

FEEDING MECHANISMS AND DIET IN THE SAUROPODOMORPH DINOSAURS: A FUNCTIONAL AND PALAEOECOLOGICAL APPROACH

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The feeding mechanisms of the sauropod dinosaurs have received little attention. The prevailing view states that sauropods possessed relatively simple, uniform jaw mechanisms with no significant oral processing. Several independent lines of evidence suggest that this is not the case and that the jaw mechanisms and other feeding adaptations of the sauropods were more diverse than previously supposed and may have contributed to their success throughout the Jurassic and into the Cretaceous. The dietary preferences of prosauropods also need re-evaluation following examination of prosauropod dentitions and the diets of living analogue reptiles.

Sauropods display a variety of jaw mechanisms which follow broad taxonomic groupings. Jaw mechanisms range from simple orthal jaw mechanisms (cetiosaurids, euhelopodids, brachiosaurids, ?nemegetosaurids) through a combination of orthal and propalinal jaw movements (camarasaurids) to those which rely mainly on propalinal movements (diplodocids and ?dicraeosaurids). A variety of tooth wear patterns are also observed: steep mesial and distal wear facets which produce "shoulders" on the tooth crown (cetiosaurids, euhelopodids, camarasaurids, brachiosaurids, nemegetosaurids) and apical wear facets (brachiosaurids, diplodocids, dicraeosaurids). Significant oral processing occurred in many sauropod groups whilst diplodocids and ?dicraeosaurids utilised a unilateral branch stripping action with little or no oral processing.

Ecological partitioning between sauropod genera has previously been regarded as a problem. Why should so many different genera, with seemingly similar palaeoecologies, appear in the same faunas? For example, at least 4 genera of sauropod are recognised in the Tendaguru fauna. Information on jaw mechanics coupled with various postcranial features (neck length, relative forelimb/hindlimb lengths, body length and tripodality) suggests that differences in these variables may have allowed niche partitioning between the various sauropod genera, both in terms of browse heights and plant types (or parts of plants) eaten. The feeding adaptations of sauropods seem to have been well established by the Middle Jurassic and may account for the success of the group at this time. There is no evidence of significant improvement in the ornithischian masticatory apparatus until the Late Jurassic with the advent of pleurokinesis in the ornithomimids. The masticatory adaptations of sauropods were more advanced than those of the prosauropods and this may have allowed sauropods to out-compete prosauropods, replacing them as the largest land animals.

Much has been written on the diet of prosauropods and the current view holds that they were herbivores. This view is based on the similarity between the dentitions of prosauropods and the extant *Iguana*. However, iguanas are not completely herbivorous but are best regarded as facultative omnivores. This diet is reflected in their dentitions which show a combination of features suited to the slicing of plant material and the capture of small prey. Prosauropods have remarkably similar dentitions and it seems reasonable to suggest that they were also facultative omnivores with plant material making up the bulk of the diet and small prey or carrion taken as a supplement.