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Prospects of Biological Weed Management in Organic Farming

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SUMMARY

Biological weed control through parthinium for zygogzma biocoloraota and other weed species is control easy troublesome. Opuntia vulgaris in central and northern India by Dactylopius ceylonicus introduced from Brazil and subsequently during 1836-1838 into southern India. Searching for the natural enemies, identification and conducting preliminary host range studies. Detailed host specificity studies, importation and quarantine after confirmation of the first factor. Carps are used in Hungary for weed control in rice fields, and they show promise for controlling weeds in large drainage ditches in the United States.

INTRODUCTION

Living organisms viz., insects, disease organisms, herbivorous fish, snails or even competitive plants for the management of weeds are called biological methods. Not possible to eradicate weeds -weed population can be reduced. Not useful to control all types of weeds. Introduced weeds are best targets

- Biological control of weeds - Mid 1800s
- Over 125 species of weeds (Julien, 1992)

Opuntia vulgaris in central and northern India by *Dactylopius ceylonicus* introduced from Brazil and subsequently during 1836-1838 into southern India. First project from Australia, - Argentinean moth *Cactoblastis cactorum* released in 1925, brought about virtual complete control of *O. inermis* and *O. stricta* from 24 million hectares of infested land and restoring the same to agricultural use. From late 1950's projects were initiated on aquatic and semi-aquatic weeds, annuals and biennials, crop land and rangeland weeds in Australia, Canada and the USA.Information on the weed, its taxonomy, close relatives, natural enemies and native range. Preliminary exploration to find the native range and select the site for an exploration laboratory. Setting up of an exploration laboratory. Searching for the natural enemies, identification and conducting preliminary host range studies. Detailed host specificity studies, importation and quarantine after confirmation of the first factor. Conducting host range studies in introduced land. Release and monitoring on long term basis to confirm establishment, control and spread.

Classical biological control method is practiced when an invasive species has established outside its native range. Second approach is of augmentation when the existing natural enemies are not providing effective control.

Biocontrol Agents

- Use of Pathogens
- Use of Aquatic Mammals & Rodents
- Use of Fish
- Use of Snails
- Use of Insects
- Use of Birds & Animals
- Allelopathic Plants

Biological Weed Control by Insect *Lantana camara* a prickly shrub is controlled effectively (a) Larvae of *Crocidosema lantana*, the tortricid moth,

(b) Larvae of Agromyza lantanae,

(c) Larvae of *Thecla echion* and *T. bazochi*, the Iycaenid butter flies

Prickly pear, Opuntia spp. is controlled by the larvae of *Cactoblastis cactorum*, a moth borer and *Dactylopius opuntiae*, the cochinial insect. India, the infestation of Opuntia was controlled by cochinial insects *Dactylopius indicus* and *D. tomentosus*. *Cuscuta spp*. dodder, a parasitic weed occurring on a variety of plant by *Melanagromyza cuscutae, Smicronyx cuscutae. Eupatorium odenophorum* in Hawaii and Australia -a gallfly

Procecidochares utilis. *Leptospermum scoparium*- mealybug *Eriococcus orariensis*. *Imperata cylindrica*- *Orseoliella javanica Cyperus rotundus- Bactra vermosana*

Parthenium hysterophorus

Field releases of *Z. bicolorata* were initiated in 1984 which established readily under field conditions in Bangalore in 1984.

Before beetle release

Beetle eggs on leaf

Beetle feeds on plant

Beetle eggs on leaf

Beetle congregation

Two weeks after beetle release

Biological control of aquatic weeds

Herbivorous fish Tilapia spp. algae (*Chara and Nitella*) and saw weeds (*Najas*) in Africa. White amur (*Ctenopharyngodon idella* Val.) has a voracious appetite for many aquatic plants. Common carp (*Cyprinus carpio*) a non herbivorous fish, certain aquatic weeds. Carps are used in Hungary for weed control in rice fields, and they show promise for controlling weeds in large drainage ditches in the United States. Manatees or sea-cows (*Trichechus manatuo* L) are aquatic animals - water hyacinth, and on accessible plants at the water's edge.

Large tropical fresh water snail *Marisa cornuarietis* L. submersed weeds, common coontail (*Ceratophyllum demersum* L.), Illinois pond weed (*Potamageton illinoensis*) and southern naiad (*Najas guadalupensis*). Snail prefers submersed weeds as food plants to floating or emersed weeds. However, it does feed on Salvinia (*Salvinia rottendifolia*) a floating weed. A flea beetle (*Agasiches connexa*) - aligator weed (*Alternanthera philoxeroides*), a free floating aquatic weed.Two Approaches:

- Classic-Initial inoculation of the weed with a self-sustaining fungi
- Annual application of endemic or foreign fungi, "mycoherbicide" approach
- Classic: Skeleton weed control in Australia with the fungal rust, *Puccinia chondrilina*
- Mycoherbicide: Northern joint vetch suppression in rice a *Colletotrichin sp.*. 90-95%
- *Spurred anoda* and *Velvetleaf suppression* with *Alternaria macrospora*
- Fungi *Alternaria macrospora* and *Puccinia heterospora* affect spurred anoda (*Anoda cristata*)
- Water hyacinth (*Eichhornia crassipes*) - *Cercospora rodmanii*. Conway et al. (1978) observed that this pathogen is pathogenic only to water hyacinth
- *Fusarium roseum* 'culmorum' is pathogenic to *Hydrilla verticillata*.

CONCLUSION

Science of biological control of weeds has made significant contribution to the control of alien weeds in our country. Biological control of weeds has an excellent track record and none of the organisms introduced for weed control have become pests of crops and has been the answer in many ecologically challenged atmospheres worldwide. Classical biological control approach is needed for the new found problems. Further attempts to import more natural enemies for weeds that are not suppressed and for other weeds that are becoming problematic must be accelerated. Classical biological control programme and augmentation are dependant on laboratory bred phytophages. Programmes have overtly relied on the mass production in their natural hosts. Systems for production of these agents on artificial/semisynthetic media could reduce the cost of the production programmes. Greater community participation and involvement of the non-governmental organizations in production and distribution of the weed killers is needed.

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