DAVIS EXPEDITION FUND

REPORT ON EXPEDITION/PROJECT

Expedition/Project Title: The search for Life History Invariants in a sex-changing Caribbean Coral Reef Fish .....

Travel Dates: March 2002 .....

Location: Belize, Central America .....

Group Members: Staff of the University of Belize Marine Field Station, James Humphreys and Dr Stuart West.....

Aims: To test theoretical predictions for the existence of invariant life histories in sex changing organisms using the marine goby *Coryphopterus personatus* .....

OUTCOME (not less than 300 words):-

The Expedition to Belize was both rewarding and a success. Field work in remote situations is logistically difficult and the Davis Expedition Award made a major contribution towards the likelihood of success.

Experiments were carried out to confirm the adaptive nature of sex change in a marine goby (*Coryphopterus personatus*). The experiments demonstrated that large males inhibit female to male sex change in small groups, whilst in large groups female stimulation outweighs male suppression, leading to sex change. In essence this is adaptive sex change using sex ratio as a cue.

Following on from this, whole breeding populations of the marine goby (a known sex changer), were sampled from North, South, East and West fringing reefs of both Turneffe and Glovers Atolls. We compared population sex/size distributions to see if different populations were changing sex at a constant proportion of their maximum size. The existence of such a size invariant for sex change would reveal underlying similarities across all populations in the shape of the trade off functions linking fundamental life history traits (such as those links between growth, mortality and reproductive value).

Results demonstrated no such life history invariants for this species of sex change fish. Further analysis of the data are pointing towards a disrupting effect of early maturing males on the reproductive value curve for larger, parental males. Such an effect would act to reduce the selective pressure for females to change sex, as the potential reproductive pay-off for being a large male are reduced or eliminated.

The search for life history invariance which motivated this expedition has led to some unexpected and interesting discoveries regarding the selective pressures shaping the evolution of sex change in the marine goby (*Coryphopterus personatus*). These results are currently being followed up with more in-depth analysis of the data, combined with further planned field studies.

The work generated from this and a previous expedition was recently presented to an international audience of PhD students and research scientists, in Lohja, Finland in the form of a lecture. The support of the Davis Expedition Fund in this work was acknowledged during this presentation.