

NOTE

Feeding by *Medetera* Species (Diptera: Dolichopodidae) on  
Aphids and Eriophyid Mites on Apple,  
*Malus domestica* (Rosaceae)

Adults and most known larvae of dolichopodids are predaceous on soft-bodied arthropods (Robinson, H. and J. R. Vockeroth. 1981. In J. F. McAlpine et al., eds., Manual of Nearctic Diptera, Vol. 1. Agric. Canada Monogr. No. 27. Biosystematics Research Institute, Ottawa. 674 pp.). Several *Medetera* larvae are subcortical predators living under the bark of dead and dying trees. Immatures of *Medetera aldrichii* Wheeler are major predators of scolytid larvae (Schmid, J. M. 1971. Can. Entomol. 103: 848-853.), (Hopping, G. R. 1947. Can. Entomol. 79: 150-153), (Nagel, W. P. and T. D. Fitzgerald. 1975. Entomophaga 20: 121-127). The feeding habits of adult *Medetera* remain obscure. Bickel (1985. U.S.D.A. Tech. Bull. 1692. 109 pp.) reported *Medetera petulca* Wheeler (Fig. 1) preying on arthropods such as spiders, mites, small centipedes, Collembola, Diptera (Sciaridae, Psychodidae, and Cecidomyiidae), Homoptera (including Aphididae) and small lepidopterous larvae. Here we describe feeding behavior of 3 species of *Medetera* from central Washington: *Medetera petulca* Wheeler, *M. n. sp. nr. alpina* and *M. n. sp. nr. xerophila* or *utahensis*. *Medetera petulca* was the most common species encountered on apple and has previously been collected on *Salix* and cultivated apple trees (Bickel 1985). Present observations cannot be linked to any one of the 3 species. *Medetera n. sp. nr. alpina* and *Medetera n. sp. nr. xerophila* or *utahensis* will be described in a later publication.

During our study adult *Medetera* spp. were observed on unsprayed 3-year-old apple trees, *Malus domestica* (Borkhausen) var. "Red Delicious." The trees (ca. 1-1.2 m

high) were in 2 experimental "mini-orchards" planted within a deciduous riparian habitat near the Wenatchee River (Washington: Chelan Co., elev. 220 m). The 2 "mini-orchards," Sunnyslope (SS) and River County Park (RCP), were being studied by the senior author (RJR) to determine the contribution of colonists from native habitat to young apple trees. Vegetation surrounding the 2 "mini-orchards" was an important source pool for *Medetera* adults colonizing apple and included: *Rosa woodsii* Lindley (Rosaceae), *Populus trichocarpa* Torrey & Grey (Salicaceae), *Cornus stolonifera* Michaux (Cornaceae), *Salix exigua* Nuttall (Salicaceae), *Crataegus douglasii* Lindley (Rosaceae), and *Amelanchier alnifolia* Nuttall (Rosaceae). *Medetera* adults were collected in sweep samples of plants surrounding the apple trees at both the RCP and SS sites. The SS orchard, 10 km northwest of Wenatchee, was partially shaded and the RCP orchard, 12 km northwest of Wenatchee, was in direct sunlight. At 2-week intervals from late May until late July, 1987, visual observations were made on the trees at each site. The behavior of adult *Medetera* on the main stem, lateral branches, and foliage of the apple trees was recorded by ground level observations. Approximately 10 hours were spent recording *Medetera* feeding behavior. All observations were made between 8 a.m. and noon.

Flies remained in a stationary position for ca. 90% of the total observation time with prothoracic legs fully extended and meso- and metathoracic legs pressed against the body. Individual flies oriented themselves at 30-40° angles to the branch or leaf upon which they rested. During feeding the pro-



thoracic legs were retracted and the meso- and metathoracic legs were extended, forcing the head downward. Striking at leaf and bark surfaces was repeated as a "pecking" motion until either the prey had been secured between the labellae or had escaped.

*Medetera* spp. adults were first noted feeding on apple rust mites, *Aculus schlechtendali* (Nalepa) (Acari: Eriophyidae) on 2 June 1987 at the SS site. Flies were observed making a "pecking" motion on bark and leaf surfaces. *Medetera* spp. could have been feeding on any micro-arthropods present (scales, whiteflies, other mite species). However, examination of leaf and bark samples in the laboratory with a binocular microscope revealed eriophyids were the only arthropods present in high numbers. Other mite species, including *Tetranychus* spp. and *Panonychus ulmi* (Koch) (Tetranychidae), were absent from the trees at RCP and SS in 1987. From May through August, 1987, counts of eriophyids were made at 2-week intervals. On 4 June at SS the rust mite population peaked at  $\bar{x} = 232.0 \pm 80.39$  mites/leaf [Mean  $\pm$  SE ( $n = 75$ )]. Feeding by *Medetera* on rust mites at SS was also observed on 16 and 20 June. Twenty-eight "pecking actions" were recorded during an 8-minute observation period of one fly on 20 June. The observed fly concentrated "pecking" at the veins on the upper leaf surface. Examination of the leaf with a hand lens ( $16\times$ ) showed the highest density of *A. schlechtendali* near the veins on the upper surface of the leaf. One fly feeding on the upper surface of a leaf was collected with an aspirator and immediately transferred to alcohol. In the laboratory the mouth parts of this fly were examined, and a rust mite was found between its labellae.

On 27 June, *Medetera* spp. were again observed feeding on eriophyid mites at SS. They were also seen consuming apple aphids, *Aphis pomi* De Geer. Within a 15 minute period, 9 *Medetera* adults were observed attacking apterous aphids which were moving up and down a single apple tree.



Fig. 1. Line drawing of male *Medetera petulca* (Magnification  $\times 30$ ).

After capture, duration of feeding was ca. 60 seconds/aphid. *Medetera* were observed preying on aphids on 3 additional dates: 11, 13, and 15 July at both the RCP and SS sites. Estimates of mean aphid abundances for 20 trees were  $103.55 \pm 31.64$  aphids/tree and  $1384 \pm 679.4$  aphids/tree, at SS on 1 and 15 July, respectively, and  $332.5 \pm 120.10$  aphids/tree on 13 July at RCP.

The importance of predation by adult dolichopodids on 2 apple pests, rust mites and aphids, remains to be determined. Based on these preliminary observations, we conclude that *Medetera* probably does not have a significant impact as a biological control agent on apple. To our knowledge this is the first record of feeding by dolichopodid adults on *A. schlechtendali* and *A. pomi*. We also observed *Medetera* feeding on immature thrips at both RCP and SS. Further studies are planned to tie feeding observations with the different *Medetera* species.

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