

Pest Management in Natural Farming

Shivaraj¹, Archana Anokhe² and Priyanshu Pawar³

¹Division of Plant Pathology, ICAR- Indian Agricultural Research Institute, New Delhi

²Scientist, Division of Entomology, ICAR- Indian Agricultural Research Institute, New Delhi

³Ph.D Scholar, Jawahar Lal Nehru Krishi Vishwavidyalaya Jabalpur, Madhya Pradesh

SUMMARY

Natural farming emphasizes sustainable and eco-friendly approaches to agricultural practices, seeking to minimize reliance on synthetic inputs. Pest management in natural farming revolves around fostering a balanced ecosystem that supports natural predators, enhances soil health, and employs preventive measures. This abstract provides an overview of key strategies employed in natural farming for effective pest management.

INTRODUCTION

Conventional chemical farming is currently experiencing challenges, including reduced crop production and increased costs, or sometimes both. The practice of cultivating monocultures like rice, wheat, and cotton on the same land has led to the depletion of topsoil, soil health, groundwater quality, and beneficial microorganisms. This has made crop plants more susceptible to pests and diseases. Additionally, the widespread use of chemical fertilizers and pesticides is causing environmental pollution and posing a global threat. Continuous use of these chemicals may harm the beneficial soil microorganisms. The heavy use of inorganic chemical fertilizers and pesticides has led to soil, surface water, and groundwater contamination with harmful chemicals and the accumulation of heavy metals. This approach involves no tillage and avoids the use of herbicides, inorganic fertilizers, and pesticides. In this system, the farmer acts as a facilitator, and the majority of the work is carried out by nature itself. Natural farming minimizes external inputs to the farmland, which can degrade the natural qualities of the soil.

Organic Pest Management Techniques

Beejamrita (Seed treatment): Beejamrit is an ancient, sustainable agriculture technique. It is used for seeds, seedlings or any planting material. It is effective in protecting young roots from fungus. Beejamrit is a fermented microbial solution, with loads of plant-beneficial microbes, and is applied as seed treatment. It is expected that the beneficial microbes would colonize the roots and leaves of the germinating seeds and help in the healthy growth of the plants.

Inputs needed: 5 kg cow dung, 5 litre cow urine, 50 gram lime, 1kg bund soil, 20 litre water (for 100 kg seed)

Method of preparation:

Step 1: Take 5 kg cow dung in a cloth and bind it using tape. Hang the cloth in 20 litre water for up to 12 hours.

Step 2: Simultaneously, take one litre water and add 50 gram lime in it, keep stable for overnight.

Step 3: Next morning, continuously squeeze the bundle in the water thrice, so that all the essence of cow dung is mixed in the water.

Step 4: Add handful of soil, approximately 1 kg in the water solution and stir well.

Step 5: Add 5 litre desi cow urine in the solution and limewater, and stir it well.

Benefits of beejamrita:

1. Use of beejamrita increase germination capacity of seeds.
2. Plants remain free from seed and soil borne diseases, insect-pests and other disorders.
3. Plants show increased resistance against insect-pests and diseases throughout their growth period.

Darekastra/Paudhastra: This solution is used to control sucking insect-pests and young caterpillars attacking fruits and vegetables.

Method of preparation: Cut the branches of darek tree along with leaves in small parts. Add 40 litres water, 2 litres cow urine, 400 g cow dung and 2 kg chopped branches in a barrel. Stir the solution for 2-3 minutes in clockwise direction so that all the contents are mixed well. Keep stirring the solution intermittently for 2 days in clockwise direction for 2-3 minutes and then cover with jute bag. After that, strain the solution through a cloth and store in a barrel/drum. This solution can be stored for upto 6 months.

Time of preparation: Under normal environmental conditions in 2 days and during winters in a week

Precautions: Store darekastra in a place away from direct sunlight and rainfall. Spray darekastra in evening.

Rate of application: spray 40 litres in 1 bigha area.

Brahmastra: This solution is used to control sucking insect-pests and older larvae infesting crops.

Method of preparation:

1. Take 200 g crushed and ground leaves each of darek, papaya, guava, mango and Duranta in a big vessel.
2. Add 4 litres of cow urine in the vessel and cover it with a lid.
3. Bring the solution to boil on low flame and then remove from the flame and keep it aside for cooling.
4. After 48 hours, store the solution in a container and use upto 6 months.

Precautions:

1. Place the vessel containing the solution away from direct sunlight and rainfall.
2. Spray the solution in evening hours.

Rate of application: 1 litre brahmastra in 40 litres water for 1 bigha area.

Agneyastra: This solution is used against pests like fruit borers, root borers and leaf folders that are hidden inside fruits, roots and leaves of plants.

Method of preparation:

1. Take desi cow urine 10 litres, crushed leaves of darek 5 kg, tobacco powder 500 g, chilli powder 500 g and crushed garlic 500 g in a vessel.
2. Heat the solution on low flame till it starts boiling. Then remove the solution from flame and let it cool for 48 hours.
3. Strain the solution through cotton cloth and store in a cool place. The solution can be used for upto 6 months.

Precautions:

1. Store the solution at a place that is away from direct sunlight and rainfall.
2. Spray the solution in evening.

Rate of application: 1 litre agneyastra in 40 litres water for spraying in 1 bigha area.

Dashparni: This solution is used to control all types of insect-pests infesting crops, fruits and vegetables. It takes care of the difficult to control pests.

Method of preparation:

1. Put 4 litres of cow urine, 400 g cow dung, 100 g turmeric powder, 100 g ginger paste, 5 g asafoetida powder, 200 g tobacco powder in a barrel and cover with a jute bag.
2. Next morning, add 200 g green chilli powder, 100 g garlic paste and 400 g darek leaves. Mix the contents with a wooden stick for 2-3 minutes in clockwise direction.
3. Cover the solution with jute bag for upto 24 hours.
4. Next day, add lantana leaves, Dhatura leaves, papaya leaves, marigold leaves, guava leaves, bana leaves, basuti leaves, turmeric leaves and ginger leaves each at 400 g in the mixture and cover with jute bag.
5. Stir the mixture for 2-3 minutes every morning and evening for 30-40 days in clockwise direction.
6. Strain the solution through a cloth and store it. The mixture can be used for upto 6 months.

Precautions:

1. Store the solution in a place where sunlight and rain do not fall.
2. Spray the solution in evening.
3. While mixing this solution, cover nose with a cloth.
4. Keep children and cattle away from the place where dashparni is prepared and stored.

Time of preparation:

1. Under normal environmental conditions: 40 days
2. Hilly areas having severe cold: 50-60 days.

Rate of application: 1 litre dashparni in 40 litres of water for spraying in 1 bigha area.

Neem paste: It is prepared from the leaves and twigs of neem tree, *Azadirachta indica*. All parts of neem tree like seed kernels, flowers, leaves, twigs, bark possess insecticidal activity, seed kernel being most effective. Azadirachtin is the most potent limnoid isolated from neem tree which is effective against more than 550 insect species. It has properties of repellence, antifeedance, oviposition deterrence, and growth disruption against wide variety of insect-pests belonging to diverse orders. Besides insecticidal activity, neem also displays strong nematicidal, fungicidal, bactericidal and molluscicidal activity.

Method of preparation

Take 50 litres water, 20 litres cow urine, 20 kg cow dung, 10 kg paste of neem leaves, twigs and 10 kg twigs of custard apple and place in a drum. Mix all the ingredients well and keep covered for 48 hours while stirring intermittently. The paste is ready to be used in 2 days period. Use within 7 days of preparation.

Time of application: Apply once in each quarter of the year.

Neemastra: It is used to control sucking insect-pests and young caterpillars attacking various crops.

Method of preparation:

1. Crush and grind 5 kg neem leaves/fruits into fine powder and put in a drum.
2. Add 100 litres water in this powder.
3. Pour 5 litres urine of desi cow and add 1 kg cow dung. Stir the mixture with a wooden stick in clockwise direction. Cover the mixture for 48 hours.
4. Stir the solution thrice for 2 days and then strain through a cloth and use it for spraying.

Rate of application: 2 litres in 20 litres of water for 1 bigha area.

CONCLUSION

While literature offers limited research on using natural products to control crop pests and diseases, available reports demonstrate their effectiveness against various pests. Natural pesticides can effectively manage pests that resist chemical control. More research is required to further substantiate these findings, emphasizing their use, either in combinations or rotations, for a deeper understanding of their efficacy. Educating farmers on the benefits of natural products in natural farming will encourage them to create these solutions using local materials, promoting natural farming in India and abroad while mitigating the toxic effects of chemical agriculture.

REFERENCES

<https://naturalfarming.niti.gov.in/components>