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Parthenium hysterophorus: A cursed weed for society –A case study English bazar Block, Malda, West Bengal, India

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Abstract

Parthenium has now become one of the world's seven most devastating and hazardous weeds. Though literal meaning of the word parthenium is medicinal uses but actually it is the most harmful for man, animal, plants and after all for environment and biodiversity. Now-a-days parthenium invades not only roadside, vacant land, railway track, wasteland but also farmland and agricultural field. In Malda district mango cultivation is the prime agricultural activity and 50% of the district populations are engaged with mango production. Now parthenium population is rapidly increased in mango field and the people worked in mango field are suffering from several diseases like asthma, fever, skin rashes and eczema. Reducing agricultural field is another burning problem of the district. So from this research work an attempt has been made to protect people and environment from these toxic weeds and try to use this weed to alternative purpose for human benefit.

Keywords: Hazardous, Bio-diversity, Asthma, Burning problem, Medicinal uses.

1. Introduction

"Nearly 4.25 million hectares are under threat from the deadly weed parthenium, and parthenium weed control could help increase crop yield and the country's food grains production by 25-30 per cent" -THE HINDU (21 May, 2009) ^[8].

"The presence of parthenium cropped lands resulted in yield reduction up to 40%" - THE HINDU (4 Sept, 2005).

The word parthenium is derived from the Latin word parthenice meaning medicinal uses. Parthenium hysterophorus, commonly known as carrot weed, white tap, congress grass, star weed, altamisa, bitter weed. It is believed to have entered into the Indian soil some time during 1956 along with wheat sent by USA under PL-480(public law 480 passed in 1954 to give food grain to developing countries for eliminating starvation and malnutrition). Prof Paranjape, noticed this weed for the first time in 1951, at pune. Since 1956, this weed has spread like wildfire throughout India. Now parthenium is the one of the world's seven most devastating and hazardous weeds and it occupies over 5 million hectare of land in the country. And in Malda town is often spotted in roadside, railway track, abandoned land, developing residual colonies around the town, hospital area. But in recent progress it is found abundantly in farmland and agricultural land. A large single plant produces up to 100,000 seeds in its life cycle. Seed do not have dormancy period and are capable of germinating anytime when moisture is available. This seeds can disperse and germinate to cover large areas. So the larger portion of the district and as well as Englishbazar Blok are invaded by the parthenium weeds. And a huge number of people and animal are in threat due to these toxic weeds.

Features of Parthenium hysterophorus

It is light green with branching stems, finely lobed leaves and grows up to 1.5 meters. The flowers are creamy white, borne in profusion at the tips of the stems. Flowering occurs about a month after germination. A large single plant produces up to 100,000 seeds in its life cycle. More than 340 million seeds per hectare can be present in the surface soils. The root system has one main branched taproot and many finer root.

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Fig 1: parthenium hysterophorus

Dispersal of the seeds of Parthenium hysterophorus

The seeds of Parthenium hysterophorus are mainly dispersed through movement of vehicles, animal, water current and lesser extent by the wind. Most of the long distance spread is through vehicles, farm machinery and flooding.

Threats

Adverse effect of parthenium on human and animal health has been well documented from many years. But now in present activity parthenium invaded millions of farmland and agricultural land after 2001.

On human being

Several diseases have been occurred due to these toxic weeds. The pollen grains, air borne pieces of drained plant materials and roots of parthenium can cause allergic-type responses like hay fever, photo dermatitis, asthma, skin rashes, peeling skin, puffy eyes, swelling and itching of mouth and nose, constant cough, running nose and eczema. Parthenium hysterophorus also causes diarrhoea, severe papular erythematous eruptions, breathlessness and choking (Maishi *et al.*1998). Exposure to Parthenium hysterophorus pollens causes allergic bronchitis (Towers and Subba Rao 1992).

On animal

In animal, the plant can cause anorexia, pruritus, alopecia, dermatitis and diarrhoea, loss of skin pigmentation. Degenerative changes in both the liver and kidneys and inhibition of liver dehydrogenases have been reported in buffalo and sheep (Rajkumar *et al.* 1988). The milk and meat quality of cattle, buffalo and sheep deteriorate on consumption of this weed (Lakshmi and Srinivas 2007). Parthenium can taint sheep meat and make dairy milk unpalatable due to its irritating odour.

Reducing agricultural and pastures land

This paper begins with news published in THE HINDU that 4.25 million hectares of land under threat due to parthenium. Parthenium weed now invaded agricultural land, farmland and pastures land. In malda district production of mango is the prime agricultural activity. One after another mango field are invaded by Parthenium hysterophorus. The farmers who work in this field are get suffering from several diseases occurred due to these toxic weeds. Rice fields and pastures lands are also affected by this weed. After a detailed study J.G. Varshney Director of Jabalpur based Directorate of Weed Science Research (DWSR) has said that "Parthenium invaded 14.25 million hectare of farmland during 2001-2007 and 2 million hectare in 1991-2000." The eminent

agriculturist S.Swaminathan expressed surprise at the news that parthenium invaded agricultural land and he said "I am surprised to know that parthenium has spread to farm lands. I have no knowledge about this development. So far I have seen it growing along roads and rail lines only". Now day by day it has become a serious threat for agricultural productivity.



Fig 2: parthenium in mango field.

Parthenium hysterophorus is a serious invasive weed of pasture system, reducing pastures productivity 90% (Evans1997). It squeezes grassland and pastures, reducing fodder supply. So on the basis of this above situation J.G. Varshney also said that "There is no need to have a Rs. 4882.5 crore National Food Security Mission if a control mechanism is put in place at a community level to manage the weed".

Loss of biodiversity due to parthenium

Infestation by parthenium degrades natural ecosystem. It aggressively colonizes distributed sites and captures the entire region so very sparse or sometimes no other vegetation can be seen in Parthenium hysterophorus dominated area. These weeds rapid invasion of the new surrounding often replace the indigenous species and pose a serious threat to biodiversity in India.

Macro level analysis on English bazar Block

In Malda district there are 15 blocks out of which English bazar is most populous. In this block parthenium weeds are abundantly found in roadside, wasteland, railway track residential area and now also in mango field. Here some areas are chosen which seriously affected by toxic weeds for discussion-

A) District Hospital Area: District hospital area is invaded by parthenium from all side very badly. The patient, doctor, nurse and visitor of the hospital are affected by the parthenium.

B) College campus: Parthenium which affects greatly the health of the students, teachers, guardians and other, are found abundantly in college campus. The college hostel area, surrounding the pond area, backside of the college is also largely invaded by parthenium.

C) Bandh Area: The parthenium invaded the bank of Mahananda River very badly. Many people go to the bandh area for morning and evening walk and for physical exercise. But due to parthenium, they loss their health instead of recovery.

D) Mango field: The toxic weeds are found abundantly in mango field of the block. The district economy is based on mango production. So a major portion of people are engaged with mango field and due to the parthenium they are affected by several diseases like asthma, skin disorder, swelling, skin rashes.

E) Roadside: NH 34 and several state high ways have crossed the block. This year good summer rainfall helps to germinate dense population of parthenium weed along the roadside and also in the unmanaged patchy pastoral land.



Fig 3: Parthenium in roadside

Control over Parthenium hysterophorus

Several methods have been applied in different regions to control parthenium. This method are briefly described here-

A) Mechanical Method

Manual uprooting of parthenium before flowering and seed setting is the finest option. Mechanical removal is easily done during rainy season when the soil is wet. This operation should be started before blooming. Because uprooting the weed after blooming will increase the area of infestation. ploughing the weed before the plants reach the flowering stage. And establishing pastures or other plants may be effective.

But the problem of manual method is very expensive and need to be repeated. Mechanical removal with the help of tractor, plough etc. is possible only up to a certain extent and in open fields.

B) Biological Method

In recent years much emphasis has laid on biological measures to control parthenium and use several biological agents like insects and pathogens in this work.

Experimentally it was found that cassia species can control parthenium Also marigold (*Tagetes erecta*) is reported to suppress parthenium growth in field trials (Lakshmi and Srinivas 2007). Pink morning glory (*Ipomoea carnea*) and Spanish flag lantana camara are crucial examples regarding management of Parthenium hysterophorus.

Among insects leaf feeding beetle *Zygogramma bicolorata* and stem-galling moth *Epiblema strenuana* are widely used in several countries to manage parthenium. *Z.bicolorata* is now wide used in India to control parthenium. *Z.bicolorata* eats leaf and seed of parthenium and *E.strenuana* significantly reduces flower and seed production of the weed especially at a young stage.

The limitation of this method is *Z.bicolorata* is able to produce its population only during July to September. But

parthenium germinates any time in the year.

C) Chemical Method

Variety of chemicals have been tried to control over parthenium. Glyphosate, atrazine, metribuzin has been widely used. The plants should be treated before flowering and seed setting. During summer and winter, the population of the parthenium remains low in comparison to the rainy season and therefore spraying glyphosate@ 1 % solution will be of much use. And before monsoon atrazine, metribuzin or bromacil at the rate of 2, 2.3 and 1.5 kg per hectare can be applied in the dominant patches. But the problem of this method is plants suppressed by chemicals have been observed to regenerate after remaining dormant for a short period.

D) Alternative Uses

A recent approach to control parthenium is “*control through utilization*”. Parthenium has been used in different way for the benefit of people and animal like

- 1) Parthenium, the major constituent of the plant, exhibits significant medicinal attributes including anticancer property (Venkataiah *et al.* 2003). Parthenium has been used in medicine to treat fever, dysentery, malaria, neurological disorder, urinary tract infection, and hepatic amoebiasis.
- 2) Parthenium odour is said to be peculiarly disagree to bees and that insects may be easily kept at a distance by carrying handful of the flower heads (J. Lindley 1838).
- 3) Environmental pollution with heavy metals (like nickel, cadmium, and cresol) has been minimized by parthenium.

Suggestion & Conclusion

Parthenium offers a big challenge to all attempts of control because of its high seed germinability and production of huge amount of seeds. So there is no single, full proof method of controlling parthenium. Every method suffers from some limitations.

In this situation, here are some suggestions for proper management of parthenium.

- 1) Integrated approaches are needed step-by-step to eradicate this toxic weed completely from district map.
- 2) Public awareness has to be developed and participatory approach to control the invasive weed should be adopted.
- 3) Washing down vehicles and machinery before entering into a non-infested region will restricted the spread of seeds. Also while purchasing cattle feed and crop seeds these need be checked for contamination by parthenium seeds.
- 4) There is an urgent need for an integrated approach by trying out more than one option to root out this dangerous weed from the face of the earth.
- 5) In recent years Tamil Nadu state set a remarkable instance for other state in the field of control over parthenium. Several NGO, university, social organization, school are organized by government to take part in the eradication programme of parthenium. The honorable minister of agriculture K.A. sengottian directed the government department of agriculture to join hands with universities, NGOs, farmer and common public in organizing such campaign throughout the state during whole year.

Proposed action plan for parthenium control in Englishbazar block

Here we propose a phase wise action plan for parthenium control -

Phase-I In primary stage make public awareness through seminar, conference, discussion and make sure that NGOs, club, school, college university and different social organization are taking part in this programme. Poster, hoarding, social network sites can be used for advertisement.

Phase -II Raise fund for these programme by participation of general public, student, different organization and people from different disciplines.

Phase-III A manual uprooting programme should be initiated in every Saturday of April and may month for one hour by student, teachers, government employees and general public in neighboring area. After that cassia tora, marigold and Citra plants should be planted.

Phase-IV In first week of June a mass rally would be organized for manual uprooting in rest of area. Repeat this programme in every consecutive year.

Phase-V First week of every May month would be declared as "PARTHENIUM ERADICATION WEEK". And said process will inaugurated in this week. And total process should be completed before rainy season.

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