Identification of developmental stages of *Actiniopteris radiata* Swartz) Link.,

M. Maridass#, G. Raju#, R. Mahesh*, K. Muthuchelian* and K.Dharmar**

Department of Advanced Zoology and Biotechnology, Pioneer Kumasawamy College, Nagercoil – 629 003, Tamil Nadu, South India.

*Centre for Biodiversity and Forest Studies, Madurai Kamaraj University, Madurai – 625 021,

**Pasumpon Thiru Muthuramalinga Thevar Memorial College, Kamuthi, Ramnathpuram-623 604, Tamil Nadu


**Abstract**

The fern gametophyte is a small plant that exists as an intermediate in the fern life cycle, between the germination of a spore and the mature sporophyte. The gametophytic generation of *Actiniopteris radiata* was observed in spore morphology, spore germination and also development stages of the gametophytes. The spores of *A. radiata* were trilete in shape, 50x50µm size and characteristics of apogamous type gametophytes observed.

**Keywords**: Pteridophytes; *Actiniopteris radiata*; gametophytes;spores;

**Introduction**

Pteridophytes are commonly to be found as particularly rare in arid environments (Aldasoro et al., 2004; Christ, 1910; Ozenda, 2004), especially in the Sahara (Quézel, 1965; Tardieu Blot, 1953; White,1983). Many traits are used to infer the reproductive biology of ferns, such as the mating system, the number of spores in each sporangium, sporogenesis, spore size, and in some ferns, the lifespan of the gametophyte generation are reported earlier workers (Manton, 1950, Masuyama, 1979, 1986, Walker, 1979, Haufler *et al.*, 1985, Lin *et al.*, 1990, Kawakami *et al.*, 1996, Huang *et al.*, 2006).

*Actiniopteris radiata* Swartz) Link., is belonging to the family Actiniopteridaceae which is a small terrestrial fern, found in India, Burma, Sri Lanka, Afghanistan, Persia, Arabia, Yemen, South Eastern Egypt, Tropical Africa, Australia and Madagascar. It is of limited distribution, and in areas where it occurs, is restricted to depleted walls and rocky crevices of steep slops of exposed hilly areas, up to the altitude of 1200m. It is used as styptic and anthelmintic; fronds are chewed for sore throat and rhizome is boiled to cure dandruff in West Indies (Dixit and Vohra, 1984). The Wealth of India, (2006) reported that this plant has been used for various biological activities such as antifertility, styptic, anthelmintic, antitubercular etc. Taneja and Tiwari, (1974) studied in phytochemical analysis of stems and leaves to be found in hentriacontane, hentriacontanol, β-sitosterol palmitate, β-sitosterol, β-sitosterol-D-glucoside and quarcetin-3-rutinoside. The present study is focused on the growth and development of gametophytes of *A. radiata* on natural environments.

**Materials and Methods**

**Field collections**

Field collections and observation of *A. radiata* was conducted from December 2010 to March 2011 at Sivagiri forest range of Southern Western Ghats region, Tirunelveli District, Tamil Nadu, South India. The spore germination, growth of gametophytes and differentiation and sex ontogeny were observed periodically. Photomicrographs were taken of spore morphology, germination of spores and gametophytes by compound microscope and optic microscope with Digital Camera Nickon, 3100.

This article is PR direct Email Submission. Freely available on online through the PR open access www.gbtrp.com.

Received: January, 17, 2012
Accepted: February, 18, 2012

*To whom correspondence may be addressed.
Email: maridassugcpdf@yahoo.co.in
Results and Discussion

The structure of spores and gametophytes of *A. radiata* are observed under compound microscope. The spores were trilete in shape and 50x50µm size (Plate-1, Fig. B). The sporangium was produced very low spores which are deposited in the parent plants of *A. radiata*. The majority of some fern spores were deposited in the vicinity of parent plants (Ramirez-Trejo *et al.*, 2004), but transport of spores into opposing habitats can occur by wind (Dassler and Farrar, 2001). Spores are incredibly resistant to extremes temperature, moisture, altitude, and irradiation (Page, 2002), and reportedly many have the ability to remain viable for decades (Ramirez-Trejo *et al.*, 2004).

![Gametophytes developmental stages on *A. radiata*](image)

Fig.1: Gametophytes developmental stages on *A. radiata*
Gametophytes of A. radiata stages were more likely to develop 0-3 stages (Fig 3-6). A total of 15-65 gametophytes of each plant were examined. Most gametophytes were cordate, and all had a midrib, two wings, and an entire margin (Fig. 4). The observed results showed that the apogamous characteristics of gametophytes formed in A. radiata (Plate-1 D-I). Earlier reports of A. radiata growth on epiphytic soils may be limited by water accessibility, gametophyte morphology, epiphytic pathogens, and biochemical influences by natural conditions (Chiou and Farrar, 1997; Chiou et al., 1998; 2002; Onyilagha and Grotewold, 2004; Watkins et al., 2005). The conclusion of the present study of A. radiata, was agamospory characteristic of the production of a sporophyte without fertilization and formation of gametophytes, which is grown in under dry conditions and also propagation through vegetatively via their rhizomes.

Acknowledgements
The work was supported by Dr. D. S. Kothari Postdoctoral Program, University Grants Commission, New Delhi, India.

References