

## Lecture 24 PESTICIDE APPLICATION METHODS

The desired effect of a pesticide can be obtained only if it is applied by an appropriate method in appropriate time. The method of application depends on nature of pesticide, formulation, pests to be managed, site of application, availability of water etc.

1. **Dusting** : Dusting is carried out in the morning hours and during very light air stream. It can be done manually or by using dusters. Some times dust can be applied in soil for the control of soil insects. Dusting is cheaper and suited for dry land crop pest control.
2. **Spraying** : Spraying is normally carried out by mixing EC (or) WP formulations in water. There are three types of spraying.

	<b>Spray fluid (litre per acre)</b>	<b>Droplet size</b>	<b>Area covered per day</b>	<b>Equipment used</b>
a) High volume spraying	200-400	150	2.5 ac	Knapsack, Rocker sprayers
b) Low volume spraying	40-60	70-150	5.6 ac	Power sprayer, Mist blower
c) Ultra low volume spraying	2-4 lit.	20-70	20 ac	ULV sprayer, Electro-dyn sprayer

3. **Granular application** : Highly toxic pesticides are handled safely in the form of granules. Granules can be applied directly on the soil or in the plant parts. The methods of application are
  - a) **Broadcasting** : Granules are mixed with equal quantity of sand and broadcasted directly on the soil or in thin film of standing water. (eg.) Carbofuran 3G applied @ 1.45 kg/8 cent rice nursery in a thin film of water and impound water for 3 days.
  - b) **Infurrow application** : Granules are applied at the time of sowing in furrows in beds and covered with soil before irrigation. (eg.) Carbofuran 3G applied @ 3 g per meter row for the control of sorghum shootfly.
  - c) **Side dressing** : After the establishment of the plants, the granules are applied a little away from the plant (10-15 cm) in a furrow.

- d) **Spot application** : Granules are applied @ 5 cm away and 5 cm deep on the sides of plant. This reduces the quantity of insecticide required.
- e) **Ring application** : Granules are applied in a ring form around the trees.
- f) **Root zone application** : Granules are encapsulated and placed in the root zone of the plant. (eg.) Carbofuran in rice.
- g) **Leaf whorl application** : Granules are applied by mixing it with equal quantity of sand in the central whorl of crops like sorghum, maize, sugarcane to control internal borers.
- h) **Pralinage** : The surface of banana sucker intended for planting is trimmed. The sucker is dipped in wet clay slurry and carbofuran 3G is sprinkled (20-40 g/sucker) to control burrowing nematode.
4. **Seed pelleting/seed dressing** : The insecticide mixed with seed before sowing (eg.) sorghum seeds are treated with chlorpyrifos 4 ml/kg in 20 ml of water and shade dried to control shootfly. The carbofuran 50 SP is directly used as dry seed dressing insecticide against sorghum shootfly.
5. **Seedling root dip** : It is followed to control early stage pests (eg.) in rice to control sucking pests and stem borer in early transplanted crop, a shallow pit lined with polythene sheet is prepared in the field. To this 0.5 kg urea in 2.5 litre of water and 100 ml chlorpyrifos in 2.5 litre of water prepared separately are poured. The solution is made upto 50 ml with water and the roots of seedlings in bundles are dipped for 20 min before transplanting.
6. **Sett treatment** : Treat the sugarcane setts in 0.05% malathion for 15 minutes to protect them from scales. Treat the sugarcane setts in 0.05% Imidacloprid 70 WS @ 175 g/ha or 7 g/l dipped for 16 minutes to protect them from termites.
7. **Trunk/stem injection** : This method is used for the control of coconut pests like black headed caterpillar, mite etc. Drill a downward slanting hole of 1.25 cm diameter to a depth of 5 cm at a height of about 1.5 m above ground level and inject 5 ml of monocrotophos 36 WSC into the stem and plug the hole with cement (or) clay mixed with a fungicide. Pseudo stem injection of banana, an injecting gun or hypodermic syringe is used for the control of banana aphid, vector of bunchy top disease.

8. **Padding** : Stem borers of mango, silk cotton and cashew can be controlled by this method. Bark of infested tree (5 x 5 cm) is removed on three sides leaving bottom as a flap. Small quantity of absorbant cotton is placed in the exposed area and 5-10 ml of Monocrotophos 36 WSP is added using ink filler. Close the flap and cover with clay mixed with fungicide.
9. **Swabbing** : Coffee white borer is controlled by swabbing the trunk and branches with HCH (BHC) 1 per cent suspension.
10. **Root feeding** : Trunk injection in coconut results in wounding of trees and root feeding is an alternate and safe chemical method to control black headed caterpillar, eriophyid mite, red palm weevil. Monocrotophos 10 ml and equal quantity of water are taken in a polythene bag and cut the end (slant cut at 45) of a growing root tip (dull white root) is placed inside the insecticide solution and the bag is tied with root. The insecticide absorbed by root, enter the plant system and control the insect.
11. **Soil drenching** : Chemical is diluted with water and the solution is used to drench the soil to control certain subterranean pests. (eg.) BHC 50 WP is mixed with water @ 1 kg in 65 litres of water and drench the soil for the control of cotton/stem weevil and brinjal ash weevil grubs.
12. **Capsule placement** : The systemic poison could be applied in capsules to get toxic effect for a long period. (eg.) In banana to control bunchy top vector (aphid) the insecticide is filled in gelatin capsules and placed in the crown region.
13. **Baiting** : The toxicant is mixed with a bait material so as to attract the insects towards the toxicant.
  - a) **Spodoptera** : A bait prepared with 0.5 kg molasses, 0.5 kg carbaryl 50 WP and 5 kg of rice bran with required water (3 litres) is made into small pellets and dropped in the field in the evening hours.
  - b) **Rats** : Zinc phosphide is mixed at 1:49 ratio with food like popped rice or maize or cholam or coconut pieces (or) warfarin can be mixed at 1:19 ratio with food. Ready to use cake formulation (Bromodiolone) is also available.
  - c) **Coconut rhinoceros beetle** : Castor rotten cake 5 kg is mixed with insecticide.
14. **Fumigation** : Fumigants are available in solid and liquid forms. They can be applied in the following way.
  - a) **Soil** : To control the nematode in soil, the liquid fumigants are injected by using injecting gun.

- b) **Storage** : Liquid fumigants like Ethylene dibromide (EDB), Methyl bromide (MB), carbon tetrachloride etc. and solid fumigant like Aluminium phosphide are recommended in godowns to control stored product pest.
- c) **Trunk** : Aluminium phosphide 7f to I tablet is inserted into the affected portion of coconut tree and plugged with cement or mud for the control of red palm weevil