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**Shivaprakash B**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

**HP Hadimani**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

**Dr. CN Hanchinamani**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

**Dr. Vijay Mahantesh**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

**Ashok**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

**Sandhyarani Nishani**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

**Correspondence**
**Shivaprakash B**
Department of Vegetable Science Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India

# Effect of different planting dates on the growth and yield of underutilized medicinal vegetable Karchikai (*Momordica cymbalaria*) under northern dry zone of Karnataka

**Shivaprakash B, HP Hadimani, Dr. CN Hanchinamani, Dr. Vijay Mahantesh, Ashok and Sandhyarani Nishani**

**Abstract**
Planting dates of Underutilized medicinal vegetable Karchikai (*Momordica cymbalaria*) is an important factor influencing growth and productivity. An experiment on Karchikai was conducted at KRCCH, Arabhavi, and Belgaum district during 2017 to determine the best date of planting for obtaining higher yield. Experiment comprises of four dates of sowing *viz*. June 1st, July 1st, August 1st and September 1st of 2017. The parameters were days to sprouting, sprouting percentage, days to flowering, number of fruits per vine, vine length (cm), average fruit weight (g), number of fruits per vine, yield per plant and yield per hectare. The results were significantly differed at 5% level of probability. The study showed that tubers planting on June 1st speed up days to sprouting, Sprouting percentage, flowering, vine length (cm), average fruit weight (gm) yield per plant (kg). The yield results indicated that June 1st is the best date of planting for higher production and also early planting give better yield performance than late planting.

**Keywords:** Antioxidant, antimicrobial, hypoglycemic, hypolipidemic, cardio protective, hepatoprotective, nephroprotective, saponins, tubers, vitamin C

## Introduction
Karchikai (*Momordica cymbalaria*) belongs the family Cucurbitaceae, dicotyledonous cross-pollinated unexploited vegetable. So far no review has been covered from the literature encompassing valuable attributes of *M. cymbalaria* in all dimensions. The crop is not cultivated by the farmer as a regular crop it is available mainly in the black soils where sorghum, Bengal gram and onion can be cultivated. Initially it was considered as a weed, it is having more medicinal qualities from ancient times. Because of lack of awareness about the nutritional aspects, it is not commercially cultivated. Hence it is considered as an underutilized vegetable crop. The reason for this is these are generally region and season specific. Because of the nutritional value of the fruits, it is used as vegetable. A first attempt has made in order to increase the production in order to fight against several diseases. Not only the fruits even leaves can also be used as a leafy vegetable (Kirtikar & Basu 1993) [5]. It contains higher amounts of carbohydrate (3.72%), protein (3.26%) fat (1.61%), fiber (5.63%) and ash (1.25%). The beta-carotene content of Karchikai was 224.9 I g/100 g and that of sponge gourd and ridge gourd was 200 I.U/100 g and 55 I.U/100 g respectively. Karchikai contained a higher amount of ascorbic acid 160.77mg/100 g on a fresh weight basis. The iron and phosphorous content of Karchikai was also found to be higher (130.00 mg and 5.50 mg/100 g, respectively) compared to other species. (Gopalan *et al.* 1993) [4]. the nutrient contents of Fruits of the two vegetables *M. cymbalaria* (Karchikai) and *Momordica charantia* (Bitter Gourd) are compared. The calcium content of Karchikai is three times higher than that of the Bitter gourd. The ascorbic acid (Vitamin C) content of Karchikai is two times higher than that of Bitter gourd. It is used to meet the shortage of vitamin C consumption. Not only the fruits, even the tubers and leaves of this crop are also used for therapeutic uses as these contain flavonoids, steroids, Triterpenes, Saponins (Pramod Kumar *et al.* 2010) Tubers have been reported to contain sterols, Triterpenes, Cardiac glycosides, and Saponins. (Fernandes *et al.* 2007) [2]. this crop can act as a weapon against malnutrition & hunger. Fruits are the economic part of this crop. Fruits are green in color and these are used as vegetables. Fruits has Hypoglycemic, Hypolipidemic, Cardio protective, Hepatoprotective (Koneri *et al* 2008). The presence of Saponins the responsible for Hepatoprotective, Antioxidant and Antimicrobial activity (Kulkarni *et al.* 1992) [7]. Fruits are also used in treating several disorders such as, rheumatism, sub-acute cases

of spleen and liver disease. Fruit juice is also used for the treatment of malaria, wounds, worms, and parasites. Rao *et.al* 2001) [10] reported that fruits possess ant diabetic and hypoglycemic activity. Leaf Tea is used for malaria, wounds, worms, parasites, fever etc. (Fernandes *et al*. 2007) [2] and (Osinubi *et al*. 2008) [8]. Tubers have been in use since from ancient times for curing many ailments such as wounds, diarrhea, Stomach ache & Mouth ulcers. Recent studies proved that tubers are useful for the extraction of the Sterols, Triterpenes, Saponins, carbohydrates etc. Which are the important secondary metabolites (Fernandes *et al*. 2007) [2].

**Materials and Method**

The research project was conducted to study the effect of different Planting dates on the yield of Karchikai under the agro-climatic conditions of northern Karnataka, KRCCH, Arabhavi, Belgaum district. Department of Vegetable Science, University of Horticultural Sciences, Bagalkot. The experiment was laid out in Randomized Complete Block Design (RCBD) having four treatments and with five replication. The plot size was 3.6X2.4 $m^2$. The Tubers were planted on one sides of the raised beds which were three meters apart and plant to plant distance was 45cm and were planted at the depth of 10 cm with a spacing of 60×45 cm. All the other pre planting and post planting cultural practices were carried out including leveling, manuring, weeding, hoeing, irrigation fertilizer in etc. Data regarding the various parameters were recorded and analyzed statistically by using RCBD design.

**Results and Discussion**

**Days to Sprouting:** The data regarding days taken to germination are given in Table 1. The data shows that the maximum number of days 8.48 were taken by June 1st planting followed by July date of planting, which took 12.88 days for germination, whereas the minimum number of days 8.48 were recorded in June 1st planting for germination. These variations observed might be due to the variation in their external factors i.e. environment. Statistically, the planting at August 1stand September 1st showed non-significant variations and thus it discourages the Planting of the crop among any one of these dates. These results corroborated the findings of Farooq (1992) [3] who reported the similar number of days taken to germination in muskmelon (Table1). Maximum Sprouting of 99% was recorded in June 1st planting and was significantly different from all other dates of planting, followed by July 1st date of planting with 72.4% germination. Minimum germination percentage of 47.2% was noted when tubers were planted on September 1st date of planting. Similar results were also reported by Burki (1996) [1]. who stated that maximum germination percentage of tinda seeds were obtained in third week of March.

**Number of days taken to flowering:** The data in Table 1 shows that the results for days taken to flowering were significant. Maximum number of days taken to flowering were recorded in September 1st date of planting while the minimum days of 16.72 were observed in July 1st date of planting. These findings may be due to the change in temperature, because higher temperature (in the month of September) caused the delay in flowering which resulted in poor fruit setting.

Similar findings were also observed by Farooq (1992) [3] in muskmelon.

**Table 1:** Effect of different sowing dates on days to Sprouting, Sprouting percentage and days to flowering of Karchikai

| Treatments | Planting dates | Days to sprouting | | Sprouting percentage | Flowering |
|---|---|---|---|---|---|
| T 1 | June 1st | 8.48 | | 99 | 18.4 |
| T 2 | July 1st | 12.88 | | 72.4 | 16.72 |
| T 3 | August 1st | 18.36 | | 62.8 | 19.2 |
| T 4 | September 1st | 18.32 | | 47.2 | 21 |
| SEm± | | 0.35 | | 1.64 | 0.53 |
| CD @ 5% | | 1.07 | | 5.06 | 0.75 |

**Table 2:** Effect of different planting dates on days to days to maturity, vine length, Fruits per vine, Average fruit weight, Yield per plant and Yield per hectare (kg) of Karchikai

| Treatments | Planting dates | Days to maturity | Vine length (cm) | Fruits per vine | Average Fruit weight (gm) | Yield Per plant (gm) | Yield per hectare (kg) |
|---|---|---|---|---|---|---|---|
| T 1 | June 1st | 28.18 | 89.28 | 16.9 | 65.68 | 35.6 | 501.846 |
| T 2 | July 1st | 30.5 | 76.72 | 15.8 | 44.88 | 29 | 339.994 |
| T 3 | August 1st | 42.1 | 50.14 | 8.9 | 28.24 | 18.56 | 215.426 |
| T 4 | September 1st | 45.3 | 76.72 | 3.2 | 15.76 | 7.76 | 121.6 |
| SEm± | | 0.82 | 3.63 | 0.66 | 1.43 | 1.97 | 9.91 |
| CD @ 5% | | 2.54 | 11.62 | 2.02 | 4.39 | 6.07 | 30.53 |

**Days to maturity of first fruit:** The data pertaining to number of days taken to maturity of first Fruit are presented in Table 2. The difference among the dates of planting with respect of days taken to maturity were highly significant. Maximum number of days (45.33) were taken when the tubers were planted on September 1st, followed by October planting with (42.1) days to maturity. The minimum number of (28.18) days taken to maturity was found in case of June 1st planting. These results corroborated the findings of Burki (1996) [1] who reported the similar number of days taken to maturity of first fruit in Tinda.

**Vine length (cm):** Table 1 shows vine length of Karchikai as affected by different time of planting and was found to be significant. Maximum vine length of 89.28 cm was noted in June 1st planting. Minimum vine length was 50.14 cm observed in august month of planting. Although there is a increase in length of vine in June month of planting, less vine length was observed in August month of planting it is due to climatic conditions like temperature, rainfall etc.

**Number of fruits per vine:** The data regarding the number of fruits per vine is given in Table 2. These treatments had significant differences in number of fruits per vine. The highest number of fruits (16.9) per vine was noted in June 1st planting followed by (15.8) July 1st of planting. Minimum number 3.2 of fruit per vine was observed in September 1st of planting. These observed variation may be due to the

difference in their environment or soil wherein these are planted.

**Average fruit weight (g):** The significant mean values for average fruit weight of Karchikai as affected by different sowing dates are given in Table 2. The maximum fruit weight (65.68g) was recorded in June 1st of planting being significantly different from other treatments. It was followed by July 1st month of planting (44.88g) of fruit weight. Minimum fruit weight of (15.76 g) was observed in October 1st month of planting. However, all the treatments differ significantly from one another. The results of June 1st and July 1st month of planting were significant whereas September and October month were non-significant. Weight of fruit significantly decreased with later date of sowing. It might be due to better development of vines with early planting, which increased the net photosynthesis and production of more assimilates available for individual to grow. The differences in average fruit weight due to planting method were non-significant, however, maximum average fruit weight (756.80 g) was observed in M2. Similar results were also given by Singh *et al*. 1989 [11] in case of summer squash.

**Yield per plant (g):** Results shown in table 2 clearly states that there is a significant increase in yield per plant when the tubers are planted on June 1st (35.6 g) and less number of fruits were found resulting in reduction of yield per plant when tubers are planted late.

**Yield (kg ha$^{-1}$):** The significant data recorded on yield (kg ha$^{-1}$) as affected by different planting dates is being presented in Table 2. Results showed that maximum yield of 501.846 kg ha$^{-1}$ was obtained in June 1st date of planting followed by July 1st date of planting. September 1st date of planting produced significantly lower yield of 121.6 kg ha$^{-1}$ compared to other date of planting.

## Conclusion

Planting dates of underutilized vegetable Karchikai is unknown since it is region and season specific. Moisture content, soil factors and genetic affinities of crops are the main influencing factors that boost growth and yield of crops in a given environment. This study showed that Karchikai plants are very sensitive to extreme condition of rainfall, but moderate rainfall intensity in time and volume as observed in June 1st and July 1st date of planting and though it is region and season specific crop among the four date of planting June 1st is observed the best performance of crop in terms of both growth and yield parameters.

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