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Effect of pruning on growth, flowering, yield and quality of the fruit in Meadow orcharding in guava (*Psidium guajava* L.) cv. Allahabad safeda three years old plants under Allahabad agro-climatic condition

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Abstract
A field experiment was conducted during 2018-2019 to assess the effect time of shoot pruning with different combination on growth, flowering, yield and quality of the fruit in meadow orcharding in guava three years old plants under Allahabad agro-climatic condition cv. Allahabad Safeda. The study of one (year) indicates that half shoot (50%) pruning significantly influenced cropping pattern of guava viz. plant height (30, 60, 90, 120, 150 DAP), plant spread (N-S and E-W) (30, 60, 90, 120, 150 DAP), number of flowers per pant, fruit set (%), fruit drop (%), number of fruit per tree, fruit weight, fruit diameter, yield per plant, TSS, Acidity and yield in each rainy and winter season crops. Half shoot pruning in November results in lowered rainy season yield and more number of emergence of new shoots/plant, flower buds/ plant and increased fruit weight during winter season. The maximum yield was recorded in T_6 (4.02kg.) per plant and the minimum yield was recorded in T_0 (2.32 kg) per plant.

Keywords: Guava (*Psidium guajava* L.), meadow orchard, pruning, growth, fruit quality

Introduction
Guava (*Psidium guajava* L.) trees are hardy, prolific bearer, long lived, drought tolerant and need comparatively less attention which makes its cultivation more remunerative. It is a flavoured crop among fruit growers due to its wide adaptability and higher return per unit area. But, of late, this crop has exhibited a paradigm shift in the production system, from subsistence farming to commercial production. Although, there is increase in area and production of fruits during last decade in the country, productivity did not show significant increase. Generally guava is cultivated through traditional planting system. In which it is very difficult to achieve desirable level of production. Moreover, in this system guava plant takes 4-5 years for coming into commercial bearing and thus maximizes the overall cost of production per unit area, because large plants provide low production per unit area. The increasing importance of guava as a commercial tropical fruit crop, both for table purposes and processing, demands its wide spread cultivation ensuring regular cropping and higher production. Plant spacing is one method used to obtain efficient and profitable land use. Its basic function is to confine the exploitation zone of the plant with regard to light, water, and nutrients so the highest total yield positional can be reached in the smallest possible area. With ever increasing land costs, and the need for early returns on invested capital, there is a worldwide trend toward high density plantings/meadow orcharding. (Sah *et al.*2018).
Meadow Orchard System is a new concept of guava planting which has been developed for the first time in India at Central Institute for Subtropical Horticulture, Lucknow. The planting is done at 2.0 m (row to row) x 1.0 m (plant to plant), which gives a density of 5000 plants ha-1. Initially, the trees are pruned and trained to allow maximum production of quality fruits during the first year. A single trunk tree with no interfering branches up to 30 - 40 cm from the ground level is desirable to make dwarf tree architecture. After a period of 1-2 months of planting, all the trees are topped at a uniform height of 30-40 cm from the ground level for initiation of new growth below the cut ends. In general, 3~4 shoots are retained from below the cut point after topping. As shoots mature generally after a period of 3-4 months, they are reduced by 50 per cent of their total length so that new shoots emerge below the cut point.

The emerged shoots are allowed to grow for 3 - 4 months before they are again pruned by 50 per cent. After pruning, new shoots emerge on which flowering takes place.

Materials and Methods

The following experiment was conducted in Randomize Block Design (RBD) method with 8 treatments and 3 replications at Research farm, the Central Research field of Horticulture, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj during 2018- 2019.

Table 1: Treatment combinations

Notation	Combinations (15 day interval)
T_0	Control (no pruning)
T_1	Half shoot pruning in mid-week in August.
T_2	Half shoot pruning in first week in September.
T_3	Half shoot pruning in mid-week in September.
T_4	Half shoot pruning in first week in October.
T_5	Half shoot pruning in mid-week in October.
T_6	Half shoot pruning in first week in November.
T_7	Half shoot pruning in mid-week in November.

Climate condition in the experimental site

The area of Prayagraj district comes under subtropical belt in the South east of Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46 ˚C – 48 ˚C and seldom falls as low as 4 ˚C – 5 ˚C. The relative humidity ranges between 20 to 94 per cent. The average rainfalls in this area are around 1013.4 mm annually.

Result and Discussion

In terms of Plant height (cm) (148.33cm) was recorded under treatment T_6 i.e. (Half shoot pruning in first week in November) and the minimum plant height (cm) (137.00cm) was recorded under the treatment $T_0$where only control (no pruning). The plant spread reveal that the various treatments, the maximum tree spread (cm) (N-S and E-W)(96.33cm) was recorded under treatment T_3i.e.(Half shoot pruning in mid-week in September)and the minimum plant spread (87.33cm) was recorded under the treatment T_0 where only control (No pruning).The maximum number of flowers (74.33) was recorded under treatment T_6 i.e. (Half shoot pruning in first week in November) and the minimum number of flowers in (32.33) was recorded under the treatment T_1 where only (Half shoot pruning in mid-week in August). The maximum number of fruit set (%) (57.90) was recorded under the treatment T_6 i.e. (Half shoot pruning in first week in November) and the minimum fruits set (%) in (26.38) was recorded under the treatment $T_0$where only control (no pruning). The maximum fruit drop (48.33%) was recorded under the treatment T_0i.e. control (no pruning) and the minimum fruit drop (%) in (31.67%) was recorded under the treatment T_6i.e. (Half shoot pruning in November). The maximum number of fruit per tree (42.67%) was recorded under the treatments T_6i.e. (Half shoot pruning in mid-week in November) and the minimum no. of fruit per tree (17.33%) was recorded under the treatment T_0 i.e. control (no pruning). The maximum weight of fruit (g) (165.37g) was recorded under the treatments T_6i.e.(Half shoot pruning in mid-week in November) and the minimum weight of fruit per tree (110.81g)was recorded under the treatment in T_0i.e. control (No pruning).The maximum fruit diameter (7.27cm)was recorded under the treatment T_6i.e. (Half shoot pruning in November) and the minimum fruit diameter (5.73cm) was recorded under the treatment in T_0i.e. control (No pruning). The maximum yield (4.02 kg/tree) was recorded under the treatment T_6 i.e. (Half shoot pruning in November) and the minimum yield (2.49 kg/tree) was recorded under the treatment in T_0 i.e. control (No pruning). The maximum TSS (11.39^0Brix) was recorded under the treatment T_2i.e. (Half shoot pruning in first week in September) and the minimum TSS (10.04^0Brix) was recorded under the treatment in T_0 i.e. control (No pruning).The maximum acidity (0.48%) was recorded under the treatment T_3 i.e. (Half shoot pruning in mid-week in September) and the minimum acidity (0.41%) was recorded under the treatment T_7 i.e. (Half shoot pruning in mid-week in November). The maximum pectin (0.68%) was recorded under the treatment T_5 i.e. (Half shoot pruning in mid in October) and the minimum pectin (0.52%) was recorded under the treatment T_0 i.e. control (no pruning).

Table 2: Effect of Pruning on Growth, flowering, yield and quality of the fruit in meadow orcharding in guava three years old plants

Treatments no.	Treatments	Plant heigh (cm)	Plant spread (cm)	Number of flowers per plant	Fruit set (%)	Fruit Drop (%)	Number of fruits per tree	Average of fruit weight (g)	Fruit diameter (cm)	Yield/tree (kg)	Acidity (%)	TSS (%)	Pectin (%)
T_0	Control (no pruning)	137.00	87.33	65.67	26.38	48.33	17.33	110.81	5.73	2.32	0.43	10.04	0.52
T_1	Half shoot pruning in mid-week in August.	143.33	90.67	64.67	36.47	41.33	23.33	117.11	5.97	3.44	0.46	10.07	0.65
T_2	Half shoot pruning in first week in September.	141.67	88.33	62.00	37.17	39.00	23.00	137.68	5.80	2.50	0.47	11.39	0.58
T_3	Half shoot pruning in mid-week in September.	146.67	96.33	65.33	39.10	39.67	25.67	129.01	6.13	3.39	0.48	10.73	0.56
T_4	Half shoot pruning in first week in October.	143.00	93.67	66.00	46.91	35.33	30.67	151.71	6.17	3.77	0.44	11.06	0.62
T_5	Half shoot pruning in mid-week in October.	146.00	92.67	74.00	54.88	33.33	40.67	144.02	6.43	3.92	0.42	11.38	0.68
T_6	Half shoot pruning in first week in November.	148.33	90.67	74.33	57.90	31.67	42.67	165.37	7.27	4.02	0.45	10.72	0.53
T_7	Half shoot pruning in mid-week in November.	147.33	92.00	71.00	51.62	34.67	36.33	140.01	6.13	3.92	0.41	11.07	0.60
	F- test	**S**	**S**	S	S	S	S	S	S	S	S	S	S
	S. Ed. (±)	3.539	3.639	4.634	6.590	6.072	3.941	3.049	0.583	0.283	0.020	0.641	0.02
	C. D. (P = 0.05)	7.590	7.805	9.939	14.134	13.024	8.452	6.540	1.251	0.608	0.043	1.374	0.04

Conclusion

Based on the present investigation it is concluded that the treatment T_6 found maximum Plant height and maximum Plant Spread swas recorded in treatment T_5, and maximum Number of flowers/plant, maximum Fruit set percent, minimum Fruit drop percent per plant, maximum Number of

fruit per tree, Fruit weight (g), Fruit diameter (cm), Fruit yield/tree was recorded in treatment T_6 and maximum TSS (^{0}Brix) $T_{2,}$ maximum Acidity percent was recorded in treatment $T_{3,}$ and maximum pectin percent was recorded in treatment $T_{5,}$ in terms of economics maximum Gross Return, Net Return and Cost Ratio was recorded in treatment T_6 where was minimum was recorded in treatment T_0 (control) in all the parameters. Where treatment T_0 (control) was recorded minimum in all the parameter.

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