MANIPULATION OF ROW SPACING DID NOT AFFECT GROWTH AND YIELD OF CHIA IN TWO CONTRASTING ENVIRONMENTS IN KENYA #9434

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ABSTRACT

Sustainability of agricultural production relies on a good management strategy in crop production. Optimal spacing is one of the major crop management systems in chia production required to increase yield and quality of chia seed. In this regard, this study explored the potential of different row spacing on the growth and yield of chia in Kenya. Two experiments comprising three spacing arrangements of 30 cm x 10 cm, 60 cm x 10 cm and 90 cmx 10 cm were carried out in Kabete and Nyeri in a randomized complete block design. In this study, all the assessed row spacing did not show any significant differences in growth and yields of chia in open fields. However, highest panicle length for both sites in two seasons was recorded at a spacing of 60cm by 10cm. In consideration of effective agricultural practices such as weeding, fertilization and irrigation, a spacing of 60cm by 10cm is recommended.

Keywords: Seeds, management, treatments, optimization, systems

INTRODUCTION

Chia (*Salvia hispanica* L.) is a crop in the Lamiaceae family, with its centres of origin being Mexico and Guatemala (Cahil, 2004). It is a relatively new crop in Kenya and is gaining popularity owing to its rich nutritional profile and its low cost of production thus making it more profitable in comparison to other crops to farmers. Most sub-Saharan Africans are characterized by diverse soil characteristics and experience diverse agro-climatic conditions. In this very soil dynamism, each soil has its optimal density of establishment as per the land equivalence ratio (Graves *et al.,* 2010). The adoption of chia as a pseudo-cereal across several sub-Saharan African countries such as Kenya calls for extensive studies on its agronomic suitability, especially on its spacing. This study establishes whether varying row spacing influences the growth and yield of chia in contrasting agro-ecological zones in Kenya.

MATERIALS AND METHODS

Chia was established in two study sites, Kabete and Nyeri in a randomized complete block design for two seasons. The treatments were three row spacings; 30cm × 10 cm, 60cm × 10cm, and 90cm × 10cm. In each plot, 5 plants were randomly selected and data on growth and development were assessed 15, 45, 80 and 100 days after sowing (DAS). Harvesting was 100 DAS whereby the number of panicles, and grain yield (g/plant) were determined.

RESULTS

The assessed row spacings did not show any significant differences in growth and yields of chia in open fields.

Table 1. Seed yield, number of panicles and number of branches of chia at physiological maturity under three row spacings in Kabete and Nyeri in two seasons.

KABETE						
	Season 1			Season 2		
Row spacing	Seed yield (g/plant)	No. of panicles	No. of branches	Seed yield (g/plant)	No. of panicles	No. of branches
30cm × 10cm	783.30a	28.00a	11.73a	2300a	13.40a	9.87a
60cm × 10cm	600.00a	28.60a	11.87a	2360a	17.93a	11.87b
90cm × 10cm	846.70a	40.13b	12.67b	2320a	18.13a	10.80ab
LSD	442.3	7.14	0.66	1017.1	4.76	1.2
P-value	0.37	0.002	0.01	0.99	0.09	0.001
NYERI						
	Season 1			Season 2		
Row spacing	Seed yield (g/plant)	No. of panicles	No. of branches	Seed yield (g/plant)	No. of panicles	No. of branches
30cm × 10cm	783.30a	31.80a	12.00a	702.45a	19.93a	13.80a
60cm × 10cm	600.00a	28.53a	11.60a	643.00a	24.00a	13.60a
90cm × 10cm	846.70a	31.33a	12.27a	894.50a	21.33a	13.07a
LSD	442.3	8.61	0.92	288.34	13.43	1.78
P-value	0.37	0.71	0.35	0.34	0.83	0.69

Means in the same column not having a common letter are significantly different based on the Tukey's LSD test ($P<0.05$).

DISCUSSION

Seed yield and number of panicles were not significantly different across the three row spacings in both sites. There was a significance difference on the number of branches across the three-row spacing for Kabete for the two seasons with a spacing of 90cm by 10cm recording the highest number of branches. In Nyeri however, there was no significance difference in number of branches across the three row spacings for the two seasons.

From the results, it is evident that manipulation of row spacing had no effect on growth and yield of chia. This can be attributed to the aspect of chia having low water requirement and its capability to adapt well in arid semi-arid regions (Ayerza, 1995). This therefore shows that when chia is planted in soils that have not been depleted of nutrients, its growth and yield will not be affected by the row spacing adopted. For this experiment, the available N% in the soil, was 0.25% and 0.13% for the clay-loam and clay soils of Kabete and Nyeri, respectively. This was optimal for effective production of chia and the crop only utilized enough for its growth and development. Although in these studies there were no significant differences on assessed parameters across the three treatments, in is important to make consideration of management practices that will not only contribute to good agricultural practices, but also economical and profitable to farmers. Further work is recommended on water use dynamics, water and nutrient use, and light use efficiency of chia.

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