

**Original Research Article****DOI: 10.26479/2019.0502.06*****PARTHENIUM HYSTEROPHORUS*: A PERNICIOUS THREAT TO
PHYTODIVERSITY OF POONCH DISTRICT, JAMMU AND KASHMIR INDIA****Javed Manzoor***

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ABSTRACT: *Parthenium hysterophorus* L. is an exotic weed of Astraceae family distributed throughout the world. Due to its aggressive nature and ability to compete with native herbaceous flora, it has attained a major weed status in India [1][2]. The present work was carried out in Poonch district of Jammu and Kashmir, India with an aim to study the distribution, occurrence and colonizing mode of *Parthenium* weed along with other common invasive weed species. For the sampling of exotic weeds, intensive survey was conducted in different habitats of the study area. During the survey a total number of 10 common exotic weeds were identified in the area. Phytosociological data revealed that *Parthenium hysterophorus* has a highest frequency and density of 96% and 28.8% respectively while the rest of the weeds associated with the *Parthenium* in the study area showed frequency and density of 10-72% and 0.9%-28% [3]. Due to its rapid growth and adaptability to a variety of habitats, this weed has emerged as a major threat for the environment, agro-biodiversity, livestock and human health in the area.

KEYWORDS: *Parthenium hysterophorus* L., threat, diversity, Poonch.

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1.INTRODUCTION

Biological invasion by the alien species is now recognized as one of the major threats to native species and ecosystems as these species produces severe and often irreversible impacts on agriculture, biodiversity and natural resources [4]. *Parthenium hysterophorus* L. is one of such invasive weed widely distributed in many parts of the world including India. It belongs to family Asteraceae and is Neotropical in origin. It is commonly known as Carrot weed (English) or Congress

grass (English) throughout the world, however in India it is known by different vernacular names like Chatakchandani, Broom bush, Gajari, Phandriphuli, Nakshathragida, Vayaribama, Safed topi, Kadvighas and Gajarghasetc [5][6]. *Parthenium hysterophorus* L. was reported to be one of the seven most dangerous weeds of the world (Singha, 1992) [7]. It is an aggressive weed which grows in a wide variety of habitats such as wasteland, roadsides, railway tracks, fallow fields, open orchards, plantation crops, forests, overgrazed pastures, industrial areas, crop fields and residential areas etc [8]. Due to fast multiplication, rapid growth and ability to compete with other native flora, *Parthenium hysterophorus* has achieved a major weed status in India and Australia within a relatively short period of time [8] [9]. *Parthenium hysterophorus* can affect crop production, animal production, human health and biodiversity in its area of infestation. When human beings frequently come in contact with this weed many medical complications develop, allergy and dermatitis being the common [11]. The domination and rapid spread of *Parthenium* weed in grazing lands with gradual reduction of native plants species could be due to its high invasive capacity, allelopathetic properties, short life cycle and prolific character (Dalip et al, 2013) [12]. Its allelopathic effect along with absence of natural enemies like insects and diseases are the two major factors responsible for its spread in India. Although *Parthenium* weed is capable of growing in most of the soil types, but it grows dominantly in alkaline and clay loamy soils [13] [14]. In Jammu and Kashmir India, it mostly germinates in the months of February-March and attains maturity after rains in June [15]. Poonch is one the remotest district of Jammu and Kashmir, India and is agro-pastoral in nature. However for the last one and half decade due to various reasons such as militancy and mass migration of people from rural hamlets to urban settlements, most of the pastures and agricultural fields had left abandoned/fallowed by the people which in due course of time get colonised by many invasive weed species including *Parthenium* [16]. *Parthenium* has emerged as a dominant weed species in Poonch district as it has covered almost all the fallow lands, river beds, croplands, wastelands, pastures, grasslands etc. cutting across the district boundaries and agro-climatic regions [17] [18]. The aim of the present work was to collect phyto-sociological data on different invasive weed species present in Poonch district of Jammu and Kashmir, India with special reference to distribution, threats and colonizing mode of *Parthenium hysterophorus*.

2. MATERIALS AND METHODS

Study Area

The present study was conducted in Poonch, one of the remote districts of Jammu and Kashmir India, situated at the foothills of Pir Panjal range in Western Himalayas with an average elevation of 981 meters above sea level. Geographically it lies within 33.77° N Latitude and 74.1° E longitudes. Climate of area ranges from sub-tropical to temperate with a temperature scope of 20-39 °C in summer to 3-19 °C in winter. Topographically Poonch is steep, hilly and undulate with a few plain valleys, drained by small rivulets and nallahs. Rainfall in the study area was recorded to be

929.2mm/annum. Poonch district is bordered by Kashmir valley in the north east, Rajouri district in the south and Pakistan occupied Kashmir in the west. The study area has three notable seasons winter, summer and rainy respectively. The vegetation of the study area is primarily subjected to monsoon rainfall and varies from humid zone to temperate zone. Agriculture is the primary occupation of people followed by pastoralism. Sub-mountainous, meadow, alluvial and loamy soils are present in various valleys of the district.

Methodology

Based on the severity of the threats imposed by invasive weed species on the local diversities and accessibility of the study area, 10 different sites/land use types (wastelands, watersheds, grasslands, roadsides, fallow fields, open orchards, plantation crops, forests, overgrazed pastures, and residential areas) of Poonch district were selected for the study. Each study site was intensively surveyed for the occurrence of various invasive weeds [19]. Observations were made regarding the distribution, colonization modes and damage caused by these species particularly, the *Parthenium* weed to local agro-ecosystems and biodiversity during April to September 2018. The samples were taken at the interval of 5 km. Sampling was done with a 1m² quadrat, a total of 100 quadrates, i.e. ten sample quadrates were thrown at each major site [20] [21]. The weed species were collected and properly identified with the help of available literature, monographs by Sharma and Kachroo (1983), Kaul (1986). [22] The data on species diversity were analyzed for density and frequency by applying the following formulas.

$$\text{Absolute frequency (AF) (\%)} = \frac{\text{Number of quadrates in which species occurs}}{\text{Total number of quadrates}} \times 100$$

$$\text{Relative frequency (RF) (\%)} = \frac{\text{Absolute frequency value for a species}}{\text{Total Absolute frequency values for all species}} \times 100$$

$$\text{Absolute density (AD) (\%)} = \frac{\text{Total number of individuals of a species in all quadrates}}{\text{Total number of quadrates}} \times 100$$

$$\text{Relative density (RD) (\%)} = \frac{\text{Absolute density for a species}}{\text{Total absolute density for all species}} \times 100$$

3. RESULTS AND DISCUSSION

The distribution, occurrence and colonization mode of *Parthenium hysterophorus* along with other invasive weed species was studied in various habitats of the Poonch district [23]. During the phytosociological survey of the study area, a total number of 10 common exotic weed species were identified. *Parthenium hysterophorus* was found to be the most common and dominated weed species present in the area with 96% absolute frequency and 24.36% relative frequency followed by *Euphorbia hirta* L with an absolute and relative frequency 72% and 18.27% respectively. The rest of the weeds identified in the study area showed an absolute and relative frequency of 10%-55% and 2.53%-13.95% respectively [24]. *Parthenium hysterophorus* also exhibited the highest absolute density of 28.8% and relative density of 33.97% followed by *Euphorbia hirta* with an absolute and relative density 20.16% and 23.78% respectively. The rest of the weed species in the study area showed an absolute density of 0.9% to 10.45% and relative density of 1.06% to 12.32%. (Table 1). Phyto-sociological data revealed that *Parthenium* weed has the highest frequency and density in the study area. During the field observation it has been observed that *Parthenium* has covered most of the available wastelands, roadsides, fallow lands, open orchards, degraded forest areas, pastures, croplands and residential areas etc. and has emerged as a major noxious weed threat to agroecosystems and local biodiversity of Poonch district. As reported by (Navie-et al,1996),[25] *Parthenium* weed spread at a faster rate due to its aggressiveness, high vitality of seeds, easily dispersal, fast germination, innate dormancy and prolific seed producing nature and also due to having an enormous seed bank in abandoned fields, (Joshi,1991)[26][27]. During the field survey large scale reduction of grasses and forages were noticed in pastures due to dominant growth of *Parthenium*, which has become a threat for the livestock of area also. [28]. It has also been observed that this weed is spreading at an alarming rate in Poonch district due to various reasons such as intensive agriculture, increase in industrialization and easily dispersal of its seeds through wind, water, hay, fodder, cereals and animals like cattle, horses, sheep and goats etc as the Poonch district is agro-pastoral in nature [29]. Its eradication has become a major challenge for the inhabitants of Poonch, primarily because of its epidemic proliferation and strong reproductive potential, apart from its wide ecological range [30]. Moreover several physical methods tried by the locals for its elimination have proven ineffective and remained an issue of health [31] [32]. Therefore there is a need for ecologically balanced management of *Parthenium* weed aiming to enhance the quality of life for farmers and rural communities, especially in pastoral and agro-pastoral areas of Poonch district.

Table 1: Frequency and density of *Parthenium hysterophorus* L and other weeds in the study area

| S.No | Name of Plant species | Family | Absolute frequency | Relative frequency | Absolute Density | Relative Density |
|------|---|----------------|--------------------|--------------------|------------------|------------------|
| 1 | <i>Ageratum conyzoides</i> L. | Asteraceae | 12 | 3.04 | 1.56 | 1.84 |
| 2 | <i>Calotropis procera</i> (Ait.) R. Br. | Asclepiadaceae | 13 | 3.29 | 1.82 | 2.14 |
| 3 | <i>Cannabis sativa</i> L. | Cannabaceae | 55 | 13.95 | 10.45 | 12.32 |
| 4 | <i>Euphorbia heterophylla</i> L. | Euphorbiaceae | 10 | 2.53 | 0.9 | 1.06 |
| 5 | <i>Euphorbia hirta</i> L. | Euphorbiaceae | 72 | 18.27 | 20.16 | 23.78 |
| 6 | <i>Malvastrum coromandelianum</i> (L.) | Malvaceae | 53 | 13.45 | 8.48 | 10.0 |
| 7 | <i>Oxalis corniculata</i> L. | Oxalidaceae | 18 | 4.56 | 2.52 | 2.97 |
| 8 | <i>Parthenium hysterophorus</i> L. | Asteraceae | 96 | 24.36 | 28.8 | 33.97 |
| 9 | <i>Solanum nigrum</i> L. | Solanaceae | 49 | 12.43 | 7.84 | 9.24 |
| 10 | <i>Xanthium strumarium</i> L. | Asteraceae | 16 | 4.06 | 2.24 | 2.64 |

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CONFLICT OF INTEREST

Authors have no any conflict of interest.

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