

Australian Jurassic dinoflagellate cysts

Establishing taxonomic foundations through collaborative research

by Jim Riding, *Keyworth*

The standard palynological zonation of the Mesozoic of Australia was published by Helby, Morgan and Partridge in 1987 (Association of Australasian Palaeontologists Memoir 4). This biozonation, which grew out of hydrocarbon exploration in Australia since the 1960s, was the first attempt to provide an integrated, pan-Australian microplankton and spore-pollen zonation. It was partially presented publicly at a conference in the USA during 1978 and at a course in Sydney in 1979. The Helby *et al.* dinoflagellate cyst and spore-pollen zonation has rapidly become the industry standard for Australasia and adjacent areas. The dinoflagellate cyst zones especially have proven correlative value in all the principal Australian Mesozoic

deposits such as the Bonaparte, Canning, Carnarvon, Carpentaria, Eromanga and Perth basins and the Exmouth Plateau.

However, the paper provided only the framework of the zonation and it was anticipated that further development, principally the documentation of new taxa, would be necessary as the zonation scheme was refined. Many informal subdivisions of the Helby *et al.* zones have been recorded in unpublished well completion reports since the mid 1980s. These subzones are largely based on dinoflagellate cyst taxa which have not been formalised. The majority of the Australian well completion reports are released under the 1967 Petroleum (Submerged Lands) Act, hence the informal palynological zonation has been entered into the Australian Geological Survey Organisation's STRATDAT database on petroleum geology. Because of the widespread usage of the subzones, there is an urgent need to validate them *via* publication.

A prerequisite of this is that the key dinoflagellate cysts are also published.

As a consequence of this, a project to provide the taxonomic foundation for some of the informal subdivisions has been instigated by the Petroleum and Marine Division of the Australian

Luehndea sp. from the Toarcian of offshore northwest Australia. The specimen is 80 by 50 micrometres.



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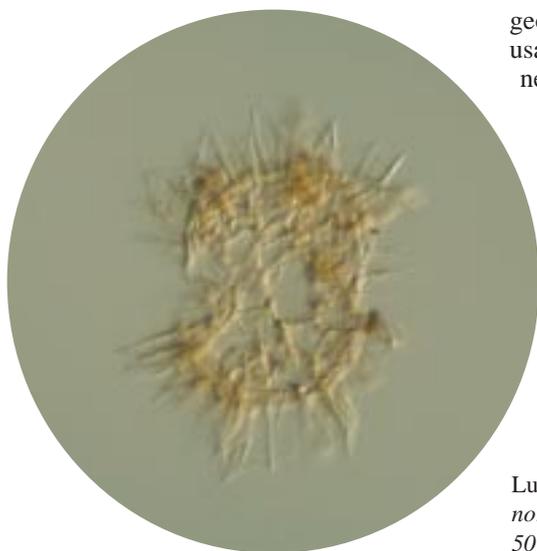
Tabulodinium senarium Dodekova 1990 from the Callovian offshore northwest Australia. The specimen is 80 by 45 micrometres.

Geological Survey Organisation (AGSO). In September 1999 Dr J B Riding, a BGS palynologist, started a one-year secondment at AGSO headquarters in Canberra, Australia in order to describe the key Jurassic and Lower Cretaceous dinoflagellate cyst species which will allow the formalisation of the palynological subzones. This secondment is part of a Memorandum of Understanding between the BGS and AGSO. Dr Riding is working closely with Dr Robin Helby, an independent consultant from Sydney, in the description and illustration of the key new genera and species.

The first projects centered on a new suite of early Toarcian (Early Jurassic) dinoflagellate cysts and some stratigraphically restricted Callovian (Mid Jurassic) forms from the Timor Sea. The Toarcian association is apparently strongly endemic to offshore northwest Australia. Future studies are being planned and include the description of dinoflagellate cysts from the Oxfordian, Kimmeridgian and Tithonian (Late Jurassic) and the Lower Cretaceous of offshore Australia.

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