

## AUSTRALIA AS A MAJOR EVOLUTIONARY CENTRE FOR AMPHIPODA (CRUSTACEA)

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### SUMMARY

The morphology of modern amphipods is used in place of a cogent fossil record to conclude that amphipods existed in the early Mesozoic during Pangaea. A freshwater group called crangonyctids was distributed at that time over most of the continental coagulum. Freshwater amphipods abhor tropical environments so that the modern dispersal of continents has resulted in widely dispersed relict fragments of crangonyctids. North America remains heavily populated with these animals whereas South Africa and Australia are now poorly endowed owing to climate. Eurasia is poorly endowed with crangonyctids because of the later evolution of more successful freshwater amphipods such as gammarids and niphargids, neither of which reached the southern hemisphere. South America lacks any of the mentioned groups, having a freshwater amphipod fauna of unique character except for bogidiellids shared with other world regions.

Marine amphipods also are cold-adapted. This characteristic in part provides a global ecological effect best represented in Australia and known as ends-of-the-earth phenomenon. The warm-temperate region of southern Australia therefore comprises a large isolated reservoir of amphipods dominated by groups poorly represented elsewhere. Parts of certain families have exploded evolutionarily in Australia. These include Phoxocephalidae, Dexaminidae and Urohaustoriidae. Australia is seen primarily as a huge environment capable of containing a diverse assemblage of these taxa and is not necessarily the place of origin for these and other taxa. However, Australia retains the most primitive living phoxocephalid (*Pontharpinia*).

A new classification of amphipods based on fleshy telson is promulgated and criticised. Two new families and two new genera are also created to fill obvious gaps in Australian taxonomy.

A prospectus treats new research needed, especially that which requires morphofunctional investigation.

### Introduction

Evidence that Australia is a major evolutionary centre and refugium for both freshwater and marine Amphipoda (Crustacea) is presented in this paper. The evidence thrusts the presumed origins of the group back into the early Mesozoic during the time of Pangaea.

The evolutionary system, dispersal knowledge recently gained about Australian amphipods, and new ideas on classification are all interrelated. Two data bases, on freshwater and marine facts, will be presented here, then discussed and problems raised. The faunule in Australia is summarised and a prospectus treats the many investigations now required to clarify not only certain facts but the tentative conclusions drawn herein. Research to be done in the Australian region is of major importance.

A new subordinal classification of the order Amphipoda based on telson is presented in which the group is reduced to 3 suborders, Corophiidea, Gammaridea, and Hyperiidea, part of the old Gammaridea being removed to join Caprellidea to form the Corophiidea.

Objections to certain hypotheses and alternative explanations for several conditions are provided by the second author, Karaman, in Notes a, b, c, and d in Appendix 2.