Pollinator Academy

Genus: *Chrysotoxum*

Chrysotoxum verralli male habitus

Genus: *Chrysotoxum* Meigen, 1803

Family: Syrphidae

Subfamily: Syrphinae

Tribe: Syrphini

Number of species of this genus found in Europe: 20

Description

Head

The face is yellow with black central stripe extending from base of antenna to oral margin, shiny, covered with long, yellow or black hairs. The gena is broad, yellow, sometimes with black stripe from eye to lateral oral margin, or completely black, shiny to grey dusted, with yellow hairs. The lunule is yellow to brown, shiny. The frontal triangle is usually black, shiny to grey dusted, covered with yellow or black hairs; in few species (e.g. *C. parmense, C. cisalpinum*) the frontal triangle is yellow. In females the frons is completely black, or yellow in lower part above lunule, usually with lateral more or less large grey dust spots (rarely completely absent), yellow or black haired. The ocellar triangle is isosceles to equilateral. Eyes are more or less densely short haired; males are holoptic, females dichoptic. The occiput is black, shiny to white dusted, covered with long yellow, or black hairs especially in dorsal part. The antenna is porrect, elongated, black: first antennal segment (scape) ca. 1-4 times as long as wide, second antennal segment (pedicel) 1-3 times as long as wide, third antennal segment (basoflagellomere) usually 3-4 times as long as wide. Arista is yellow to brownish black, inserted dorsally near the base of basoflagellomere, always bare, short almost reaching the top of the basoflagellomere or slightly longer.

Thorax

The postpronotum is bare and mostly concealed in dorsal view by the head capsule (as in the Syrphinae subfamily). The scutum is black, shiny to faintly dusted, with yellow spots in the anterior part laterally extending to transverse suture, and another lateral spot on the posterior part and on the postalar callus. The scutum is covered with long yellow, orange or to a varying degree black hairs. Many species with two more or less broad dust stripes in the anterior part medially extending backwards beyond transverse suture, sometimes also two additional faint

dust stripes laterally. The pleurae are black with yellow spots of varying size on posterior anepisternum, dorsal part of katepisternum and katatergite; pleurae are shiny with long, yellow or to a varying degree black hairs. Metasternum is black and bare. Scutellum yellow with more or less large central black spot, rarely completely black, with white, yellow or black hairs. Subscutellar hair fringe is present and yellow.

Wings

The wing membrane is hyaline, in some species with distinct yellow or black coloration along the front margin or with a dark spot near wing apex. Wing is densely covered with microtrichia, in some species large bare areas are present on first and second basal cells and anal cell. The pterostigma is yellow to brown or black. Vein R_{4+5} is slightly sinuate; vein M_1 meets R_{4+5} at wing apex in an acute to rectangular angle (< 90°); cell r_1 is open at wing margin; cross-vein r-m is placed on the basal third to basal half of the discal cell.

Legs

Legs are of normal shape, without any modifications. Femur is completely yellow or black at base to a varying degree. All femora have long dense black, or yellow hairs at base postero-ventrally (hairs have a length of approximately the diameter of the femur), of normal shape. Tibiae are yellow, in some species tip of tibia darkened orange to brownish, short yellow hairs (distinctly less than half the diameter of tibia) or to a varying degree with black hairs intermixed.

The tarsi are yellow, sometimes the basitarsus is darker orange to brown, of normal shape, covered with short yellow hairs.

Abdomen

The abdomen is tapering to broadly oval, and dorsally strongly convex. The tergites are black with yellow spots almost meeting in the middle, reaching the side margin or leaving the side margin black. In addition, a yellow band may be present at hind margin notably in tergites 3 to 5, the extent of yellow markings is usually higher in the last tergites towards the tip of the abdomen. Hairs on tergites are yellowish to black, more or less short. Some species have a broader yellow band on tergite 2, while tergites 3 and 5 are (almost) completely black. In *Chrysotoxum triarcuatum* the abdomen is largely yellow to brown in ground colour with faintly demarcated clear yellow bands on tergites. Postero-lateral edges of tergites are often projecting.

Sternites are black with yellow oblique spots across hind margins of sternites or smaller median parallel spots on each sternite, shiny, covered with long white to yellow or black hairs. Rarely the sternite 2 is completely yellow extending to a broad anterior yellow band on sternite 3 (*C. triarcuatum*).

Chrysotoxum verralli antenna

Chrysotoxum festivum male habitus

Chrysotoxum triarcuatum male habitus

General comments on identification to species level

The genus *Chrysotoxum* consists of medium-large sized hoverflies (body length 8 to 17 mm) with a clearly marked yellow and black pattern on abdomen, thoracic pleurae black with yellow spots, a dorsally strongly convex abdomen and long porrect antennae with third antennal segment at least 3 times as long as wide, mimicking wasps.

Differential diagnosis

At first sight *Chrysotoxum* may be mistaken for other brightly yellow and black coloured hoverflies of the subfamily Syrphinae with bare postpronotum, such as the genus *Xanthogramma* or *Sphaerophoria*. However *Xanthogramma* has a short pending antenna and the abdomen is flat to slightly convex dorsally. *Sphaerophoria* have very narrrow long abdomen with short pending

antennae. Other wasp mimicking hoverflies with long antennae like *Ceriana* or *Sphiximorpha* have a well visible hairy postpronotum and often a constricted second tergite.

Xanthogramma pedissequum male habitus

Sphaerophoria scripta male habitus

Sphiximorpha subsessilis male habitus

Geographical distribution and global diversity

Chrysotoxum occurs in all biogeographical regions except Australasia and Antarctica with globally over 100 species, in the Palaearctic region ca. 87 species are known with 26 species have been recorded for Europe. Most complete key for Europe is given by Speight et al. (2016) and Speight & Sarthou (2017), but recent additions and additional keys are needed, for example van Steenis et al. (2020), Nedelkovic et al. (2015), Vujic et al. 2017. For central and Northern Europe also Bot & van de Meutter (2019) can be used.

Presence in Europe

Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Gibraltar, Greece, Hungary, Ireland,

Isle of Man, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russian Federation - European Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Biology

Adult behaviour and flower preferences. The European *Chrysotoxum* species are rapid flyers both close to the ground in the vegetation and higher up around shrubs and forest margins. Males may hover at 2-3 m height. They are found in many different habitats from lowland wetland to dry grasslands, all kinds of shrub vegetation, forest clearings, heathland, garrigue, but also up to alpine grasslands. Adults are regular flower visitors on a wide spectrum of flowers, mainly on tall herbs of the families Apiaceae and Asteraceae, different shrubs species but also on a number of small herbs and in the Mediterranean region often on Euphorbiacae.

Reproduction and larval biology. Larvae of *Chrysotoxum* are associated with ants (myrmecophilous) and probably feeding mostly on root aphids, however for the majority of the species the larvae are still undescribed.

Seasonal life cycle. The developmental cycle is annual, with a more or less long flight period from late spring to autumn

Type species: *Musca bicincta* Linnaeus, 1758

Common names:
EN - Meadow Fly;
DE - Wespenschwebfliege;
FI - sarvikirvarit;
DA - hvepsesvirreflue;

NO - vepseblomsterflue;
SE - getingfluga

List of species found in Europe:

1. *Chrysotoxum arcuatum* (Linnaeus 1758)
2. *Chrysotoxum bicinctum* (Linnaeus, 1758)
3. *Chrysotoxum cautum* (Harris, 1776)
4. *Chrysotoxum cisalpinum* Rondani, 1845
5. *Chrysotoxum elegans* Loew, 1841
6. *Chrysotoxum fasciolatum* (De Geer, 1776)
7. *Chrysotoxum festivum* (Linnaeus, 1758)
8. *Chrysotoxum gracile* Becker, 1921
9. *Chrysotoxum intermedium* Meigen, 1822
10. *Chrysotoxum lessonae* Giglio-Tos, 1890
11. *Chrysotoxum lineare* (Zetterstedt, 1819)
12. *Chrysotoxum montanum* Nedeljković & Vujić in Nedeljković et al, 2015
13. *Chrysotoxum octomaculatum* Curtis, 1837
14. *Chrysotoxum orthostylum* Vujić in Nedeljković et al, 2015
15. *Chrysotoxum parmense* Rondani, 1843
16. *Chrysotoxum tomentosum* Giglio-Tos, 1890
17. *Chrysotoxum triarcuatum* Macquart in Webb & Berthelot, 1839
18. *Chrysotoxum vernale* Loew, 1841
19. *Chrysotoxum verralli* Collin, 1940

20. *Chrysotoxum volaticum* Séguy, 1961

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Attributions

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