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On the presence in Switzerland of *Microdon myrmicae* Schönrogge et al., 2002, *Xanthogramma dives* (Rondani, 1857) and *X. stackelbergi* Violovitsh, 1975 (Diptera: Syrphidae)

Martin C.D. Speight[1] & Daniele Sommaggio[2]

[1] Dept of Zoology, Trinity College, Dublin 2, Ireland – speightm@indigo.ie

[2] Dista University of Bologna, Bologna, Italy – dsommaggio@tiscalinet.it

Abstract: First records of the syrphids (Diptera: Syrphidae) *Microdon myrmicae, Xanthogramma dives* and *X. stackelbergi* are provided for Switzerland. A lectotype is designated for *Xanthogramma dives* (Rondani, 1857). A provisional key to the European species of *Xanthogramma* is given in appendix.

Zusammenfassung: Die Schwebfliegen *Microdon myrmicae, Xanthogramma dives* und *X. stackelbergi* werden erstmals für die Schweiz gemeldet. Der Lektotypus von *Xanthogramma dives* (Rondani, 1857) wird designiert. Ein provisorischer Schlüssel zu den europäischen Arten von *Xanthogramma* wird im Appendix vorgestellt.

Résumé: Les espèces de Diptères Syrphidae *Microdon myrmicae, Xanthogramma dives* et *X. stackelbergi* sont signalées de Suisse pour la première fois. Un lectotype est désigné pour *Xanthogramma dives* (Rondani, 1857). Une clé provisoire des espèces européennes de *Xanthogramma* est proposée en appendice.

Keywords: Syrphidae, Switzerland, taxonomy, new records, *Xanthogramma*, identification key

INTRODUCTION

Since publication of the most recent list of the Syrphidae of Switzerland (Maibach et al. 1998) the following species have been added to the Swiss list: *Criorhina pachymera* Egger, 1858 (Dirickx & Obrecht 2007); *Epistrophe olgae Mutin,* 1993 (Speight 2007); *Eumerus uncipes Rondani,* 1850 (Carron et al. 2006); *Platycheirus brunnifrons* Nielsen (Nielsen 2004); *Platycheirus caesius* Nielsen & Stuke, 2004 (Nielsen 2004); *Platycheirus clausseni* Nielsen, 2004 (Nielsen 2004); *Platycheirus goeldlini* Nielsen, 2004 (Nielsen 2004); *Platycheirus speighti* Doczkal, Stuke & Goeldlin, 2002 (Doczkal et al. 2002). The present paper adds a further three species, *Microdon myrmicae, Xanthogramma dives* and *X. stackelbergi.*

Microdon myrmicae Schönrogge et al., 2002
Vaud: Les Grangettes, 26.V.2008, puparia ex nest of *Myrmica scabrinodis* in moss hummocks in poor fen, leg et det MS.

Schönrogge et al. (2002) demonstrated that the taxon until then known as *Microdon mutabilis* (Linnaeus, 1758) was two cryptic species, *M. mutabilis and M. myrmicae,* that could only be separated from one another using features of the developmental stages. Since then it has not been possible to record either species just on the basis of adult specimens. As recognised now, *M. mutabilis* is a species identified using features of the puparia and whose larvae live in nests of the ant *Formica lemani* Bondroit, 1917 in well-drained grassland. *M. myrmicae* can similarly be identified from features of its puparia and has larvae that live in nests of the ant *Myrmica scabrinodis* Nylander, 1846 in wetlands. Keys for the separation of the puparia of European *Microdon* species are included in Speight & Sarthou (2008).

M. myrmicae is the only European *Microdon* species known to inhabit nests of ants of the genus *Myrmica*. It is also the only European *Microdon* species inhabiting wetlands, where it lives with its ant host *Myrmica scabrinodis*, in the top of *Carex* tussocks and moss hummocks, that protrude above the level to which the ground surface is normally flooded. *Adults of M. mutabilis/myrmicae* have been found repeatedly in the immediate vicinity of a small fen within Les Grangettes. It was suspected that the species involved was *M. myrmicae* but it was not known with which ant the *Microdon* was associated and its puparia had not been found. At the end of May 2008 a concerted effort was made to locate developmental stages of this species, resulting, eventually, in the discovery of empty puparia in two nests of *M. scabrinodis* in moss tussocks in the wetland. Because the puparia had hatched, the diagnostic anterior spiracular processes were missing. But the fact that the puparia were obtained from nests of *M. scabrinodis* in wetland is sufficiently strong evidence of the identity of the *Microdon* species involved to confirm it as *M. myrmicae*. This small fen unfortunately appears to be drying out – 10 years ago it exhibited numbers of tall *Carex* tussocks that are now absent – and changing in character, the abundance of *Eriophorum* seen there now suggesting it is now fed primarily by rain water. If this interpretation is correct it is debateable how long *M. myrmicae* will continue to survive there.

Xanthogramma dives (Rondani, 1857)
Vaud: Les Grangettes, 8-23.V.2008, female, ex Malaise trap in poor fen, leg. E. Castella, det. MS.

X. dives is very similar to both *X. pedissequum* (Harris, 1776) and *X. stackelbergi* and until recently it has been uncertain whether it requires recognition as a separate species. In Peck (1988) *X. dives* is given as a synonym of *X. pedissequum*. The identity of *X. stackelbergi* has become clearer now that keys have appeared separating this species from *X. pedissequum* (Haarto & Kerppola 2007, Bartsch et al. 2009), prompting us to re-examine the type material of *X. dives* to establish whether it is the same species as *X. stackelbergi* or *X. pedissequum*. In the Natural History Museum "La Specola" in Florence there are five specimens belonging to the Rondani type series of *X. dives*. One of these carries a lectotype label, having been selected as lectotype by Kassebeer, but this designation has never been published. We confirm

Kassebeer's designation of this specimen as lectotype. It is a male in reasonable condition, apart from missing one wing and showing damage to the base of the abdomen, ventrally. The lectotype carries the following labels: a round, white label on which the number "226" is written in red; a yellow, rectangular label reading "LECTOTYPE Syrphus dives Rondani design. C. Kassebeer 1992". We do not confirm the designation of the four paralectotypes, which seem to include more than one species.

Re-examination of the lectotype has enabled us to confirm the separate identity of *X. dives*, as a *Xanthogramma* species in which the actual wing tip is infuscated, a feature in which it differs from both *X. pedissequum* and *X. stackelbergi*. Although the original description of *X. dives* makes no reference to presence or absence of infuscation on the wings (Rondani 1857), the remaining wing on the lectotype is clearly infuscated. The only other European *Xanthogramma* species known with an infuscated wing tip are *X. citrofasciatum* (De Geer, 1776) and *X. marginale* (Loew, 1854), which differ greatly from *X. dives* as recognised here (see key in Appendix 1). There is no published key to European *Xanthogramma* species that includes *X. dives*, and the present key represents a first attempt at providing a basis for separation of *X. dives* from the other *Xanthogramma* species known in Europe. As such, it requires to be used with some caution. In particular, males of *X. dives* with clear wing-tips remain difficult to separate from males of *X. stackelbergi* and the key is unlikely to resolve the identity of all specimens. The shape of the pale marks on tergite 2 (Figure 1, a–d) is one of the easiest features to use, but the rounded inner extremity of these marks, found in X. stackelbergi, can also occur in one or other of these marks in *X. dives*, so that one mark appears pointed, the other rounded. This condition is seen in the lectotype of *X. dives* (Figure 1a). The shape of the anteromedial extension of the black band present on sternite 2 can also be useful to help in separation of the males, but post-mortem discolouration can render this feature difficult or impossible to interpret. In the lectotype of *X. dives* this part of the specimen is damaged, and the shape of the black mark cannot be interpreted. The darkened wing membrane occurring at the wing tip of males of *X. dives* can be very useful, when present. It is well developed in the lectotype, but may be hardly discernable in some males of *X. dives*. In all males of *X. dives*, the wing microtrichia are denser in the apical part of the marginal and submarginal wing cells, contrasting with the less dense microtrichial covering of the adjacent posterior wing cell. But in some males of *X. stackelbergi* the microtrichia are also denser on the same parts of the wing tip, even if not quite so dense as in *X. dives*. Nonetheless, the wing tip in males of *X. stackelbergi* is never darkened by a slight and diffuse infuscation, such as can frequently be seen in males of *X. dives*. The females of *X. dives* and *X. stackelbergi* are easier to separate, the wing tip being more consistently and strongly infuscated in females of *X. dives*, but entirely clear in females of *X. stackelbergi*.

X. dives is essentially a southern European insect, usually associated with well-drained sites with a seasonally high water-table level. The record from Les Grangettes confirms the presence of this species in Switzerland, but we have not had an opportunity to check the identity of *Xanthogramma* specimens standing in the collections of Swiss museums or other institutions and so have no basis for evaluating the status of the species in Switzerland. Suffice it to say that re-appraisal of Swiss material

standing in collections under the name *X. pedissequum* could well reveal more *X. dives* records.

Xanthogramma *stackelbergi* Violovitsh, 1975
Vaud: Le Motta, Montricher, Jura Vaudois, 5.VII.1998, males, leg. et det. MS.

X. stackelbergi was first described from eastern parts of the Palaearctic. Its distribution in Europe is as yet poorly known, but records of it are scattered from southern Finland to the Mediterranean. It is essentially a forest species, occurring along woodland margins and tracksides and further Swiss records of *X. stackelbergi* might be expected from re-examination of material standing under the name *X. pedissequum*. The difficulty of separating *X. stackelbergi* from *X. dives*, particularly in the male, is alluded to in preceding paragraphs dealing with *X. dives* – additional key characters are needed before all specimens could be identified with certainty. The female of *X. stackelbergi* is illustrated in colour by Haarto & Kerppola (2007) and Bartsch et al. (2009).

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APPENDIX

Provisional key to European *Xanthogramma species*, July 2009

1. Abdominal tergite 2 wider than long; alula entirely covered in microtrichia 2
– abdominal tergite 2 longer than wide; alula extensively bare (tergite 3 with yellow, transverse band; costal margin of wing darkened to wing-tip) .... *marginale* (Loew)

2. Males (eyes meeting above antennae) 3
– females (eyes separated) 7

3. Eye hairs very sparse, no eye hairs longer than the diameter of the anterior ocellus; tergites 2–4 each with a pair of pale (yellowish), transverse marks 4
– eyes hairs dense, longer than 2 × the diameter of the anterior ocellus; tergite 3, at least, normally with the pair of pale markings meeting in the midline to give a transverse yellow band (wings entirely covered in microtrichia; eyes meeting above antennae for a distance greater than one third the length of the frons) .... *laetum* (Fabricius) (male)

4. Eyes meeting above antennae for a distance greater than one third the median length of the frons (pale marks on tergite 2 at most 1.25 × as wide as long, almost reaching the base of the tergite laterally; hind legs usually with the tarsi and the apical quarter of the femur infuscated, darker than the fore and mid legs, which are yellow, but all legs sometimes almost entirely yellow) 5
– eyes meeting above antennae for a distance less than one quarter the median length of the frons; pale marks on tergite 2 1.5 × as wide as long, well separated from the base of the tergite; all legs entirely yellow (wing membrane may be vaguely darkened, along costal margin and at wing tip, including distal end of submarginal cell) ..... *citrofasciatum* (De Geer) (male)

5. Abdominal membrane between each tergite and sternite with a distinct dark grey band (sometimes missing between tergite 4 and sternite 4), as long as more than half the length of each sternite (second basal cell of wing 0–25 % bare of microtrichia; pale marks on tergite 2 usually reaching their greatest length on the lateral margins of the tergite, so that there they extend closest to the posterior margin of the tergite – or at least as close to the posterior margin as elsewhere on the tergite; at the lateral margins of the tergite, the pale marks on tergite 3 occupying at least as great a length of the tergite as elsewhere; 1–4 pale marks on the thoracic pleura) ..... *pedissequum* (Harris) (male)
– abdominal membrane between each tergite and sternite entirely yellow, except for between tergite and sternite 1 and tergite and sternite 2, where there is a broad, distinct, dark-grey band 6

6. Hairs on posterior third of surface of mesoscutum nearly all long; marginal hairs on plumule (and usually also on lower lobe of calypterae) dark brown/black; inner (medial) extremity of yellow marks on tergite 2 (Fig. 1a, b) usually pointed (but may be rather rounded), the pale marks nearly always reaching their greatest length on the lateral margin of the tergite (i. e. pale marks hardly, if at all, cut away postero-laterally); pale marks on tergite 3 nearly always reaching lateral margins

of tergite at their maximum length; anterior margin of black band across sternite 2 (Fig. 1 e, f) straight or with a low, more-or-less rounded median projection; wings with 2nd costal cell yellow, contrasting in colour with the 1st subcostal cell, which is dark grey (or both of these wing cells grey); wing cells R1 and R3 usually darkened at wing-tip, contrasting with the almost clear cell R5 (2nd basal cell of wing 25–90 % bare of microtrichia; 3–4 pale marks on the thoracic pleura) ..... *dives* (Rondani) (male)

– hairs on posterior third of surface of mesoscutum of two different lengths, a distinct, often dense, layer of short hairs within the general covering of long hairs; inner extremity of yellow marks on tergite 2 (Fig. 1 c, d) very rounded; anterior margin of the black band across sternite 2 (Fig. 1 f, g) with a pointed, median extension; wings with 2nd costal and 1st subcostal cells usually of almost the same yellowish colour, though the 2nd costal cell may be almost clear and colourless and the 1st subcostal cell can be contrastingly grey; infuscation of wing restricted to the area of R1 posterior to (below) the stigma; pale marks on tergite 2 often cut away postero-laterally, so that usually they are closest to the posterior margin of the tergite at some distance from its lateral margins; pale marks on tergite 3 cut away antero-laterally, so that they occupy a greater part of the length of the tergite at some distance from its lateral margins; (2nd basal cell of wing 20–30 % bare of microtrichia; 3–4 pale marks on the thoracic pleura) .... *stackelbergi* Violovitsh (male)

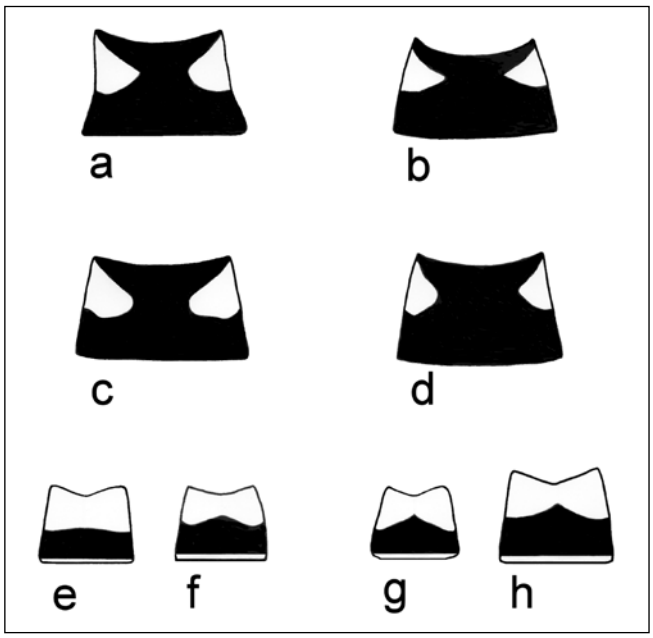

Figure 1.
Xanthogramma species:
a–d, tergite 2; e–g, sternite 2;
X. dives male: a, b, e, f;
X. stackelbergi male: c, d, g, h.
Figure 1a drawn from a photo of the lectotype; other figures drawn from specimens.

7. Tergites 3 and 4 each with a pair of pale (yellowish), transverse marks (in some specimens of *X. dives* the pale marks on tergite 3 may meet in the mid-line, to make an entire yellow band across the tergite; legs with or without dark marks; eyes with very sparse hairs shorter than diameter of anterior ocellus) 8
– tergites 3 and 4 each with a transverse yellow band across entire width (legs entirely yellow; eyes with sparse hairs that are longer than the diameter of the anterior ocellus) ..... *laetum* (female)

8. Hind legs nearly always partly darkened (dark parts distinctly darker than fore and mid legs, which are entirely yellow); wings with areas bare of microtrichia; stigma brown/dark brown; tergite 2 posteriorly <2 × as wide as its length in the mid-line and the pale marks at most 1.25 × as wide as long 9
– legs entirely yellow; wings entirely covered in microtrichia; stigma brownish-yellow; tergite 2 posteriorly >2 × as wide as its length in the mid-line and with pale marks 1.5 × as wide as long (wing membrane often vaguely darkened close to costal margin and at wing tip) ..... *citrofasciatum* (female)

9. Abdominal membrane between each tergite and sternite with a distinct dark grey band (sometimes missing between tergite 4 and sternite 4), as long as more than half the length of each sternite (hairs on ventral parts of the mesopleur shorter than the maximum width of basitarsus 1 in dorsal view; 2nd basal cell of wing 0–30 % bare of microtrichia; pleura with 1–4 pale mar ..... *pedissequum* (female)
– abdominal membrane between at least tergite 3 and sternite 3 entirely yellow; between tergite and sternite 1 and tergite and sternite 2 there is a broad, distinct, dark-grey band; membrane between tergite 4 and sternite 4 either entirely yellow or with a grey band (pleura with 3–4 pale marks) 10

10. Median, black, longitudinal stripe on frons broad anteriorly, so that it reaches the posterior margin of the lunule (which is normally yellow) across almost the entire width of the lunule; posteriorly, the median black stripe on the frons usually reaches the black vertex, at least as a thin black line; hairs on ventral parts of the mesopleura usually noticeably longer than the maximum width of basitarsus 1 in dorsal view; 2nd costal cell yellow; wing tip nearly always distinctly infuscated; marginal hairs on lower lobe of calypterae and on plumule dark brown/ black (pleura with 3–5 pale marks; 2nd basal cell of wing 25–90 % bare of microtrichia; alula entirely covered in microtrichia) ..... *dives* (female)
– median, black, longitudinal stripe on frons narrowing anteriorly, so that it meets the posterior margin of the lunule across only half, or less, of the width of the lunule; posteriorly, the median black stripe on the frons terminates before reaching the black vertex; hairs on ventral parts of the mesopleura noticeably shorter than the maximum width of basitarsus 1 in dorsal view; 2nd costal cell clear, almost colourless; wing-cell R1 without infuscation; wing-tip clear; marginal hairs on the lower lobe of the calypterae and on plumule yellow/yellow-brown (2nd basal cell of wing 30–40 % bare of microtrichia) ..... *stackelbergi* (female)

Spinnen – die erfolgreichen Jäger

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