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Influence of different cover crops on flowering and fruit set of custard apple (*Annona Squamosa* L.) cv. Balanagar under northern dry zone of Karnataka

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Abstract
A trial conducted to evaluate the influence of different cover crops on flowering and fruit set of custard apple (*Annona squamosa* L.) cv. Balanagar under northern dry zone of Karnataka. Different cover crop treatment includes Mucuna, Dhaincha, Sunhemp, Cowpea, Lucerne, water spray and control (without cover crop) were used as a different treatments. A field experiment was conducted in two seasons 2021 and 2022. In pooled data, among the different cover crop treatments cover crop Sunhemp (T_3) recorded the minimum (33.39) number of days required from flowering to fruit set and flowering to maturity (40.61 days). Days required for initiation of flowering, number of flowers per shoot and number of flowers per plant were found non-significant among the different cover crop treatments. Similarly, maximum (74.10%) pollen viability, maximum (81.50) number of fruits per plant and highest (10.28%) fruit set were recorded in T_3 (Sunhemp). Whereas, maximum (40.61 days and 127.06 days) from flowering to fruit set and flowering to maturity, respectively were recorded in control treatment. Similarly, the minimum pollen viability (56.07%), fruits per plant (52.20) and lesser fruit set (7.78%) were recorded in control treatment.

Keywords: Custard apple, cover crops, sunhemp, dhaincha

1. Introduction
The custard apple (*Annona squamosa* L.) is the most frequently grown fruit in India and probably in the world tropical and subtropical region. It is also known as sugar apple, sweetsop and called by Sharifa in northern India and Sitaphal in southern India. The fruit is made up of loosely cohering carpels forming a squamose or tuberculated surface. Custard apple is India's most significant arid fruit crop among annonaceous fruits. It is well-known for its natural expansion in forests, wastelands, rocky slopes and in uncultivated areas. It is produced on 41000 hectares in India, with an annual yield of 387.26 metric tonnes (Anon, 2021.) [2]. In India, it is grown commercially on smaller scale in Telangana, Bihar, Maharashtra, Madhya Pradesh, Odisha, Gujarat, Andhra Pradesh, Rajasthan, Uttar Pradesh, Assam, Karnataka and Tamil Nadu. Maharashtra stands first in production of custard apple with a total production of 120.88 metric tonnes. In Karnataka, it is grown in an area of 1800 hectare with the production of 13,400 tonnes and productivity of 7.4 tonnes per hectare (Anon, 2021) [2].
Custard apple is one of the most delicious and nutritionally important fruits available for consumption. The pulp of the fruit is edible, soft, granular, juicy and sweet with a mild flavour and minor acidity. Aside from their common usage in ice cream, confectionary and some milk products, fruits are valued for their therapeutic significance. The pulp of Custard apple is mostly consumed as dessert fruits, they can be preserved as jam and jelly. The immature fruits, seeds, leaves and roots are known for their medicinal use in Ayurveda (Pareekh and Sharma, 1993) [14]. Sugar apples include a lot of vitamin C, dietary fibre, vitamin B6, magnesium, potassium, and a little amount of vitamin B2, as well as some complex carbohydrates.
Low productivity in sugar apple is the major hurdle in expand their commercial cultivation (George and Nissen, 2002) [4]. A custard apple plant produces enough blossoms to provide a good harvest but the poor fruit set results in a reduced yield. Under natural circumstances, just one to eight per cent of fruit set has been documented (Thakur and Singh, 1965 and George and Nissen, 1988) [17, 5]. Poor pollination causes less fruit set in custard apple, which has been linked to both external and internal factors such as high and low humidity at flowering, soil moisture stress and competition between vegetative and floral growth, hypogyny, dichogamy,

poor pollen germination and a lack of insect pollinators. Thakur and Singh (1965) [17] found that pollen grains shriveled and sterile when temperature was very high and relative humidity was very low in May and June. Low relative humidity and hot days, according to Hopping (1985) [9], may reduce pollen viability, therefore, fruit set occurs only in rainy season on reversal of environmental conditions. Under dry land condition due to high temperature and low relative humidity, receptivity of stigma and viability of pollen reduced. In southern India, where humidity level is greater and temperature is lesser than northern India, early fruit set occurs.

The cultural practices includes close planting, regular irrigation in summer months, overhead spraying of water and mulching help in enhancing setting of fruits (Ahmed, 1936; Rao, 1974; George and Nissen, 1988) [1, 15, 5]. Air temperature is important as excessively hot condition during critical developmental stages like flowering and fruit set may greatly reduce the crop yield. The peak flowering period of custard apple coincides with the summer season in north India when the temperature goes beyond 40 ^{0}C, humidity is extremely low, desiccating wind is prevalent and the soil is in dry condition. Neither the pollen is produced nor does fruit set occur in this situation (Hayes, 1957; Kumar *et al.*, 1977) [8, 12]. Keeping view on flowering behavior of custard apple plants to improve the flowering and fruit set during summer along with other cultural practices, sowing of cover crops in plant basin one month before flowering helps in creation of microclimate under the canopy by reducing canopy air temperature and increase the canopy relative humidity and conservation of soil moisture during flowering favors better pollination and fruit set. Plants that are cultivated to cover the soil rather than to be harvested are known as cover crops. Given the importance of cover crops in custard apple, the current study, titled "Influence of different cover crops on flowering and fruit set of custard apple (*Annona squamosa* L.) cv. Balanagar under northern dry zone of Karnataka" was undertaken.

2. Material and methods

The experiment was conducted on 12 years old, healthy and vigorous and uniformly grown custard apple trees of cv. Balanagar planted at a spacing of 4.5 x 4.5 m at Horticultural Research and Extension Centre, Vijayapura. Tidagundi. Karnataka located in a Northern dry zone of Karnataka at 16.59' North latitude, 75.45' East longitude and at an altitude of 513 m above mean sea level with an average annual rain fall of about 589 mm. Soil was alkaline with pH range from 7.5 to 8.5 having medium to black in colour. The range of maximum temperature during experiment period was 13.5^{0}C to 38. 5^{0}C and relative humidity varied from 68.26 to 72.6 per cent.

The field experiment was laid out in Randomized Block Design with total seven treatments like T_1 – Mucuna (*Mucuna purines*), T_2 - Dhaincha (*Sesbania bispinosa*), T_3 - Sunhemp (*Crotalaria juncea*), T_4- Cowpea (*Vigna unguiculata*), T_5- Lucerne (*Medicago sativa*), T_6 - Water spray (Evening), T_7- Control (Without cover crops) and three replications with six plants per treatment during the year 2021 and 2022. Before sowing of cover crops, custard apple plants were defoliated manually and removal of dried shoots, slight pruning was done. Cover crops were sown in plant basin at a size of 2.5 X 2.5 square meter, cover crops like Mucuna (130 g/basin), Dhaincha (170 g/basin), Sunhemp (170 g/basin), Cowpea (90 g/basin) and Lucerne (110 g/basin) were sown under the canopies in a plant basin by broadcasting and line sowing irrespective of any spacing. They were sown on 27th January 2021 in first season and 24th January 2022 in second season *ie.*, one month before the flowering of custard apple. After sowing cover crops plant basin was irrigated by flood method (4 - 5 times) later on custard apple plants were irrigated by drip method.

For all the treatments recommended dose of fertilizer 25 tonnes of FYM and 123 kg: 62 kg: 62 kg N: P: K per hectare (250:125:125 g of NPK/plant) is common as per the recommendation suggested by University of Horticultural Sciences, Bagalkot. All the cultural operations like weeding, inter culturing and irrigation were adapted uniformly to all experimental plants. Observations on different reproductive parameters and yield parameters were recorded by the following methods.

2.1 Number of days required for initiation of flower (days)

On each tree, the date when the blossom first became apparent was noted. The average number of days from the date that cover crops were sown until the date that flowers first appeared were counted and recorded as the time needed for flower initiation.

2.2 Number of days required from flowering to fruit set and to maturity

The days taken for flowering to fruit set was recorded by recording the number of days required for the initiation of flowering on each tagged plants and on date of fruit set was recorded on the same tree and average number of days for the flowering to fruit set recorded. On each tagged tree, the date when the blossom first became apparent was noted. Each tagged tree's average number of days from the date of flowers first appeared was counted, and the days needed for blooming to fruit maturity were noted.

2.3 Number of flowers per shoot, per plant and pollen viability

To record the number of flowers per shoot, three shoots were tagged and counted the number of flowers manually and recorded the average number of flowers per shoot and number of flowers per shoot was multiplied with total number of shoots per plant to calculate the number of flowers per plant**.** To assess the pollen viability aceto-carmine test was used (Jalikop and Kumar, 2007) [10].

2.4 Number of fruits per plant and Fruit set (%)

The percentage of fruit set was calculated by dividing the total number of fruits set by total number of flowers per tree and multiplied by 100. The matured fruits were harvested and counted at each harvesting from each tagged plant for observation. The total number of fruits harvested during the entire harvesting period of each is counted as total number of fruits per plant.

3. Results

3.1 Reproductive parameters

The results obtained on reproductive parameters *viz.*, number of days required for initiation of flowering, number of days required from flowering to fruit set, number of days from

flowering to maturity, number of flowers per shoot, number of flowers per plant and pollen viability test (%) during 2021 and 2022 in response to different cover crops sown as a treatment were compiled and presented in Table 1 and 2.

Days required for initiation of flowering in custard apple by the different cover crops treatments was found non-significant in both the season 2021 and 2022 as well as in pooled data. However, in pooled data, the minimum (23.94) number of days required for the initiation of flowering was recorded in the treatment Sunhemp (T_3). While, maximum (25.67 days) was recorded in control treatment.

From the experimental data (Table 1) it was clearly indicated that there was a significant difference among the cover crop treatments with respect to days required from flowering to fruit set and from flowering to maturity in both the season (2021 and 2022) and also in pooled data. In pooled data, number of days required for flowering to fruit set was significantly lower (33.39 days) in T_3 (Sunhemp) and it was statistically on par with T_2 (Dhaincha) (34.56 days) and followed by T_1 (Mucuna), T_4 (cowpea) and T_5 (water spray) (34.94, 35.00 and 39.00 days, respectively.). While, maximum number of days required from flowering to fruit set was recorded in control treatment (40.61 days). Similar trend was noticed during individual years. Minimum (111.94 days) number of days from flowering to maturity was recorded in treatment T_3 (Sunhemp) and it was followed by T_4 (cowpea) (115.11 days). However, more number of days was recorded in T_7 (control) treatment (127.06 days).

The data regarding number of flowers per shoot and plant is presented in Table 2. Total number of flowers per shoot and flowers per plant was not significantly influenced due to the growing of cover crops as a treatment in both the season (2021 and 2022) as well as in pooled data.

In pooled data, the maximum number of flowers per shoot (60.78) was recorded in T_4 (cowpea) and it was followed by T_2 (Dhaincha) (60.76) and least number of flowers per shoot was recorded control treatment (50.17). Maximum (803.02) number of flowers per plant was recorded in the treatment (T_3) Sunhemp and it was followed by T_4 (cowpea) (755.80) and T_2 (Dhaincha) (751.57). While, the least (688.50) number of flowers per plant was recorded in control treatment.

The mean data pertaining to pollen viability (%) is presented in Table 2. Results from the experiment indicated that, pollen viability was significantly influenced by different cover crop treatments during 2021, 2022 as well as in pooled data. In pooled data, treatment Sunhemp as cover crop (T_3) recorded significantly higher (74.10%) pollen viability over the rest of the treatments but it was on par with treatment T_2 (Dhaincha) (69.54%) and it was followed by T_4 (cowpea) and T_1 (Mucuna) which recorded 67.41 and 63.91 per cent, respectively. While, lower pollen viability was recorded in control treatment (56.07%) and it was on par with T_6 (water spray) (59.12%).

Table 1: Days required for initiation of flowering, flowering to fruit set and flowering to maturity of custard apple cv. Balanagar as influenced by different cover crops

Treatments	Days required for initiation of flowering			Days required from flowering to fruit set			Days required from flowering to maturity		
	2021-22	2022-23	Pooled	2021-22	2022-23	Pooled	2021-22	2022-23	Pooled
T_1	24.67	23.56	24.11	36.22 ^{b}	33.67 ^{a}	34.94 ^{b}	121.22^{cb}	113.00 ^{b}	117.11^{c}
T_2	24.56	23.89	24.22	35.22 ^{b}	33.89 ^{ab}	34.56 ^{ab}	122.44 ^{c}	112.00^{ab}	117.22^{c}
T_3	24.44	23.44	23.94	33.89 ^{a}	32.89 ^{a}	33.39 ^{a}	114.00 ^{a}	109.89 ^{a}	111.94^{a}
T_4	26.56	23.78	25.17	36.00 ^{b}	34.00 ^{ab}	35.00 ^{b}	119.44 ^{b}	110.78^{ab}	115.11^{b}
T_5	24.56	24.22	24.39	37.78 ^{c}	35.33 ^{b}	36.56 ^{c}	122.67 ^{c}	118.00 ^{c}	120.33^{d}
T_6	25.22	24.56	24.89	41.11 ^{d}	36.89 ^{c}	39.00 ^{b}	126.78 ^{d}	121.78 ^{d}	124.28^{e}
T_7	26.33	25.00	25.67	42.78 ^{e}	38.44 ^{d}	40.61 ^{e}	129.78 ^{e}	124.33 ^{d}	127.06^{f}
S.Em±	1.01	0.34	0.57	0.44	0.48	0.42	0.92	0.90	0.44
CD at 5%	NS	NS	NS	1.36	1.49	1.30	2.85	2.76	1.36

Note: T_1 – Mucuna (*Mucuna purines*), T_2 - Dhaincha (*Sesbania bispinosa*), T_3 - Sunhemp (*Crotalaria juncea*) T_4- Cowpea (*Vigna unguiculata*) T_5- Lucerne (*Medicago sativa*), T_6 - Water spray (evening), T_7- Control (RDF + without cover crops) *NS – non significant

Table 2: Number of flowers per shoot, number of flowers per plant and pollen viability of custard apple cv. Balanagar as influenced by different cover crops

Treatments	Number of flowers/shoot			Number of flowers per plant			Pollen viability (%)		
	2021-22	2022-23	Pooled	2021-22	2022-23	Pooled	2021-22	2022-23	Pooled
T_1	60.22	54.96	57.59	806.52	659.56	733.04	63.53 ^{cd}	64.28 ^{b}	63.91 ^{b}
T_2	64.56	56.96	60.76	819.59	683.56	751.57	67.77 ^{b}	71.31 ^{a}	69.54 ^{a}
T_3	59.78	58.30	59.04	906.48	699.56	803.02	74.19 ^{a}	74.00 ^{a}	74.10 ^{a}
T_4	63.07	58.48	60.78	809.81	701.78	755.80	64.13 ^{c}	70.69 ^{bc}	67.41 ^{b}
T_5	57.52	55.04	56.28	833.44	660.44	746.94	60.84 ^{cd}	63.25 ^{bcd}	62.04^{bc}
T_6	55.04	52.93	53.98	781.67	635.11	708.39	59.17 ^{de}	59.07 ^{cd}	59.12^{cd}
T_7	50.15	50.19	50.17	774.78	602.22	688.50	56.35 ^{e}	55.78 ^{d}	56.07 ^{d}
S.Em±	4.37	2.09	2.70	29.33	25.14	23.45	2.89	1.13	1.53
CD at 5%	NS	NS	NS	NS	NS	NS	8.92	3.48	4.71

Note: T_1 - Mucuna (*Mucuna purines*), T_2 - Dhaincha (*Sesbania bispinosa*), T_3 - Sunhemp (*Crotalaria juncea*) T_4- Cowpea (*Vigna unguiculata*) T_5- Lucerne (*Medicago sativa*), T_6 - Water spray (evening), T_7- Control (RDF + without cover crops)

3.2 Number of fruits per plant and fruits set (%)

The effect of different cover crops on number of fruits per plant and fruit set is presented in Table 3. The result clearly indicated that cover crops treatments significantly influenced the number of fruits per plant and fruit set in both the season (2021 and 2022) and also in pooled data.

It is obvious from the pooled data, the maximum (81.50) number of fruits per plant were recorded in the treatment (T_3)

Sunhemp, it was followed by T_2 Dhaincha (73.67) and it remained at par with the treatment (T_4) cowpea (71.60). While, the minimum number of fruits per tree (52.20) was recorded in the treatment T_7 (control) and followed by T_6 water spray (58.73). Pooled data clearly indicated that, maximum (10. 28%) fruit set was recorded in the treatment (T_3) Sunhemp and it was statistically on par with T_2 (9.98%) and T_4 (9.52%). While, minimum fruit set (7.78%) was recorded in the control treatment.

Table 3: Number of fruits per plant and fruit set (%) of custar influenced by different cover crops d apple cv. Balanagar as

Treatments	Number of fruits per plant			Fruit set (%)		
	2021-22	2022-23	Pooled	2021-22	2022-23	Pooled
T_1	61.87^{d}	66.93^{cd}	64.40^{c}	8.31^{ab}	9.42^{bc}	8.87^{cd}
T_2	72.20^{b}	75.13^{b}	73.67^{b}	9.23^{a}	10.72^{ab}	9.98^{ab}
T_3	78.20^{a}	84.80^{a}	81.50^{a}	9.36^{a}	11.21^{a}	10.28^{a}
T_4	69.33^{bc}	73.87^{bc}	71.60^{b}	9.15^{a}	9.89^{abc}	9.52^{abc}
T_5	65.27^{cd}	68.73^{bc}	67.00^{c}	8.25^{ab}	10.06^{abc}	9.15^{bcd}
T_6	56.93^{e}	60.53^{d}	58.73^{d}	7.75^{bc}	9.01^{c}	8.38^{de}
T_7	53.33^{e}	51.07^{e}	52.20^{e}	6.60^{c}	8.96^{c}	7.78^{e}
S.Em±	1.53	2.43	1.31	0.40	0.48	0.35
CD at 5%	4.72	7.49	4.04	1.23	1.46	1.07

Note: T_1 - Mucuna (*Mucuna purines*), T_2 - Dhaincha (*Sesbania bispinosa*), T_3 - Sunhemp (*Crotalaria juncea*) T_4- Cowpea (*Vigna unguiculata*) T_5- Lucerne (*Medicago sativa*), T_6 - Water spray (evening), T_7- Control (RDF + without cover crops)

4. Discussion

Custard apple flowering takes place over a lengthy period of time, which in March-April and continues until July-August. Flowering is at its maximum in the months of April and May. Fruit set does not occur throughout the spring and summer months, and it only begins during the rainy season. It is mainly due to increase in temperature and decrease in relative humidity during summer month (March- April) and there will be shortage of soil moisture for growth and development, hot shriveling winds has deleterious effect on flowers and reduces the fruit set and development. Productivity of custard apple in the field may be improved by cultural practices like overhead misting, windbreaks, efficient irrigation schedule and proper nutrient management. Hence, in the present study five cover crops were evaluated under custard apple *viz.*, Mucuna, Dhaincha, Sunhemp, Cowpea, Lucerne along with water spray (evening) and control treatment to create a microclimate by reducing the temperature and increasing canopy relative humidity to increase fruit set and yield of custard apple cv. Balanagar.

4.1 Reproductive parameters

Number of days required for the initiation of flowering was found non-significant among the different cover crop treatments. Whereas, days required from flowering to fruit set and flowering to maturity was minimum in cover crop treatments than compare to control. Among the different cover crops, cover crop Sunhemp and Dhaincha recorded the minimum number of days required from flowering to fruit set and flowering to maturity**.**

The decrease in number of days required from flowering to fruit set and flowering to maturity under cover crop treatments is might be due to creation of micro climate by growing of cover crops (Sunhemp) in plant basin reduces the average canopy temperature (1- 1.2 ^{0}C) and as well as they increases canopy relative humidity (3 to 4%) (Fig 6 and 7) than compare to the control treatment. These results are in agreement with the findings of Gulave and Joshi (2017) [7] in custard apple cv. Balanagar under Maharashtra condition and also Sanewski (1988) [16] who reported that decrease in temperature and increase in relative humidity helps in better fruit set. Conservation of more moisture in the soil by cover crops during the flowering period maintains high stigmatic receptivity which helps in better pollination and early fruit set. The present results are in conformity with the findings of George *et al*. (1995) [6] that applications of light irrigation in the late afternoon using wide throw mini sprinklers will helping for opening of and flowers, maintain their stigma receptivity until the following morning.

In pooled data, the highest number of flowers per plant was recorded in the treatment (T_3) Sunhemp and least number of flowers per plant was recorded in control treatment. An increase in number of flowers per plant under different cover crops is due to increase in vegetative growth caused by conservation of soil moisture and fixation of nitrogen in the soil. Similar results have been reported by Aziz *et al.* (2008) [3] in Valencia orange by growing of green manures and Gulave and Joshi (2017) [7] in custard apple cv. Balanagar under Maharashtra condition.

With respect to pollen viability, maximum pollen viability was recorded in treatment (T_3) Sunhemp and it was statistically on par with treatment T_2 (Dhaincha). While, lowest was recorded in control treatment. (T_3) Sunhemp produced significantly higher pollen viability (74.10%) which was 24. 4 per cent higher over control treatment. An increase in pollen viability under different cover crops treatments compared to control treatment is might be due to conservation of more moisture in the soil by cover crops during the flowering period maintains high stigmatic receptivity for a longer period and also as per the weather data (Fig 1 and 2) there was a decrease in canopy temperature (1.42 ^{0}C) and as well as they increases canopy relative humidity (3.2%) maintains the high pollen viability in cover crops (Sunhemp) treatments than compare to control treatment. The present study results are in conformity with the findings of Gulave and Joshi (2017) [7] in custard apple cv. Balanagar under Maharashtra condition, George *et al*. (1995) [6] in custard apple and Khalate *et al*. (2018) [11] in custard apple.

4.2 Number of fruits per plant and Fruit set (%)

The maximum number of fruits per plant and fruit set (%) was recorded T_3 (Sunhemp) and followed by T_2 (Dhaincha) and T_4 (Cowpea). Whereas, minimum number of fruits per plant and fruit set (%) was recorded in control treatment.

The increase in number of fruits per plant might be due to increase in number of flowers per plant due to increase in

vegetative growth by the cover crops. As per the weather data there was a decrease in canopy air temperature in cover crop Sunhemp at an average of 1-1.5 ^{0}C and as well as they increases canopy relative humidity (3-4%) during the flowering period by the different cover crops creates a micro climate helps in better fruit set and increases the number of fruits per plant. The results are more or less in conformity with findings of Gulave and Joshi (2017) [7] in custard apple cv. Balanagar under Maharashtra condition, George *et al.* (1995) [6] in custard apple and Khalate *et al.* (2018) [11] in custard apple. The current results are in agreement with those of George *et al.* (1995) [6], who reported that the productivity of custard apple in the field could be improved by techniques which raise relative humidity (RH), such as the use of windbreaks and overhead intermittent misting.

The increase in fruit set by the different cover crop treatments like Sunhemp (T_3), T_4 (cowpea) and Lucerne (T_5) and Mucuna (T_1) might be due to the cover crops have the advantages not only to increase water-holding capacity (WHC) but also to modify the microclimate under the tree canopy. These beneficial effects of cover crops reduce the tree stress by abiotic stress which helps in better fruit set percentage and reduce the fruit drop percentage.

According to results on pollen viability the highest pollen viable percentage was recorded in cover crops treatments than compared to control treatments. In cover crop treated plants stigma receptivity must have remained for longer duration under high humidity conditions, providing opportunities for higher level of pollination and fruit set. High temperature and low humidity has the opposite effect. That is clearly indicated that increase in pollen viability under cover crops treatments helps in fruit set. The results are accordance with the findings of Gulave and Joshi (2017) [7] in custard apple cv. Balanagar under Maharashtra condition, George *et al.*, (1995) [6] in custard apple, Khalate *et al.*, (2018) [11] in custard apple, Mulinge *et al.*, (2018) [13] in sweet orange and Aziz *et al.*, (2008) [3] in Valencia orange.

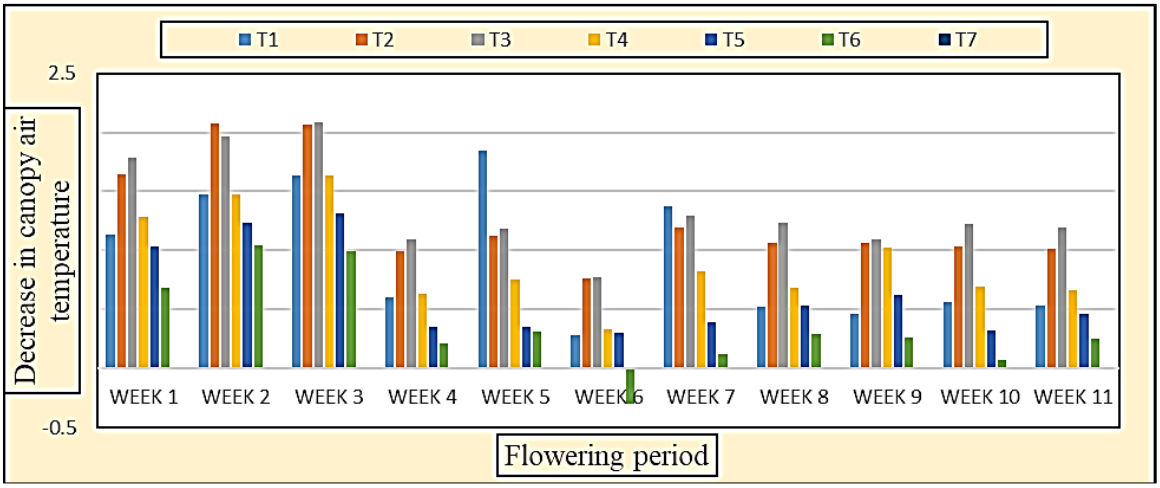

Fig 1: Per cent variation in canopy temperature (^{0}C) in custard apple cv. Balanagar as influenced by different cover crops compare to control during flowering period (Feb 12- April 29) of 2021 and 2022 (Week 7 to 11 – standard metrological weeks)

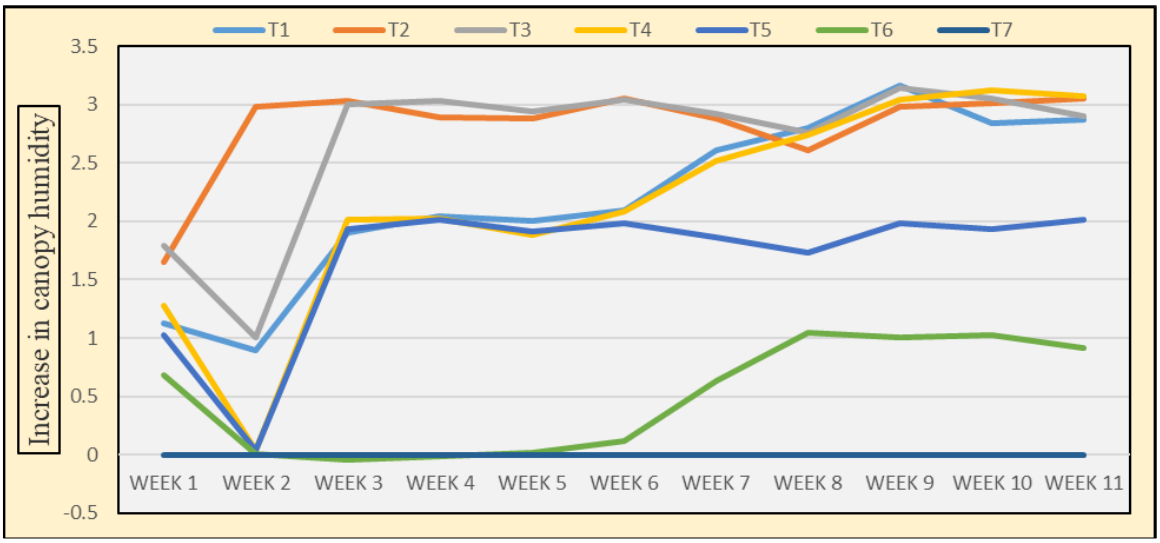

Fig 2: Per cent variation in canopy relative humidity (%) in custard apple cv. Balanagar as influenced by different cover crops compare to control during flowering period (Feb 12- April 29) of 2021 and 2022 (Week 7 to 11 – standard metrological weeks)

5. Conclusion

Custard apple is dry land fruit crop its flowering commences from February to March and end up to June – July. Although it flowering commences in summer and spring no fruit set occurs naturally. Hence, sowing of cover crops like Sunhemp, Dhaincha and cowpea along proper inter cultural operations,

recommended dose of fertilizer and proper irrigation schedule we can induce early flowering and fruit set in custard apple. These cover crops helps in conservation of soil moisture during flowering period, maintains the stigmatic receptivity for a longer period and avoids nutrient loss through leaching. Growing of cover crops in a plant basin helps in creation of microclimate by reducing canopy air temperature and increasing canopy relative humidity favors better pollination and fruit set. By adopting all these practices we can get the fruits during off season and get higher prize in the Market.

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