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Quality Seed Production of Zucchini

Khyati Singh

Dept. of Vegetable Science, CCS Haryana Agricultural University, Hisar, Haryana (125 004), India

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Corresponding Author
Khyati Singh
e-mail: chaudhrykhyati@gmail.com

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Abstract

Zucchini, a new gourd introduced to India belongs to family Cucurbitaceae. Being a good source of Vitamin A, Calcium and Phosphorous, it is becoming famous in the country. India has rich climatic diversity and has great potential to improve the local cultivars by appropriate breeding methods and develop improved varieties and hybrid. It can be cultivated throughout India and seed production is proved to be a profitable endeavor. For production of quality of crop, it is necessary to perform rouging at correct stage of plant growth based on morphological characters of plants and by maintaining the isolation distance.

Introduction

Zucchini (*Cucurbita pepo*), commonly known as courgetti and *Turae* in hindi, is a popularly cultivated summer squash that often grows up to a good length (1 metre or 40 inches), but are harvested at immature stage of 15 to 25 cm (6 to 10 in) size. The fruit is light to dark green colored, the hybrids, golden zucchini has orange or deep yellow color fruit. The crop is consumed as vegetable and flowers are also edible. Apart from India, it is commonly cultivated in United Kingdom, New Zealand, Ireland, Singapore, Malaysia and South Africa. The zucchini is a creeping and trailing crop, bear yellow colored flowers. The male flowers are smaller in size than female flowers and are borne in the leaf axilon a long stalk. It is commonly cultivated among the cucurbits for its rich source of Vitamin A, Phosphorus, Folate and Calcium. It is temperate region crop for seed production which takes place only in hilly region of north India in summer season. But these days, it is possible to produce seeds of summer squash in south India (Ranebennur, Bengaluru).

Climatic Requirements and Sowing Time

Zucchini is a warm season crop that requires mild climate for the plant growth stages like flowering, fruit setting and development and seed formation. It cannot tolerate frost condition and produce maximum yield and best quality fruits in summer. It requires warm temperature ranging from 22-29 °C. In north India, it is planted in the month of January when minimum temperature is higher than 13 ^{0}C and frost has passed. While, in south India, it is planted in last week of October to first week of November.

Soil and Field Preparation

The optimum soil condition for zucchini crop production is well drained, rich in organic matter, sandy loams having a pH range from slight acidic to neutral soil (pH 6.0 to 6.5).

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E-mail: bioticapublications@gmail.com

The soil should be free from nematodes, soil borne diseases, and larvae/ adults of insect pest. The crop should not be grown in the field where cucurbits crop was sown at least 2-3 years before to avoid any soil-borne problems of pathogen. Before sowing, soil should be ploughed and harrowed properly two to three times to achieve fine tilth to remove soil clods. The field should be furrowed and beds of 0.75 to 1 meter wide and 2 meters apart should be prepared. At time of planting, it is better to incorporate well decomposed FYM in the soil to improve soil structure.

Sowing System and Seed Rate

Zucchini is commercially seed propagated crop. The seed rate required for crop is 5000 seeds per acre land. Two to three seeds are sown per hill to obtain the good plant stand and sowing is done at a depth of $^{3}/_{4}$ to $^{1}/_{2}$ inches in spacing of one meter. Thinning is done by removing single unhealthy seedling. Mulching can be done in the crop using plastic mulch or rice straw for maintaining soil moisture level and minimizing the incidents of weeds. The application of mulch has many other advantages such as it avoid fruits from touching the soil which prevents soil borne pathogens infestation.

Manures and Fertilizers

Fertilizers have to be applied based on the nutritional quality of soil. Well decomposed farm yard manure (FYM) @ 1.5-2 Q should be applied in soil at the time of field preparation. A basal dose of NPK @ 25 Kg per acre and remaining dose @ 20 Kg is sprayed in 4 split doses by drip irrigation system at subsequent growth stages. After pollination, NPK in the ratio of 13:0:45 are applied through drip irrigation.

Irrigation

When availability of water source is sufficient throughout the cropping season, ridges and furrow system of cropping can be adopted. Mulching and drip irrigation system aids in achieving a quality produce and higher yield. Polyethylene/ plastic mulch has many advantages as they increase the soil temperature, conserves soil moisture, reduce problem of weeds, many soil-borne pathogens, thus improving plant growth and development. It also reduces problems of evaporation, soil compaction and crusting, fertilizers leaching, ground rot of fruit and drowning of crops. Plastic mulching also supports drip irrigation systems and growing of double or multiple cropping system which can reduce the risk of crop failure.

Weed Management

The crop-weed competition in field should be avoided at early stage of crop, as at later stages the rapidly spreading vines suppress the weed growth. First hand weeding and hoeing is done at 15-20 DAS and second at 30-35 DAS along with earthing up. Chemical control can also be adopted to control weeds such as pre-emergence application of Alachlor @ 2.5 Kg *a.i.*/ha.

Pollination

Cucurbits are generally cross-pollinated and the insects act as carrier of pollens. Honey bees and squash bees are major vector of pollination. But it can also be hand-pollinated easily as identification of male and female flowers is simple. The female flowers can easily be identified by the small squash-like structure under petals, whereas in male flowers such structure is absent and have a straight petiole (Figure 1). Bagging of female flowers is done a day prior to pollination from 4 to 6 am.

Figure 1: Male and female flowers and insect pollination of Zucchini

Roguing

The removing of off-types plants, disease infected plants, objectionable weeds, plants of other crops and wild type from the seed crop is known as rouging. It should be done throughout the growing season to maintain true to type plants.

Isolation

Care should be taken to maintain isolation among plants of same species or varieties. It can be done either by mechanical isolation like bagging, caging or by distance isolation of at least $^{1}/_{2}$-1 mile between varieties.

Pests

The major insect pest of zucchini plant is cucumber beetles. The striped cucumber beetles have yellow and black spots on its dorsal side of body, while, there are black spots on yellow back of spotted cucumber beetle. They chew on young leaves and stems of zucchini. Cucumber beetles are also a carrier of wilt diseases. These pests along with other minor insect pest including vine borers and squash bugs can be controlled by common insecticides like Diazinon and Malathion used in form of sprays and dust.

Diseases

The common fungal diseases reported in powdery mildew are the downy mildew, powdery mildew and septoria leaf spot. Other viral diseases are also found like squash

mosaic virus and cucurbit stunting disorder. Several cultural management practices can be adopted to protect plants like crop rotation, field and crop sanitation to remove the infected plant debris that can cause infestation of diseases and insect pest. The infected plant parts like leaves, stems or fruits should be removed to prevent the disease spread. The insect pest can become potential carrier of viral diseases; hence they should be removed with insecticides or quick blast of water. The method to protect crop is to grow resistant varieties and hybrids and always select healthy seed, free from any infestation. The powdery mildew can be controlled by copper spray or dust every 10 days. Plants should not be watered from top as this avoid wetting of the leaves which do not allow fungal spores to bloom.

Harvesting and Seed Extraction

The crop is allowed to grow up to full maturity for production of seeds. Maturity stage is identified by a simple fact that the shell of ripened summer squash is not penetrable by a fingernail (Figure 2). Before processing for seed extraction, zucchini fruit should be allowed to sit for at least 3 weeks after harvesting.

Seed processing of zucchini is quite easy and straight forward. It involves cutting of the squash open, scooping the seeds

Figure 2: a) Ripened fruit of Zucchini; b) Cleaned seeds of the crop

out followed by rinsing off the pulp. After this, the seeds are allowed to dry on a screen. Care should be taken while cutting open the fruit with axe or shovel to hurt and scatter the seeds. About 200-300 Kg seed is obtained from an acre land.

Conclusion

Zucchini is recently exploited crop and its easy cultivation practices makes popular in our country. It is nutritive vegetable crop, rich in minerals and vitamins. Novel crop varieties and hybrids can be developed and the existing cultivars can be improved with application successful breeding programmes.