Collection and release of the beetle

The beetle can easily be collected from the established sited during June to September. Collection can be made in ordinary polythene or plastic containers that are perforated with a needle. Upper parthenium twigs without leaves should be placed inside the polythene to avoid the shrinking and to provide resting place for the insect. If the insects have to be carried over long distances, it is better to avoid leaves to prevent moisture condensation and fungal growth, which can cause insect mortality. Care must be taken to make the initial releases on small and succulent growth of parthenium in undisturbed areas away from human habitations. Initial release should be avoided in cultivated land because ploughing of land may disturb the pupation process hence poor survival and subsequent establishment. Low lying areas prone to water logging should also be avoided because pupation takes place in soil. The ideal time for carrying out releases will be June to August when plenty of fresh parthenium plants are available in nature. There is no benefit in undertaking releases between November to May when they normally do not breed.

How many beetles should be released?

One adult was found to bring defoliation of a single parthenium plant in 6-8 weeks. Therefore, if releases are to be carried out at this rate, about 0.4 to 0.7 million insects will be required per hectare, as the weed density varies between 40 to 70 plants per square metre. In practice, it is neither possible nor necessary to release so many insects as they are capable of multiplying rapidly. Releases of about 500-1000 beetles can bring about establishment and eventual control. Once plants are eaten up in the release spot the insects migrate into adjacent areas. Taking this into consideration, a number of release spot can be selected in a particular place or town, which can act as a focal point. More releases mean quicker establishment of the beetle.

What happen to the insects after the weeds are eaten?

Parthenium will never be eradicated in a vast country like India. Some plants will always escape from the attack, which will allow the insect population to sustain itself during years of low weed density.

For Further Details

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Management of Parthenium hysterophorus L. (Congress grass)

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Management of Parthenium hysterophorus L. (Congress grass)

Parthenium hysterophorus L, commonly called as carrot weed, gajarghas, white top or congress grass in India. It is a herbaceous erect and annual plant belonging to the family Asteraceae (Compositae). This plant is a native of Mexico, America, Trinidad and Argentina. It is surmised that this weed possibly got entry from USA through the imported food grains during 1950s. At present, parthenium is estimated to be in about 10 million hectares of land in India.

Parthenium is a poisonous, pernicious, problematic, allergic and aggressive weed posting a serious threat to human beings and livestock.

This weed is also the greatest source of dermatitis, asthma, nasal-dermal and Naso-bronchial types of diseases to human beings. Besides such ill effects, it also causes several other problems like blockage of common pathways and orchards and reduces the aesthetic values of parks, gardens and residential colonies. Parthenium is also well known to cause heath hazards in cattle. Mostly it is a weed of fallow and wastelands but it also occurs in cropped fields. Its impact on agricultural crops has been well documented. The reasons of its fast spread are its high reproductive capacity (5000-25,000 seeds/ plant), light weight of seeds, which disseminate fast by wind and traffic activity and high colonizing capacity with lack of seed dormancy. This weed can grow in all seasons and under a wide range of agro-climatic situations. Ever since the weed became a menace in India and other countries, efforts are being made to manage the weed by different methods. Parthenium can be managed by manual, chemical and biological methods and by way of utilization.

Mexican beetle (Zygograma bicolorata) as a safety bioagent and its introduction in India

Based on well documented success by Mexican beetle, Zygogramma bicolorata Pallister (Coleoptera: Chrysomelidaer), in other countries where they were introduced, beetles were imported in 1982 from Mexico to Bangalore. Detailed host- specificity tests under quarantine conditions confirmed the safety of Z. bicolorata to cultivated crops in the country. Thereafter, field releases were initiated in Bangalore in 1984. After seven years of first release of this beetle, it was reported feeding on an important oilseed crop sunflower which created a controversy on the utilization of the beetle as biocontrol agent. In view of this controversy, a fact finding committee (FCC) was set up by the Indian Council of Agricultural Research (ICAR) in November 1992. In-depth laboratory and field studies, co-ordinated by FFC at various centers, unequivocally proved that Z. bicolorata is a safe agent against parthenium. Government of India lifted the ban imposed on the Mexican beetle. Now Mexican beetles can be multiplied and released anywhere in India for parthenium suppression.

Biology of Mexican beetle

Beetles are off-white or light reddish in colour with dark brown longitudinal markings on the elytra, measuring about 6mm in length. Light yellow eggs are laid generally on ventral side of the leaves and hatch in 4-7 days. There are four instars. The grubs feed for 10-15 days on the leaves and on maturity enter into soil and pupate below up to 15 cm depth. Beetles emerge after 8-12 days. The beetle completes its life cycle in 27-32 days. Insect completes 4-5 generations from June to October in natural conditions. The female can lay up to 2500 eggs during its life span. The beetle remains most active in the field during the rainy season between June to October but stages of Z. bicolorata may be encounter in summer and winter season depending on the moisture and temperature.

How beetles kill the parthenium?

Both adults and larvae are capable to feed on parthenium leaves. Larvae after hatching start to feed on soft growing leaves, first attacking the terminal and axillary buds and later the leaf blades, thus checking the plant growth and flower production. Adults voraciously defoliate the plant. Immature flowers are cut by the beetles in an effort to chew soft tissues beneath the flowers. Completely defoliated plants start to show die back symptoms and gradually get killed. At many places, beetle even controlled parthenium in crop fields where insets searched the parthenium amidst crop and devoured it.