Morpho-Palynological Studies On The Angiospermic Fern 
Cyrtomium Cyrotideum C. Chr; (Syn: Polystichium Falcatum).

Ashfaq Ahmed Awan¹, Zahid Iqbal Awan²* and Fiaz Aziz Minhas²
¹Department of Botany, University of Azad Jammu & Kashmir, Muzaffarabad, 13100, Pakistan
²Department of Chemistry, University of Azad Jammu & Kashmir, Muzaffarabad, 13100, Pakistan

Abstract: The Angiospermic fern Cyrtomium cyrotideum C. Chr. was collected from Chikar and Kachelli, under the shade of Pinus wallichianum (A. B. Jackson) at an altitude of 7000 feet, Jehlum Valley District Muzaffarabad Azad Kashmir. The sporangia globose, sori are small and scattered, stripes tufted, densely clothed below with large dark scales, scattered, texture coriaceous with naked surface, the upper surface glossy with primary veins from the midrib of the pinnae. Each meristele has thick walled pericycle within which a crescent-shaped xylem is located with exarch protoxylem. Phloem cells are thin walled and filled to make a round mass of the cells. Average size of capsule is 250μ×100μ across wide, 180μ in height. Spore manostele is 90μ thick, isosporous, bilateral, proximal, flat, perine, and delicate. Spore dimension is 92 x 66μ. Distal surface heavily warty with the exine thickness of 3.5μ.

I. Introduction

The genus Cyrtomium is placed in the family Pteridaceae and sub family Dryopteridaceae, which includes 25 genera. Leave texture of Cyrtomium cyrotideum is leathery, having xero-phytic characters. These Dryopteroid and leptosporangiate ferns are grouped together as Coniogrammittum affinis Wall. Onychium cotiguum Wall Athyrium flex-fomina (L) Roth, Cystopters fragalis (L) Berth, Polystichium nigroplacum (Christ) Diels and contains other ferns but the genus Cyrtomium may contain only one specie. Cyrtomium cyrotideum has been recorded from Hazara, Swat and Nathia Galli in Pakistan. The venation may be open as in Polystichium while it is closed reticulation in Cyrtomium. This close type of venation is rather advanced order open type. The ferns of this group have varied form of sori [1]. The author had visited Jehlum Valley District Muzaffarabad in Azad Kashmir, representing home land for certain beautiful ferns. It was observed that the plants like Cyrtomium were very common near Serimang in Poonch [2]. He identified 127 ferns from Pakistan [3], in his comprehensive account of the ferns of Kaghan Valley which was important diversified ferns. The contribution of these workers was strengthened and ultimately enlisted in the “Flora of Pakistan” [4]. Anatomy, sporangial structure and spore morphology have not been investigated. The present study is an effort to add some information about the rare angiospermic fern Cyrtomium cyrotideum after earth quake (8th October 2005) because this fern is totally extinct from the Kachili area.

II. Materials and Methods

The fresh specimens were collected along with rhizome. The material was preserved in acetic acid and alcohol (1:3) till further use. The clearing of leaflets/fronds were made according to the technique [5]. The material (500g) was kept in aqueous solution of chloral hydrate which was obtained by dissolving 200g in 1000ml of distilled water for 5 hours. The fronds were washed thoroughly with distilled water and chlorinated [6]. The fronds were then stained with alcoholic basic fuchsin (saturated solution of basic fuchsin in ethanol) was filtered in brown colored glass bottle. Ammonium solution (33%) was added drop by drop to alcoholic basic fuchsin till the red color changes to pale yellow, filtrate was used to stain.

The plants fronds, basic section, (8×6 inches) with sporangium and spores were mounted in Euperal on a glass plate. The sporangia were detached from the fertile fronds with the help of needle under binocular microscope and the mounted in glycerin jelly on a glass slide. For spore investigations the sori were crushed with glass rod and pass through 1.5 inch dia funnel placed in a centrifuge tube and plucked with loosely placed glass wool.

The sieved spores were treated with KOH solution for the removal of solids and humic acid. After chlorination the spores were mounted in 2% saffranin. The mounted slides were sealed using synthetic enamel on a ringing disc. For anatomical studies the Transverse section of the rachis were made. After staining with 2% saffarnin solution the sections were mounted in Euperal for microscopic studies. Most of the observational work was carried out using PZO Microscope No. 5196. Palaeological investigations of spores were also studied under the same microscope and terminology for the description has been borrowed from Erdtman (1954) and Falgri and Irorsen (1950). The whole mount of fronds or leaflets was photographed using Nikon Camera.
III. Results and Discussions

In Cyrtomium cyrotideum the sori are small, copious and scattered. Indusia peltate and shed at very easily state (see fig 1 & 2). Close type of venation in a leaflet of cleared specimen has been shown as in fig. 3. Morphologically the rachis of Cyrtomium cyrotideum has stripe tufted having large dark scales from 1-2 feet long by 6-9 inches broad, pinnate, pinna numerous lower one staked, orate acurinate. Falcate 4-6 inches long, the upper side narrowed, interiorly glossy sometimes base auricled, rounded or obliquely truncated, texture coriaceous, glossy, surface naked, primary veins from the midrib of the pinnae (fig. 4).

Anatomically the transverse section of the rachis sorts the following textures, Outer cortex is sclerenchymatous compresses of many layers of cells. The ground tissue is with tightly packed parenchyma with four meristete, two smaller and two larger, smaller towards the dorsal surface and larger towards the ventral surface. Xylem is located with exarch protoxylem. Phloem thin walled, filled with a round mass of cellis (fig. 5). Similarly sporangial morphology shows sporangial stalked of three cells. Capsule away during isolation and average size is 250μ wide, 18μ in height and 90μ thick. Stomium is transverse, stomium cells in corporate, the annulus is complete and placed vertically around the capsule. Average number of annuls cells are 12-14 and individual annulus cells 25 × 25μ across and 20μ deep and 20μ in length. Number of spores per sporangium is unknown (fig. 6). palaeologically sori (Cyrtomium cyrotideum ) is isospore, monolette, bilateral, proximal surface flat, on the upper surface discernable sinurus, perine delicate, dorsal surface heavily warty exine thickness is 3.5μ. (Fig. 7 & 8)

References

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