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ANAX TRISTIS HAGEN, 1867 (AESHNIDAE) AND *THOLYMIS TILLARGA* (FABRICIUS, 1798) (LIBELLULIDAE) RECORDED FROM OFF ANGOLA
(Odonata)

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INTRODUCTION

There are very few records of dragonflies far out over the sea. Bowden & Johnson (1976) list 19 such cases for the Atlantic, the Indian and Pacific oceans. The scarcity of records might partly be attributed to the fact that, being predators with high visual capacity, dragonflies are seldom caught in aerial traps set on ships. A spectacular exception is that of *Pantala flavescens* (Fabricius, 1798), a global tropical migrant that has often been spotted and identified at sea hundreds of kilometres from land. Another reason is that many migratory species being eocrepuscular (flying at sunrise and sunset) or crepuscular (flying at sunset) — although some are attracted by light — are rarely observed.

All insects recorded far out over the sea are windborne, though many of them, as Odonata, may sustain themselves in the air by active flight for long periods, and thus can travel long distances. *Pantala flavescens*, for example, takes advantage of the wind systems of the Intertropical Convergence Zone (Waterston, 1985). The occurrence of Odonata far away from land (or in other hostile environments such as deserts) may be one clue to assess their potential of dispersal, e.g. to the colonization of oceanic islands or other regions remote from their sites of transformation. Though favoured by meteorological conditions, their presence over the ocean is always linked to events in "terrestrial" populations, as emergence, maiden flight or migration. Under ideal circumstances, it might therefore be possible, taking into account meteorological parameter and autecological data, to trace their source of origin.

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One such case is *Hemianax ephippiger* (Burmeister, 1839), a well-known migrant who has turned up in the British Isles and even Iceland, where no native dragonfly exist (Nordling, 1967). All records for Great Britain and Iceland fall into a period from September to February. Based on observations in West Africa on migrating *Hemianax ephippiger*, the duration of larval development of this species (100 days in Nigeria: Gambles, 1960) and the onset of the wet season (June), Dumont (1977) concluded that the specimens found in Iceland and the British Isles most likely originated from West Africa, taking advantage of the air currents between the Açores and Iceland.

This example demonstrates how, by relating observations and published data on mass emergence, migrations and associated meteorological events, the occurrence of Odonata remote from their centre of distribution may be back-tracked to a probable source. Unfortunately, in many publications dealing with insects over the open ocean, Odonata are often not even identified to the family level (e.g. Larsen & Pedgley, 1985). In light of this, every exact record under exceptional conditions should be published, even if such records merely indicate the presence of particular species and cannot be linked to a "terrestrial" source for the time being.

Records for Odonata over the Eastern Atlantic Ocean are scarce and all concentrated along major shipping lanes from Morocco to Liberia. South of the equator — to the best of my knowledge — no published data are available, except one unspecified record for the mid-Atlantic Ascension Island (Bowden & Johnson, 1976). The following observations were made onboard the Norwegian research vessel "RV DR. FRIDTJOF NANSEN" during a cruise off West Africa (23 April to 12 June 1989) in which the author had the opportunity to participate.

OBSERVATIONS

Anax tristis Hagen, 1867

MATERIAL. 1 male (teneral; wings opalescent); 30.04.1989 off Angola, hydrographic station 53 (12°04'S/13°05'E, 60 km from mainland); outside temperature 26°C; wind 0.4 knots (direction 99°E); time 21.05h (total darkness), at light.

Anax tristis, one of the largest extant dragonflies of the world, is widely distributed in tropical and subtropical Africa but rarely seen

in numbers (Pinhey, 1961a). Insular records are available for Madagascar (Fraser, 1956), the Aldabra and Maledive Islands (Blackman & Pinhey, 1967) and Sri Lanka (Waterston, 1985). Waterston (1985), based on an adult male obviously caught off-shore ("Red Sea; V. 1927, P. Buitendijk), expects *A. tristis* to reach Arabia and classifies this species as a migrant. The first record for Angola was published by Pinhey (1961b).

The specimen recorded here was easily caught by hand, obviously attracted by the lights on deck of the vessel. This corresponds well with another male specimen from Angola (Pinhey, 1961c) which was also collected "at light" (Angola: Dundo, leg. L. de Carvalho).

Tholymis tillarga (Fabricius, 1798)

MATERIAL. 1 male, 1 female (both teneral): 25.05.1989, off Angola, hydrographic station 59 (06°13'S/11°34'E, 60 km from mainland); outside temperature 27°C; wind 0 knots; time 21.30h (total darkness), at light. — 1 male (adult); 03.05.89, off Angola, project station 266 (11°44'S/13°45'E, 10 km from mainland); time 21.00h (total darkness), at light.

The wide distribution of this species from tropical West Africa to the Pacific Islands (Fraser, 1936) reflects well its migratory capacity. As *Tholymis tillarga* is eocrepuscular in habit (Corbet, 1962), migrations are less frequently observed than in *Pantala flavescens* or *Tramea basilaris*. Fraser's (1956) observation that this species is attracted by light can be confirmed. As no net was available, several attempts had to be made before the specimens were caught by hand. During these attempts, the escaped specimens always returned, flying directly to the source of light.

The characteristic chocolate-brown spot on the hindwing is deepest in colour and well defined (almost circular) in the adult male, while it is lighter, larger and more diffused in the other specimens. The bordering opalescent white spot is best developed in the subadult male and absent in the female.

SUMMARY

Anax tristis Hagen, 1867 (Odonata, Aeshnidae) and *Tholymis tillarga* (Fabricius 1798) (Odonata, Libellulidae) are reported from the open Atlantic Ocean off Angola, 60 km from the mainland. Both species flew in total darkness and were attracted by light.

RIASSUNTO

Viene segnalata la cattura nell'Oceano Atlantico, 60 km al largo delle coste dell'Angola degli Odonati *Anax tristis* Hagen, 1867 (Aeshnidae) e *Tholymis tillarga* (Fabricius, 1798) (Libellulidae).

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