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New data on the distribution and habitat preferences
of *Hagenella clathrata* (Kolenati, 1848) (Trichoptera:
Phryganeidae) in Poland – the species from the Polish Red
Book of Animals

Nowe dane o rozmieszczeniu i wymaganiach siedliskowych *Hagenella clathrata* (Kolenati, 1848) (Trichoptera: Phryganeidae) w Polsce – gatunku z *Polskiej czerwonej księgi zwierząt*

SUMMARY

Hagenella clathrata is one of the rarest and the most threatened European caddisfly associated with bogs. In Poland it has been known from 15 sites so far. Six new sites are given in this paper: one in the Południowopodlaska (South Podlasie) Lowland and five in the Orawa-Podhale Depression. In the mountain area 11 larvae were collected with the use of Barber pitfall traps. The habitat preferences of larval stages in Poland is also provided.

Keywords: *Hagenella clathrata*, Trichoptera, new records, Polish Red Book, Barber pitfall traps

STRESZCZENIE

Hagenella clathrata jest jednym z najrzadszych i najbardziej zagrożonych w Europie chrzączków związanych z torfowiskami. W Polsce był znany dotąd z 15 stanowisk. W tej pracy podano 6 nowych stanowisk: jedno z Niziny Południowopodlaskiej i 5 z Obniżenia Orawsko-



Fig. 1. Distribution of *Hagenella clathrata* in Poland. White spots – sites before 1950, grey spots – 1951–1975, black spots – 1976–2009, red spots – new sites (scheme after Czachorowski 2004).

Podhalańskiego. Na obszarze podgórskim zebrano 11 larw w pułapki Barbera. Autorzy analizują też preferencje siedliskowe larw w Polsce.

Słowa kluczowe: *Hagenella clathrata*, Trichoptera, nowe rekordy, pułapki Barbera

INTRODUCTION

Hagenella clathrata (Kolenati, 1848) belongs to the rarest caddisfly species in Poland as well as in many European countries, which results from the vanishing and destroying its vulnerable habitats – bogs of particular type (8). Its European distribution covers West, North, North-East and Middle Europe, Alps, Dinaric Western Balkans and the Carpathians (15).

In Poland *H. clathrata* has been known from 8 contemporary sites so far (Fig. 1), they are situated in: the Północnopodlaska (North Podlasie) Lowland, the Sandomierska Basin, the Łódzka Upland, the Świętokrzyskie Mts. and the Południowopomorskie (South Pomerania) Lake District



Phot. 1. "Wielosił" – the planned nature reserve in the South Podlasie Lowland (site no. 1 – photo by Paweł Buczyński)

(5, 8). In this paper, the authors give 6 new sites of the occurrence of this species from the years 2004-2010, with some remarks on species habitats and methods used for collecting larvae.

MATERIAL

In the years 2004, 2006, 2009 and 2010, *H. clathrata* was collected at 6 new sites in Poland – one in the Mazowiecko-Podlaskie (Mazovian-Podlasie) Lowlands and 5 in the Central Western Carpathians (Fig. 1). Short descriptions of the sites are given below. Imagines were caught conventionally in an entomological net, while larvae were obtained untypically as for caddisflies with the use of Barber pitfall traps, therefore some notes on this method are provided below.

Collectors: EB – Edyta Buczyńska, PD – Patrycja Dominiak, WC – Włodzimierz Cichocki.

1. The Południowopodlaska Lowland, Nowy Staw (FB09) – Figure 2: 15.05.2004 – 1♀ leg. EB.

The area of the planned nature reserve "Wielosił", near fish ponds. The site was covered with degraded fresh meadow, with a clear share of ruderal vegetation as well as willow thickets. The development of the species probably took place in



Phot. 2. Baligówka raised bog in Piekelnik (marginal zone), the Orawa-Podhale Depression, the location of pitfall traps marked with sticks with white ribbons (site no. 5 – photo by Włodzimierz Cichocki)



Phot. 3. “Bór na Czerwone” raised bog in Nowy Targ (marginal zone), the Orawa-Podhale Depression (site no. 6 – photo by Agnieszka Ważna)

one of the nearby *Sphagnum* pools of which some are typical vernal habitats that completely dry up in late summer.

2. The Orawa-Podhale Depression, Chyżne, Puścizna Jasiowska (Łysa) raised bog (DV07): 26.10 – 26.11.2009 – 1 larva, leg. WC.

3. The Orawa-Podhale Depression, Piekelnik, Puścizna Wielka raised bog (DV17): 27.06.2006 – 1♂, leg. PD.

4. The Orawa-Podhale Depression, Piekelnik, Puścizna Mała raised bog (DV17): 26.11.2009 – 8.04.2010 – 4 larvae, 8.10. – 30.10.2009 – 1 larva, 30.10. – 4.12.2009 – 1 larva, leg. WC.

5. The Orawa-Podhale Depression, Piekelnik, Baligówka raised bog (DV18) – Figure 3: 12.12.2008 – 9.04.2009 – 3 larvae, leg. WC.

6. The Orawa-Podhale Depression, Nowy Targ, “Bór na Czerwonem” raised bog (DV37) – Figure 4: 14.12.2008 – 9 – 21.04.2009 – 1 larva, leg. WC.

The whole larval material in the sites no. 2, 4–6 was collected with the use of Barber traps which were initially set up for the investigations of spiders of the Orawa-Nowy Targ Basin. Traps were dug through peat bog moss into the ground and filled with glycol. Every peat bog was provided with 10 traps placed in the line transect of 50 m length. Traps were situated at the marginal areas of the raised bogs in wet *Rhynchospora albae*. Studies were conducted throughout the year, except for the period when the raised bogs were covered with snow and frost appeared. Therefore, the whole period of exposition of the traps is given above. Material was collected every two weeks.

DISCUSSION

Taking into consideration the historical (the end of the 19th century till 1975) and contemporary (1976–2004) data about the occurrence of *H. clathrata* (larval and imaginal stages together) in Poland, there are 15 spots on the map (Fig. 1) showing a rather dispersed distribution of this species (5, 8). New sites presented in this paper significantly increase this number to 21, but the most important is the fact that raised bogs of the Orawa-Podhale Depression are a very essential reservoir of *H. clathrata* in Poland and this species has never been found before in this region. It is also evident that this species can be found on lowlands, highlands and also submontane areas. Moreover, the number of the collected larvae is evidently understated because they were obtained as a result of collateral studies. The second thing worth mentioning is the sampling method. Barber pitfall traps are usually used for collecting terrestrial invertebrates (like spiders, beetles, ants etc.). As for caddisflies, this method of catching larvae is extremely rare and used only while catching terrestrial species, e.g. North American *Philocasca demita* Ross (1). Additionally, there are single examples of catching adult caddisflies in such traps (10) but they seem to be accidental. In the aquatic environment as the

main and typical environment of larval Trichoptera the use of a hydrobiological sampler or a dredge is most common. Raised bogs where there is no open water but just the mass of wet *Sphagnum* are hard to take a reliable sample. It seems that accidental usage of pitfall traps in the bogs of the Orawa-Podhale Depression was the best method for catching *H. clathrata*, which moved freely within emerged or submerged stems of *Sphagnum*.

Due to the fact that most of historical data is very imprecise and there are no detailed descriptions of the larval habitat of *H. clathrata*, the closer analysis of the habitat preferences of this species in our country must be limited to the latest records (7 sites). So far, larvae of *H. clathrata* were found in: a peat bog excavation – 1 individ. (7); a raised bog with a stagnant ditch overgrown by *Sphagnum* – 11 individ., a fen with a belt of *Sphagnum* at the marginal zones – 3 individ. (9); a small water body, strongly overgrown and slimy – 1 individ. (13); three drainage ditches strongly overgrown by *Sphagnum* with very slow water current situated on a large raised bog – 14 individ. (5). All of these records (except for a small water body with a poor characteristics) as well as these presented in the paper show that *H. clathrata* has a strong connection to *Sphagnum* moss which may occur on: raised bogs (marginal zones mainly), the edges of fens (fresh meadows) or water bodies of anthropogenic origins like peat bog excavations or stagnating ditches situated within raised bogs. In Europe the habitat spectrum of the discussed species is very wide (23); for example in the UK, *H. clathrata* is associated with: raised bogs, quaking bogs and wet heaths, and according to the author, well developed tussocks (*Molinia caerulea* mainly) and birch trees are important factors. In Poland it seems that they are not necessary elements of the habitats. Nevertheless, the conclusion of Wallace (23) about the rarity of this species despite many available habitats in the UK also refers to Poland: *H. clathrata* was found in the degraded planned nature reserve but in spite of detailed studies, e.g. in the Poleski National Park with theoretically suitable habitats or on the raised bogs of the Roztocze Region no trace of this species was found (3, 4).

Invertebrate species associated with raised bogs are often present in the Red List and/or Red Book of Animals. *H. clathrata* is included in the Red List of: the Netherlands, Austria (Carinthia), Germany, Denmark, the Czech Republic, Lithuania, Estonia, Hungary and Slovenia (6, 11, 12, 16, 17, 18, 24) and in the Red Books of: Great Britain (Shropshire), Estonia and Belarus (2, 14, 26). In Poland it was included in the Red Book, with the high category EN (endangered species) (8). Despite this it has never been added to the Red List of Threatened Animals in Poland (19, 20) or Carpathian List of Endangered Species (25) although the species belongs to the rarest and the most threatened European caddisflies associated with bogs.

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