SOME ASPECTS OF THE ECOLOGY OF A BIVALVE MOLLUSK IN KANEOHE BAY, OAHU, HAWAII

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SUMMARY

A general ecological study was made of the bivalve, Tapes philippinarum in Kaneohe Bay, Oahu, Hawaii. Data from the general ecology study are summarized as follows:

1. The clams occur in aggregations or beds generally on the periphery of the shallow water reef platforms of southeastern Kaneohe Bay. Clam distribution is possibly related to substratum, circulation, depth, and salinity.
2. Two species of crab and a gastropod were observed feeding on the clam in the laboratory. Field observations indicate that crabs are the most important predators on T. philippinarum.
3. The larvae settled in the Spring probably between February and June with peak settling in April-May.
4. Gonad examinations indicate a minimum size at maturity of shell length 16.1 mm (males) and 18.2 mm (females), and that the clams are mature by 20 mm.
5. Shell length was related to total weight by the equation $W = 1.75 \times 10^{-4} L^{3.06}$. Body weight is approximately 29-33% of total weight.
6. Clam beds in general have an interior core of high density with numbers decreasing away from

the interior. A curve was used to express this density distribution.

7. Most of the clams occur in crowded conditions; as density increases the average clam weight or size decreases.

Growth rates of Tapes philippinarum were observed over a nine month period in various localities of Kaneohe Bay using retrievable boxes containing clams in a standard substrate. Growth rates of clams in Bed 1 were determined by sampling, ring analysis, and releasing marked individuals into the bed. The results are summarized as follows:

8. Average growth rates varied with locality with stations in the southeast Bay showing the most rapid growth. Nutrition was probably the ecological factor responsible for these variations.
9. A von Bertalanffy growth curve was calculated from growth data of several stations.
10. Average growth rates in Clam Bed 1 were about half of those observed in the experimental boxes in the southeast section of the Bay.
11. When different sediments were used in pairs the clams grew faster in a substratum of 3 parts sand, 1 part shells and pebbles than in a mixture of shells and pebbles or mud.

Studies were made of the clam beds before and after clam season. In one bed, chosen for extensive observation because of its high population density and heavy exploitation by the public, the following effects were noted:

12. Bed dimensions, especially width were considerably reduced. Clammers tend to work on the periphery of the bed because the clams are larger there. Thus, the periphery of the bed becomes clammed out first, compressing the bed around the high density interior. This leaves the remaining clams crowded where conditions for growth may be poor.
13. Virtually all clams above the legal size limit (25 mm) were taken and the average weight of the clams dropped from 1.7 to 1.1 grams, a 35% reduction.
14. Population density curves and sampling showed a reduction in population density of approximately 50%. The samples taken before clam season showed only about 15% of the clams were above 25 mm in length, indicating clammers were removing or destroying clams smaller than the legal size limit.

15. A growth ring not present on clams before clam season or on clams from unclammed areas indicates a disruption of growth during clam season.
16. Several regulations are suggested to insure the continued harvest of clams.