ANAX CONCOLOR BRAUER PREDATION ON DRAGONFLY AGGREGATIONS AT A RESTINGA HABITAT IN SOUTHEASTERN BRAZIL (ANISOPTERA: AESHNIDAE)

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Abstract – Species composition of odon. in aggregations were determined in a Restinga habitat at Espírito Santo, SE Brazil. In a total of 8h 35 min. of sampling, 2 attacks of *A. concolor* were observed in large groups, mainly composed of *Pantala flavescens* and *Miathyria marcella*. *P. flavescens* responded to these attacks by pursuing *A. concolor*. The behaviour of *P. flavescens* in the aggregations under attack suggests that due to a decrease in the chance of predation, the smaller spp. could gain an extra advantage in these groups.

Introduction

During December 1995, we undertook a collecting trip to the TAMAR project (Marine Turtle Project, Instituto Brasileiro do Meio Ambiente - IBAMA) at the Comboios Biological Reserve, Espírito Santo state, SE Brazil. We observed many odonate aggregations in the Restinga vegetation. This open vegetation has a canopy up to 7m and is comprised mainly of a strip of grass and Guriri palm trees (*Alagoptera arenaria*) along the beach, followed by another strip with clumps of *Clusia hilaiana, Protium heptaphylum* and *Coocoloba alnifolia*, surrounded by various grass species (PEREIRA & WEILER, 1994). Here we describe the patterns of species composition in these aggregations, the occurrence of predation by *Anax concolor* and the behaviour of the individuals in the aggregation under attack.

Methods and results

All observations were made between 5:00 a.m. and 4:00 p.m. For each aggregation we counted the number of individuals per species, when possible, and recorded the hour and duration of the observation. Twelve aggregations were observed during a total of 8h 35 min., averaging one aggregation in 42.9 min. The total time spent was 177 min.

Large groups of *P. flavescens* and *M. marcella* were observed with *Tramea binotata, T. calverti* and *M. simplex*, all belonging to the Tramaeinii group. Nine out of the twelve aggregations had *P. flavescens* and *M. marcella*, two had only *P. flavescens* and one had only *M. marcella*.

In three *Pantala-Miathyria* aggregations we observed individuals of *A. concolor* attacking the groups. In one case two individuals were attacking a large aggregation of 200 *Pantala*. Usually they flew over and aside the aggregations and performed fast flights toward the aggregation under attack. Some *P. flavescens* responded to these attacks by flying over *A. concolor* that had left and returned for another attack a few seconds later.

We observed only one successful attack. A female *A. concolor* flew over a female *P. flavescens* and brought it to the ground. It crawled and chewed on the thorax for 5 min. (Fig. 1). Even when caught, *A. concolor* continued to feed on the thorax and seemed to neglect the abdomen.

Discussion

Odonate aggregations have been known for long time and various hypotheses were offered as to the explanation of their occurrence. In some migratory species, aggregations were observed at dawn

Fig. 1. Female *A. concolor* devouring the thorax of a *P. flavescens* female.

prior to the migration (PINHEY, 1979; CORBET, 1984). In other species, groups were observed where resources were patchily distributed (PINHEY, 1979; YOUNG, 1980). Some authors (CORBET, 1984) argue that aggregations are frequently composed of immature females, suggesting the group foraging has advantage, due to fast prey localization.

In the Restinga areas where *Pantala-Miathyria* aggregations occurred we were unable to detect any prey aggregation that could cause this association.

We noticed here that individuals of *P. flavescens* responded to the attacks of *A. concolor*, a behaviour that was not recorded in the other species, participating in such aggregations. If *P. flavescens* could force *A. concolor* predators aside, they could indirectly protect the smaller species, such as *M. marcella*, which would gain an extra advantage by following the swarm. It is possible that the aggregation could produce a dilution in the predator threat, as an odonate corollary of the "selfish herd" hypothesis of HAMILTON (1971). Odonate aggregations could be an important resource for predators that are sufficiently efficient to prey upon. *A. concolor* and other large aeshnids are expected to use this resource and possibly produce a selection pressure that triggers defense behaviours in *P. flavescens*.

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