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**FLORISTIC AND CONSERVATION STUDIES OF THE PTERIDOPHYTES OF HAZARA DIVISION PAKISTAN**

**Project Summary**

Systematics studies of the pteridophytes will be conducted by field surveys and conservation information of each taxa. Comprehensive field visits will be arranged followed by specimen’s preparation and systematic laboratory works. Plants will be identified by authentic floras. Species diversity of the area will be determined. Conservation studies and various threats in the area will be determined. Taxa of conservation priorities will be sorted out. Reference material will be obtained by submitting the specimens in the herbarium. Students will be trained to aware the community for conservation.

**Introduction**

Pteridophytes are very important group of plants second in diversity to angiosperms however Pteridophytes Flora of Pakistan yet not explored. Pakistan is facing severe threats of native species decline and loss due to forest cutting and habitat degradation. Although pteridophytes are the source of new medicine, cosmetics, air refinement agents against heavy metals, from aesthetic and as a source of food, green fertilizers but unfortunately, we are losing their diversity without knowing it. They are seriously threatened due to frequent land sliding and ecological disequilibrium, specific requirements of rocks association moisture and forest understory. Its population is declining due to ruthless use and dependency on the wild population by the locals. No exploration and conservation work have been done for this important group of plants.

Currently there are more than 79,800 species on The IUCN Red List, and more than 23,000 are **threatened with extinction,** highest no of Conifers 41% and 10% pteridophytes are threatened globally. Recently 1500 species of Pteridophytes are listed as threatened taxa at world level (IUCN, 2012). But in Pakistan the work is lagging due to many reasons. Chandra *et al*. (2008) prepared a red list of 414 pteridophyte of India. This list was a wider list and compact by Fraser-Jenk (2012). A new list of 337 pteridophytes according to the six basic IUCN categories from India was organized by Fraser-Jenk (2012). From his findings about 15 Indian species (from the list of 337 threatened) are also rare in Pakistan. Ebihara *et al. (*2012) analyzed rare and threatened 886 pteridophytes of Asia. They prepared a red list of Asian pteridophytes using the IUCN criteria including 15 rare ferns of Pakistan. Chaudhri and Qureshi (1991) proposed a checklist for rare and threatened taxa of Pakistan. They focused on rare vascular plants including only two pteridophytes i.e. *Dennstedetia wilfordii* (T. Moore) Christ and *Pellaea hastata* Link as rare taxa. In Pakistan, no work has been done for this important group of plants and even higher vascular plants red listing is its initial stage. According to conservationists, 142 plant species (2% of total documented flowering plants for Pakistan) have been assessed according to IUCN red list categories and criteria (2001) yet (Alam & Ali, 2009; Alam, 2010; Abbas, 2010; Ali 2010; Majid, 2015). But Pteridophytes are totally ignored and only a single pteridophyte species evaluated from Pakistan according to IUCN, Red list Categories and Criteria (2001) (Gul, 2017). Two important workers provided the preliminary checklists of the pteridophytes of the country like R. R Stewart (1972). 50 years ago and Nakaike and Malik (1992:1993) 20 years ago but no conservation work and economic aspect were touched. Although considerable floristic studies of the pteridophytes have been made in Mansehra District (Gul, 2017) but the rest of the area needs to be explored. All of the taxa remained data deficient in terms of conservation. More than 10 species of the area are threatened globally. There conservation is not only important for Pakistan but also at international level. This project will be a baseline for diversity assessment and will contribute in future to the Pteridophytes Flora and Red list of Pakistan and we will also fulfill the international agreement of prevention species extinction. We will educate, train our students and communities also. This will increase our knowledge of species, diversity, protection, habitat protection and will identify those species needs priorities.

**Objectives**

1. To assess the species diversity of the pteridophytes of Hazara Division
2. the conservation status of the native pteridophytes species of the area,
3. to identify their potential threats and suggest conservation measures.
4. To investigate the economic potential of the available species
5. To develop conservation strategies and to ensure their protection and sustainable utilization.

**Materials and Methods**

Pteridophytes Systematic and conservation studies of Hazara division will be investigated. It is located in the north eastern part of Khyber Pakhtunkhwa on Indus River with 18013 sq. Km area. Comprehensive and systematic research activities will be carried out in all the valleys of Hazara Division focusing all important forests, like Galyat, Shran Forest, Kamal ban, Nadi Bangla, and the hills of Hazara Division.

Through literature will be surveyed and useful information will be noted. Authentic maps will be consulted. During this period, field visits fully equipped with accessories (GPS, field note book, field pressers etc) will be conducted in suitable months according to maturity of the species. Lower areas will be surveyed in early spring while snow lines and upper areas will be surveyed in summer. Different families’ reproductive stages will be confirmed through literature. Special taxa will be focused to study even in early spring in all the altitudes where weather allows us.

Field notes with habit, habitat, growth form, abundance, latitude, latitude, uses in local recipes etc will be noted. Systematically focusing, population size, scatteredness or distribution pattern, geographic range or confines, decline in number germination rates will be noted. Herbarium specimens will be prepared to promote research and learning of basic Biology of pteridophytes. IUCN Red Categories and Criteria (2001; 2003) will be adopted for Conservation status assessment. Plants will identify using various authentic floras like Pteridophytes Flora of China, Flora of North America. All the specimens will be deposited in (HUH) on slandered herbarium sheets.

**Impact of the project**

Pteridophytes Flora of Hazara Division will be explored. Specimens will be prepared. Field data will be collected for conservation and ethnobotanical studies. Students will be involved to interact with the community to create awareness regarding these plants. These collections will be used as a reference material in future. Herbarium will be upgraded by providing these specimens. All these efforts will contribute to the pteridophytes flora of Pakistan and Red List of the country

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