

Mitchell, Joan Ramage. July 1971. Food preferences, feeding mechanisms, and related behavior in phyllosoma larvae of the California spiny lobster, Panulirus interruptus (Randall). San Diego State College Master's Thesis.

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ABSTRACT

Phyllosoma larvae of Panulirus interruptus were cultured in the laboratory from hatching through Stage VI at a temperature of 25 C, using a basic diet of Artemia nauplii. Food preference trials and behavioral observations were conducted in which phyllosome Stages I-VI were offered a variety of planktonic forms, to investigate which types of food organisms are preferred and how these food organisms are captured and eaten. The mouth parts and thoracic appendages for Stages I-V are described and illustrated. An attempt is made to relate the apparent function of these structures to their morphology and to laboratory observations of stage-specific food habits and feeding behavior.

The results indicate that phyllosomes feed readily on planktonic organisms which vary considerably in size and morphology. Chaetognaths, fish larvae, hydromedusae, and ctenophores were the preferred prey both when: (i) offered as individuals of a single species; and (ii) offered in a mixture of prey species. The ability of the phyllosomes to capture and feed upon these forms appears to be influenced primarily by the relative size and mobility of the food organisms, and

the degree of hardness or softness of its body.

Temperature, diet, size of container, and number of individuals per container all influence the development, size, growth, and survival of laboratory-reared phyllosomes.

Evidence is presented that phyllosomes fed a diet of wild plankton for 17 days showed better survival, and advanced to a later stage than those reared on a continuous diet of Artemia nauplii. These and other considerations suggest that use of Artemia as a standard laboratory food may be a deterrent to the progress of work on phyllosome culture.

The functions of the mouth parts and thoracic appendages can be classified as capturing, holding, cleaning or feeding. The endopodites of the first, second, and third pairs of legs terminate in sharp dactyls which are recurved to fit between one or two pairs of setae on the distal end of the propodus, and form a kind of subchela. The long terminal spines on legs one and two capture food, while the shorter spine on the third leg holds food once caught. The third maxillipeds have two types of modified setae, suggesting a cleaning function, and the terminal dactyls of the second maxillipeds hold the food while it is eaten. The mandibles and the first maxillae terminate in an incisor

process and molar process, and two terminal teeth, respectively. Their arrangement suggests that their toothed processes are applied directly to tear the food.

Observations of food preference and feeding behavior, as well as the examination of mouth parts and thoracic appendages indicate that phyllosoma larvae are best suited for capturing and eating large, soft-bodied forms. The fact that they feed upon relatively inactive, live animals and those freshly killed or damaged, suggests that they utilize both live and moribund individuals as natural foods.