Parthenium Hysterophorus L. (Congress Grass) Asteraceae: An Invasive Weed

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Abstract- *Parthenium hysterophorus L. (Congress Grass) belongs to the family Asteraceae. It is a invasive alien weed species. Parthenium hysterophorus L. has become a problematic issue to humans all around the world. It is considered a major threat in many regions. Parthenium causes severe human and animal health issues, agricultural losses and serious environmental problems. There is a need to develop effective management strategies to control of this invasive species. In the present paper the detail information about ecological conditions, allelopathic effect and control of Parthenium hysterophorus are discussed.*

Keywords- Invasive alien species, Pathogen, environment, problematic.

I. INTRODUCTION

Invasive alien species are a serious implement to conservation and use of global biodiversity [1]. The invasive weed *Parthenium hysterophorushas* become one of the world's seven most devastating and hazardous weeds in more than 20 countries worldwide. *Parthenium hysterophorus* L. (Congress Grass) belongs to the family Asteraceae. *Parthenium hysterophorus* was thought to be initially introduced in India before 1950s [2], [3] with food grains imported from the USA, but heavily introduced after 1956 through the transport of Milo (red wheat) from Mexico. After 1956, the weed spread throughout India, and invades in all disturbed land, including farms, pastures, and roadsides. In some areas, outbreaks have been of almost epidemic proportions, affecting crop production, livestock and human health [4].

It has been well established that *Parthenium* causes severe human and animal health issues, agricultural losses besides serious environmental problems like loss of biodiversity [5].

Owing to its fast spread *Parthenium hysterophorus* L. has become a problematic issue to humans all around the world. It can tolerate drought condition also to a certain extend under favorable conditions [6]. *Parthenium hysterophorus* L. completes about three generation in a year. It is also reported that congress grass has remarkable power of regeneration [7].

Fig 1: The plant of *Parthenium hysterophorus* (Congress grass)

II. ORIGIN

Parthenium hysterophorus L. (Asteraceae), an annual asteraceous herb, is native to Central and South America and is considered to have originated from the Gulf of México. *Parthenium hysterophorus* has spread rapidly and extensively throughout the world since the 1970s [8] and is considered a major threat in many regions [9].

III. ECOLOGICAL CONDITIONS

Parthenium hysterophorus is capable of growing on a wide range of soil types ranging from sandy to heavy clays, but favors' the latter [10]. It occurs in areas with summer rainfall greater than 500 mm per annum [11]. *Parthenium hysterophorus* is found mostly in hot climates. High temperature (28 to 33°C) is favorable because it increases the dry matter production of the plant due to maximum photosynthesis [12]. Low winter temperature inhibits the growth of the plant and the seed production [13]. Germination

can occur at temperatures between 10°C and 25°C, it has high germination ability throughout the year [14]. *Parthenium hysterophorus* colonizes new areas rapidly by means of relatively high numbers of seeds, seed dispersal is by various modes and hence exhibit rapid growth rate [15]. Disturbed habitats, such as roadsides and railway tracks, stockyards, around buildings and fallow agricultural lands, are particularly suitable for *P. hysterophorus*, due to a lack of interspecies competition [16].

IV. ALLELOPATHIC EFFECTS

Due to the invasive capacity and allelopathic effects of *P. hysterophorus* [17], natural ecosystems are disrupted [8]. The weed possess an adverse effect on crop production, animal production, human health, and biodiversity in the area of infestation due to the allelopathic nature [18], [19]. Positive and negative allelopathic effects have been reported of *Parthenium* on many agricultural crops and other plant species [20] and it inhibits the surrounding herbaceous vegetation [21], [22]. Allelopathy is achieved primarily via the two groups of allelochemicals, phenolics and sesquiterpene lactones, mainly parthenin [23], which inhibit the germination and growth of plants that include pasture grasses, cereals, vegetables and other plant species [2]. In India, *P. hysterophorus* causes a yield decline of up to 40% in agricultural crops [24]. The most common effects of allelochemicals may occur through leaching, volatilization, root exudations and decay of the fallen parts either through biotic or abiotic means [25].

V. CONTROL

Singh [26] considered use of biological control agents and exploitation of competitive plants, the most economic and practical way of managing *Parthenium*. During last few years much emphasis has been given to control *Parthenium* through various biological agents like insects, pathogens and competitive plants. In past, attempts were made to review work on biological control of *Parthenium* in context to India, Australia and global situations [27], [28]. The classical biological control was started with the introduction of a host-specific leaf-feeding beetle *Zygogramma bicolorata* Pallister (Coleoptera: Chrysomelidae) from Mexico [29].

The method by which the weeds can be managed through the use of pathogens is called biological control through pathogens. In this approach, fungi, bacteria and viruses may be used. The toxins produced by these organisms which may kill the weeds are known as bioherbicides and toxin produced by the group of fungi are called mycoherbicides. Among different microorganisms, maximum work has been done on fungi. Use of pathogens and mycoherbicides against *Parthenium* has been reviewed by Sreeramkumar [30], Sreeramkumar and Evans [31].

VI. CONCLUSION

The rapid spread of Parthenium has been a risk to the biodiversity, sustainable production of many crops, human health and livestock. Control of Parthenium is therefore crucial to boost productivity of many crops as well as to overcome the loss of biodiversity. There is a need for weed scientists to develop effective management strategies to control of this invasive species.

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