

Organic cultivation of Potato

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Introduction

On an organic farm, organic potato production typically fits into a planned rotation. On an organic farm, organic potatoes can be grown by a skilled potato farmer. The farmer will still need to adhere to all other organic criteria and register with a certification agency. If the field follows an appropriate planned rotation and organic potatoes can be sufficiently isolated from any other potatoes cultivated on the farm, it might also be viable to grow organic crops in just one field. Many farmers are interested in organic potato farming because of the crop. Modern intensive agriculture depends on high inputs of chemical fertilizers and pesticides for crop production. Although such technology-based practice has increased agricultural productivity, the resulting ecological and economic impacts have not always been positive (Basu 2009).

- Consumer demand
- Potential profitability
- Potential use as a break crop from grass in the rotation;

- Need for cultivation to aid in weed control.

Challenges of organic potatoes

Organic potato production has a number of challenges that must be tackled:

- Providing adequate nutrients
- Preventing potato blight
- Weed control

Organic producers have to rely on alternative approaches rather than artificial fertilizers and synthetic chemical herbicides and fungicides.

Cultural practices

Soil

A friable, permeable, and well-drained soil is ideal. The pH range that works best is 4.8 to 5.4. It is a crop for chilly climates. Rainfed agriculture is primarily used to cultivate potatoes. It is grown in areas with annual rainfall ranging from 1200 to 2000 mm.

Propagation

Use well-sprouted, disease-free seeds weighing 40 to 50 grams. The tubers should be spaced 20 cm apart. The seeding rate is 3,000–3,500 kg/ha.

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- Grow varieties suited to organic production
- Grow varieties which best suit the intended market as with all organic produce, grow what will sell, not what you want to sell

➔ Kufri Swarna, Kufri Giriraj and Kufri Chipsona- II are suited for organic farming since they are resistant to blight and nematode.

Preparation of field

The land should be fine-tilthed. Terraces on slopes provide an inward slope of 1:40. Create a drainage channel along the terrace's inner edge. By using a ridge maker or a manual hoe, create ridges and furrows with an interval of 45 cm.

Irrigation

Irrigate the crop 10 days after planting. Subsequently irrigation should be given once in a week.

Manuring

Application of well-decomposed farmyard manure at a rate of 50 t/ha at the time of land preparation, application of biodynamic compost at a rate of 5 t/ha, application of vermicomposting at a rate of 5 t/ha, application of neem cake at a rate of 1250 kg/ha at the time of land preparation, and application of horn manure at a rate of 75 g/ha by dissolving it in 40 litre.

After cultivation

- Up to 60 days are the important period of weed competition, and it is crucial to preserve the field weed-free at that time. On the 45th day, begin your first hoeing without disturbing the stolons. At the 60th day, a second hoeing and earthing up should be performed. Weed control is done without the use of herbicides by choosing fields with no major weed problems
- Flame weeding of weed seedlings before the potato tops emerge – this can be expensive
- Mechanical weed control just before tops meet between rows
- Limited hand weeding of any large invasive weeds

Growth regulators

- Foliar spraying of panchagavya @ 3 per cent at 10 days interval from 1st month after sowing
- Spraying 10% vermiwash 5 times at 15 days interval from one month after sowing
- Foliar spray of horn silica @ 2.5 g/ha in 50 litres of water on 65th day after sowing

Plant protection

Pests

Aphids

- Foliar spray of 10% nettle leaf extract on 45th, 60th and 75th day after sowing
- Foliar spray of 10% garlic- chilli extract on 45th, 60th and 75th day after sowing
- Foliar spray of 3% neem oil

Cutworms

- Install light trap during summer to attract adult moths
- Install sprinkler irrigation system and irrigate the field in day time to expose the larvae for predation by birds
- Application of pyrethrum bait in soil

White grubs

- Summer ploughing to expose the pupae and adults
- Install light traps between 7 pm and 9 pm in April – May months
- Hand pick the adult beetles in the morning
- Hand pick the 3rd instar grub during July – August
- Application of *Metarrhizium anisopliae* @ 20 kg/ha at the time of land preparation

Potato tuber moth

- Avoid shallow planting of tubers. Plant the tubers at 10 – 15 cm depth
- Install pheromone traps @ 20 numbers per hectare

- Earth up at 60 days after planting to avoid potato tuber moth egg laying in the exposed tubers
- To control foliar damage, spray 5% neem seed kernel extract
- Keep pheromone traps in godowns
- ➔ In godowns cover the upper surface of potato with *Lantana* or *Eupatorium* branches to repel ovipositing moths

Diseases

Potato blight

Potato blight cannot be cured and particularly in an organic situation, avoidance is definitely the best policy.

- Blight is not generally a problem with early harvested, early varieties
- Plant early varieties if suitable/possible
- Plant healthy, blight free seed
- Select varieties with high blight resistance
- Listen for and pay attention to blight warnings
- If the blight pressure is high apply a permitted fungicide
- Remove ground creepers which serve as a source of infection
- Spraying Agni Hotra ash (200 g Agni Hotra ash soaked in 1 liter cow urine for 15 days and diluted in 10 litres of water before spraying) 3 times at one month interval from one month after planting

Brown rot

- Select disease free seeds
- Give proper drainage facilities
- Remove and destroy the affected plants

Virus diseases

- Use virus free potato tubers
- Rogue the virus affected plants regularly
- Control the aphid vectors by spraying 10% nettle leaf extract on 45th, 60th and 75th day after planting

Nematodes

- Avoid growing potato year after year in the same field
- Follow rotation of crop with vegetables and green manure
- For cyst nematode, a resistant variety called Kufri Swarna can be grown
- Application of *Pseudomonas fluorescens* @ 10 kg/ha can be done
- Sow mustard as intercrop at the time of potato planting and harvest the mustard greens on 45th day for the control of potato cyst nematode

Storage

Normal methods of storage apply to organic potatoes however,

- ❖ Sufficient isolation from non-organic potatoes will be needed to prevent contamination or substitution. This might simply require varieties that can be seen.

- ❖ Fungicides and sprout suppressants are not allowed in the store.

Yield

15 – 20 t/ha in duration of 120 days.

Conclusion

The employment of contemporary plant protection methods in organic potato growing has been discussed. According to the authors, proper crop rotation, healthy, disease-free seeds, sturdy disease-resistant varieties, appropriate irrigation and fertilisation, use of oils, lifting of green crops as necessary, straw mulching, natural enemies, equipment to collect CPB, and planting potatoes early with a short vegetative period are the most important techniques for growing healthy potatoes organically. In the future, the authors suggest plant breeders to concentrate more on developing cultivars that are more weed-suppressing and suitable for organic agricultural production.

References

1. Basu A. 2009. Employing eco-friendly potato disease management allows organic tropical Indian production systems to prosper. *Asian J Food Agro-Indust.* Special issue. S80–S87.