

REVEGETATION OF WASTELANDS - AN INDIRECT APPROACH TO CONTROL *PARTHENIUM HYSTEROPHORUS* L.

B.F. RODRIGUES

Department of Botany, Goa University, Taleigao Plateau, Goa - 403 206

ABSTRACT

Parthenium hysterophorus L., a native of north-east Mexico, is one of the world's worst weeds, accidentally introduced into India in 1956. It is known to cause serious health problems in human beings and livestock. It also affects the growth and yields of many crop species.

Besides various methods used to suppress the growth of *Parthenium*, a revegetational approach has been suggested especially to control the spread of *Parthenium* in the degraded areas. Creating a thick tree canopy in such areas would possibly check the seed load thereby reducing the severity of *Parthenium* infestation in other areas.

INTRODUCTION

Parthenium hysterophorus L. an annual noxious weed, belonging to family Asteraceae has originated from North East Mexico (Haseler, 1976; Dale, 1981 and McClay, 1984). Presently, it has been reported from United States, Central America, South America, West Indies, India, Nepal, China, Africa, Vietnam and Australia (Towers *et al.*, 1977 and Aneja *et al.*, 1991). It is a major crop and pasture weed in India, and a major pasture weed in Australia. This weed reaches a height of 2 m in good soil and flowers between 4 to 6 weeks of germination.

The weed was first brought to India as an ornamental plant in 1910 (Prashar, 1989) but failed to establish. Later in the

fifties it was carried into India and Australia along with imported wheat from USA (Rao, 1956; Gidwani, 1975 and Haseler, 1976).

Each plant can produce more than 10,000 to 15,000 seeds which can be distributed by floating on water or in mud adhering to animals, vehicles and machinery (Auld *et al.*, 1982-1983). The seeds are also easily carried away by wind. This has resulted in the firm establishment of this weed in India. Presently about 2.5-3 million hectares of land has been invaded by this weed. Prolific seeding habit of *Parthenium*, non-dormancy and extreme light weight of its seeds armed with pappus are some of the characteristics which help

its extensive spread and establishment.

EFFECT OF *PARTHENIUM* ON HUMAN BEINGS, ANIMALS AND PLANTS

Parthenium is known to have adverse effects on both human beings and animals. It is known to cause asthma, dermatitis, bronchitis and hay fever in man and livestock. Both pollen and trichomes are known to contain toxins called sesquiterpene lactones. The major component of toxin is "Parthenin". Besides this, others include phenolic acids, caffeic acid, vanillic acid, anisic acid, chlorogenic acid, parahydroxy benzoic acid and p-anisic acid.

The plant has dense pubescent hairs which are responsible for skin allergies. Severe cases can lead to septicemia infection. It is also responsible for bitter milk disease in livestock fed on grass mixed with *Parthenium*.

Parthenium is known to suppress the local herbaceous vegetation by release of growth inhibitors through leaching, exudation of roots, decay of residues, etc. It is also reported to affect the growth and yield of several plants (Mohandas, 1981). If it is left unchecked, it is likely to affect natural diversity and extinction of many economically important wild plant species.

STRATEGIES TO CONTROL *PARTHENIUM*

Parthenium is known to cover large areas of uncultivated wastelands. It is also found along roads and railway tracks. According to a conservative estimate, about two lakh *Parthenium* seeds are present in a square meter of earth and remain viable for two years. (Devasagayam & Shariff, 1993).

Although several methods viz., manual method, chemical method, use of insects and pathogens have been developed for the control of this weed, each has its own disadvantages. However, the use of biological agents seems to be a good method to fight the *Parthenium* menace. Many herbaceous species like *Cassia sericea*, *Croton sparciflorus*, *Croton bonplandianum*, *Tagetes erecta*, *Abutilon indicum*, *Amaranthus spinosus*, *Cassia tora*, *Cassia auriculata*, *Hyptis suaveolens*, *Ipomoea carnea*, *Mirabilis jalapa*, *Sida spinosa*, *Tephrosia purpurea*, etc. have been found to suppress the growth of *Parthenium*.

The manual method is very useful in eliminating the *Parthenium* weed from the cultivated fields. The entire plants should be uprooted before flowering, dried and burnt or composted. Persons involved in uprooting should be free from *Parthenium* allergy and should wear hand gloves and nose covers.

Similarly, the chemical method is restricted to limited areas. It gives temporary control and again, the chemicals used in the controlling are expensive and does not permit its use by an average farmer. The other drawbacks of chemical control include pollution and danger of toxicity to non-target plants. Spraying with twenty per cent of saline water is also used to control *Parthenium*. However, constant use of salt solutions may create salinity problems for the soils.

Biological control using various insects particularly the beetle *Zygogramma bicolorata* is known to effectively control *Parthenium*. The larval and adult forms of this beetle are known to feed on *Parthenium* leaves and inflorescences, thereby drastically defoliating the plant

populations. However, there are some doubts about this beetle feeding on sunflower, an economically important oilseed crop.

THE REVEGETATIONAL APPROACH

It is observed that the density and abundance of *Parthenium* is relatively low or is all together absent in thick forests with maximum canopy. It may also be noted that the wastelands turn out to be the most appropriate ecosystems for *Parthenium* establishment and perpetuation. These observations indicate that large scale revegetation (using tree species) of the degraded or wastelands would produce enough canopy to suppress *Parthenium* growth. However, it may be noted that only native, fast growing tree species with maximum canopy should be preferred to the exotic species. If at all, the exotic species are to be used, their introduction should be made with great care and after consultation, as these species may turn out to be a nuisance.

By adopting this strategy, one would be able to reduce the amount of propagules. This, would in turn keep a check on *Parthenium* spread and could possible be a long term solution to check the *Parthenium* menace.

REFERENCES

ANEJA, K.R., S.R. DHAWAN & A.B. SHARMA
1991. Deadly weed - *Parthenium*

hysterophorus Linn. and its distribution. *Ind. J. Weed. Sci.* 23 : 14-18.

AULD, B.A., J. KOSKING & R.E. Mc FADYEN
1982/83. Analysis of the spread of tiger pear and *Parthenium* weed in Australia. *Aust. Weeds.* 2 : 56-60.

DALE, I.J. 1981. *Parthenium* weed in America. *Austr. Weeds*, September, 1981.

DEVASAGAYAM, M. & M.M. SHARIFF 1993. *Cassia* Controls *Parthenium*. *The Hindu*, Wednesday March 17, 1993, pp. 24.

GIDWANI, I. 1975. Weed out "Congress Grass" or else face disaster. *The Current*, October 25, pp. 12.

HASELER, W.H. 1976. *Parthenium hysterophorus* L. in Australia. *PANS* 22 : 515-517.

McCLAY, A.S. 1984. Biocontrol agents for *Parthenium hysterophorus*, L. from Mexico. *Proceeding VI International Symposium on Biological Control of Weeds*. Vancouver, Canada.

MOHANDAS, S. 1981. Agrophysiological impact of the allelopathic effects of *Parthenium hysterophorus* L. *Science Academy Medals for Young Scientists - Lectures* pp. 275-285.

PRASHAR, A.S. 1989. Congress Grass : Start chemical fight. *The Tribune* 109 (295) : 17.

RAO, R.S. 1956. *Parthenium hysterophorus* Linn. - a new record for India. *J. Bombay Nat. Hist. Soc.* 54 : 218-220.

TOWERS, G.H.N., J.C. MITCHELL, E. RODRIGUEZ., F.D. BENNETT & P.V. SUBBA RAO 1977. Biology and chemistry of *Parthenium hysterophorus* L. a problem weed in India. *J. Sci. Indust. Res.* 36 : 672-684.