

## ABSTRACT

Behavioural ecology, in a simple sense, is the study of the relationships between the behaviour of an animal and the ecological effects imposed by the environment in which the animal lives.

The behavioural ecology of the Stoplight parrotfish was studied with regard to the distribution, home-ranging and dispersive movements, habitat preferences, and the effects of different habitats (differentiated as several substrate types) upon the behaviour of the species. Data were recorded primarily in the form of sequences of activities, from which time-budgets were constructed for different individuals. For the purposes of the study, individuals were divided into groups comprising juveniles, mid-phase (small adult and large adult; usually females) and termphase (small and large; always males). In addition, densities were estimated by counts over line-transects, and some individuals were tagged, leading to the calculation of home-range sizes.

It was found that the species was relatively sedentary, occupying home-ranges which overlapped to some degree and which varied in area proportional to the size of the individual. Core areas were apparent, being usually centrally located regions of rock or coral. Adults ranged over much larger areas than juveniles, but still occupied the same portions of the reef for periods ranging to several months. Juveniles were distributed in all reef habitats but were more common in shallower regions, while adults were limited to rubble areas. The main factor involved in habitat selection was the selection of highly creviced areas apparently for their protective function. In this regard, individuals appeared to select a certain habitat

configuration rather than a special substrate or habitat type.

Similarities were seen in the time-budgets of the different phases in that all were composed to a large extent of the activities swimming, hovering, and feeding. However, the habitat had a direct effect on the proportions of different activities in juveniles, as juveniles in Thalassia spent more time swimming and sheltering than other juveniles, this being ascribed to the lack of proper shelter in the Thalassia habitat. Also, an effect on behaviour of the size of the individual (and size  $\equiv$  age) was noticed, as adults spent a great deal more time sheltering than other individuals. Based on the duration and sequencing of activities, a hypothetical foraging strategy was suggested, in which individuals utilized patchily-distributed resources (see also Itzkowitz, 1977) with a possible difference in the type or size of food material accounting for differences in foraging behaviour between juveniles and adults.

Stochastic analysis of behavioural sequences provided little new information at the levels of analysis applied, however, the species was shown to possess a 'finite memory span' (Cane, 1978) in that behavioural activities were influenced by activities two steps previous in the sequence, allowing the behaviour to be described by second-order Markov chains.

In conclusion, the study is the first, to my knowledge, to investigate time-budgets and the stochastics of coral-reef fish behaviour, and in this regard makes an important contribution to the study of the ecology of reef fishes.