



# Production Technology of Kiwi Fruit in India

Anjali Tripathi<sup>1\*</sup>, Sanjay Pathak<sup>2</sup> and Sneha Singh<sup>3</sup>

<sup>1,2&3</sup> Acharya Narendra Deva University of Agriculture and Technology, Kumarganj

Corresponding Author: [anjalihorti@gmail.com](mailto:anjalihorti@gmail.com)

## Introduction

Kiwi fruit (*Actinidia deliciosa* Planch.) belongs to Actinidiaceae family and native to China and also known as China's miracle or Chinese gooseberry or Wonder of New Zealand. Introduction of kiwi fruit has also been made in the states of Arunachal Pradesh, Sikkim, Meghalaya, Darjeeling district of West Bengal and Nilgiri hills of Tamil Nadu. In India, kiwi fruit occupied 4,000 ha area with 13,000 MT production (Anonymous, 2020). Kiwi is one of the most popular fruits today, kiwi fruit is highly nutritive being rich in antioxidants, vitamin C. Ripe kiwi fruit contains very high amount of biologically active compounds with abundance of chlorophyll, dietary fiber,  $\beta$ -carotene, provitamins- A, B1, B2, B3, B6 and vitamin B9, phenolics, flavonoids, lutein and zeaxanthin.



## Climate

Kiwi is a deciduous vine which requires moderately cold climatic conditions. It requires 700–800 chilling hours below 7°C to break its rest period in the winter otherwise the bud break may be delayed. Kiwi fruit vine needs 0-7°C chilling temperature of 600-850 hours

for initiation of flowers and fruits. In summer, high temperature more than 35°C may cause scorching of leaves. In India, kiwi can successfully be grown at 800–1,500 m above mean sea-level. A rainfall of about 150 cm/year is sufficient for kiwi cultivation.

## Soil

It can be grown on a wide range of soils but deep, rich, well-drained sandy-loam soils are ideal. Neutral soil is best for its production and grows well in pH slightly less than 6.9 but higher pH up to 7.3 affects adversely because of Mn deficiency.

## Varieties

Kiwi is a dioecious plant, it bears pistillate and staminate flowers separately.

**Abbott** : This is an early-flowering and early-maturing cultivar. Fruits are oblong, medium-sized and covered with dense hairs.

**Allison**: Heavy-bearer and early-ripening cultivar most suited variety for Himachal Pradesh.

**Bruno**: Heavy bearer cultivar, requires comparatively less chilling hours for breaking the dormancy. This cultivar has longest fruits among the all cultivars and tapering in shape towards the stem end.

**Hayward**: Hayward is comparatively shy-bearer with a tendency of biennial bearing. The fruit is broad and flat, being much wider in relation to length.

**Monty**: It is a late-flowering cultivar but fruit maturity is not late. The fruits are oblong, resembling those of Abbott and Allison.



**Tomuri:** This is good pollinizer for Hayward and Monty and late flowering cultivar.

### Propagation

Kiwi fruit can be propagated by seed and vegetative propagation. Kiwi plants raised from the seeds are heterozygous and undesirable for commercial multiplication. The propagation through cuttings is most rapid and suitable method of multiplication. Kiwi fruit can propagate by various types of stem cuttings hard wood, semi-hardwood and soft wood cuttings. Soft wood cuttings are quite successful in root initiation. Cuttings are taken from semi mature plants of 0.5-1.0 cm thickness with short internode and about 15-20 cm in length. The base of cutting is treated with IBA solution gives best result of success of sprouting and survival percent.

### Planting

Land having very gentle slope is ideal for it. Steep land should be contoured into terraces for planting vines. If possible, its rows should be oriented in a north-south direction to avail maximum sunlight. Preparation of pits, mixing of farmyard manure and filling of pits should be completed by December. Planting distance varies according to variety and system of training. By and large, T-bar and pergola are adopted for planting. In T-bar, a spacing of 4m from row-to-row and 5–6 m from plant-to-plant is common, whereas in pergola system, a spacing of 6 m from row-to-row should be maintained. January is ideal time for planting. Planting male and female plants in a 1:9 ratio is common.

### Training

More commonly T-bar fences or overhead pergolas training systems are used in kiwi fruits. Main advantage of this system is to provide protection to the fruits from wind rub.

Training on t bar system is most popular training system among the fruit growers in hills.

In this system first year, the single apical bud allows growing up to the height and rest vine is headed back. This will be the main trunk. In second year two shoots are selected and tied down at both sides to middle wire. These are the secondary arms. In the third year the tertiary fruiting arms, which bears fruits in the coming year are selected on the secondary arms. These tertiary arms should be tied down to the out trigger wire to hold them in right position.

### Pruning

Pruning in kiwi fruit is done in two seasons i.e., summer pruning and winter pruning.

### Manuring and Fertilization

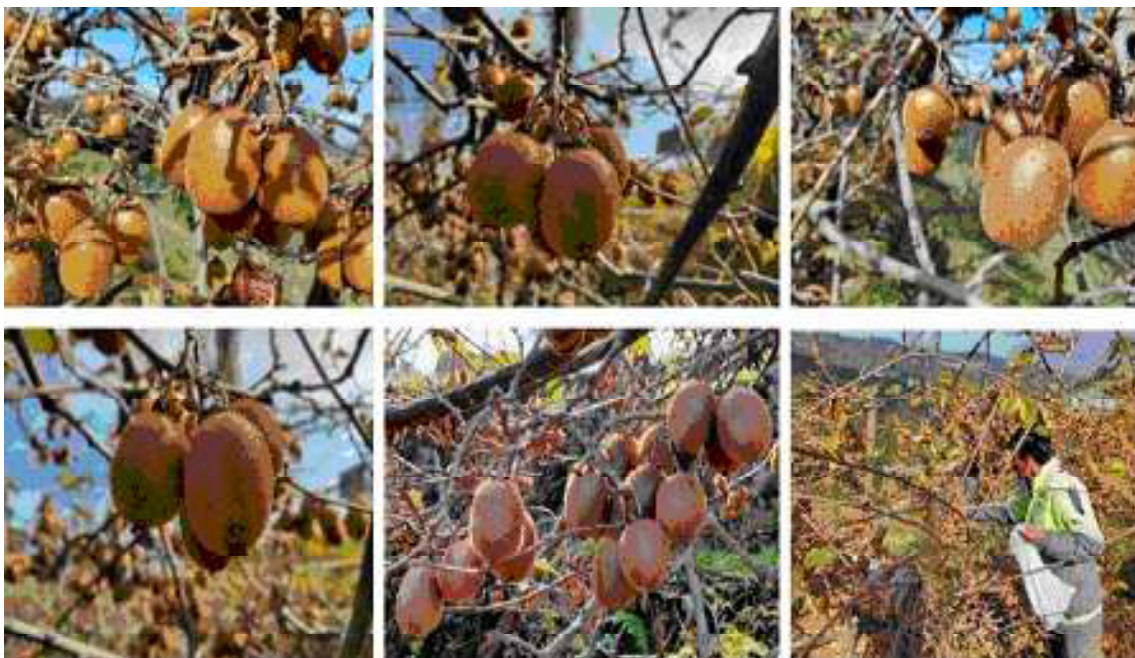
Fertilizer should be applied in kiwi vine after soil testing. N, P, K should be applied on yearly-basis, while the other elements on requirement-basis. Generally, a basal dose of 20 kg farmyard manure, 0.5kg NPK mixture containing 15% N is applied each year. After 5 years of age, 850–900 g N, 500–600 g P, 800–900 g K and farm yard manure should be applied every year. The Nitrogen dose should be applied to equal doses, half to third in January-February and rest after fruit set in April-May.

### Irrigation

Summer irrigation is essential for better fruit production. Moisture stress during summer season adversely affects fruit size and crop returns. Irrigation is also needed during September and October when the fruit is in initial stage of growing and development.

### Harvesting and Postharvest Management Practices

The fruits mature earlier at lower altitude and later at higher altitudes because of variation in temperature. Kiwi fruits TSS 6.2% are ideal for harvesting. Larger-sized berries should be harvested first while smaller ones should be allowed to increase in size and improve in quality.



### **Kiwi Fruit Vines at Bearing and Harvesting Stage**

After harvesting, the fruits are rubbed with a coarse cloth to remove stiff hairs found on their surface. Hard fruits are transported to the market. On an average, kiwi yield varies from 50 to 100 kg fruits/vine. Vines on trellis produce about 25 tonnes/ha after 7 years.

### **Grading**

For getting better price in nation and international market we need to grade fruit on the basis of fruit weight. According to fruit weight we can classify fruits into different grade

- Grade A- Fruit weight more than 100 g
- Grade B- 60-100 g fruit weight and
- Grade C- Less than 60 g fruit weight.

### **Storage**

Kiwi fruits can be stored up to 6-8 weeks if harvested hard and can be kept in cool place without refrigeration. Kiwi fruits can be stored for 5-6 months when harvested at correct maturity and at optimal storage conditions. In cold storage kiwi fruits can be stored up to 4

months at 0°C with 80-90% RH.

### **Conclusion**

Kiwi fruit accounts one of the good sources of antioxidant substances along with organic compounds such as amino acids, sugars, proteins, minerals and the necessary vitamins for the human body. Because of its nutritive value as well as the antioxidant properties, there is a tremendous increase in the interest of the crop production in the recent years. The main obstacles lie at the high initial costs due to the provision of expensive structure for its cultivation. The shortage of quality planting material, proper irrigation supplies and poor marketing and promotion activities accounts other major problems. Quality planting material requires quality nursery management most of time farmers neglect this very important fact. Quality seedling production is necessary for quality plant production. Thus, kiwi fruit cultivation should be mechanized with introducing innovative and advance improved technology, tools, and equipment that would boost up the kiwifruit production in India.



## References

- Anonymous 2020. Horticultural statistics at a glance, India, 142-186.
- Chadha, K.L. 2002. Hand Book of Horticulture. Directorate of Information and Publications of Agriculture, ICAR, Krishi Anusandhan Bhavan, Pusa, New Delhi, pp 1031.
- Du, G., Li, M., Ma, F., Liang, D. 2009. Antioxidant capacity and the relationship with polyphenols and vitamin C in *Actinidia* fruits. *Food Chem.*, 113: 557-562.
- Hunter D, Skinner M, Ferguson A, Stevenson L. Kiwifruit and health. In: Watson R, Reedy V, eds. Bioactive Foods in Promoting Health: Fruits and Vegetables. Atlanta, GA: Elsevier, Inc, 2007, 565-580.
- Jindal, K.K. and Sharma, L. 2016. Emerging horticultural crops of north-eastern states of India suitable for precision farming to improve livelihoods of farming community - with special reference to kiwifruit. *Life Sciences International Research Journal* 3:(2):1-9.
- Nishiyama, I., Y. Yamashita, M. Yamanaka, A. Shimohashi, T. Fukuda et al. 2004. Varietal difference in vitamin C content in the fruit of kiwifruit and other *Actinidia species*. *J Agric Food Chem*, 52: 5472-5475.

❖❖