

# Errata and Addenda: Updated Illustrated Checklist of Dragonflies of the UAE – including a third species of *Ischnura* damselfly

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Our paper titled “An Updated Illustrated Checklist of Dragonflies of the UAE” (Feulner et al. 2007), published in *Tribulus* Vol. 17, stimulated valuable comment and inquiry as well as further investigations by the authors themselves. These confirmed errors in the identifications attributed to several photographs, which are corrected below.

In addition, continuing research and field studies by Reimer have revealed the presence of a third species of *Ischnura* damselfly, as well as the possible presence of a further dragonfly species observed in the coastal environment in neighbouring Oman. These developments are reported below, along with certain additional information likely to be of interest to those studying the Odonata of the UAE and northern Oman, including tips for field discrimination between *Ischnura* damselfly species.

**Fig. 15b** is an immature male *Diplacodes lefebvrei*, not an adult female of that species. Among the distinguishing features are the relatively long pair of white claspers at the tip of the abdomen and the pruinescence (dark colouration) on the face (frons). A bona fide female *D. lefebvrei* is shown here as **Fig. 15c**.

## Errata

Among the photographs which illustrated the checklist, we made the decision to include images of a number of atypical forms seen over the years, which were not always readily identifiable. Subsequent comment by international experts has confirmed the value of that decision from a heuristic standpoint, but also emphasises that we should have been more circumspect in assigning even tentative identifications.

Three of our photographs, all of immature individuals, have now been more authoritatively identified and a note is made here of the corrections. K-D.B. Dijkstra, Wolfgang Schneider and Laurent Juillerat have all written to indicate their views as follows (all Figures referenced are reproduced here):



Fig 15b. Immature male *Diplacodes lefebvrei* [RWR] (corrected).



Fig 15c. *Diplacodes lefebvrei* female [GRF].

**Fig. 24d** is an immature male *Sympetrum fonscolombii*, not an immature male *Trithemis arteriosa*.

**Fig. 25c** is an immature male *Crocothemis sanguinolenta*, not an immature male *Trithemis kirbyi*.



Fig 24d. Immature male *Sympetrum fonscolombii* [GRF] (corrected).



Fig 25c. Immature male *Crocothemis sanguinolenta* [GRF] (corrected).

In addition, further study of the *Ischnura* species in the UAE leads us to believe that **Fig. 4d** captioned “*Ischnura evansi* female in a brighter gynomorph colouration” is actually a female *Ischnura senegalensis*, based on the shape of the pterostigma and the ovipositor, which can be seen better in the original photograph. **Fig. 4d** is a more vivid example of the colouration shown in **Fig. 5b**.



Fig 4d. *Ischnura senegalensis* female [GRF] (corrected).



Fig 5b. *Ischnura senegalensis* female [RWR] (original).

### Addenda

**Photo of *Ceriagrion glabrum* (female).** At the time of publication we lacked an image of the cryptically coloured female of *Ceriagrion glabrum*, which has only rarely been observed in the UAE and northern Oman. We have since seen females at 'Ubul (Abool), in the Mahdhah area of northern Oman. One image is shown here as **Fig. 3b**.



Fig 3b. *Ceriagrion glabrum* female [RWR].

**Photo of *Crocothemis sanguinolenta* (female).** We also lacked photographs of the female *Crocothemis sanguinolenta*. We were able to obtain some at Wadi Wurayah which has recently been given protected status by the Emirate of Fujairah. One is shown as **Fig. 14b**.



Fig 14b. *Crocothemis sanguinolenta* female [RWR].

**A third *Ischnura* species, *I. fontaineae*, confirmed for UAE and Oman.** During April 2009, Reimer was privileged to be able to spend two days with Dr. Wolfgang Schneider at the Senckenberg Institute in Frankfurt, Germany, going over specimens of the various species present or expected in Arabia. As part of that process, Schneider kindly reviewed photographs taken in the Mahdhah area of northern Oman of *Ischnura* that could not confidently be assigned to either *Ischnura evansi* or *I. senegalensis*, the only two *Ischnura* species previously recognised in the UAE and Oman. Keying out the photographs led to the conclusion that these anomalous individuals were in fact *Ischnura fontaineae* Morton, 1905, representing a new species for Oman. Literature

for the UAE and Oman in Schneider’s library, much of which is not available in the UAE, was also reviewed. Kappes & Kappes (2001) published photographs of female *Ischnura* from Ramtha Lagoons in Sharjah which was identified as *Ischnura senegalensis* (**Fig. 27**). With the review of *Ischnura* keys fresh in mind, it was suspected that the photograph was not of *I. senegalensis*. The keying process again led to the judgment that the female was *Ischnura fontaineae*, adding this third *Ischnura* species to the UAE list as well. *I. fontaineae* had previously been recorded in the Arabian Peninsula from Saudi Arabia (Waterston 1980) and Qatar (Waterston & Pittaway 1991).



Fig 27. *Ischnura fontaineae* female [Wulf Kappes].

The three species are known to occur sympatrically in other localities (Dumont 1991). Sage (1960) reports that *Ischnura evansi* and *I. fountaineae* (*I. bukharensis* in his paper, since synonymised with *I. fountaineae*) occur together in the marshes in the south of Iraq. Borisov (2006) describes the ecology of five species of *Ischnura* that occur together in the oases of the Pamir-Alia Mountains of Tajikistan. *Ischnura fountaineae*, *I. evansi*, *I. elegans*, *I. forcipata* and *I. pumilio* were found to use the same habitat during different time intervals, apparently driven by temperature and humidity.

We posited in our earlier article that *I. evansi* was the dominant species at mountain sites, which seems to hold true for most of the year. *I. senegalensis* appears to be dominant at anthropogenic sites such as the ponds at the Palm Sports Resort (formerly Al Maqam) and the sewage treatment plant in Al Ain. A recent survey of an artificial watering hole at the Dubai Desert Conservation Reserve showed an even split between the two species. Reimer's observations of *I. fountaineae* in the Mahdhah area of Oman have occurred at locations where the other two species were also seen, but they have tended to occur in well shaded areas. Photographs by Feulner of *Ischnura* males and females along irrigation channels among cultivation on the Saiq Plateau, at ca. 2000 metres elevation in the Jebel Akhdar region of Oman, also appear to show *I. fountaineae*.

Heidari and Dumont (2002) list seven species of *Ischnura* from Iran. With that information and the fact that Borisov observed assemblages of up to five *Ischnura* species, it is possible that additional species will be recognised in the UAE as more attention is paid to this fascinating genus.

**Distinguishing males of the three *Ischnura* species in the field.** As evidenced by the confusion in recognising the three species of *Ischnura* now known from the UAE, it is difficult to distinguish the various species with the naked eye in the field. Even binoculars or the view through a long telephoto lens may be insufficient. However, digital photography is a real aid and the latest digital SLR cameras have LCDs that allow zooming in sufficiently to recognize several diagnostic characteristics.

The three species are closely related, with *I. evansi* and *I. fountaineae* belonging to the *elegans* group and *I. senegalensis*, not too distant phylogenetically, being closely related to the Australian species *I. heterosticta* (Morgan 2002). Hybrids are known to occur in *Ischnura* as well. Identification of *Ischnura* females is complicated by the fact that they exhibit multiple colour forms (occasionally including male, or androchrome, colouration) that change as the individual matures. Males of the three species are compared in **Fig. 28**.

We do not know of any field guide that includes all three *Ischnura* species now recognised for the UAE and Oman. The only place all three are treated in detail in the English language is in Dumont's (1991) monograph, *Odonata of the Levant*. While this publication is excellent, it concentrates on features that are distinguished

microscopically or with a 10x or better hand lens, such as the pronotum (part of the thorax behind the head) and the terminal appendages of the male which form the lock and key system for mating in damselflies. It is well illustrated with line drawings and SEM images, but lacks photographs or drawings of the entire insect. There is a good species account of *Ischnura fountaineae* in Dijkstra and Lewington's *Field Guide to the Dragonflies of Britain and Europe* (2006). Wolfgang Schneider's Ph.D. thesis also treats all three species but is in German.

*Ischnura senegalensis* males are most easily identified in the field by three characters mentioned by Samways (2008): (i) the colour of the second abdominal segment ("The most distinguishing feature in the field is the blue patch on the side at the base of the abdomen."); (ii) the pterostigma ("blackish on the inner half, bright blue in outer half, the blue of which fades on death"); and (iii) the terminal appendages ("the peaked end of S10 and the horn-like inferior appendages are also distinctive."). Clear photographs taken from the side or above will show the longer, pointed terminal appendages.

In contrast, both *I. evansi* and *I. fountaineae* have blunt terminal appendages. Also, in both *I. evansi* and *I. fountaineae* the black on the second abdominal segment does not extend all the way around the segment, but is limited to the top half of the segment only. The pterostigma of these two *elegans* group species is dark with a whitish edge surrounded by dark veins. In *I. fountaineae*, the apical (outer) half of the pterostigma can be clear (Kalkman 2006) but may turn black in older specimens (Dumont 1991).

*I. evansi* and *I. fountaineae* can be most easily distinguished in the field by the colouration of the thorax and first few segments of the abdomen and the antehumeral stripes on the thorax. In *I. evansi*, the colour is greenish-blue and there are always clearly visible stripes of the same colour on the shoulders (Dumont 1991). *I. fountaineae* is coloured sky-blue without a hint of green, the same colour as the blue that occurs on the eighth abdominal segment (Dijkstra and Lewington 2006). The antehumeral stripe may be missing, interrupted or very narrow (Dumont 1991).

**Records from the Ru'us al-Jibal (the mountains of the Musandam peninsula).** We noted that dragonflies are uncommon in the Musandam region due to the extreme scarcity of surface water. In fact, apart from *Anax ephippiger* and *Pantala flavescens*, both of which are often found far from water, the only known records of Odonata from within the mountain areas of the Musandam are associated with a small number of permanent or ephemeral springs and with the permanent bedrock pools of the precipitous Wadi Zibat, a tributary of Wadi Bih. The species that have been observed at such sites are *Arabineura khalidi*, *Crocothemis erythraea*, *Orthetrum chrysostigma*, *O. ransonnetii* and *Trithemis arteriosa*. Access to most of these sites is physically challenging and has been made politically so as well, following the closure of the UAE/Oman border in Wadi Bih a few years ago.



Fig 28a. *Ischnura evansi*.



Fig 28b. *Ischnura fountaineae*.



Fig 28c. *Ischnura senegalensis*.

**A possible additional species: *Macrodiplax cora* (Kaup in Brauer, 1867).** We wrote of *Pantala flavescens* that it is “[o]ccasional in mangroves, where it is the most commonly observed dragonfly.” While this is supported by numerous observations and by positive identifications (see Feulner *et al.* 2007, **Fig. 20b**), Reimer has subsequently suggested, based on recent observations in Oman, that a similar species, *Macrodiplax cora*, may also be present in UAE coastal environments, at least at Khor Kalba on the East Coast.

In Dhofar in January 2008, Barbara Reimer photographed male and female dragonflies (**Figs. 29a and b**) resting in a coastal khor. Based on Reimer’s experience and available references, the only reasonable identification that appeared to be close was *P. flavescens*. Reimer himself took in-flight pictures of a swarm of reddish dragonflies that was foraging at sunset at about 50 -100cm off the ground on the beach near Al Mughsayl, which he could not identify. Subsequently, van der Weide and Kalkman (2008) published several new records for Oman that included a picture of *Macrodiplax cora*. That picture matched up well with Barbara Reimer’s resting male “*P. flavescens*”.

On a second trip in 2008, Reimer was able to obtain additional records from along the Dhofar coast, including pictures of pairs copulating in flight and ovipositing in flight (**Figs. 29c and d**). Then, in November 2008, he was at the Al Sawadi Resort at Ras Sawadi on the Gulf of Oman and observed several dragonflies behaving like the ones in Al Mughsayl. Because the individuals were foraging around the swimming pool, no photographs were obtained but they flew close enough to identify them as *M. cora*.

A species account of *M. cora* is included in *Dragonflies and Damselflies of South Africa* (Samways, 2008). It is just a bit smaller than *P. flavescens* and the male is redder. The pterostigmae of the two are similar in size and colour. *P. flavescens* has a distal amber patch on the rear wing while *M. cora* has a basal amber patch on the rear wing. The markings on the abdomen are

similar although *M. cora* has a more pronounced hourglass shape to the black marks on each segment. *M. cora* perches horizontally rather than hanging vertically as *P. flavescens* does.

Keith Wilson, now resident in the UAE, commented from Hong Kong on *M. cora* as follows:

“*Macrodiplax cora*, a dragonfly newly recorded for Hong Kong in May 1997 (see Porcupine! 16:5), is a widespread species found in three zoogeographical areas – the Ethiopian, Oriental and Australasian regions. It is highly migratory with populations established on islands in the Indian and Pacific Oceans. The larvae are salt tolerant with populations occurring in lagoons and estuaries. The genus *Macrodiplax* is both tropical and neotropical and closely allied to *Pantala* which is also found throughout the tropics. *Macrodiplax cora* and *Pantala flavescens* are perhaps today’s most successful dragonflies in terms of numbers and distribution.”

*M. cora* was recorded in Socotra in 1903 and Salalah and Yemen in 1990 (Schneider & Dumont 1997). Hedari and Dumont (2002) expect that *M. cora* could occur as an Oriental faunal element in south-eastern Iran, since it occurs in southern Arabia. Sakagami *et al.* (1974) provide detailed behavioural descriptions of several species in the Bonin Islands, including *P. flavescens*, and they note generally that the behaviour of *M. cora* is similar to *P. flavescens*.

The Sawadi beach area is approximately 200 km from the UAE border at Khor Kalba. The intervening Batinah coast does not present any barriers to dispersal, especially to a dragonfly that is so successful in migrating to new sites. Feulner’s records from Khor Kalba include observations of reddish dragonflies that were not positively identified but were presumed to be male *Pantala flavescens*. At least one of these, however, was seen to perch (not hang) on a mangrove branch, behaviour which would be unusual for *P. flavescens*, suggesting it could have been *M. cora*. More concerted efforts to observe dragonflies on the east coast of UAE could be rewarded with the discovery of another species.



**Fig 20b. *Pantala flavescens* female [RJH].**



Fig 29a. *Macrodiplax cora* male, from Dhofar [Barbara Reimer].

Fig 29b. *Macrodiplax cora* female, from Dhofar [Barbara Reimer].



Fig 29c. *Macrodiplax cora* copulating in flight, from Dhofar [RWR].

Fig 29d. *Macrodiplax cora* ovipositing in tandem flight, from Dhofar [RWR].





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