# FIRST RECORDS OF ONE GENUS AND THREE SPECIES OF LONG–LEGGED FLIES (DIPTERA: DOLICHOPODIDAE) FROM SLOVAKIA

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**Abstract:** First records of three species of long–legged flies (Diptera: Dolichopodidae) of the subfamily Medeterinae from Slovakia are presented. *Systenus pallipes* (von Roser, 1840) and *Systenus leucurus* Loew, 1859 emerged from rearing units with sediment from a water–filled tree hole of elm (*Ulmus* sp.), and *Systenus scholtzii* (Loew, 1850) from rearing units with similar sediments from birch (*Betula* sp.). The relevance of this approach i.e. the rearing process of immature stages from tree holes in laboratory conditions is briefly discussed.

**Key words:** Diptera, Dolichopodidae, *Systenus,* tree holes, first records.

## INTRODUCTION

Dolichopodidae or long–legged flies is one of the largest families of Diptera (Pape et al. 2009), characterized by a striking morphological homogeneity. Most species have a metallic green body colour and usually long and slender legs (hence the family name). The long–legged flies occupy all terrestrial habitats from coastal beaches to high altitude mountain sites (e.g. Robinson & Vockeroth 1981, Pollet et al. 2004, Yang et al. 2006, Pollet & Brooks, 2008).

Current knowledge on the distribution of Dolichopodidae in Europe is summarized by Pollet (2011). In Europe, over 790 species have been recorded (Pollet 2009, 2011; Naglis 2010), whereas the recent Slovakian checklist of long–legged flies (Pollet & Suvák 2009) includes 238 species.

## MATERIAL AND METHODS

During 2012, the first author collected debris from tree holes of birch (4. 4. 2012) and elm (25. 5. 2012) (see in Figure 1) in deciduous forests in Slovakia in order to rear Dolichopodidae larvae from this substrate. This sampling was carried out in the immediate vicinity of the village Diviacka Nová Ves (district Prievidza, Slovakia) at two sites: an oak forest northeast of the village (site 1), with one sampled birch tree (*Betula* sp.) (tree hole at 1.5 m height), and a beech forest west of the same village (site 2), with one sampled elm tree (*Ulmus* sp.) (tree hole at 0.5 m height). Both tree holes had a capacity of 1–5 litres.

Collected debris and fluids from each tree were transferred from the field to the laboratory, and placed in a separate transparent 4–liter canning jar. This jar was filled with sediment topped with

**Oboňa J, Pollet M & Naglis S, 2012: First records of one genus and three species of long–legged flies (Diptera: Dolichopodidae) from Slovakia. *Folia faunistica Slovaca*, 17 (4): 357–360.**
Received 30 October 2012 ~ Accepted 14 December 2012 ~ Published 16 December 2012


ISSN 1336–4529 (online) ISSN 1335–7522 (print)

liquid from the same tree hole to one third of its height, and closed by a Petri dish. These rearing units were daily monitored. Long–legged flies that emerged from these substrates were stored in a 75 % ethanol solution in a polyethylene Eppendorf vial and disseminated for identification to the junior authors.

Explanations and abbreviations: geomorphological units and grid mapping codes of the Databank of the Slovak fauna (DFS) are cited following Lučivjanská (1989).

## RESULTS

**Dolichopodidae**
**Subfamily: Medeterinae**
**Genus: *Systenus* Loew, 1857**

***Systenus leucurus* Loew, 1859**

Material examined: Slovakia occ., Prievidza district, Diviacka Nová Ves, site 2, Strážovské vrchy mountains**,** elm tree hole, 48° 44' 54.63" N 18° 28' 45.13" E, 340 m a. s. l., 7276 DFS , 26. 8. 2012, 1 ♀, J. Oboňa leg., M. Pollet det., in M. Pollet coll., **New species for Slovakia**.

***Systenus pallipes* (von Roser, 1840)**

Material examined: Slovakia occ., Prievidza district, Diviacka Nová Ves, site 2, Strážovské vrchy mountains**,** elm tree hole, 48° 44' 54.63" N 18° 28' 45.13" E, 340 m a. s. l., 7276 DFS , 20. 8. 2012, 1 ♂, J. Oboňa leg., M. Pollet det., in M. Pollet coll., **New species for Slovakia**.

***Systenus scholtzii* (Loew, 1850)**

Material examined: Slovakia occ., Prievidza district, Vrbany env. Diviacka Nová Ves, site 1, Rudnianska kotlina basin, birch tree hole, 48° 45' 16.87" N 18° 30' 44.73" E, 320 m a. s. l., 7277 DFS , 5. 5. 2012, 1 ♀, 14. 5. 2012, 1 ♀, J. Oboňa leg., S. Naglis det., in S. Naglis coll., **New species for Slovakia**.

## DISCUSSION

The majority of dolichopodid species is found in all kinds of humid to wet habitats, often in large numbers. In these habitats, adults feed on insect larvae, mites, worms and other invertebrates (see Ulrich 2004) that they obtain from substrates like wet mud, mosses and plant foliage. In contrast, dolichopodid larvae and their ecology are very poorly known, and the preimaginal stages of only very few Palaearctic species have been described (Hedström 1997). *Systenus* species make an exception to that rule, most probably due to the fact that they are easily gathered, as being restricted in their occurrence to rot holes and sap runs of trees (Steyskal 1970, Vaillant 1978). As such, larval habitats of eight Palaearctic (Lundbeck 1912, Krivosheina & Mamaev 1967, Krivosheina 1973) and four Nearctic species (Wirth 1952) have been

**Figure 1.** Sampled tree holes of birch and elm respectively.

**Table 1.** *Systenus* specimens collected in Belgium (1981–2006) and separated per sampling method (Pollet, unpubl. data).

* HC: collected by hand; MT: Malaise trap; PiT: pitfall trap; BGPT: blue–green pan trap; WPT: white pan trap; YPT: yellow pan trap; RE: rearing from rot hole debris.

| Species \ Collecting method * | HC | MT | PiT | BGPT | WPT | YPT | RE |
|---|---|---|---|---|---|---|---|
| *Systenus bipartitus* | 1 | 9 | | | | 2 | 1 |
| *Systenus leucurus* | | | | | | | 3 |
| *Systenus pallipes* | 1 | 5 | 2 | 1 | 1 | | |
| *Systenus scholtzii* | | 5 | | | | | |
| *Systenus tener* | 3 | 3 | | | | | |

documented, but the identification of the first immature stages remains quite difficult. In order to achieve a reliable identification, it is therefore recommended to rear these larvae to the adult stage. This was also the approach applied in this study.

According to the older literature, *Systenus* adults are mainly collected by the rearing of larvae from substrates (rot hole detritus or tree saps), gathered on trees (e.g. Lundbeck 1912, Parent 1938, d'Assis Fonseca 1978). With the introduction of new sampling techniques, representatives of this genus are currently more readily, but still not quite often, encountered. And although most recent records still originate from larval rearing, others were gathered with pan traps (Yang & Gaimari 2003, Pollet & Grootaert, 1987, 1994, Diestelhorst & Lunau 2001), Malaise traps (Bickel 1986, Naglis 2000), light traps (Wirth 1952, Bickel 1986), and sweep nets (Godfrey 1993) or observed directly in the field (Bickel 1986). Of particular interest are the light trap collectings, which might be explained by the fact that *Systenus* appears to be mainly active beyond its known microhabitats late in the afternoon and the evening (Speight 1987). In addition, also the predominance of *Systenus* in dull black coloured pan traps seems to have an ecological fingerprint (these traps might simulate the dark coloured microhabitats where *Systenus* breeds) (Diestelhorst & Lunau 2001). Table 1 summarizes records of Belgian specimens collected between 1981 and 2006 in 15 Belgian localities, according to the sampling technique (Pollet, EURODOL database, unpubl. data). It can be concluded from this overview that Malaise traps yielded most of the specimens (22 of 37). Also, six species of *Systenus* were collected by Malaise traps from the same locality in the Amazonas Basin near Manaus, Brazil (Naglis 2000).

*Systenus* larvae have been reared from tree hole sediments of a number of northern temperate deciduous tree species (see overviews in Speight 1987, Pollet 2000). Such tree holes, often called dendrotelmata, are special, terrestrial to aquatic, microhabitats (e.g. Röhnert 1950, Kitching 1971, 2004), which house the immature stages of a wide array of stenotopic Diptera and Coleoptera (Schmidl et al. 2008). These invertebrates, in turn, represent a suitable food source for *Systenus* larvae (e.g. Wirth 1952). Damaged trees or trees with tree holes are quite common in Slovakia. Therefore it is quite surprising that *Systenus* has not yet been recorded, especially considering the *Systenus* diversity observed in an even intensively managed beech forest in Germany (Diestelhorst & Lunau 2001). Of course, in order to gather a reliable picture of the *Systenus* diversity in a certain region, the employment of traditional collecting methods for dolichopodids will prove unsatisfactory. One approach that yields very detailed information on the type of microhabitat of the different species certainly is the collection of substrate from potential breeding sites on trees (see the present study). Another one might be the periodic monitoring of these breeding places which is less destructive, but requires a higher time investment.

## ACKNOWLEDGEMENTS

The work of the first author was supported by the Slovak Research and Development Agency under the contract No. APVV–0059–11.

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