including grafting experiments in *Alternanthera* and *Hydrophylla* which belong to modified helicoidal type. I thank Professor B. M. Johri and Professor H. Y. Mohan Ram for facilities and valuable suggestions and Dr. P. S. Ganapathy for guidance and constructive comments. Award of a Junior Research Fellowship by C.S.I.R., New Delhi, is acknowledged.

Department of Botany, Sharda Thakur,
University of Delhi,
Delhi-110007, India.


**POLLEN CHAMBER—IN THE OVULE OF WILLIAMSONIA CARR.**

Occurrence and formation of pollen chamber in the ovule of the bennettitalean plant *Williamsonia* is described for the first time. The material for the present investigation was collected from the Jurassic rocks of Amarjola in the Rajmahal Hills, India. Fructifications of different sizes were studied for the present purpose. Slides were prepared in different planes.

Bennettitalean plants are unique among the Cycadophytes in the structure of their reproductive organs. Male as well as female fertile parts are distinct and different from other cycads. Orthotropous ovules are produced on small, cylindrical seminiferous scales. Nucellar stalk is long and it terminates into an oval-shaped nucellus. Integument is free from the nucellar stalk but closely adhered with the nucellus. Upper part of nucellus is provided with long, cylindrical cells similar to the one described recently in the ovule of the genus *Cycadeoidea*1. The cells are ranging in size from 48–56 × 20–22 μ and are filled with some dark staining substance. The peripheral cells are also comparatively larger than those occurring in the central part of the nucellus. The size of peripheral cells reduces gradually, so much so, that in the lower part of nucellus they are like the central cells. The initiation of pollen chamber begins with the degeneration of the apical cells of the nucellus. A fully developed pollen chamber is 60–65 μ deep (Fig. 1). It is a funnel-shaped structure having the wider part on its outer side. It is surrounded by the elongated cells of nucellus which are filled with dark colouring substance.

However, any pollen grain or microspore-like structure could not be seen in the chamber.

![Fig. 1. A fully developed funnel-shaped pollen chamber and the surrounding dark coloured nucellus, × 150.](image)

The discovery of pollen chamber, and its way of formation by the degeneration of nucellar cells, throw light on the relationship of *Williamsonia* with the cycads on the one hand and with the plant like *Ephedra* on the other hand. Presence of pollen chamber in an ovule is certainly a primitive feature, but its occurrence in diverse and unrelated groups of plants like Cycadales, Ginkgoales, Cordaitales and Ephedrales suggests that this character can hardly be considered of direct phylogenetic importance.

Department of Botany, B. D. Sharma,
University of Jodhpur,
Jodhpur-342001, India,