

Congress Grass: An Emerging Threat for Sustainable Crop Production in India

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INTRODUCTION

Parthenium hysterophorus L. which is commonly known as congress grass is a problematic weed of Asteraceae family. It is posing a serious threat to crop cultivation and also to human and animal health. It is native to Tropical America but now it has widespread in India, Africa, China, Vietnam, Pacific Islands and Australia. In India, it was first recorded in 1810 in Arunachal Pradesh and Nagaland and in Pune in 1955. By 1972, it has spreaded in every state of India. In general, the overall spread in terms of density and infestation level is that it is highest in Andhra Pradesh, Bihar, Chhatisgarh, Delhi, Haryana, Karnataka, Maharashtra, Madhya Pradesh, Punjab, Tamil Nadu and Uttar Pradesh. Congress grass has now achieved the status of the countries “Worst Weed” because of its allelopathic effects on agricultural crops and harmful effects on people and animals. During the 1980s, congress grass used to be considered a weed of rainfed fallow and wasteland but now it has become a weed of every crop.

Morphology of Congress grass

Congress grass is annual herb with a deep tap root and an erect stem that becomes woody with age. With the time, it develops many branches in its top half and may eventually reach a height of 2 m under favorable conditions. The leaves are pale green in color, deeply lobed and covered with fine soft hairs. The flowering starts 4 to 8 weeks after germination and it continues until the plant death. The flowers are small creamy white occur on the tips of the numerous stems. Each flower is having 4-5 black seeds that are wedge-shaped, two mm long with white scales. A single plant can produce 15000- 100000 seeds and these seeds can spread from one place to another by different dispersal mechanisms.

Impact of Congress grass on agriculture production

The congress grass is having severe negative impacts on pastures and forage crops. It has been reported that that infestation of congress grass reduced the forage production by up to 90%. It strongly competes with the crops like sunflower and sorghum and resulted in lower yield. It affects the nodulation process in legumes by inhibiting the activity of nitrogen fixing and nitrifying bacteria viz., Rhizobium, Actinomycetes, Azotobactor and Azospirillum. It was reported to cause yield losses of up to 40% in several crops. Its pollen through dispersal mechanisms can inhibit the fruit setting in crops like tomato, brinjal, beans, capsicum and maize when the pollen grains are deposited on the stigmatic surfaces. This weed acts as an alternate host for many diseases caused by viruses and also for insects like mealy bug in crop plants.

Management of Congress grass

It is of major importance to control *P. hysterophorus* in time before spreading, because of its negative impact on natural and agro eco-systems. There are different methods to control this weed. The different approaches include manual, mechanical, chemical and biological control. Manual and mechanical approach consists of uprooting or hoeing the plants out. This approach is usually neither

very effective nor economical because of the rapid re-growth requiring repeated removals for its long control. Further, it is not easy to get labor for congress grass uprooting as they fear about the ill effects caused by congress grass. Chemical method includes application of herbicides to kill the congress grass. This method is gaining popularity in India due to its timely and effective control. In this method the time of application of herbicide is most important. The herbicides should be applied before flowering and seed setting. The herbicides should be selected based on their availability and recommendation by state agricultural university. The biological method of weed control is most cost-effective, environmentally safe and ecologically viable method. The different types of insects and pathogens can be used in biological control. The leaf-feeding beetle *Zygogramma bicolorata* and the stem-galling moth *Epiblema strenuana* are widely used in several countries including India to manage the congress grass. Before the introduction of any biological agent, host specific test are to be conducted for the safety of crops. The mulching can also be used for smothering the *P. hysterophorus* by restricting the photosynthesis. Also mulching helps in conserves moisture, maintains surface temperature and improves the soil quality.



Parthenium hysterophorus



Zygogramma bicolorata beetle