A RELIC POPULATION OF *PSEUDAGRION S. SUBLACTEUM* (KARSCH, 1893) IN MOROCCO (ZYGOPTERA: COENAGRIONIDAE)

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Abstract The origin is discussed of a population on the Oued Sebou R., nr Fes, northern Morocco, situated about 2600 km from the nearest locality known (Senegal). Some notes on morphology, behaviour and habitat are also provided.

Introduction

In 1979, during his hydrobiological work on the Oued Sebou River, nr Fes, northern Morocco, M. Dakki caught the first Moroccan *Pseudagrion*, which was misidentified as *P. torridum* Sel. (AGUESSE, 1981). In 1984 and 1985, I collected several specimens of both sexes and of different degrees of maturity. These were identified by Professor H.J. Dumont (Ghent) as *P. sublacteum* (Karsch). This species, with *P. pseudomassaicum* Pinhey as a synonym (cf. DUMONT, 1974) is widely distributed in Ethiopian Africa, South of the Sahara. Nevertheless, relic populations were reported from the Levant and from the Arabian peninsula (WA-

TERSTON, 1980, 1985).

***Pseudagrion sublacteum* in the Levant**

DUMONT (1974) demonstrated that *P. mortoni* from Palestine, described by RIS [& SCHMIDT] (1936), represents a geographically isolated population, for which he proposed the subspecific rank, *P. sublacteum mortoni* Schmidt in Ris & Schmidt, 1936. In the same paper he emphasized that the three *Pseudagrion* taxa recorded from the Levant probably are early Ethiopian immigrants, which are likely to have arrived there through the Rift Valley, as confirmed also by the presence of *mortoni* in the SW of the Arabian peninsula. The fact that the three Israeli *Pseudagrion* taxa are infraspecifically distinct from the Ethiopian elements strongly suggests that the immigration is fairly ancient (Pleistocene), though more recent humid periods probably opened a pathway through the Sinai and along the Mediterranean coast (the last of which ended only some 7000 yr ago; cf. DUMONT, 1977).

The subspecies *mortoni* is mainly distinguished by its pale coloration, the black markings being reduced, particularly so in the female. The whitish pruinosity, which characterises the Ethiopian individuals, is here reduced or lacking, and the pterostigma is yellow instead of brown-orange. *P. sublacteum mortoni* is essentially encountered along the rivers, but sometimes inhabits stagnant waters too (Lake Hula).

***Pseudagrion sublacteum* in Morocco**

Contrary to the Levantine subspecies there is no appreciable colour difference between the Moroccan individuals and those from Ethiopian Africa I could examine, except for the lack of pruinosity. Figures 1 and 2 show the range of black markings encountered in the Fes population. Dimensions (in mm), measured on 9 males and 3 females conserved in alcohol, are as follows:

— male: abdomen, (app. incl.) 28.5-31 (mean 30.0), hindwing 19.5-20.5 (mean 19.8);

— female: abdomen, (app. incl.) 29-29.5 (mean 29.2) hindwing 20.5-21.0 (mean 20.8).

The northern hitherto known range limit of *P. sublacteum* in NW Africa was the Niokolo-Koba National Park, Senegal (DUMONT, 1978a). Thus the Moroccan locality, ca 2600 km distant, represents a very isolated relic population, evidence of a past immigration wave of Ethiopian species to the North (Maghreb, Iberian Peninsula). But the absence of speciation suggests that this immigration is more recent than in the Levant. It could have occurred in the last humid period in the Sahara (ca 12000-4000 BP) corresponding to the so-called "climatic optimum" in Europe (6000 BP). About 7000-4000 BP, lakes still were at a high level in the Sahara (even in the Erg Chech area for instance) and the Maghreb region knew a strong increase in rainfall, while the Atlantic coast climate was warmer than today (ROGNON, 1976). This hypothesis is in good agreement which the opinion of DUMONT (1982) that the Atlas range constituted an impassable barrier during the last glaciation phase (ca 20000-13000 BP).

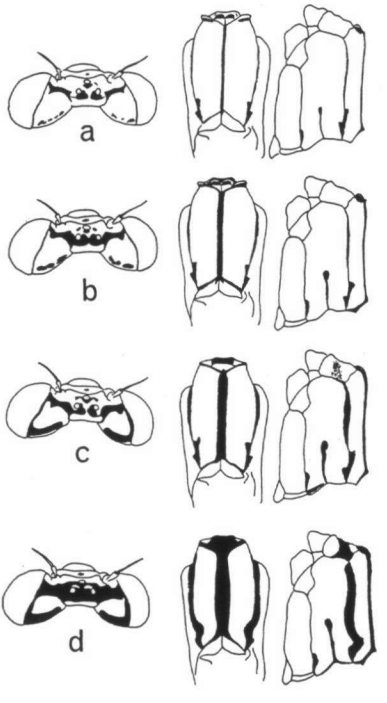

Fig. 1 — *Pseudagrion sublacteum* (Karsch, 1893) (Fes, Morocco): (a-b) female; — (c-d) male. — Head and thorax in dorsal and lateral view.

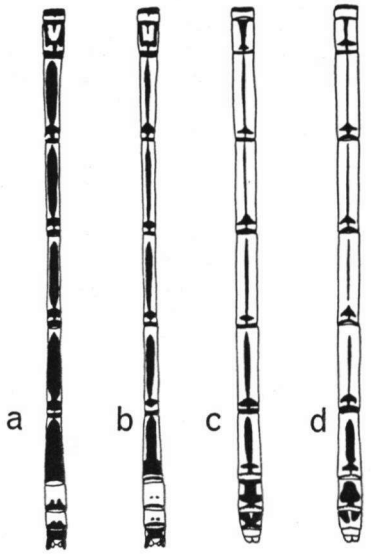

Fig. 2 — *Pseudagrion sublacteum* (Karsch, 1893) (Fes, Morocco): (a-b) male; — (c-d) female. — Abdomen in dorsal view.

The discovery of *P. sublacteum* in Morocco is somewhat surprising, for one would have expected *P. hamoni* Fraser, 1955 (= *P. whellani* Pinhey, 1956), which is already known as a relic from some localities in Lybia and Algeria (Fezzan, Tassili n'Ajjer; DUMONT 1978a, 1982, 1984) and in Mauritania (Adrar and Tagant Mountains; DUMONT, 1976, 1978a, 1978b), as also from the Arabian peninsula (WATERSTON, 1984, 1985). New localities of *P. sublacteum* probably are to be expected in the Maghreb.

The habitat is a large river, Oued Sebou, above Fes, so far not noticeably polluted. The altitude is 170 m above sea level, the width of the river amounts to about 25-30 m (40 m in swelling periods), the depth is variable from 0.2 to 2.0 m and the annual mean flow is 35 m^3/sec. The current is appreciable, fairly swift in places. The bottom consists of pebbles in the rapid zones and of silt in the calm sections. The water temperature is rather high , always above 10° C, reaching up to 29° C in summer. The averages seem to be 12° C in the coldest, and 24-25° C in the warmest month. I caught *P.sublacteum* along grassy banks (a few cm to one m high), which are provided here and there with some bushes and reeds. The species flies up and down along the water side, skimming the surface, and appears rather shy. The red colour on head and thorax of males is conspicuous even during flight. Females are dull. I never observed any pruinosity, even in August.

The flying period spreads at least from the middle of May (well coloured individuals on May 26, 1985) to August (numerous on August 2, 1985).

Acknowledgement — I thank Professor H.J. DUMONT for kindly allowing me to study his collection.

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Received June 5, 1987