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New distribution data for *Clinocera stagnalis* (Haliday, 1833) and *Clinocera wesmaeli* (Macquart, 1835) (Diptera: Empididae: Clinocerinae) in the Polish Tatra Mountains

Nowe dane dotyczące występowania *Clinocera stagnalis* (Haliday, 1833) i *Clinocera wesmaeli* (Macquart, 1835) (Diptera: Empididae: Clinocerinae) w polskich Tatrach

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ABSTRACT. *Clinocera stagnalis* (Haliday, 1833) and *Clinocera wesmaeli* (Macquart, 1835) (Diptera: Empididae: Clinocerinae) have been rediscovered in the Polish Tatra Mountains for the first time since the 19th century. Short ecological and phenological notes on these empidid flies are provided.

KEY WORDS. Empididae, Clinocerinae, Polish Carpathians, Tatra Mountains, distribution, phenology

INTRODUCTION

The subfamily Clinocerinae (Diptera: Empididae) represents a large group of predacious Diptera that inhabit lotic freshwater habitats. They are small to medium-sized flies, greyish or brownish in colour, distinguished by their long, slender legs and relatively narrow wings. Both larvae and adults live in the same habitats as those of Chironomidae and Simuliidae, on which they feed (Vaillant 1952, 1953, 1967; Werner & Pont 2003, 2006).

Clinocerinae encompasses 19 genera and over 480 described species worldwide of which almost 170 occur in Europe (e.g. Krysiak & Niesiołowski 2004; Krysiak 2005a; Yang et al. 2007; Raffone 2011; Sinclair & Shamshev 2014; Zherebilo & Kustov 2014; Kustov & Zherebilo 2015; Palaczyk et al. 2015; Saigusa & Sinclair 2021, 2022; Sinclair 2023). Among clinocerines, the genera *Wiedemannia* and *Clinocera* Meigen, 1803, have the highest species richness. Members of the latter genus predominantly occupy seepage habitats as well as wet stones, rocks, and moss in headwater streams (Sinclair 2008). They are sometimes found in larger streams (personal observation). Adults of this genus feed on the larvae and adults of Simuliidae and Chironomidae. Moreover, they are also able to prey on larvae of Thaumaleidae (Sinclair 2008). It has been observed that some species are parasitized by larvae of water mites (Sinclair 2008; Słowińska et al. 2020). The genus *Clinocera* contains more than 120 described species (Yang et al. 2007; Sinclair 2000, 2008; Sinclair et al. 2020; Sinclair & Plant 2022). It is present in all biogeographical regions, except Antarctica, and it is predominantly found in the Nearctic Region, where 44 species have been recorded.

In Poland, the subfamily Clinocerinae has been investigated for many years (e.g., Niesiołowski 1990, 2005; Klasa et al. 2000; Palaczyk & Klasa 2003; Krysiak 2005b; Krysiak et al. 2010; Palaczyk & Słowińska-Krysiak 2013; Słowińska-Krysiak 2014a,b; Słowińska 2017, 2019, 2022; Słowińska & Jaskuła 2021). However, some regions, including the Polish Carpathians and the Sudetes, remain scarcely studied. To date, a total of 38 species of Clinocerinae have been recorded in Poland. Among them only seven belong to the genus *Clinocera*, which has not been intensively studied in the country. Some of these species are known only from the type specimens (males only) or, at the most, from no more than three localities.

This paper presents the results of research conducted in the Polish Tatra Mountains from 2014 to 2018.

MATERIAL AND METHODS

The study is based on material collected by the author in the Tatra Mountains during several day trips.

Adults were caught using a sweep net slightly above the water surface and with tweezers directly from boulders and stones protruding from water. The material was preserved in 95% ethanol and deposited in the Department of Invertebrate Zoology and Hydrobiology, University of Lodz (Łódź, Poland). The photographs of flies were taken using a Leica M205C stereomicroscope.

RESULTS AND DISCUSSION

FAMILY: EMPIDIDAE
SUBFAMILY: CLINOCERINAE

Clinocera stagnalis (HALIDAY, 1833)

Material examined: 3 individuals (2♂♂, 1♀)

New records: Tatra Mountains, stream in the Koryciska Wielkie, 1100 m, 13.VI.2015, 1♀; Małołącki Potok, 960 m, 30.04.2018, 1♂; Wywierzysko Olczyskie, 1067 m, 3.V.2018, 1♂.

Clinocera stagnalis (FIG. 1) is, among Clinocerinae, the most widespread species of this subfamily in the world, recorded from Europe, including Great Britain, Iceland, the Faroe Islands, Norway, the Azores, as well as North Africa, Asia, North America, along with Greenland (Lundbeck 1898; Collin 1961; Vaillant 1964; Joost 1981; Chvála & Wagner 1989; Yang et al. 2007; Sinclair 2008). In Poland, it was recorded by Vaillant (1968) from West Pomerania (Słupsk, 12.V.1919), based on one male specimen from the collection of Otto Karl. Furthermore, it has been documented by Niesiołowski (1990) in Central Poland (Pilica River, Widawka River, and Roztocze).

Prior to this study, *Clinocera stagnalis* had been reported from the Tatra Mountains based only on specimens (2♂♂, 2♀♀) found in the Tatra collection of Nowicki, dating from the late 19th century (Niesiołowski 1990). Unfortunately, there is a lack of information about both the date and location of the capture of these specimens.

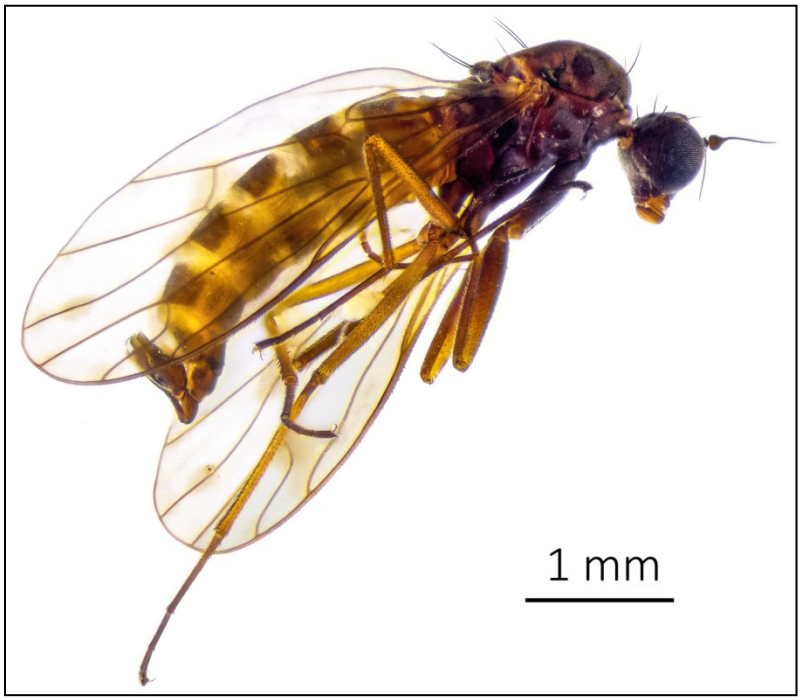

FIG. 1. *Clinocera stagnalis* – male. (Phot. J. Brodecki).
RYC. 1. *Clinocera stagnalis* – samiec. (Fot. J. Brodecki).

Remarks: In the studied area, *Clinocera stagnalis* was found in three locations only within the Western Tatras (FIG. 2), at elevations between 960 m and 1,100 m, while in the Alps, it occurs at altitudes exceeding 2,000 m (Vaillant & Chvála 1973). Adults were found on emergent stones with a few clinocerine species: *C. appendiculata* (Zetterstedt, 1838), *C. storchi* Mik, 1880, *Kowarzia plectrum* Mik, 1880, *Dolichocephala irrorata* Rondani, 1856, and *Phaeobalia inermis* (Loew, 1861). Regarding its seasonal occurrence, in Germany, as well as in Great Britain, *C. stagnalis* has been collected in emergence traps nearly throughout the entire year (Collin 1961; Wagner & Gathmann 1996; Plant 2003). In Poland, due to the small number of sampled individuals, it is difficult to infer the duration of their flight. However, it can be assumed that the flight period is short and lasts from May to June.

FIG. 2. Stream in the Koryciska Wielkie, 1100 m – habitat of *Clinocera stagnalis* (Phot. I. Słowińska).
RYC. 2. Koryciska Wielkie, potok, 1100 m – habitat *Clinocera stagnalis* (Fot. I. Słowińska).

Clinocera wesmaeli (MACQUART, 1835)

Material examined: 49 individuals (23♂♂, 26♀♀)

New records. Western Tatra Mts.: Bobrowiecki Potok, 1160 m, 17.VII.2014, 1♂; stream in the Koryciska Wielkie, 1080 m, 18.VII.2015, 3♂♂; 1100 m, 18.VII.2015, 3♀♀; Wąwóz Kraków (an intermittent stream), 1100 m, 19.VII.2015, 1♂; 19.VII.2017, 1♂; Kościeliska Valley, a series of karst springs, 1030 m, 29.VIII.2015, 1♂, 1♀; Małołącki Potok, 1040 m, 16.VI.2017, 1♂; 20.VII.2017, 1♀; 18.X.2017, 1♂, 4♀♀; 6.VIII.2018, 1♂; 15.X.2018, 1♂, 1♀; 7.XI.2018, 1♂, 1♀; Kościeliski Potok, 1040 m, 18.VI.2017, 1♂; Małołącki Potok, 1000 m, 20.VII.2018, 4♀♀; Wywierzysko Olczyskie, 1067 m, 4.VIII.2017, 2♂♂; 3.V.2018, 2♂♂; a couloir in the Mała Łąka Valley, 980 m, 28.08.2017, 1♀; Wściekły Żleb (Kościeliska Valley), 950 m, 17.X.2017, 2♂♂,

2♀♀; Małołącki Potok, 1000 m, 18.X.2017, 1♀; Małołącki Potok, 980 m, 30.IV.2018, 1♀; 1100 m, 30.IV.2018, 3♂♂, 4♀♀; brook near Kościeliski Potok, 990 m, 1.V.2018, 2♀♀; Strążyski Potok, 920 m, 2.V.2018, 1♀; Olczyski Potok, 1060 m, 4.05.2018, 1♂.

Clinocera wesmaeli (FIG. 3) is widely distributed in Europe, recorded from the British Isles and Scandinavia to the Balkan Peninsula. It is represented in the Alps, Carpathians, and Pyrenees (Collin 1961; Vaillant 1964; Vaillant & Vinçon 1986; Chvála & Wagner 1989; Krysiak 2005b; Yang et al. 2007). Similar to *C. stagnalis*, this species was recorded in Poland by Vaillant (1968) from West Pomerania (Słupsk, 10.X.1935), based on one male specimen from the collection of Otto Karl. Additionally, it has been reported from the Świętokrzyskie Mountains, the Gorce Mts., the Sudetes, the Sowie Mts., the Babia Góra Mts., and the Pieniny Mts. (Niesiołowski 1990; Palaczyk & Klasa 2003; Krysiak 2005b). *C. wesmaeli* is more common in lowland areas than in the mountains, although in the Świętokrzyskie Mts. it is the most frequent species of the genus *Clinocera* and the entire subfamily Clinocerinae (Niesiołowski 1990). In the French Alps, it was found up to an altitude of 1100 m (Vaillant 1964), while in Poland, in the Babia Góra Mts., it has been recorded at 1250 m (Palaczyk & Klasa 2003).

Clinocera wesmaeli was mentioned from the Tatras only by Nowicki (1873) in the list of Diptera of Galicia, unfortunately without any data. On the other hand, it was not reported from the Tatra Mts. by Engel (1918, 1939-1946). Unfortunately, Niesiołowski (1990, 2005) did not find *C. wesmaeli* in this area. It is worth noting that the specimens in Nowicki's collection come from various locations of Galicia, ranging from the Pilsko Massif and the Babia Góra Mts. to Bukowina and Podole jarowe, and most of them lack locality labels. Consequently, it is difficult to definitively ascertain whether the present studies indicate *Clinocera wesmaeli* as a new species for the Polish Tatra Mts. or merely confirm its presence in this massif.

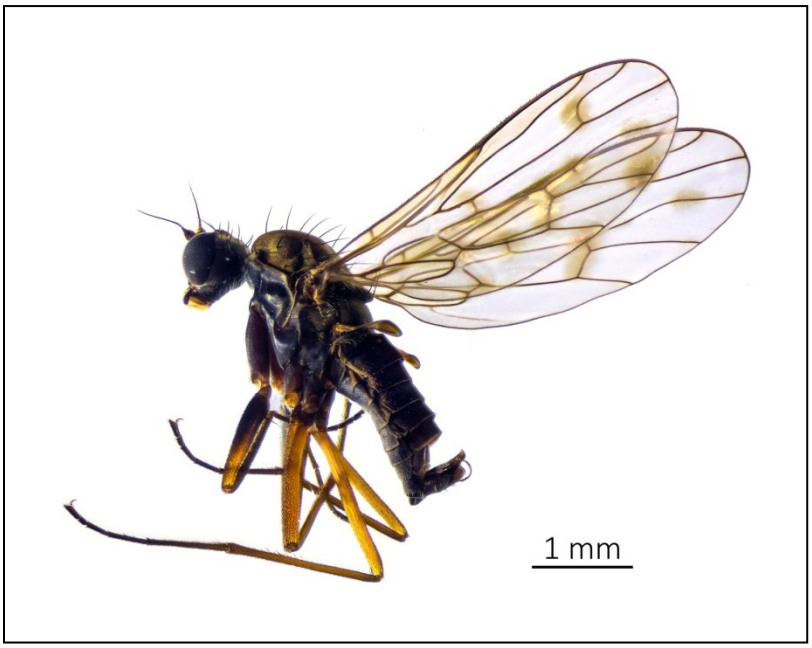

FIG. 3. *Clinocera wesmaeli* – male. (Phot. J. Brodecki)
РУС. 3. *Clinocera wesmaeli* – samiec. (Fot. J. Brodecki)

Remarks: In the studied area, *Clinocera wesmaeli* was found only within the Western Tatras (FIG. 4), occurring at altitudes from 920 to 1160 m. Adults were found on emergent stones with several clinocerine species: *C. appendiculata* (Zetterstedt, 1838), *C. storchi* Mik, 1880, *Kowarzia plectrum* Mik, 1880, *Dolichocephala irrorata* Rondani, 1856, *Phaeobalia inermis* (Loew, 1861), *Wiedemannia beckeri* (Mik, 1889), *W. jazdzewskii* Niesiołowski, 1987, *W. hygrobia* (Loew, 1858), and *W. mikiana* (Bezzi, 1899).

In Europe, adults of *Clinocera wesmaeli* have been noted to overwinter (Chvála 1983). In Germany, they have been collected from January to July (Wagner & Gathmann 1996), while in Great Britain, they have been observed from April to November (Collin 1961; Plant 2003). Niesiołowski (1990) reports that *C. wesmaeli* occurs in Poland from the end of March to mid-October. In the Pieniny Mountains, flight period of this species extends from mid-June to mid-October (Krysiak 2005b), while in the Tatra Mountains it extends from the end of April to mid-November.

FIG. 4. Małołącki Potok, 1040 m – habitat of *Clinocera wesmaeli*. (Phot. I. Słowińska)
RYC. 4. Małołącki Potok, 1040 m – miejsce występowania *Clinocera wesmaeli*. (Fot. I. Słowińska)

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STRESZCZENIE

W pracy przedstawiono nowe dane dotyczące rozmieszczenia w polskich Tatrach dwóch gatunków: *Clinocera stagnalis* i *Clinocera wesmaeli* z podrodziny Clinocerinae. Pierwszy z nich był podawany dotąd z tego masywu na podstawie okazów pochodzących z kolekcji Nowickiego, niestety bez danych na temat miejsc i dat połowów. Drugi został wymieniony z Tatr tylko przez Nowickiego (1873) w wykazie muchówek Galicji. Warto zaznaczyć, że okazy znajdujące się w kolekcji Nowickiego pochodzą z różnych okolic Galicji, od masywu Pilska i Babiej Góry po Bukowinę i Podole jarowe, a większość nie posiada niestety etykiet lokalizacyjnych. Trudno zatem jednoznacznie stwierdzić, czy niniejsze badania wykazują *C. wesmaeli* jako gatunek nowy dla polskich Tatr czy tylko potwierdzają jego występowanie w tym masywie. W pracy podano również informacje dotyczące ekologii i pojawów obydwu gatunków.

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Editorial remarks:

***** Papers of the 40th volume of Dipteron are dedicated to the late Maria Grzybkowska

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