Integrated Pest Management (IPM) in Forages and Fodder seed production

Proper kit for pesticide spray

Pheromone trap

Insect light trap

Bihar hairy caterpillar larvae

Hand weeding

Pests, Diseases and Weeds Control Measures Enhance Green Fodder / Seed yield

National Dairy Development Board
Anand

Introduction

India is deficit in green fodder and certified fodder seeds of improved high yielding varieties. Infestation of pests, diseases and weeds in fodder /seed crops, further cause enormous losses and aggravates the availability of green fodder and quality fodder seeds. Hence, there is a need to control infestation of pests, diseases and weeds using environmental friendly technologies. Few such technologies for insect, disease and weed control have been standardized for commercial application which when used in conjunction with other pest control measures prove to be more economic and effective. Such eco-friendly technologies are economically sustainable and known as Integrated Pest Management (IPM).

Integrated Pest Management

It is an ecologically based strategy that focuses on long-term solution of pests through a combination of techniques such as biological control, habitat manipulation, modification of agronomic practices and use of resistant varieties. Embracing a single tactic to control a specific organism does not constitute IPM, even if the tactic is an essential element of the IPM system. Pesticides may be used to remove/prevent the target organism only after assessing that they are needed to prevent economic damage. Pest control tactics, including pesticides, are carefully selected and applied to minimize risks to the human health, beneficial & non-target organisms and environment.

Through IPM approach farmers need to be advised to use the following practices:

a. Cultural pest control

- Use treated seed of improved varieties, resistant to disease/pest.
- Timely planting/sowing of crops and follow proper crop rotations.
- Fallowing of field and destruction/burning of old crop debris.
- Removal of weeds from field boundaries and deep ploughing during summer.

b. Physical and mechanical control

- Manual destroying of insect pests eggs, larvae and pupa etc.
- **Pheromone trap** is a type of insect trap that uses pheromones to lure insects. Sex pheromones and Aggregating pheromones are the most common types used.
- **Insect light trap** is also one of the very effective tools of insect pest management in organic agriculture. The ordinary light trap consists of an electric bulb emitting yellow light as attractant and a funnel to direct lured insects into a container containing water.

c. Biological control

- Rearing biological control agents for their field use and conservation of naturally occurring bio-agents such as *Trichogramma* spp., Lady bird beetle and Chrysopa.
- Installation of bird perches @ 15 per hectare for attracting predatory birds.

d. Organic pesticides

- Promotion of bio-pesticides such as *Neem* seed kernel extract @ 5 per cent as alternative to chemical pesticides.
- Spray of nuclear polyhedrosis virus (NPV) suspension @ 2.5 ml/10 litre of water are recommended for the control of foliage eating spodoptera and heliothis spp. larvae.
- For the effective management of *Helicoverpa armigera* larvae spraying of *Bacillus thuringiensis* @ 1 kg/ha at flowering stage is recommended.
- Soil application @ 1.25 kg/ha or seed treatment with 5g/kg of seed of different fodder crops before sowing by bio-fungicide like *Trichoderma viride*, *Verticillium* spp., *Aspergillus* spp., etc. that attack and suppress the growth of harmful soil borne plant pathogens causing root decay.

e. Chemical control: When above mentioned efforts fail to control pests, recommended chemicals may be used at proper stage.

Integrated Weed Management (IWM)

It is an important component of a total IPM program. Weeds not only decrease fodder /seed yield by competing with crop for water, light and nutrients but also make fodder unpalatable. Weeds also provide shelter to many insect-pests and cause diseases leading to economic losses. IWM combines a variety of approaches to suppress weeds and reduces dependence on herbicides for weed control.

a. Deep tillage during summer.
b. Proper field preparation.
c. Sowing of certified/truthfully labelled fodder seed for fodder production.
d. Application of well decomposed farm yard manure.
e. Keeping irrigation channels and field boundaries free from weeds.
f. Using crop residues for mulching.
g. Changing crop sequences.

Precautions to be taken while handling, applying and storing pesticides

i. Keep the container of pesticides in a locked place, away from children, animals and food.
ii. Use pesticides as per instructions mentioned on the container.
iii. Buy pesticides from reputed source. Do not buy expired pesticides.
iv. Wear hand gloves, face mask and full clothes while applying pesticides.
v. Spray pesticides in cool and calm weather.
vi. Do not wash spray equipment's in ponds and rivers.
vii. Empty containers and packets of insecticides should be disposed properly.

Anthracnose fungal disease in Sorghum

Commonly Recommended Pesticides for important Fodder Seed / Fodder crops in India

Sr. No.	Crop	Chemical name	Herbicide /Fungicide /Insecticide	For controlling	Recommended doses
1	Maize	Atrazine	Herbicide	Annual grasses and broad leaf weeds	1.0 - 1.5 Kg / ha pre-emergence (1-2 DAS*)
		Pendimethaline	Herbicide	Annual grasses and broad leaf weeds	1.0 - 1.5 Kg / ha pre-emergence (1-2 DAS)
		Thiram 75 % WDP or Carbendazim or Vitavax	Fungicide	Seed borne diseases (for seed treatment)	2.5 gram / Kg of seed
		Dithane M-45 (Mancozeb)	Fungicide	Leaf Blight/Downy Mildew diseases	2-3 Kg / ha
2	Sorghum	Atrazine	Herbicide	Annual grasses and broad leaf weeds	1.0 - 1.5 Kg / ha pre-emergence (1-2 DAS)
		Pendimethaline	Herbicide	Annual grasses and broad leaf weeds	1.0 - 1.5 Kg / ha pre-emergence (1-2 DAS)
		Carbendazim /Thiram dust	Fungicide	Seed treatment to control seed borne diseases	2.5 gram / Kg of seed
		Imidacloprid WS or Thiomethoxam 25 WSC	Insecticide	Shoot fly	Seed dressing @ 3g / Kg seed
		Imidacloprid	Insecticide	Shoot fly / Army worm / Cut worm / Sorghum midge / Stem borer	@ 0.5 ml / litre of water
3	Pearl Millet	Atrazine	Herbicide	Annual grassy and broad leaf weeds	1.5 Kg / ha pre-emergence 1-2 DAS
		Thiram 75 % WDP or Carbendazim or Vitavax	Fungicide	Seed borne diseases (for seed treatment)	2.5 gram / Kg of seed
4	Cowpea	Pendimenthalin or Trifluralin	Herbicide	Annual broadleaf and grassy weeds	1.0 Kg / ha as pre-emergence 1-2 DAS
		Tricoderma viridae	Bio-fungicide	Root rot disease	5 gram / Kg of seed
		Carbendazim/ Thiram dust	Fungicide	Root / Collar rot diseases (seed treatment)	2.5 gram / Kg of seed
		Imidacloprid	Insecticide	Leaf eating insects/ aphids	0.5 - 1.0 ml / litre of water as foliar spray
5	Lucerne and Berseem	Tricoderma viridae	Bio-fungicide	Root/stem rot disease (seed treatment)	5 gram / Kg seed
		Carbendazim /Thiram 75 % dust	Fungicide	Seed borne disease (seed treatment)	2.5 gram / Kg of seed
		Hexaconazole / Tebuconazol	Fungicide	Foliar fungal diseases such as rust, leaf spots and mosaic diseases	0.5 ml / litre of water
6	Oats and Barley	Pendimethalin	Herbicide	Annual broad leaf weeds	1.0 – 1.5 litre / ha
		Metsulfuron Methyl	Herbicide	Annual broad leaf weeds	1 packet (10 gram) / acre
		Carfentrazone	Herbicide	Annual broad leaf weeds	1 packet (4 gram) / acre
		Vitavax or Carbendazim or Thiram	Fungicide	Seed borne fungal diseases (seed treatment)	2.5 gram / Kg of seed

* Day after sowing

For more information, please contact: Animal Nutrition Group, Anand.