

Odonata from the Mouydir Plateau (North Central Sahara, Algeria)

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Abstract

Nine species of Odonata are reported from the Mouydir, a little researched desert plateau north of the Ahaggar Mountains (Algeria), and a tenth one from the Ahaggar itself. A population of *Pseudagrion hamoni* was discovered on a permanent aguelman (=lakelet) at the oasis of Tajmut, extending the known range of that species in the central Sahara by about 500 km to the West; one old male was seen at Guelta Affilal on the Assekrem plateau. *Orthetrum ransonneti* was widespread, with *Trithemis arteriosa* the most common species, and *Trithemis kirbyi* a close second, on any type of desert water. *Sympetrum sinaiticum* was not found in the Mouydir in May, but was freshly emerging from Ahaggar waters above 2000 m.

Introduction

In recent decades, not much has been said about the dragonflies of the Central Sahara. I here define the Central Sahara as the mountainous core of the desert, including the Ahaggar Mountains, the Tassili of the Ahaggar, the Adrar Ahnet, Mouydir Plateau, Tefedest, and Tassili-n-Ajjer. The Fezzan to the East, and the Tidikelt, Tanezruft, and Saoura valley to the West are not included.

Here, I concentrate on the Mouydir, a large sandstone plateau of roughly triangular shape situated north of the Ahaggar. The plateau slants from the west to the east, rising from c. 500 m near its western edge, to about 1500 m in the east, where the plateau is bounded by the broad valley of the Oued Irharhar, roughly between the village of Amguid in the North and In Eker in the South.

Several minor Oueds (=intermittent rivers) have carved deep valleys, occasionally steep canyons, into the sandstone, and the 20-30 mm of yearly local precipitation are sufficient to drain water permanently to the deepest parts of these ravines, creating lakelets (=aguelman, or guelta) that may range from ephemeral to truly permanent in nature. Other types of freshwater surfaces are called abankor (short stretches of river bed that intersect the groundwater table; in contrast to an aguelman, these are often situated in open landscape; an aguelman is

usually situated in a canyon, at the foot of an intermittent waterfall). Abankors that extends over several kilometers, either continuously or as a string of ponds, are called tejert (river).

The Mouydir is rich in such surface waters, but they had remained unstudied to date, to the exception of tejert Arak (the so-called gorges of Arak) (KIMMINS, 1934), the well of Meniet (REYMOND, 1952), and the "small oasis of Tajmut" (DUMONT, 1978c). These localities were situated on (or near) the trans-Sahara highway between In Salah and Tamanrasset in the Ahaggar, and therefore attracted the attention of occasional travelers. The "inner core" of the Mouydir, only accessible on foot, had remained untouched, however. Here, I discuss the dragonflies seen and/or collected during a two-week crossing of the Mouydir, on foot and camelback, in May 2007.

List of localities

- Loc 1. 11-12 May 2007. Tajmut (also known as Tadjmout and Tajmoute) (25° 30' 32" N, 03° 47' 92" E, altitude 510 m). This locality, somewhat erroneously designated as a "small oasis" by DUMONT (1978a), used to be a water point and fuel station on the trans-Sahara highway, until the latter was asphalted and thereby displaced several kilometers to the west. In reality, the fuel station had been situated at the point where the Oued el Abiod breaches the north-south oriented rock wall

that forms the western boundary of the Mouydir, to empty in the Oued Gourdane. About 8 km east of the breach, the bed suddenly narrows and plunges in a canyon, abundantly grown with a jungle of Acacia, palm trees, and reeds. After another 5 kilometers, a side-canyon detaches to the south-west. On its floor, at the foot of a waterfall, a permanent guelta is found, rich in cyprinid fish and other aquatic life. Above the waterfall, and over a distance of several kilometers, several additional gueltas are encountered. However, from the nature of their zooplankton (large species, including *Daphnia*, and fairy shrimp of the genus *Streptocephalus*), it was clear that these are non-permanent.

- Loc. 2. 13 May 2007. Aguelman n'Rakli (25° 34' 380" N, 03° 59' 620" E, altitude 794 m): two circular temporary gueltas, still in the basin of the Oued el Abiod. High-resolution pictures of Google Earth show this general area shortly after a rainfall event: the riverbed is covered in gueltas that extend as far west as Tajmut, providing a continuous aquatic environment.
- Loc. 3. 15 May 2007. Abankor Tejert Tifirin (25° 41' 595" N, 04° 07' 861" E, altitude 504 m): a stretch of riverbed of more than 150 m long, lined with *Typha*. Abundant small cyprinid fish suggest a permanent nature for this water point.
- Loc. 4. 15 May 2007. Aguelman In Sita (25° 43' 549" N, 04° 13' 150" E, altitude 620 m): large and deep but temporary guelta (fairy shrimp present) at foot of a c. 30 m high cliff.
- Loc. 5. 16 May 2007. Abankor Amen Salem in valley of Oued Ti-n-Djaren (25° 49' 974" N, 04° 19' 537" E, altitude 590 m): another stretch of flooded riverbed, with small cyprinid fish, and aquatic vegetation consisting of *Potamogeton*, *Myriophyllum*, and *Chara*.
- Loc. 6. 17 May 2007. Aguelman Eknouen (25° 53' 001" N, 04° 23' 788" E, altitude 694 m): large permanent guelta (fish present) with two side arms. Fringing vegetation mainly *Phragmites*; submerged vegetation mainly *Potamogeton*.
- Loc. 7. 18 May 2007. Abankor Tilemsin (25° 56' 967" N, 04° 30' 839" E, altitude 619 m): shallow and rather short abankor with fish present.
- Loc. 8. 18-19 May 2007. Oued Akrenta gueltas, in basin of Oued Tafarakrak (25° 48' 311"N, 04° 33' 733" E, altitude 1081 m): long canyon with a series of about 6 large and deep yet temporary gueltas, just west of plateau of Ifetesene.
- Loc. 9. 20 May 2007. Shallow rock crevices and small "marmite" with temporary water in bed of small oued on Ifetesene plateau at 'In Selbouk Mellene (25° 433' 407" N, 04° 33' 446" E, altitude 1402 m).
- Loc. 10. 21 May 2007. Canyon of Oued Tafarakrak at site of guelta In Tawinast (25° 44' 119" N, 04°

37' 872" E, altitude of guelta 1146 m, of canyon rim 1408 m). The guelta is situated at the foot of a waterfall at the very end of a short side canyon, 260 m deep. Downstream from the main guelta, several small pools, all temporary.

- Loc. 11. 22 May 2007. Valley of Immeten (25° 37' 102" N, 04° 34' 142" E, altitude 1530 m): a series of water-bodies extending over several kilometers, partly in riverbed, partly on rocky substrate. No fish. Large fairy shrimp present.
- Loc. 12. 25 May 2007. Permanent Guelta Affilal in the Ahaggar Mountains (23° 08' 598"N, 05° 43' 934" E, altitude 2021 m). A classical locality, known for its large population of *Barbus* fish, and studied for dragonflies by DUMONT (1978c).

Results: list of dragonfly species recorded

- Ischnura saharensis* (Aguesse): loc 1, 2, 3, 4, 5, 6, 7, 8, 11, 12
- Pseudagrion hamoni* Fraser: loc. 1, 12 (a single old male).
- Anax imperator* Leach: Loc. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
- Orthetrum chrysostigma* (Burmeister): Loc. 6, 8, 11, 12.
- Orthetrum ransonneti* (Brauer): Loc. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
- Diplacodes lefebvreii* (Rambur): Loc 1
- Crocothemis erythraea* (Brullé): Loc. 1.
- Trithemis arteriosa* (Burmeister): loc. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
- Trithemis kirbyi* Selys: loc. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
- Sympetrum sinaiticum* (DUMONT): loc. 12.

Discussion

Five species emerge from this field study as common and ubiquitous in the Mouydir, suggesting their larval stage is capable of coexisting with fish, and their adult stage disperses rapidly across a desert landscape. The larva of at least one of them (*T. arteriosa*) is capable of surviving droughts by digging into damp sand (DUMONT, 1979), and it is indeed the most successful of all odonates known from the Sahara desert. However, a second species that is suspected of the same performance (*O. chrysostigma*) was remarkably local in the present study, in fact far more local and rare than the otherwise little known *O. ransonneti*. It is also doubtful whether the larvae of *I. saharensis* and *A. imperator* may survive droughts, yet adults of



Plate 1. 1. An aged male specimen of *Pseudagrion hamoni* at guelta Affilal in the Ahaggar mountains. 2. A freshly emerged female of *Sympetrum sinaiticum* at Guelta Affilal in the Ahaggar mountains.

both species were spotted on temporary and permanent gueltas alike. Larval adaptation therefore appears non-vital for these dragonflies to be able to successfully live in a desert. Possibly, as Google Earth pictures show, there had been a period of good rainfall not too long ago, to which all dragonfly populations had responded by a quick invasion of a number of suboptimal (ephemeral) biotopes. While walking across the Mouydir plateau, a journey of about 250 kilometers, we spotted (libellulid) dragonflies, mainly females, in nearly every riverbed provided a minimum of vegetation (usually Acacia trees) was present.

Three species, however, were restricted to one or two gueltas: *P. hamoni*, *D. lefebvrii*, and *C. erythraea*, suggesting a tighter linkage to permanent water than the others. The latter two

are widespread in Africa and the Mediterranean, and seem rather uninteresting from a biogeographical point of view. *Pseudagrion hamoni*, in contrast, is an intriguing insect. It is widespread in Africa south of the Sahara, and the existence of relict colonies in the Tassili-n-Ajjer, Central Sahara was reported by DUMONT (1979, 1982). The first Sahara record of this species was from Traghan (=Trarhen), a Libyan oasis on the east flank of the Tassili-n-Ajjer, by NIELSEN (1935), under the name *P. acaciae* (see DUMONT, 1982). Four populations are currently known from the Tassili, although there are certainly others: the Oued Imirhou canyon at Iherir and north of it, the Oued Djerat near Illizi, the area of Djanet, and the guelta of Adessei on the Fadnun plateau. Our discovery of a thriving population (many specimens seen skimming over the surface of the guelta, including pairs in tandem, in copula, and

ovipositing) at Tajmut extends the range of the species in the Sahara by about 500 kilometers to the West. It is remarkable that so far no population has been found in the water-rich canyon of Arak, only few tens of kilometers south of Tajmut such that, for the time being, the latter colony has to be considered as a curious isolate. The presence of an aged specimen on the altitudinal guelta of Affilal in the Ahaggar is equally intriguing (Plate 1: 1). It represents the first sighting of a *Pseudagrion* in the high central Sahara Mountains.

That two libellulids not found elsewhere only occurred at the same site too suggests that these gueltas may have a biological significance that presently eludes us. Perhaps they are super-permanent sites, that never dried out on a time scale of millennia, whereas many other "permanent" sites (like the abankors that we found to harbour fish) may still dry out at spaced intervals, like once or twice per century. *Pseudagrion hamoni* might be a slow disperser, that needs continuous surface water and a real wet climate to extend its range, but can afterwards, if aridity sets in, rather easily maintain relict populations in remaining wet pockets. Such isolates also exist in the Western Sahara: the Adrar Plateau and the Tagant Hills in Mauritania (DUMONT, 1978a, b). Here too, *P. hamoni* occurs exclusively on permanent gueltas, where it co-exists with several species of cichlid, silurid, and cyprinid fish. However, it does not extend to Morocco in the North. For unknown reasons, the only *Pseudagrion* that managed to reach the Western Maghreb is *P. sublacteum*, a species that has not left any relict populations within the desert (JACQUEMIN, 1987; JACQUEMIN & BOUDOT, 1999). One has to travel as far south as the Senegal valley in West Africa to find it (DUMONT, 1982). In the Eastern Mediterranean countries of Jordan and Israel, a separate subspecies (*P. sublacteum mortoni*) occurs (RIS & SCHMIDT, 1936; DUMONT, 1973, 1991), while in South Arabia, the nominal subspecies is found (SCHNEIDER, 1987).

A final word needs to be said about *Sympetrum sinaiticum* (Plate 1: 2). This species, rather widespread in the semi-arid Eastern Mediterranean and Maghreb (Tunisia and Libya: DUMONT, 1977; LE ROI, 1915; RIS, 1913) appears to extend south into the desert as far as the Ahaggar, where it occurs in isolated colonies. DUMONT (1978c) found it commonly on the Assekrem plateau (above 2000 m.) in September.

Here, we found it, freshly emerging, in rather large numbers, suggesting that its flight period might start in late spring and extend to late summer. We found no evidence of its presence in the Mouydir, suggesting an insular nature for the "alpine" relict populations of the Ahaggar. However, RIS (1913) published records from Amguid (just East of the Mouydir), beside records from the Ahaggar (Ideles and Oued Agelil) in February and March. Possibly, therefore, the flight period of this relatively cool-temperature loving species was already over in the Mouydir in May, while its phenology at the cooler high altitudes of the Ahaggar is shifted to the summer months of the year.

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