AgriCos e-Newsletter
ISSN: 2582-7049
Volume : 01 Issue : 03 July 2020 Article No: 60

# Mycoherbicides: Weeds Killing Fungi

**K. Manikandan[1] and V. Keerthana[2]**

[1]Assistant Professor, Department of Plant Pathology, Imayam Institute of Agriculture and Technology, Thuraiyur, Tamil Nadu

[2]Assistant Professor, Department of Agricultural Economics, Imayam Institute of Agriculture and Technology, Thuraiyur, Tamil Nadu

## SUMMARY

Fungal pathogens are known to be only category of microorganisms with potential for weed control. Such agents of living products control particular weeds in agriculture as successfully they will continue to live on the weeds every year for long periods and provide protection unlike the herbicides that are expected to be applied year after year or season after season. The organisms have been known as “Mycoherbicide” indicates that the application of a massive dose of inoculum at a particular stage of weed growth may make a natural endemic pathogen entirely destructive to its weed host. Since then it has produces several fungal herbicides.

## INTRODUCTION

A strategy for Mycoherbicides: Daniel *et al.* (1973) first introduced the concept of a Mycoherbicide. During that initial description of the word, the term mycoherbicide has been redefined as "plant pathogens produced and used in the flood strategy to control weeds in the method in which chemical herbicides are used" or as "living products that control specific weeds as effectively as chemicals in agriculture". Its use of the microorganism in a "product form" and a "chemical strategy-like application technique" are salient characteristics that differentiate mycoherbicides from classical agents. Hence the microbe's *in vitro* cultivation to obtain large amounts of inoculum and the techniques and procedures application of inoculum to achieve rapid outbreak buildup and higher mortality levels are two distinctive aspects of the mycoherbicide concept. A certain kind of parasitism that a fungus exhibits affects their capacity to function as a mycoherbicide. Though compulsory parasites are usually less harmful to their hosts than facultative parasites or facultative saprophytes, these have much less potential for use as mycoherbicides in situations which require rapid and complete control (i.e. weed kill). The technical issues in growing obligate parasites are also a deterrent to the use, but improvements in the cultivation of compulsory parasites on ex planta can create new opportunities for mycoherbicidal use of obligate fungi in the potential. Some of the facultative weed parasites being considered for mycoherbicidal use could reflect new associations of host-pathogens.

### Micro-organisms as Mycoherbicides

Since Daniel *et al.* identified the Mycoherbicide technique; two similar weed control approaches have since been established. In the first, a U.S.-born rust fungus, *Puccinia canaliculata*, was successfully used to manage yellow nut sedge, *Cyperus esculentus* Uredospore inoculum of this fungus is obtained from infected plants, preserved, and distributed with suitable carriers. Regardless of the parasite's obligatory existence, no mass processing of inoculum is possible *in vitro*. In practice, it takes just a few grams of inoculum each hectare to induce a sustained high level of disease during the planting season-similar to the inoculative tactic. Epidemiologically, this rust fungus is frequently multiplication and dissemination-dependent on host density. It is usually found in different parts of the United States on an endemic basis. Yet in the farmer, for a significant proportion of the weed population, inoculum is neither mass generated, nor administered as an inundated dosage. Other examples in this respect include the use or the attempted use of *Puccinia obtegens* to control Canada thistle *Cirsium arvense*, the smut fungus *Sphacelotheca holci* to control Johnson grass, Sorghum halepense; and *Puccinia punctiformis* to control Canada thistle.

### Characteristics of Good Mycoherbicide

- Culturable in artificial media
- Capable of abundant spore production
- Stable in storage
- Genetically stable
- Effective under field conditions
- Tolerant to variations in temperature
- Compatible with other chemicals/cultural practices

### Achievements of *Mycoherbicides*

Most of the recently produced mycoherbicides have been found to largely satisfy these requirements. Devine is a liquid solution made up of *Phytophthora palmivora* pathotype chlamydospores and is used as a post-emergent mycoherbicide against *Morrenia odorata* (milk weed vine / strangler vine). Control of the weed is commonly produced at nearly 100 per cent and control lasts two years. COLLEGO is wettable powder formulation of *Collectotrichum gloeosporoids* f. sp. *aeschenomene* and is used for controlling Northern joint with (*Aschenomene virginica*) in rice and soybean. When the weeds have just grown, it is applied aerially or with land-based equipments. Observed controls were as high as 90 per cent. The fungus *Cercospera rodamanii* was established for the control of *Eichhornia crassipes* as a mycoherbicide was registered in 1982. Similarly many pathogens have been identified that have mycoherbicidal properties. Mycoherbicides extracted from the pathogens usually initiate disease in particular weed populations and kill the weeds within 3-5 weeks. Two other mycoherbicides are under advanced development, CASST (*Alternaria cassiae* against sickle pod, *Cassia obtusifolia*) and BioMal (*Colletotrichum gloeosporioides* f.sp. *malvae* against round-leaf mallow, *Malva pusilla*. *Colletotrichum gloeosporioides* f.sp. *cuscutae,* under the name of LUBOA II, is used in the People's Republic of China against dodders (*Cuscuta* spp). *Alternaria cassiae*, a foliar blight-inducing pathogen, was found in Mississippi and proved a safe and effective mycoherbicide for sickle pod by Walker and co-workers. In a region-wide trial involving five Southern States, it was subsequently shown to be highly effective in controlling soybean weeds under field conditions. This has a small host range and is able to monitor sicklepod, coffee senna (*Cassia occidentalis*), and showy crotalaria (*Crotalaria spectabilis*), three economically important leguminous weeds. The fungus is presently under mass production as a wettable powder formulation by Mycogen Corporation, to be sold under the registered trademark CASST.

### Mycoherbicides used the most frequently

| Mycoherbicide | Trade name | Country | Weed controlled |
|---|---|---|---|
| *Colletotrichum gloeosphoroides* | COLLEGO | USA | *Aeschynomene sp.* |
| *Colletotrichum gloeosphoroides* | LUBOA II | China | *Cuscuta* sp. |
| *Cercospora rodmanii* | ABG 5003 | USA | *Eichhornisc crassipes* |
| *Colletotrichum gloeosphoroides* | Biomal | USA | *Malva* f. sp. *malvae pusilla* |
| *Phytophthoro palmivora* | Devine | USA | *Malva* f. sp. *malvae pusilla* |
| *Alternaria cassiae* | CASST | USA | *Cassia obustifolia* |

*Parthenium hysterophorus*, known as false rageweed / congress weed, is reported to cause allergic reactions, such as respiratory malfunction and human dimities. The pathogen of rust, *Puccinnia abrupta* var. *parthinicola* which can regulate *Parthenium hysterophorus* was also identified.

## CONCLUSION

The production of mycoherbicides for integrated use in niche markets may be. But the main determinants of whether or not this technology finds commercial sponsor and consumer acceptance would be effectiveness and practicability. It is wise to predict that potential use of Mycoherbicides as biological control will remain small but significant component of weed control technology. Weed control is really a big role in crop cultivation. Though it is mainly achieved by manual weeding in India. Owing to pesticide use, people are actually more mindful of environmental contamination, ecological disruption, risks and contaminants in food.

## REFERENCES

Damel J. T., Templeton G. E., Smith R. J and Fox W. T. (1973). Biological control of northern JOlntvetch In nce With an endemic fungal disease. Weed Sci. 21 303-307.

Kenney D. S. (1986). DeVine-the way It was developed-an mdustnahst's view Weed Sci. 34 (Suppl. 1):15-16.

Bannon, J. S., and Hudson, R. A. 1988. The effect of applIcation timmg and IIghtmg mtenSIty on efficacy of CASST™ herbicIde *(Alternana casswe)* on slcklepod *(Cassw btusifoila).* Weed Sci. Soc. Am. Abstr. 28:143.