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SCIENTIFIC CULTIVATION OF POTATO

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Introduction:

The potato, a well-known cash crop, is crucial to the region's crop cycles, especially in high-altitude areas. In terms of the total area under cultivation, Meghalaya ranks second in the North Eastern Region for potato production. An annual plant in the nightshade family (Solanaceae), the potato (*Solanum tuberosum*) is grown for its starchy edible tubers. A crop that has traditionally been "the poor man's buddy" is the potato. Over 300 years have passed since the cultivation of potatoes began in our nation. Since the Spanish conquest of Spain and Italy in 1565, it has been extensively farmed in China, the Russian Federation, Ukraine, Poland, Ireland, Great Britain, Germany, the Netherlands, France, and Spain. The potato was first brought to India in the early 17th century and is now one of the country's main economic crops One of the most significant food crops in the world is the potato, which has its origins in the Peruvian-Bolivian Andes. As a cooked vegetable, potatoes are frequently consumed whole or mashed. They are also processed to create potato flour, which is used in bakeries and as a sauce thickener. The tubers are simple to digest and rich in proteins, thiamin, and the antioxidant vitamin C.

Importance and Uses

- It is regarded as a staple food in India and is eaten either by itself or with other vegetables. It is one of the most significant vegetable crops in the world and is grown in almost every nation.
- Potatoes can be cooked in sambhar and other vegetable, fish, and meat curries as well as mashed, boiled, roasted, fried, and other methods as vegetables.
- Potatoes are processed into a range of dehydrated, canned, and fried items that are sold commercially, including chips, flakes, french fries, finger chips, granules, discs, flour, etc. • They are also used to make starch, flour, and other products.

Botany

Potato has a cymose inflorescence.

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Each segment of the sympodium-shaped vegetative stalk ends with an inflorescence. The vegetative growth is continued by the bud in the axil of the last true foliage leaf. This branch appears to have been moved to the side. The blooms are actinomorphic and hypogynous. Five calyx lobes are present. The five petals make up the corolla tube. The five stamens alternate with the petals and are carried on the corolla tube. Joined anthers encircle the pistil. When mature, the stamens have long anthers and short, robust filaments. Pollen can be released through pores at the tips of the anthers. Two carpels fuse to form a syncarpous, bilocular, superior ovary with a long style and a stigma with two lobes.The mature fruit is a green berry with an axile placentation, which frequently does not form in a potato grown for human use. Although some flowers may continue to bloom throughout the day, most flowers open in the early morning. In nature, self-pollination is the norm. Bumblebees, who are the primary pollen transporters, do cross-pollination most frequently. In nature, wing pollination is not very important. After 30 minutes, the pollen has finished germination, and 12 hours later, the ovary has undergone fertilization.

Potato Varieties

At the Central Potato Research Institute (CPRI), Kufri, Shimla, most improved potato types are created. The majority of early varieties are clonal selections derived from exotic or well-liked acclimated types that persisted following introduction. Based on their habits, pigmentation of the stem, leaf, and flower as well as the size, colour, and depth of the eyes as well as the flesh colour of the tubers, varieties are identified. Numerous previous types were replaced by new, improved kinds as they matured, either because they were created at CPRI, Shimla, or because they changed as well-known choices from improved varieties.Most popular varieties of Potato are Satha, Gola, Up-to-date, Phulva, Great Scot, President, Kufri Kuber, Kufri Kisan, Kufri Neela, Kufri Khasi-Garo, Kufri Naveen, Kufri Chamatkar, Kufri Neelmani, Kufri Sheetman, Kufri Alankar, Kufri Jeevan, Kufri Moti, Kufri Lavkar, Kufri Red, Kufri Safed and Kufri Dewa are a few of the earlier varieties.

Climatic requirement

Although potatoes are generally a temperate-zone crop, there is a wide range in the gene pool about how the crop responds to thermal cycles. With an ideal tuberization temperature of 16–22°C, potato crops are typically grown when daily maximum and minimum temperatures are below 35°C and 20°C, respectively.

Soil

Potatoes grow well in alluvial, hill, black, red, and laterite soils with pH values

between 5.5 and 8.0. Any layers that are compacted and obstruct root emerging or deform tubers should be absent from the soil, which should be fine and loose. Loamy, sandy, or coarse soils with good drainage and a lot of organic matter are ideal for growing potatoes.

Size and rate of the seeds:

The tuber of each seed must weigh between 30 - 50 grams and have three to four functional eye buds. Although 30-35q is the ideal seed rate, 20-25q/ha is advised if small-sized tubers (30-40g) are seeded.

Seed Treatment

After being removed from cold storage, seed potatoes should be stored in a cool, shaded area for one to two weeks prior to planting in order to promote the appearance of sprouts. It is best to use the sprouting tubers as seed.

Nutrient management

Spread 120 kg N, 240 kg P, and 120 kg K/ha in two separate treatments, one as a base dressing and the other as a top dressing, 30 days after sowing. Additionally, utilise a base of 15 t/ha of FYM, 2 kg of Azospirillum, and 2 kg of Phosphobacterium. Use 60 kg/ha of magnesium sulphate as a starting dose. To overcome the phosphorus shortage, phosphate is used topically (Kashyap et al., 2022).

Irrigation management

Potatoes require 350 to 550 mm of water, depending on how long the growth season is. Potato cultivation needs a lot of irrigation because the plant's shallow and haphazard root system. 2-3 days after planting, the soil should receive a light irrigation. Depending on the soil type and weather, subsequent irrigations should occur every 4-6 days.

Harvesting and Yield

One common pre-harvesting method is killing. Many farmers use mechanical methods, pesticide applications, or stopping all irrigation to remove the tops of potato plants. The potatoes were left in the ground after the plants were removed for a further 10 to 14 days before being harvested. Potatoes have thick skin as a result, which some markets favour for a variety of reasons (the potatoes may be transported with a decreased risk of bruising, etc.). The potatoes can be harvested 2.5 to 4 months after they are planted. Modern tractors come with harvesting equipment for gathering potatoes. The machines harvest the potatoes by using a share to raise them off the bed. Potatoes, soil, dirt, and other materials are arranged on a succession of webs.

The yield varies between 25 and 35 tonnes per hectare. However, factors including variety, soil, climate, and cultural practises may affect the yield.

Major pests

- Colorado potato beetle (*Leptinotarsa decemlineata*) is a serious pest with strong resistance to insecticides.
- Potato tuber moth, most commonly *Phthorimaea operculella*, is the most damaging pest of planted and stored potatoes in warm, dry areas.
- Leafminer fly (*Liriomyza huidobrensis*) is a South American native common in areas where insecticides are used intensively.
- Cyst nematodes (*Globodera pallida* and *G. rostochiensis*) are serious soil pests in temperate regions, the Andes, and other highland areas.

Diseases

Viruses are disseminated in tubers and can cut yields by 50 percent.

- Late blight, the most serious potato disease worldwide, is caused by a water mould, *Phytophthora infestans*, that destroys leaves, stems, and tubers.
- Bacterial wilt, caused by the bacterial pathogen, leads to severe losses in tropical, subtropical, and temperate regions.
- Potato blackleg, a bacterial infection, causes tubers to rot in the ground and in storage.