The distribution and status of the rare *Rhingia borealis* and *Rhingia rostrata* in Belgium (Diptera: Syrphidae)

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Abstract. In this paper we provide an overview of all currently known records of *Rhingia borealis* and *R. rostrata* in Belgium. Inspection of collection material showed that *R. borealis* since long belongs to the Belgian fauna, but was confused with *R. rostrata*. Recent observations indicate that it still occurs with some prosperous populations in the extreme east of Belgium. Re-inspection of *R. rostrata* collection material revealed 10 historical Belgian records, the latest dating back to 1945. In 2009, *R. rostrata* was again observed in Belgium at three localities in the Hautes Fagnes possibly indicating a revival of this species.

Samenvatting. De verspreiding en status van de zeldzame *Rhingia borealis* en *Rhingia rostrata* in België (Diptera: Syrphidae)
In dit artikel wordt een overzicht gegeven van alle tot nu toe bekende gegevens van *Rhingia borealis* en *R. rostrata* in België. Onderzoek van collectiemateriaal toonde aan dat *R. borealis* van oudsher tot de Belgische fauna behoort, maar verward werd met *R. rostrata*. Recente waarnemingen duiden op bloeiende populaties in het uiterste oosten van België. Heronderzoek van *R. rostrata* in collecties leverde 10 historische Belgische waarnemingen op, de laatste daterend uit 1945. In 2009 werd *R. rostrata* opnieuw in België waargenomen, en wel in drie lokaliteiten in de Hoge Venen wat mogelijk duidt op een heropleving van deze soort.

Résumé. Distribution et statut des rares *Rhingia borealis* et *Rhingia rostrata* en Belgique (Diptera: Syrphidae)
Une liste de toutes les observations en Belgique de *Rhingia borealis* et de *R. rostrata* est donnée. Une inspection des collections a montré que *R. borealis* appartient depuis longtemps à la faune belge, mais que cette espèce a été confondue avec *R. rostrata*. Des observations récentes montrent qu'il y a toujours des populations dans l'extrême Est du pays. Une ré-inspection de *R. rostrata* dans les collections a révélé 10 observations anciennes en Belgique, la dernière en 1945; *R. rostrata* a été trouvée de nouveau en Belgique en 2009 dans trois localités des Hautes Fagnes, ce qui pourrait indiquer une réexpansion de cette espèce.

Key words: *Rhingia borealis* – *Rhingia rostrata* – Faunistics – Distribution – Belgium.

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Introduction

If we may judge one's fame from the number of hits he/she generates on the internet, long-beaked hoverflies (*Rhingia* sp.) must be among the most renowned hoverfly species. No doubt, their extraordinary mouthparts which make them readily identifiable to non-expert entomologists add greatly to this reputation. Yet, things are never as easy as they seem. European *Rhingia* in fact are three closely similar species: *R. borealis* Ringdahl, 1928, *R. campestris* Meigen, 1822 and *R. rostrata* (Linnaeus, 1758), which require close inspection for identification.

Rhingia campestris is the most likely *Rhingia* to be seen at any place and time over most of Europe. It occurs in a variety of agricultural, natural and urbanized habitats and is often abundant. In contrast, the other two *Rhingia* are more critical woodland species that occur localized in Europe and at much lower densities.

Rhingia rostrata is known from many European countries; *R. borealis* is restricted to the boreal zone and (sub)montane areas south to the Pyrenees (Speight 2008). Larvae of *Rhingia* sp. probably all feed on dung. Yet, it appears that only *R. campestris* is able to exploit the omnipresent cattle dung, making it the most successful of the species trio (Speight 2008).

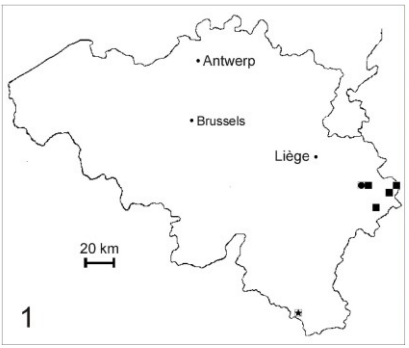

Figure **1**.– Map of Belgium showing the 5×5km UTM squares where *Rhingia borealis* has been observed. (✱=observation <1950, ●=observation >1950 <1980, ■=observation >1980); Figure **2**.– *Rhingia borealis* ♂, 24.v.2009, Saint-Vith (province of Liège), Belgium (photo P. Vantieghem).

In Belgium, according to the faunistic overview by Verlinden & Decleer (1987), two species of *Rhingia* can be found: *R. campestris* and *R. rostrata*. The Belgian Syrphidae database (conceived by the E.I.S. Belgium) holds eight records of *R. rostrata*, which all refer to one individual. Two records are not dated. The other six records range from 1870 to 1945. The database records contrast with Verlinden & Decleer (1987) where a long series of observations from one locality is mentioned and a last observation in 1913. During visits to the collection of the Royal Belgian Institute of Natural Sciences (RBINS) in Brussels I noticed several tens of *Rhingia* labeled as *R. rostrata* in the collection. For some individuals it was clear that they concerned misidentifications of *R. campestris*. However, it also was evident that more than eight *R. rostrata* individuals were present, which accords with Verlinden & Decleer (1987) but contrasts with the database.

Recently, it became known that also the third European *Rhingia* species, *R. borealis*, occurs in Belgium (van Steenis 1998). The individual referred to in that paper (Bévercé, 28.VII.1973, leg. R. Leys) was discovered in a Dutch collection and was labeled as *R. rostrata*. Van Steenis (1998) indicates that this confusion between *R. borealis* and *R. rostrata* may be more common for three reasons. First, *R. borealis* females are extremely similar to females of *R. rostrata* and differ mainly in the presence of hairs on the arista (van Steenis 1998). Second, the key by Van der Goot (1981) only helps to key out males, not females. Third, it was long thought that *R. borealis* did no occur at moderately low altitudes in

Western Europe. Verlinden (1991, 1994), which is largely based on Van der Goot (1981), therefore refrained from including this species in his key. Van Steenis (1998) advocated re-identifying (female) *R. rostrata* present in collections to check whether *R. borealis* may be involved. His advise is particularly relevant to Belgian collection material, since he found the species to be present in Belgian material in a Dutch collection, in nearby areas in the Netherlands (1 record of two females) and in the German Eifel area (several records).

Figure **3**.– *Rhingia rostrata* ♂, 17.VIII.1945, Chiny, Belgium, leg. & coll. M. Goetghebuer, kept at the RBINS, Brussels (photo J. Mortelmans); Figure 4.– *Rhingia rostrata* ♂, 06.IX.2009, Spa, Belgium, feeding on *Origanum majorana* (photo Ch. Devillers).

The aim of this study is to clarify the details of historical *R. rostrata* records in Belgium, and to check all the female *R. rostrata* material for *R. borealis*. In addition, I report all recent Belgian records of *R. borealis* and *R. rostrata*. Finally, by combining these two sources of information, I present an overview of the faunistic status of *R. borealis* and *R. rostrata* in Belgium.

Material and methods

Collection

I have found no reports of Belgian *R. rostrata* that are kept outside the main RBINS collection and the large private collections (e.g. the collections of Goetghebeur, Becquaert,…) that are now stored at the RBINS. For this study I therefore have only examined the material in these collections. I carefully re-identified all the specimens labeled as *R. rostrata* in the collections using the keys of van Steenis (1998), van Veen (2004) and Haarto & Kerppola (2007). The abundant material of *R. campestris* was briefly screened for misidentified *R. rostrata* or *R. borealis*.

Table 1: Detailed overview of all currently known records of *Rhingia rostrata* in Belgium. Records are listed chronologically.

Locality	Male	Females	Date	Legit	Collection
Belgique		1	Not dated		RBINS
Sclessin		1	Not dated	de Moffarts	E. Coucke/RBINS
Louette St. Pierre	5	3	IV-V.1870		RBINS
Louette St. Pierre	7	1	VI.1870		RBINS
Louette St. Pierre		1	13.VII.1870		RBINS
Heure		1	19.VIII.1891		RBINS
Dinant		1	V-VI.1889	Naturalistes Dinantais	RBINS
Glain	2		<1918	E. Candèze	RBINS
Hockai	1		26.IV.1913		RBINS
Chiny	1		17.VIII.1945	M. Goetghebuer	M. Goetghebuer
Hockai	1		23.V.2009	M. Reemer	M. Reemer
Rocherath	1		31.VIII.2009	F. Van de Meutter	F. Van de Meutter
Spa	1		6.IX.2009	C. Devillers	

Table 2: Detailed overview of all currently known records of *Rhingia borealis* in Belgium.

Locality	Male	Females	Date	Legit	Collection
Orval		2	25.VII.1891	E. Coucke	E. Coucke
Bévercé		1	28.VII.1973	R. Leys	R. Leys
Robertville (Warche)	1		26.V.2005	B. Wakkie	B. Wakkie
Rocherath (Jansbach)	1	1	23.V.2009	B. Wakkie, F. Van de Meutter, P. Vantieghem	B. Wakkie, F. Van de Meutter
Rocherath (Holzwarche) Enkelberger mühle	2		23.V.2009	B. Wakkie, F. Van de Meutter, P. Vantieghem	B. Wakkie, F. Van de Meutter
Saint Vith (Walleroderwald)	3	1	24.V.2009	B. Wakkie, F. Van de Meutter, P. Vantieghem	B. Wakkie, P. Vantieghem
Rocherath (Holzwarche) Enkelberger mühle	1	2	13.VI.2009	F. Van de Meutter	F. Van de Meutter
Rocherath (Jansbach)		3	13.VI.2009	F. Van de Meutter	F. Van de Meutter
Rocherath (Holzwarche) Enkelberger mühle		1	13-30.VI.2009	F. Van de Meutter	F. Van de Meutter
Rocherath (Holzwarche) Enkelberger mühle		2	30.VI-31.VIII.2009	F. Van de Meutter	F. Van de Meutter

Field surveys

During May, June and August 2009 I spent six whole-day excursions to the Belgian Eifel area near Rocherath. Special focus was on the Jansbach, Holzwarche and Olef river valleys. End May 2009, a weekend was spend looking for Syrphidae in the company of Pieter Vantieghem and Bastiaan Wakkie visiting the Walleroderwald near Saint-Vith in addition to the above areas.

Results

Re-examination of the RBINS collection

Rhingia borealis

Among the *R. rostrata* specimens in the collections at the RBINS I found two female *R. borealis*, both collected at the "forêt d'Orval" on 25.VII.1891. These well-conserved individuals stood out among the *R. rostrata* by their short, bold snout. The relatively long-haired arista confirmed their identity. I want to note, however, that also *R. rostrata* often has well visible hairs on the arista, in contrast to the drawings in van Steenis (1998) and the description given in some recent keys (van Veen 2004). The hairs on the arista in *R. rostrata* are shorter than the width of the arista, while they are equal or longer than de arista width (except at the base of the arista) in *R. borealis*. In the *R. borealis* specimens I have seen, arista hairs often seemed longer in females than in males, possibly pointing to sex-specific differences, but more material should be examined to confirm this.

The Belgian Syrphidae database lists an intriguing set of 26 observations under the name *R. austriaca*. This name was long (but wrongly – auct. nec.) applied to *R. borealis*, but seems to have been applied to (some phenotype?) of *R. campestris* as well. The latter conclusion comes from re-examining a number of *R. austriaca* individuals that were relocated in the RBINS collections that were all *R. campestris*. A set of more recent observations could no be checked since it is unclear whether they were collected and, if so, where they are now. Interestingly, some of these records are from Elsenborn and the Jansbach valley at Rocherath, exactly the places where we found *R. borealis* in 2009, and were done by expert observers. Strangely, while all these records predate 1981, they were not considered by the later publications of Verlinden & Decleer (1987) or Verlinden (1991, 1994).

Rhingia rostrata

Re-identification of the 40+ *R. rostrata*-labeled specimens in the RBINS collection revealed the presence of 24 *R. rostrata* individuals (15 male, 9 female) constituting ten different records (Table 1). A remarkable series of observations comes from Louette Saint-Pierre where no less than 17 individuals were collected in April-July 1870 by a single observer. A male *R. rostrata* dating from 17.VIII.1945 at Chiny was found in the collection of M. Goetghebuer. This record is lacking in Verlinden & Decleer (1987).

Recent observations

R. borealis

After the first confirmed record in collection material (van Steenis 1998), it lasted until 2005 when again a *R. borealis* was found in Belgium (Warche valley, Table 2). More specific searches during 2009 revealed the presence of some prosperous populations in the area upstream of the 2005 record, in the valleys of the Holzwarche and the Jansbach, and in the south-east of the Hautes Fagnes near Saint-Vith (Table 2). A total of 17 individuals of *R. borealis* were observed in 2009. *R. borealis* were found visiting flowers of *Ajuga reptans*, *Centaurea montana*, *Polygonum bistorta*, *Sarothamnus scoparius*, *Silene dioica* and *Taraxacum officinale*.

R. rostrata

Surprisingly, *R. rostrata* was observed several times in Belgium in 2009 after 65 years of absence (Table 1, Van de Meutter *et al*., in prep.). A first individual of the spring generation was seen near Hockai in the valley of the Hoegne end May 2009. End August 2009 a *R. rostrata* of probably the second generation was caught feeding on *Cirsium palustre* in the valley of the Jansbach river near Rocherath at exactly the same place where a series of *R. borealis* was observed earlier that year. Also *R. campestris* occurs here in number making this an exceptional locality housing all three European *Rhingia*. Finally, at the beginning of September 2009, *R. rostrata* was photographed in a residential neighbourhood in Spa, which is not far (1.5 km) from the Hautes Fagnes woodlands.

Discussion

Barkemeyer (1986) was the first to discover that *R. borealis* may not be a strictly boreomontane species in Western Europe being restricted to the Alps, but that it also occurs in the lower mountains of the Harz area near Hannover and in SW Germany. Van Steenis (1998) showed that also the Eifel and the Vosges are populated with *R. borealis*. He postulated that the presence of this species in the latter areas may be due to a recent range shift given the lack of observations predating 1960. I now show that *R. borealis* occurred in Belgium already as early as 1891. The fact that two individuals are involved suggests that probably a local population existed, and that this were no haphazardly taken wandering individuals. The locality of this observation is situated outside the Eifel area indicating that *R. borealis* may occur more widespread and at even lower altitudes than was so far known (the 1891 locality at Orval is at 250–300m ASL). In 2009, a thorough search for Syrphidae in the Hautes Fagnes/Eifel area revealed the presence of several apparently prosperous populations of *R. borealis*. Several individuals were repeatedly observed at three localities (Table 2) at altitudes varying from 460–650m ASL. We experienced that finding *R. borealis* required a strategy different from a general search for Syrphidae: *R. borealis* usually flew in poorly accessible, damp, shaded places with thick undergrowth and in close proximity of small rivulets. This may explain why such

a conspicuous black-reddish (males) and grey-orange (females) fly has gone unnoticed for all these years. Since all populations currently known are closely linked to the dendritic network of the many small rivers that occur in the Hautes Fagnes/Eifel (Holzwarche, Jansbach, …), it is likely that this network may act as a dispersal corridor for this species. It would be interesting to selectively sample along this network to find out how extensive the distribution of *R. borealis* in Belgium may be.

Re-identifying all the *R. rostrata* material present in the RBINS collection resulted in ten different records of *R. rostrata* concerning 24 individuals. Not less than 17 individuals are from one single year and place (Louette St.-Pierre, April–July 1870) indicating the species was prosperous at that time and place. It appears that the Belgian Syrphidae database does not mention counts above one from the same day for collection material (and observations?); a recurrent problem that creates an incomplete view on the faunistics of the species involved. One record (two individuals) of *R. rostrata* listed by Verlinden & Decleer (1987) and mapped in subsequent publications by Verlinden (1991, 1994) was shown to be *R. borealis*, whilst three "new" overlooked records of *R. rostrata* may be added (Table 1). One of the additional records of *R. rostrata* is from 1945, which is considerably later than the last date (1913) mentioned by Verlinden & Decleer (1987). Interestingly, the species made a noticeable comeback in 2009 after 65 years of absence! All three new records are from the Hautes Fagnes, though distantly spaced over its entire area. In the U.K., the species' status was revised several times to a less vulnerable class recently to keep up with an increasing distribution and number of observations (Hoverfly Recording Scheme; http://www.hoverfly.org.uk/). I am not aware of a similar ongoing population resurrection on the European continent at present. However, it is hoped that the series of observations in 2009 may reflect a revival of *R. rostrata* in Belgium, and may be part of a larger phenomenon acting at the West-European scale. It may well prove worthy keeping an eye open for this species in the coming years in Belgium and its neighbouring countries.

Conclusion

The data presented in this study allow us to revise the status of *R. borealis* and *R. rostrata* in Belgium. *R. borealis* appears to be an ancient member of the Belgian fauna that probably was long overlooked due to its secretive behaviour and close affinity with a poorly accessible habitat (small and shaded rivulets). Recent data suggest that it occurs localized in the east and southeast of the Hautes Fagnes area, but may be found in numbers here. *R. rostrata* appears to have been a relatively abundant species in Belgium in the second half of the 19th century, at least locally (cf. Verlinden & Decleer 1987). It then probably has declined dramatically at the beginning of the 20th century, as was observed over the whole of Europe (van Steenis 1998, Speight 2008). An observation in 1945 indicates that some populations may have locally persisted for some time, however, it was considered extinct by Verlinden & Decleer (1987). In 2009, *R.*

rostrata was rediscovered at three locations within the Hautes Fagnes area, though always in singletons indicating densities may be very low. It is to be awaited whether *R. rostrata* now will be found more regularly and/or more widespread. More prospecting will be needed to assess the status of the currently known populations(?). We may cautiously conclude that *R. rostrata* (still?) has some local populations in the Hautes Fagnes.

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