Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 03, Issue: 06 (NOV-DEC, 2023)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Onion Seed Production

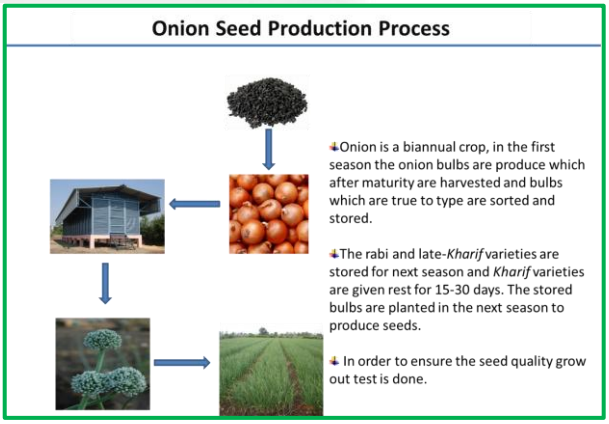
(*Vishwanath Rohidas Yalamalle and Chandu Singh)
ICAR-Indian Agricultural Research Institute, New Delhi
*Corresponding Author's email: vishwanath_yal@yahoo.com

Onions are crucial condiments widely used since ancient times in salads and for seasoning food, making them an integral part of Indian culinary preparations. An Indian dish is considered incomplete without the addition of onions. Besides its flavor-enhancing role, onions are valued for various health benefits, including anticarcinogenic activity, antioxidant properties, antiasthmatic effects, immunomodulation, and antimicrobial attributes. India holds the position of the second-largest onion producer globally, following China. Over the past two decades, onion production in India has surged more than fourfold, primarily due to horizontal expansion. With an estimated population of 1.7 billion in India by 2050 and limited possibilities for horizontal expansion, the imperative is to meet the growing demand by increasing productivity by 40% from the present level. The lower productivity of onions in India can be attributed to various factors, with one of the major reasons being the limited availability of quality seeds and a poor seed replacement rate, as highlighted by studies.

The formal sector, comprising government agencies and private seed companies, fulfills only 18-20% of the country's total seed requirement, while a substantial 80% of the seed is produced by farmers themselves. The latter predominantly relies on old and obsolete cultivars, often failing to meet isolation standards, leading to the production of poor-quality seeds. Notably, the state of Maharashtra takes the lead in traditional commercial onion seed production and stands as the primary producer of onion seed in India. This dual structure in seed sourcing, with limited formal sector contribution and a significant reliance on farmer-produced seeds, underscores the need for improving seed quality standards and promoting the adoption of advanced cultivars to enhance overall onion productivity in the country.

Production technology: Bulb to bulb method is most widely practiced, in the first season, onion bulbs are produced, and upon reaching maturity, they are harvested. The bulbs that are true to type are carefully sorted and stored. Rabi and late kharif varieties are stored for the upcoming season, while kharif varieties are given a rest period of 15-30 days. In the next season, the stored bulbs are utilized for seed production.

The selection of planting material: The selection of planting material and bulb treatment involves choosing seed bulbs based on varietal characteristics such as shape, color, and size. Doubles, bolters, and diseased bulbs are discarded during this process. The top one-third portion of the bulb is cut to examine the number of axes of the growing center and to facilitate sprout emergence. Preferably, single-center bulbs should be chosen for planting. The selected



bulbs undergo soaking in a solution containing 1g/liter carbendazim and 1ml/liter carbosulphon. This meticulous procedure ensures the use of high-quality planting material for successful onion seed production.

Field Standards

Table 1: Contaminants and isolation distances

Contaminants	*Minimum distance (meters)*			
	Mother bulb production stage		*Seed production stage*	
	Foundation	*Certified*	*Foundation*	*Certified*
1	2	3	4	5
Fields of other varieties	5	5	1000	500
Fields of the same variety not conforming to varietal purity requirements for certification	5	5	1000	500

B. Specific requirements

Factor	*Maximum permitted (%)**	
	Foundation	*Certified*
1	2	3
*Bulbs not conforming to the varietal characteristics	0.10% (by number)	0.20% (by number)
**Off-types	0.10%	0.20%

*Maximum permitted at second inspection at mother bulb production stage.

**Maximum permitted at and after flowering at seed production stage

Field Inspection: For quality seed production, field inspections is essential during both mother bulb production as well as seed production

A. Mother bulb production stage: A minimum of two inspections should be made.

1) The first inspections should be made after transplanting of seedlings in order to determine isolation, volunteer plants, off types including bolter, and other relevant factors.

2) The second inspection shall be made after the bulbs have been lifted to verify the true characteristics of the bulbs

B. Seed production stage: Minimum of four inspections shall be made as follows:

1) The first inspection shall be made before flowering in order to determine isolation, volunteer plants, offtypes including bolters and other relevant factors.

2) The second and third inspections should be made during flowering to check isolation, offtypes and other relevant factors.

3) The fourth inspection should be made at maturity to verify the true nature of umbels and other relevant factors.

Climate and seasons: Climate and seasons significantly influence onion flowering, a thermo-sensitive phenomenon. Short-day tropical types initiate flowering under low chilling

conditions, with temperatures ranging from 25°C during the day and 10–15°C at night. In contrast, long-day temperate types require higher chilling temperatures, ranging from 0–5°C. For tropical types, the optimal planting time is in October to November. Following the recommended package of practices, mother bulbs of the Rabi crop should be produced and stored until October. Proper storage conditions are crucial, and the bulbs should be stored in a well-ventilated structure with temperatures maintained between 25-30°C and relative humidity between 65-71%. Plants developed from bulbs stored under these optimum conditions typically exhibit early flowering and maturity, resulting in higher seed yield.

Bulb planting: The preferred method of planting is the ridges and furrow technique with drip irrigation. In this method, bulbs are planted at a spacing of 45cm X 30cm on the ridges and furrows. If irrigated by a drip system, bulbs are planted on both sides of the ridges with a spacing of 60cm X 20cm, and the adjacent ridge is skipped for earthing up. Approximately 30-40 quintals of seed bulbs are required to plant one hectare of seed plot. This planting approach, combined with drip irrigation, optimizes spacing and water management for efficient and productive onion cultivation.

Nutrient management: For optimal fertilization in onion cultivation, it is recommended to apply 15 tons per hectare of Farm Yard Manure (FYM) along with NPK fertilizer at the ratio of 100:50:50 kg/ha. The NPK fertilizer should be applied in two splits: 50:50:50 kg/ha at the time of planting, and the remaining nitrogen in two splits, one at 30 days and the other at 45-60 days after planting. Additionally, a 1% spray of Polyfeed (19:19:19, NPK) is advised at 30 and 60 days after planting. Furthermore, a single spray of multi K (0:0:50) is recommended after 60 days of planting. This comprehensive fertilization strategy ensures that onion crops receive the necessary nutrients at different growth stages, promoting healthy development and maximizing yield potential.

Roguing: Roguing is a crucial practice in onion cultivation, necessitating regular visits to the plot. Yellow and lanky plants should be identified and removed before flowering to prevent the spread of potential diseases. Additionally, plants exhibiting differential umbel height should be eliminated before the opening of flowers to maintain uniformity in the crop. To prevent the spread of diseases such as aster yellow and stemphyllium blight, affected plants should be promptly identified and removed before the seed harvest stage.

Weed management: For effective weed management in onion seed production, it is recommended to spray (Oxyfluorfen 23.5% EC) Goal® herbicide at a concentration of 1.5 ml per liter after the planting of bulbs. This helps control weed growth and establishes a favorable environment for plants. Additionally, conduct one weeding operation between 45 to 60 days after planting to further manage and suppress weed growth. This combined approach ensures that weeds are adequately controlled during critical stages of garlic growth, minimizing competition for nutrients and optimizing overall crop performance.

Harvesting and postharvest care: Umbels are ready to harvest when 2/3rd of the umbel turns blkack. Dry the umbels in the open sun, and the threshing process can be carried out using methods such as rolling, threshing machines, or combines. Subsequently, the seeds should be dried in the open sun until a moisture level of $\leq$ 6 percent is attained.

Seed yield: The average seed yield ranges from 500 to 800 kg per hectare, and under the best management practices and favorable climatic conditions, yields of up to 1200 kg per hectare can be obtained.

Seed packing and storage: Seed moisture and storage temperature play important roles in seed viability. Seeds should be dried to a moisture level below 6 percent and then packed in 400-gauge poly bags treated with 2g/kg captan. Preferably, seeds should be stored in cold

storage below 15°C with a relative humidity of 30–40%. This meticulous seed storage and packing protocol ensures the preservation of seed quality and viability.

Seed quality standards: Indian Minimum Seed Certification Standards according to the Seeds Act 1966 are

Seed Standards

Factor	*Standards for each class*	
	Foundation	*Certified*
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour-proof containers (maximum)	6.0%	6.0%