Community Structure and Mortality in European Populations of Phyllocolpa Leaf-gallers (Hymenoptera: Tenthredinidae: Nematinae)

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The parasitoid complex of sawfly gallers of the genus Phyllocolpa (Hymenoptera: Tenthredinidae: Nematinae) was studied from 1988 to 2010. 27 European species were recorded, belonging to five species-groups: the leucosticta, leucapsis, crassispina, anglica (= scotaspis sensu Kopelke 2007c), and ?piliserra groups. The larvae of all European Phyllocolpa species feed and develop in open leaf-rolls or -folds on willows (Salix spp) which, depending on the sawfly species, are simple or twisted leaf-folds along the edge of leaves. In total, 34,210 Phyllocolpa galls from 18 willow species at 132 natural sites in 8 European countries were collected and their inhabitants reared. The community of natural enemies of the Phyllocolpa species-groups thus sampled comprised 42 parasitoid species of Hymenoptera (Braconidae 5 spp, Ichneumonidae 33 spp, Eulophidae 4 spp). Brief notes are presented on host species, distribution, and biology of all recorded species of the enemy complex.

The majority of the species constituting the enemy complex of Phyllocolpa are specialists, favouring concealed living hosts. Mortality caused by parasitoids varied significantly between gallers and sites, generally showing low values. However, at one site in the Alps mortality reached 90.4% in Phyllocolpa plicaglauca Kopelke 2007. Among a total of 286 samples studied 101 (35.3%) enemy-free samples were found. The maximum number of parasitoids per host galler per site was 4 species in Phyllocolpa plicaglauca and Ph polita (Zaddach 1883) of the leucosticta-group and Ph leucapsis (Tischbein 1846) and Ph acutiserra (Lindqvist 1949) of the leucapsis-group. A narrow majority of 23 spp attacked young host larvae (1st to 3rd larval stage), whereas 19 spp parasitized older larvae (4th or 5th larval stage). The parasitoid complex of Phyllocolpa is dominated by endoparasitic (23 spp) and/or ectoparasitic (11 spp) koionibionts (34 spp) rather than by endoparasitic (1 sp) and/or ectoparasitic (7 spp) idiobionts (8 spp).

Of 42 enemy species occurring in the galls of Phyllocolpa, only three species reached higher abundances in a gall former population, separating the enemy complex into three more frequent (eudominant: 1 sp, dominant: 1 sp, subdominant: 1 sp) and 39 infrequent species (recendent: 2 spp, subrecendent: 6 spp, sporadic: 31 spp). The most common species Chrysocharis elongata (Thomson 1878) (Eulophidae) was associated with 21 leaf-folders and was found in 137 samples (47.9%) from 73 sites. Two species of the ichneumonid genus Adelognathus (A pusillus Holmgen 1857 and A sp) were also very common in the galls of Phyllocolpa, occurring in 102 samples (35.7%) and causing a maximum mortality of the host larvae of up to 48.7%. The larvae of Phyllocolpa developing in the leaf folds were also attacked by a guild of undefined predators. At a few sites this guild caused up to 74.1% larval mortality.

Species of the genus Phyllocolpa often induce galls without oviposition (= ‘clean galls’). Between 12.3 ± 11.6% (in Ph anglica) and 39.9 ± 28.0% (in Ph tuberculata) of the galls collected for rearing contained no egg. The composition of the enemy complex of Phyllocolpa is greatly different to that of enemy complexes of the related genera Pontania or Euura, which cause closed galls.

Key words: Phyllocolpa – leaf-galler – parasitoids – rates of parasitism – species community – survival.

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