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Chrysomya albiceps (WIEDEMANN, 1819), a forensically important blowfly (Diptera: Calliphoridae) new for the Polish fauna

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ABSTRACT. During studies of arthropod succession on pig carrion in Western Poland, several specimens of *Chrysomya albiceps* were collected. This is the first record of the genus *Chrysomya* in Poland and the northernmost site of this forensically important blowfly in Europe. Morphological features useful for identification of adults and third-instar larvae of *Ch. albiceps* are presented. The occurrence of *Ch. albiceps* in Poland is discussed according to its temperature requirements.

KEY WORDS: *Chrysomya albiceps*, forensic entomology, biology, new record, Poland, Central Europe.

INTRODUCTION

In the Palaearctic the genus *Chrysomya* ROBINEAU-DESVOIDY, 1830 is represented by 7 species (ROGNES 1998). Two of them, *Chrysomya albiceps* (WIEDEMANN, 1819) and *Chrysomya megacephala* (FABRICIUS, 1794) occur in European mainland (SCHUMANN 1986, ROGNES 2004). *Chrysomya megacephala* is the newly discovered species in Europe, with distribution still restricted to Spanish mainland, Canary Is. (ROGNES 2004), Malta (EBEJER

2007) and Madera (MARTÍNES & ROGNES 2008). In contrast, *Ch. albiceps* is common in the Mediterranean and Black Sea area and recently was recorded in Switzerland (ROGNES 1997), Austria (POVOLNÝ 2002, GRASSBERGER et al. 2003), Slovakia, Czech Republic, Germany (POVOLNÝ 2002) and Ukraine (VERVES 2004).

Chrysomya albiceps is a carrion breeder but differs from the other European necrophagous blowflies in the facultative predatory behaviour of the second and third instars. Laboratory experiments and field observations show that maggots of *Ch. albiceps* may significantly reduce the abundance of larvae of native blowflies when they settle on the same experimental culture or carrion (GRASSBERGER et al. 2003). Females of *Ch. albiceps* deposit eggs preferably among clusters of the other blowfly eggs (ZUMPT 1965). Oviposition is slightly delayed in comparison to other blowflies but larvae of this species may eradicate larvae of the earlier colonizers (GRASSBERGER & FRANK 2004).

Second and third instars of *Ch. albiceps*, commonly named 'hairy maggots', have very characteristic transverse rows of fleshy protrusions on the third thoracic and all abdominal segments (Fig. 1). This feature makes this species easily distinguishable from other European necrophagous blowflies. Adults are distinct in having white-yellow genae covered with dense white hairs, whitish posterior thoracic spiracle, narrow dark green transverse stripes on the posterior edge of the III and IV abdominal segment and dense white hairs on the ventral surface of the abdomen (Fig. 2). For detailed keys see DRABER-MOŃKO (2004).

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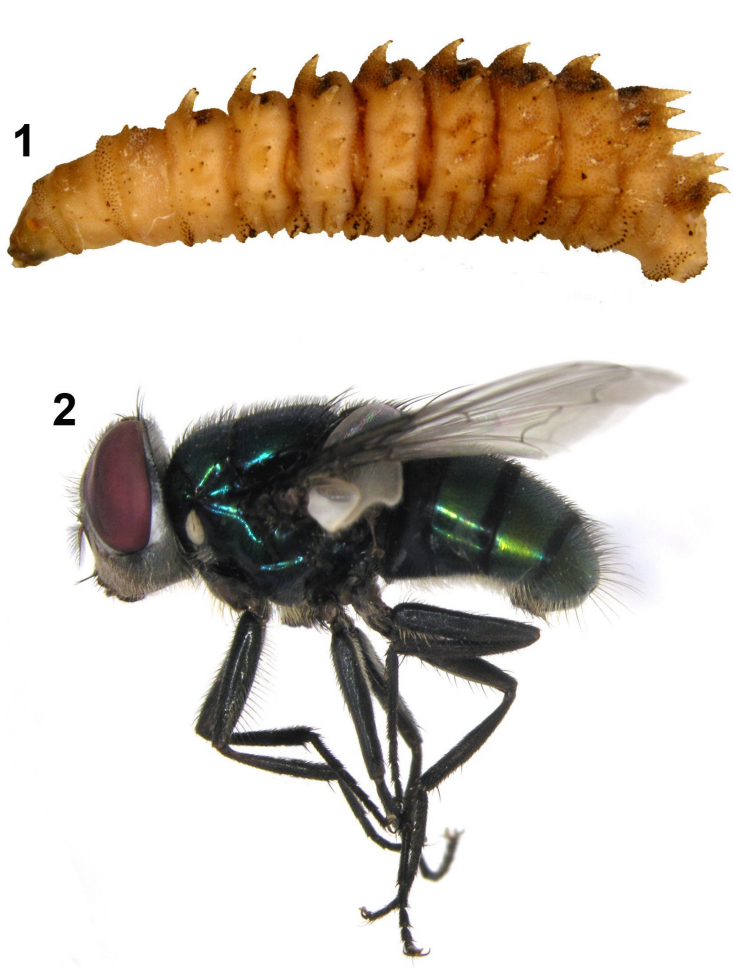
RESULTS

Chrysomya albiceps (WIEDEMANN, 1819)

Material examined

POLAND, Biedrusko Military Range (UTM: XU22). Alder forest: 11.08.2007, 9 third instars; 12.08.2007, 9 third instars; 13.08.2007, 2 third instars, puparium; 17.08.2007, puparium; 23.08.2007, ♀ (teneral, in pitfall trap); 30.09.2007, ♀ (net collecting on carcass), leg S. MATUSZEWSKI & D. BAJERLEIN. Pine-oak forest: 13.08.2007, 1 third instar, leg. S. MATUSZEWSKI & D. BAJERLEIN.

During studies of arthropod succession on pig carrion, several specimens of *Ch. albiceps* were collected. The experiment was carried out in the Biedrusko Military Range in Western Poland (52°31'N, 16°54'E). During spring, summer and autumn of 2006 and 2007 two pigs were exposed in each of the three forest types: alder forest, pine-oak forest and hornbeam-oak forest. Specimens of *Ch. albiceps* were collected only in 2007. In the summer in alder forest one adult, twenty third instar larvae and two puparia were collected on one carcass. Additionally, a single adult was collected in autumn. A single larva was also found on one carcass in a pine-oak forest in the summer.



Figs 1-2. *Chrysomya albiceps* (WIEDEMANN, 1819). 1 – third instar; 2 – adult.

DISCUSSION

Because of the expansion of *Ch. albiceps* towards the north of Europe, DRABER-MOŃKO (2004) included this species in the monograph of Polish Calliphoridae. Experimental and case data from Vienna show high abundance of *Ch. albiceps* larvae on carcasses during summer (GRASSBERGER et al. 2003, GRASSBERGER & FRANK 2004). In our study area (Biedrusko Military Range), only several larvae of *Ch. albiceps* were collected. Greater abundance of *Ch. albiceps* in Poland is probably limited by the temperature requirements of this species. In the laboratory, a constant temperature of 15°C stops the development of first instars (GRASSBERGER et al. 2003). Therefore *Ch. albiceps* is able to accomplish the development only during hot summers in Poland, like that one of 2007, when the mean daily temperature exceeded 15°C from August 2 to 25. Future observations will show whether *Ch. albiceps* is able to overwinter in Poland. However it is also possible that it will be only an ephemeral element of the Polish fauna, similar to *Cochliomya macellaria* (FABRICIUS, 1775) in the northern part of USA and southern Canada (HALL 1948). This statement is supported by lack of *Ch. albiceps* specimens during the initial part (2005) and first full year (2006) of our experiment (MATUSZEWSKI et al. 2008, SZPILA et al. 2008).

The occurrence of *Ch. albiceps* in Poland has several implications for forensic entomology. The delayed (a few days) arrival of *Ch. albiceps* on carcass, in connection with the predacious activity of its maggots, may eradicate earlier colonizers and reset the 'post-mortem insect clock' (GRASSBERGER et al. 2003). Moreover the development of *Ch. albiceps* is longer than the development of native blowflies (GREENBERG & TANTAWI 1993; ANDERSON 2000, GRASSBERGER & REITER 2001, 2002, GRASSBERGER et al. 2003). It extends by several days the time during which PMI (post-mortem interval) can be calculated based on the preimaginal blowflies. The temperature requirements of *Ch. albiceps* allow this species to complete development in Poland only during summer and in cases of cadavers discovered after several years, the presence of *Ch. albiceps* puparia may thus indicate the season of death.

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