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Bittacus hageni Brauer, 1860 – a new locality in northern Poland, and a summary of current knowledge of the distribution and biology of this species

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Abstract: *Bittacus hageni* was trapped in the Reptowo nature reserve near Bydgoszcz – its northernmost locality in Europe. The distribution of this species in Poland and Europe is discussed, and current knowledge of its life history, including habitat preferences, is summarised.

Key words: hangingfly, *Bittacus hageni*, N Poland, Reptowo nature reserve, distribution, life history.

Bittacus hageni Brauer, 1860 is a very rare member of the order of scorpionflies Mecoptera. Single specimens of these hangingflies are occasionally trapped throughout the species' distribution range, which lies mainly in southern Europe and parts of central Europe (Przybyłowicz 2006, Tillier 2008). Since 1990 it has been found only in Hungary (Ábrahám 2000), France and Germany (Tillier 2008), and Slovakia (Vidlička & Kmetová 2002, Majzlan 2005, Vidlička 2010). Its easternmost localities are Comana, Giurgiu County, Romania (McLachlan, 1898) and the Caucasus (Martynova 1959). The only published records from Poland are from Młodziejowice near Kraków (Przybyłowicz 2006) and Łomianki Dolne near Warsaw (Plewka & Ceryngier 2013). Nevertheless, its distribution in this country, like that of the related *B. italicus* (O.F. Müller, 1766), is not well known at all.

A survey of the insect fauna in the Reptowo nature reserve near Bydgoszcz, carried out in connection with plans for its conservation, revealed the presence of *Bittacus hageni* there. The localities from the Bydgoszcz and Warsaw areas are thus the northernmost and north-easternmost ones respectively within its entire distribution range (Fig. 1). Localities of *B. hageni* up to 2008 are given in Tillier (2008).

Wielkopolska-Kujawy Lowland: "Reptowo" nature reserve (NE part), commune of Dąbrowa Chełmińska [UTM: CD19], 53.17 N, 18,25 E, caught by hand among ground layer vegetation; 24.08.2015, 1 ex. (♀), leg. B. Pacuk, det. R. Dobosz, coll. Upper Silesian Museum, Bytom (USMB).

The Reptowo nature reserve came into being as a result of a decision by the Minister for Forestry and the Timber Industry, dated 28 July 1962, to protect a colony of grey herons. Situated in the commune of Dąbrowa Chełmińska, district of Bydgoszcz, province of Kujawy-Pomerania, it lies adjacent to provincial road No. 551, a little over 3 km from the administrative boundary of the city of Bydgoszcz; the nearest villages are Nowy Dwór, Reptowo and Wałdowo Królewskie. Kondracki's (2009) physico-geographical regionalisation places it in the Chełmno-Dobrzyń Lake District macroregion and the Chełmno Lake District mesoregion. According to the regionalisation given in the Catalogue of Polish Fauna, the Reptowo reserve lies in the Wielkopolska-Kujawy Lowland. It is also part of the Chełmno and Vistula-side Landscape Parks. It has an area of 4.14 ha, and since 2013 has been a strict protection zone.

All of the Reptowo nature reserve is covered by elm-ash riparian woodland (*Ficario-Ulmetum minoris* – sub-association *chrysosplenietosum*) (Natura 2000 habitat code 91F0-2) (Matuszkiewicz 2007). The plant communities in the reserve were evaluated on the basis of phytosociological studies carried out in 2015 and 2016 (Paszek *et al.* 2016).

Being very rare, *B. hageni* has been red-listed in a number of regions and countries of Europe (Röhricht 2004, Devetak 1992, Dvořák 2017). Tillier's (2008) comprehensive work on this species gives an indication of its rarity in the context of both the number of its localities and its abundance in Europe. As its numbers throughout its range are relatively small, not much is known about its habitat preferences. All the more surprising, then, are its numbers reported from the small Šúr National Nature Reserve (48°14'22.91"N 17°13'58.58"E) near Svätý Jur in Slovakia (Vidlička 2010). Šúr is the fifth locality of this species in that country. Most of the 96(!) specimens caught in the "Panónsky háj" were taken in oak-elm woodland (*Quercetum*) and in extensive saline xerothermic meadows. Single specimens of *B. hageni* were also caught on a small waterlogged meadow and in other meadows near the local biological research station, but none were found in emergent aquatic vegetation (*Phragmitetum*). In 2008 and 2009, the activity of *B. hageni* in this area extended from mid-June to mid-August (Vidlička 2010); Tillier (2008) gives much the same period. According to the latter author, the great majority of specimens are caught in July and August (87.5%), the earliest of these hangingflies being caught in June, and the last ones in early September. The scant, scattered data regarding the habitat preferences of *B. hageni* indicate that it inhabits a variety of biotopes, from waterlogged and moist habitats to xerothermic ones (Tillier 2008, Vidlička 2010). The male and female from Młodziejowice near Kraków were caught at the edge of deciduous woodland on a sunny, extremely warm afternoon (17:00 hrs). The specimens were spotted hanging by their forelegs from the stems of low vegetation about 50 cm above the ground (Przybyłowicz 2006). In contrast, the female found at Łomianki Dolne was caught in a blue and white pan trap deployed in riparian woodland by the River Vistula near the Ławice Kiełpińskie nature reserve (Plewka pers. comm.). The trap was hung from a bough about 4 m above the ground and about 8 m from the river bank (Plewka & Ceryngier 2013).

In the part of the Reptowo reserve where *B. hageni* was caught (Fig. 2), the tree stand consists of hornbeam *Carpinus betulus* L., sycamore *Acer pseudoplatanus* L., ash *Fraxinus excelsior* L. and single Scots pines *Pinus sylvestris* L. The shrub layer is of beech *Fagus sylvatica* L., ash, spindle *Euonymus europaea* L., elderberry *Sambucus nigra* L. and redcurrant

Ribes spicatum E. Robson. The ground layer consists of saplings of the trees and shrubs in the stand and the shrub layer, as well as some 20 herbaceous plants. The exact spot where *B. hageni* was found was strongly insolated, with a very low density of both trees and shrubs.

Before being caught, the female of *B. hageni* was observed for a few minutes, during which she moved around for short distances, and then hung in typical pose from her hindlegs among the ground layer vegetation. On being flushed out, she flew up to a height of 1.2-1.3 m, after which she settled, suspended from the upper parts of the ground layer (again, no higher than 1.3 m), on such plants as small balsam *Impatiens parviflora* DC., enchanter's nightshade *Circaea lutetiana* L. and common nettle *Urtica dioica* L. On completion of these observations, the female was picked off the vegtation by hand.

In the light of the above information, and the fact that *B. hageni*, a predator, actively searches for its food, one comes to the conclusion that it does not have any preferred habitat. It selects the ecotones between various habitats, from damp river banks or waterlogged meadows to xerothermic meadows; significantly, most of its known localities are stongly insolated. In addition, vertical migrations and the activities of single individuals have been observed both close to the gound in the ground layer and in the tree crowns several metres above the ground.

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Fig. 1. The occurrence of *Bittacus hageni* in the northern and north-eastern parts of its distribution range: black circle – literature data, red circle – Reptowo reserve.

Fig. 2. The part of the Reptowo nature reserve where *Bittacus hageni* was caught.