

Contributions to the knowledge of Dolichopodid flies in Belgium: IV. Ecology and faunistics of dolichopodid flies collected in some nature reserves (Diptera: Dolichopodidae)

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Summary. The results of some short inventories on dolichopodid flies (Diptera : Dolichopodidae) during 1988 in Belgium are presented. The following nature reserves were sampled: Het Torfbroek (Berg), De Sint-Pietersberg (Eben-Emael), Het Hageven (Neerpelt) and De Ronde Put (Postel). A total of 2841 specimens were collected, belonging to 70 species. Many species of special faunistic interest were detected, for some of which only few records are known in Belgium. Furthermore, the capture of the dune-inhabiting *Hercostomus nigriplantis* in the Sint-Pietersberg Nature Reserve is highly remarkable. Finally, *Campsicnemus pusillus*, which was caught in a limestone marshland in Het Torfbroek Nature Reserve, is new to the Belgian fauna.

Samenvatting. Bijdragen tot de kennis van de Dolichopodidae in België: IV. Ecologie en faunistiek van Dolichopodidae in enkele natuurreservaten (Diptera: Dolichopodidae) De resultaten van enkele korte inventarisaties op slankpootvliegen (Diptera: Dolichopodidae) tijdens 1988 in België worden voorgesteld. De volgende natuurreservaten werden bemonsterd: Het Torfbroek (Berg), De Sint-Pietersberg (Eben-Emael), Het Hageven (Neerpelt) en De Ronde Put (Postel). In totaal werden 2841 exemplaren gevangen, behorende tot 70 soorten. Een groot aantal faunistisch interessante soorten werden aangetroffen, waarvan enkele slechts van heel weinig lokaliteiten in België bekend zijn. Daarnaast is de vangst van de duinbewonende *Hercostomus nigriplantis* in het natuurreservaat 'De Sint-Pietersberg' heel opmerkelijk. Ten slotte is *Campsicnemus pusillus* nieuw voor de Belgische fauna. Deze soort werd verzameld in een kalkmoeras van het natuurreservaat 'Het Torfbroek'.

Résumé. Contributions à la connaissance des Dolichopodidae en Belgique: IV. Écologie et faunistique des Dolichopodidae de quelques réserves naturelles (Diptera: Dolichopodidae).

L'auteur publie le résultat de quelques inventaires sommaires de Dolichopodidae effectués en 1988 en Belgique. Les réserves naturelles suivantes ont été étudiées: Het Torfbroek (Berg), la Montagne St.-Pierre (Eben-Emael), Het Hageven (Neerpelt) et le Ronde Put (Postel). Au total 2841 exemplaires furent récoltés, appartenant à 70 espèces. Un grand nombre de renseignements faunistiques fut noté, parmi lesquels quelques espèces ne furent mentionnées de Belgique qu'en très peu d'exemplaires. D'autre part, la capture de *Hercostomus nigriplantis* à la Montagne St.-Pierre est remarquable. Enfin, *Campsicnemus pusillus*, est nouveau pour la faune belge. Cette espèce fut récoltée dans les marais calcaires de la réserve naturelle 'Het Torfbroek'.

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Introduction

For most nature reserves in Belgium and probably other European countries too, information about their invertebrate faunas is generally only fragmentary or even completely lacking. In contrast, the management of most, if not all, nature reserves do have detailed lists of bird, mammal and higher plant species at their disposal. Nevertheless, despite their small size, invertebrates are potentially the most important organisms for bio-indicator purposes. Two features are of great significance in that respect: in the first

place, many species are known to respond to subtle environmental changes much more rapidly than mammal or bird species. As a result, the real impact of a superficially unimportant alteration might be detected much sooner using invertebrates. Secondly, as insects comprise the majority of animal life on earth, inventories based on this group undoubtedly yield much more detailed information about the biological value of a particular area. This is not only due to the fact that many taxa, e.g. families, consist of a large number of species. Moreover, the often large species abundances enable statistic analysis and thus provide a reliable basis for conclusions. Such information is of great importance for the management of nature reserves, if only as a reference for future comparisons of faunas after environmental changes.

In Belgium, nature reserves are not evenly distributed. Especially, in East and West Flanders, very few and mostly small reserves are present. However, concerning our knowledge of Dolichopodidae, these are by far the most intensively investigated regions in the country (POLLET et al. 1987). In order to cover interesting areas in the remaining provinces too, several short field excursions were carried out during 1988 and 1989. Previously, POLLET et al. (1988) dealt with the collection results obtained during 1987 in nature reserves situated in Antwerpen and Limburg, whereas POLLET & DECLEER (1989) discussed the dolichopodid composition of three sites of Het Molsbroek Nature Reserve at Lokeren (East Flanders). In the present paper, the results of our 1988 inventories outside West Flanders are presented. Furthermore, the fauna composition per site as well as the faunistic interesting species are briefly discussed.

Material and methods

Figure 1 shows the location of the sampled nature reserves in Belgium. Het Torfbroek Nature Reserve is situated in the province of Brabant, De Sint-Pietersberg Nature Reserve in Liège, het Hageven Nature Reserve in Limburg and De Ronde Put Nature Reserve in Antwerpen. In the following, a short characterization of the nature reserves and a list of the sampled habitat types is given (between brackets, the locality and the surface is indicated) :

(a) Het Torfbroek (Berg, 19 hectare): a relict area of the once vast humid marshlands on limestone in this region. A complete succession from open

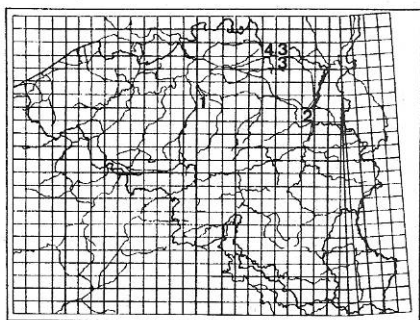


Figure 1 : Location of the sampled habitats in Belgium. 1, Het Torfbroek Nature Reserve (Berg); 2, De Sint-Pietersberg Nature Reserve (Eben-Emael); 3, Het Hageven Nature Reserve (Neerpelt); 4, De Ronde Put Nature Reserve (Postel).

water to alder carr is present. Sampled sites: banks of ponds, marshland, border of ditch within deciduous woodland, humid calcareous grassland.

(b) De Sint-Pietersberg (Eben-Emael, 51 hectare): a elongated hill of limestone with steep slopes, covered with flowery dry grasslands and sparsely distributed bushes. This nature reserve is known for its remarkably warm microclimate. Since the grasslands appeared not to be very interesting for dolichopodid flies, which are pronouncedly hydrophilous, samples were only taken from herbage bordering a small pool at the foot of the hill and from borders of a woodland path.

(c) De Ronde Put (Postel, 20 hectare): almost entirely occupied by a large oligotrophic pond, which was originally created by peat-digging. The pond is bordered by coniferous and birch woodlands on the dry parts and reed-marshes and peat-moors in the humid places. Sampled sites: woodland edge, *Erica*-heathland.

(d) Het Hageven (Neerpelt, 155 hectare): an extended predominant heathland area on sandy soil with dry and humid heathlands, inland dunes, fens, marshlands and ponds. Sampled sites: banks of fens, cattle-pool amid humid heathland, alder woodland edges, borders of a ditch.

Samples were exclusively taken by net sweeping during 6.VI.1988 (a, b) and 7.VI.1988 (c, d). In the field, the entire yield per sampled site was put in a collecting jar containing a 70% alcohol solution. Afterwards, these collections were sorted in the laboratory using a binocular microscope (WILD-M5). Dolichopodid flies were identified by means of D'ASSIS FONSECA (1978), PARENT (1938) and some unpublished keys by Drs H.J.G. MEUFFELS. Nomenclature is according to MEUFFELS & GROOTAERT (1987).

Results and discussion

Table 1 presents a list of all species with the numbers per nature reserve. A total of 2841 specimens were collected, belonging to 70 species. Three species were caught in all nature reserves investigated: *Campsicnemus curvipes*, *Dolichopus unguulatus* and *Sympycnus pulicarius*. These are among the most common species in Belgium (POLLET et al. 1987). The numbers of the species are not suitable for a detailed analysis because of the unstandardized nature of our sampling. As a result, the dolichopodid fauna of each area is separately discussed. The fauna of De Sint-Pietersberg Nature Reserve, however, is not included since the sampled habitats are not a good reflection of the whole area.

The fauna of Het Torfbroek Nature Reserve clearly differs from these of the two heathland areas. This is undoubtedly due to the alkaline character of the soil and the open water. Species which are typical for eutrophic marshlands are *Hercostomus nanus*, *H. plagiatus* and *Teuchophorus spinigerellus*. The following are mainly known from inland humid woodlands: *Argyra atriceps*, *Hercostomus parvilamellatus* and *Rhaphium monotrichum*. *Dolichopus picipes* and *D. urbanus* occur very abundantly in meadows neighbouring deciduous woodland.

Stenotopic species of oligotrophic fens, *Erica*-heathland and peat-moors are *Dolichopus atratus*, *D. lepidus*, *D. tanythrix* and *Rhaphium longicorne*. *Diaphorus nigricans*, *Dolichopus simplex* and *Hydrophorus bipunctatus* reach their highest abundances in humid heathland and fenland too, but can occasionally be found in other similar habitat types too. All these species were caught at either De Ronde Put Nature Réserve or Het Hageven Nature Reserve. A large number of species proved to be of special faunistic interest. In the following discussion, records are added only for these species, which are known from very few sites (HC: hand catches, PT: pitfall traps, SW: sweepnet, BWT, WWT: blue and white water traps, MT: malaise traps) :

***Campsicnemus armoricanus* PARENT, 1926**

Other records for Belgium: Mol, Studiecentrum voor Kernenergie, fenland, VI-VII.1986, MT (GROOTAERT et al. 1986); 1 ♀, Noisieux, bank of the Ourthe River, 30.VI-2.VII.1987, BWT (POLLET et al. 1988); 3 ♀, Robertville, peat-moor along the Roer River, 8.VII.1989, SW (leg. POLLET); 1 ♀, Mirwart, herbage along the Lomme River, 21.VII.1989, SW (leg. POLLET).

This species apparently occurs in humid heathland, peat-moors and on riverbanks. According to BRUNEL (1986), this species is cold-preferent. In the key of PARENT (1938), females of this species and the closely related *C. pusillus* could apparently not be distinguished and are included in the same couplet. However, *C. armoricanus* shows brownish black halteres and 2 ventral bristles on tibia III, instead of slightly infuscated halteres and 1 ventral bristle in *C. pusillus*.

***Campsicnemus compeditus* LOEW, 1857**

Other records for Belgium: 1 ♀, Zonhoven, De Slangebeekbronnen Nature Reserve, 18.V.1986, HC (POLLET & GROOTAERT 1986); 3 ♂, 7 ♀, Zonhoven, De Teut Nature Reserve, 16.VIII.1987, SW (POLLET et al. 1988); 3 ♂, 5 ♀, Houthulst, Houthulstbos Military Depot, 6.VII-20.X.1988, WWT (leg. POLLET).

C. compeditus is strictly confined to oligotrophic fenland in Belgium and has thus far always be encountered in the direct vicinity of fens and ponds. MACGOWAN (1988) called it a moorland and montane species in Scotland.

***Campsicnemus (Ectomus) alpinus* (HALIDAY, 1873)**

Other records for Belgium: 1 ♂, Zedelgem, Vloetenveld Military Depot, 18.VIII.1979, SW (leg. VERBEKE); 21 ♂, 15 ♀, Zedelgem, Vloetenveld Military Depot, 21.VI-29.XI.1986, PT (leg. POLLET); 1 ♂, Wingene, De Gulke Putten Nature Reserve, IV-VI.1985, PT (leg. DECLER); 44 ♂, 48 ♀, Houthulstbos Military Depot, 30.V-20.X.1988, WWT (leg. POLLET); 18 ♂, 20 ♀, Houthulstbos Military Depot, 6.VII.1988 + 16.VIII.1988, SW (leg. POLLET); 2 ♂, Rekem, Vallei van de Zijpbeek Nature Reserve, 15.VIII.1987, SW (POLLET et al. 1988); Kalmthout, De Kalmthoutse Heide Nature Reserve (?) (PARENT 1924).

C. alpinus, which was first detected in England (LUNDBECK 1912), is generally considered as typical for moorland (NELSON 1971; MACGOWAN

1988). It is not at all restricted to mountainous regions, as PARENT (1924) mentions, and is also known from dune grasslands on the isle Amrum (KARL 1930). Like the previous species, in Belgium *C. alpinus* obviously prefers humid heathland (POLLET et al. 1989). It is most abundantly found on patches of bare soil within *Erica* heathland. Like other species of this genus, it exhibits a pronounced soil surface activity, which is reflected by the high pitfall and water trap catches. *C. alpinus* reaches its activity peak during late summer (August-September).

Campsicnemus lumbatus occurs in largest numbers in marshlands along eutrophic or mesotrophic ponds. It is one of the dominant species on floating leaves of Nymphaeid plants in The Netherlands (VAN DER VELDE 1985). However, it has also been found in humid woodland (POLLET & GROOTAERT 1987), on river banks (POLLET et al. 1988) and, quite surprisingly, here at the border of a cattle-pool within heathland (see table 1). Its rather remarkable occurrence might be explained by an eutrophication of the pool water due to cattle droppings. Despite the fact that it was first discovered in The Netherlands as late as 1978 (MEUFFELS 1978) and generally considered as very rare in our country too, recent investigations revealed that *C. lumbatus* indeed shows a very strict habitat preference but is not uncommon.

Campsicnemus pectinulatus, on the contrary, is mainly found on bare muddy banks of mesotrophic pools or oligotrophic fens. According to my knowledge, it has been captured exclusively on sandy soil.

Campsicnemus pusillus is new to the Belgian fauna. A single male and female were collected in a short-grazed marshland on limestone. Nothing is known about its ecology nor its habitat preference.

Chrysotus femoratus is characteristic for relatively humid to dry open habitats on a sandy soil, which is in agreement with the findings of LUNDBECK (1912) and EMEIS (1964): both authors recorded it from rather dry grassy sites such as borders of roads and paths in heathland and moorland. In Belgium this species is rather common in the coastal dune grasslands and the inland heathlands. In Het Hageven Nature Reserve, this species was particularly abundant on the leaves of minute birch trees amid heathland.

Chrysotus monochaetus can be termed relatively rare in Belgium, since only 10 records are thus far known for this species. All of them are situated in the eastern and southern parts of the country. This species has mainly been found on river banks and is known to be thermophilous (BRUNEL 1986).

The habitat preference of *Chrysotus pulchellus* is quite similar to that of *C. femoratus*, although the former species is somewhat less common. Moreover, in Denmark and Schleswig-Holstein, it is termed very rare (LUNDBECK 1912; EMEIS 1964). It has been found in moorland edges (EMEIS 1964) and meadows (WEBER 1983). In Belgium, it is almost exclusively encountered in dune grasslands and humid heathlands but appears to prefer a somewhat more humid microhabitat and a lower herbage than its congener.

To date, very little is known about the ecology of *Dolichopus agilis*.

D'ASSIS FONSECA (1978) mentioned only 3 authentic records for Great Britain, which emphasizes its rarity in that country. Also LUNDBECK (1912) considered it as rare in Denmark, where it apparently reaches the northern limit of its distribution area in Europe. Only EMEIS (1964) and KARL (1930) gave some ecological data: *D. agilis* occurs in sandy areas as well as in saltmarshes. Moreover, according to the latter author, it belongs to a characteristic halophilous fauna. Since we only captured a single specimen, no valuable ecological information can be added.

Dolichopus vitripennis has mainly been recorded from moorland (EMEIS 1964; NELSON 1971; MACGOWAN 1988). EMEIS (1964) postulates that it is particularly characteristic of peatmoors with *Erica*, *Myrmica* and scattered desiccated patches of *Molinia* tussocks. In Denmark, on the contrary, it is found in marshy areas often near the coast (LUNDBECK 1912). In Belgium, *D. vitripennis* is extremely rare in the western part of the country and thus far only known from two sites. Both are fenland habitats situated within military depots (POLLET et al. 1989). In the eastern part of Belgium, where still large fenland areas are left, this species is expected to be more common. In any case, it seems to be strictly confined to the borders of oligotrophic fens on a sandy soil.

The distribution of *Dolichopus picipes* and *D. urbanus* in Belgium is restricted to the central and southern parts. Both species are often found together in marshland and meadows or in adjacent humid woodland sites, which is in concordance with EMEIS' findings (EMEIS 1964). Maps showing their distribution patterns in Belgium are given by POLLET et al. (1988).

Hercostomus nigriplantis is definitely a coast species: EMEIS (1964) recorded it from shores and saltmarshes with *Limonium*, whereas GOETGHEBUER (1928) found it at the borders of dune ponds, which dry out during summer. Until recently, also in our country *H. nigriplantis* was reported exclusively from the coastal dunes (Fig. 2), where it demonstrates a strong preference for relatively humid dune woodland. Consequently, the capture of this species in De Sint-Pietersberg Nature Reserve at Eben-Emael in the south-east of Belgium is surely enigmatic. Although we can not explain this yet, the exceptional warm microclimate associated with the presence of a calcareous soil in both areas might be an important factor.

Thus far, only 6 records of *Hercostomus parvilamellatus* are known from Belgium (POLLET et al. 1988). This species occurs mainly in canopied sites near eutrophic or mesotrophic ponds and pools.

Hercostomus plagiatus has a bimodal habitat preference, occurring in both woodland and non-woodland habitats (POLLET et al. 1989). Nevertheless, it reaches its highest abundances in marshland bordering eutrophic ponds. Very recently, a thorough examination of a large number of European specimens revealed the occurrence of a sibling species in Europe, new to science: *Hercostomus verbekei* (POLLET in prep.).

Figure 2 : Distribution of *Hercostomus nigriplantis* (STANNIUS, 1831) in Belgium.

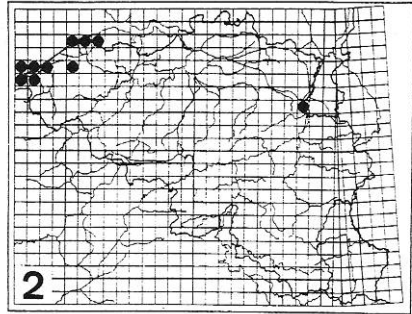


Figure 3 : Distribution of *Hercostomus angustifrons* (STAEGER, 1842) in Belgium.

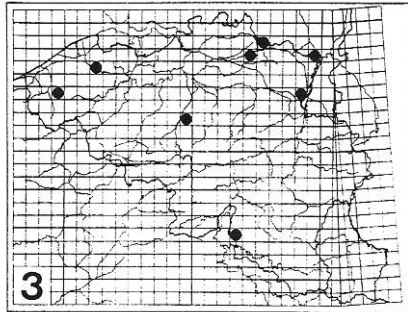
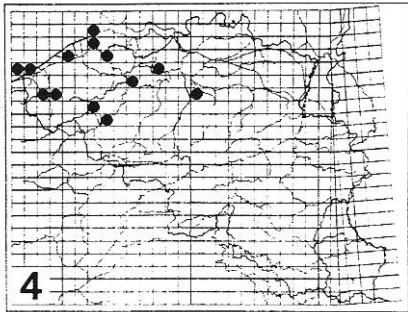


Figure 4 : Distribution of *Thinophilus (S.) versutus* (HALIDAY, 1832) in Belgium.



All species belonging to the subgenus *Hercostomus* (*Gymnopternus*), are mainly found in woodland sites or sites showing a high herb vegetation. From all Belgian species, *Hercostomus (G.) aerosus* is undoubtedly the most common. However, as our investigations proved, it avoids calcareous soil types and is very common on acid sandy soils. In these regions, it can be found both in woodland and heathland sites. The other species are more exigent in their habitat choice and are mainly found in humid woodland.

Hercostomus (G.) angustifrons can be considered as one of the rarer species of this subgenus. It is rare everywhere in Europe. LUNDBECK (1912) found it in humid places, at the border of water on aquatic plants and EMEIS (1964)

Table 1. List of Dolichopodidae, collected by net sweeping during 06-07.VI.1988 in four nature reserves in Belgium. A, Het Torfbroek (Berg); B, De Sint-Pietersberg (Eben-Emael); C, De Ronde Put (Postel); D, Het Hageven (Neerpelt); T: total number per species (males/females).

Species list	A	B	C	D	T
<i>Argyra atriceps</i> LOEW, 1857	1/	-	-	-	1/
<i>Argyra leucocephala</i> (MEIGEN, 1824)	-	4/1	-	-	4/1
<i>Campsicnemus (C.) armoricanus</i> PARENT, 1926	-	-	-	2/1	2/1
<i>Campsicnemus (C.) compeditus</i> LOEW, 1857	-	-	-	/1	/1
<i>Campsicnemus (C.) curvipes</i> (FALLÉN, 1823)	6/3	21/14	5/2	1/1	33/20
<i>Campsicnemus (C.) loripes</i> (HALIDAY, 1862)	-	1/	-	-	1/
<i>Campsicnemus (C.) lumbatus</i> LOEW, 1857	-	-	-	1/2	1/2
<i>Campsicnemus (C.) pectinulatus</i> LOEW, 1864	-	-	-	5/5	5/5
<i>Campsicnemus (C.) picticornis</i> (ZETTERSTEDT, 1843)	-	-	7/3	12/6	19/9
<i>Campsicnemus (C.) pusillus</i> (MEIGEN, 1924)	1/1	-	-	-	1/1
<i>Campsicnemus (C.) scambus</i> (FALLÉN, 1823)	1/	/2	6/2	-	7/4
<i>Campsicnemus (Ectomus) alpinus</i> (HALIDAY, 1873)	-	-	-	3/	3/
<i>Chrysotus blepharoseoles</i> KOWARZ, 1874	1/2	-	-	-	1/2
<i>Chrysotus femoratus</i> ZETTERSTEDT, 1834	-	-	-	32/13	32/13
<i>Chrysotus gramineus</i> (FALLÉN, 1823)	1/	-	-	-	1/
<i>Chrysotus monochaetus</i> KOWARZ, 1874	-	1/	-	-	1/
<i>Chrysotus neglectus</i> (WIEDEMANN, 1817)	2/1	-	/1	14/16	16/18
<i>Chrysotus pulchellus</i> KOWARZ, 1874	-	-	-	1/	1/
<i>Chrysotus suavis</i> LOEW, 1857	-	-	-	1/3	1/3
<i>Diaphorus nigricans</i> MEIGEN, 1824	-	-	-	2/20	2/20
<i>Dolichopus agilis</i> MEIGEN, 1824	-	-	-	1/	1/
<i>Dolichopus argyrotarsis</i> WAHLBERG, 1850	-	-	-	5/6	5/6
<i>Dolichopus atratus</i> MEIGEN, 1824	-	-	1/1	-	1/1
<i>Dolichopus brevipennis</i> MEIGEN, 1824	-	1/	-	1/1	2/1
<i>Dolichopus claviger</i> STANNIUS, 1831	-	4/6	-	11/4	15/10
<i>Dolichopus discifer</i> STANNIUS, 1831	-	-	1/1	5/6	6/7
<i>Dolichopus latilimbatus</i> MACQUART, 1827	-	3/	/1	1/1	4/2
<i>Dolichopus lepidus</i> STAEGER, 1842	-	-	1/1	-	1/1
<i>Dolichopus longicornis</i> STANNIUS, 1831	-	-	-	1/2	1/2
<i>Dolichopus pennatus</i> MEIGEN, 1824	/5	-	-	-	/5
<i>Dolichopus picipes</i> MEIGEN, 1824	1/1	-	-	-	1/1
<i>Dolichopus plumipes</i> (SCOPOLI, 1763)	/1	5/4	-	1/1	6/6
<i>Dolichopus popularis</i> WIEDEMANN, 1817	/2	-	-	-	/2
<i>Dolichopus signatus</i> MEIGEN, 1824	-	-	/1	-	/1
<i>Dolichopus simplex</i> MEIGEN, 1824	-	-	-	1/4	1/4
<i>Dolichopus subpennatus</i> D'ASSIS FONSECA, 1976	4/1	3/1	-	-	7/2
<i>Dolichopus tanythrix</i> LOEW, 1869	-	-	1/	1/1	2/1
<i>Dolichopus ungulatus</i> (LINNAEUS, 1758)	1/1	7/	15/17	5/2	28/20
<i>Dolichopus urbanus</i> MEIGEN, 1824	5/	-	-	-	5/
<i>Dolichopus vitripennis</i> MEIGEN, 1824	-	-	-	1/7	1/7
<i>Hercostomus nanus</i> (MACQUART, 1827)	5/	-	-	-	5/
<i>Hercostomus nigriplantis</i> (STANNIUS, 1831)	-	2/	-	-	2/
<i>Hercostomus parvilamellatus</i> (MACQUART, 1827)	2/1	-	-	-	2/1
<i>Hercostomus plagiatus</i> (LOEW, 1857)	1/2	-	-	-	1/2
<i>Hercostomus (G.) aerosus</i> (FALLÉN, 1823)	-	-	37/27	809/806	846/833
<i>Hercostomus (G.) angustifrons</i> (STAEGER, 1842)	-	-	1/4	1/2	2/6
<i>Hercostomus (G.) brevicornis</i> (STAEGER, 1842)	-	-	3/2	-	3/2
<i>Hercostomus (G.) celer</i> (MEIGEN, 1824)	-	-	-	10/4	10/4
<i>Hercostomus (G.) cupreus</i> (FALLÉN, 1823)	-	1/	80/188	94/87	175/275
<i>Hercostomus (G.) metallicus</i> (STANNIUS, 1831)	1/4	-	1/4	26/17	28/25

<i>Hydrophorus bipunctiatus</i> (LEHMANN, 1822)	-	-	-	2/3	2/3
<i>Neurigona quadrifasciata</i> (FABRICIUS, 1781)	-	/1	-	/1	/2
<i>Poecilobothrus nobilitatus</i> (LINNAEUS, 1767)	1/	-	-	-	1/
<i>Rhaphium appendiculatum</i> ZETTERSTEDT, 1849	-	1/1	-	-	1/1
<i>Rhaphium caliginosum</i> MEIGEN, 1824	/1	/6	-	1/	1/7
<i>Rhaphium commune</i> (MEIGEN, 1824)	-	4/3	-	-	4/3
<i>Rhaphium longicorne</i> (FALLÉN, 1823)	-	-	/1	-	/1
<i>Rhaphium monotrichum</i> LOEW, 1850	1/1	-	-	-	1/1
<i>Sciapus platypterus</i> (FABRICIUS, 1805)	-	/2	-	-	/2
<i>Sciapus vialis</i> (RADDATZ, 1873)	-	-	-	1/	1/
<i>Sciapus wiedemanni</i> (FALLÉN, 1823)	-	-	-	1/5	1/5
<i>Sympycnus pulicarius</i> (FALLÉN, 1823)	15/21	18/19	1/	31/20	65/60
<i>Syntormon denticulatus</i> (ZETTERSTEDT, 1843)	-	-	-	/1	/1
<i>Syntormon pumilus</i> (MEIGEN, 1824)	2/	1/	-	3/1	6/1
<i>Teuchophorus calcaratus</i> (MACQUART, 1828)	4/3	2/	-	-	6/3
<i>Teuchophorus nigricosta</i> (VON ROSER, 1840)	1/	-	-	-	1/
<i>Teuchophorus spinigerellus</i> (ZETTERSTEDT, 1843)	16/19	-	-	-	16/19
<i>Thinophilus (S.) versutus</i> (HALIDAY, 1851)	1/	-	-	-	1/
<i>Xanthochlorus ornatus</i> (HALIDAY, 1832)	-	/2	-	-	/2
<i>Xanthochlorus tenellus</i> (WIEDEMANN, 1817)	-	/3	-	-	/3
number of species	27	23	18	37	70
number of specimens	144	144	416	2137	2841

mentioned the capture of a single specimen in a dry peatmoor area. Apart from some single captures, in Belgium all specimens of this species were caught in deciduous or coniferous woodland sites at the border of oligotrophic fens. Moreover, it is exclusively known from such sites in the province of West Flanders, where it has been found within *Juncus effusus* tussocks. Although we have only 8 Belgian records for this species, most of them originate from wooded heathland areas in the eastern part of the country (Fig. 3). Previously, POLLET et al. (1986) mentioned the capture of a single female of *H. (G.) angustifrons* at Wijnendalebos (Ichtegem-Torhout). However, as a result of a recent closer examination, this fly proved to be an aberrant specimen of the related *H. (G.) cupreus*. Although, as in *H. (G.) angustifrons*, it showed a single ventral bristle on the middle tibia and a slightly pubescent face, the following features were decisive to identify it as *H. (G.) cupreus*: (i) entirely yellow hind tibiae (ii) face about twice as wide as third antennal joint, (iii) slight dilatation of the costal vein beyond end of subcostal vein and (iv) total wing length more than 4 mm.

All *Teuchophorus* species mainly occur in eutrophic marshlands and are in general not or very rarely found in heathlands. Perhaps *T. monacanthus* is the only species which can also be found in rather oligotrophic situations. In Belgium, *T. spinigerellus* is the most eurytopic species of the genus and is most abundant in open marshlands (POLLET et al. 1989). In contrast to the latter species, the other *Teuchophorus* species seem to prefer more canopied sites.

According to the literature, *Thinophilus (S.) versutus* occurs mainly at the coast. It is known from both dune grasslands and saltmarshes with *Scirpus maritimus* and *Spartina* (EMEIS 1964). GOETGHEBUER (1934) claimed that the

species was widespread but preferred the littoral coast zone. *T. (S.) versutus* is indeed the only species of this genus which can be found beyond the few saltmarshes left in Belgium: *T. flavipalpis* and *T. ruficornis* are only found in Het Zwin Nature Reserve at Knokke. Although thus far, it has been captured in largest numbers at fresh water dune pools, it is also known from De Polders (a large area of wet meadows and pastures behind the coastal dunes, divided by a very large number of small and large ditches) and some inland marshland habitats. In this respect, the capture in Het Torfbroek Nature Reserve is obviously the most (eastern) inland record of this species in Belgium (Fig. 3).

Acknowledgements

Thanks are due to Drs Mark ALDERWEIRELDT for the gift of some supplementary net sweeping yields.

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Boekbesprekingen

Wilkins, M. : *Physiologie der Pflanzen : ein neuartiges Lehrbuch mit Farbfotos*

21,5 x 27,5 cm, 207 p., 308 kleurenfoto's, 73 kleurendiagrammen, 12 zwartwitfoto's, Franckh'sche Verlagshandlung, W. Keller & Co., Postfach 106011, D-7000 Stuttgart 1, 1989, gebonden, DM 68,- (ISBN 3-440-05983-9).

Dit leerrijke en mooi verzorgde boek beantwoordt zowat alle vragen die een in planten geïnteresseerde lezer zich zou kunnen stellen. Dit boek, dat met zeer duidelijke tekeningen en foto's geïllustreerd is, behandelt o.a. het doel en nut van planten, de bouwstenen van de cel en de celdeling, de verscheidenheid in vormen (algen, mossen...). Verder worden de kieming, de invloed van water, de zwaartekracht, en uiteraard het licht besproken (fotosynthese). Ook het transportstelsel doorheen de plant, de invloed van mineralen en hormonen, het «ademhalingsstelsel» van de plant, de ingebouwde klok en het controlemechanisme van de bloemvorming ontsnappen niet aan de aandacht.

Tot slot worden ook symbiose en parasitisme besproken alsmede het ontwikkelen van nieuwe planten door middel van bio- en gentechnologie. Een zeer degelijk boek dat ruim boven het gemiddelde vulgariserende «natuurboek» uitstijgt.

T. Garrevoet

Gomez de Aizpurua, C. : *Biología y morfología de las orugas. Lepidoptera Tomo VII Geometridae*. 19 x 24,5 cm, 224 p., talrijke kleurenfoto's en verspreidingskaarten, Ministerio de Agricultura, Pesca y Alimentación, Madrid, 1989, gebonden, Ptas 3000,- (ISBN 84-7479-787-X).

Dit zevende deel in de reeks over de biologie en de systematiek van de rupsen is volledig gewijd aan de rupsen van spanners (Geometridae). Het boek beperkt zich tot 50 soorten die in Spanje voorkomen. Daar zijn er vele bij die erg gewoon zijn, ook in onze gematigde streken, zoals: *Eupithecia centaureata*, *Cabera pusaria*, *Campaea margaritata* enz. Maar er worden ook enkele soorten behandeld die men slechts zelden te zien krijgt, of die endemisch zijn in het Iberisch schiereiland. Voorbeelden hiervan zijn o.a. *Tephronia espaniola*, *Onychora agaritharia* en *Menophra harterti*.

De tekst is zoals gebruikelijk in de andere delen van deze reeks beknopt gehouden en de nadruk is gelegd op de afbeeldingen. De foto's van de rupsen zijn zonder meer prachtig. Meestal worden per soort enkele volledige rupsen afgebeeld en enkele details. Verder wordt het imago getoond in de vrije natuur en een opgezet exemplaar. Bij elke soort hoort ook een kaartje waarop de verspreiding in Europa wordt aangeduid en een diagram waarin zeer overzichtelijk de biologie van de soort wordt voorgesteld.