REPRODUCTION CYCLES IN SOME FRESHWATER AMPHIPODS IN SOUTHERN AUSTRALIA

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SUMMARY

Reproduction patterns in three populations of southern Australian amphipods were examined to investigate the suggestion that a basic difference exists in reproduction patterns between northern hemisphere and southern hemisphere stream invertebrates. The species considered were *Pseudomoera gabrieli,* sampled in Sassafras Creek, Victoria, and *Austrochiltonia australis,* sampled at Dandenong Creek, Victoria, and Aldgate Creek, South Australia. The former species showed continuous breeding, the latter, seasonal. These results, together with a review of published studies, indicated that for Amphipoda no such basic reproductive difference exists.

INTRODUCTION

The study of stonefly life cycles on the mainland of south-eastern Australia by Hynes and Hynes (1975) is of considerable interest for they found that, unlike most stoneflies of the northern hemisphere, the stoneflies investigated by them had life cycles which lacked precise seasonal timing. A similar finding was obtained for a wide variety of benthic invertebrates, including a species of amphipod, in New Zealand streams (Towns, 1976; Winterbourn, 1978). Hynes and Hynes concluded that although some of the flexibility in the life-cycle patterns was a response to temperature, an important determinant was the uncertain Australian climate. In the New Zealand aquatic studies, on the other hand, the flexibility in life cycles has been attributed to New Zealand's mild climate (Devenport and Winterbourn, 1976; Towns, 1976).

A further explanation unrelated to climate may be advanced for both studies. It is that the pattern of invertebrate life cycles in streams, if not rivers, is linked to the seasonal pattern of allochthonous organic input in the form of leaf-fall. Such input is known to be an important source of energy for maintaining stream ecosystems. In contrast to the situation in the northern hemisphere, the input in Australia and New Zealand mostly occurs over a long and imprecisely timed period: both countries lack native trees deciduous in the northern sense of that word. In the northern hemisphere, leaf-fall from deciduous trees provides massive and precisely timed allochthonous inputs to streams in autumn.

Drawing on the (then) unpublished work of Hynes and Hynes on Australian stoneflies, Williams and Wan (1972) hypothesised that the lack of a precisely timed autumnal leaf-fall would be reflected in poorly synchronised life cycles for Australian stream invertebrates (and in lowered species diversities) but this hypothesis was not taken up by Hynes and Hynes (1975) in their explanations of stonefly life-cycle flexibility.

Against this background, it is of interest to consider the life-cycle patterns of two species of amphipod known from Australian streams. One, *Pseudomoera gabrieli* Sayce (Eusiridae), is known thus far only from upland streams in Victoria. The other, *Austrochiltonia australis* (Sayce) (Ceinidae), with its congener *A. subtenuis* (Sayce), is widespread in south-eastern Australia (Williams, 1962) and occurs in many freshwater habitats, both lotic and lentic. The two known species of *Austrochiltonia* are by far the most common freshwater amphipods of temperate Australia. Amphipods from fresh waters in the northern hemisphere are claimed to exhibit seasonality in life-cycle patterns, as do stoneflies there.