Available online at
www.agrospheresmagazine.vitalbiotech.org

ISSN (E): 2582 – 7022

Agrospheres:e-Newsletter, (2022) *3*(6), 9-12

Article ID: 404

Onion Cultivation

Asha Nama[1]*,
S.K. Trivedi[2],
Rakesh Kumar Meena[3]

[1]Research Scholar,
[2]Dean Agriculture,
Department of Horticulture,
School of Agricultural Sciences,
Career Point University, Kota,
(Rajasthan)
[3]Assistant Professor, Department of Horticulture, Apex University Jaipur (Rajasthan)

*Corresponding Author
Asha Nama*

Article History
Received: 29. 05.2022
Revised: 4. 06.2022
Accepted: 11. 06.2022

INTRODUCTION

The second position in cultivating onion (*Allium cepa* L.) is held by India worldwide. Onion is described by its unique flavor and pungency because of certain sulphur substances. The chemical ingredients vary as per cultivation season and storage life. Onion is majorly cultivated in Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Rajasthan, Bihar, Andhra Pradesh, Haryana, West Bengal, Uttar Pradesh, Chhattisgarh, Odisha, Tamil Nadu, Jharkhand and Telangana in India in both the seasons; Rabi and Kharif.

Climate & Soil- Onion is a kind of crop having better performance under moderate climatic conditions. Vegetative growth preferred the cool weather while bulb formation & maturity required comparatively warmer and sunny weather. The temperature around 20-25^{0}C is needful for proper seedling growth; however, seedlings may tolerate low temperature as well. For vegetative growth, temperature around 13-23^{0}C is well suited for short day whereas for bulb development, temperature around 18-25^{0}C is preferred for long day conditions. Unanticipated increase in temperature in the *Rabi* season may lead to early and small bulb formation. *Rabi* season types need comparatively higher temperature and a day length of 12-14 hours while *Kharif* onion needs a day length of 10-11 hours for bulb development.

On the other hand, soil like topsoil or muddy and silty-clay loam having better drainage capabilities and deep crumbly are best for onion. For cultivation, medium to light soil are favorable. P_H of soil should be 5.8-6.5.

Season- In different regions of India season for sowing, transplanting and harvesting differ. Sowing season is mainly in between February to March (Early Kharif), May-June (Kharif), August to September (Late Kharif), October to November (Rabi). Transplantation time is in between April to January while harvesting time is between August to May.

Varieties-

Multiplier Onion - Co 1, Co 2, MDU 1, Agrifound Red

Small Common Onion - Agrifound Rose, Arka Bindu

White Onion - Bhima Shubra, Bhima Shweta, Bhima Safed, Pusa White Round, ArkaYojith, Pusa White Flat, Udaipur 102, Phule Safed, N-25791, Agrifound White.

Spanish Brown - Bhima Light Red, Bhima Kiran, Phule Suvarna, Arka Niketan, Arka Kirthiman

Red onion - Bhima Super, Bhima Red, Bhima Raj, Bhima Dark Red, Bhima Shakti, Punjab Selection, Pusa Red, N2-4-1, Pusa Madhavi, Arka Kalyan, Arka Lalima.

Sowing Method-Onions are growing from seeds, seedlings as well as from bulblets.

Nursery raising- Management of nursery and proper transplantation are significant operations for onion cultivation. Around 0.05-hectare bed area for nursery is sufficient for proper seedling growth & then for transplantation in 1 hectare. The bed must be ploughed for 5-6 times to shatter clumps and well pounded to grasp water. The litter of preceding crops, weeds and stones must be separated prior the bed formation. Seeds must be sown in rows at 50 mm to 75 mm apart to ease the confiscation of seedlings for transplantation, swift weeding, spraying pesticides *etc*. Seedlings are accessible for transplantation in 35-40 days after sowing (DAS) for *Kharif* and 45-50 DAS for late *Kharif* and *Rabi* seasons.

Raising small Bulblets- This way is used for acquiring early crop in the kharif season so that encounter the urge of green onion for salad in early winter. To fulfill this, small onion bulblets of kharif onion varieties viz. Agrifound Dark Red, Baswant 780, N-53 and ArkaKalyan developed in the preceding season are utilized for plantation. The foremost time of sowing of seeds for achieving quality bulblets is mid-January to the starting of February based upon the field area.

Broadcasting in Beds/Direct Sowing- Seeds of big onion are sown straight in rows (30 cm apart), which are dwindled later to give suitable spacing for growth of bulbs. Seeds of small onion (Bangalore Rose, Agrifound Rose and ArkaBindu) are relayed in small flat beds which are dwindled later. Additionally, for plains, seeds are sown in rows of 30 cm apart in between September-October.

Land preparation and Transplanting -Field is nicely plunged about 3 to 4 times and 10-15 t/ha FYM is assorted. The field is then splited into flat beds or uplifted beds with required channels with pattern of cliffs and crinkles. The normal broadness of a bed must be about 1.8 m and length can as per the field size. Transplantation is carried out 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 sprinkled. All required amount of FYM, Phosphorus and Potassium are assorted well in the soil prior to transplantation. Nitrogen is applied in three hewed doses, first 50% N along with Phosphorus and Potassium, second (25% N) one month after transplantation and third (25% N) 45–50 days after transplantation. Sulfur fertilizer can be needed sometimes @ 4-50kg/ha and used along with Phosphorus and Potassium.

Irrigation and Intercultural Operations- Irrigation is required instantly after transplantation and 15-20 irrigations are needed at the time of the plant development and bulb maturation time. Ranking is needed to maintain the soil lose and free of weed.

Landing up of soil is carried out to envelope the growing bulb at regular interlude. At the time of drought stress, onions are probable to break or form two or more bulbs. Onions needs more water, generally up to 3 inches of water in a week. Rather, late in irrigation can hold up maturity and cause cracking of skin. Irrigation should be stopped 15-20 days prior the bulb maturation for betterment of texture & quality of bulb.

Harvesting- Onion harvesting is carried out from the green tops start dangling. Harvesting is started after 10 days of finishing irrigation. Then plants are dragged out tenderly from the soil and keep on the soil for around 4-5 days for drying purpose. Spraying of crop should be done with carbendazim 2 gm/L in water; it will keep harvested onion safe from any type of fungal infections.

Yield- In Rabi season, after irrigation the onion crop reaches to the yield of 25-30 t/ha whereas in the rainfed situations it yields reach to only about 0.7-1.0 t/ha. Onion cultivated as an intercrop in sugarcane and turmeric, in passages of naive fruit and banana garden, provides a yield of 5-9 t/ha. The tiny sized, pungent, local cluster kind onion yields half as comparative to the huge sized varieties.

Storage- Onions are saved in a proper-aerated place with required sunlight. Onion bulbs are kept in riddled grass bags and trailed in vertical column, one above the other. Rather, height of such vertical column must not exceed more than 5 feet and should have proper space all around.

Plant Protection

Precautionary and non-discriminatory perspectives for plant safety are fruitful for overall management of various disorders and insects.

Diseases

Damping off: The collar part of tiny seedling decays and finally the seedlings sag and die. Saturation of soil and of seeds with thiram or captan or carbendazim. Or ridomil fungicides (@ 2g/L of water).is effective in affected beds.

Purple Blotch: Appearance of small, sunken, whitish flecks with purple color decenter on leaves and flower stalks. Spray of mancozeb (2g/L water) or chlorothalonil (2g/L water) at fortnightly gap is effective.

Stemphylium Blight: Tiny yellowish to pale orange patches or lines on leaves converts into brown. Drizzling of mancozeb (2 g/L water) or combination products azoxystrobin 25% + flutriafol25% SC and fluopyram 20% + tebuconazole 20% SC @ 2g/L water can be done to get rid off.

Downy Mildew: Violet growth of fungus appears on leaves or flower stalk, which further turns to pale greenish yellow color and eventually the leaves or seed stalks subside. Drizzling with Zineb (2g/L water) or Karathane (1ml/L water) is fruitful.

Onion Smut: The black marks develop at the base of the lamella on planting. The pompous leaves curved downwards unusually. Effective treatment of soil and pre sowing seed can be done using Thiram or captan.(2g/L water).

Neck Rot: The infection occurs in the area under moist situations, but symptoms arise in storage. Soft water soaked lamella primarily at collar part and then towards the middle. Bulbs are separating from the stalk while healing. Sufficient field drying of the bulb and sprinkling with carbendazim (2g/L water) can be beneficial.

Insect

Thrips: Onion thrips are tiny insects that penetrate the leaves or stems and creep the discharged sap. Soil spray of Phorate or Carbofuran granules (1kg a.i./ha), Cypermethrin (1ml/litre of water) or Dimethoate (1ml/L water) at fortnightly gaps is effective.

Cutworm: The larvae of the insect are appeared in nursery beds and freshly transplanted areas. Leaves are dissected at the collar area. Soil spray of Carbofuran (1kg a.i./ha) and saturating the soil with Chlorpyriphos @ 2 ml/lit. is quite effective.

Nematode: Microscopic insect like organisms in the soil, which harms roots. Spray of

ISSN (E): 2582 – 7022

Carbofuran 3 G 1 kg a.i./ha or Phorate 10 G 1 kg a.i./ha.is fruitful.

Onion Maggot: Stash at the base of plant and pounces the leaves and soft bulbs. Drenching of soil with phorate or Thimet (@4-6kg/ha) followed by light irrigation is helpful.

CONCLUSION

It may be concluded that proper management of cultural practices like intercultural operations, advanced sowing methods etc. should be followed regularly. Keeping in mind the demand and supply interval of onion throughout specific time period of the year; harmonization of onion cultivation technique in the liberal fields is a good alternative for achieving the continuously growing requirement for onion in the trade.

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