaceae: *Acer negundo* L.). The galls of both host midges consist of a pouchlike swelling along the underside of a leaf vein, with a narrow longitudinal opening on the upper surface. This opening allows the female phorid to insert an egg inside the gall. In *M. submarginalis*, the larva preys on three to six cecidomyiid larvae in its lifetime, then drops to the ground to pupariate, emerging as an adult the following spring (Robinson and Brown 1993). At this point we have no indication that the life history of *M. nantucketensis* differs.

CSE’s rearing notes indicate that eight cecidomyiid larvae emerged from the Dead Horse Valley galls on 23 May. It is
possible that one of these was actually the phorid larva and was not recognized as something different; the larvae were transferred to soil without close examination. Another possibility is that the galls were placed directly in the jar of soil after larvae first started emerging in the rearing vial, allowing the phorid larva to enter the soil unnoticed. This was not recorded in CSE’s rearing notes but has certainly been done in other rearings. Although *M. submarginalis*
requires three or more cecidomyiid larvae to complete development, *M. nantucketensis* is substantially smaller (EAH compared the holotypes) and may require fewer. We have considered the possibility that the larva of *M. nantucketensis* is an internal parasitoid of the *Macrodiplosis* larva, which is approximately 3.3 mm long when mature, but further observations are clearly needed. The other known phorid predator of gall insects, *M. chinensis* on the elm cockscomb gall aphid *Colopha ulmicola* Fitch, pupariates within the host gall (Robinson and Brown 1993). All three phorid species inhabit galls with openings that allow for oviposition as well as emergence of mature larvae or adults, and all three have univoltine life cycles synchronized with those of their hosts.

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**Literature Cited**


