

**Turmeric Intercropping in High-Density Mango Orchard: A Promising
Demonstration at KVK Azamgarh-I**

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ABSTRACT: -

Turmeric intercropping can help farmers make productive use of the vacant space in young high-density mango orchards. A field demonstration was conducted at KVK, Kotwa, Azamgarh-I using two turmeric varieties, Rajendra Sonia and Kesari. Rajendra Sonia performed better, with 400–450 q/ha yield, 7.8–8.0% curcumin content and 200–210 days crop duration, compared with 300–350 q/ha yield, 1.16% curcumin and 230–240 days in Kesari. The results indicate that Rajendra Sonia was more suitable for intercropping under the high-density mango orchard conditions of the KVK. The demonstration also showed the potential of turmeric to improve land-use efficiency and provide additional income during the early years of mango orchard establishment.

Keywords: Mango, high-density planting, turmeric, intercropping, Rajendra Sonia, curcumin, land-use efficiency etc.

Introduction:

A newly established mango orchard has considerable open space between the plants during its initial years. Until the mango canopy develops fully, this space remains largely unutilized. Growing a suitable intercrop during this period can help farmers obtain additional production from the same land while the mango orchard continues to develop. Keeping this opportunity in view,

Krishi Vigyan Kendra, Kotwa, Azamgarh-I have demonstrated turmeric cultivation under a high-density mango orchard on its campus. The demonstration is aimed at showing how the vacant space between young mango plants can be used productively through a suitable intercrop. The demonstration also provides an opportunity to compare turmeric varieties and identify those having better performance under the conditions of the KVK campus.

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KVK Azamgarh-I: A Centre for Field-Based Technology Demonstration

Krishi Vigyan Kendra, Kotwa, Azamgarh-I have approximately 17.00 acres of land, comprising crop areas, fruit orchard and agroforestry areas, demonstration units and other institutional-use areas. The campus is viewed not only as a production area but also as a practical centre for technology demonstration and farmer training. The objective is to provide farmers with an opportunity to see agricultural technologies under actual field conditions and understand their production, management and economic aspects. The approach can be summed up as: **“See, Understand and Adopt.”**

KVK has important facilities including an administrative building, farmers’ hostel, demonstration units, threshing floor, agricultural storage facility, tube well and underground irrigation channels. These facilities support field demonstrations and practical training activities. The development of crop demonstrations, fruit-based farming systems, improved production technologies, seed production, integrated plant protection and other suitable agricultural technologies can further strengthen the campus as a living field laboratory for farmers. The turmeric demonstration under high-density mango is one such practical initiative.

High-Density Mango Orchard: Opportunity for Intercropping

High-density planting allows mango plants to be established more closely and managed systematically for efficient use of available land and production resources. However, during the early stage of orchard establishment, mango plants are still young, and their canopy does not cover the entire orchard floor. As a result, substantial space remains available between the mango rows. This space can be utilized for a suitable intercrop as long as the intercrop does not adversely affect the growth and management of mango. The intercrop should have suitable duration, good productivity and manageable requirements for water and nutrients. At KVK Azamgarh-I, this concept has been demonstrated by introducing turmeric as an intercrop in the high-density mango orchard.

Why Turmeric?

Turmeric (*Curcuma longa* L.) is an important spice crop and has wide use as a spice and colouring material. It is also valued for its curcumin content, which is an important quality characteristic. The technical material supplied with the article describes turmeric as a crop suited to warm and humid conditions and indicates that good production requires suitable soil and moisture conditions. Well-drained soil with a pH of approximately 6.0–7.5 is suitable for turmeric cultivation. The

same material emphasizes the importance of healthy rhizomes, proper land preparation, suitable planting, mulching, irrigation, nutrient management, weed control and timely harvesting. For cultivation under a mango orchard, variety selection becomes particularly important. A variety with good yield, shorter duration and desirable quality can be more useful because it can complete its crop cycle before the mango canopy becomes too dense.

Turmeric Demonstration at KVK Azamgarh-I

Two turmeric varieties were selected for the demonstration:

1. **Rajendra Sonia**
2. **Kesari**



Fig: 1 Rajendra Sonia variety

Both varieties were grown under the high-density mango orchard and observed for important characteristics, particularly:

- ☞ crop duration,
- ☞ yield and
- ☞ curcumin content.

The observations showed a clear difference between the two varieties, with Rajendra Sonia performing better than Kesari under the conditions of the KVK campus.

Performance of Rajendra Sonia

Rajendra Sonia showed a favourable combination of higher yield, earlier maturity and high curcumin content. Under the KVK Azamgarh-I demonstration, the variety produced approximately 400–450 quintals per hectare and became ready for harvest in around 200–210 days. Its curcumin content was approximately 7.8–8.0%. The technical material supplied with the article also reports Rajendra Sonia as a variety developed by Rajendra Agricultural University, Bihar, with



Fig: Kesari variety

approximately 7.8–8.0% curcumin, maturity in about 210 days and average yield of 400–450 quintals per hectare. These characteristics make Rajendra Sonia particularly interesting for an orchard-based intercropping system.

Performance of Kesari

Kesari was also grown under the same high-density mango orchard conditions. The variety recorded approximately 300–350 quintals per hectare and required around 230–240 days to reach harvest maturity. Its curcumin content was approximately 1.16% under the observed conditions. Thus, compared with Rajendra Sonia, Kesari showed a lower yield, longer crop duration and lower curcumin content in the KVK campus demonstration.

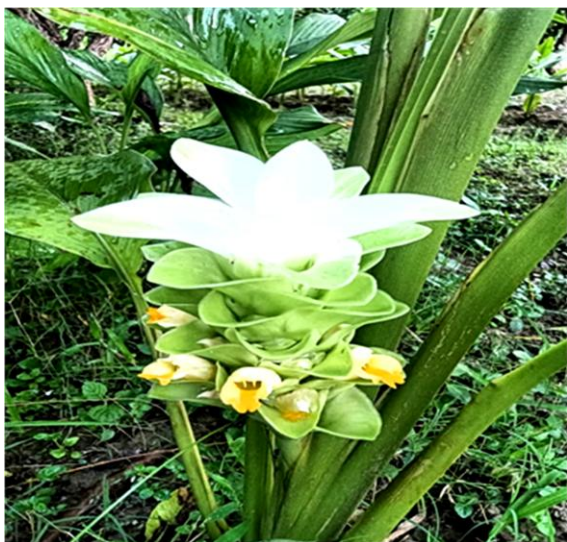


Fig: 3 Flowering stages of turmeric

demonstration. Its advantage was seen in all three important parameters productivity, earliness and curcumin content.

Why Rajendra Sonia Is More Suitable for This System

The advantage of Rajendra Sonia becomes particularly meaningful when turmeric is grown as an intercrop rather than as a sole crop.

1. Its higher yield means greater production from the available inter-row space.
2. Its shorter duration allows the crop to be harvested earlier. This is useful because mango plants continue to grow during the turmeric crop period and their increasing canopy gradually changes the growing environment beneath the orchard.
3. Early removal of turmeric also allows easier implementation of subsequent mango orchard operations.

Comparative Performance of the Two Varieties

Parameter	Rajendra Sonia	Kesari
Yield	400–450 q/ha	300–350 q/ha
Crop duration	200–210 days	230–240 days
Curcumin content	7.8–8.0%	1.16%
Overall performance at KVK Azamgarh-I	More promising	Comparatively lower

The comparison indicates that Rajendra Sonia showed better overall performance under the conditions of the KVK

4. The higher curcumin content provides an additional quality advantage.

Management strategies during cultivation

Successful intercropping depends on maintaining a proper balance between the main crop and the intercrop. Turmeric should be planted in the available inter-row space without disturbing the mango plants. The mango root zone and regular orchard operations should be protected.

Soil and planting

Turmeric requires well-prepared, fertile and well-drained soil. The technical material recommends a soil pH of approximately 6.0–7.5. Healthy rhizomes should be selected for planting. The supplied technical material mentions approximately 20–25 quintals of seed rhizomes per hectare and suitable spacing and planting depth for establishing the crop.

Mulching

Mulching after planting helps conserve soil moisture and supports crop establishment. The technical material recommends mulching soon after planting and again during crop growth.

Irrigation and nutrition

Irrigation should be provided according to soil type, weather and crop requirement. At the same time, excessive moisture should be avoided around mango plants. Nutrient management should also consider the requirements of both turmeric and mango so that the intercrop does not create unnecessary competition with the main orchard crop.

Weed management

Timely weeding and intercultural operations are important during turmeric growth. Keeping the inter-row area relatively weed-free helps reduce competition for moisture and nutrients.

Plant Protection

Turmeric is affected by several diseases and insect pests that can reduce plant growth and rhizome yield. The major diseases and insect pests and their management are as follows.

Diseases

1. Leaf Blotch (*Tapharina maculans*)

Leaf blotch is caused by the fungus *Tapharina maculans*. Reddish-brown spots appear on both surfaces of the leaves. As the disease develops, the leaves gradually turn yellow and the affected plants may eventually die. The disease is more severe during October–November. For prevention, rhizomes are treated before planting with Mancozeb M-45 @ 3 g per litre of water for 30 minutes. In an established crop, 2–3 sprays of the same concentration are recommended in the supplied material.

2. Leaf Spot

Affected leaves develop brown spots and may appear scorched or burnt. The disease is generally more prominent during August–September. As per the supplied material, spraying Dithane Z-78 @ 0.2–0.3% at monthly intervals can be used for management.

3. Rhizome and Root Rot (*Pythium aphanidermatum*)

The disease initially causes yellowing of the lower leaves. Later, the whole plant becomes yellow and starts wilting. The portion of the plant near the soil surface becomes water-soaked and soft. When an affected plant is pulled, it may break easily at the point of attachment with the rhizome, which later becomes completely rotten. The supplied material recommends Dithane Z-78 @ 0.2–0.3% for management.

Insect Pests

1. Thrips (*Thrips tabaci*)

Thrips are small insects that suck sap from the tender parts of the plant. Severe infestation affects plant growth and may reduce yield. The supplied material recommends Imidacloprid @ 200 ml per acre in 150 litres of water for management.

2. Root-knot Nematode (*Meloidogyne incognita*)

Root-knot nematodes affect the roots and cause weak plant growth and drying of leaves, particularly from the margins. The supplied material recommends application of Carbofuran @ 20–25 kg/ha before planting for management.

3. Tissue Borers

The important tissue-boring pests mentioned in the supplied material are shoot borer (*Dichocrocis punctiferalis*) and rhizome

maggot (*Calobata* sp.). These pests damage the internal tissues of the plant, causing affected shoots to weaken and dry. Infested plants should be uprooted and removed from the field. The supplied material also mentions Phosphamidon @ 0.04% for control

Conclusion

The turmeric–mango intercropping demonstration at Krishi Vigyan Kendra, Kotwa, Azamgarh-I shows how the open space available in a young high-density mango orchard can be used for additional crop production. Two turmeric varieties, Rajendra Sonia and Kesari, were evaluated under the KVK campus conditions. Rajendra Sonia recorded approximately 400–450 q/ha yield, matured in about 200–210 days and showed 7.8–8.0% curcumin. Kesari recorded approximately 300–350 q/ha, required 230–240 days for maturity and showed about 1.16% curcumin. Thus, based on the observations at KVK Azamgarh-I, Rajendra Sonia showed better overall performance, combining higher yield, earlier maturity and higher curcumin content. The demonstration also highlights the broader role of the KVK campus. Its 17 acres of land can serve simultaneously as a production resource, demonstration field and practical classroom for farmers.