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Review Article

A Review: Parthenium (*Parthenium heterosporus* L.) major threat in Gujranwala

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Abstract

A survey on Parthenium (*Parthenium heterosporus* L.) was conducted to review the noxious weed in Gujranwala during 2012. The survey showed that maximum numbers of pollens were present during October to February each year in atmosphere and its intensity minimum from June to August. Although at present this weed is found on sides of roads & canals, but slowly its entrance in crops is becoming problem. Due to deep tap root system it could not be controlled easily that's why it becomes major threat to the farmers. According to the findings of the scientists the use of Glyphosate @ 2.5 Lha⁻¹; Atrazine @ 1250 mlha⁻¹; Metribuzen @ 625 gha⁻¹ and Ematrene+Atrazine @ 2.5 kgha⁻¹ these gave best result against this weed in fallow lands. At the end it is concluded that development of new cost effective and persistent herbicides with less residual effects should be adopted. The best options regarding use of parthenium are mulching, producing biogas, paper and making compost.

Keywords: Deep root, threat, allergy, pollen, Gujranwala.

Introduction

Parthenium (*Parthenium heterosporus* L.) commonly known as Gajar booti/star weed or Gajar booti. It belongs to the division magnaliophyta having class Magnoliopsida, order Asterales and family Asteraceae. It is distributed all over the world like Asia. Many years ago this weed entered in Pakistan through contaminated cereal grain. The weed has been spread like wild fire throughout Pakistan. It occupies almost fallow lands near road sides, railway tracks and grounds in agro ecological

zone of Gujranwala. At flowering stage, uprooting or mere touch of leaves by naked hands caused contact dermatitis to susceptible individuals; enormous quantity of pollens are produced which become air borne to great height in significant amount (Lewis *et al.*, 1987-88; Seetharamiah *et al.*, 1981; Agashe *et al.*, 1988). In India and Australia this weed is considered as major problem in uncultivated lands (Mahadevappa, 1997), (Navie *et al.*, 1996) and also in cultivated lands (Shabbir,

2002). This is a noxious weed that can effect crop production, animal husbandry, human health and natural biodiversity. Besides causing dermatitis, the pollen grains of plant are responsible for asthma, in human beings. Increasing attack of this weed in urban areas also poses a serious threat to the health of the inhabitant of Islamabad (Shabbir *et al.*, 2007). The allergic reactions include hay fever, asthma and dermatitis and can be caused by the dust debris or volatiles fumes the plant as well as its pollen (McFadyen, 1995). However the survey has been planned to review & control measures of the dangerous weeds in Punjab-Pakistan.

Investigation of Parthenium

Phenotype

This is an annual herb, erect, up to 2m in height; the stem is branched and covered by trichomes. Leaves of the plant are pale green, lobed, hairy, initially forming a basal rosette of strongly dissected leaves that are up to 30cm in length. Close to the soil, alternate, sessile, irregularly dissected and bipinnate, having small hairs on both the sides resembling the leaves of carrot. Flowers are creamy white about 4mm across arising from the leaf forks.

Botanical characteristics

Flowering occurs after one month of germination. The fruit is called cypsela, each flower contains five seeds which are wedge shaped, black, 2mm long with thin white scales. A single plant produced up to 100000 seeds in its life cycle. More than 340 million per hectare can be present in surface soil. Seeds did not have dormancy period and are capable of germinating any time when moisture is available. They have tap root system. The highest germination rates are at temperature from 12-27°C.

Seed dispersal

The seeds are mainly dispersed through water and air currents and by the movement of vehicles, machinery and animals from one place to another. Parthenium seeds can germinate between 8-30 °C; however the optimum temperature for germination

is 22-25°C. More than 90% Parthenium seeds buried 5cm deep in the soil and they can survive upto 2-3 years.

Damage

Parthenium attack is caused through natural ecosystem. It disturbed natural sites that reduce pasture growth and depresses forage production. As it has allelopathic effect so there is almost no attack of insect and diseases on it and ultimately it spread rapidly.

Threat

Its pollen is known to inhibit fruit setting in many crops. The germination and growth of indigenous plants inhibited by its allelopathic effect. The pollen grains especially air borne species of dried plant material and roots of parthenium can be caused allergy-type responses like hay fever, photo-dermatitis asthma, skin rashes, peeling skin, puffy eyes, excessive water loss, swelling and itching of mouth and nose, cough running nose and eczema in human beings. In animals the plants can cause anorexia, pruritus, alopecia, dermatitis and diarrhea in animals. Parthenium can be stained sheep meat and make diary milk unpalatable due to its irritating odor. In India an extensive outbreak of weed dermatitis caused by parthenium allergy involving around 100 patients (Anuradha *et al.*, 2006).

Habitat

It grows in wastelands, vacant lands, orchards, forest, flood plains, agricultural areas, shrub lands, urban areas, over grazed pastures, road sides and railway tracks. It prefers alkaline, clay loam to heavy clay soils but it can tolerate a wide variety of soil. This weed grows well in areas where the annual rainfall is more than 500 mm and falls dominantly in summer.

Utilization

Parthenium has been well documented for its insecticidal, nematicidal and herbicidal properties.

It is also used for mulching and for producing biogas, paper and compost.

Methods to control weed

Cultural practices

Manual uprooting or hoeing.

Mechanical control

Ploughing of *Parthenium* before flowering and seed setting is the most effective in wet soils.

Chemical control

A large number of chemicals have been sprayed to control this weed in Pakistan. The use of Glyphosate @ 2.5 L ha⁻¹, Atrazine @ 1250 ml ha⁻¹; Metribuzen @ 625 g ha⁻¹; Emmatrene+Atrazine @ 2.5 kg ha⁻¹. The timing of chemical control is critical which is sprayed before flowering in open waste lands, non cropped areas, railway tracks and road sides the spraying of solution of common salt (Sodium chloride) @ 20% concentration has been found most effective (Sankaran, 2011).

Biological control

Leaf feeding beetle (*Zygogramma bicolorata*) and the stem galling moth (*Epiblema strenuana*) are widely used in several countries to manage parthenium. Their moth significantly reduced flower and seed production of the weed. Seed boring weevil (*Listronotus setosipennis*); seed feeding weevil (*Semicronyx lutulentus*); leaf mining moth (*Bucculatrix perthenica*); stem boring moth (*Platphalonidia mystica*) and root boring moth (*Carmenta ithacae*) are found most effective for its control. However insect which remain active during most of the year would be more helpful in managing the weeds in general.

Conclusion

At the end it is concluded that development of new cost effective and persistent herbicides with less residual effects is necessary for its control. However

utilization of weed as green manure, growth inhibitor in medicines should be promoted; hence population is controlled through exploitation. . It could be used for mulching, producing biogas, paper and making compost & as growth inhibitor. However the use of Glyphosate @ 2.5 L ha⁻¹ and Metribuzen @ 625 g ha⁻¹ gave best result to control this weed in fallow lands.

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