STUDIES ON GRADED LEVELS OF NPK ON GROWTH AND YIELD OF PARTHENOCARPIC CUCUMBER (*Cucumis sativus* L.) UNDER NATURALLY VENTILATED POLYHOUSE CONDITION.

ABSTRACT

The present investigation entitled "Studies on graded levels of NPK on growth, yield and quality of parthenocarpic cucumber (*Cucumis sativus* L.) under naturally ventilated polyhouse condition" during Winter season of year, 2022 at A field experiment was conducted at College of Agriculture, Ambajogai. The experiment was layout in RBD with three replications and recommended variety of – Parthenocarpic cucumber as a test crop along with nine treatments. The graded level of NPK applied in parthenocarpic Cucumber (Cucumis sativus l.) under naturally ventilated polyhouse condition. The results in nutshell indicated that the growth, yield, quality, nutrient availability, nutrient uptake were significantly influenced by application of 125% NPK RDF of cucumber crop. The growth parameters viz., plant height 74.44, 99.18, 131, 153 and 194.58 cm at 30 DAT, 45 DAT, 60 DAT, 75 DAT and 90 DAT, Number of primary branches 8.24, 10.96, 15.40, 17.60 and 20.02 at 30 DAT, 45 DAT, 60 DAT, 75 DAT and 90 DAT, leaf area 163, 242.33, 307, 387.33 and 492.33 cm^2 30 DAT, 45 DAT, 60 DAT, 75 DAT and 90 DAT, internodal distance, fruit length, fruit weight, fruit diameter, dry matter content, chlorophyll – a, chlorophyll – b and total chlorophyll content, number of leaves significantly increased with application of 125 % RDF with 7 days of intervals. Significantly higher number of fruits $plant^{-1}$, number of primary branches, fruit yield $plot^{-1}$, Leaf area and fruit yield ha^{-1} , with application of 125 % RDF with 7 days of intervals. The improvement in quality parameters were recorded with application of 125 % RDF with 7 days of intervals. followed by treatments T_6, T_7, (100 % RDF with 2 and 7 days of intervals upto 90 DAT) and T_8 (125% of RDF 2 days of interval up to 90 DAT)

Keywords: Cucumber, Parthenocarpic, RDF, NPK

Introduction

Global vegetable production of 956 million tonnes has grown by 56 percent in the last decade. Asia cultivates by far the most vegetables in the world and has also shown the strongest growth over the last decade. The total area of protected cultivation in India is approx 30,000 ha. Contributes 0.23% of the total area under the horticulture crop cultivation in India at and of the 11th five-year plan (Shweta *et al*. 2014). The total area of cucumber growing In India is 78,000 hectares with an annual production of 11.42 lakh MT (National

Horticulture Board 2016-17). The cucumber (*Cucumis sativus* L.) is one of the most important greenhouse vegetable crops of the cucurbitaceous family and has a chromosome number, 2n = 14. As a vegetable crop parthenocarpic cucumber has great economic importance.

The immature fruit of cucumber is used as salad and for making pickles, paharirayata and brined on a commercial scale. The root system consists of the main root which branches out into very fine secondary roots which are white in colour. the main stem is angular and thorny, with nodes at the point where thorns and leaves developed. Secondary shoots are from each leaves axle. The flowers are yellow in colour. The fruits of cucumbers possess various medicinal properties e. g. cooling effect, prevention of constipation, checks jaundice and indigestion. Cucumber is a very low-calorie vegetable, providing only 15 calories 100 per g, it contains a high content of water which makes cucumber an ideal food for hydration and cooling. This is a very good source of potassium, vitamin K and other special antioxidants that are essential for the human body's brain, heart and urinary system (Sikarwar, 2016). Cucumber contains 0.6 g protein, 2.6 g carbohydrate, 12 cal energy, 18 mg Ca, 0.2 mg Fe, 0.02 mg thiamine, 0.02 mg riboflavin, 0.01 mg niacin and 10 mg vitamin C per 100 g of edible portion (Rashid 1999). Parthenocarpic and gynoecious cucumber cultivars increase the potential to yield high fruit load in controlled environments resulting in a high harvest index.

The yield of cucumber is influenced by several factors including the optimum nutrition of the crop. Cucumber is the fourth most important sole vegetable crop after tomato, cabbage and onion in Asia. the second most important vegetable after tomato in 2 Western Europe Cucumber is a thermophilic and frost-susceptible crop, growing best at temperature above 20^0C Growing of high-value vegetables like cucumber in the greenhouse has been reported to give high yield and good quality produce in developed countries. Hence there is a need to standardize the integrated nutrient management practices for cucumber growing under low-cost greenhouses to increase productivity under indian conditions (Anjanappa *et al*. 2012).

Materials and Methods

A field experiment entitled “Studies on graded levels of NPK on growth, yield and quality of parthenocarpic cucumber (*Cucumis sativus* L.) Under naturally ventilated polyhouse condition” was conducted in Research field of the College of Agriculture, Ambajogai. during 2021-2022. The details of the material used and the techniques employed

in the experiment are given in this chapter. The total geographical area of Beed district is 10.69 mha. Geographically Beed district comes under Maharashtra state which is located between 18.72^0 05' to 18^0 75' North. The soils of Beed district belongs to order Vertisols, Inceptisol and Entisol derived from Deccan trap. RDF (100: 50: 50 kg NPK ha) was supplied through water soluble fertilizer as 0:52.34, and 13:00:45.

The composite soil sample before sowing was taken for their initial values. The soil pH (7.23) and EC (1.04 dSm^{-1}) were analyzed using soil:water suspension (1:2.5) and determined by potentiometric method and Conductivity meter method (Jakson, 1973), respectively, The soil was also carried for organic carbon (0.30%) by Walkley and Black (1934) method, available N (198.2 kg ha^{-1}) determined by alkaline $KMnO_4$ as described by Subbiah and Asija (1956), available P (16.23 kg ha^{-1}) by Olsen's method as described by Jackson (1973), and available K (275.5 kg ha^{-1}) by using Flame photometer as described by Piper (1966). The experiment was laid out in factorial randomized block design with two factors *viz.* At the time of bed preparation, 5 qt FYM was applied to experimental plots uniformly. Cucumber plants were fertigated on day of 2 days intervals and seven days intervals of treatments and one-hour were irrigation applied through drip irrigation. Water soluble fertilizers viz, 0:52.34, and 13:00:45 will be applied treatment-wise as soil application according to RDF of cucumber crop at 2 days and 7 days of intervals up to 90 DAT.

Results and discussion

The effect of graded levels of NPK on growth of parthenocarpic cucumber under naturally ventilated polyhouse condition.

The data related to different vegetative parameters viz., vine length, stem girth, leaf area, internodal distance and number of primary branches as influenced by application of graded level of NPK with certain parameters.

1. Vine length

It was observed that the average length of the vine was significantly influenced by different fertigation treatments at various growth stages. The highest vine length 74.44, 99.18, 131, 153.76 and 194.58 cm at 30, 45, 60, 75, and 90 DAT was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) respectively. Which was at par with treatments T6, T7 and T8. The lowest average vine length 42.10, 66.53, 89.40, 111.36 and 124.13 cm at 30, 45, 60, 75, and 90 DAT respectively was observed in treatment T_1 (control).

Shown in the table no 1.The increased vine length of cucumber might be due to microclimate conditions inside the polyhouse and application of organic and inorganic fertilizers along with increased nutrient availability to plants, their better absorption and translocation more quickly by plants as compared to a single source or lower amount of nutrients.

Organic manures are rich sources of both macro and micronutrients and when applied with biofertilizers, enhance the environmental nitrogen fixation and also increase humus forming microbes which has a positive effect on vine length. these findings are by Singh *et al.* (2017) who reported that the application of 25 percent FYM + 25 percent Poultry manure + 25 percent VC + 25 percent NPK was recorded highest vine length of cucumber under protected cultivation. Similarly, Anjanappa *et al*. (2012) reported that increased vine length could be attributed to the positive response of cucumber to the INM and prevailing environmental conditions in a greenhouse. Similar findings have also been reported by Mohan *et al*. (2016) in cucumber under polyhouse conditions.

Table 1: **Effect of graded level of NPK on Vine length (cm) of parthenocarpic cucumber**

Treatments	Vine length (cm)				
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
T1 Control	42.10	66.53	89.40	111.36	124.13
T2 50% RDF at 2 days interval upto 90 DAT	61.53	78.45	108.62	139.21	167.86
T3 50% RDF at 7 days interval upto 90 DAT	62.12	82.03	112.77	140.33	174.45
T4 75% RDF at 2 days interval upto 90 DAT	64.59	83.56	115.96	143.19	177.05
T5 75% RDF at 7 days interval upto 90 DAT	66.89	84.36	117.33	144.71	180.85
T6 100% RDF at 2 days interval upto 90 DAT	70.21	94.70	125.71	148.68	188.51
T7 100% RDF at 7 days interval upto 90 DAT	71.96	95.80	126.78	149.11	189.41

T8 125% RDF at 2 days interval upto 90 DAT	73.75	98.40	129.04	151.55	192.21
T9 125% RDF at 7 days interval upto 90 DAT	74.44	99.18	131.00	153.76	194.58
S. E ±	**1.21**	**1.95**	**1.51**	**2.42**	**2.35**
C. D @ 5 %	**3.62**	**5.83**	**4.53**	**7.27**	**7.05**

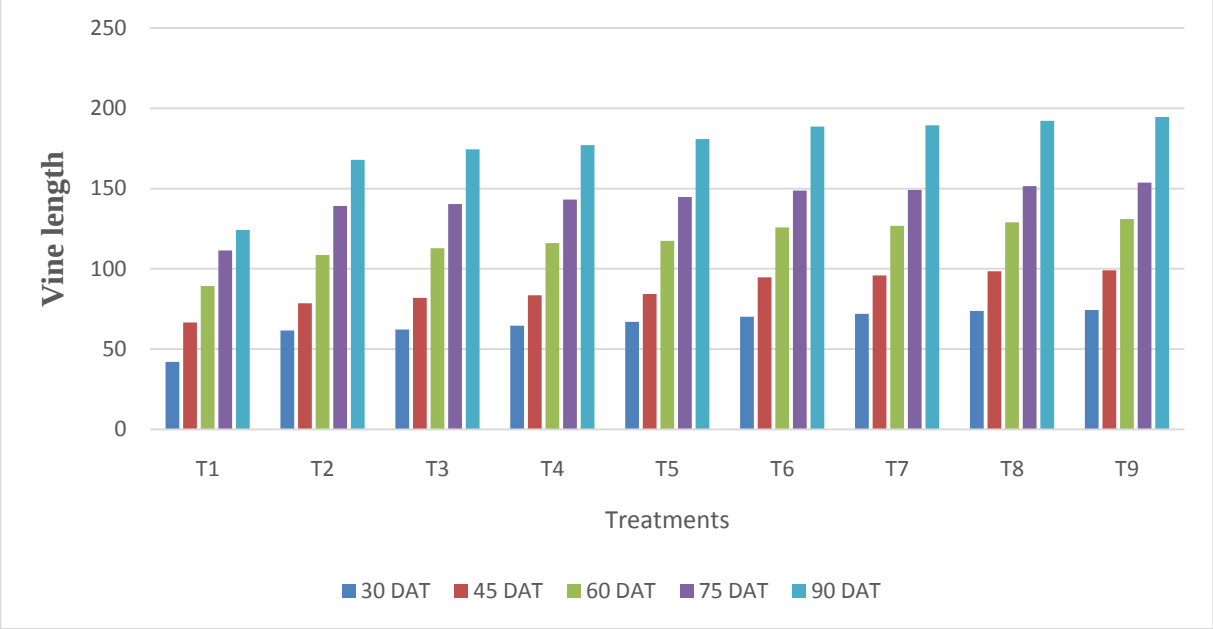

Fig 1: **Effect of graded level of NPK on Vine length (cm) of parthenocarpic cucumber**

Leaf area

The data related to leaf area as influenced by the application of graded levels of NPK at different growth stages is represented in table no.2 and figure 2. It was observed that the average leaf area was significantly influenced by different fertigation treatments at various growth stages. The highest leaf area 163, 242.33, 307, 387.30, and 492.34 cm^2 at 30, 45, 60, 75, and 90 DAT respectively was observed in treatment T_9 (125% RDF at 7 days interval upto 90 DAT) which was at par with treatment T_6, T_7 and T_8. The lowest average leaf area of 131.33, 155, 193.32, 241 and 286 cm^2 at 30, 45, 60, 75, and 90 DAT respectively was observed in treatment T_1 (control). Ahamad *et. al.*, (2015) also revealed that the application of organic manure, chemical fertilizers and fluorescens separately and in combination significantly enhanced the growth-related attributes of cucumber.

Table 2 : **Effect of graded level of NPK on Leaf area (cm^2) of parthenocarpic cucumber**

Treatments	Leaf area (cm^2)

	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
T1 Control	131.33	155.00	193.33	241.00	286.00
T2 50% RDF at 2 days interval upto 90 DAT	141.33	213.33	280.00	369.33	451.33
T3 50% RDF at 7 days interval upto 90 DAT	143.67	218.67	285.33	371.33	454.33
T4 75% RDF at 2 days interval upto 90 DAT	146.00	222.67	292.67	374.33	464.33
T5 75% RDF at 7 days interval upto 90 DAT	149.33	228.00	294.33	376.33	468.67
T6 100% RDF at 2 days interval upto 90 DAT	158.33	236.00	298.67	381.67	486.00
T7 100% RDF at 7 days interval upto 90 DAT	159.67	237.00	299.33	383.33	487.00
T8 125% RDF at 2 days interval upto 90 DAT	161.33	240.00	305.33	385.67	490.67
T9 125% RDF at 7 days interval upto 90 DAT	163.00	242.33	307.00	387.33	492.33
S. E ±	**3.16**	**3.05**	**3.35**	**3.13**	**3.69**
C. D @ 5 %	**9.48**	**9.13**	**10.04**	**9.38**	**11.06**

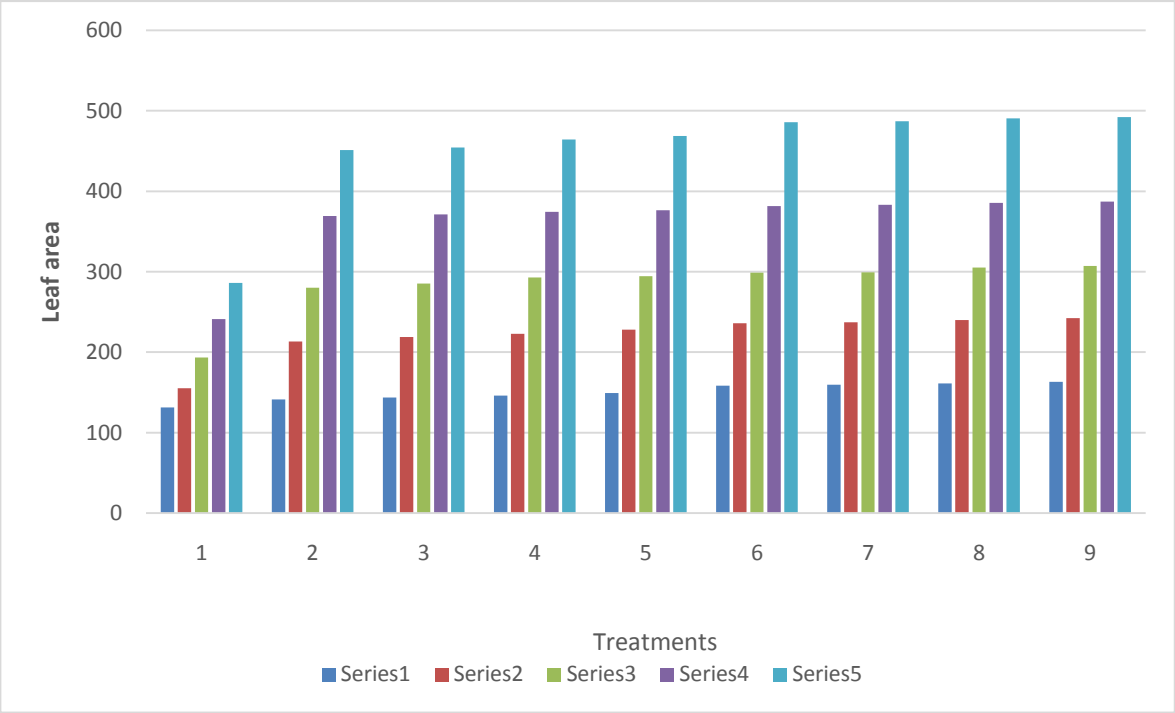

Fig 2 : **Effect of graded level of NPK on Leaf area of parthenocarpic cucumber**

2. Internodal distance

The data on internodal distance as influenced by the application of graded levels of NPK at different growth stages is represented in table no. 3 and figure 3. It was observed that the average internodal distance was significantly influenced by different fertigation treatments at various growth stages. The highest internodal distance of 4.97, 5.34, 6.78, 8.56 and 9.70 cm at 30, 45, 60, 75, and 90 DAT was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) respectively. which was at par with treatments T_6, T_7 and T_8. The lowest average internodal distance of 1.98, 2.29, 3.12, 4.30 and 5.12 cm at 30, 45, 60, 75, and 90 DAT was observed in treatment T_1 (control). The parthenocarpic cucumber cultivar bears fruits at almost every node. Therefore, plants with less internode distance produce a higher number of nodes per plant which is desirable to get higher fruit yield. Similar findings earlier reported by Bhoopendra *et al.* (2019).

Table 3: **Effect of graded level of NPK on internodal distance (cm) of parthenocarpic cucumber**

Treatments	Internodal distance (cm)				
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
T1 Control	1.98	2.29	3.12	4.30	5.12
T2 50% RDF at 2 days interval upto 90 DAT	2.15	2.86	3.68	5.20	5.89
T3 50% RDF at 7 days interval upto 90 DAT	2.60	2.80	2.98	4.49	6.39
T4 75% RDF at 2 days interval upto 90 DAT	3.27	3.18	3.68	4.96	6.79
T5 75% RDF at 7 days interval upto 90 DAT	3.56	3.89	4.58	5.45	7.48
T6 100% RDF at 2 days interval upto 90 DAT	3.78	3.97	4.75	6.35	7.89
T7 100% RDF at 7 days interval upto 90 DAT	4.56	4.78	5.12	7.45	7.95
T8 125% RDF at 2 days interval upto 90 DAT	4.86	4.96	6.19	7.92	8.89
T9 125% RDF at 7 days interval upto 90 DAT	4.97	5.34	6.78	8.56	9.70
S. E ±	**0.43**	**0.59**	**0.73**	**0.79**	**0.61**
C. D @ 5 %	**1.28**	**1.78**	**2.18**	**2.37**	**1.84**

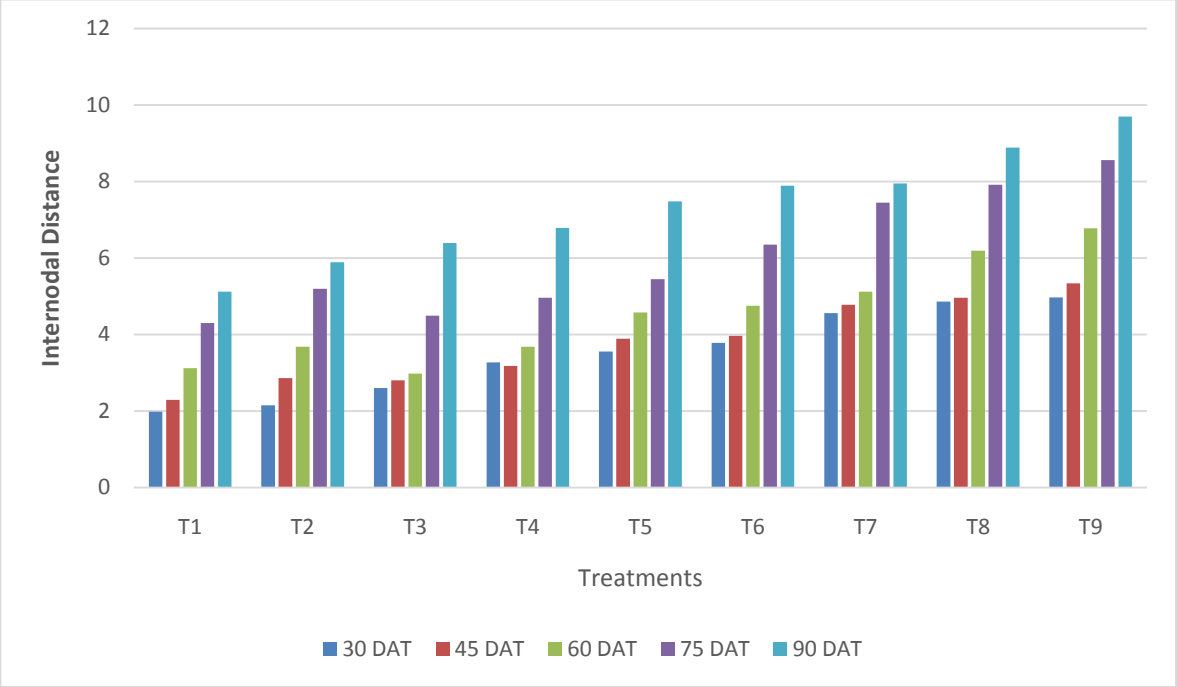

Fig 3: **Effect of graded level of NPK on Internodal Distance of parthenocarpic cucumber.**

3. Number of primary branches

The data resulting on primary branches as influenced by the application of graded levels of NPK at different growth stages is represented in table no. 4 and figure 4 It was observed that the average primary branches were significantly influenced by different fertigation treatments at various growth stages. The highest primary branches 8.24, 10.96, 15.40, 17.60 and 20.02 at 30, 45, 60, 75, and 90 DAT respectively was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) which was at par with treatment T_6, T_7 and T_8. The lowest average primary branches 2.70, 3.34, 6.38, 7.41 and 9.46 at 30, 45, 60, 75, and 90 DAT respectively were observed in treatment T_1 (control).

The variation in the number of branches might have been due to the number of nodes in the vine because branches rise from the nodes of the vine. The significant growth concerning fertilizer doses and fertilizer treatments. Similar were also found by Eifediyi and Remison (2010). Tekale *et al.* (2014).

Table 4 : **Effect of graded level of NPK on Primary branches of parthenocarpic cucumber**

Treatments	Primary branches				
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT

T1 Control	2.70	3.34	6.38	7.41	9.46
T2 50% RDF at 2 days interval upto 90 DAT	4.85	7.50	10.34	11.37	13.41
T3 50% RDF at 7 days interval upto 90 DAT	4.93	7.59	10.43	11.53	14.58
T4 75% RDF at 2 days interval upto 90 DAT	5.70	8.25	11.29	12.20	15.38
T5 75% RDF at 7 days interval upto 90 DAT	5.75	8.86	11.46	12.52	16.34
T6 100% RDF at 2 days interval upto 90 DAT	6.52	9.52	13.93	15.64	18.37
T7 100% RDF at 7 days interval upto 90 DAT	6.84	9.83	13.95	15.44	18.74
T8 125% RDF at 2 days interval upto 90 DAT	7.17	10.40	14.40	16.23	19.19
T9 125% RDF at 7 days interval upto 90 DAT	8.24	10.96	15.40	17.60	20.02
S. E ±	**0.51**	**0.63**	**0.61**	**0.68**	**0.57**
C. D @ 5 %	**1.52**	**1.88**	**1.84**	**2.04**	**1.72**

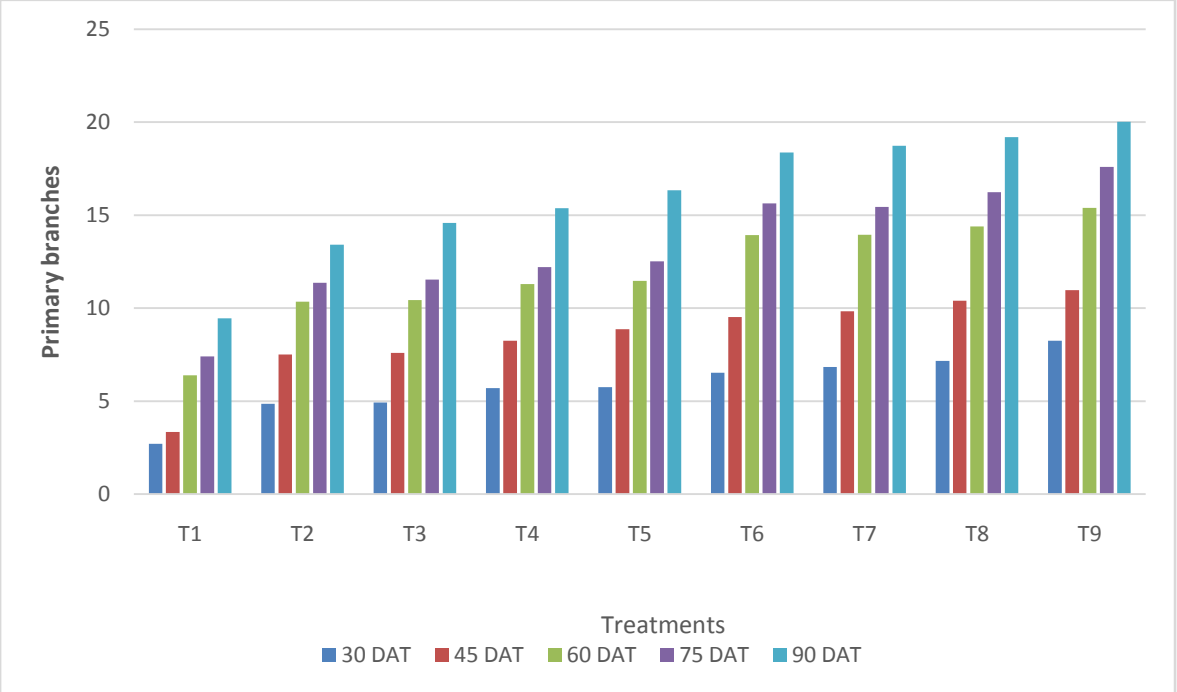

Fig 4: **Effect of graded level of NPK on Primary branches of parthenocarpic cucumber**

Fruit length

The data regarding fruit length as influenced by the application of graded levels of NPK at different growth stages is represented in table no.5 and figure 5 It was observed that the average fruit length was significantly influenced by different fertigation treatments at various growth stages. The highest fruit length was observed in treatment T_9 (125% RDF at 7

days interval upto 90 DAT) 19.01 cm at harvest. which was at par with treatments T_6, T_7 and T_8. The lowest average fruit length 7.46 cm at harvest was observed in treatment T_1 (control).

The increased fruit length might be due to favourable conditions inside the polyhouse and graded level application of nutrients which perhaps helped in the synthesis of a greater amount of food material and translocated to developing fruit whereas higher accessibility of nutrients due to chemical fertilizers and organic manures helped in higher protein synthesis resulted in increased fruit length of the parthenocarpic cucumber. Similarly, they revealed that the application of chemical fertilizers and vermicompost along with biofertilizers significantly increased the fruit length and fruit diameter of cucumber.Similar trends were also observed by Singh *et al.* (2017).

Table. 5: Effect of graded level of NPK on fruit length, fruit weight and fruit diameter (cm) at harvest of parthenocarpic cucumber

Treatments	Fruit length (cm), fruit weight (gm), fruit diameter (cm)		
	Fruit length (cm)	Fruit weight (gm)	Fruit Diameter (cm)
T1 Control	7.46	72.81	5.78
T2 50% RDF at 2 days interval upto 90 DAT	10.56	122.82	7.41
T3 50% RDF at 7 days interval upto 90 DAT	12.51	125.22	8.19
T4 75% RDF at 2 days interval upto 90 DAT	13.81	128.85	8.87
T5 75% RDF at 7 days interval upto 90 DAT	15.63	130.10	9.19
T6 100% RDF at 2 days interval upto 90 DAT	17.50	133.46	11.15
T7 100% RDF at 7 days interval upto 90 DAT	17.81	136.23	11.30
T8 125% RDF at 2 days interval upto 90 DAT	18.17	138.66	11.48
T9 125% RDF at 7 days interval upto 90 DAT	19.01	140.76	12.34
S. E ±	**0.51**	**2.69**	**0.42**
C. D @ 5 %	**1.51**	**8.06**	**1.26**

4. Fruit diameter

The data resulting in fruit diameter as influenced by the application of graded levels of NPK at different growth stages is represented in table no. 5 and figure 5. It was observed that the average fruit diameter was significantly influenced by different fertigation treatments at various growth stages. The highest fruit diameter was observed in treatment T_9 (125% RDF at 7- day intervals upto 90 DAT) 12.34 cm at harvest, which was at par with treatments T_6, T_7 and T_8. The lowest average fruit diameter 5.78 cm at harvest was observed in treatment T_1 (control).

The increased fruit diameter might be due to favourable microclimate conditions inside the polyhouse and integrated application of nutrients which perhaps helped in the synthesis of a greater amount of food material and translocated to developing fruit whereas higher accessibility of nutrients due to chemical fertilizers and organic manures helped in higher protein synthesis resulted in increased fruit length and fruit diameter of cucumber. The findings of Kanujia and Daniel (2016) are in conformity with these results was also reported that maximum fruit length and diameter was observed with the application of 50 percent NPK + 5 tonne VC + biofertilizers in cucumber.

5. Fruit weight

The data regarding fruit weight by application of graded levels of NPK at different growth stages is represented in table no. 5 and figure 5. It was observed that the average fruit weight was significantly influenced by different fertigation treatments at various growth stages. The highest fruit weight was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) 140.76 gm at harvest, which was at par with treatments T_6, T_7 and T_8. The lowest average fruit weight 72.8 gm at harvest was observed in treatment T_1 (control).

Increased fruit weight might be due to the maximum uptake of nutrients due to the influence of fertilizers along with organic and inorganic fertilizers under polyhouse conditions which provided favourable conditions for better absorption and translocation of nutrients. the application of organic and inorganic fertilizers which increased phosphorus levels which perhaps resulted in the proper formation of nucleic acid and cell division increased the fruit weight and the C:N ratio in a balanced manner might have increased the carbohydrate synthesis which ultimately enhanced the fruit weight. similar findings were also reported by Prabhu *et al.* (2006).

Yield parameters

The data relating to different yield parameters of parthenocarpic cucumber number of fruits per plant, fruit yield per plant, fruit yield per plot, and fruit yield tone per hector as influenced by the application of graded level of NPK with certain parameters.

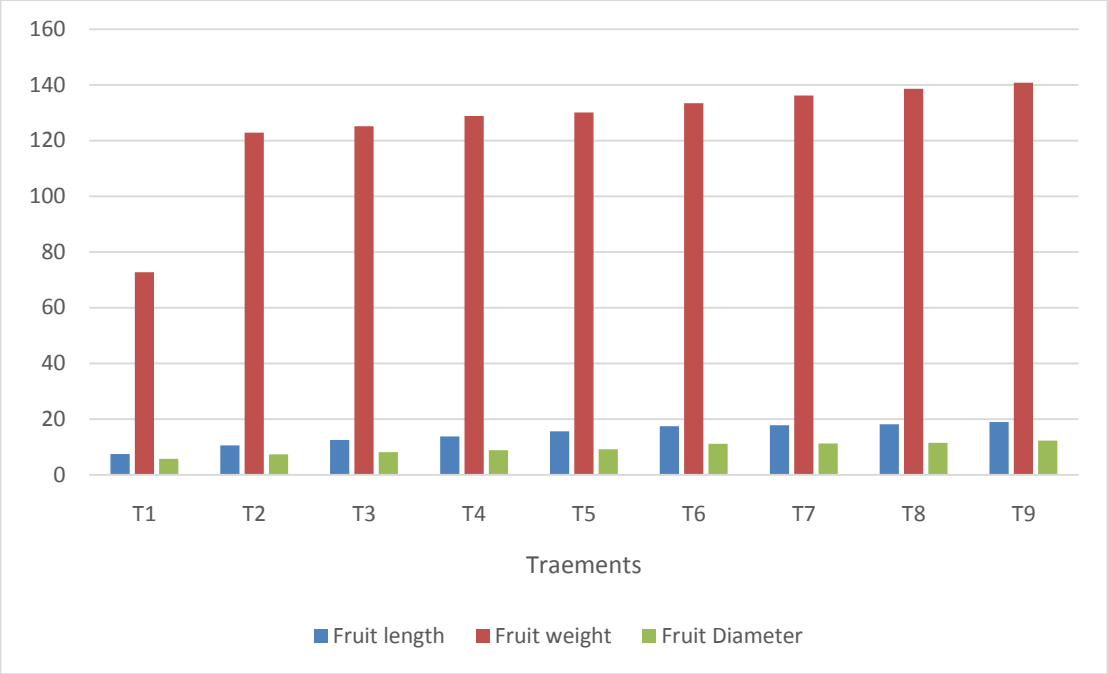

Fig 5: Effect of graded level of NPK on Fruit length Fruit Weight, Fruit Diameter (cm) at Harvest of parthenocarpic cucumber

6. Number of fruits per plant

The data concerning the number of fruits per plant as influenced by the application of graded levels of NPK at different growth stages is represented in table no. 6 and figure 6. It was observed that the average number of fruits per plant was significantly influenced by different fertigation treatments at various growth stages. The highest number of fruits per plant 9.17, 15.41, 18.64 and 26.27 at 45, 60, 75, and 90 DAT respectively was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) which was at par with treatment

T_6, T_7 and T_8. The lowest average number of fruits per plant 4.90, 6.62, 8.66 and 10.83 at 45, 60, 75, and 90 DAT was observed in treatment T_1 (control).

It is clear from the above results that the application of graded-level NPK fertilizers significantly increased the number of fruits per plant in parthenocarpic cucumbers might be due to a higher rate of metabolic activity and more accumulation of carbohydrates with these treatments under naturally ventilated climatic conditions inside the polyhouse. These findings are in accordance with Anajanappa *et al.* (2012) who recorded that higher number of fruits per plant.

Similarly, Prabhu *et al.* (2006) also revealed a greater number of fruits per plant in cucumber with the application of 50 percent RDF + VC 2 t ha^{-1} along with biofertilizers. Similar findings were also reported by Bindiya *et al.*(2014) in cucumber.

Table. 6: Effect of graded level of NPK on number of fruits per plant of parthenocarpic cucumber

Treatments	Number of Fruits per plant			
	45 DAT	60 DAT	75 DAT	90 DAT
T1 Control	4.90	6.62	8.66	10.83
T2 50% RDF at 2 days interval upto 90 DAT	6.55	11.14	12.16	13.70
T3 50% RDF at 7 days interval upto 90 DAT	6.73	11.50	12.80	14.99
T4 75% RDF at 2 days interval upto 90 DAT	7.75	12.25	14.58	16.98
T5 75% RDF at 7 days interval upto 90 DAT	7.90	13.58	15.64	17.85
T6 100% RDF at 2 days interval upto 90 DAT	8.86	13.98	16.98	22.57
T7 100% RDF at 7 days interval upto 90 DAT	8.96	14.96	17.13	23.01
T8 125% RDF at 2 days interval upto 90 DAT	9.14	15.14	17.87	25.11
T9 125% RDF at 7 days interval upto 90 DAT	9.17	15.41	18.64	26.27
S. E ±	**0.21**	**0.47**	**0.56**	**1.34**
C. D @ 5 %	**0.62**	**1.40**	**1.67**	**4.01**

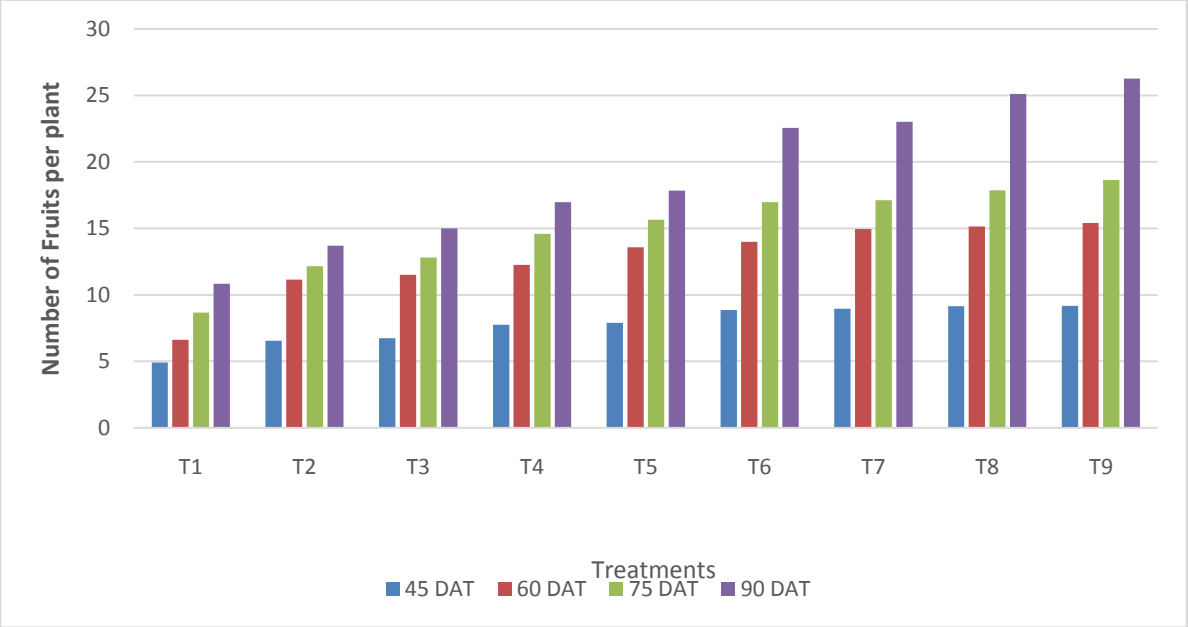

Fig 6: Effect of graded level of NPK on Number of Fruits per plant of parthenocarpic cucumber

7. Fruit yield per plant

The data related to fruit yield per plant as influenced by the application of graded levels of NPK at different growth stages is represented in table no. 7 and figure 7. It was observed that the average fruit yield per plant was significantly influenced by different fertigation treatments at various growth stages. The highest fruit yield per plant 1.97, 2.22, 2.35, and 2.48 kg at 45, 60, 75, and 90 DAT was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) respectively, which was at par with treatment T_6, T_7 and T_8. The lowest average fruits yield per plant 0.93, 0.96, 1.35 and 1.45 at 45, 60, 75, and 90 DAT was observed in treatment T_1 (control).

8. Fruit yield tone per ha

The data represented on fruits yield tones per hector as influenced by the application of graded levels of NPK at different growth stages is represented in table no. 8 and figure 8. It was observed that the average fruits yield tons per hector significantly influenced by different fertigation treatments at various growth stages. The highest fruits yield tons per hector 52.77, 59.46, 62.95 and 66.43 tons per ha at 45, 60, 75, and 90 DAT was observed in treatment T_9 (125% RDF at 7 days intervals upto 90 DAT) respectively, which was at par with treatment

T_6, T_7 and T_8. The lowest average fruits yield tons per hectare *i.e*. 25, 25.71, 36.25, and 38.84 tons per ha at 45, 60, 75, and 90 DAT was observed in treatment T_1 (control).

Table. 7: Effect of graded level of NPK on fruit yield per plant (kg) of parthenocarpic cucumber

Treatments	Fruit yield per plant (kg)			
	45 DAT	60 DAT	75 DAT	90 DAT
T1 Control	0.93	0.96	1.35	1.45
T2 50% RDF at 2 days interval upto 90 DAT	1.80	2.00	2.08	2.30
T3 50% RDF at 7 days interval upto 90 DAT	1.82	2.04	2.13	2.29
T4 75% RDF at 2 days interval upto 90 DAT	1.84	2.09	2.15	2.31
T5 75% RDF at 7 days interval upto 90 DAT	1.85	2.11	2.20	2.38
T6 100% RDF at 2 days interval upto 90 DAT	1.92	2.19	2.29	2.42
T7 100% RDF at 7 days interval upto 90 DAT	1.92	2.19	2.30	2.42
T8 125% RDF at 2 days interval upto 90 DAT	1.93	2.20	2.31	2.44
T9 125% RDF at 7 days interval upto 90 DAT	1.97	2.22	2.35	2.48
S. E ±	**0.01**	**0.01**	**0.02**	**0.02**
C. D @ 5 %	**0.04**	**0.04**	**0.06**	**0.07**

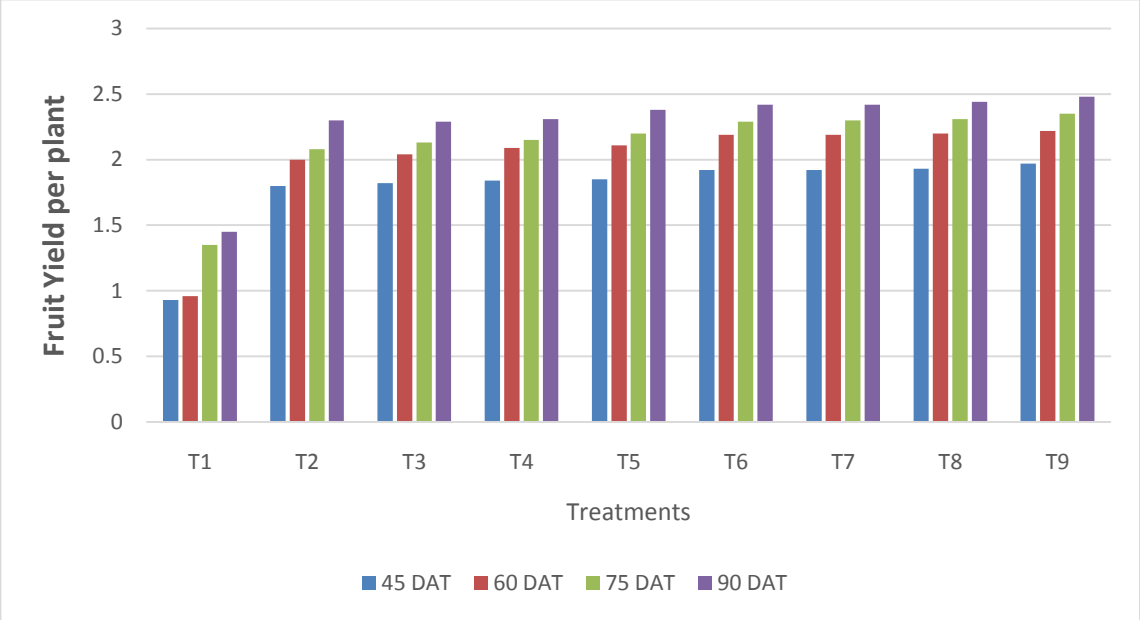

Fig. 7: Effect of graded level of NPK on Fruit Yield per plant of parthenocarpic cucumber.

The higher yield in different graded levels of fertilizers with individually applied nutrients might be due to better nutrient uptake and translocation to productive organs resulting in a greater number of fruits per plant and fruit weight with these treatments which ultimately might result in higher yields. It is a well-known fact that better nutrient utilization in the presence of different graded level of fertilizers, enhanced biological nitrogen fixation and better root system development as well as the higher synthesis of plant growth hormones may also results in higher yield.

These findings are in conformity with the findings of Prabhu *et al. (*2006) who revealed that the application of 50 percent of RDF + VC @ 2 t ha^{-1} + biofertilizers resulted in maximum yield. Similarly, Anjanappa *et. al.,* (2012) reported maximum fruit yield during summer and rabi for cucumber under protected condition. Similar findings were also reported by Kanaujia and Daniel (2016).

Table 8: Effect of graded level of NPK on fruit yield (tone ha^{-1}) of parthenocarpic cucumber

Treatments	Fruit yield (tone ha^{-1})			
	45 DAT	60 DAT	75 DAT	90 DAT
T1 Control	25.00	25.71	36.25	38.84

T2 50% RDF at 2 days interval upto 90 DAT	48.30	53.57	55.80	61.70
T3 50% RDF at 7 days interval upto 90 DAT	48.75	54.55	57.14	61.25
T4 75% RDF at 2 days interval upto 90 DAT	49.29	55.89	57.59	61.79
T5 75% RDF at 7 days interval upto 90 DAT	49.55	56.61	58.84	63.84
T6 100% RDF at 2 days interval upto 90 DAT	51.43	58.75	61.34	64.55
T7 100% RDF at 7 days interval upto 90 DAT	51.34	58.75	61.70	64.82
T8 125% RDF at 2 days interval upto 90 DAT	51.79	58.84	61.96	65.27
T9 125% RDF at 7 days interval upto 90 DAT	52.77	59.46	62.95	66.43
S. E ±	**0.38**	**0.40**	**0.54**	**0.60**
C. D @ 5 %	**1.13**	**1.20**	**1.62**	**1.79**

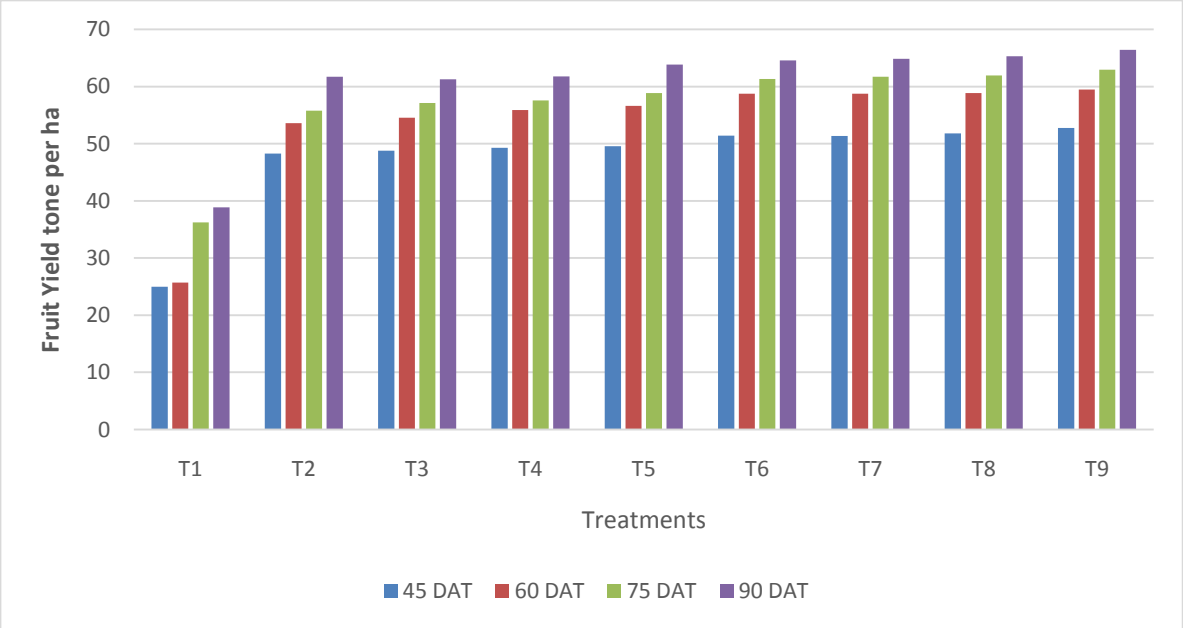

Fig.8: Effect of graded level of NPK on Fruit Yield tone per ha of parthenocarpic cucumber

Conclusion:

Parthenocarpic cucumber crop fertilized with application of 125% of RDF 7 days of interval. Improved growth parameters like plant height, number of primary, internodal distance, leaf area, fruit length, weight of fruit and fruit diameter as well as yield

contributing characters, number of fruits per plant, fruit yield plant and fruit yield tone per hacter shown siginificantly more under naturally ventilated polyhouse conditions.

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