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## *Scientific Seed Production Techniques of Multiplier Onion*

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**Onion is one of the important bulbous vegetable crop grown in India and it is a vital constituent of Indian cookery. Indian average productivity is 16.80 Mt/ha. However when compared to other countries, the Indian average yield is very low. The main difference between the bulb and seed propagated types is, investment on seed component. In bulb propagated type, farmer requires 500 to 600 kg of seed bulbs for planting an acre which is higher in cost. Whereas in seed propagated type, it requires only one kg of seeds for an acre which is cheaper as compared to seed bulbs. This will minimize the cost of cultivation, reduction in diseases incidence, enhance the drought tolerance and more income to the farming community.**

### **INTRODUCTION**

Onion is known as the dynamic of nature foods and it is used as spice, condiment and vegetable almost daily in every kitchen as a seasoning for wide variety of dishes. Therefore, it is popularly known as “Queen of kitchen”. However China and India are the leading countries in growing of onions. China produces 2,26,00,000 Mt. Onions from 10,25,000 hectare and India produces 23,26,000 Mt. of onion from 13,85,000 hectares.

Onion is a one of the important bulbous vegetable crop grown in India and it is a vital constituent of Indian cookery. Being an important food item, it is also a highly politically sensitive commodity. Indian average productivity is 16.80 Mt/ha (Source: Department of Agri & Cooperation Govt. of India) However when compared to other countries, the Indian average yield is very low and USA tops the list and its productivity is 54.60 Mt followed by Netherland with 49.70 Mt/ha and China with 22 MT/ha.

However, in India most of the states are growing common onion and in Tamil Nadu the multiplier onion is being cultivated in larger area. Also in a few villages in new Visakhapatnam (Srikakulam) are cultivating this crop.

### ONION SCENARIO - TAMIL NADU

In Tamil Nadu, the area under onion during 2018-19 was about 32,044 hectares and production is about 3.46 lakh tones. The productivity is low 10.66 Mt / ha as compared to Indian average yield of 16.10 Mt/ha.

### PRODUCTION AND PRODUCTIVITY OF ONION IN TAMIL NADU

Year	Area in hectare	Production in MT	Productivity in MT/ha
2011-12	37100	556500	15.00
2012-13	37700	429700	11.40
2103-14	40000	472700	11.80
2014-15	25740	259630	10.08
2015-16	36730	380950	10.37
2016-17	28357	304246	10.73
2017-18	28360	301140	10.61

**Source:** Directorate of Agriculture & Co-operation, Govt of India. Database 2019.

Tamil Nadu state has 3% share in area and 2% share in production. The major onion growing areas are Oddanchatiran, Dharapuram, Perambalur, Trichy, Namakkal, Erode, Tiruppur, Coimbatore, Dindigul, Theni, Madurai, Virudhunagar, Tirunelveli and Tuticorin. A distinct feature that differentiates Tamil Nadu from other onion producing states is that area under common onion is very meagre (18%) of total onion area and rest 82% of the area is covered with aggregatum onion. The big onions are grown in Kundadam, Udumalpet and Palladam regions in Tiruppur district and Tenkasi, Pavorchatram and Alangulam regions in Tirunelveli districts. The other onion growing districts are covered by only aggregatum onion.

The main difference between the bulb and seed propagated types is, investment on seed component. In bulb propagated type, farmer requires 500 to 600 kg of seed bulbs for planting an acre which is higher in cost. Whereas in seed propagated type, it requires only one kg of seeds for an acre which is cheaper as compared to seed bulbs.

The bulb propagated type has 6 to 8 bulbs per clump, red in colour and 2-3cm in size, whereas the seed propagated types has 3-5 bulblets per clump with bolder size of more than 3 cm appealing pinkish red in colour. Because of its bigger size and attractive colour, the Co-on-5 bulbs fetch always higher price in the market. Moreover, during export in March to September, the CO (On) 5 bulbs are preferred. Therefore now-a-days farmers prefer the seed propagated types.

The seed propagated type was initially grown in seashore villages such as Gnanamedu, Thengaithittu near Pondicherry and Santhipadugai near Cuddalore district since long period. This variety grown here is called as mutlore onions. This has poor keeping quality. Later on the mutlore type was taken for varietal improvement studies in TNAU and based on mass pedigree method of selection, the variety CO (On) 5 was released in 2001.

Initially the seed propagated aggregatum onion was cultivated in Cuddalore district and slowly spread to some parts of Dindigul district. Later on it spread to neighbouring district of Tiruppur, Erode and Namakkal. Farmers were reluctant to grow this crop initially, at later stage due to high cost of seed bulbs during the time of plating season and wide adaptability of this crop, they started using the seeds of aggregatum onion. Now, this crop is widely grown in most of onion growing pockets of Tamil Nadu.

### STATUS OF ONION SEED PRODUCTION IN INDIA

Seed production represents the first crucial step along the onion supply chain. Also seed is the essential component of crop cultivation. India desires 18,850 Quintals of multiplier onion seeds annually for covering 13.85 lakh hectares area. The organised sector *viz.*, NHRDF, NSC, ICAR state SAU's and private companies produce 54% of the total seed necessity and rest 46% is met by the growers personal seed. Therefore it is necessary to increase the seed production. The reason for lower yield of onion in India is due to poor quality seeds.

In India, most of the states are covered by common big onion and its seed production is taken in Karnataka, A.P Maharashtra, Gujarat Rajasthan, Madhya Pradesh etc. But aggregatum onion seed

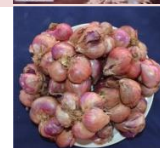
production is being taken up only in Tamil Nadu. Initially it was taken in smaller scale by individual farmers in Cuddalore district. Now demand for seeds is increasing and its production is taken in Dindigul, Tiruppur, Erode, and Theni Districts where the favourable climate prevails. Presently it

### CLIMATE AND SEASON

Onion flowering is a temperature orientated phenomenon. For aggregatum onion, it requires 25°C day and 10-15°C in night temperature. Normally after storage of 65-75 days, the bulbs are planted in December. Heavy rains during

### VARIETIES

Institution	Variety	Special Features
TNAU, Coimbatore	CO 1	Selection from a germplasm type CS 450 introduced from Manachanallur, yield : 10t/ha, Duration : 90days, medium size and red in colour
	CO2	Selection from a germplasm type CS 911, yield : 12t/ha, Duration : 65days, Early maturing, bulbs crimson in colour
	CO3	Clonal selection from OP progenies of CS.450, yield : 15.8t/ha.
	CO 4	Hybrid derivative of the cross AC863 x CO3, yield : 19t/ha, Duration : 65days, bulbs pink in colour and can store well over 150 days.
	CO (On) 5	Mass pedigree method, yield : 18.9t/ha, Duration : 90days, flowering and fruit set throughout Tamil Nadu, the small onion cv. CO (On) 5 has got superior consumer preference because of its size and attractive pink colour (Anbukkarasi <i>et al.</i> , 2020)
	CO 6	Mass selection method, yield : 18.8t/ha, pink colour, bold size bulbs, short duration : 60-75 days, Seed yield per plant : 2.9-3.5 g, Seed yield/ha : 250-300 kg/ ha



is estimated that 25 Mt seeds are produced by farmers, which will covers 6500 hectares. Since onion area is increasing there is need to increase the seed production.

In Tamil Nadu the ideal place for seed production is Coimbatore, Tiruppur, Erode, Dindigul, Theni and Cuddalore districts. The other districts in Tamil Nadu are not preferred by the seed producers due to lower seed yield. However, few traders are taking seed production in Karnataka nearby Bellary and Gowaribindnur area.

Though there are two methods of seed production *i.e.* seed to seed and bulb to seed. The onion nursery of required variety is raised in April end and seedlings are planted in the second week of June and the crop will be harvested in September second week. After sorting and grading, it is kept in storage for rest till November end. Then these mother bulbs are planted in the fields in first week of December.

germination and pollination affect the seed yield drastically.

### PRODUCTION OF QUALITY SEED BULBS

The weight of the bulbs has marked influenced on seed production in small onion. Therefore production of quality seed bulb is important.

### RAISING NURSERY

Production of vigorous seedlings is more important and quality seeds should be used for raising the nursery. Field should be properly ploughed and before bed preparation applied with FYM (1.5kg/m<sup>2</sup>) and 2kg DAP/ cent area. Raised beds should be formed with the size of 2.5 feet width and 15-feet length. In these beds, lines are to be formed with the distance of 5 cm and 40 g seeds per bed are to be sown. Since high temperature prevails in April, it is necessary to cover the beds after sowing with coconut thatches or by using shade net. After germination is over, these covered materials should be removed. Proper irrigation should be given. The seedlings will be ready by 6-7 weeks. Seedlings will be transplanted in main field and it will be

ready for harvest within 85-90 days. During cropping period, every care should be taken as per the recommendation of TNAU for getting better quality seed bulbs.



#### LAND REQUIREMENT FOR ONION SEED CROP

Land selection is a difficult task for seed producer. The field should be free from volunteer plants. Fields continuously grown with onion should also be avoided since they may harbour root rot pathogens. The performance of onion will be good in humus-rich light soils. The ideal soil pH is 6-6.8.

#### LAND AND BED PREPARATION

The soil should be ploughed 3-4 times and made into a fine tilth. At the time of last ploughing, 25t of FYM, Azospirillum 2.0 kg and phosphobacteria 2.0 kg/ha, NPK 30:60:30 kg/ha is incorporated into the soil as basal.



Generally after ploughing, the ridges are formed with a distance of 45cm. For drip irrigation 2.5 feet wide beds are formed with a walking space of 45 cm in between two beds.

#### QUALITY OF SEED BULBS

The weight of the bulb has noticeably influenced the seed yield. Therefore, it is better to use the bulbs of size 3 cm and above (Saraswathi *et al.*, 2017). Longer stored poor quality onions may result in

more number of weak sprouts resulting in lower seed yield.

#### PLANTING OF SEED BULBS

Selected seed bulbs should be similar to the parents and it is dipped in 1% carbosulfan + carbendazim 1% solution for 1-2 minutes before planting. In ridges and furrows at 15 cm distance bulbs are planted on the sides of the ridges. In drip beds, the spacing recommended is 30 cm x 30 cm.

#### ISOLATION OF ONION SEED CROP

Onion is a cross-pollinated crop. Hence it requires 500 m of isolation distance among other varieties of onion. For foundation seed production, isolation distance of 1000 m is required and 5 m distance is required for mother bulb production to maintain purity.

#### ROGUEING OF SEED CROP

The off types should be removed periodically to maintain the genetic purity.



#### WEED MANAGEMENT

Due to lack of dense foliage, slow growth and shallow roots, the competition of weeds is heavy in onion crop. Application of pre-emergence herbicide Pendimethalin 30 EC – 4.5 ml/litre of water or oxyfluorfen 23.5 EC 2 ml/litre of water just after planting and followed by one or two hand weeding is suggested to manage the weed flora in small onion.

#### IRRIGATION

Periodical irrigation should be given and avoid water logging conditions. Therefore, drip irrigation may be adopted for getting higher seed yield and better quality seed.

#### POLLINATION

Honey bee colonies can be kept and their proper care will boost up the seed yields.



**HARVESTING**

Harvesting may be done 3-4 times based on the maturity of the umbels.

**DRYING UMBELS**

The harvested umbels should be dried by spreading on canvas and putting under shade in the morning or late afternoon sun for few days.

**THRESHING, CLEANING AND SEED EXTRACTION**

Seed heads after thoroughly dried with and threshed. Seed is cleaned by using hand winnower and fans. Upgrading is further done by gravity separator.

**SEED YIELD**

The seed yield of onion is 2.5-3 q/ha depending upon variety and the regions where they are grown.

**MINIMUM SEED STANDARD FOR ONION**

The seeds produced should meet the following minimum seed standards when it is marketed in India.

Factor	Standard
Germination	Not less than 70%
Physical purity	98%
Genetic purity	98%
Other crop seed	0.1%
Inert matter	2.0%
Moisture	8%

**CONCLUSION**

In bulb propagated type, farmer requires 500 to 600 kg of seed bulbs for planting an acre which is higher in cost. Whereas in seed propagated type, it requires only one kg of seeds for an acre which is cheaper as compared to seed bulbs. This will minimize the cost of cultivation, reduction in diseases incidence, enhance the drought tolerance and more income to the farming community.

**REFERENCES**

Anbukkarasi, V., P. Paramaguru, L. Pugalendhi and Jayakumar, P. 2020. Effect of Packing and Storage Methods on Quality and Shelf Life of Onion (*Allium cepa* L. var. *aggregatum* Don.). Int.J.Curr.Microbiol.App.Sci. 9(11): 611-622.

Saraswathi, T., V.A. Sathiyamurthy, N.A. Tamilselvi and Harish, S. 2017. Review on aggregatum Onion (*Allium cepa* L. var. *aggregatum* Don.). Int.J.Curr.Microbiol.App.Sci. 6(4): 1649-1667.