

## A NEW RECORD FOR THE TURKISH BLOW FLY FAUNA (DIPTERA: CALLIPHORIDAE)

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**ABSTRACT:** Due to, blowflies (Calliphoridae) are usually the first insects to colonize a body after death, often within hours, they have greatest value to forensic investigations. The age of the oldest blowflies gives the most accurate evidence of the Post Mortem Interval (PMI) and habitat preferences ensure us the determination of crime scene. This family is a wide spread calyprate family all over the World and Turkey. In this study *Pollenia rudis* (Fabricius, 1794) was collected from Eskişehir and reported first time in Turkey. Seasonal activity and succession of this species on the decaying pig carcasses were given and interpreted. The variation of taxonomical characters and distribution on the world briefly discussed.

**KEY WORDS:** *Pollenia rudis*, new record, Turkish fauna, forensic entomology, blow flies

Diptera are one of the three largest and most diverse animal groups in the world comprised of over 160,000 named species in about 150 families (Ssymank et al., 2008) and the Calliphoridae is a large and cosmopolitan family of Diptera that belong to the Calyprata family group. Calliphoridae contains over 1000 described species (Smith, 1986), of which about 115 are present in Europe (Oosterbroek, 2006). The genus *Pollenia* Robineau-Desvoidy 1830 is represented by 42 known species in Palaearctic, and the Western Palaearctic being much more species rich than the Eastern Palaearctic (Rognes, 1998).

Members of the genus *Pollenia* are commonly referred to as cluster flies. Taxonomy of some species groups and their life history are well documented (Rognes, 1991a; Thomas & Davies, 1973). They are Calliphorids that have very diverse habits, especially the larvae. While the adults generally visit flowers, faeces and carrion, there are species whose larvae feed on dead animals, faeces or other decaying organic matter. Larvae usually infest living vertebrate animals (Zumpt, 1965; Rognes, 1998). These maggots quickly invade the areas of the corpse and grow in size and weight. Information about the size, weight and age of blowfly larvae and adults on a corpse can be used to identify the time, and sometimes place, of death (Sharma et al., 2013).

This work provides the first country record for *Pollenia rudis* (Fabricius, 1794), collected on different days of pig decomposition during a forensic entomology research in Eskişehir, extending the known range of the species and taxonomic characters were given in details, variability and distribution of species were briefly discussed.

### MATERIAL AND METHODS

The first sampling process occurred on bloat and early active decaying stage of forensic research at decomposition field, the adult samples were collected by nets within 30 cm diameter and preserved in ethyl acetate jars. The study was conducted in oak forest on 39°56'07.12"N, 30°29'34.11"E, Eskişehir, near the Tekeciler village. The specimens were collected between 15 June 2012 and 15 June

2013. The species were identified by literatures and keys (Rognes, 1987; 1991b; Szpila, 2010 and Jewiss-Gaines et al., 2012). The taxonomical characteristics were photographed by Leica microscope MZ12.5 donated with DFC 480 camera.

## RESULTS

Totally 28 specimens, belonging to the Polleninae subfamily, was determined as a new record; *Pollenia rudis* (Fabricius, 1794).

### Family Calliphoridae

### Subfamily Polleninae

### Genus *Pollenia* Robineau-Desvoidy 1830

### Species *Pollenia rudis* (Fabricius, 1794)

**Material examined:** 25.03.2013, 26.03.2013, 27.03.2013, 28.03.2013, 07.04.2013, 08.04.2013, 09.04.2013, 16.04.2013, 17.04.2013, 18.04.2013, 19.04.2013, 21.04.2013, 22.04.2013, 23.04.2013, 22.06.2012, 25.06.2012, 01.07.2012, 17.07.2012, 18.07.2012, 19.07.2012, 11.09.2012, 21.09.2012, 14.10.2012, 15.10.2012, 17.10.2012, 18.10.2012, 20.10.2012, 26.10.2012, Eskişehir (Tekeçiler), 1143 m, 39°56'07.12"N, 30°29'34.11"E, 128♀♀.

**Distribution:** Canada, United States, United Kingdom, Netherlands, Germany, Switzerland, Norway, Sweden, Finland, Russia, Albania, Andorra, Austria, Belarus, Belgium, Cyprus, Czech Republic, Finland, French mainland, Greek mainland, Hungary, Ireland, Italian mainland, Lithuania, Madeira, northern Ireland, Poland, Portuguese mainland, Romania, Sicily, Slovakia, Spanish mainland, Ukraine, Australian region, East Palaearctic, Nearctic region, North Africa, Oriental region ([www.faunaeur.org](http://www.faunaeur.org); [www.globalspecies.org](http://www.globalspecies.org)).

**Comments:** General distribution of this species is North America, North Africa and North Europe. This species is also distributing in Russia, Greek mainland and Cyprus. Due to near distribution to Turkey (Greek mainland, Cyprus and East Palaearctic) and habitat preferences explain the being *P. rudis* in Turkey, especially with the human race. This species can be distinguished from closely related species with anterodorsal setae of mid-tibia and dark brown or black setulae of mid- and hind femur. This species are not so variable but, variabilities in coloration of antennae and in abdominal pattern were seen. The other variaties are body size, coloration of posterior thorasic spiracle, basicosta and coloration of mid-and hind femur setulae on posteroventral surfaces.

The taxonomical characters were described by photos within the quotes of identification keys;

1. Underside of wing without tuft of pale setulae at intersection of subcosta and humeral crossvein (Fig. 1).
2. Presutural area with only 1 anterior intra-alar seta (Figure 2), thorax without mid-dorsal stripe (Figs. 2, 3).
3. Lappets of posterior thoracic spiracle (anterior to halter) tan, yellow, or orange in colour (Fig. 4), basicosta brown, light brown or tan (Fig. 5).
4. Facial carina between antennae prominent, not reduced (Fig. 6).
5. Mid-tibia with 2-3 anterodorsal setae (Fig. 7), mid- and hind femur with only dark brown or black setulae on posteroventral surface (Fig. 8).

## DISCUSSION

Comparing with the other Pterygot orders in Turkey, Diptera is the fourth richest order in Turkey after Lepidoptera, Coleoptera and Hymenoptera, according to the total number of the species (Anonymous, 2012). Unfortunately, there are still many undiscovered new species to the science, and unrecorded species to the fauna of Turkey. Potential of the dipteran fauna of Turkey may be estimated more than 10,000 species (Koçak & Kemal, 2013).

The preference of Calliphoridae for a fresh corpse makes them a high priority at crime scenes whenever they are encountered (Sharma et al., 2013). Blow flies are the first organisms to arrive on a dead body. Their offspring can give a good estimate of the time a body has been exposed to insects. We expect that *P. rudis* also have great forensic importance due to the specimens were collected in early stages of decomposition, lay their eggs same time with the other species that forensically very important, larvae grow up with the other larva and habitat preference.

The distribution area of this species is known pine-oak forest that colonized on dead body at this location. As a reported at recent study that species live in forest near the urban sites (Fremdt & Amendt, 2013). Specific habitat preferences of this species possibly use as evidence about corpse is moved or not.

This species shown their intensive activity at dead body at spring and autumn before other species (Table 1). This species use to determine PMI (Post mortal interval) cause of that earlier comes to corpse than other Calliphoridae. Therefore, succession and development stages of this species can be useful as reference for the crime investigations.

In this study, *P. rudis* was reported as new record for Turkish Calliphoridae fauna. The variety of lifestyle, diverse habits, feeding on several foods show us the way to conclude that the actual diversity of this family in Turkey can be higher than currently known. In the future, we expect that more new Turkish cluster fly records will be found for this family.

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Table 1. Activity of specimen during a year.

Species	Week	June			July			August			September			October			November			December			January			February			March			April			May						
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<i>Pollenia rudis</i>																																									



Figure 1. Underside of wing without tuft of pale setulae at intersection of subcosta and humeral crossvein.



Figure 2. Presutural area with only 1 anterior intra-alar seta.



Figure 3. Thorax without mid-dorsal stripe.



Figure 4. Lappets of posterior thoracic spiracle (anterior to halter) tan, yellow, or orange in colour.



Figure 5. Basicosta brown, light brown or tan.



Figure 6. Facial carina between antennae prominent, not reduced.

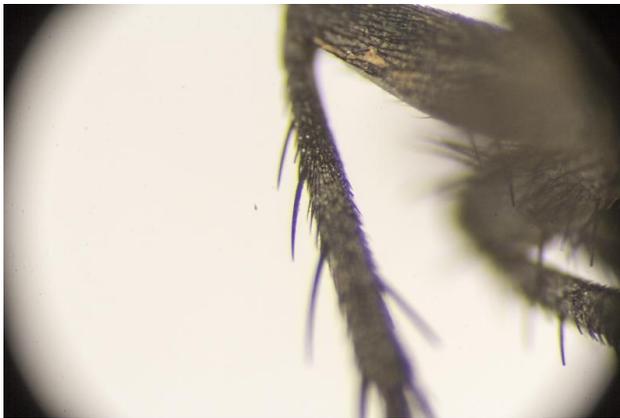


Figure 7. Mid-tibia with 2-3 anterodorsal seta.



Figure 8. Mid- and hind femur with only dark brown or black setulae on posteroventral surface.