Curing and Grading

One of the effective techniques of bulb curing (drying process) is by tying the tops of the bulbs in bunches and hanging them on a horizontal wire under well-ventilated shades. Curing in shade improves bulb colour and reduces losses during storage. Onions are considered cured when neck is tight and the outer scales are dried until they rustle. This condition is reached when onions have lost 3 to 5% of their weight. Onions are graded into A, B and C according to different sizes and quality. However, different grades are extra large: >6cm dia, medium: 4-6cm dia. and small: 2-3cm dia. Double bulbs, small or under size bulbs and bolters are removed. Good quality onion are firm and compact, well filled/heeled neck end, free from dust and black powdery mass of moulds on the scales or soft rot. Graded bulbs are packed in hessian cloth bags or nylon bags with proper label. Under Tripura condition, 78.5-198.5 g bulb weight, 5.4-9.6 cm length and 19.1-23.4 cm diameter were recorded. Final yield has been recorded to be in the range of 20-24t/ha. However, due to high rainfall and high humidity storage loss increases after about 2 months.

Plant Protection

Prophylactic and integrated approaches for plant protection is beneficial for overall management of different diseases and insects.

Diseases

Damping off: The collar portion of small seedling rots and ultimately the seedlings collapse and die. Nursery soil and seed treatment with thiram or captan or carbendazim. Or ridomil Drenching of affected beds with these fungicides (@ 2g/L of water).

Purple Blotch: Leaves and flower stalks develop small, sunken, whitish flecks with purple coloured centres. Spraying of mancozeb (2g/L water) or chlorothalonil (2g/L water) at fortnightly interval.

Stemphylium Blight: Small yellowish to pale orange flecks or streaks on leaves turns into brown . Spray mancozeb (2 g/L water) or combination products azoxystrobin 25% + flutriafol 25% SC and fluopyram 20% + tebuconazole 20% SC @ 2g/L water.

Downy Mildew: Violet growth of fungus develops leaves or flower stalk, which later becomes pale greenish yellow and finally the leaves or seed stalks collapse. Spraying with Zineb (2g/L water) or Karathane (1ml/L water).

Onion Smut: The black lesions appear near the base of the scales on planting. The affected leaves bend downwards abnormally. Nursery soil and seed pre sowing treatment with Thiram or captan. (2g/L water).

Neck Rot: The infection takes place in the field under moist conditions., but symptoms appear in storage. Soft water soaked scales first at collar region and then towards the core. Bulbs are detaching from the stalk during curing. Proper field drying of the bulb. Spraying with carbendazim (2g/L water) 10-15 days

Curing by Hanging

Insect

Thrips: Onion thrips are minute insects that puncture the leaves or stems and suck up the exuding sap. Soil application of Phorate or Carbofuran granules (1kg a.i./ha). Spraying of Cypermethrin (1ml/litre of water) or dimethoate (1ml/L water) at fortnightly intervals.

Cutworm: The larvae of this insect are seen in nursery beds and newly transplanted onion fields. Leaves are cut at the collar region. Soil application of Carbofuran (1kg a.i./ha) and drenching the soil with Chlorpyriphos @ 2 ml/lit.

Nematode: Invisible worm like organisms in the soil, which damages roots. Application of Carbofuran 3 G 1 kg a.i./ha or Phorate 10 G 1 kg a.i./ha.

Onion Maggot: Hides at the base of plant and attacks the leaves and tender bulbs. Apply phorate or Thimet (@4-6kg/ha) followed by light irrigation.

Final Stage of Curing

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Disclaimer: Some contents and photos are taken from difference sources to make the topic more elaborative for farmer's easy understanding and for welfare of farmers. Sources/ person are hereby well acknowledged.

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भाकृअनुप
ICAR

Onion Cultivation :

A remunerative option for Tripura farmers

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भा कृ अनुप - पूर्वोत्तर
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Onion (*Allium cepa* L.) is widely cultivated in Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Bihar, Andhra Pradesh, Rajasthan, Haryana, Tamil Nadu and West Bengal. In these states, onion is cultivated in Rabi as well as Kharif season. Though India is the second largest onion producer in the world, every year there is shortage of onion in the market. Cultivation of superior varieties in Tripura following improved production technology and better post-harvest handling is possible as agro-climate for *Rabi* season onion production is suitable. Considering the demand and supply gap of onion during specific period of the year standardization of onion cultivation technology in the non-convectional areas is a better option for meeting the ever increasing demand for onion in the market. Tripura, being a north eastern state, onion is not cultivated commercially and full requirement of onion in the state is met by importing from other states. ICAR Research Complex for NEH, Tripura Centre, Lembucherra, Tripura, standardized the production technology after extensive trials since 2013.

Climate & Soil

Onion is a cool season crop, hardy and performs better under mild climate without extreme cold and hot. Cool temperature during vegetative growth and relatively warmer and sunny weather during bulb formation and maturity is preferable. Proper seedling growth takes place in temperature 20-25^{0}C, however, seedlings can withstand low temperature. Temperature of 13-23^{0}C is good with short day for vegetative growth and long day conditions with temperature of 18-25^{0}C is favourable for bulb growth. Long day varieties do not bulb under short day, however, short day varieties develop early bulbs under long day condition. Sudden rise in temperature in the *Rabi* season may result in early and small bulb formation. *Rabi* season varieties require relatively higher temperature and 12-14 hours day length, whereas, *Kharif* onion varieties require 10-11 hours day length for bulb formation.

Soil like sandy loam or alluvial and silty-clay loam with good drainage facilities and deep friable are good for onion. Medium to light soil are suitable for cultivation. Soils pH should be 5.8-6.5. Water logging can result in failure of crop. So, suitable land situation under Tripura condition should be leveled upland as well as semi uplands or low land where water stagnation is not a problem starting from October to March.

Varieties Selection for Tripura

Varieties tested under Tripura conditions are Pusa Red, Arka Niketan, Arka Kalyan, Arka Ujjwal, Arka Kirthiman, Arka Pragati, Agrifound Light Red, Bhima Shakti and Bhima Red. Apart from bulb production, there are many improved varieties with broad neck and long leaf for fresh leaf as green onions or as 'Pyaaz Kali pata'. Though early Kharif season varieties can also be cultivated (February to June) in upland situation with proper drainage to escape pre-monsoon rain water.

Onion Nursery

Drip irrigation

Nursery raising

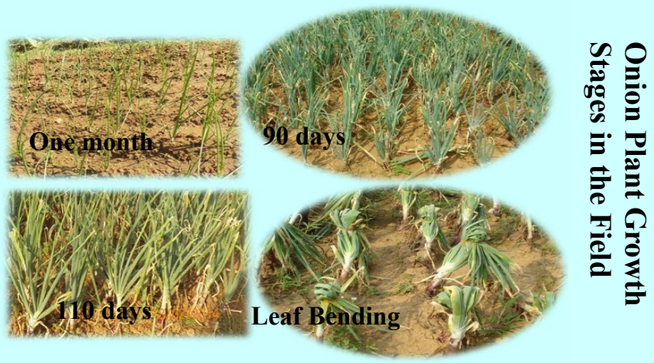
Onion seedling is raised in the nursery beds. Nursery bed size is 0.6-0.8x3 m or 1.2x3-4 m having 15-20 cm height. Number of beds will depend upon the area to be covered. In general, 50-55 beds with 60-70 cm gaps are required for raising seedling for one hectare or 8-9 beds for 1 Kani. Nursery soil is mixed with well rotten FYM and phorate granules to kill any soil born insects. Thiram or captan or carbendazin @ 4-5g/m^2 is also applied for eliminating soil borne diseases. Formalin 40% is drenched into nursery soil @ 200-250ml/10L water and the heap is covered with black polyethylene sheet for 7 days. Soil is then turned and left for 4-6 days. Such treated soil is free from all types of soil born insects-diseases. 10-20g SSP is also mixed with the soil. Seed rate is 8-10 kg/ha (1-1.2kg/Kani). *Trichoderma viride* (1kg/kani) mixed with fine powdered farm yard manure (25kg/Kani) and incorporated into the soil. Seed sowing time is August-September to October or may be extended to First week of November. Time of nursery raising and transplanting should be adjusted in such a way, so that bulbs escape pre-monsoon rain or monsoon during the final stage of maturity in the summer. Seeds are very light and black in colour. Onion seeds can be treated by captan/ thiram/ carbendizam @ 3gm/Kg seeds and *Trichoderma viride* (4g/kg seeds) before sowing. Line sowing of seeds with spacing of 3-5cm is done. The seeds are covered with fine powdered farmyard manure or compost after sowing and light watering is given. The beds are covered with dry straw or grass to maintain optimum temperature and moisture. Watering is done at alternate day. Dry straw or grass is removed immediately after germination. It is always beneficial to provide net cover over the nursery beds. Seedlings are ready in 35-45 days. Seedlings are also raised in portrays for long distance transpiration.

Land preparation and Transplanting

Field is well ploughed 3-4 times and 10-15 t/ha FYM is mixed. The field is then divided into flat beds or raised beds with proper channels with lay out of ridges and furrows. The normal width of a bed should be about 1.8 m and length may depend on the field size. Transplanting is done at spacing of 10 cm plant to plant and 15 cm line to line.

Fertilizer

Fertilizer @ 215 kg urea, 300kg SSP and 85 kg MOP per hectare is applied. Whole quantity of FYM, Phosphorus and Potassium are mixed well in the soil before transplanting. Nitrogen is given in three splits doses, first 50% N along with Phosphorus and Potassium, second (25% N) one month after transplanting and third (25% N) 45–50 days after transplanting. Sulfur fertilizer may be required sometimes @ 4-50kg/ha and applied along with Phosphorus and Potassium .



Onion Plant Growth Stages in the Field

Irrigation and intercultural operations

Irrigation is necessary immediately after transplanting and 15-20 irrigations are required during the plant growth and bulb maturity period. Hoeing is required to keep the soil lose and weed free. Earthing up of soil is done to cover the developing bulb at regular interval. Under drought stress, onions are more likely to split or form double and multiple bulbs. Onions have a high water requirement, usually around 3in of water per week. However, late season irrigation can delay maturity and lead to skin cracking. Irrigation is stopped 15-20 days before the bulb maturity to improve bulb texture and quality.

Green Leaf Harvesting

Green tender leaves are very much popular as leafy vegetable or as *'Pyaaz Kali Pata'* in the state. Tender green hollow and erect leaves are used for garnishing vegetables and curries. Leaves may be plugged @ 1-3 leaves/ bulb carefully so that bulb is not starves due to less number of leaves. Leaves are available during late December to January. Green Onions with white tender small bulb may be harvested in December– February.

Bulb Maturity and Harvesting

Onion bulbs become ready for digging after 115-130 days of transplanting depending upon the variety and prevailing micro climate. In onion, Leaves turns to yellow and neck fall or collapsing of these leaves at the neck region is the indication of maturity. In general, 50% neck fall in the whole field is considered that bulbs are ready for digging. Tying of rubber bends after bending the leaves is also effective to accelerate the maturity. Onion for storage should be fully developed. Thick-neck bulbs which result due to premature harvesting do not store well. Development of red pigment and characteristic pungency of variety are also important harvesting indices of onion. Bulbs are dug out with the help of fork or hoe by loosening the soil. Dug out plants are spread for 1-2 days on the open surface or even in the field until the tops become fully dried. Harvesting should be completed before the start of pre monsoon rain in 1st week of March.

Onion Digging & Freshly Harvested Bulbs

Sorting and Tying in bunches for Curing

Continue.....