EFFECT OF PLANTING DATE AND SPACING ON THE GROWTH AND YIELD OF SWEET PEPPER (*Capsicum annuum* L.) IN SAMARU AREA OF ZARIA IN NIGERIA

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**ABSTRACT**

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The experiments were conducted in 2010 and 2011 cropping seasons at the Teaching and Research Farm of the Institute for Agricultural Research; Ahmadu Bello University Zaria located on latitude11°11′N longitude7°38′E and 686 m above the sea level in the Northern guinea savannah ecological zone of Nigeria. The trial is a two factors experiment (planting dates and spacing) which consisted of four planting dates (planting date 1 of 20th August, planting date 2 of 3rd September, planting date 3 of 17th September and Planting date 4 of 1st October, 2010 and 2011 cropping seasons respectively) and spacing of 15, 30, 45 and 60 cm replicated three times and laid out in a randomized complete block design (RCBD). It was observed from the results that significant higher increases in most of the growth and yield parameters per plant were obtained from planting dates 1 of 20th August 2010 and 2011 cropping seasons and spacing at 60cm, while planting date 4 of 1st October 2010 and 2011 cropping seasons and spacing at 15cm, significantly obtained lower growth and yield increases in characters observed during the period under review. Therefore, farmers are advised to plant crops as early as possible at a spacing of at least 60cm to provide enough time and space for growth and development of crops in order to increase yields.

**Keywords:** Planting date, Spacing, Pepper, Growth, Yield

**INTRODUCTION**

Sweet pepper (*Capsicum annuum* L.) belongs to the family Solanaceae under the genus *Capsicum* (Russo, 1996). The crop is a native of Tropical South America especially Brazil which is thought to be the original home of peppers (Islam et al., 2010). The genus Capsicum contains about 20 species but the popularly cultivated species are sweet pepper (*Capsicum annuum*) and hot pepper (*Capsicum frutescens*) both serving as a food and cash crops in Nigeria and other countries. Much of the foreign exchange can be earned from exportation of this crop to other countries of the world (Verroens et al., 2006). The sweet pepper is either used green or red and may be eaten as cooked or raw, as well as in salad (Andrews, 1984). The sweet pepper is relatively non–pungent with thick flesh and is the worlds’ second most important vegetable after tomato (Anonymous, 1989). It is also used for pickling in brine, baking and stuffing. The leaves are also consumed as salad, soup, or eaten with rice. It was discovered to be a good source of medicinal preparation against vomiting and paralysis (Islam et al., 2010). Pepper has little energy value but higher nutritive value of protein, vitamins A, C and calcium. Crop production depends on several factors, of which sowing date is one of the most important (Islam et al., 2010). Optimum sowing time brings about proper growth and development of plants resulting in maximum yield of the crop and economic use of land (Islam et al., 2010). In an experiment to investigate growth and yield as influenced by three levels of spacing viz. 50x50cm, 50x40 cm, 50x30 cm. There were significant variations in almost all the growth and yield components. Number of branches per plant, number leaves per plant, stem girth, number fruits per plant, days to first harvest, fruit length, individual fruit weight, yield per plant were found to be significantly increased with the increasing of plant spacing but plant height at different stages, number of fruits per plot, days to 50% flowering, fruit breadth, yield per plot and yield per hectare were found to be significantly increased with the decreasing plant spacing. Considering the yield fruits per hectare, cost production and net return, 50x30cm appeared to be recommendable for the cultivation of sweet pepper (Islam et al., 2010). The present study was carried out to clarify the optimum planting date for sweet pepper and the recommended spacing in Zaria.

**MATERIALS AND METHODS**

The experiment was conducted at the Teaching and Research Farm of the Institute for Agricultural Research; Ahmadu Bello University Zaria located on latitude11°11′N longitude7°38′E and 686 m above the sea level in the Northern guinea savannah ecological zone of Nigeria. The trial is a two factors experiment (planting dates and spacing) which consisted of four planting dates (planting date 1 of 20th August, planting date 2 of 3rd September, planting date 3 of 17th September and Planting date 4 of 1st October, 2010 and 2011 cropping seasons respectively) and spacing of 50 x 15, 50 x30, 50 x45 and 50 x 60 cm replicated three times and laid out in a...
randomized complete block design (RCBD). The Seedlings of sweet pepper local cultivar called ‘Tattase’ were kept in the nursery for one month before transplanting for each of the treatments. The seedlings were transplanted in plots that measured 5 x 3m at the rate indicated in the experiment. Each plot contained 30 seedlings, the total number of seedlings were 30 x 12 plots (i.e. total of 360 seedlings). The total plot size of the experimental area was 180 m². After transplanting seedlings from the nursery to the field, the following operations were carried out to promote their early establishment, quick growth and development. The crop was irrigated as required depending on the moisture status of the soil and requirement of plants. Plots with transplanted seedlings were regularly observed to identify damaged or dead seedlings for replacement. Weeding was done as required and also plant protection measures were carried out against insects and diseases through appropriate application of pesticides.

**Data collection**

Data was collected from five randomly selected plants in each plot on growth and yield characters such as plant height (cm), number of leaves per plant, number of branches per plant, stem girth (mm), fruit length (cm), fruit breadth (cm), days to 50% flowering, number of fruits per plant, yield per plot (kg) and yield per ha (kg). Data was statistically analysed using GENSTAT. The analysis of variance (ANOVA) was performed to find out the significance of variation among the treatments while the significance difference between mean treatments were separated using the Duncan’s’ Multiple Range Test (DMRT) at 5% level of probability.

**RESULTS**

All growth characters showed significant variations due to planting dates and spacing as shown in (Table 1). Treatment 1, planting date of 20th August 2010 and 2011, spacing at 60cm and interactions between planting dates and spacing significantly produced higher mean values on plant height (cm), number of leaves per plant, number of branches per plant and stem girth (mm) per plant, number of fruits per plant, fruit yield per plant and fruit yield per hectare in all the stages of assessment. However, planting date of 1st October 2010 and 2011 cropping seasons, spacing at 15cm and interactions between planting dates and spacing significantly produced lower mean values on all growth characters at all stages of measurement. The yield characters such as fruits per plant and fruit yield per hectare were significantly different due to planting date and spacing. Planting date of 1st August 2010 and 2011 cropping seasons, spacing at 60cm and interactions between planting dates and spacing significantly produced higher mean values among the treatments, while planting date 4 of 1st October 2010 and 2011 cropping seasons; spacing at 15cm and interactions between planting dates and spacing significantly produced lower mean values on yield parameters recorded. Fruit lengths per plant and fruit girth per plant were not significantly different. However, there were no significant interactions on these characters.

**DISCUSSION**

The observations of significant variations among the treatments indicated that cultivation of any crop depends on several factors for growth and development. Planting dates and spacing has been observed as some of the factors that affect growth and development of a crop. Islam et al. (2010) reported that optimum sowing dates and spacing of a crop ensures proper growth, development and maximises the yield of the crop. Also optimum planting dates and spacing ensures the economy of land use of a crop. As observed from the results of this trial, planting dates 1 and 60cm spacing performed better in terms of growth and yield characters than the rest of the treatments by giving higher values. Progression further into drier period and spacing significantly decreased the values of parameters measured on the crop. From planting dates of 20th August 2010 and 2011 cropping seasons; spacing at 60cm down to planting dates 4 of 1st October 2010 and 2011 cropping seasons; spacing at 15cm, treatment means decreased accordingly. This means that the earlier and proper you space a crop the better the performances of the crop with respect to growth and yield characters. Planting dates 4 of 1st October 2010 and 2011 cropping seasons; as well as spacing at 15cm could not produce higher mean values because the duration and space of the crop was not quite enough to guarantee plants under this treatment complete the vegetative and reproductive phases fully. Also, competition for resources by plants under this treatment was higher resulting into haste by plants under this treatment to complete their growth and developmental stages.

**CONCLUSION**

It was observed from the results that significant higher increases in most of the growth and yield parameters per plant were obtained from planting dates 1 of 20th August 2010 and 2011 cropping seasons and spacing at 60cm, while planting date 4 of 1st October 2010 and 2011 cropping seasons and spacing at 15cm, significantly obtained lower growth and yield in characters observed during the period under review. Therefore, farmers are advised to
plant crops as early as possible at a spacing of at least 60cm to provide enough time and space for growth and development of crops in order to increase yields.

REFERENCES

Table 1: Growth and yield of pepper as influenced by planting dates and spacing at Samaru, Zaria in 2010 and 2011 cropping seasons

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Plant height (cm)</th>
<th>Number of leaves per plant</th>
<th>Number of branches per plant</th>
<th>Stem girth (mm)</th>
<th>Number of fruits per plant</th>
<th>Fruit length (cm)</th>
<th>Fruit girth (cm)</th>
<th>Fruit yield per plant (kg)</th>
<th>Fruit yield per hectare (kg)</th>
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<tbody>
<tr>
<td>Planting dates</td>
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<td>4</td>
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<td>15.33d</td>
<td>51.62d</td>
<td>57.48d</td>
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<td>9.24d</td>
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<td>5.29b</td>
<td>6.05c</td>
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Interactions

P x S

* = Not significant at 5% level of significance
* = Significant

Means with the same letter(s) within a column are not significantly different at P = 0.05 using Duncan’s Multiple Range Test (DMRT).


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