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SHORT COMMUNICATION

DIFFERENCES IN THE ACTIVITY OF JUVENILES, FEMALES AND MALES OF TWO HUNTING SPIDERS OF THE GENUS *CTENUS* (ARANEAE, CTENIDAE): ACTIVE MALES OR INACTIVE FEMALES?

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ABSTRACT. The difference in activity levels between adult male and female spiders has been attributed to a more sexually motivated searching behavior by males, but the possibility that females reduce their activity when they reach maturity has not been considered, which may be evaluated by comparing adults and late instar juveniles behavior. We recorded the displacements during 15 min periods for 137 males, females and juveniles of *Ctenus amphora* and *C. crulsi*, two similar-sized syntopic hunting spiders species which search for prey on the leaf litter in central Amazonian tropical rainforests. For both species, males were significantly more active than females and juveniles. *Ctenus amphora* females were less active than juveniles, but the *C. crulsi* female activity did not differ from the juvenile activity. There were no significant differences in activity between these species for males and females, but the juveniles of *C. amphora* where more active than the juveniles of *C. crulsi*. Therefore, differences in activity between sexes are not always restricted to changes in male behavior, and the degree of decrease in female activity may depend on how active juveniles are.

Keywords: Amazonia, behavior, movements, foraging mode

Hunting spiders actively move about in search of prey (Uetz et al. 1999). However, activity levels may differ between adult males and females (e.g., Schmitt et al. 1990). This difference has been attributed to a more sexually motivated searching behavior of males (Rovner & Barth 1981); but, as far as we know, the possibility that females reduce their activity when they reach maturity has not been considered. To test this hypothesis it is necessary to compare the behavior of adults with that of late instar juveniles. The objective of the present paper is to evaluate whether the differences in activity between sexes in two species of hunting spiders (*Ctenus amphora* Mello-Leitão 1930 and *C. crulsi* Mello-Leitão 1930) may be attributed to a more active behavior of adult males, a less active behavior of adult females, or both. Both species forage on the leaf litter, do not have fixed retreats, have similar size (both with prosoma length of 5.5–11 mm) and are sympatric in the study areas.

The observations were made in Adolfo Ducke Forest Reserve, a 10,000 ha ''terra-firme'' primary forest reserve 25 km north of the city of Manaus, Brazil, where the ecology of this genus has been intensively studied (Höfer et al. 1994; Gasnier 1996; Gasnier & Höfer 2001) and on the campus of the Universidade do Amazonas, a forest fragment in Manaus. Using head lamps, we observed the spiders during their nocturnal activity, in the dry (2 nights in June and 3 nights in October of 1998) and wet seasons (6 nights in January and 3 nights in April of 1999). We memorized the trajectory of the movements for 15 min of activity and recorded the total displacement (including curves) with a tape measure. This was possible because of the low activity levels and the tendency of the spiders to move in straight lines. We tried to minimize the effect of our presence on the behavior of the spider by using a red filter on the lamp and by avoiding movements. Voucher specimens for these

studies are deposited in the arachnological collection of the Instituto Nacional de Pesquisas da Amazônia under the numbers INPA-001 to INPA-023. We used non-parametric statistics (Mann Whitney *U*-test and Kruskal-Wallis *H*-test), for all comparisons. Our significance level was $\alpha = 0.05$; however, we adjusted α when multiple comparisons were performed following Rice (1989). When we compared juveniles, males and females, we had three pairs of comparisons per species: in these cases, we used the significance levels of 0.017, 0.025 and 0.05 from the greatest to smallest *P* value.

We observed 137 *Ctenus crulsi* individuals (28♀, 19♂ and 37 juveniles) and *C. amphora* (15♀, 14♂ and 24 juveniles). There were no significant differences between the species in the displacements of males ($U_{14.19} = 136$, $P = 0.91$) (Fig. 1) or females ($U_{15.28} = 186$, $P = 0.44$). However, *C. amphora* juveniles were significantly more active than *C. crulsi* juveniles ($U_{24.37} = 579$, $P = 0.03$).

There were significant differences in displacement among males, females and juveniles within each species (*C. amphora:* $H = 14.45$, $P < 0.001$; *C. crulsi:* $H = 19.71$, $P < 0.001$). For both species, the males were significantly more active than females (*C. amphora:* $U_{14.15} = 176$, $P < 0.001$ and *C. crulsi:* $U_{19.28} = 436$, $P < 0.001$) and significantly more active than juveniles (*C. amphora:* $U_{24.14} = 94.50$, $P = 0.02$ and *C. crulsi:* $U_{37.19} = 143$, $P < 0.001$). However, the species differed when we compared the activity of females and juveniles. *Ctenus amphora* females were significantly less active than juveniles ($U_{24.14} = 267$, $P = 0.01$), and *C. crulsi* female activity did not differ from juvenile activity ($U_{37.28} = 564.50$, $P = 0.48$).

Our results support the hypothesis that males become more active when they reach maturity. However, at least for *C. amphora*, females activity does decline. The reason for this, and for the absence of a decline in *Ctenus crulsi*, is not clear. Gasnier (1996) found no evidence that these species differed in reproductive cycle and apparently they reproduce continuously throughout the year, so males probably seek females in all seasons. Extreme sedentary behavior appears to be the foraging strategy adopted by adult females of this genus. However, juveniles of these species have different foraging strategies and this may result from differences in the species' diets and the resources available. It will be necessary to study diet and resource availability to determine whether these factors affect the activity of males, females and juveniles of these species, and why some females become less active and others maintain the same level of activity as juveniles.

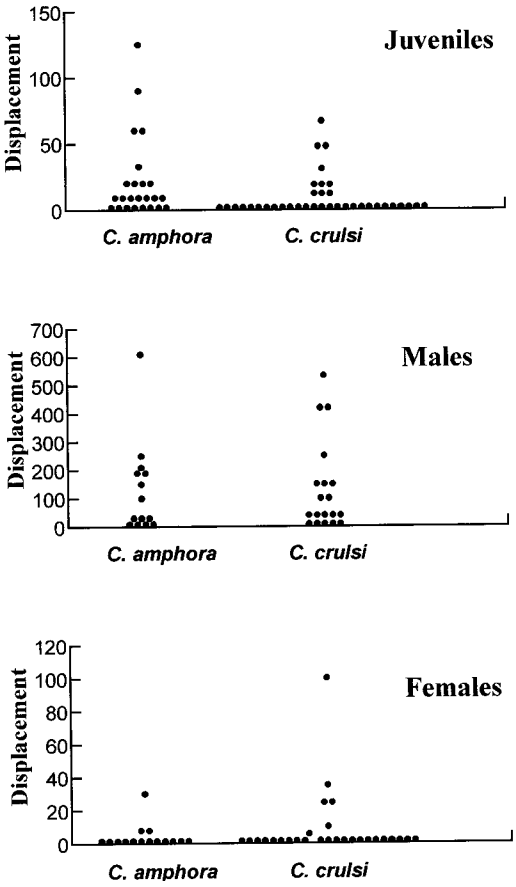

Figure 1.—Displacement (cm) of juveniles and adults of *Ctenus amphora* and *Ctenus crulsi* during a 15 minute period.

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