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robiniae Buhl & Duso (Hymenoptera : Platygasteridae) in Switzerland

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First records of the gall midge *Obolodiplosis robiniae* (Haldeman) (Diptera: Cecidomyiidae) and its associated parasitoid *Platygaster robiniae* Buhl & Duso (Hymenoptera: Platygasteridae) in Switzerland

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In 2007 galls of the gall midge *Obolodiplosis robiniae* (Haldeman, 1847) (Diptera: Cecidomyiidae) were found for the first time in Switzerland on black locust trees (*Robinia pseudoacacia*) at four locations both north and south of the Alps. At most locations only one leaf was infested indicating that population densities are still low. At two out of the four locations the galls contained pupae clusters of the newly described parasitoid *Platygaster robiniae* Buhl & Duso, 2007 (Hymenoptera: Platygasteridae).

Keywords: *Robinia pseudoacacia*, leaf gall, Cecidomyiidae, Platygasteridae, parasitoid

INTRODUCTION

The host tree of the cecidomyiid *Obolodiplosis robiniae* (Haldeman, 1847) (Diptera: Cecidomyiidae), i.e. the black locust (*Robinia pseudoacacia* L.) is itself an alien species in Europe. It was introduced in 1601 from North America to Europe in order to consolidate soils and to reforest devastated areas, or as an ornamental tree. In recent years various phytophagous insect species associated with the black locust such as the leafminers *Phyllonorycter robiniella* (Clemens, 1859) and *Par-ectopa robiniella* Clemens, 1863 (Lepidoptera: Gracillariidae) have been accidentally introduced to Europe.

The gall midge *O. robiniae*, like its host a native to North America, was first reported in Europe in 2003 in the Veneto region in Italy (Duso & Skuhrová 2003). It then spread to South Tyrol, Slovenia and the Czech Republic (2004), Hungary, Slovakia, Serbia and Germany (2006), and to Montenegro (2007) (Hoffmann *et al.* 2007; Skuhrová *et al.*, in press).

The gall midge was observed in 2002 in Japan and South Korea approximately at the same time as the first records in Europe (Kodoi *et al.* 2003). The history of its taxonomy is summarized by Duso & Skuhrová (2003) and the current distribution in Europe by Skuhrová *et al.* (in press).

The present communication reports that *O. robiniae* has also been found in Switzerland in 2007, together with an associated new parasitoid of the family Platygasteridae.

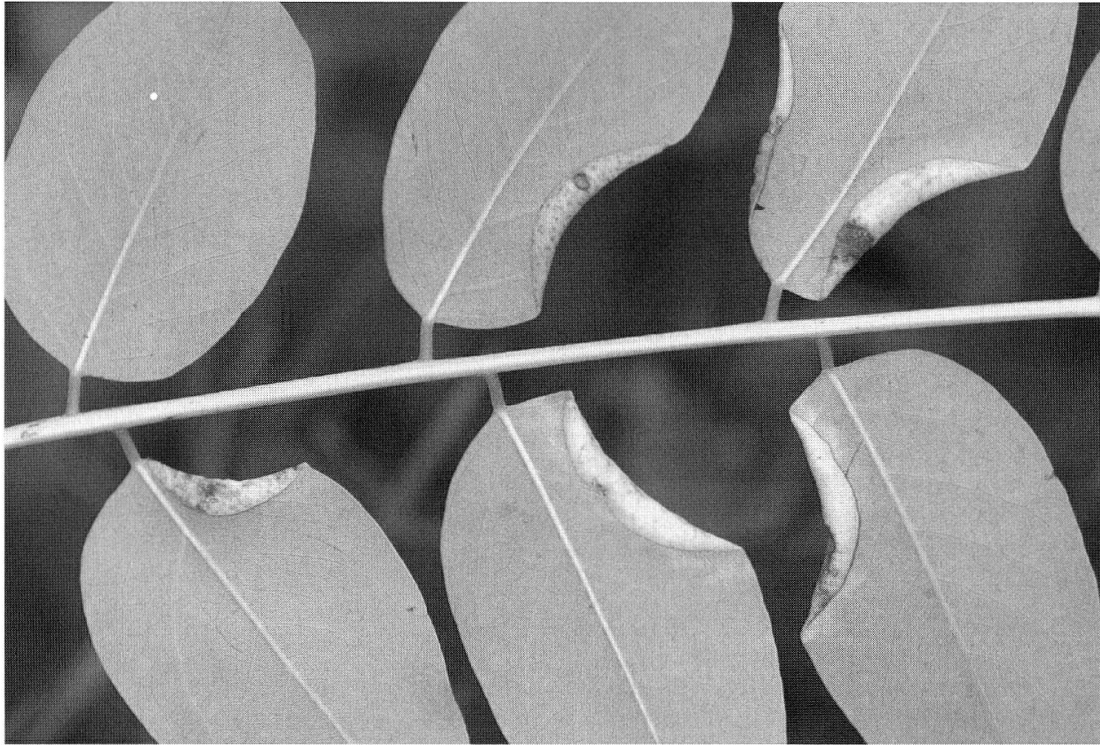


Fig. 1. Several galls of *Obolodiplosis robiniae* on leaflets of a *Robinia pseudoacacia* leaf.

RESULTS

Gall formation

The gall midge *O. robiniae* can produce several generations per year (Gagné 1989). The gregariously feeding larvae induce the margins of the leaflets to thicken (Hoffmann *et al.* 2007) and to bend downwards, forming the characteristic leaf margin roll galls (Fig. 1).

O. robiniae records from Switzerland

While some scattered checks for *O. robiniae* in 2006 failed to be positive, galls of this species could be found in 2007 in different regions of Switzerland. Galls of *O. robiniae* were identified at four locations out of the approximately ten places randomly searched:

1st record: 16 August 2007, Emmen near Lucerne (Canton Lucerne), galls on leaflets of one leaf from a wimpy, 1-meter black locust underneath a highway bridge.

2nd record: 26 August 2007, Agarone near Locarno (Canton Ticino), galls on one leaf of a suppressed bushlike tree on the roadside.

3rd record: 27 August 2007, Birmensdorf near Zürich (Canton Zürich), galls on one leaf of a water shoot of a solitary locust in a parklike area.

4th record: 28 September 2007, Susten, Pfynwald (Canton Valais), galls on several leaves on bushlike *Robinia*-trees.

The galls at the first three locations did not contain any gall midge larvae any more, while at Susten, about half of the galls contained 1–2 larvae per gall (Fig. 2).

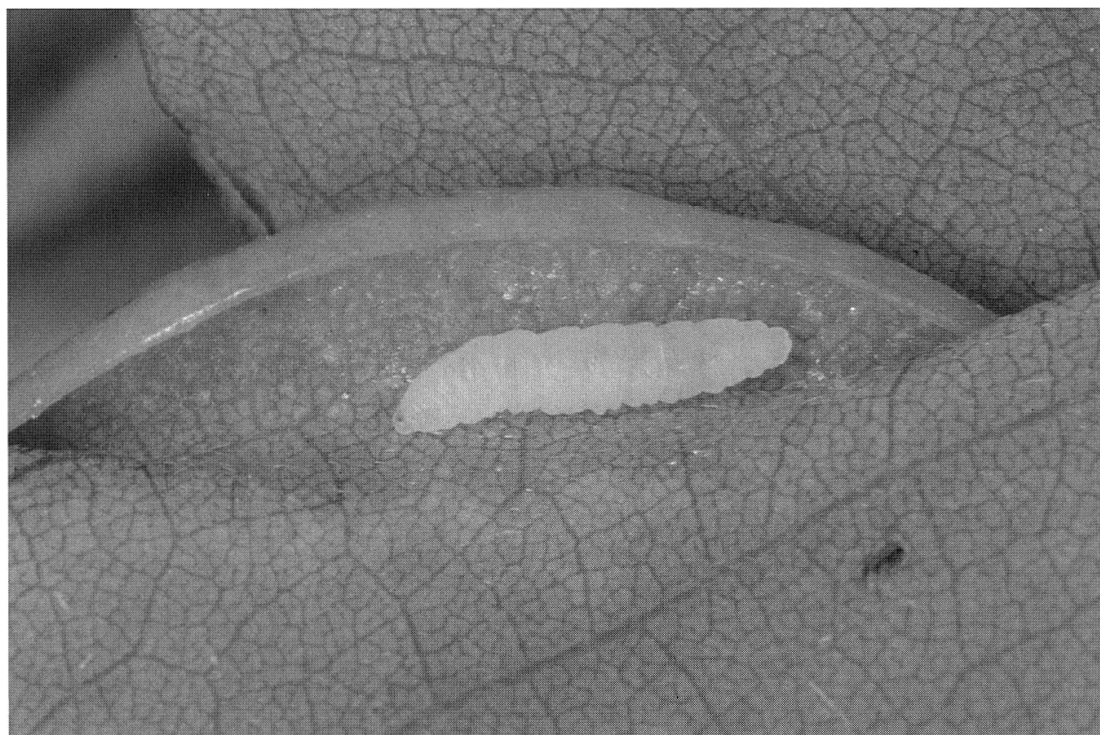


Fig. 2. Opened gall with larva of *Obolodiplosis robiniae*.

Parasitism

Pupae of a parasitoid wasp were found in the galls of the leaves of records #2 and #3. They were aggregated to clusters of approximately a dozen pupae. The pupae from record #3 were reared at room temperature. At the time of sampling the cocoons contained white, young pupae. Three weeks later (7.9.2007) the wasps could be observed fully developed inside the cocoons (Fig. 3), and the tiny, 1 mm adults emerged during the following week. They were identified by P. N. Buhl (Denmark) as *Platygaster robiniae* Buhl & Duso (Hymenoptera: Platygastriidae), a species that had been described only recently (Buhl & Duso, in press). Specimens of this species from the present study are deposited at the Natural History Museum Bern.

DISCUSSION

The black locust gall midge *O. robiniae* has spread quite fast from the place of its first record in Europe to the neighboring countries. In 2006 alone it was reported in four new countries. As with other invasive species, the spread probably occurred mainly through human mobility or the transport of plant material rather than active dispersal of the gall midge. The establishment of such new species has been generally enhanced by the ongoing climate change.

As far as the four *O. robiniae* records from Switzerland are concerned, it is noticeable that at most locations only one leaf of a single tree was found infested. This suggests that until now *O. robiniae* is present but in small densities. However, the records both south and north of the Alps as well as in an inneralpine valley



Fig. 3. Cocoon cluster of a new parasitoid, i.e. *Platygaster robiniae*, comprising fully developed wasps collected from *Obolodiplosis robiniae* galls at Birmensdorf (7.ix.2007).

(record #4) show its wide distribution in Switzerland. Most probably, it is present in low densities in most of Switzerland.

An interesting fact is that, together with the first record of this galling insect, an associated parasitoid, i.e. *P. robiniae* was present. Usually, newly introduced insects lack their natural enemies for quite some time and therefore may pose phytosanitary problems. It is unknown whether *P. robiniae* was introduced together with the gall midge or whether it is a European species that was hitherto unknown and that quickly adapted to the new host.

Until now, *O. robiniae* has not been relevant as a pest for ornamental black locust or as a control agent against the unwanted proliferation of this alien tree species in Europe.

ZUSAMMENFASSUNG

Im Sommer 2007 wurden erstmals in der Schweiz Gallen der Robiniengallmücke *Obolodiplosis robiniae* (Haldeman, 1847) gefunden, und zwar an Robinien (*Robinia pseudoacacia*) sowohl der Alpennordseite (Emmen LU, Birmensdorf ZH), der Alpensüdseite (Agarone TI) und des inneralpinen Rhodanets (Susten VS). Es konnte meist nur ein einziges befallenes Blatt mit Gallen dieser aus Nordamerika eingeschleppten Art gefunden werden, was auf noch tiefe Populationsdichten schliessen lässt. Einige der Gallen enthielten Puppen eines Parasitoiden, aus denen Wespen der kürzlich neu beschriebenen Art *Platygaster robiniae* Buhl & Duso (im Druck) (Hymenoptera: Platygasteridae) schlüpften.

ACKNOWLEDGEMENTS

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