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PACKAGE OF PRACTICES FOR TABLE AND SEED POTATO PRODUCTION IN THE

PLATEAU REGION

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Package of practices for table and seed potato ' production in the plateau region

Introduction

The plateau region of India covers vast area of central and peninsular India. It is spread over parts of Tamil Nadu, Karnataka, Gujarat, Andhra Pradesh, Maharashtra, Madhya Pradesh, Bihar and even Orissa. Potato is being increasingly grown in this region. At present, it is grown in about 75,000 ha. The present yield levels are, however, low-only about 9.0 tones/ha, while the national average is 14.8 t/ha. This is due to a combination of factors such as relatively unfavorable growing conditions, raising crops under rainfed conditions, poor quality of seed and lack of knowledge about scientific practices of potato cultivation.

To meet the seed requirements of the region partly and to develop the package of practices for raising table and seed potato in the region, the Central Potato Research Institute, Shimla has set up a research station at Rajgurunagar, Pune District in Maharashtra in 1960. The results of the work done here so far in developing scientific methods of cultivation are summarized below. The package described here is applicable to other areas of this region also but with some minor modifications.

TABLE POTATO PRODUCTION

Recommended cultivars-Kufri Lauvkar; also Kufri Chandramukhi and Kufri Jyoti in both *kharif* and *rabi* seasons, and Kufri Sindhuri in *rabi* season.

Seed size-Use 40-50 gm, well sprouted tubers.

Seed preparation-The seed should be removed from cold store 11 about 10 days before planting. Keep the seed bags in the precooling chamber of the cold store for 24 hours. Then, the seed should be spread in a cool and shaded place for drying and sprouting. They should not be exposed to sun. Unsprouted and rotted tubers should be removed. Bigger-sized tubers could be cut into two or more longitudinal halves, the cut pieces dipped for 5-10 minutes in 0.2% mancozeb solution and dried in shade. The cut tubers should be covered with moist gunny bags for 2-3 days for suberization, otherwise, cut tubers when planted are liable to rot. Do not use brown rot infected seed tubers.

Planting time-Potato is generally planted during end June-early *July* in *Kharif* season depending on the onset of rains and early November in *rabi* season.

Manuring- (a) Apply well rotten FYM @ 15-30 t/ha in furrows at the time of planting. 30 t/ha FYM can take care of phosphorus and potassium needs of potato crop. However, if FYM is applied at 15 t/ha, half the dose of phosphorus and potassium is to be applied through fertilizer. (b) Apply 120 kg nitrogen

(6.0 q ammonium sulphate or 2.6 q urea)

in *kharif* and 140 kg (7.0 q ammonium sulphate or 3.1 q urea) in *rabi*, ' about 60 kg phosphate

(3.75 q single superphosphate), and 60 kg of potash (1.0 q muriate of potash) per hectare. The fertilizers are applied in furrows before planting. Nitrogen is applied in split doses, two-thirds at planting time and the rest at earthing up.

Method of planting-

Prepare the fields thoroughly. Make furrows at a distance of 60 cm in *kharif* and 50 cm in *rabi* with *desi* or mould board plough or a ridger. Apply FYM and fertilizer mixture in furrows and mix them well using a *Kudali* (the hand implement used for cultivation in plateau region). Sprouted tubers/cut seed pieces are planted in these furrows at 20-25 cm distance with sprout facing upwards. Cover the tubers by making ridges of about 15 cm height over the furrows. If the soil is dry, irrigate the field immediately after planting.

If irrigation facilities are not available these operations have to be done when the soil is moist.

Irrigation- Irrigations are not usually given in *kharif*. However, if the rains are irregular and extended dry spells occur, 1-2 light irrigations will be necessary for providing proper growth of the crop and to prevent potato tuber moth incidence due to soil cracking and ensuring economic yield.

The *rabi* crop can be raised only if facilities for irrigation are available. The first 2 or 3 irrigations during the germination period should be light just enough to keep the soil moist. This crop will need 10-12 irrigations in all at intervals of about 10 days. Stop irrigation 10 days before harvesting.

Interculturing-

Normally, two weedings are done, one immediately before earthing up and the second if weed growth is high, 50-60 days after planting.

Earthing up should be done after about 25 days of planting. Apply the second dose of nitrogen at this time.

Earthing up is necessary to ensure better tuber development. It also helps to avoid potato tuber moth infestation during tuber development in areas where it is a problem.

Plant protection

- (i) *Control of fungal and wilt diseases:* In this region, *phoma* and early blight are the main fungal diseases affecting the crop during *kharif* season. To control them, spray the crop with 0.2% mancozeb solution at 10-12 days intervals both in *kharif* and *rabi*. Normally, about two sprays may be enough. Sometimes, sclerotial wilt may also appear. Wilt infected plants should be removed along with surrounding plants. In case of severe incidence of wilt disease, crop rotation with cereals should be followed.
- (ii) *Control of insects pests:* During the *kharif* season, the crop is attacked by a number of pests such as jassids, aphids, potato tuber moth and mites. To control jassids and aphids, spray the crop with methyl demeton 25 EC or dimethoate 30 EC at 1.0 l/ha in 1000-1200 litre water. Repeat the spray at about every 10 days. For controlling potato tuber moth, spray the crop with carbaryl 50% WP at 4 kg/ha in 1000 litres water. If the crop is damaged by mites, spray the crop with kelthane 18 EC at 2.0 l/ha in 1000 litres water. Some time a second spraying would be needed. Discontinue the insecticidal spray at least 15-20 days before harvesting.

Harvesting and marketing- The crop should be harvested as soon as it matures. The normal harvesting time of *kharif* crop is end September-early October and of *rabi* crop, end January-early February. After harvest, sort out all damaged and rotted tubers. The tubers are then graded in different sizes and packed in gunny bags. Particular care should be taken to avoid greening of the tubers by not exposing them to light. The produce should be sent to the market or the cold store as early as possible to avoid infestation by potato tuber moth.

SEED POTATO PRODUCTION

Seed source- Use breeders' seed or foundation seed from any reliable source preferably from a government source. It is better to replace the seed every 2-3 years.

Seed size- Use 40-50 gm well sprouted seed. **Seed preparation-** The seed potato, if it has been kept in the cold store, should be removed about 10 days before planting. The seed bags are kept in the pre-cooling chambers of the cold store for 24 hours before taking them out. Do not bring out the bags directly out side from the cold store as this will result in rotting due to sudden change of temperature. The tubers are then spread in a cool shady place for drying and

Sprouting. Unsprouted and rotted tubers are sorted out. Sprouted tubers should be taken to the fields in seed trays or baskets and not in gunny bags. Do not use cut tubers for seed crop. Do not use brown rot (*bangai* in Marathi) infected seed for planting.

Planting time-- The crop is planted in about the last week of October. Earlier planting is advantageous, as it would avoid incidence of aphids, since under normal condition, the aphid population will cross-critical level by about the second week of January, and they are the main carriers of several virus disease.

Manuring- (a) Apply well rotten FYM @ 15-30 t/ha in furrows at the time of planting and mix it well in the soil. 30 t/ha FYM can take care of phosphorus and potassium needs of potato crop. However, if FYM is applied at 15 t/ha, then half the dose of phosphorus and potassium is to be applied through fertilizers.

(b) Apply 120 kg nitrogen (6 q ammonium sulphate or 2.6 q urea), about 60 kg phosphate (3.75 q single super phosphate) and 60 kg potash (1.0 q muriate of potash) per hectare. The fertilizers are applied in furrows before planting. Nitrogen is applied in split doses, two-thirds at planting time and the rest at earthing up.

Planting method- The seed crop should be planted in isolation at a distance of at least 50 m from the table potato crop and other aphid susceptible crops. Make furrows at a distance of 50 cm with a *desi* plough or ridger. Apply FYM and fertilizer in furrows and mix them well with a *kudali*. Sprouted tubers are planted in furrows at 20-25 cm distance with sprouts facing upwards. Cover the tubers by making ridges of about 15 cm height over the furrows. If the soil is dry, irrigate the field immediately after planting.

Irrigation- For the *rabi* crop regular irrigations will be necessary. The first 2 or 3 irrigations should be light, just enough to keep the soil moist. The crop will need 10-12 irrigations in all at intervals of about 8 days each. The irrigations should be stopped about 10 days before harvesting.

Interculture- Normally two weedings are done - immediately before earthing up, and the second, if weed growth is excessive, 50-60 days after planting.

Earthing up is done about 25 days after planting. This is done to ensure better tuber development. It

also helps to avoid potato tuber moth infestation during tuber development in areas where it is a problem. At this time, apply the second dose of nitrogen.

Weeds in the seed crop are better controlled by spraying paraquat @ 2.5 l/ha in 1000 litres water.

Weedicidal spray is given when the plant, emergence is about 5%.

Roguing-

During the crop season, examine the seed plots thrice and remove all the off-type and diseased plants. First roguing is done 20-30 days after planting, and immediately before earthing up. Second roguing is done 45-50 days after planting. All the diseased and off-type plants together with their tubers should be removed and destroyed. The third roguing is done 3-4 days before haulm cutting.

Plant protection

- (i) *Control of insect pests:* The most important pest to be controlled is the aphid, which acts as vector of virus diseases. For this, apply a granular systemic insecticide such as phorate 10 G @ 10 kg/ha at the time of earthing up. The appearance of aphids will depend upon ~ prevailing atmospheric conditions. After 40-50 days of applying the granular systemic insecticide, that is, by about middle December, spray the crop with methyl demeton 25EC or dimethoate @ 30 EC 1.0 l/ha in 1000-1200 litres water, especially if the aphids begin to make their appearance. This spraying will control jassids also. Another important pest is the potato tuber moth, which generally appears during January-March. To control this pest, spray the crop and ridges with carbaryl 50% WP @ 4.0 kg/ha in 1000 litres water. Repeat the insecticide spray at every 10 days, if necessary.

In the stores, the tubers should be covered with 2-3 cm thick layer of dried and chopped leaves of *Lantana* or *Eucalyptus* plants.

- (ii) *Control of fungal diseases:* In the plateau region, early blight and *phoma* are the most common fungal diseases. To control them, spraying with 0.2% mancozeb solution at 10 days intervals is recommended.
- (iii) *Haulm cutting:* The haulms should be cut when 2-3 aphids/100 compound leaves are observed. This occurs generally in the second week of January when the crop is usually 70-75 days old. The haulms should be cut at the ground level to prevent regrowth. No regrowth should be allowed to appear on the stumps after dehauling the crop. This is ensured by periodically removing all regrowths. Immediately after haulm cutting, spray the ridges with carbaryl 50% @ 4.0 kg/ha in 1000 litres water to prevent tuber moth infestation.

Harvesting, grading and marketing-Harvest the crop using a tractor driven potato digger or *desi* plough one week after haulm cutting. Surface-dry the harvested tubers and sort out all damaged and rotted tubers. Sort the tubers according to their size, preferably into four grades, small, medium, large and extra large.

Seed treatment-

After grading, wash the tubers in water. Then dip ~ tubers in 1% chlorocin solution followed by rinsing in water and treating in 3% solution of boric acid for 30 minutes to control surface-borne diseases.

The solution for this treatment can be used 20 times if the tubers have been thoroughly washed.

After treatment, ensure that the tubers are dried properly. Pack the seed tubers in gunny bags with proper labelling for marketing as seed. Treated tubers should not be used for table purposes.

Seed storage-

Keep your own seed requirements from your harvest. Seed should be stored in a cold store. In the absence of a cold store,

it may be stored in a country store, locally known as *aran*. This is erected in a cool, shady place with thatched roof and mud walls and used for short term (February-June) storage. Before storage, the seed tubers should be treated also with malathion 5% @ 150 g/q, for protecting them from potato tuber moth. In the country store, to protect the seed from potato tuber moth, the tubers may be stored in small heaps and covered first with neem leaves and then with dry grass. To prevent incidence of potato tuber moth, thatched walls, roof and grass cover of the store should be sprayed at intervals of 15-20 days, with quinalphos 25 EC 2.0 ml dissolved in one litre of water or carbaryl 50% WP 4 gm dissolved in one litre of water. Country stores should also be well protected from rats. Such treated tubers should not

be used for table purpose.

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