Package of Practices: Integrated Disease and Pest Management (IDPM) in Cucurbitaceous Vegetable Crops

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Crop: Cucurbits (e.g., Bitter Gourd, Pumpkin, Cucumber, Bottle Gourd)
Theme: Integrated Disease and Pest Management (IDPM)
Objective: To promote sustainable cultivation of cucurbitaceous vegetables by integrating cultural, biological, mechanical/physical, and need-based chemical methods for effective and eco-friendly pest and disease control.

A. Cultural Methods

These practices modify the crop environment to create conditions unfavorable for pests and diseases.

- **Field Preparation:** Conduct deep ploughing of fields to expose soil-borne pathogens and pest life stages to sunlight and predators.
- **Field Sanitation:** Remove and destroy crop residues and weeds from the previous season to eliminate alternate hosts and overwintering sites for pests.
- **Water Management:** Avoid water stagnation around the base of plants. Maintain proper drainage in the field to prevent root diseases and create conditions unfavorable for pests.
- **Soil Solarization in Nursery:** Cover nursery beds with a clear polythene sheet of **45 gauge (0.45 mm) thickness** for three weeks before seed sowing. This solarization helps in reducing soil-borne pests, pathogens, and weed seeds.
- **Proper Spacing and Pit Preparation:** Prepare pits of size **30 cm x 30 cm x 30 cm** at a spacing of **2 m x 1.5 m**. Form basins around each pit to ensure proper water management and plant growth.
- **Balanced Nutrition:** Apply the recommended dose of fertilizers. For example, for **Bitter Gourd**, apply **50:40:30 NPK kg/ha**. Adjust doses based on soil test reports and specific crop requirements.
- **Resistant/Tolerant Varieties:** Cultivate resistant or tolerant varieties to manage specific pest and disease pressures.
    - **For Bitter Gourd:** Use varieties such as **Palee F1, Unnat Kathi Gaurav, Kathi Selection, Kashi Mayuri**, etc.

B. Biological / Botanical Methods

These methods utilize natural enemies, antagonists, and plant-based products for pest management.

- **Soil Application of Oil Cakes:** Apply **Neem cake or Pongamia cake @ 100 kg/acre** in the soil at the time of the last ploughing. This helps in managing nematodes and soil-dwelling pests.
- **Seed Treatment:** Treat seeds before sowing with a mixture of **UmComb (@ 10 ml per kg seed)** and **CAU Bioenhancer (@ 10 ml per kg seed)** to protect against seed and soil-borne diseases and enhance early vigor.

- **Enriched FYM Application in Pits:** Prepare enriched farmyard manure (FYM) by mixing **UmComb (@ 3 litres per 100 kg FYM)** and **CAU Bioenhancer (@ 3 litres per 100 kg FYM)** with cow dung. Apply this mixture into the pits one week before sowing seeds or transplanting seedlings.
- **Botanical Sprays:** Apply **Neem Oil (@ 4 ml/L of water)** or **Neem Leaf Extract (1 kg leaf in 10 L water)** as a foliar spray at critical growth stages: **15, 30, 45, 60, and 75 Days After Transplanting (DAT)**.
- **Foliar Application of UmComb:** Apply **UmComb (@ 10 ml/L of water)** at **20, 35, 50, 65, and 80 Days After Sowing (DAS)** for its biopesticidal action.
- **Foliar Application of UmBir and UmMet:** Apply a combination of **UmBir (@ 10 ml/L of water)** and **UmMet (@ 10 ml/L of water)** at **25, 40, 55, 70, and 85 DAS** to manage pests through entomopathogenic and antagonistic effects.

C. Mechanical / Physical Methods

These methods involve manual operations or physical devices to prevent pest establishment and spread.

- **Yellow Sticky Traps:** Use yellow sticky traps or cards to monitor and mass trap pests like aphids, whiteflies, and leaf miners.
    - **For Monitoring:** Install **4-5 traps per acre**.
    - **For Mass Trapping:** Install **25 traps per hectare**.
- **Fruit Fly Traps:** Install **melon fly traps (cue-lure traps) @ 25 traps per hectare** for monitoring and mass trapping of fruit flies, a major pest in cucurbits.
- **Manual Removal and Destruction:**
    - Collect and destroy infested fruits showing maggot damage to prevent pest buildup.
    - Collect and destroy egg masses and larvae of pests like pumpkin beetles and defoliators.
    - Remove and destroy diseased or pest-infested plant parts (e.g., leaves with powdery mildew, vines with wilt symptoms) to prevent the spread of infestation.

D. Chemical Methods

These methods are a last resort and should be applied judiciously based on regular field scouting and Economic Threshold Levels (ETL).

- **Need-based Application:** Apply synthetic pesticides or fungicides only when absolutely necessary and pest/disease populations cross the ETL. Choose chemicals that are specific to the target pest and safer for natural enemies and pollinators.

Additional Important Practice

- **Soil Amendment:** Apply Agricultural Lime **@ 500 kg/ha once in three years**, ideally **21-30 days before sowing or transplanting**, to correct soil acidity and improve nutrient availability, leading to healthier and more resilient plants.

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