

ECOLOGY OF HAWAIIAN SERGESTID SHRIMPS
(PEDAEIDEA: SERGESTIDAE)

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ABSTRACT

Extensive midwater trawling from 1970 to 1973 in the vicinity of Oahu, Hawaii, produced a large collection of twenty species of sergestid shrimps. This paper describes each species and presents data on vertical distribution and migration, population size, seasonal size-frequency distribution and diet.

Hawaiian sergestids occur primarily between 450 and 1200 m during the daytime. Species are separated by color pattern into a "half-red" assemblage from 450 to 725 m and an "all-red" assemblage from 650 to at least 1200 m. The transition zone from 650 to 725 m has been previously considered to mark the lower limit of ventral countershading, but appears instead to result from the increasing importance of bioluminescent flashes and the decreasing importance of lateral countershading. All-red sergestids probably countershade ventrally to about 775 m.

At night all but two species migrate into the 0-300 m region, half-red and all-red assemblages mixing together. A shallow species group in the 0-100 m region may be countershading ventrally at night; the deep group below 125 m does not countershade. Moonlight has two effects on vertical distribution. The shallow group is depressed below 150 m, while the deep group is relatively

unaffected. In addition there appears to be a period of about a week around full moon when some species stop migrating altogether, remaining at their daytime depths. The daytime depths may also be abnormally deep at this time.

Most species appear to spawn mostly in the spring, although ovigerous females can be found at any time of the year. Maximum life span appears to be one year for all species except the large Sergestes bisulcatus, which lives two years. One species, S. fulgens, apparently does not reproduce in Hawaiian waters, but is carried in from other areas.

All species examined eat planktonic crustacea in the 1-3 mm size range; primarily calanoid copepods, ostracods, and amphipods. In addition some species also eat smaller zooplankton in the 0.4-0.6 mm size range, including larval bivalves, foraminifera, and cyclopoid copepods. Ability to utilize the small size fraction appears related to the degree of setation of the thoracic appendages and not to the size of the third maxillipeds, which are greatly enlarged in a number of species. Most feeding occurs at night.

The twenty species of Hawaiian sergestids include many pairs and triplets of closely related species. These species are always separated by size, less often

by vertical distribution or seasonal abundance. The Hawaiian sergestid assemblage is very similar to assemblages reported from two areas of the subtropical Atlantic.