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PACKAGE OF PRACTICES FOR TABLE AND SEED POT A TO PRODUCTION IN EASTERN INDO-GANGETIC PLAINS

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Table and seed potato production in eastern Indo-Gangetic plains

TABLE POTATO PRODUCION

1. Hot weather cultivation

Plough the fields during the summer months of April-June. Keep the fields open and give one or two turnings to the soil during the

Hot summer days to reduce incidence of soil borne diseases and control perennial weeds.

2. Green manuring

Practice green manuring with *dhaincha* before potato planting can reduce NY.K doses by 20 to 30 per cent and improve the potato yield by 3 t/ha.

3. Variety

The following high yielding varieties are recommended for the region:

Maturity Class	*Variety*	*Maturity period*
Early	*Kufri Chandramukhi (White tuber)*	*70-80 days*
Medium	Kufri Jyoti (white tuber) Kufri Lalima (red tuber)	90-100 days
Late	Kufri Badshah (white tuber) Kufri Sindhuri (red tuber) Kufri Bahar (white tuber)	110-120 days

4. Seed source

Obtain seed from a reliable source preferably from a government seed) producing agency. Replace the seed stock every 3-4 years because the field is reduced progressively if the same seed is used year after year.

5. Field preparation

After green manuring, prepare the field for planting. The field should be levelled and provide good drainage. The potato does not thrive on wet and undrained soil. Well-drained sandy loam and loamy soils are most suitable for potato cultivation. Plough the fields with a mouldboard plough or disc harrow followed by one or two tilling with a tiller or a desi plough. It is better to plank the soil after each round of tilling. Planking and tilling can be combined.

6. Seed size

Use well sprouted tubers weighing 30-40 gm.

7. Seed preparation

Remove the seed potato from the cold store at least 10 days before the planting date. Keep the seed bags in precooling chamber of the cold 24 hours. Bringing cold tubers from the cold store directly out- result in condensation of moisture and promote rotting. Do not expose seed tubers in the bag to the sun. Spread the tubers in shade 001 place for sprouting. Remove unsprouted and rotted tubers.

Carry sprouted tubers to the field in seed trays or baskets for planting.

8. Planting time

Plant the early crop in the last week of September or first week of the main crop in the last week of October or in the first week of November and the late crop after paddy in the last week of November week of December. In the plateau region of Chhota Nagpur (Bihar) plant the *Kharif* crop in the second or third week of July.

9. Manuring

a). Apply 15-30 t/ha well rotten FYM in furrows at the time of planting. 30t/ha FYM can take care of phosphorus and potassium needs of potato crop. If FYM is applied at 15 t/ha, then half the dose of phosphorous and potassium is to be applied through fertilizers.

b). The optimum dose of inorganic fertilizer will depend upon the soil fertility, crop rotation and growing period of the variety. Generally, 90 Kg nitrogen (3.6 q calcium ammonium nitrate), 60 kg phosphate (3.75q single supper phosphate) and 120 kg potash (2.0 q muriate of potash) per hectare at the time of planting and another 90 kg nitrogen (3.6 q calcium ammonium nitrate) per hectare at the time of earthing-up are recommended.
For basal application apply the fertilizers in the furrows cover them partially with soil and then plant the tubers so that they do not come in direct contact with the fertilizers.

10. Planting method

(a). Keep the seed in furrows already made for the application of fertilizers. In planting with tractor, keep spacing between the rows at 60 cm and between the tubers at 20 cm. Cover the tubers with soil after planting using a ridger or a spade.
(b) Potatoes are also planted by dibbling on ridges. Open furrows m apart with narrow spade or tractor driven marker in east-west direction and keep the soil on the southern side forming the ridges. Place the fertilizer mixture on the northern side of ridge and cover it with 3-4 cm oil. Dibble the tubers on the ridges at a distance of 20 cm and at 5-6 cm depth. Alternatively use a tractor driven fertilizer drill-cum-potato planter or a fertilizer drill-cum-marker for making furrows to reduce the number of field operations.

11. Mulch

If any plant material such as paddy straw, wheat husk or farm refuse available, apply it on the ridges as mulch.

Early planted crop must be mulched. Remove the mulch 20-25 days after planting for interculturing and earthing up operations. Mulch reduces the soil temperature by 5°C, helps to conserve soil moisture and also controls weeds.

12. Interculture
After 25 days of planting, when the potato plants are 8-10 cm high,
Remove the weeds by using either a tractor driven spring tine cultivator between the rows or by *khurpi*. Apply the remaining dose of nitrogen and cover it with soil to make a thick ridge with the help of a narrow spade or tractor driven potato ridger.

13.Irrigation

Give one irrigation before planting to ensure uniform germination. If pre-irrigation has not been given then the first irrigation may be given day after planting. The post-planting irrigation should be light Give subsequent irrigations at 6-10 days intervals in sandy loam soil and 10-12 s in heavy soils. Do not let the ridges submerge under water in any case. Stop irrigation 10 days before harvest

14. Plant protection
(i) Normally early blight. *phoma*. and late blight diseases start appear- from December. To control them,
(ii) spray 0.2% solution of mancozeb 0-15 days intervals beginning from the first week of December.
Ensure that all parts of the plant including the lower surface of the age are completely covered with the spray solution.
(ii) If leaf eating caterpillars damage is noticed, spray the crop with endosulfan 35 *EC* @ 1.5 l/ha or with carbaryl 50 WP @ 2.5 kg/ha in 1000-1200 litres water.

15. Harvesting and marketing
Harvest early potato when the prices are remunerative. Kufri Chandramukhi can be harvested 60-70 days after planting. Harvest the late crop before the temperature rises above 25-28"C to avoid tuber rottage rom soft rot/charcoal rot. It is better to harvest the crop with the help
If a tractor or bullock drawn potato digger because they cause less tuber damage than when harvested with *khurpi*. After harvest, surface-dry and keep the tubers in heaps for 10-15 days
in shade for curing of skin. Remove all damaged and rotten tubers. In order to get better returns, the produce

should be graded and packed in gunny bags. Do not expose the tubers to light as far as possible otherwise they will become green, bitter in taste, difficult to cook, and poisonous if consumed in large quantities.

SEED POTATO PRODUCTION

If the seed is meant for sale, consult the state seed certification agency bout the choice of variety, seed source and seed certification standards.

1. Hot weather cultivation
Plough the field during the summer months of April-June. Keep the field open and give one or two turnings to the soil during hot summer days to reduce incidence of soil borne diseases and pests, also control perennial weeds.

2. Green manuring
Green manuring with *dhaincha* before planting can reduce N, P & doses by 20-30 per cent and improve the potato yield by 3 t/ha.

3. Variety

Grow the following high yielding varieties:

Maturity class	*Variety*	*Maturity period*
Early	Kufri Chandramukhi (white tuber)	70-80 days .
Medium	Kufri Jyoti (white tuber)	90-100 days
	Kufri Lalima (red tuber)	
Late	Kufri Badshah (white tuber)	
	Kufri Sindhuri (red tuber)	110-120 days
	Kufri Bahar (white tuber)	

4. Seed source Procure the seeds from the state agriculture, horticulture department or the national or state seeds corporation. Use only foundation or certified seed for multiplication. Replace the seed stock after 3-4 years.

5. Field preparation
After green manuring, prepare the field for planting. Level the field and provide good drainage. The potato does not thrive on wet and Undrained soil. Well-drained sandy loam and loamy soils are *most* suitable for potato cultivation. Plough the fields with a mouldboard plough or disk harrow followed by one or two tillings with a tiller or a *desi* plough. Plank the soil after each round of tilling. Planking and tilling can be combined.

6. Seed size

Use well sprouted tubers weighing about 40 g each. Well sprouted Tubers having multiple sprouts produce more number of seed size tubers. Do not use cut tubers for raising seed crop.

7. Seed preparation

Remove the seed potato from the cold store for at least 10 days before planting. Keep the seed bags in precooling chamber of the cold store for it least 24 hours. Do not bring the seed bags outside directly from cold stores as it will result in rottage due to immediate exposure to high temperature. Do not expose the seed tubers to the sun.

Spread the tubers in shade or a cool place for sprouting. Remove unsprouted and rotten tubers.

8. Planting time

Plant the seed crop during the last week of October or first week of November. Do not plant early as this will produce lankly plants with reformed leaves. The actual time for planting may, however, vary with the prevailing temperature and other factors such as crop rotations followed etc.

9. Manuring

(i) Apply 15-30 t/ha well rotten FYM 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, then half the dose of phosphorus and potassium is to be applied through fertilizers.

(ii). The optimum dose of inorganic fertilizers depends on the soil fertility, crop rotation and related factors. The seed crop should treated with 90 kg nitrogen (3.6 q calcium ammonium nitrate), 60 sphate (3.75 q single super phosphate) and 120 kg potash (2.00 ate of potash) at the time of planting and 90 kg nitrogen (3.6 q 11 ammonium nitrate) per hectare at the time of earthing up. Do ly excess nitrogen as it will be difficult to rogue out diseased plants, Lich plots and it will result in more number of large size tubers subsequent reduction in the number of seed sized tubers. Apply for in furrows, then cover the furrows partially with soil so that the do not come in direct contact with fertilizer. .

10. Planting method

Keep the seed in furrows already made for the application of fertilizer .In planting with tractor, keep spacing between the rows at 60 cm and between the tubers at 20 cm. cover the tubers with soil after g using a ridger or spade,

Potatoes are also planted by dibbling on ridges. Open furrows 60 cm apart with narrow spade or tractor driven marker in west direction and keep the soil on the southern side forming the Place the fertilizer mixture on the northern side of ridge and cover 3-4 cm of soil. Dibble the tubers on the ridges at a distance of and at 5-6 cm depth. Alternatively use a tractor driven fertilizer 1m-potato planter, or a fertilizer drill-cum-marker for making furrows reduce the number of field operations.

11. Interculture

After 25-30 days of planting, when the plants are 8-10 cm high, remove the weeds using a tractor-driven spring tine cultivator between the rows or by a *khurpi*. Weeds in seed crop are, however, better controlled by spraying paraquat dichloride @ 2.5 I/ha dissolved in 1000 liters water. Weedicide spray is given when the plant emergence is about 5%. The remaining dose of nitrogen. Mix it with a spring-tine cultivated earth up the soil to make a thick ridge with the help of a narrow spade or tractor driven potato ridger. Care should be taken that the plants are not disturbed during cultural operations.

12.Irrigation

One irrigation before planting is advantageous for ensuring uniform germination. If pre-irrigation has not been given, then the first irrigation be given soon after planting. The post planting irrigations should light and subsequent should be given at 6-10 days intervals in sandy loam soil and at 10-12 days in heavy soils. Normally, the soil should remain moist but not become too wet Do not let the ridges submerge under water in any case. Stop irrigation 7-10 days before haulm cutting.

13. Roguing

During crop season, examine the seed plots at least thrice to remove off types and diseased plants, e.g. those showing mottling, mosaic, veinal necrosis, crinkling, rolling of leaves, marginal flavescence and purple top roll. Complete first roguing 20-30 days after planting. Remove the diseased and off type plants along with their tubers. Third roguing is done 3-4 days before haulm cutting. Collect diseased plants in a bag and bury in a pit away from the field.

14. Plant protection

(i) *Control of insect pests:* For aphids and leafhoppers, apply granular systemic insecticides such as phorate10G @ 10 kg/ha at the time of planting and a second dose at the same rate at the time of earthing up. If necessary spray the crop with dimethoate 30 EC or methyl demeton 25 EC @ 1.0 l/ha in 1000 litres water by first week of January to check leafhoppers and aphid build up. 2.0 Repeat the spray after 10-15 days interval, if required.
If leaf eating caterpillar damage is noticed, spray the crop with endosulfan 35 EC @ 1.5 l/ha or with carbaryl 50 WP @ 2.5 kg/ha in 1000-1200 litres water. If cutworm damage is observed in more than 2% of the plants, drench the ridges with chlorphyriphos 20 EC @ 2.5 l/ha in 1000 litres water.

(ii) *Control of fungal diseases:* Normally early *blight, phoma* and late blight diseases start appearing from December. To control them, 0.2% solution of mancozeb may be sprayed at 10-15 days intervals beginning. From the first week of December. While spraying, it should be ensured that all parts of the plant including the lower surface of the foliage are completely covered with the spray solution.

15. Haulm killing

Stop irrigation 7-10 days before haulm killing. Cut the haulms when 3-5 green peach aphids/l00 compound leaves are observed. Normally this occurs between 10-15 January. Cut the plants at ground level. Ensure that all regrowths appearing on the stumps after dehaulming are promptly removed, as tender and succulent leaves attract the aphid vectors. For killing the haulms, paraquat dichloride @ 2.5 l/ha in 1000 litres water has also been found to be effective. Two sprays at 4-7 days interval are necessary to get complete killing of the haulms.

16. Harvesting and grading

Harvest 10-15 days after haulm killing when the skin of the tubers become firm. Complete the harvesting by 15 February and do not delay ond 3rd week of February as this may result in tuber rot due to soft and charcoal rot Harvesting is better done by a tractor driven or bullock drawn potato digger, as it causes less tuber damage than when done by a *khurpi. Af*ter harvest, keep the potatoes in heaps in a cool place. For about 10-15 days for curing of the skin. The height of the heap should be more than 1-1.5 meters.

17. Seed treatment

After grading, wash the tubers in water and then dip 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 treatment can be used 20 times if the tubers have been thoroughly washed. After treatment, ensure that the tubers are dried properly. Pack seed tubers in gunny bags with proper labelling for marketing as seed. Treated tubers being poisonous should not be used for table purposes.

18. Seed storage

Store the seed bags in a cold store. Label the seed bags as 'poisonous' so that they do not get mixed with table potatoes stored in the same cold store. The seed potatoes should be sent to the cold store by 15 March, as otherwise the rising temperature will adversely affect the tubers in various ways. The bags should be kept in pre-cooling chamber before ling in the cold store. The temperature inside the cold store should maintained at 2-4°C during storage and the relative humidity should I maintained above 95%. The stored bags should be inspected periodically. The bags should be stacked in the cold store in a manner as to allow free circulation of air.

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