

**Morphology, biology and distribution of *Chamaesphecia nigrifrons*
(LE CERF, 1911), (Lepidoptera: Sesiidae) in Poland**

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ABSTRACT. *Chamaesphecia nigrifrons* (Lepidoptera: Sesiidae) has been hitherto known in Poland on the basis of a single specimen caught in 1967 in Bieszczady. In 2007 the presence of this species in Poland was confirmed. It was reported from a number of sites in Polesie Lubelskie and Podlasie, over the area of 14 UTM squares. The paper presents morphological description and new biological data on this clearwing moth.

KEY WORDS: Lepidoptera, Sesiidae, *Chamaesphecia nigrifrons*, Poland, morphology, biology, distribution.

Chamaesphecia nigrifrons (LE CERF, 1911) was for the first time reported from Poland by Z. Śliwiński who caught one specimen in 1967 in Wetlina (FV04), Bieszczady (BĄKOWSKI & ŚLIWIŃSKI 2001). This specimen was at first identified as *Pyropteron muscaeformis* ESP. and it was given under this name by BIELEWICZ (1973).

The authors BĄKOWSKI & ŚLIWIŃSKI (2001) suggested wider occurrence of *C. nigrifrons* in Poland, especially in the south-eastern part of the country. It has been searched for many years and to a great joy of the authors of this paper it was found in 2007 at many localities in Polesie Lubelskie. Over this area a complex study of Sesiidae, including the

search for preimaginal stages and the use of synthetic pheromones designed for Sesiidae, has been carried out since the beginning of the 1990s (BAKOWSKI & HOŁOWIŃSKI 1996, 1997).

Despite the studies on clearwing moths in this area the presence of this species had not been evidenced prior to 2007. The fact of finding this species by second author at so many sites over the area in Poland, so well studied in respect of Sesiidae, indicates the importance of knowledge of the biology of clearwing moths. On the other hand, it means that the clearwing moths, in particular those feeding on herbaceous foodplants, are local but frequently abundant. They usually occur closer to their habitats and are less mobile than xylophagous species, that may be found relatively far from their host -plants.

New records in Poland

- Zawadówka (FB66), 18 II 2008, caterpillar, fallow land with scarce bushes near railway track, 24 III 2008, female ex. l.
- Chutcze (FB68), 18 II 2008, 3 infested hostplants - *Hypericum perforatum*, fallow land grown with scarce a few year old pines trees, 20 - 24 III 2008, 2 females ex.l.
- Wojciechów (FB69), 13 IV 2009, numerous infested plants, fallow land, 2 V – 12 V 2009, 5 males, 6 females ex. l.
- Hańsk (FB69), 18 III 2008, 4 caterpillars, fallow land in forests and shrubs, 7 IV 2008, male ex. l.
- Mszanna (FB78), 22 II 2008, 6 infested plants, fallow land and a few year old forest crops established on the post-agricultural land, 18 III 2008, female, 24 III 2008, female ex. l.
- Sawin (FB78), 16 III 2008, caterpillar, idle land grown with scarce a few year old pines and birch trees; 1 V 2008, male ex.l.
- Kosyń (FB79), 6 X 2007, numerous infested plants, fallow land grown with scarce a few year old pines and birch trees, 15 II 2008, 15 infested plants; 20 - 25 III 2008, 5 males, 3 females ex. l.
- Macoszyn (FB79), 11 X 2007, numerous infested plants, fallow land grown with scarce a few year old pines and birch trees, 10 II 2008, 12 infested plants, 15 - 24 III 2008, 5 males, 2 females ex. l. 31 I 2009, 4 infested plants, 24 - 25 II 2009, male, 2 females ex. l.
- Piaski (FB79), 29 I 2009, 7 infested plants, fallow land, 23 II 2009, female, 24 II 2009, 2 females ex. l.
- Bukowski Las (FB79), 10 IV 2009, numerous infested plants, fallow land, 3 V – 10 V 2009, 6 males, 6 females ex. l.
- Podpakule (FB79), 20 XII 2007, infested plant on the side of an unsurfaced road, 3 II 2008 male ex. l.
- Wola Uhruska (FB88), 22 II 2008, 3 infested plants on fallow land grown with single a few year old pines and birch trees, 1 IV 2008, male, female ex. l., 27 I 2009, 3 infested plants, 20 II 2009, male ex. l.

- Zbereże (FB89), 25 X 2007, numerous infested plants, idle land and a few year old forest crops established on the post-agricultural land, 22 II 2008, 8 infested plants, 28 III 2008, male, 2 females ex. l.
- Wołoskowola (FC50), 24 III 2008, 5 infested plants, fallow land, 13 IV 2008, 2 males, 2 females ex. l.; 26 XII 2008, caterpillar, 2 II 2009, male ex. l.
- Kamień (FC51), 2 V 2008, 5 infested plants, on the sides of an unsurfaced road, 10 V 2008, 3 males ex. p.
- Kołacze (FC60), 24 III 2008, 2 infested plants, fallow land, 15 IV 2008, female ex. l.
- Dubeczno (FC70), 5 X 2007, 3 caterpillars, fallow land, 11 II 2008, male ex. l., 20 III 2008, male ex. l.; 20 I 2009, 4 infested plants, 16 II 2009, male ex. l., 17 II 2009, female ex. l., 1 male in uni-trap with pheromone nigri-6, 20 VI - 26 VI 2009
- Okuninka (FC70), 13 III 2008, 3 caterpillars, idle land in forests and shrubs near lake "Święte", 3 IV 2008, male, female ex. l.
- Orchówek (FC71), 13 III 2008, caterpillar, fallow land grown with single a few year old pines and birch trees, 7 IV 2008, male ex. l.
- Sobibór (FC80), 2 X 2007, 5 infested plants, 20 III 2008, 4 infested plants on the wood dumping yard and on the sides of the railway track, 6 IV 2008, male ex. l.
- Osłowo koło Mielnika (FD30), 14 XI 2009, 2 caterpillars.

Distribution in Europe

The distribution of *C. nigrifrons* in Europe is insufficiently known. This clearwing moth species is known from central and south-eastern France, Corsica, Luxembourg, south – western Germany, Austria, south-eastern Czech Republic, eastern Slovakia, Hungary, Croatia, Slovenia, Yugoslavia, Serbia, southern Macedonia, Bosnia and Herzegovina, Bulgaria, northern Romania, northern Greece; southern Ukraine (Crimea), Transcaucasia, north-western and southern Turkey, north-western Syria (ŠPATENKA et al. 1999, LAŠTŮVKA & LAŠTŮVKA 2001, LAŠTŮVKA 2004, BAKOWSKI & DOBOSZ 2005, PREDOVNIK 2005). In Poland this clearwing moth species is known from south-eastern part of country (Fig.1). The new localities in Poland forms the north-eastern corner of the range limit of *C. nigrifrons* in Europe.

Morphologie

C. nigrifrons is one of the smaller clearwing moth species in Europe (Fig. 2).

Wingspan 9 - 18 mm. Head: antenna black with a few yellow scales laterally; frons dark brown with violet shining; vertex black; labial palpus black dorsally, white ventrally; pericephalic hair-like scales yellow mixed with a few black scales. Thorax: meso- and metathorax black, thorax dark brown laterally with a large pale yellow spot; tegulae black with some pale yellow scales apically; patagia dark brown to black. Legs: fore coxa black with a narrow white stripe externally; hind tibia black dorsally with conspicuous yellowish white distal end; spurs white. Abdomen: black with green to violet sheen; tergites 4, 6 and

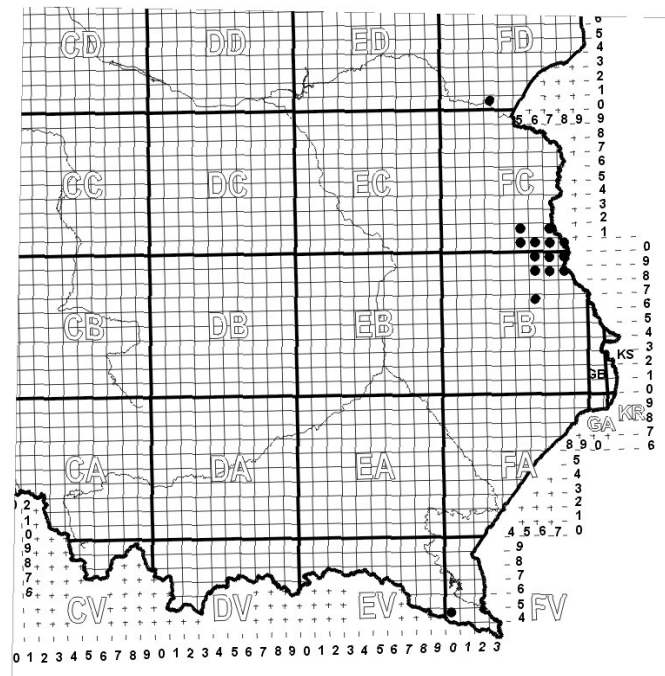


Fig. 1. Distribution of *Chamaesphecia nigrifrons* in Poland.



Fig. 2. Female of *Chamaesphecia nigrifrons*.

(7 in male) with narrow white or yellowish posterior margins; anal tuft black in male (mixed with individual yellow scales in females). Forewing: brownish black, transparent areas small, covered with hyaline scales; Posterior Transparent Area (PTA) absent; External Transparent Area (ETA) with rounded distal margin, consisting of 3 cells; apical area without distinct spots. Hindwing: veins of hindwing black; discal spot broad, trapezoid, extending to base of veins M3-Cu1; margins black.

Male genitalia (Figs 3, 4). Tegumen – uncus complex narrow with individual setae apically; scopula androconialis not significant; cristae laterales narrow, ovoid; crista medialis practically not significant, valve ovoid with pointed tip; hairs in the distal part of valve are slightly smaller than in the proximal part, crista sacculi relatively small, ventral crista with or without a few flat-topped setae; sclerotized crista short and low; saccus as long as vinculum; aedeagus about 1,3 times longer than valvae; vesica with 2 cornuti.

Female genitalia (Fig. 5). 8th abdominal tergite relatively broad; apophysis posterior about 1,3 times longer than apophysis anterior; ostium bursae relatively broad, funnel-shaped; antrum relatively narrow, strongly sclerotized, about half as long as apophysis anterior; corpus bursae ovoid, membranous, without signum (ŠPATENKA et al. 1999, LAŠTŮVKA & LAŠTŮVKA 2001).

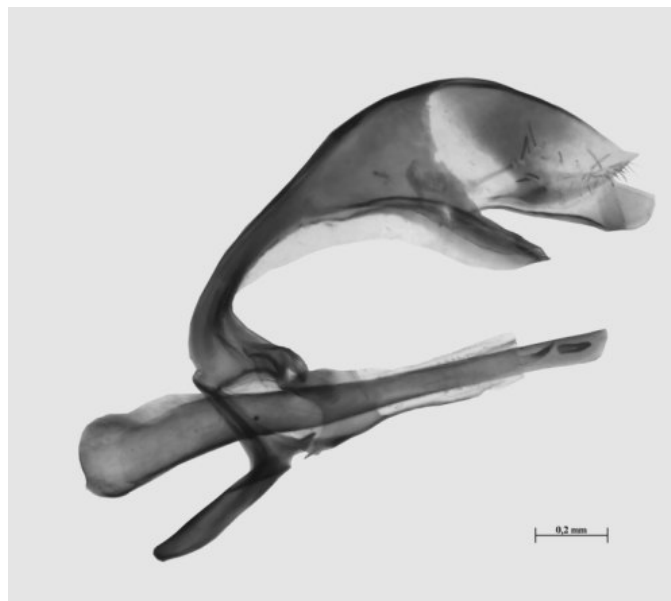


Fig. 3. *Chamaesphecia nigrifrons* male genitalia, lateral view with valva removed.

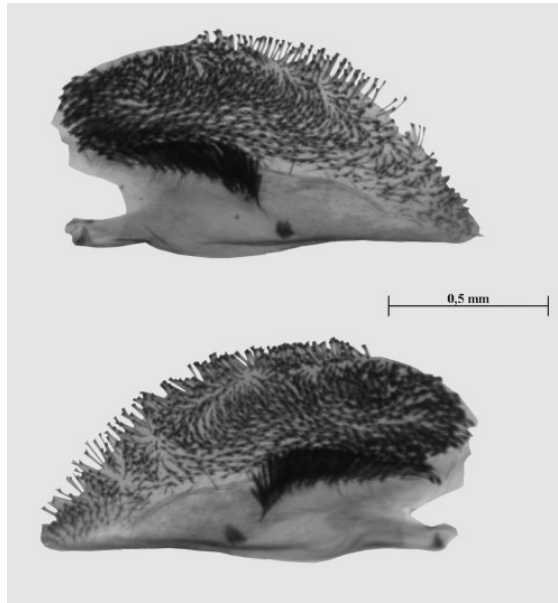


Fig. 4. *Chamaesphecia nigrifrons* male genitalia, valva.

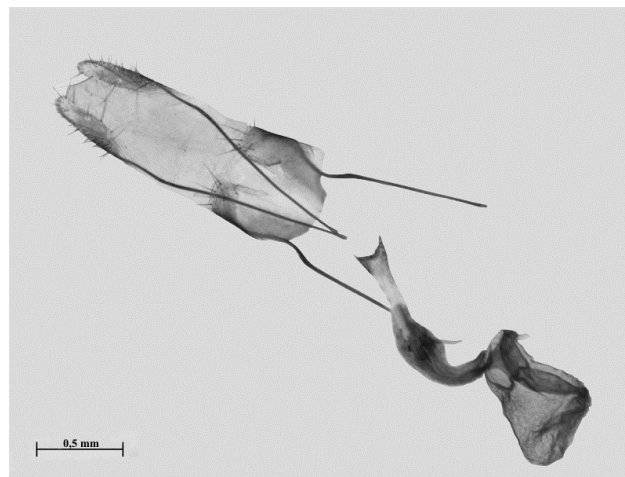


Fig. 5. *Chamaesphecia nigrifrons* female genitalia.

Biologie

The hostplant of *C. nigrifrons* is *Hypericum perforatum* L. (Hypericeae). The larvae inhabit the root for one year and pupation takes place in the basal part of dry stem. In autumn the larvae extrude a lot of reddish brown sawdust from the galleries at the base of the stems while the larvae construct a tunnel up into an old stem (BETTAG 1991, HURDES 1996, BARTSCH 2001, PREDOVNIK 2005).

Usually the foraging of a caterpillar of the species leads to the death of the hostplant. A characteristic feature of presence of larvae is that the surface of the infested plant stem at the site of breaking is clearly cut and concave. The infested stem often falls off during winter. An adult emerges usually from the top of the broken stem. *C. nigrifrons*, similarly as the majority of clearwing moths, lives on hostplants growing at well-sunlit and warm biotopes such as forest edges, clearings, glades and pastures. The imago occurs from May to mid-July (LAŠTŮVKA & LAŠTŮVKA 2001).

In Polesie, in the south-eastern part of Poland, almost all adults of *C. nigrifrons* were reared from larvae collected from *H. perforatum* which were found on post-agricultural fallow lands grown with scarce covering of a few years old pines and birch trees. *C. nigrifrons* was usually found on the plants growing among tall grass with domination of *Elymus repens* (L.) Gould. The sites of its growth were well sunlit and shielded from the wind. On large open areas with no trees, although *H. perforatum* was present in abundance and the soil was covered with *E. repens*, no infested plants were noted. Also no infested plants were found on the typical xerothermic grasslands on sand, grown with plants: *Corynephorus canescens* (L.), *Hieracium pilosella* (L.) and *Helichrysum arenarium* (L.) MOENCH.

In June and July 2008 and 2009, at many earlier detected sites of *C. nigrifrons* occurrence some pheromone traps were placed. According to the suggestions of Nils Ryrholm, the pheromones designed for *Synanthedon tipuliformis* Cl. and *S. formicaeformis* Esp. (PRI-DLO, Wageningen, The Netherlands) were used. In 2009, the pheromone compositions specially designed for *C. nigrifrons* (the nigri type) supplied by N. Ryrholm were used. Unfortunately, only one male was caught in a trap with nigri-6 pheromone in Dubeczno.

PÜHRINGER (2000) reports to have caught the males of *C. nigrifrons* in Austria in the pheromone traps with nigri 4 and nigri 5. In Slovenia the single males of this clearwing moth species were attracted to a pheromone lure, intended for *S. tipuliformis* and to a pheromone composition specially designed for *C. nigrifrons* - E2 Z13 - 18: Ac + Z3 Z13 - 18: OH + E3 Z13 - 18: Ac + E3 Z13 - 18: OH (30 µg: 30 µg: 100 µg: 30 µg) (PREDOVNIK 2005, PREDOVNIK, pers. comm.).

In view of the above it seems that the use of pheromone traps is little effective method of proving the presence of the *C. nigrifrons* species. The most effective was the search for infested plants, in particular in autumn or winter.

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