

2. In naam van de Heren M. POLLET, L. MERCKEN en K. DESENDER presenteert de Heer J. VAN STALLE de volgende mededeling.

A note on the detailed distribution and diel activity of riparian dolichopodid flies (Dolichopodidae, Diptera)

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Introduction

Non polluted riverbanks are in most cases very special habitats, often showing a very unique fauna. Many species of insects and other groups are known as exclusively riparian; this holds true, for example, for Carabidae and Araneae.

Thus far, the dolichopodid fauna (Dolichopodidae) of riverbanks has never been studied in detail. In this study, our aim was to find out (i) if riverbanks also show a typical dolichopodid fauna, (ii) in which way the species are distributed and (iii) when they are active.

Study site, material and methods

During 4 days (29.VI.-2.VII.1987), water traps were installed at soil surface level on a riverbank of the Ourthe at Noiseux (prov. Namur, Belgium). Two types of traps were used: a small white one (diameter: 12.5 cm, depth: 5 cm) and larger blue and red ones (diameter: 22 cm, depth: 9 cm). Six white traps were installed on a gradient from very wet and muddy (near the river) to stony, drier and sparsely vegetated zones. All traps were placed at intervals of 1 meter. During the collections, the row was replaced, if necessary, due to the fluctuating water level of the river. Consequently, trap W1 was almost permanently situated 0.5 m from the water surface. Trap W7 was placed very close to the water on a very stony spot, whereas the remaining traps (W8, R, B) were in operation on a muddy site, more removed from the river. Aerial humidity and temperature were recorded per water trap (Table 1). All traps were filled with 2.5 % formalin solution with detergent. During the first two days, the traps were emptied at dusk and dawn in order to separate the flies caught during the daytime and the night. Finally, on 2.VII.1987, the herb and shrub vegetation at the outer border of the bank were swept to get some information on the leaf-dwelling species.

Water traps	W1	W2	W3	W4	W5	W6	W7	W8	W7	WB	R	B	R
temperature (°C)	20.65	20.95	20.95	20.85	20.95	20.95	21.15	21.15	20.65	21.05	21.15	21.15	21.15
aerial humidity (%)	83.9	90.6	84.5	81.1	78.6	78.1	78.1	78.1	67	92.4	93.3	94.6	94.6

Table 1. Summary of measurements of temperature (°C) and aerial humidity (%), taken on 1.VII.1987 at 20.15 h near the white (W), red (R) and blue (B) water traps. For more information, see text.

Species / Trapping methods	W1	W2	W3	W4	W5	W6	W7	W8	R	B	R	B	R	Sw	Total
<i>Complicanema armoricana</i>	-	-	-	-	-	-	-	-	1/1	-	1/1	-	-	-	1/1
<i>Complicanema curvipes</i>	-	-	-	-	-	-	-	-	1/1	-	-	-	-	-	1/2
<i>Complicanema lumbata</i>	-	-	-	-	-	-	-	-	1/1	-	-	-	-	-	1/1
<i>Complicanema marginatus</i>	-	-	-	-	-	-	2/1	-	-	-	-	-	-	-	2/1
<i>Complicanema monchilug</i>	-	-	-	-	1/1	-	-	-	-	-	-	-	-	-	1/1
<i>Chironomus pulchellus</i>	-	-	1/1	1/6	1/6	1/6	3/1	1/4	-	-	1/2	-	-	-	6/40
<i>Chironomus suspiris</i>	1/5	1/1	1/1	1/2	1/2	1/2	3/2	21/11	1/1	-	-	1/1	-	-	2/2
<i>Dolichopus arcticobasis</i>	-	-	1/1	4/2	9/2	3/3	3/2	3/1	-	-	1/1	3/2	-	-	74/30
<i>Dolichopus brevipennis</i>	-	-	1/1	-	-	1/1	-	3/1	-	-	-	1/4	-	-	5/5
<i>Dolichopus longicornis</i>	-	-	1/1	1/2	4/3	1/1	-	8/1	-	-	1/1	8/5	-	-	16/8
<i>Dolichopus pennatus</i>	-	-	1/1	1/2	4/3	3/3	-	23/8	-	-	1/1	7/1	-	-	29/8
<i>Dolichopus plumipes</i>	-	-	1/1	1/2	4/3	1/1	-	1/1	-	-	1/1	16/17	-	-	509/113
<i>Dolichopus subannulatus</i>	1/4	1/1	52/5	56/3	43/10	61/7	28/4	23/8	1/1	-	1/1	6/9	-	-	6/10
<i>Dolichopus unguiculatus</i>	176/39	53/17	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Hercostronus ceter</i>	1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Hercostronus chrysozygus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Nematoprosctus praeseclusus</i>	1/1	1/4	1/4	1/4	1/1	1/1	-	3/6	-	-	1/1	-	-	-	7/71
<i>Rhabdium fractum</i>	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	-	-	-	-	-	-	3/4
<i>Rhabdium laticornis</i>	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	-	-	-	-	-	-	6/6
<i>Rhabdium micans</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Rhabdium nasutum</i>	-	-	1/1	1/1	1/1	1/1	1/1	1/1	-	-	-	-	-	-	3/4
<i>Rhabdium riparium</i>	-	-	1/1	1/1	1/1	1/1	1/1	1/1	-	-	-	-	-	-	1/1
<i>Rhabdium rivale</i>	2/2	2/1	3/2	6/3	4/2	2/3	1/1	1/2	1/1	-	1/1	1/1	-	-	22/43
<i>Synotomon denticalatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Teuchophorus calcaratus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Teuchophorus monacanthus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1
<i>Teuchophorus sp.</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/3
no. of species	10	9	12	11	9	9	7	10	5	10	10	16	26		
no. of specimens	255	104	87	93	89	94	45	111	6	13	106	106	1003		

Table 2. List of dolichopodid species, caught by white (W), red (R) and blue (B) water traps and sweeping (Sw) on a riverbank of the Ourthe at Noiseux (Belgium) (males/females). Numbers are indicated per sampling method. For more information, see text.

Results and discussion

1. Detailed distribution

Table 2 summarizes the dolichopodid species collected with the numbers per trap indicated. A total of 1003 specimens were caught, belonging to 26 species. Apart from the captures by sweeping, *Dolichopus unguatus* made up almost 66% of the total numbers of flies collected. *D. brevipennis* also appeared to be rather abundant (10.9%). Both species are very eurytopic and widely distributed all over Europe. Together with *D. plumipes*, these are the most common species of this family in Western Flanders (Belgium) (POLLET et al., 1987), The Netherlands (MEUFFELS, pers. comm.) and Schleswig-Holstein (EMEIS, 1964). Although several authors mention that *D. unguatus* is more regularly found in woodland than the other species, the commonness of these species implies that they were found in very diverse habitat types, being not all characteristic for riverbanks.

D. pennatus and *Hercostomus celer* are eurytopic woodland species (POLLET & GROOTAERT, 1987). When considering the catches at all sites in the vicinity of Heure-en-Famenne, Noiseux and Grandhan (POLLET et al., in press), several species were found almost exclusively on the riverbanks of the Ourthe. Among the species, of which more than 5 specimens were collected, *Chrysotus suavis*, *Dolichopus subpennatus*, *Nematoproctus praeseclusus*, *Rhaphium fractum*, *R. laticorne*, *R. nasutum* and *R. rivale* obviously preferred those riparian habitats. More than 86% of the total number of these species were collected in these places. *R. fractum* even appeared to be completely restricted to them. *Dolichopus argyrotarsis* on the other hand was encountered in various sites such as marshland, woodland, borders of ponds and riverbanks.

In the literature, *R. fractum*, *R. nasutum* and *R. rivale* are known from shingly edges of rivers (WOOD, 1913), while the second species has also been caught on a muddy footpath shaded by willows (WHITE, 1973). No literature data were found on the habitat preferences of most of the other species, probably due to their rarity: POLLET et al. (1987) and POLLET et al. (in prep.) even recorded *N. praeseclusus* and *R. fractum* as new to the Belgian fauna. *D. argyrotarsis* occurs in the central and southern parts of Belgium, while *R. nasutum* and *R. rivale* are known only from very few locations in the south-eastern part of the country. For more information on the distribution of these species, we refer to POLLET et al. (in press).

Concerning the distribution of the former species on the investigated riverbank, both eurytopic *D. unguatus* and *D. brevipennis* were caught in largest numbers near the river on the coolest and most humid spot, their numbers gradually decreasing up the river bank (Fig. 1). *C. suavis*, *R. fractum* and *R. laticorne* were equally distributed over the water traps, whereas *D. subpennatus*, *N. praeseclusus*, *R. nasutum* and *R. rivale* preferred intermediate microhabitats.

Despite their smaller size, the white water traps yielded many more dolichopodid flies, as compared to the blue and the red one. The colour preference for white in several species of the genus *Dolichopus*, *Hercostomus* and *Rhaphium* has previously been recorded from a woodland system (POLLET & GROOTAERT, 1987). Furthermore, *H. celer*, *D. plumipes* and females of *R. rivale* appear to demonstrate a rather pronounced leaf-dwelling behaviour in comparison to their soil surface activity.

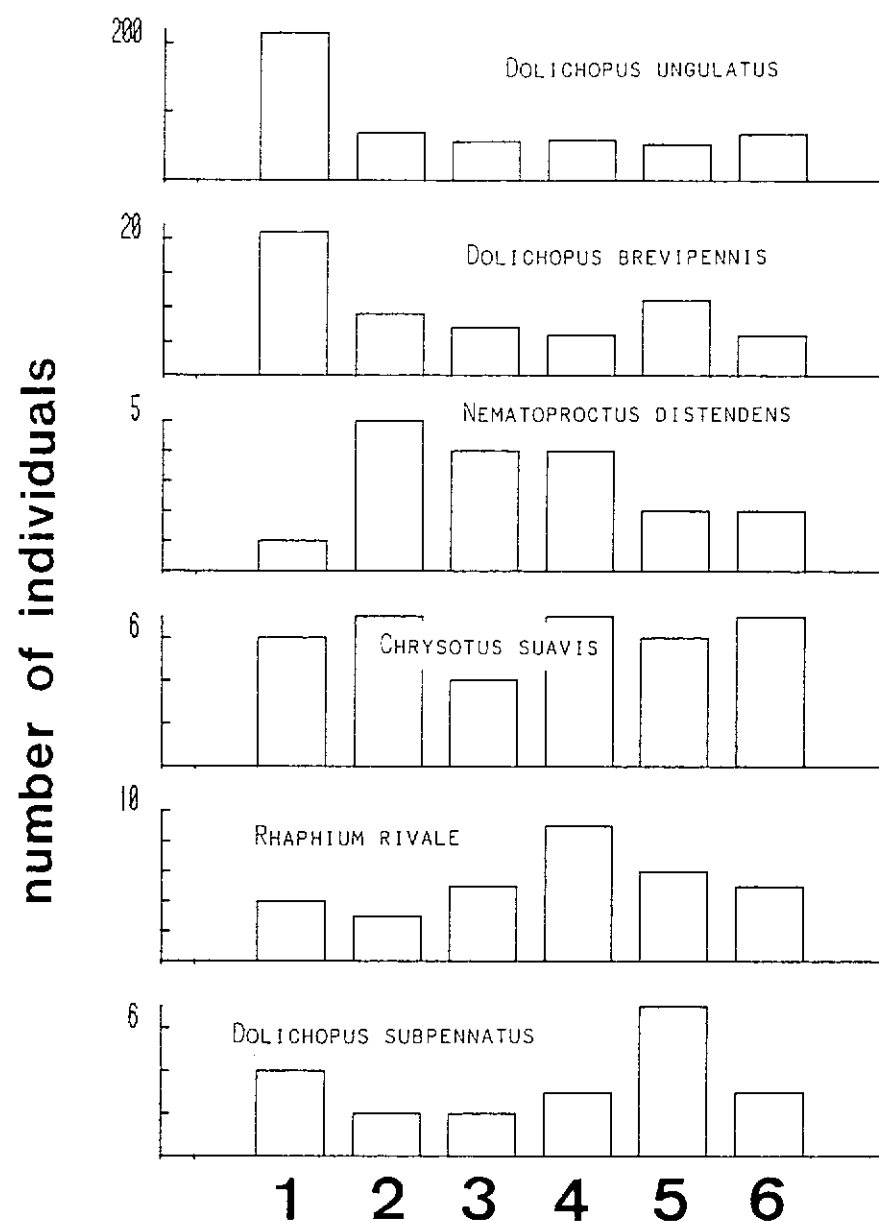


Figure 1. Distribution of the most abundant dolichopodid species on a riverbank of the Ourthe at Noiseux (Belgium), expressed as the numbers caught per white water trap (1-6). For more information, see text.

2. Diel activity patterns

Table 3 presents data on the diel activity of some dolichopodid species. All species appear to be almost exclusively diurnal, except for *H. celer*, the only specimen of which was caught at night. Apart from *R. rivale*, the remaining *Rhaphium* species are partly nocturnal. The high attractiveness of the white colour to most of the species undoubtedly increases the numbers caught during the daytime. This mainly diurnal activity is most probably related to their feeding strategies (OLEJNICEK, 1980; SMITH & EMPSON, 1955; SMITH, 1959) and courtship display (SMITH & EMPSON, 1955). Another argument for the great importance of visual stimuli during courtship are the often rather complicated tibial and tarsal ornaments in the males of many species.

Species / period	D	N
<i>Chrysotus monochaetus</i>	1/	-
<i>Chrysotus pulchellus</i>	1/	-
<i>Chrysotus suavis</i>	3/23	-
<i>Dolichopus argyrotarsis</i>	1/2	-
<i>Dolichopus brevipennis</i>	43/21	-
<i>Dolichopus pennatus</i>	3/1	-
<i>Dolichopus plumipes</i>	2/1	-
<i>Dolichopus subpennatus</i>	16/7	-
<i>Dolichopus unguatus</i>	324/67	/6
<i>Hercostomus celer</i>	-	/1
<i>Nematoproctus praeseclusus</i>	4/17	/1
<i>Rhaphium fractum</i>	3/2	/1
<i>Rhaphium laticorne</i>	5/2	/1
<i>Rhaphium nasutum</i>	1/2	/1
<i>Rhaphium rivale</i>	17/9	-

Table 3. List of dolichopodid species, caught during the daytime (D) and the night (N) by means of white water traps during a two day period on a riverbank of the Ourthe at Noiseux (Belgium) (males/females).

Acknowledgements

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References

- EMEIS, W., 1964. - Untersuchungen über die ökologischer Verbreitung der Dolichopodiden (Ins. Dipt.) in Schleswig-Holstein. *Schr. Naturw. Ver. Schlesw.-Holst.* 35: 61-75.
 OLEJNICEK, J., 1980. - Species of the family Dolichopodidae as enemies of mosquito and blackfly larvae and adults. *Folia Parasitologica (Praha)* 27: 75-76.

- POLLET, M., VERBEKE, C. & GROOTAERT, P., 1987. - Preliminary results of the investigations on the distribution of dolichopodid flies (Diptera: Dolichopodidae) in Western Flanders (Belgium). *Bull. Anns Soc. r. belge Ent.* 123: 338-345.
 POLLET, M., & GROOTAERT, P., 1987. - Ecological data on Dolichopodidae (Diptera) from a woodland ecosystem. I. Colour preference, detailed distribution and comparison of different sampling techniques. *Bull. Inst. R. Sci. Nat. Belg.* 57: 173-186.
 POLLET, M., GROOTAERT, P. & MEUFFELS, H. J. G., 1987. - Dolichopodid species (Dolichopodidae, Diptera) new to the Belgian fauna with notes on their habitats. *Ent. Ber., Amst.* 48 (3): 44-46.
 POLLET, M., MEUFFELS, H. J. G., MERCKEN, L. & DESENDER, K. (in press). - Faunistic data on the dolichopodid fauna (Dolichopodidae, Diptera) of some habitats in the Famenne (Prov. Namur, Belgium). *Biol. Jb. Dodonaea*.
 SMITH, K. G. V., 1959. - A note on the courtship and predaceous behaviour of *Neurigona* species (Dipt., Dolichopodidae). *Ent. mon. Mag.* 25: 32-33.
 SMITH, K. G. V. & EMPSON, D. W., 1955. - Note on the courtship and predaceous behaviour of *Poecilobothrus nobilitatus* L. (Dipt., Dolichopodidae). *Brit. J. Animal Beh.* 3: 32-34.
 WHITE, O. M., 1973. - Some Nottinghamshire Diptera (Dolichopodidae). *Ent. mon. Mag.* 85 (9): 217.
 WOOD, J. H., 1913. - *Thrypticus nigricauda*, a new species: and notes on a few other dolichopodidae from Herefordshire. *Ent. mon. Mag.* 49: 268-270.

3. M. C. VERSTRAETEN présente pour le Dr M. LECLERCQ, excusé, la communication suivante.

Présence de
Hybomitra nitidifrons confiformis Chvala et Moucha, 1971,
 et de deux autres espèces boréales
 d'**Hybomitra** en Belgique

Hybomitra nitidifrons confiformis CHVALA et MOUCHA, 1971, est une sous-espèce européenne qui a été trouvée dans la province de Liège: Barrage d'Eupen, ♀, 20.VI.1965 (M. LECLERCQ) et dans la province de Luxembourg: Bodange (Fauvillers), ♀, 30.VI.1975; Champlon, les Aunays, ♀, 19.V.1986 (Coll. F.A.Gx.). Elle est connue dans le Nord, le Centre et l'Est de l'Europe: Scandinavie (Suède et Finlande), Russie européenne jusqu'à l'Oural et les environs de Sverdlosk, Tchécoslovaquie, Allemagne et l'Est de la Belgique.

L'autre sous-espèce, *nitidifrons nitidifrons* (SZILLADY, 1914) est asiatique, elle est connue de la Sibérie, Mongolie, Oussouri, N.E. de la Chine (Mandchourie), Corée, au Japon (Honsu).

Les deux autres espèces boréales existant encore dans les Hautes-Fagnes en Belgique sont: *Hybomitra kaurii* CHVALA et LYNEBORG, 1970, et *Hybomitra arpadii* (SZILLADY, 1923), cette dernière étant holarctique (Nord de l'Asie, de l'Europe et de l'Amérique).