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Ex situ Conservation and developmental studies on gametophyte and sporophyte of *Pteris vittata* L

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Abstract

The aim of the present study was ex situ conservation and developmental biology of *Pteris vittata* L., observed in natural conditions. The complete observation of spore structure, germination, development of different stages of gametophyte and sporophytes of *P. vittata* L., were identified in microscopically. Results reveal that observed in microscopically, spores of *P. vittata* were easily germinated and life cycle of gametophyte to sporophytes stages identified and it was easily adopted on the natural conditions.

Keywords: Pteridophytes; pteris vittata, gametophytes, sporophytes, spores, germination

Citation

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1. Introduction

The pteridophytes are very important of lower vascular plants and which is originated from about 250 million years ago. They were fast growing in the region of moist tropical and temperate regions (Dixit, 2000). Now, most of the species of pteridophytes are going to threatened category due to reasons for change of microclimatic conditions, forest degradation, development of urbanization, over harvesting of medicinal and ornamental purposes. *Pteris vittata* is one of rare species in Tamil Nadu, which is distributed in the hills of Coimbatore, Kothayar and Palni hills (Beddome, 1864; Manickam, 1986). *Pteris vittata* is known as Chinese braken or ladder Fern. Srivastava *et al.,* (2010) reported that potential hyper accumulator of arsenic compounds in this plant. The objective of the present work was *ex situ* conservation methods and detailed observation of spore germination, development of gametophyte and sporophyte of *P. vittata* for natural conditions in *ex situ* method.

2. Materials and Methods

The developmental study of *Pteris vittata* was observed in natural resources of Palayamkottai, Tamilnadu. The regeneration study was observed in the one year period from April, 2012- March 2013. The spore study was observed in the fertile leaves of *P. vittata* were collected and wrapped in smooth paper and kept at room temperature to induce dehiscence of sporangia. Spores were filtered through lens cleaning tissue. Measurements of the spore length and width were obtained the compound microscope. Spore morphology, and gametophyte development was observed under the compound microscope. All pictures of microscopic material were taken from Nikon camera.

3. Results and Discussion

The present study reveals that spore morphology, germination, development of gametophytes and sporophytes of *P. vittata* L., were observed in natural conditions (Plate-1). The spores of *P. vittata* were observed in yellow colour and trilete. Spores of *P. vittata* were easily germinated and adopted the natural conditions. Spores that are wind-borne to shady, moist habitats germinated and yield multicellular, gametophytes, the sexual stage of the life cycle (Plate-1). The spore of *Pteris vittata* L., were germinate the rainy season for suitable conditions, it was observed in well developed into a yellowish green colour tiny heart-shaped gametophyte. The gametophyte is the intermediate stage from spore to adult stage.

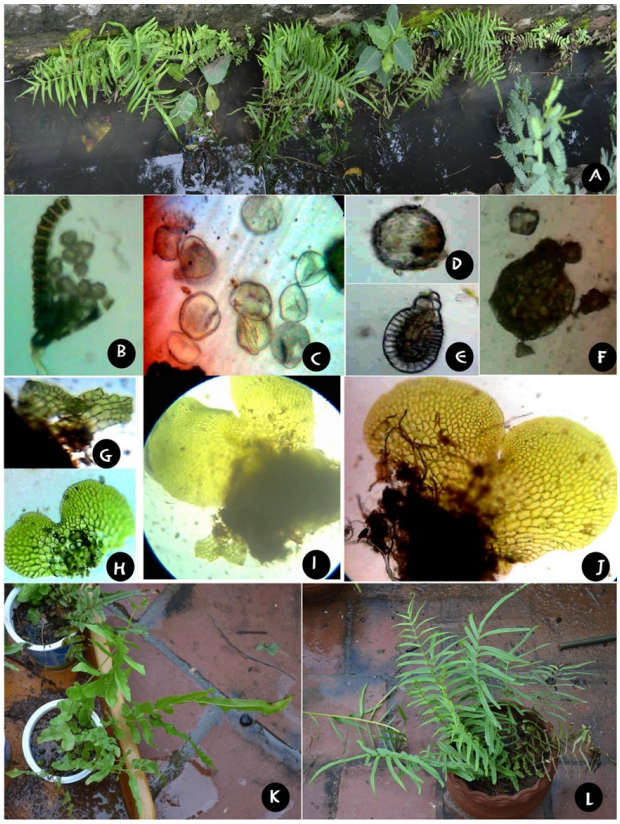

Figure 1: *Pteris vittata* gametophyte development: a) Habitat b) Spore dispersion; c) spores; d, e, f: spore germination; G,H,I,J: Cordate gametophyte; K) Young Sporophytes and L) Mature plants

The observed the one year study, rhizome of *Pteris vittata* L., is well known in the regeneration parts of this plant. The rhizomes are easily grow and produced new young plants in moisture regions. Earlier, Nayar and Kaur, (1971) who has reported that gametophyte of *P. vittata* L., growing in the suitable moist place and it was transformed into a complete adult plant. In this type, the rhizoid develops first after a wall perpendicular to the polar axis of the spores is formed. The first rhizoid of *P. fauriei* is chlorophyllous, but according to Nayar and Kaur (1971), the rhizoids of *Pteris* are nonchlorophyllous. The first prothallial cell divides and then the apical cell continues to divide, producing a short filament 2-25 cells long. Our result of *P. vittata* was faster growth and easily germinated and fast

growing the gametophytes to sporophytes about 4-6 week in the natural conditions. The conclusion of the present results, *Pteris vittata* is easily grown and new plants formed in rhizomes and which is easily conserved by small piece of rhizome cut into cultured in the new locality of moisture region. This information is provided very helpful to support the cultivation and conservation of *P. vittata*.

4. Acknowledgements

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