

Cryptocotylar semihypogeal germination and seedling morphology of *Polyalthia longifolia* (Sonn.) THW. (Annonaceae)

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SUMMARY

A study was undertaken to reinvestigate the germination pattern of *Polyalthia longifolia*. When the radicle is anchored in the soil and plumule protruded, the seed part consisting of testa, endosperm and cotyledons remained on the soil level and so the germination is semihypogeal. Since the cotyledons are abutted inside the endosperm within the testa and the cotyledonary petioles alone are emerged, the germination is cryptocotylar. The seedling excised from the testa and endosperm shows distinct radicle, collet, hypocotyl, plumule and white fragile cotyledons which are reserve (haustorial) in function. A pair of alternate cophylls are present above the cotyledonary node.

Key words : Collet, Cotyledonary petioles, Eophyll, Hypocotyl, Ruminant endosperm

Phanerocotylar germination is a general characteristic of the family Annonaceae and cryptocotylar is probably noticed in species with large seeds (Duke, 1969). It has been reported that only three of 90 forest species of Venezuela showed cryptocotylar type of germination (Ricardi 1999a, 1999b). Out of 20 humid forest species of Mexico, only five species are characterized by epigeal cryptocotylar germination and five functional types of seedlings are existing (Ibarra-Manriquez *et al.*, 2001) based on the terminology suggested by Garwood (Garwood, 1996). Examples of epigeal cryptocotylar germination are seemed to be rare.

Polyalthia Blume (Annonaceae) is an old world tropical genus comprising 100 species (Mabberley, 1997). An investigation on the germination and seedling morphology of *Polyalthia longifolia* (Sonn.) Thw. revealed that germination is hypogeal phanerocotylar (Saha(Das) *et al.*, 1998). The present authors made an attempt to reinvestigate the germination pattern of *Polyalthia longifolia* as a part of the studies on seed biology of Calicut University flora under Ph.D. program of the first author and germination behaviour of this taxa is found to be inconsistent with the views reported earlier (Saha(Das) *et al.*, 1998)

MATERIALS AND METHODS

Ripened fruits of *Polyalthia longifolia* were

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collected during 2005 - 2006 from the avenue trees of Calicut University campus. Fruits were depulped manually and seeds were washed thoroughly and air dried at room temperature.

Fresh seeds were kept for germination in Petri dishes lined with moist filter paper and germination was done under field conditions also. Time taken for germination was noted and seedling growth was observed until the seedlings attained growth up to 12 ± 2 cm length during a period of 10-15 days when the seedlings consisted of 4-5 leaves. Photographs of seeds, embryos, seedlings and excised seedling-parts were taken using Nikon D100 digital camera. Drawings were made using Wild Stereo Microscope and Prism type Camera lucida.

RESULTS AND DISCUSSION

Seeds of *P. longifolia* are endospermous with thick testa (Fig.1B-D). Seeds were considered germinated when the radicle protruded and attained 2 mm length. Seven to eighteen days were taken for germination. During germination embryonic axis alone was exposed and cotyledons, endosperm and testa remained intact as a unit. But prominent cotyledonary petioles were visible in very young seedlings (Fig. 1C). When the radicle and plumule were emerged, the testa and the cotyledons are abutted in the ruminant endosperm, remained on the soil surface without any hypocotyl growth.

Seedling morphology showed that the cotyledons were enclosed within the endosperm exposing prominent green coloured cotyledonary petioles (Fig. 1C) and the endosperm was ruminant type (Fig. 1D). During germination though the cotyledons grew inside the seed (Fig. 1 D-G), the testa and endosperm remained intact. Hence, the growth pattern and structure of the cotyledons