TECHNOLOGY BRIEF

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QUINOA

Quinoa is a nutritious and versatile crop that has gained popularity in recent years. It is a highly resilient crop that not only has superior nutritional quality vis-à-vis common cereals but can also withstand environments where other crops have difficulty to grow. Quinoa is considered a “superfood” due to its impressive nutrient profile. It is a complete protein, meaning that it contains all nine essential amino acids, making it an excellent source of protein. Quinoa has a unique balance between oil (4-9%), protein (averaging 16%, with high nutritional relevance due to the ideal balance of its essential amino acid content), and carbohydrate (64%).

Quinoa is gluten-free and hence good for consumption by people with gluten intolerance. Similarly, it is food with low glycemic index (GI), a trait that makes it a perfect food for the people with diabetes.

Here are brief guidelines for quality seed production and crop management for quinoa.

Crop requirements

Climate and soil preparation

Quinoa prefers well-drained soils, sandy-loam to loamy-sandy soils with a slightly acidic to neutral pH. Prepare the soil by plowing or tilling to create a fine seedbed. Organic matter can be incorporated to improve soil structure. Optimal temperatures for growth are around 20 °C. Temperatures exceeding 35 °C cause pollen sterility and failure to set seed.

Planting

Sow quinoa seeds directly into the soil or use transplants, depending on the climate and growing conditions. Plant seeds at a depth of 1 to 2 cm, with rows spaced adequately (25 to 50 cm spacing) for good air circulation.

Isolation

An isolation distance of 20 m is required because quinoa is an often cross-pollinated crop. It is preferrable to plant adjacent varieties for seed production that are of different maturity (temporal isolation). Wind barriers of 2.0 m height using muslin cloth materials are also preferred to check contamination through wind pollination.

Crop cultivation and management

Water management

Quinoa is relatively drought-tolerant, but consistent moisture is crucial, especially during flowering and grain filling. Irrigate when needed, avoiding waterlogged conditions.

Fertilization

Quinoa has moderate nutrient needs. Apply a balanced fertilizer or compost before planting and consider side-dressing during the growing season based on plant development.

1. Nitrogen (N): 120 kg/ha should be applied in three splits:
    a. Basal dose at 40 kg/ha at the time of sowing (1/3rd)
    b. First topdressing at 40 kg/ha (1/3) at branching stage (30-35 days after sowing)
    c. Second topdressing at 40 kg/ha (1/3) at 50-55 days. Urea is a better option for the topdressings.
2. Phosphorus (P_2O_5): Basal dose at 50 kg/ha
3. Potassium (K_2O): Basal dose at 50 kg/ha
4. Organic fertilizers (compost or farmyard manure): An application of 15-20 t/ha of well-decomposed organic matter satisfies the nutrient requirements of quinoa; this replaces the requirement of any other kind of fertilizer.

Weed control

Keep the quinoa field free from weeds, especially during the early stages of growth. Quinoa plants are not very competitive against weeds, so timely weeding is essential.

Harvest, postharvest, and seed storage

Harvesting

Harvest when the seed heads have changed color and the majority of the seeds are firm. Once the leaves have fallen off and only the dried seed heads remain, the seeds are ready to be harvested. Average seed yield varies from 2,000 to 2,500 kg/ha.

Postharvest threshing

After harvesting, thresh the quinoa to remove seeds from the seed heads. Winnow to separate seeds from chaff. Ensure proper drying before storage to prevent mold.

Seed storage

Seeds should be dried to a moisture content of 12-14% to prevent deterioration. The seeds can be stored at low temperature (10 °C) and low humidity for about two years.

For details, please refer to the quality seed production manual (resade.biosaline.org/sites/default/files/2021-06/Quality_Seed Production Manual_RESADE.pdf).

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ICBA is an international not-for-profit applied agricultural research center with a unique focus on marginal environments where an estimated 1.7 billion people live. It identifies, tests, and introduces resource-efficient, climate-smart crops and technologies that are best suited to different regions affected by salinity, water scarcity, and drought, among other factors. Through its work, ICBA helps to create jobs and improve livelihoods, food security, and nutrition for some of the poorest rural communities around the world.

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