# *Parectopa robiniella* (Lepidoptera: Gracillariidae), a leafminer of black locust *Robinia pseudoacacia*, new to the Belgian fauna

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**Abstract**. Some mines of *Parectopa robiniella* Clemens, 1863 (Lepidoptera: Gracillariidae) were found on 17 August 2007 on *Robinia pseudoacacia* L. (Fabaceae) in the valley of the river Lesse at Hour (Province of Namur). It is the first time that this Nearctic species was found in the Benelux. Information on the biology and distribution of this species are provided.

**Résumé**. *Parectopa robiniella* (Lepidoptera: Gracillariidae), une espèce mineuse du robinier faux-acacia *Robinia pseudoacacia* nouvelle pour la faune belge

Le 17 août 2007, quelques mines de *Parectopa robiniella* Clemens, 1863 (Lepidoptera: Gracillariidae) ont été trouvées sur *Robinia pseudoacacia* L. (Fabaceae) dans la vallée de la Lesse à Hour (province de Namur). C'est la première fois que cette espèce néarctique est signalée dans un pays du Benelux. Les informations relatives à la biologie et à la répartition du papillon sont résumées.

**Samenvatting**. *Parectopa robiniella* (Lepidoptera: Gracillariidae), een bladmineerder op witte acacia *Robinia pseudoacacia*, nieuw voor de Belgische fauna

Op 17 augustus 2007 werden enkele bladmijnen van *Parectopa robiniella* Clemens, 1863 (Lepidoptera: Gracillariidae) op *Robinia pseudoacacia* L. (Fabaceae) gevonden in de vallei van de Lesse te Hour (provincie Namen). Het is de eerste maal dat deze Nearctische soort uit de Benelux wordt vermeld. Details over de levenswijze en de verspreiding worden gegeven.

**Key words: *Parectopa robiniella* – Lepidoptera – Gracillariidae – Alien species – Belgium – Faunistics – Leafminer – *Robinia*.**

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On 17 August 2007 some leaf mines of *Parectopa robiniella* Clemens, 1863 (fig. 1) were found on black locust *Robinia pseudoacacia* L. (Fabaceae) in the valley of the river Lesse at Hour (Houyet, province of Namur). The site is located along the bike trail occupying an old railroad, at an altitude of about 140 m a.s.l. Our identification was kindly confirmed by Willem Ellis. It's the first record of the species for Belgium and the second Belgian member of the genus *Parectopa*, in addition to *Parectopa ononidis* (Zeller, 1839). That increases the number of Belgian Gracillariidae to 100 species (De Prins & Steeman 2010).

Figure 1. *Parectopa robiniella* Clemens, 1863, Belgium, Namur, Hour, 17.viii.2007, mine on *Robinia pseudoacacia*, leg. and photo J.-Y. Baugnée.

*Parectopa robiniella* is a native moth species to North America (USA and Canada) that has been accidentally introduced in Europe where it was recorded for the first time in Northern Italy in 1970 (Vidano 1970). It then spread gradually throughout South and Central Europe (Table 1). Its occurrence is reported from Austria, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Lithuania, Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine (Olivella 2001; De Prins & De Prins 2010; Buszko 2010; Lopez-Vaamonde *et al.* 2010). Lately, the species is also mentioned from Russia (Gninenko 2009). In France the first record come from Alpes de Haute-Provence in 1986 (Martinez & Chambon 1987). More recent observations are provided from the department of Gironde (Laguerre 1999; Laguerre & Dauphin 2007). Here, the moth was very abundant in various localities in 2000 and it was difficult to find black locusts which were free of mines. Three years later, however, the mines have become extremely rare everywhere (M. Laguerre, in litt). In Germany *Parectopa robiniella* was found from 2000 in Brandenburg, then in 2007 in Baden-Württemberg and Saarland and in 2008 in Bavaria and Rhineland-Palatinate (see Lepiforum). It has not yet been observed in The Netherlands, Great-Duchy of Luxembourg, Fennoscandia and the British Isles.

Within its native area *Parectopa robiniella* is an oligophagous leafminer on several woody Fabaceae: *Robinia pseudoacacia* L., *Robinia hispida* L., *Robinia viscosa* Vent., *Amorpha fruticosa* L., *Desmodium* sp., *Galactia volubilis* (L.) Britt. and *Meibomia* sp. (see De Prins & De Prins 2010). In Europe, this alien species appears to be restricted to *Robinia pseudoacacia* (Ellis 2007). Since its appearance on the continent, the moth is regarded as a pest and is the subject of numerous ecological and biological studies, particularly in Italy, Hungary and other countries where the black locust has a great importance in forestry or apiculture (i.e. Bolchi

Serini 1990; Olivella 2005; Lakatos *et al.* 2006; Fodor & Hâruţa 2009; Csóka *et al.* 2009). There are two or three annual generations, adults flying from May until September. The female lays its eggs on the underside of the leaf of the foodplant. The young larva causes a small irregular white mine in the angle of midrib with one lateral vein. Later it makes a characteristic white "amoeba-like" blotch mine on the upper surface of leaflets, which always includes the midrib of these (see Csóka 2003). The shape of this mine is at the origin of the English name "locust digitate leaf miner" given to the species. The greenish larva lives solitarily and, unlike most leafminer moths, it defecates outside its mine. Pupation takes place outside the mine, in a white cocoon attached to foliage, or hidden in the litter in the case of the autumnal generation (Csóka 2003; Ellis 2007).

Table 1. Progress of the colonization of *Parectopa robiniella* in Europe.

| Country | Year | Reference |
|---|---|---|
| Italy | 1970 | Vidano (1970) |
| Switzerland | 1971 | Sauter (1981) |
| Slovenia | 1982 ? | Macek (1984) |
| Croatia | 1982 ? | Igrc & Maceljski (1983) |
| Hungary | 1983 | Maceljski & Igrc (1984) |
| France | 1986 | Martinez & Chambon (1987) |
| Romania | 1988 | Ureche (2006) |
| Slovakia | 1989 | Kulfan (1989) |
| Austria | 1990 | Huemer *et al.* (1992) |
| Czech Republic | 1992 ? | Huemer (1993) |
| Bulgaria | ? | |
| Poland | ? | |
| Ukraine | ? | ? |
| Serbia | 1994 | Mihajlović *et al.* (1994) |
| Germany | 2000 | Stübner in Lepiforum (2010) |
| Spain | 2001 | Olivella (2001) |
| Russia | 2007 | Gninenko (2009) |
| Lithuania | 2007 | Ivinskis & Rimšaité (2008) |
| Belgium | 2007 | Baugnée, this paper |

Predators of *Parectopa robiniella* are especially passerine birds, bush-crickets, bugs and other insects. A number of parasitoid wasps (over 15 species) have been recorded from this moth, mainly belonging to the family of Eulophidae, most of these species are native from Europe, widely distributed and polyphagous (Bolchi Serini 1990; Csóka *et al.* 2009; see also De Prins & De Prins 2010). In Italy, the Nearctic Eulophidae *Closterocerus cinctipennis* Ashmead, 1888 was used since the beginning of the invasion to limit the moth populations, which causes massive defoliation of black locust (Vidano & Marletto 1972).

As reviewed by De Prins & De Prins (2010), eight species of Gracillariidae are recorded in the world as leafminers on *Robinia pseudoacacia*, four of which are confined to North America and two were imported from this region into Europe, namely *Parectopa robiniella* and *Macrosaccus robiniella* (Clemens, 1859). Introduced on the European continent in early 1980, *Macrosaccus robiniella* was discovered for the first time in Belgium in 2001 where it at present occurs throughout (De Prins & Groenen 2001; De Prins & Steeman 2010). Its larva makes a white oval mine on the lower leaf surface, very distinct and easily recognizable from that of *Parectopa robiniella* (see for example Csóka 2003 and Lepiforum). A native species in Europe, *Phyllonorycter insignitella* (Zeller, 1846), has been cited from black locust in Russia (Kuznetzov & Baryshnikova 1998, in De Prins & De Prins 2010) but this maybe accidental (host plants are mainly herbaceous Fabaceae such as *Trifolium* and *Medicago*). In addition, another native leafminer, *Incurvaria pectinea* Haworth, 1828 (Incurvariidae) was observed for the first time on *Robinia* in 2008 in The Netherlands. Its polyphagous larva lives on various trees and produces a small mine combining short corridor and circular blotch (Ellis 2007).

Like *Macrosaccus robiniella*, it's clear that *Parectopa robiniella* is a new arrival in Belgium but it seems now very rare, contrary to the first moth. Indeed, if the black locust occurs in large part of the country, our recent investigations conducted in many localities of the provinces of Namur, Hainaut and Liège did not produce any positive results, while *Macrosaccus robiniella* was omnipresent. Both species share the same niche and can occur together on the same trees, but their respective cycle and phenology are quite distinct (Fodor & Hâruţa 2009). Moreover, *Parectopa robiniella* seems more thermophilous, which could explain why this species spread more slowly towards the North and North-West.

In Belgium, these alien moths can not be treated as pest species because their host plant is also considered as an invasive alien species!

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