Fire Control – A Conservation Tool for certain Medical Plants in Grass Hills Ecosystem, The Western Ghats

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ABSTRACT: Grass Hills ecosystem lies in Anaimalais. The western ghats possesses rich biodiversity. The annual summer fire, an integral part of this ecosystem, promotes the ecological status of certain perennial grasses including the dominant grass, Chrysopogon zeylanicus Thw. On the other hand, some medicinal plants Viz., Impatiens tomentosa Heyne, Drosera peltata Sm Osbeckia parviflora Arn., Emilia sonchifolia Dc. Lecanthus penduncularis Wedd. And Lobelia nicotianifolia Heyne were identified as fire threatened species and it has been observed that their sociological attributes were hampered severely by fire. Hence, the conservation of such species is needed through effective fire control measures.

INTRODUCTION:
Grass Hills ecosystem (ca 19000 ha) lies in Anaimalais, the western ghats at an elevation range of 1650m to 2100 meters above m.s.l. Annual summer fire is an integral part of this ecosystem(1) and it suppresses the distribution, density and basal cover of many plant species(2). The present study mainly aims to know the effect of annual summer fire on the ecological status of certain medicinally important herbaceous plants and hence the need of their conservation in Grass Hills.

MATERIALS AND METHODS:
There experimental sites each with an area of ca 1 ha were selected in grass Hills. The site II was burned only once, during February, 1988 and the site III was burned twice during the February of 1988 and 1989. the site I protected from fire during the study period served as control. The study was carried out over a period of 25 months from February, 1988 to February, 1990 and the samplings were made at an interval of 3 months. In each site during sampling, 20 quadrats of 1x1 size each, were laid and the phytosociological observations were recorded the ecological attributes were arrived at by using the following formulae given by (3):

Frequency = \( \frac{\text{No of quadrats in which the species present}}{\text{Total no. of quadrats studied}} \times 100 \)

Density = \( \frac{\text{No. of individuals of the species in all quadrats}}{\text{Total no. of quadrats studied}} \)
Basal cover + pr2X total no of individuals of a species present in 20 quadrats.
Where, p-22/7
R= radius of a stem of the individual of a species.

Relative frequency = \( \frac{\text{No. of occurrence of the species}}{\text{No. of occurrence of all species}} \times 100 \)

Relative density = \( \frac{\text{No. of individuals of the specie}}{\text{No. of indivuals of all species}} \times 100 \)

Relative dominance = \( \frac{\text{Total basal area of the species}}{\text{Total basal area of II species}} \times 100 \)

Importance value index (IVI) is the sum quantities of relative frequency, relative density and relative dominance expressed in per 300.

RESULTS AND DISCUSSION:

Grass Hills ecosystem of anaimalias, a habitat of rich plant diversity is being dominated by a perennial grass, chrysopogon zeylanicus Thw. In association with various species of ecological importance. It is a diclimax community maintained at chrysopogon zeylanicus dominated stage b the annual summer fire. The species vi anaphalis subdecurrens gamble and pterdium aquilinum L. Are the indicators, enchancing their ecological attributes in the post fire communities. Certain medicinal plants viz., Impatiens tomentosa Heyne, drosera peltata S., osbeckia parviflora Arn.Emilia sonchifolia Dc., Lecanthus peduncularis wedd and Lobelia nicotianifolia Heyne were also identified in the stud area. The species impatiens tomentosa is used as ornamental plant due to its blossoms; the alcocholic extract of flowers has marked antibiotic activity. The insectivorus plant, Drosera peltata reported to be used by Ayurvedic practitioners in the preparation of gold bhasma. The powdered form of Osbeckia parvifolia is used for swellings. The herb, Emilia sonchifolia is edible and is also used as salad plant before flowering; the root is used for diarrhea; the juice of fresh leaves is used for sore ears, sore eyes and nigh blindness. The leaves of the plant, Lecanthus penduncularis are edible and the whole plant is used for curing wounds and cuttings. The species, Lobelia nicotianifolia has diverse use. The leaves are sweet ; acrid; aphrodisiac; stomachic; diuretic; cure ‘Kapha’ diseases of blood, heart, uteres, and the vagina; also used as leech repelalnt; stem bark is used to cure toothanche. These medicinal plants are highly hampered and significantly lost their ecological importance due to fire in the stud area. (Table 1). Generally, The distribution, density, basal cover and their relative values and the total ecological importance of these plants were significantly reduced during burned years in the experimental sites further, it has been observed that these species in fire influencing communities is already well documented. Occurrence of continual annual fire may terminate, these threatened species form the community in course of time since qualitative evolution of the plants was more homogeneous in the burned plots than in the unburned plots. This may be due to the reduction of seed
pools of such species on the burned plots\textsuperscript{(13)}. Hence, the conservation of these valuable medicinal sources is needed through effective fire control measures.

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### Table 1: Frequency, density, basal cover relative frequency, relative dominance and important value index (IVI) of certain herbaceous species which need conservation in the Grass Hills ecosystem, Anaimalais.

| Attributes                        | Site                                      |
|-----------------------------------|-------------------------------------------|
|                                   | SPECOE5                                   |
|                                   | Impatiens tomentosa                       |
|                                   | Drosera pelata                            |
|                                   | Osbeckia parviflora                       |
|                                   | Emilia sonichifolia                       |
|                                   | Lecanthus peduncularis                    |
|                                   | Lobelia icotianifolia                     |
|                                   | 1988-891989-90                           |
| Frequency                         | 1988-891989-90                           |
| Density (individuals /m2)         | 1988-891989-90                           |
| Basal cover (sq.mm/20 quadrats)   | 1988-891989-90                           |
| Relative frequency (%)            | 1988-891989-90                           |
| Relative density (%)              | 1988-891989-90                           |
| Relative dominance (%)            | 1988-891989-90                           |
| IVI                               | 1988-891989-90                           |

### Attributes

| Species                      | Frequency | Density | Basal cover | Relative frequency | Relative density | Relative dominance | IVI     |
|------------------------------|-----------|---------|-------------|--------------------|------------------|--------------------|---------|
| Impatiens tomentosa          |           |         |             |                    |                  |                    |         |
| Drosera pelata               |           |         |             |                    |                  |                    |         |
| Osbeckia parviflora          |           |         |             |                    |                  |                    |         |
| Emilia sonichifolia          |           |         |             |                    |                  |                    |         |
| Lecanthus peduncularis       |           |         |             |                    |                  |                    |         |
| Lobelia icotianifolia        |           |         |             |                    |                  |                    |         |

Means followed by same letter between sites for each species are not significant at 5% by DMRT.
The values are the average of 4 samples taken during one ear (February, May August and November).