

The Braincase, Mandible and Dental Structures of the Early Devonian Lungfish *Dipnorhynchus kurikae* from Wee Jasper, New South Wales

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ABSTRACT. *Dipnorhynchus kurikae* Campbell & Barwick was described from the *Receptaculites* Limestone Member at Wee Jasper. Our new specimens include material of the braincase, the snout, the nasal capsules, the palate and the mandible which were not previously available. The new specimens give new data on the pores in the snout, the arrangement of the soft tissues in the nasal capsule, the growth of the hard tissues on the surface of the dentary, the formation of the hard surface on the palate and the prearticulars, the arrangement of sacculus and the nerves VII, IX and X in the otic region, and the interpretation of the palatoquadrate. The lateral lines on the mandible have been exposed by excavation. Thin sections show that the bone on the overgrowth of the dentary is of the same kind as occurs in the cores of the ridges on the tuberosities and marginal ridges on the palate and prearticular. A thin layer of dentine-like columns which contain no dentine tubules overlie the bony cores. This, and the mode of growth, demonstrate that the dental plates—being made of a bony core—have different patterns of deposition from tooth plates in most later Palaeozoic genera, which are made of dentine. This throws light on the way tooth plates evolved from a dipnorhynchid pattern through a speonesydronid pattern to true tooth plates. The complex tooth plates of *Diabolepis* are considered to be independently developed. Ventrally the parasphenoid of *Dipnorhynchus kurikae* does not divide the pterygoids, but stops short at the posterior end of the pterygoids. The semicircular canals and the superior sinus of the saccular cavity are described from the well-preserved material. In comparison with *D. sussmilchi*, this species has a number of distinctive features, and is easily recognised as a separate species.

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Dipnorhynchus kurikae Campbell & Barwick, 1985, was described from two partial skull roofs, three isolated palates, two snout fragments, and two isolated mandibles. The neurocranium, the rostrum and the nasal capsules were unknown, and though the palate and lateral wings and the

lower part of the neurocranium were well enough preserved, their relationships with other parts of the skull were unclear. Three new specimens of the mandible have been recovered from the type locality, including the smallest and the largest known individuals. Two new crania, one of which comes