

QUANTITATIVE 3-DIMENSIONAL MOTION ANALYSIS OF KRILL AND MYSIDS IN AGGREGATIONS

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Pelagic crustaceans that aggregate in swarms and schools pose some fascinating questions about the evolutionary significance of social behaviour, but resolving the movements of individuals within the group has proved difficult in the past. We describe a compact underwater stereo video system suitable for use both in laboratory tanks and in the sea. Using motion analysis software we can track the paths of individual animals in 3 dimensions. Accuracies of ± 2 mm in X and Y co-ordinates and $\pm 4-6$ mm in Z are possible using this system. We show firstly that behaviour of individual mysids in swarms in laboratory tanks does not differ significantly from that recorded in the field. Behaviour of individuals in different regions of the swarm, in parameters such as swimming speed, acceleration, nearest neighbour distance, time spent in different sectors, is not uniform. Using this equipment we have begun to test recent theories about the costs and benefits of aggregations such as those of Antarctic krill and we present some preliminary results. This is a powerful new tool for exploring the ecological and evolutionary significance of social aggregation in the sea.