SIZE COMPOSITIONS OF LYSIANASSID AMPHIPODS IN COLD AND WARM WATER HABITATS

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SUMMARY

Since the family Lysianassidae is one of the largest and most diverse in the order Amphipoda it is suitable for the study of adaptations to different zoogeographic regions. The fauna is best known in regions of cold water (polar oceans and deep sea). Here most species are relatively small (6–13 mm) but a small number of large species are also found. In tropical waters such as the Indo-Pacific lysianassids are less well known and less conspicuous. The species are smaller and there is an apparent lack of large species. The problem is therefore not the occurrence of giants in cold water habitats but rather the small size of tropical species. While increased predation or competition could be responsible it is suggested here that the differences are probably due to shorter life spans at the higher temperatures in tropical waters. The species mature at a small size and produce small clutches of small eggs. In cold water survival is greater and the species mature at a larger size and infrequently produce large clutches of large eggs.

INTRODUCTION

One of the most striking features of marine amphipods is that they tend to be small in shallow tropical water but rather large in the Arctic, Antarctic and the deep sea. The reasons for these differences remain unknown but the apparent gigantism in the cold water habitats has been the subject of considerable speculation (Barnard, 1962, De Broyer, 1977 and Menzies, George and Rowe, 1973). The present contribution presents a different approach to this question by considering the size compositions of the faunas rather than just the occurrence of giants.

Species of the amphipod family Lysianassidae are suitable for making interhabitat comparisons since they are numerous at all depths in all oceans and many have the same life style—scavengers of freshly killed or wounded animals—and are either pelagic or benthic burrowers in soft sediments. Other lysianassids that are parasitic or commensal will not be considered here.

MATERIALS AND METHODS

In the present analysis the midpoint of the size range of mature females has been used as a measure of size. Mature females are readily recognised by the presence of setose oostegites and are usually reported in the literature. Mature males are typically smaller than females and can be recognised by their elongate calceolate antennae but are rarely reported in the literature. The midpoint of the size range is considered to be more representative of the size of mature animals than is the maximum. Since the maximum is determined by post-maturation survival it can be biased by an individual who survives longer than normal (personal observation) and is therefore not representative of the adult size of most individuals of the species. The maximum and the midpoint are similar in species with short reproductive lives. Size at maturity (Steele and Steele, 1975) and mean adult size would give a more precise measurement of size but neither is available for many lysianassid amphipods.

Total length was measured from the anterior margin of the head at the base of any rostrum, to the tip of the telson. Small individuals and hatched young from the brood pouch were measured with an eyepiece micrometer. Egg diameter is the average of the length and width of early (Stage A (Steele and