

Advanced Management of Vegetable Nursery

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Vegetable nursery management is a critical prelude to successful vegetable cultivation. The use of advanced nursery techniques ensures the production of vigorous, uniform, and disease-free seedlings, ultimately leading to higher productivity and better crop performance. This article highlights the key components and strategies of advanced vegetable nursery management, emphasizing recent technological advancements and sustainable practices. The success of vegetable production depends on good vegetable nursery management. Strong, uniform and healthy seedlings are produced with advanced nursery approaches which results in improved crop yield and better quality.

1. Introduction

A nursery is where seedlings spend time under special care prior to being transplanted onto the main field.

Advanced nursery management is crucial for growing vegetables in the present day because it helps the seedlings, raises yields and improves how resources are managed. Because many people now want quality vegetables and hybrids with high yield, nurseries must be managed efficiently.

2. Site Selection and Nursery Structures

Nursery Site selection should be strategic to

ensure to have good drainage, easy access and the right microclimate in the nursery. Raised beds, well-drained soils, and livestock protection are all needed. Modern nurseries increasingly rely on control structures such as:

➤ **Polyhouses And Shade Nets:** poly house provides better protection because rainfall is completely prevented from entering the poly house, making leaf diseases easier to control. Use of polyhouses and



shade nets to protect seedlings from direct sunlight, strong winds, and various insect pests.

- **Insect-Proof Net Houses:** Insect proof net houses are important to prevent viruses in tomato and chili seedling production.

3. Growing Media

Media is one of the important components for advanced nursery raising system. Physical characteristics of the media are important for water and nutrient holding capacity as well as proper aeration for optimum root growth. Advanced nurseries use soil-free media to prevent diseases transmitted by soil and maintain uniform germination. A good growing media should have good drainage aeration, water retention properties within pH reaction neutral. Preferred media combinations include:

Cocopeat: Cocopeat is a byproduct of fiber extraction from coconut husks. It is a 100% natural, biodegradable, fibrous, and spongy material. It has a high C:N ratio, hence it takes a long time to degrade. It also has a high-water retention capacity, about seven to nine times its own weight. Cocopeat has antifungal and antibacterial effects.

Vermiculite and Perlite: It is grey-white in color siliceous material. perlite improves soil aeration and drainage, preventing root rot, while vermiculite retains moisture and nutrients, supporting healthy seedling growth. Together, they enhance soil structure for optimal seedling development.

4. Containers

Pro-Trays or Plug Trays: In advanced nurseries, the production of seedlings often uses pro-trays, also known as plug trays. each tray consists of multiple

small cells which means each seed can be sown one at a time. It helps grow strong roots, limits the risks of transplant shock and allows seedlings to grow nicely. These methods increase efficiency when using resources, control diseases and promote easy transplantation. Pro-trays are easy to move, can be used again and help workers work faster. Firmly disinfect the media using formalin or steam to get rid of microorganisms before use.

5. Seed Treatment and Sowing

Seed treatment is the most common method adopted for healthy seedlings production. Seed treatment is necessary to prevent early-stage diseases and improve germination.

- **Chemical treatment:** Use of fungicides like carbendazim or thiram.
- **Biological Treatments:** Application of *Trichoderma viride*, *Pseudomonas fluorescens*, or neem-based products.
- **Priming:** Enhances seed vigor and synchronizes germination.

Seeds should be sown at appropriate depths in trays, ensuring one seed per cavity to avoid competition.

6. Irrigation and Nutrient Management

Consistent and light irrigation is required for seedling growth. In advance nurseries drip and mist systems are used to apply water precisely.

Fertigation: Application of water-soluble fertilizers through irrigation systems.

- **Initial stages:** 19:19:19 NPK formulation.
- **Later stages:** 13:0:45 or 12:61:00 depending on nutrient needs.

- **Micronutrients:** Zinc, iron, and boron may be applied as foliar sprays based on visual deficiency symptoms.

7. Pest and Disease Management

Advanced pest management in nurseries involves:

Pest Management

- Biological agents: *Beauveria bassiana*, *Metarhizium anisopliae*.
- Yellow/blue sticky traps to control flying insects.
- Regular monitoring and sanitation.

Disease management

Damping-off

Damping-off is a common and very serious fungal disease of nursery plants.

Soil drenching with copper oxychloride 2 2g/liter or seed treatment with Thiram or carbendazim @ 3 g/kg seed are effective method to control damping-off.

Preventive Measures: Use of sterilized media, clean water, and disease-free seeds.

8. Hardening and Transplantation

Hardening plants, also known as "hardening off" is the process of gradually acclimating plants to outdoor conditions before transplanting them from a protected environment like a greenhouse or indoors.

Before transplanting, seedlings must be hardened to withstand field conditions. This includes:

- Reducing water supply.
- Gradual exposure to sunlight.
- Suspending fertilization.

Hardened seedlings exhibit better survival, early establishment, and enhanced resistance to transplant shock.

9. Automation and Record Keeping

Technological interventions are increasingly being adopted:

- Environmental control systems: Manage temperature, humidity, and light in protected structures.
- Digital monitoring: For seedling age, batch information, and health status.
- Automated irrigation systems: Improve efficiency and reduce labor.

Conclusion

Vegetable nurseries require advanced management to address the difficulties of modern agriculture. Nurseries can help vegetable crops succeed by blending precision techniques, protected cultivation, and sustainable practices. Encouraging farmers and commercial producers to use such technologies will increase horticultural production as well as profitability.

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