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ECOLOGY AND BEHAVIOR OF SOME PANAMANIAN ODONATA

Some species of dragonflies that breed only in small temporary pools of water during the rainy season use a form of reproductive aestivation for survival during the dry season, when no breeding habitat is available. *Erythrodiplax funerea* move into forested areas during November and remain in a teneral stage until the first heavy rains in May. They then attain adult coloration rapidly and emigrate to open areas with small pools. The coloration during the dry season remains dull brown and individuals perch on or near the ground in close association with little or no aggressive interactions. Within three days after the onset of rains, their bodies become black and they acquire distinctive black wing patches.

In another study, species of *Hetaerina* damselflies (*H. macropus*, *caja*, *miniata*, and *fuscoguttata*), which co-occur on lowland streams were individually marked and recaptured during a six week period at four study areas, each on separate streams. Behavioral and ecological observations were undertaken to answer questions about the competitive relations between these species. *Hetaerina macropus* and *H. caja* occurred only on sunlit portions of the streams while *H. miniata* and *H. fuscoguttata* occurred only on shady forested portions. The apical tip of the wings of males were red in *miniata* and *caja* and brown in *macropus* and *fuscoguttata*, thus the pair of species in shady and in sunlit areas of the streams have contrasting wing tip coloration in each case, which may reduce interspecific aggressive interactions. Another behavior studied, Circle Flights, is used during territorial encounters between males. Each species was found to have a distinctive Circle Flight pattern such that when interspecific chases occurred, the differences in Circle Flight pattern rapidly dissociated the individuals. Predation from lycosid spiders was great if, during intraspecific Circle Flight encounters, the chasing individual caught up to the one being chased for they would invariably fall to the ground. Selection from predation should result in ritualized threat behavior replacing actual fighting in these species.

Territorial behavior differed between the species occupying sunlit areas and those occupying dark areas. The sunlit species remained on the territories throughout sunny portions of the day while the dark area species frequently left their territories to feed in the canopy of the forest bordering the stream. It is hypothesized that the species with territories in dark areas cannot feed efficiently there because of low light intensity. This has resulted in a higher number of aggressive encounters observed in the dark area species because of the instability of territorial possession there.

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