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**SACRED GROVES AS EXCELLENT HABITATS FOR MACRO AND MICRO LICHENS**

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**ABSTRACT**

The study dealt with lichen diversity in sacred groves of Uttar Pradesh, as these groves maintained the micro-climatic conditions and showed excellent habitat for lichens. The tradition of sacred groves could provide base line information of biodiversity conservation through community participation. In all the sacred groves, *Mangifera indica* trees were common and maximum crustose and folios lichen species were reported. Epiphytic (bark inhabiting) lichens were dominant in all sacred groves.

Figure :00

References : 19

Table : 00

KEY WORDS : Lichens, Sacred groves, Uttar Pradesh.

**Introduction**

Sacred groves are small or large patches of near natural vegetation preserved on the basis of religious and cultural beliefs and they often represent the climax vegetation of the region<sup>8</sup>. Sacred groves comprise patch of forest or natural vegetation from a few trees to forests of several acres that are usually dedicated to local folk deities or tree spirits. These forests are the relics and are left in small pockets untouched due to religious beliefs and myths<sup>5</sup>. There are different names of sacred groves in various parts of India such as *Orans* in Rajasthan, *Kavil Kadu* in Karnataka, *Dev Bhumi* in Uttarakhand, *Law Lyngdhoh* in Meghalaya and *Dev Asthan* in Uttar Pradesh etc. The sacred groves are important in taxonomical, ecological and anthropological studies. Uttar Pradesh is known for its ecologically distinct and rich biodiversity, having many rare, endemic flora and rich cultural and traditional diversity. In most of the sacred groves

of India, the higher groups of plants are well known. However, such information regarding cryptogams of the sacred groves was by and large neglected. In the sacred grove of the Ugavai of Maharashtra 17 species of lichens were reported, in which endemic taxa *Thelotrema poeltii* were encountered<sup>11</sup>. Several studies have already discussed the need and problems associated with the conservation of the sacred groves<sup>4,6,14</sup>. In Garhwal Himalaya Tarkeshwar sacred groves were reported while in Kumaun Himalaya, Thalkedar and Nakuleshwar sacred groves with respect to biodiversity conservation except lichens<sup>7,13</sup>. The importance of Haat Kali sacred groves of Central Himalaya with respect to biodiversity conservation including endemic moss and rare lichens was reported<sup>1</sup>. A study of the sacred groves and their significance in conserving biodiversity was carried out which reported six sacred groves in Uttar Pradesh<sup>9</sup>. A survey of sacred groves of Devipatan

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region of U.P. was done<sup>16</sup>. Lichens are used in medicine, fodder, and spices<sup>15</sup> and their chemical substances also show activities against different microorganisms<sup>17</sup>. Due to the fast pace of urbanization and other human activities the sacred groves are facing threats of destruction and it is essential to document first and then conserve their biodiversity for ecological balance.

### Study Area

Present study was based on the survey of lichens from Lucknow, Sitapur, Lakhimpur, Kanpur, Allahabad, Hardoi, Barabanki, Gonda, Gorakhpur, Bahraich, Shravasti, Varanasi, Balrampur districts sacred groves. In all the districts groves were dominant tree *Mangifera indica* forest especially open deciduous forest, and some time mixed with *Azadirachta indica*, *Phyllanthus emblica*, *Ficus benghalensis*, *Acacia arabica*, *Artocarpus heterophyllus* and *Nerium olender*. Shrub layers were showing dominance of *Lantana camera*, *Xanthium strumarium*, *Ocimum teniflorum* and *Parthenium* sp. etc.

### Materials and Methods

The specimens were identified by studying their morphology, anatomy and chemistry following the literature<sup>2,3</sup>. The morphology of the taxa was studied under stereo-zoom binocular microscope. The details of thallus anatomy and fruiting bodies were studied by compound microscope. The colour spot tests were carried out on cortex and medulla with the usual chemical reagents such as aqueous potassium hydroxide, Steiner's stable paraphenylenediamine and aqueous calcium hypochlorite. Thin layer chromatography was performed for authentic identification of the lichen substances in system (Toluene: 1-4 dioxane: Acetic acid)<sup>19</sup>.

### Results and Discussion

The rich diversity of lichens in the sacred groves clearly indicated that these habitats were treasure house of cryptograms and supported suitable niches not only for lichens but for the groups of plants. In all the groves crustose lichens were dominant followed by the foliose lichens. The microclimatic conditions provide optimum growth to lichens exhibit well developed growth of their fruiting bodies on various substrates. Further, studies of cryptogams are also important as lichens and bryophytes are well known for their sensitivity to atmospheric pollution and can be used as

excellent indicators of pollution.

The common trees of *Azadirachta indica*, *Ficus benghalensis*, *Acacia arabica*, provide good substratum for their growth in the groves. Parmeloid lichens popularly known as 'Charila' or 'Jhula' in these areas are exploited for their ethnic and commercial uses and hence need to be conserved for the future. The observation of lichens from all the sacred groves surveyed showed dominance of foliose lichens which clearly indicated a pollution free environment of sacred grove. The leprose and crustose lichen such as *Bacidia*, *Graphis*, *Leconara* and *Chrysothrix* were the primary colonizers of ecosystem and indicated the presence of regenerated young forest trees in sacred grove.

The occurrence of two *Peltula* species (*Peltula obscurances* Nyl. Gyeln. and *Peltula patellata* Bagl. Swinscow & Krog) found growing wall of temple or rocky outcrop suggesting the excellent habitat of sacred grove in different districts for growth of some exclusive lichens taxa. The lichen family Physciaceae, grows luxuriantly on the moist and shady habitats. The abundance of foliose lichens (*Pyxine*, *Physcia*, *Phaeophyscia*, *Dirinaria*) in the sacred grove was more experienced in the open forest with sufficient penetration of sunlight. The localities which were near the cities, the micro lichens were dominant such as *Rinodina*, *Caloplaca*, *Bacidia* and *Arthopyrenia* because of heavy anthropogenic activities

The sacred groves in Uttar Pradesh exhibit occurrence of crustose lichen species both on trees and rocky crop. The growth of *Lecanora* species is favored in well illuminated environmental conditions mostly in thinned forest with considerable exposure of light and wind.

Sacred groves are treasure of rare and endemic flora and showed occurrence of some rare lichens such as *Caloplaca subpoliotera* and *Heppia lutos* (Ach.) Nyl. on the rocks, *Collema* sp. (on the bark)<sup>10</sup>. The most common lichen species among phorophyte were *Pyxine coco*es (Sw.) Nyl. (on the bark of *Mangifera indica* and *Ficus benghalensis* trees) and *Rinodina sophodes* (Ach.) Massal. (on the bark of *Azadirachta indica* and *Acacia arabica* trees).

Climax vegetation in sacred groves was always very rich in their species composition. As such these sacred groves serve the vital function of preservation of plants which become very rare or extinct elsewhere<sup>18</sup>. The sacred groves exhibit rich

diversity of lichens as compared to their nearby city areas. Being protected areas, mostly the growth of thick phorophytes in the sacred groves formed a close canopy which provided moisture and shade at the forest floor. The moist, shady habitats provide suitable condition for many lichen taxa to colonize there. The species of *Bacidia*, *Chrysothrix* and *Pertusaria* preferred to grow on such habitats.

Ninety species belonging to 24 families and 33 genera of lichens were reported from Uttar Pradesh and the crustose lichens were dominant with 60 species followed by the 15 foliose lichens species<sup>12</sup>.

The Naimisharanya (Neemsaar) sacred grove in Sitapur, situated near Gomati river exhibited occurrence of crustose species of lichens. Similarly, many species of lichens such as *Lecanora*, *Pyxine*, *Pertusaria* and *Peltula* were reported only from localities within the sacred groves and exhibited their absence even in protected areas of the district.

Together with the plant resources, the sacred groves are also the excellent habitats of other natural resources (water, fodder, fuel and other commercial uses) and thus experience heavy

anthropogenic. The devotees, celebration of rituals ceremonies, over-grazing, and water from their resources were the various human activities responsible for loss of diversity of these areas. Under the broad umbrella of protected area a sacred grove conservation programme could be initiated keeping the traditional administrative bodies at centre stage. The degraded sacred groves should be immediately restored or regenerated using appropriate technology. Steps must be taken to raise awareness among the concerned villagers regarding importance of sacred grove conservation.

It is clear from the above observations that the sacred groves of Uttar Pradesh exhibited occurrence of some exclusive lichen taxa together with different groups of lichen which indicated different characteristic features of the sacred groves. The diverse microclimatic conditions provide opportunity for many groups of cryptogams and phanerogams to colonize in these excellent micro-habitats of sacred groves. The present number and diversity of lichen species will act as a base line data to carry out biomonitoring studies in the area in future.

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