

Contribution to the Knowledge of *Chrysopilus* (Diptera: Rhagionidae) in Türkiye: First Record of *C. asiliformis*

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Abstract: In this study, Diptera specimens photographed during nature observations in Bartın and Sakarya of Türkiye provinces were initially identified as *Chrysopilus asiliformis* (Preysslér, 1791) based on their photographs. Subsequently, to confirm the identification microscopically, representative female and male specimens were collected and examined under a stereomicroscope. This finding represents the first record of *C. asiliformis* in the Turkish fauna.

Keywords: *Chrysopilus asiliformis*, diptera, rhagionidae, taxonomy, Türkiye, fauna, first record

Introduction

Members of the arthropod order Diptera, commonly known as flies, have a cosmopolitan distribution and comprise nearly 160,000 described species across 160 families (Marshall, 2012). Flies of the family Rhagionidae, commonly known as snipe flies, include more than 700 described species across 22 genera (Nagatomi, 1982; Marshall, 2012). Rhagionidae is not only widespread in distribution but also considered among the relatively ancient lineages within Diptera, with evolutionary origins believed to date back to the Triassic period (Santos 2008).

The taxonomic history of this family has undergone several classification revisions over time. Nagatomi (1982) proposed dividing the family Rhagionidae into four subfamilies: Rhagioninae, Spaniinae, Glutopinae, and Austroleptinae. Subsequently, Stuckenberg (2001) elevated Spaniinae and Austroleptinae to family rank. Kerr (2010) further revised the classification by placing the genus *Chrysopilus* in a newly recognised subfamily, Chrysopilinae. According to current taxonomy, Rhagionidae comprises three subfamilies: Rhagioninae, Spaniinae, and Chrysopilinae, and is recognised for its diverse ecological roles (Marshall, 2012).

This study aimed to report *Chrysopilus asiliformis* as a new record for the Diptera fauna of Türkiye.

Materials and Methods

Diptera specimens were observed and subsequently collected in peri-wetland vegetation (Figures 2 & 3) in Bartın (1 June 2019 and 28 May 2020) and Sakarya (30 May 2021, 9 June 2022, and 3 June 2024). All target species were recorded exclusively during surveys conducted in late May and early June.

Initially, live dipteran individuals were photographed in their natural habitats using a compact digital camera (PowerShot SX60; Canon, Tokyo, Japan).

Then, for microscopic identification purposes, representative individuals (11 males and 6 females) were collected from both locations [Bartın (41°34'24"N, 32°19'52"E) and Sakarya (41°04'29"N, 30°38'55"E)] and examined under a stereomicroscope (Model A23.3645-B2LD, Zoom Stereo Microscope; Opto-Edu Beijing Co., Ltd., China).

Finally, Diptera specimens were carefully identified based on morphological characteristics under a stereomicroscope (MIC-B30/B Binocular Economic Microscope-Led-Achromat, Soif Optical Instruments Factory, China), with reference to relevant literature sources (Nagatomi, 1982; Lindner, 1925; Krivosheina, 2006; Zeegers & Schulten, 2022)

Taxonomic identification and nomenclature were carried out in accordance with the International Code of Zoological Nomenclature (ICZN, 1999). In addition, all Diptera specimens are preserved in microtubes containing 70% ethanol and deposited in the personal collection of Furkan Eren.

Results and Discussion

As a result of microscopic examination, the Diptera specimens were morphologically identified as *Chrysopilus asiliformis* (Preyssl, 1791).

Male Morphology. Greyish body densely clothed with fine yellowish pubescence. Thorax and coxae are covered with a distinct grey pruinosity and are concolourous laterally, in accordance with previous descriptions. Femora and tibiae are uniformly pale yellow, lacking any dark annulations. Wings are hyaline with a short, faintly brown pterostigma ending between the apices of R_1 and Sc. The head is characterised by holoptic eyes occupying nearly two-thirds of the frons, a smooth, narrow clypeus, and a short palpus with yellow hairs (based on photographs) reaching only halfway along the clypeus. The upper occiput bears fine pale setae dorsolaterally, while the face and clypeus are largely bare. The antennae are pale brown, with a rounded third segment slightly narrower than the second. Genitalic features are taxonomically informative: the gonostylus is slender and gently curved apically, gonocoxites have thickened basal margins, and tergite IX bears a shallow basal notch — a configuration consistent with diagnostic characteristics described for the genus *Chrysopilus* (Kerr 2010). In living specimens, the eye is coppery green.

Female Morphology. Broader abdomen and lacks any distinct thoracic markings. They share similar body colouration and wing characteristics with the male, including pale yellow femora and tibiae and a hyaline wing membrane with a faint brown pterostigma. The femora and tibiae are uniformly pale yellow, with no noticeable dark banding. As with males, the coxae are concolourous with the thoracic lateral sides.

Material examined. Seven males and four females from Bartın ($41^{\circ}34'24''N$, $32^{\circ}19'52''E$), and four males and two females from Sakarya, Türkiye ($41^{\circ}04'29''N$, $30^{\circ}38'55''E$), leg. Furkan Eren.



Fig. 1. Localities where *Chrysopilus asiliformis* was recorded in this study (green dots indicate sampling sites in Bartın and Sakarya Provinces, Türkiye).

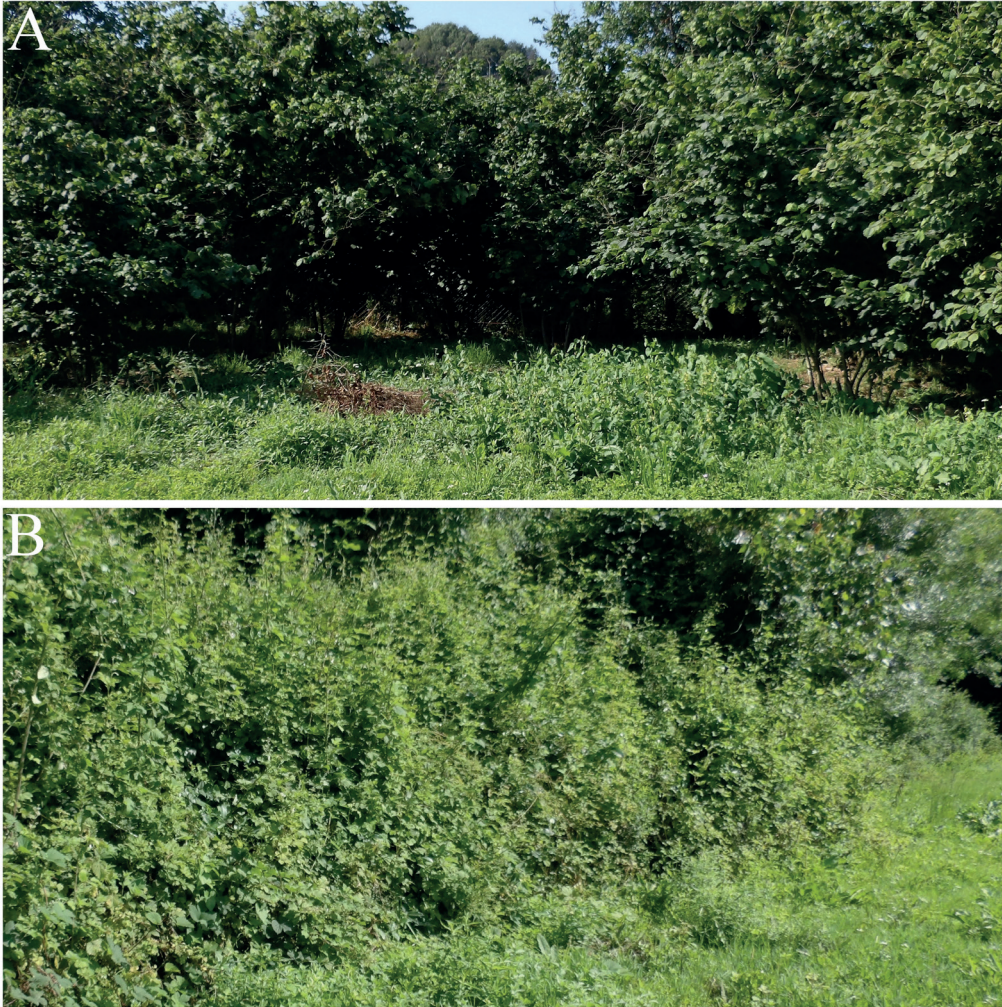


Fig. 2. Vegetated habitats in Karasu District (Sakarya), where field surveys of *C. asiliformis* were conducted. A) Herbaceous vegetation and scattered shrubs near hazelnut orchards; B) Dense herbaceous vegetation along a canal bank.

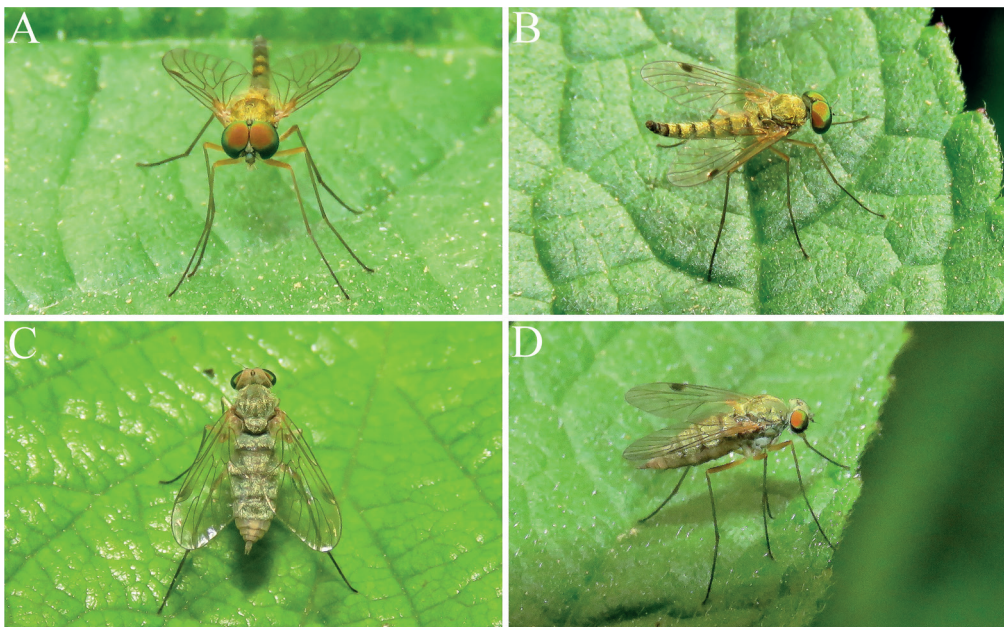


Fig. 3. A) Lateral view of a male *C. asiliformis* on leafy vegetation near a water canal; B) Frontal view of a male on leafy vegetation near a water canal; C) Dorsal view of a female on a leaf in the same habitat; D) Lateral view of a female on a leaf in the same habitat.

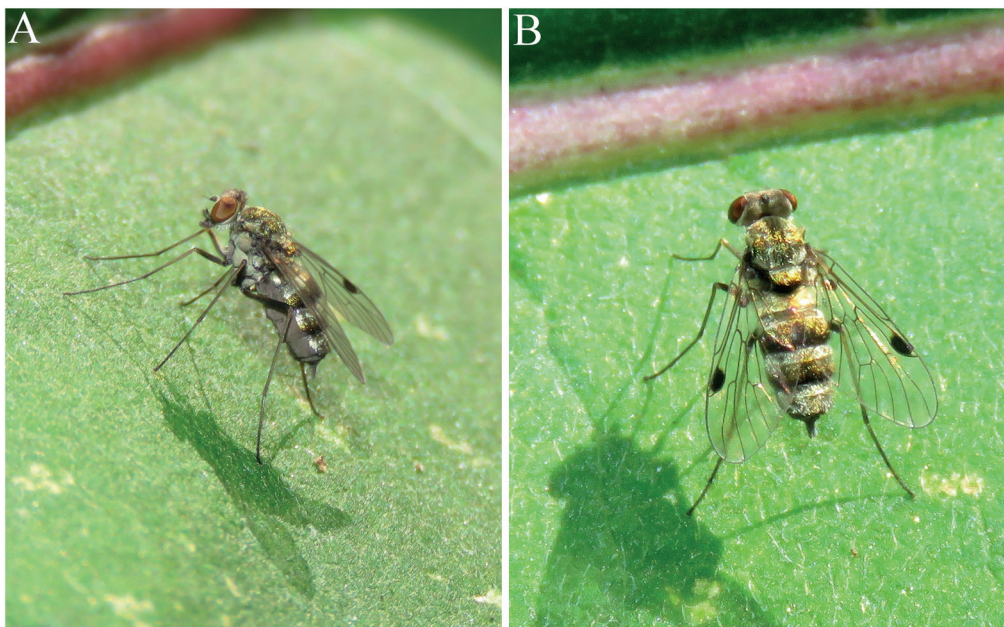


Fig. 4. A) Lateral view of a female *Chrysopilus splendidus*; B) Dorsal view of a female. (Photos by F. Eren.)

The genus *Chrysopilus* Macquart comprises approximately 319 species, with 39 recorded from the Afrotropical region, 34 from the Australian region, 69 from the Palaearctic, 31 from the Nearctic, 70 from the Neotropical, and 76 from the Oriental region (Krivosheina & Sidorenko 2007). Members of this genus are distributed across all continents except Antarctica and can occur at elevations up to 4000 meters above sea level (Kerr 2004).

Chrysopilus species are structurally delicate flies characterized by slender, elongated legs and body lengths ranging from 3.7 to 19 mm. Their body coloration varies from black, grey, and brown to orange-brown tones, and they often bear distinctive setae on the thorax and abdomen. The wings may be hyaline or darkly tinted, with or without patterns, and consistently possess the M_3 vein, a diagnostic feature of the genus (Kerr 2004).

Chrysopilus asiliformis was first described by Preysslér in 1791 as *Musca asiliformis*. Since then, the species has appeared in the literature under various names, including *Chrysopilus aureus* (Meigen, 1804), *Chrysopilus meridionalis* (Bezzi, 1898), *Rhagio aurulans* (Meigen, 1820) and *Rhagio luridus* (Meigen, 1820), making it a taxon with extensive synonymy (Nagatomi, 1982; Grootaert et al., 2020).

According to published literature, *Chrysopilus asiliformis* has been recorded from several European countries, including Austria (Krivosheina, 2005), Belgium, Denmark, the Netherlands, England, Scotland (Zeegers & Schulten, 2022), Bulgaria (Hubenov, 2021), France (Zeegers & Pollet, 2024), and Slovakia (Oboňa et al., 2021). When combined with records from online biodiversity and checklist platforms such as GBIF and iNaturalist, these data indicate that the species is widely distributed throughout Europe.

Zeegers et al. (2021) reported that *C. asiliformis* had frequently been misidentified as *Chrysopilus flaveolus* in Northwestern Europe. In particular, the fading or reduction of the wing stigma in some individuals has contributed to taxonomic confusion, leading to erroneous records of *C. flaveolus* from areas outside its actual range. However, *C. flaveolus* can be reliably distinguished from *C. asiliformis* by its larger body size, dark-colored femora, and distinctly black lateral sides of the thorax.

Two species belonging to the genus *Chrysopilus* (family Rhagionidae) are known from Türkiye: *Chrysopilus pallipes* (Loew, 1869) and *Chrysopilus splendidus* (Meigen, 1820) (Pârâu & Popescu-Mirceni, 2006).

Given these potential misidentifications, it is essential that specimens recorded from Türkiye are carefully examined morphologically, with special attention paid to the distinguishing features of both species to ensure taxonomic accuracy.

The record of *Chrysopilus asiliformis* in Türkiye is significant not only from a national faunistic perspective but also due to the ecological and taxonomic relevance of the genus. *Chrysopilus* Macquart, one of the most widespread and species-rich genera within Rhagionidae, most species are closely associated with moist and vegetated habitats such as forest understories and riparian zones (Nagatomi 1982; Krivosheina & Sidorenko 2007). The genus spans a broad climatic range, with representatives occurring in both temperate and tropical regions, and demonstrates notable ecological adaptability (Kerr 2010; Grootaert et al. 2020). This widespread distribution and environmental versatility highlight the genus's importance within the family.

Despite this taxonomic significance, the biology, life cycle, and ecological roles of most *Chrysopilus* species remain poorly understood. Krivosheina & Sidorenko (2007) emphasize that, although the genus is widely distributed across the Holarctic, it remains among the least studied groups within Rhagionidae. In particular, knowledge of larval stages is limited; only a few species have been investigated with respect to larval morphology and habitat. Nonetheless, existing data suggest that *Chrysopilus* larvae exhibit predatory behavior and likely contribute to both terrestrial and aquatic trophic networks, as some species are clearly aquatic or semi-aquatic (e.g., *C. torrentium*; Thomas, 1978) (Krivosheina & Sidorenko, 2007). These knowledge gaps underscore the need for further systematic and ecological research to better understand the evolutionary history and biological roles of the genus within Rhagionidae.

Another species of *Chrysopilus* known from Türkiye, *C. splendidus* (Meigen, 1820), closely resembles *C. asiliformis* but can be distinguished by several diagnostic features. Although both species are relatively small and bear yellowish setae, *C. splendidus* typically appears darker and slightly larger in live specimens, with distinctly dark femora. It also possesses a longer palpus and a darker, more pronounced wing stigma. In contrast, *C. asiliformis* is characterized by shorter palpi, a faint and pale stigma, and, in males, a metallic green reflection in the eyes. The cheeks of males appear largely glabrous, while females lack any prominent abdominal markings. Wing venation also differs, with *C. asiliformis* exhibiting

a non-branched M_3 vein near the apex and a narrowed upper cell—features that are critical for accurate identification (Zeegers & Schulten 2022).

In contrast to both *C. asiliformis* and *C. splendidus*, *Chrysopilus pallipes* presents a distinct set of morphological features that facilitate its recognition. Unlike the pale and uniformly yellow femora of *C. asiliformis*, *C. pallipes* exhibits yellow hind femora with a distinctly brownish apical quarter. The mesoscutum bears bright golden recumbent hairs only in restricted areas, and the abdomen is uniformly velvety black with dense silvery pubescence. Its pterostigma is pale brownish, relatively short ($2.5\times$ longer than wide), and separated from the wing margin. Furthermore, the male gonostyli are curved at an obtuse angle with obliquely truncated apices, while tergite IX presents a deeper basal emargination compared to *C. asiliformis*. These diagnostic characters confirm its clear taxonomic separation from the newly recorded species (Krivosheina, 2006).

These morphological distinctions are essential for precise species delimitation and for avoiding misidentifications in faunistic and ecological surveys.

Conclusion

This study provides the first formal record of *Chrysopilus asiliformis* for the Turkish fauna, thereby contributing to the growing knowledge of Rhagionidae diversity in the country. The occurrence of the species in Bartın and Sakarya provinces—particularly in areas adjacent to wetlands—aligns with previously reported habitat preferences of *C. asiliformis* in the literature. Given its broad distribution across Europe, it is plausible that the species may also be present in other ecologically suitable regions of Türkiye, such as Thrace and the eastern Black Sea coast.

Observing mating individuals in the field provides additional evidence for established populations in the study areas. Nevertheless, considerable knowledge gaps remain concerning the species' biology, larval development, and life history traits. Future ecological and behavioural studies will be essential to elucidate the role of *C. asiliformis* within terrestrial ecosystems.

In conclusion, this study not only reports a new faunistic record for Türkiye but also underscores the necessity of more systematic and comprehensive surveys of Diptera. It further emphasises the importance of promoting research in this relatively understudied group within the field of entomology in Türkiye.

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