

IMPACT OF *ADHATODA VASICA* ON HERBACEOUS VEGETATION

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ABSTRACT

Adhatoda vasica is a member of family Acanthaceae (Malik and Ghafoor, 1988). It has been used in ayurvedic and Unani medicines and used locally for the last 2000 years in India (Atal, 1980). The roots and leaves of this plant are used to treat bronchitis, asthma, fever and jaundice (Malik and Ghafoor, 1988). It grows in wastelands and degraded forest in the Aravali hills in Alwar district of Rajasthan. (Bhandari, M.M.1990). It may affect the soil characteristics wherever it grows. Hence an attempt has been made to evaluate its allelopathic impact on herbaceous vegetation in the Sariska Tiger Project.

Keywords: Medicinal Plant, Allopathic, Herbaceous, Sariska Tiger Project, Acanthaceae.

Introduction

Adhatoda vasica is a diffuse, branched, evergreen plant, internodes short, leaves up to 20 x 8 cm, oval or elliptical. Flowers are white with pink or purple stripes in axillary, peduncled spikes and at the end of branches. Bracts conspicuous, capsule 2.5 x 8 cm or more. It is often gregarious on the ridge adjacent hilly tracts where it occurs as a codominant shrub with *Capparis sepiarea* Linn. It is a medicinal plant. Its roots are used in fever.

The leaves are used by the local people of Sariska Tiger Project in the cure of cough. It flowers from December to April. Fruit is usually loculicidal capsule and the walls are often elastically recurved, leaving the central axis. The seeds are dispersed by explosive mechanism of the capsules.

Materials and Methods

Impact of *Adhatoda vasica* on the herbaceous vegetation. Three sites were selected in the core area with *Adhatoda vasica* and without *Adhatoda vasica* in valley of the Kali ghati forest of Sariska tiger project. So, in these study sites there were two treatments (1) herbaceous vegetation without *Adhatoda vasica* and (2) herbaceous vegetation with *Adhatoda vesica*. The phytosociological observations regarding herbaceous vegetation, i.e. density, frequency and basal area of herbaceous species were taken by laying 10 quadrates of 1 m² at random in each treatment of the study site. To evaluate the impact of this plant on the growth rate of associated herbaceous species, the biomass of the herbaceous vegetation was estimated at monthly interval from July onwards by harvesting plants from 50 cm x 50 cm quadrates from each treatment of all the study sites. Plants of individual species were separated and dried at 80°C for 48 hours in a hot air oven to estimate there above ground and below ground biomass following Misra (1968). The soil moisture content of each treatment of study site was estimated in

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September and October after the retreat of monsoon rains. Three soil samples were taken from 10 cm x 10 cm x 10 cm volume of soil from each treatment of a study site, the soil of three samples was mixed and then use to analyse the physical and chemical characteristics of soil.

Results and Discussion

Impact of *Adhatoda vasica* in the herbaceous vegetation. 27 herbaceous species were reported in the first study site where *Adhatoda vasica* was not present while 7 species were present where this plant was growing. Most of the herbaceous species exhibited reduction in density and basal area in the presence of this plant. Many local herbaceous species were completely suppressed by this plant where as many ruderal weeds were growing in the sites dominated by this plant.

Study site - 2, where 29 herbaceous species present where this plant was absent where is only 7 herbaceous species were present in presence of this plant. The density and basal area of most of the herbaceous species were reduced in the presence of this plant. *Brachiaria reptans*, *Desmostachya bipinnaata*, *Digitaria adscendens*, *Elytraria acaulis*, *Peristrophe bicalyculata* and *Trumpfetta rhomboidea* showed lower density and basal area in the presence of this plant.

In study site -3, there were 32 herbaceous species where this plant was absent while 18 species were reported where this plant was present. The slightly higher number of herbaceous species with this plant in this site may be due to less population density of this plant. The density and basal area of most of the herbaceous species were low where *Adhatoda vasica* was present. The impact of this plant seems to be more on the grass species as compared to the dicotyledonous herbs.

Biomass

In site -1 the total above ground biomass of herbaceous species was 2.74 gram/m² as compared to that of 13.24 gram/m² in vegetation without this plant. The corresponding values for the total below ground biomass were 0.59 and 3.12 gram/m² in September. After 1 month the total above ground biomass was 2.72 g/m² as compared to 35.13 g/m² in the vegetation without this plant. In October the corresponding values for the total below ground biomass were 0.55 and 6.49 g/m². Similar trends in the suppression of biomass production of herbaceous vegetation were observed in the other study sites. Hence the data collected indicate that the above ground and below ground biomass was also drastically reduced in the presence of *Adhatoda vasica*. The adverse effect was enhanced with the increase in biomass of this plant both in time and space. Most of the herbaceous species were adversely affected due to the presence of *Adhatoda vasica*. In the first harvest only 10 herbaceous species exhibited sufficient biomass whereas, there were 16 herbaceous species with high biomass at the third harvest.

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