



The Damselflies and Dragonflies of Iran – Odonata Persica –

Thomas Schneider | Dietmar Ikemeyer

PREFACE

One of the groundbreaking pioneer papers on the Odonata occurring 'east of Europe' was Edmond de Selys Longchamps's "Odonates de l'Asie Mineure", published in 1887. Iran (then still called Persia) was not prominent in that review: few people had gone there to collect, and exact locality records were even scarcer. Even after that, papers dealing with dragonflies were rare and far between, until Erich Schmidt, in 1954, brought together all available information in a paper entitled "Die Libellen Irans". That paper instantly became a classic, and was published in the same year as another significant contribution of his, on Anatolia. "Auf der Spur von Kellemish" is a type of paper that it would be difficult to publish today because it is as well the narrative of Schmidt's personal travel through south Anatolia, as of the dragonflies encountered. The Iran paper, in contrast, is a strict account of the odonata fauna of a country he did never visit himself, and never did return to in later work. And so the known fauna of this great country rose from less than ten to 73 (in fact 70, if some doubtful subspecies are suppressed).

In the 1970s-80s, I received some small collections, mostly from Teheran and Azerbaijan provinces, but they contained nothing new and I erroneously began to believe that the essentials of Iran's dragonfly fauna were known. Things changed in spring 1995, when I was a member of a UN-Worldbank mission that visited all five countries bordering the Caspian Sea, at that time an environment in peril. Iran was the last country we visited, and therefore I was free when that assignment ended. We visited of course the south coast of the Caspian, where an abundance of freshwater runs down the slopes of the Elburz mountains, and created some lakes and wetlands at their foot. One of these is Anazali lagoon, and I was struck by the abundance of dragonflies there, in spite of it being early spring. I collected a series of *Coenagrion*s that that looked like *puella*, but upon closer examination and some DNA work was found to be a different taxon, that I christened *C. australocaspicum*. Interestingly, during our technical meetings I had met a young agronomical entomologist, Hossein Heidari who was working on crop pests but had a personal interest in other groups, including dragonflies.

Hossein convinced me to extend my stay in Iran, and offered to organize a trip to areas that had been little or not explored. The choice was mine. With my fascination for deserts, I selected Baluchistan-Sistan. A place called Sarbaz was the westernmost site of the Indian Crocodile *Crocodylus palustris*. If the crocodile could live there, there would perhaps be oriental dragonflies that awaited discovery as well. We also visited the coastal region near Bandar Abbas, opposite Oman. At that time we already knew that the fauna of Oman had a good series of Oriental species, so Iran should be the same. This was confirmed, and henceforth, every new collection from Iran would add extra species to the country list.

The collaboration with Hossein was fruitful. In the late 1990s, it resulted in a series of papers that culminated with a new checklist, published in 2002. The species list had expanded substantially and reached 95 species and subspecies.

Thomas Schneider, the senior author of this book, now began to play a major role and began to take over as the leading dragonfly student. His fascination with odonates is endless, and his number of collecting trips to Iran is written in two digits! Some years, he made up to three trips to the country, every time bringing back a new harvest of species from different zones of the country, now even including some species new to science. Undoubtedly, Thomas knows the country and its dragonflies better than anyone else. Over and above this, our cooperation has at all times been pleasant, and we introduced molecular work in our studies routinely. As a result, the number of species known from Iran has risen to 103, and further increases are to be expected. With Dietmar Ikemeyer Thomas found a congenial partner, whose photographic skills are ideal to fix the dragonflies of Iran for a well illustrated book. Thus, now is time for a book, among other things to give young local odonatists a solid basis to work from. Without a good and practical identification guide, papers had started to appear with clearly wrong identifications. These unnecessarily burden the literature, doing a lot more harm than good.

The book is outstanding and a milestone. It lifts the opportunities for regional studies to an entirely new level. Each species is illustrated in line drawings and for most of them exquisite colour photographs are available as well. Identifying species should no longer be a problem to local workers! Distribution maps are also given, and the number of locality records now available is sufficient to claim that the maps show the actual species ranges (and not the distribution of observers, as is so often the case). I expect that generations of local workers will use it as a vademecum in their studies. In a broader perspective, we can now say that from Europe, over Turkey, to the eastern borders of Iran, we now know the dragonflies living there. The final frontier of the Palearctic, the Indus valley, is not far!

Sadly, there is one other reason why this book is so important, and that is linked to the water crisis in Iran. The country is thirsty, and its freshwater resources are dwindling. They are dwindling so rapidly that in the past two decades several of the localities whence important species were recorded have ceased to exist. That makes this book also a testimony to environmental conditions that have ceased to exist.

Henri Dumont, April 2019

INTRODUCTION

Personal motive for writing this book

Over a period of six years we travelled 16 times to nearly each of the Iranian Provinces and have investigated the indigenous dragonfly fauna. The initial idea for writing this book was formed in the beginning of 2013, when Thomas and his sons were making their first trip to Iran to see the Hyrcanian Rainforest:

“During one of the field trips to the nebulous forest, it was already getting dark when we suddenly saw flocks of unknown dragonflies hunting along the forest path and

in the treetops. We managed to catch some specimens with a net to take a closer look. They turned out to be a species of the genus *Aeshna* and we marvelled at the shiny blue-turquoise colour, which we were astonished to discover became duller and less bright in the sunlight, something completely reverse to what is known from other members of that genus. As we could not find this species in any reference book, the idea to write a book about Iranian dragonflies ourselves emerged.”

A new blue-turquoise species, *Aeshna vercanica*, caught near Marzanabad, Mazandarān Province, 14.VII.2013. Photo HM



During the first trip to Iran, July 2013, from left: Aryan Mohit, Thomas and his two sons, Elias and Jacob Schneider. Photo HM

General notes on the geography and biodiversity of Iran

Iran extends over an area of about 1.65 million square kilometers and is the second biggest country in southwestern Asia. It is more than twice the size of Turkey and nearly five times larger than Germany.

In the north, Iran borders on the Caucasus Mountains, the natural regions of Middle Asia, and the Caspian Sea. In the west, it borders on the Anatolian and Mesopotamian regions while Afghanistan and Pakistan (as extensions of the Iranian Plateau) lie to the east. The southern border is formed by the seacoasts of the Persian and Oman Gulf, which are part of the Indian Ocean.

About 50 % of the country is covered by desert and the climate is arid.



Geographical zones, rivers and lakes of Iran.

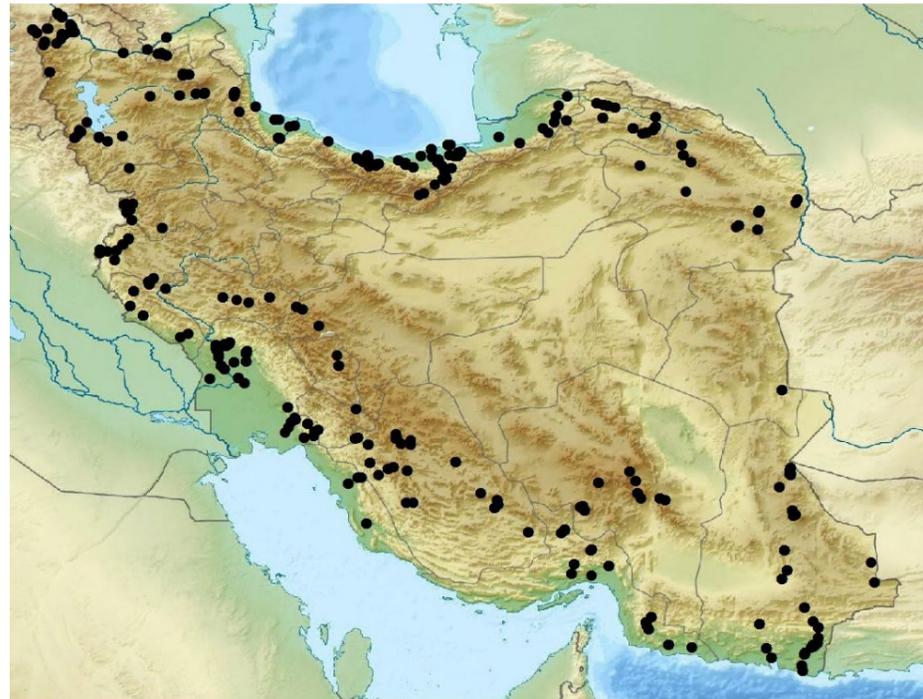


Notes to the species sections

Biometric data of dragonflies usually are indicated in total body length and length of both abdomen and hindwing. Most of these data were taken from the author's (TS) voucher specimens from Iran. For few species, biometric data were taken from voucher specimens from other countries (collected by TS) or from other published articles. This is indicated in the text. With regard to the anatomy of dragonflies in general we refer to the excellent

drawings e.g. published by Dijkstra & Lewington (2006), Dijkstra & Clausnitzer (2014) and Tarboton & Tarboton (2015). Terms used for anatomy and other topics are stated in the glossary of this book. Information about dragonfly flight seasons come mainly from our own observations. All published credible data concerning the flight season of Iranian dragonflies are included.

Distribution map of dragonfly records based on data from the authors. 363 locations were visited (with 1 874 records of dragonflies) from 2013 to 2018.



Evaluation of external data

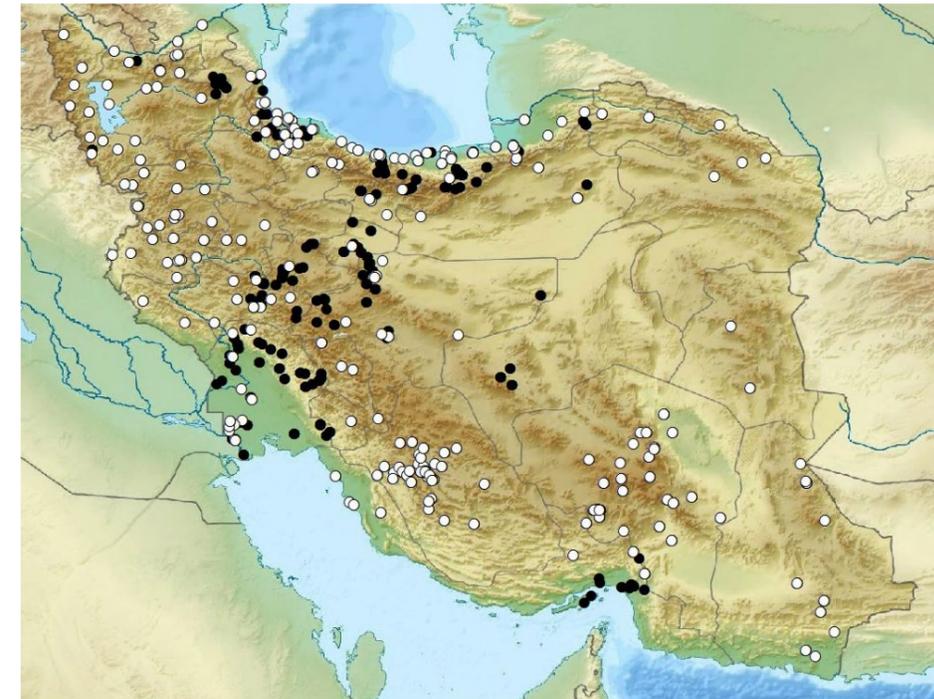
The most difficult task was the evaluation of already published data. Some of the older reports are not precise enough to be registered in a map. Information therefore was not entered in the distribution maps, when only country or province was given. Some of the published data were very old (>60 years ago) and much has changed since then. Some large habitats do not exist any more (see chapter Environmental issues).

In some cases it turned out that several recorded species in fact were representatives of species more recently described as new (for example *Gomphus kinzelbachi*, *Coenagrion australocaspicum*, *Aeshna vercanica*). In other cases it became evident that some classifications were based on wrong or mistaken identification (see Schneider et al. 2018b). The according evaluation details are mentioned directly in the species section.

Distribution maps

Published literature and available unpublished data about Iranian dragonflies were screened: A list of data provided by Vincent Kalkman and Jean-Pierre Boudot (pers. com. 2017) included also non-published museum material, for example collected by F. Brandt, a famous lepidopterologist spending years in Iran (1936-1938), whose material is stored in the Natural History Museum London and was compiled by V. Kalkman. Further unpublished data were thankfully provided by Johan van 't Bosch, Geert De Knijf, Wolfgang ten Hagen, Martin Waldhauser (pers. com. 2017, 2018) and data from 2018 could be obtained from Observation.org (de Vries, pers. com. 20.III.2019). All data up to the end of 2018 are included in our database.

A total number of 3 358 records were used for maps: 2414 records from 2010 onwards and 944 records older than 2010. For all data before 2010 open symbols, for 2010 onwards filled symbols were used. This separation was made since after 2010 many suitable habitats for dragonflies as wetlands, lakes and rivers have disappeared in Iran (Zafarnejad 2009). Locations visited by us, were recorded by a handheld Garmin GPS device and expressed as decimal degrees in the WGS 84 geodesic system. Altitudes are given in meters above sea level. A topographic map was downloaded from the internet (Arasbaran 2016). The data mapping was carried out by using Geographic Information System.



1 615 records of external authors are used for the database (see list of references). Black symbols: records from 2010 onwards (636 records), white symbols: records before 2010 (979 records).

Photos and drawings

Pictures of dragonflies were mainly taken under natural conditions in the field. Only few specimens were caught for photography, this is indicated as "posed" in the legends. 90 species and subspecies could be photographed in Iran.

All photos, including those of habitats and others, lacking an author's name are taken by Dietmar Ikemeyer. Additional photos are thankfully contributed by Tom Kompier (TK), Oleg Kosterin (OK), Elias Schneider (ES), Paul Schrijvershof (PS) and Dheerendra Singh (DS).

Calopteryx splendens intermedia (Selys, 1890)

| Intermediate Banded Demoiselle



Homochrome (androchrome) female, river near Latab, Ilām Province, 09.VI.2015.



Heterochrome female (left) and male (right), river east Kalibar, Azarbāyējān-e-Sharqi Province, 11.VIII.2016.

Description and identification

Pure populations of *C. s. intermedia* are smaller than *C. s. orientalis*. Individuals have a total length of between 44 to 48 mm, an abdominal length of between 32 to 42 mm and a hindwing length of between 27 to 37 mm. Males are very dark with very large wing spots. These coloured bands nearly cover the whole length of the wings from the tip to about halfway between the wing base and the node. Both female forms, androchrome and heterochrome, are found nearly throughout all regions of Iran. As mentioned above, in areas where populations of other *Calopteryx* forms overlap with those of with *C. s. intermedia*, hybrid forms occur, which have smaller spots compared to pure *C. s. intermedia*.



River near Rijab waterfall with a stronghold population of *C. s. intermedia*, Kermānshāh Province, 27.VI.2017.

Habitat and behaviour

Both sexes are found along running waters with shaded places. The behaviour does not differ from that of other *Calopteryx*.

Distribution

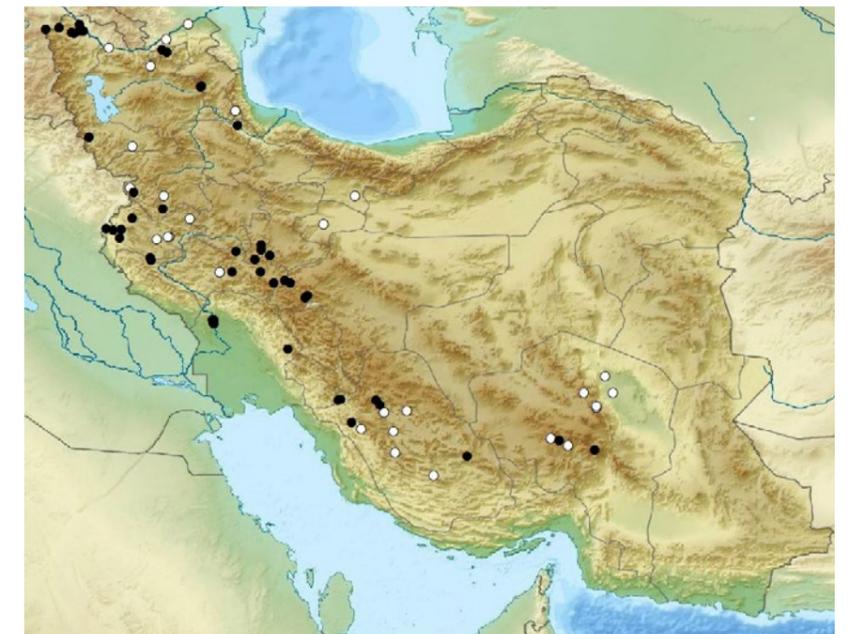
This species is found around densely vegetated, shaded streams, like ditches, brooks and rivers in western and southern parts of Iran reaching near Shiraz in the south and to the Kermān province in the SE.

Trend and conservation

The species does not seem to be threatened.

Flight season

Main flight activity in Iran: From March to October.



Distribution of *C. s. intermedia* in Iran. Black symbols: records from 2010 onwards, white symbols: records before 2010.

Ischnura forcipata (Morton, 1907) | Forked Bluetail

Ischnura forcipata seems to be restricted to E Iran and is separated by its sister species, *I. intermedia*, by the central deserts.



Immature male near Abdalabad, Khorāsān-e-Razavi Province, 10.VI.2016.



Female near Araqi, Khorāsān-e-Shomāli Province, 16.VI.2016.

Description and identification

I. forcipata is one of the larger Bluetails in Iran and is characterized by its unique appendices: The superior appendices in males are larger and longer than the inferior appendices. This feature is not found in any other *Ischnura* either from Europe or the Middle East.

I. forcipata has a total length of between 27 to 34 mm, an abdomen length of 22 to 31 mm and a hindwing length of 18 to 21 mm. In Iran *I. forcipata* is larger than its sister species *I. intermedia*. Immature females can be bright orange like those of *I. pumilio*.



Habitat of *I. forcipata*, river near Abdalabad, Khorāsān-e-Razavi Province, 10.VI.2016.



Immature female near Darijan, Kermān Province, 17.VII.2018.

Habitat and behaviour

I. forcipata is found along fast-flowing brooks and their flood zones. They are found in the riparian vegetation. It seems to be restricted to mountainous areas and is absent in the hot lowlands of SE Iran.

Distribution

The species is restricted to E Iran, to the Khorāsān Provinces and to the Sistān-va-Baluchestān Province. It is common along running waters or springs with dense vegetation at high altitudes of up to 2000 m. So it is found for example in the Tuftan Volcano Mountains.



Male near Abdalabad, Khorāsān-e-Razavi Province, 10.VI.2016.



Distribution of *I. forcipata* in Iran. Black symbols: records from 2010 onwards, white symbols: records before 2010.

Trend and conservation

The species may be threatened in Iran as its preferred type of habitat is restricted to spring waters which are in danger of drying up because of the water crisis in Iran.

Flight season

The species may be found from March to November in E Iran.

Coenagrion ponticum (Bartenev, 1929) | Pontic Azure Bluet



Male, south Oskolak, Gilān Province, 25.V.2017.

Description and identification

C. ponticum is quite similar to *C. puella* and to *C. australocaspicum*. It has recently been reported to occur in Iran (Schneider et al. 2018b). The species has a total length of between 32 to 34 mm, an abdomen length ranging from 27 to 30 mm and a hindwing length ranging from 20 to 22 mm. The appendices of male *C. ponticum* are shorter and not spread apart like those of *C. australocaspicum*. The three members of the *puella*-group (*C. puella*, *C. ponticum*, *C. australocaspicum*) can be distinguished by directly comparing their appendices.



Habitat of *C. ponticum*, little lake south Oskolak, 200 m, Gilān Province, 25.V.2017.
At this location *C. ponticum* co-occurs with *C. australocaspicum*.

Habitat and behaviour

The behaviour of *C. ponticum* is similar to that of other members of the genus.

Distribution

C. ponticum co-occurs with *C. australocaspicum* on the southern shores of the Caspian Sea in N Iran.

Trend and conservation

The species seems to be threatened in Iran.

Flight season

The species has been recorded in June.



Distribution of *C. ponticum* in Iran.
Black symbols: records from 2010 onwards.



Female (left) and male (right), south Oskolak, Gilān Province, 25.V.2017.



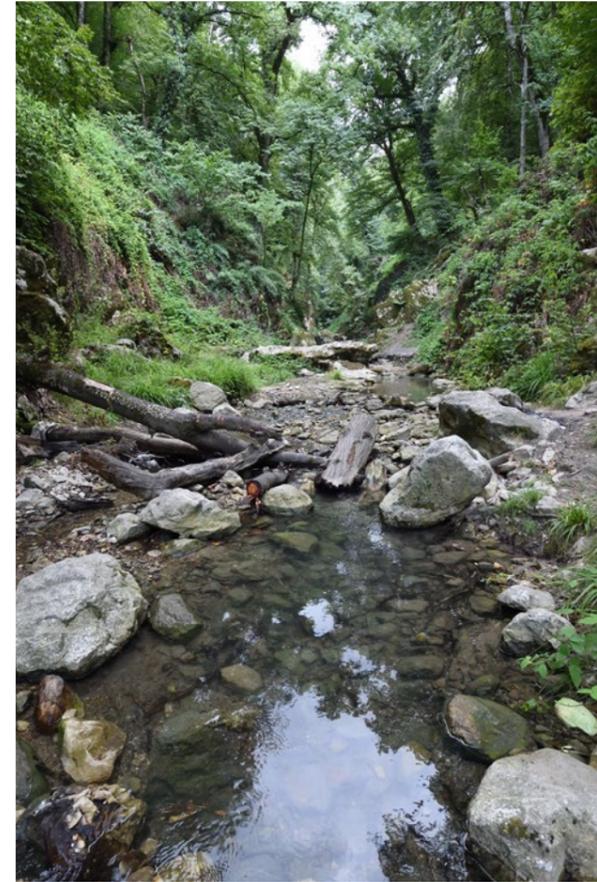
Female, north Veysar village, Māzandarān Province, 12.VII.2014. (posed)

Aeshna vercanica (Schneider, Schneider, Schneider, Vierstraete & Dumont, 2015) | Hyrcanian Hawker

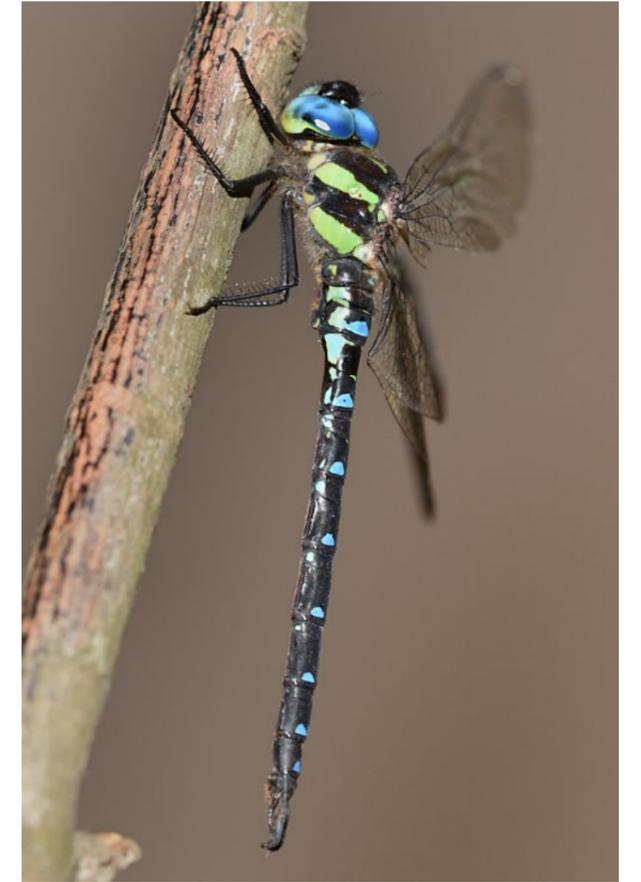
ETYMOLOGY – The specific name “*vercanica*” refers to the unique Caspian Hyrcanian mixed forests in the S and SE of the Caspian Sea. “*Vercanica*” is the latinised form of the Old Persian name of the region *Verkâna*, meaning „Wolf-land”. Hyrcania, the contemporary designation for this region is a Greek adoption (Υρκανία) of the Old Persian name.



Female, Lowe waterfall, Golestān Province, 20.VII.2014. (posed)



Habitat of *A. vercanica*, Lowe waterfall, Golestān Province, 20.VII.2014.



Male, north Veysar village, Māzandarān Province, 12.VII.2014. (posed)

Description and identification

Aeshna vercanica are conspicuously large hawks that are endemic to the Hyrcanian Forest. Their total length ranges from 69 to 77 mm with abdominal lengths between 52 and 62 mm and a hindwing length ranging from 47 to 54 mm. The appendices of the males of *A. vercanica* and *A. cyanea* are shaped very similarly into a down-turned spine. However, the shape of the head, the bright blue colour of the eyes and the small occipital triangle are noticeably different between the two species: *A. vercanica* males often lack the T-shaped marking. Furthermore, the antehumeral stripes of *A. vercanica* are rather small and not broad like those of *A. cyanea*.

In contrast to *A. cyanea*, *A. vercanica* have a tooth-like ridge on the upper side of the abdominal segment 10, like most other *Aeshna* species. Also, instead of a single blue band across segments 9 and 10, like *A. cyanea*, *A. vercanica* show separated spots. Finally, females of *A. vercanica* have rather long appendices like the females of *A. mixta*. Remarkably, unlike other West-Palaeartic *Aeshna* species, the bright blue abdominal spots of *A. vercanica* become glossy in the shade and dull in the sunlight. For a more detailed description, please refer to Schneider et al. (2015).

Gomphus kinzelbachi (Schneider, 1984) | Eastern Clubtail

Gomphus kinzelbachi is a relatively unknown Middle Eastern species known from Iraq and Iran. It was described on the basis of a single teneral male (Schneider 1984) captured by Sage (1960) in some scrubs along the Alwand River in eastern Iraq on 06.VI.1958. Since then, one other male specimen was reported by Lohmann (1992) which was captured by Kaiser 1937 on the Sezar River near Bisheh in Iran. The third record was made near Ahvaz and was reported by Sadeghi & Mohammadalizadeh (2009). Recently, we have discovered large populations along several different river systems including the Karkeh, Marun, Zohreh and Dalaki in SW Iran (Schneider et al. 2017a, 2017b).



Male, Karkheh River, Khuzestān Province, 24.IV.2016.



Male, Alwand River, Kermānshāh Province, 26.VI.2017.



Male, Alwand River, Kermānshāh Province, 26.VI.2017.

Description and identification

Overall, *G. kinzelbachi* is quite similar to the closely related *G. davidi*, but appears a little smaller. Its total length lies between 43 to 50 mm, its abdomen length ranges between 32 to 36 mm and its hindwing length is between 27 to 35 mm. The distinctive characteristics of the primary and secondary genitalia of the male teneral of *G. kinzelbachi*, given in the species description by Schneider (1984), have recently been confirmed for another fourteen mature male specimens from Iran (Schneider et al. 2017a). In contrast to *G. davidi*, the tips of the inferior anal appendages are not visible if viewed from above. The superior appendages of *G. kinzelbachi*, viewed from above, are short tapered and stout just before the tip, while they are slender, long and tapered in *G. davidi*. Viewed from the side, the superior appendages of *G. kinzelbachi* have a

small, subapical denticle overtopped by a bulge behind it, whereas it is just a pronounced and single denticle in *G. davidi*. The apical part of the posterior hamule of *G. kinzelbachi* shows a more acute and pronounced tip than that of *G. davidi*. The anterior hamule is longer in *G. kinzelbachi* compared to *G. davidi*. The anterior hamule is nearly half as long as the posterior hamule of *G. davidi*. The female has only been described recently (Schneider et al. 2016): The thorax has a similar ornamental pattern to *G. davidi*, but from a lateral view, the black pattern in *G. kinzelbachi* is fainter than that of *G. davidi*. The colouration of the head appears broader in *G. davidi* than in *G. kinzelbachi*. The frontal occipital region between the eyes is straight or concave in *G. kinzelbachi*, but more convex in *G. davidi*. From a ven-

tral view, the female vulvar lamina is distally more deeply incised and the outer ends more pointed than those of *G. davidi*. From a lateral view, the vulvar lamina of *G. kinzelbachi* is almost straight, while that of *G. davidi* is strongly curved. Compared to *G. schneiderii*, *G. kinzelbachi* is usually lighter in colouration. Also, the central yellow markings on the abdomen are much broader in *G. kinzelbachi*, especially, on segments 8 and 9, compared to *G. schneiderii*.



Freshly emerged *G. kinzelbachi* female, near Kopan, Fārs Province, April 2017. Photo ES



Habitat of *G. kinzelbachi*, Karkheh River near Ghods, Khuzestān Province, 27.IV.2016. At this location the species was rediscovered in 2016 (Schneider et al. 2017).

Trithemis kirbyi (Selys, 1891) | Orange-winged Dropwing



Male, Fahliyan River, Fārs Province, 04.VI.2015.



Immature male, river near Karevandar, Sīstān-va-Baluchestān Province, 14.IV.2015.



Female, river near Nikshahr, Sīstān-va-Baluchestān Province, 07.V.2016.

Female, pond near Jagdan, Hormozgān Province, 19.IV.2015.



Description and identification

T. kirbyi is slightly smaller than *T. annulata* and has a broader abdomen. Individuals have a total length of between 31 to 34 mm, an abdominal length of between 19 to 24 mm and a hindwing length of between 23 to 30 mm. Mature males of *T. kirbyi* typically have a bright red abdomen and orange-veined wings with large orange amber patches on the base of hind- and forewing, which extend from the base halfway to the node. The black markings are reduced on the dorsal side of the abdomen and they are most prominent on segment 9. The legs are reddish. The pterostigma is short and dark. Females are not as red on the abdomen as males, with two rows of black dashes on segments 6 to 9. On the hindwing there is often a single, roundish, orange patch.

Habitat and behaviour

Males often perch on rocks beside sparsely vegetated springs, brooks and rivers or even along unvegetated watersides.

Distribution

The distribution range of *Trithemis kirbyi* seems to be restricted to central and S Iran.

Trend and conservation

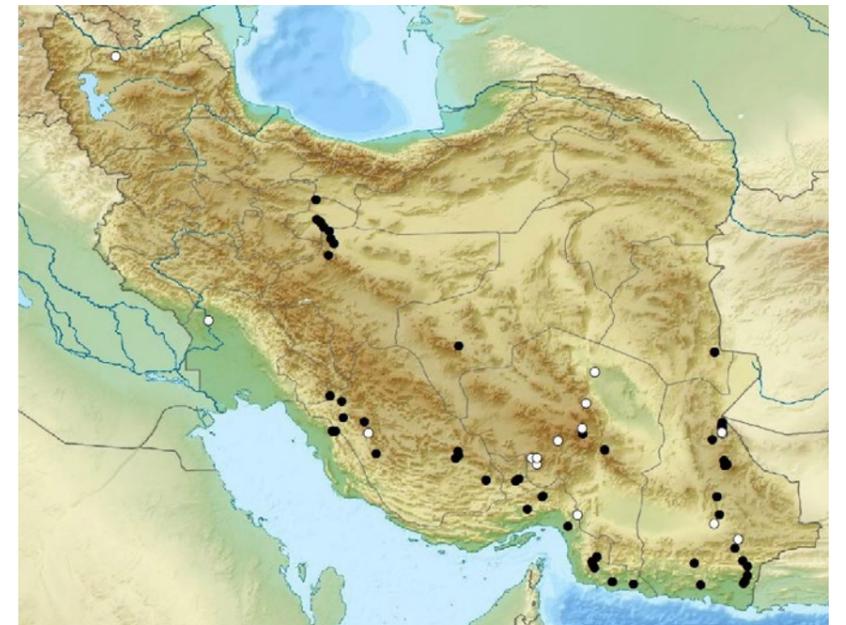
The species is not threatened in Iran.

Flight season

In Iran, specimens are mainly observed from April to September. In S Iran they are probably active all the year around.



Habitat of *T. kirbyi*, river near Nikshahr, Sīstān-va-Baluchestān Province, 07.V.2016.



Distribution of *T. kirbyi* in Iran. Black symbols: records from 2010 onwards, white symbols: records before 2010.