

Appliances for application of Fungicides and Nematicides

Plant pathogens (Fungi, Bacteria, Viruses, Phytoplasmas, Parasitic Plants, Nematodes etc.) insects, mites, weeds, mollusks, fish, birds, and mammals etc. also known as plant pest. Pest is an organism that is detrimental to humans, destroys crops & structures poses threats to human health and livestock reduces economic, aesthetic and recreational values.

Pesticide:

Chemical or biological substance designed to kill or retard the growth of pests that damage or interfere with the growth of crops, shrubs, trees, timber and other vegetation desired by humans. Pesticide application plays an important role in pest management. Proper technique of application of pesticide and the equipment used for applying pesticide are vital to the success of pest control operations. The application of pesticide is not merely the operation of sprayer or duster. It has to be coupled with a thorough knowledge of the pest problem. The use of pesticides involves knowledge not only of application equipment, but of pest management as well.

Common Types of Pesticides:

Category	Purpose
Fungicides	Kills mould, mildew and other fungi
Nematicides	Kills the Nematode
Insecticides	Kills or repel insects, ticks and mites
Herbicides	Kills weeds or unwanted plants

Objective of Pesticide Application

The objective of the application of pesticide is to keep the pest under check. The pest population has to be kept suppressed to minimum biological activities to avoid economic loss of crop yields. Thorough killing of pest or eradication of pest is neither practical nor necessary. The objective of pesticide application besides keeping the pest population under check should also be to avoid pollution and damage to the non-targets.

Thus the following aspects must be considered for a successful pest control programme.

A. Knowledge of pest problem:

- To define the target.
- To decide the time of application control
- To define the coverage requirements and droplet size.

B. Knowledge of pesticides:

- To define the application technique.
- To define the calibration requirement
- To take up necessary precautions in handling.

C. Knowledge of formulations:

- To define the agitation requirements.
- To collect suitable measure and water buckets and tools etc.

D. Knowledge of techniques & equipment:

- To operate the equipment without field troubles.
- To estimate sufficient number of equipment needed.
- To get an optimum use of the equipment.
- To select suitable equipment.

Classification of plant protection equipment:

SPRAYERS (Hydraulic energy)

Manually operated

1. Syringes, slide pump
2. Stirrup pumps
3. Knap sack or shoulder-slung:
 - Lever operated K.S. sprayer
 - Piston pump type
 - Diaphragm pump type
4. Compression sprayer
 - Hand compression sprayer
 - Conventional type
 - Pressure retaining type
5. Stationary type
 - Foot operated sprayer
 - Rocker sprayer

Powered operated

1. High pressure sprayer (hand carried type)
2. High pressure trolley/ Barrow mounted
3. Tractor mounted/ trailed sprayer
4. High pressure knap sack sprayer
5. Air craft, aerial spraying (Fixed wing, helicopter)

SPRAYERS (Gaseous energy)

Manually operated

1. Hand held type

Powered operated

1. Knap sack, motorized type
2. Hand/ Stretcher carried type
3. Tractor mounted

SPRAYERS (Centrifugal energy)

1. Hand held battery operated ULV sprayer.
2. Knapsack motorized type
3. Tractor/ vehicle mounted ULV sprayer
4. Aircraft ULV sprayer

OTHER SPRAYERS

1. Aerosol sprayers
2. Liquefied-gas type dispensers
3. Fogging machines
4. Exhaust Nozzle Sprayer

DUSTING EQUIPMENT

Manually operated

1. Plunger duster
2. Bellow duster
3. Rotary duster:
 - Belly mounted model
 - Shoulder-slung model

Powered operated

1. Knapsack motorized duster
2. High pressure trolley/ Barrow mounted
3. Tractor mounted/trailed duster
4. Aircraft

GRANULE APPLICATOR

Manually operated

1. Broad-casting tins
2. Knapsack Rotary granule

Powered operated

1. Knapsack motorized type
2. Tractor mounted/ trailed duster
3. Aircraft

Application Technique:

Spray Volume: Depending upon the volume of spray required per hectare the application is categorized

HV: High Volume = More than 150 l/ha.

- Suitable for insecticides, fungicides, herbicides
- can be done with slide pump or hand sprayers , stirrup pump sprayer , compression sprayer , foot operated sprayer , rocker sprayer, lever operated, knapsack sprayer and high pressure power sprayer etc.

LV: Low Volume = Approx. 10-150 l/ha.

- Suitable for insecticides, fungicides.
- Can be done with motorized knapsack sprayer, air craft, (in other countries) low r.p.m. Spinning Disc Appliances are also used.

ULV: Ultra Low Volume = Approx. 1-5 l/ha.

- Suitable for insecticides
- Can be done with Hand Sprayer

DUST APPLICATIONS

The dusting powders are low concentration ready to use type, dry formulations containing 2 to 10% pesticide. The inert material or dry diluents is talc, soapstone etc., and it is nontoxic. The sulphur dust is not diluted with inert material.

The advantages of pesticide dusting application are:

1. Ready to use product reduces field tasks concentrate handling and further dilution (as in case of spraying)
2. In dry land agriculture where water is scare.

But the important disadvantage is pesticide drift. The fine dust particle cause serious drift problems and the operator and field labourer are exposed to dermal and inhalation hazards, besides pesticide being carried to neighbouring field/area and causing pollution.

Granular Applications

As the name implies, this is an applicator for the application of granular formulations. Essentially, these are small hopper type units with an orifice for the material to drop onto the crank operated spinning disc which throws the material over a 15 to 20 foot swath. Also, the same equipment is available in gasoline or power take-off drives which employ the same above principle only on a larger scale. Granules are ready for immediate application. Granular applicators, except in the case of weed control are rarely used in the structural pest control industry.

Some Simple Plant Protection Equipment for Farmers

Hand shake duster, Wet dusting equipment for dry land crops and Swing sack granular applicator etc.



Figure: Knapsack sprayer