

PLASTICULTURE

Cautious crop protection

Raising crops under plastic has its pros and cons. On the upside, the artificial means affords prolongation of the growing season and on the downside, there is higher incidence of pest attacks and diseases due to build-up of temperature and humidity significantly above the normal levels. Thus, precise use of pesticides in plasticulture is of crucial importance.

Growing crops under plastic is becoming increasingly pronounced in the global agricultural paradigm. Under plastic, elevated temperatures extend the growing season, but irrigation at the same time can increase the humidity and period of leaf wetness, making the crops more susceptible to pest attacks. This has led to major dependence on the use of pesticides and it is not uncommon for farmers spraying twice a week to ward off the menace of pests. Thus, the application of pesticides in plasticulture is of considerable importance.

SPRAYING

Most growers apply high-volume sprays, using generally more than 1,000 litres water per hectare. However, it has certain disadvantages.

- Wastage of chemical which drips to the ground.
- Some parts of the plant, especially the undersurface of leaves, remain untreated.
- The concentration of the active ingredient is very low
- Longer time is required
- Adverse effects on beneficial insects.

Lower volume sprays are hence preferred in plasticulture and the nozzles of the sprayer are directed in such an angle that the under-leaf coverage is improved. Some sprayers are fitted with a fan to im-

prove penetration of foliage, but care should be taken regarding air velocity, especially in case of delicate seedlings.

FOGGING

This traditional method of applying small particles of pesticide along with smoke and other type of vapor-

Growing crops under plastic is becoming increasingly pronounced in the global agricultural paradigm. Under plastic, elevated temperatures extend the growing season, but irrigation at the same time can increase the humidity and period of leaf wetness, making the crops more susceptible to pest attacks. This has led to major dependence on the use of pesticides and it is not uncommon for farmers spraying twice a week to ward off the menace of pests. Thus, the application of pesticides in plasticulture is of considerable importance.

izers is suitably adopted in small areas where there is a good circulation of air. The results are satisfactory if glasshouses can be totally enclosed. If there are any holes or openings, the external wind will usher in fogging, leading to erroneous results. Direct sunlight also has to be avoided to minimize phytotoxicity.

Thermal fogging has been used quite successfully with *Bacillus thuringiensis* despite the high temperatures at the nozzle. Fungicidal fogging of iprodione was extremely effective in controlling grey mould disease. Cold fogging, however, has mixed results. In Germany, it is better than conventional spraying, but the reverse is true in Norway.

Fogging has certain disadvantages as well - it is mainly effective against flying insects and those, which are on the leaf surface. The underleaf pests are unaffected, if the pesticide does not have a fumigant action. Moreover, inhalation of small fog droplets is hazardous to human health.

ELECTROSTATIC SPRAYING

The prime objective of using electrostatic sprayers is to improve underleaf coverage, especially to control white fly. However, penetration of droplets into a crop canopy has not always been adequate, as charged droplets tend to collect on the outer exposed foliage of dense canopies, being the nearest to the earth sur-

face.

MISTS

To enhance localized treatment and minimize the risk of inhalation, pesticides are applied in an airstream. When the spray is directed over crops, the deposition occurs on the upper surfaces of the exposed foliage, but if the airstream is di-

ected up into the crop canopy, underleaf deposition is improved. Researches have proved that a greater volume of turbulent air is preferable to a high velocity air jet, although some advanced farmers opt to use a knapsack mist-blower to direct the spray. Spray coverage is better when there is an access to both sides of the crop bed.

Misting can also be done by hand-carried equipment. In this case, pesticides can be applied specifically to localized areas of pest infestation and with non-residual treatments. It is also very effective in mycoparasite applications, so that appropriate concentration of spores can be delivered in the optimal drop-let size and formulation.

OTHER TECHNIQUES

If the leaf surface is not dusty, thrips can be effectively controlled

with an apolybutene application, combined with an insecticide (Thripsick). The application of granules or chemigation (that is, pesticides in irrigation water) in potted plants is also prevalent. Soil fumigation or solarization under plastic sheeting can be done to reduce the initial infestation prior to crop establishment even though re-infestation can occur unless strict quarantine measures are observed. High volumes of oil emulsion, without any pesticide, can control whitefly while soap solutions can be useful aphicides.

In many cases of plasticulture, where pests have become resistant to chemical pesticides, biologicals are used. A myco insecticide, *Verticillium lecanii* is used in controlling aphids of chrysanthemum. Entomophagic nematodes have also been used, mainly as soil drenches.

Pest pressure can be alleviated if there are physical barriers such as screens to prevent access to the crop. This is often difficult to practice, but with concern about pesticides residues, any reduction in the number of applications is desirable.

The farmer would like to know which technique might be adopted. Basically, the technique to be adopted depends upon the crop and the pest, but the aim should be to minimize treatments and encourage the use of biological and cultural methods wherever possible. Extensive operational research is the need of the hour so as to devise systems of integrating chemicals and other strategies to attain an economic and sustainable pest management program in areas of intense horticulture, using plastic houses.

BY DR. SUJOY SAHA

Attention contributors

- The articles must be on current issues concerning global/Indian agriculture highlighting practical aspects, policy matters, innovations and other important developments, preferably in not more than 2500 words
- Articles in thesis format would not be considered for publication.
- Articles once sent for publication, will not be returned.
- Magazine will not be responsible for the views expressed by the authors.

The Editor

Agriculture Today

G-30, Lajpat Nagar - II, New Delhi - 110 024
 Ph: 6910927-28, 6316747, Fax: 6849107
 E-mail: agricult@del3.vsnl.net.in
www.card.org.in