International Journal of Plant & Soil Science

Volume 35, Issue 20, Page 393-396, 2023; Article no.IJPSS.105063
ISSN: 2320-7035

Baby Corn-Based Intercropping System in Enhancing the Growth and Production of Winter Season Baby Corn in Chhattisgarh Plains

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2023/v35i203820

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/105063

Original Research Article

Received: 09/07/2023
Accepted: 14/09/2023
Published: 22/09/2023

ABSTRACT

An experiment was carried out during the winter season (*rabi*) for two years 2019-20 and 2020-21 on Instructional cum Research Farm, Indira Gandhi Krishi Vishwavidyalay, Raipur (C.G.) to enhance the production of baby corn through intercropping. The experiment was laid out in randomized block design (RBD) with eight treatment consisting of sole and paired row baby corn along with a combination of various legumes. The treatments were T1 : sole baby corn (45 x 20 cm), T2 : paired row baby corn (30/60 cm) T3 : sole fenugreek (30 x 10 cm), T4 : sole pea (30 x 20 cm), T5 : sole cowpea (30 x 20 cm) T6 : paired row baby corn + pea (2:2), T7 : paired row baby corn + fenugreek (2:2) and T8 : paired row baby corn + cowpea (2:2). The result of the experiment was concluded that growth attributes was highest under the treatment of T6: paired row baby corn + pea which was closely followed by T8: paired row baby corn + cowpea. Also, T6: paired row baby corn + pea maximized the baby corn cob and fodder yield and therefore pea proved to be a valuable intercrop with baby corn in enhancing the production of baby corn.

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Keywords: Baby corn; cob yield; fodder yield; intercropping; legumes; RBD.

1. INTRODUCTION

Baby corn (*Zea mays* L.) is the unfertilized young cob of the corn which is mainly used for vegetables and soup. Baby corn is dehusked immature maize ear, harvested within 2-3 days of silking but before fertilization [1]. The valuable size of baby corn is 6-11 cm in length and 1-1.5 cm in diameter with a regular row/ovule arrangement. Generally, creamish-yellow to very light-yellow coloured baby corn is the top priority to the consumer [2]. Corn is starchy due to its carbohydrate content, but baby corn constitutes a non-starchy one. It appends several health benefits as it is a highly nutritive crop having the capacity to convert more nutrients into food [3]. It contains folic acid, vitamin A, B, C, phosphorus, calcium and zinc which is used as supplements in various preparations such as vegetable, salad, soup, pickle, kheer, murabba, chutney and manchurian foods. The nutritive value of Baby corn; 100 g of baby corn consists of 89.1% moisture, 0.2 g fat, 1.9 g protein, 8.2 mg carbohydrate, 0.06 g ash, 28.0 mg calcium, 86.0 mg phosphorus, 11.0 mg ascorbic acid [4].

The *rabi* season is generally dominated by crops like wheat/chickpea/safflower/vegetable/pulse crops. To feed the growing population, there is an alarming rate to enhance productivity per unit area and per unit time which can be excelled by enhancing the cropping intensity, especially under irrigated areas to fulfill the optimum food requirement of the country. Corn is the most popular crop among the farmers in the state, however, baby corn may also be adopted by farmers to raise their farm income and standard of living. The intercropping system is believed to enhance production per unit of land in the same of time. Aravinth et al. [5] at Annamalai University witnessed that intercropping of pulses like cowpea and black gram influences the green cob yield of baby corn. Baby corn is a wide-spaced crop however, the possibility for the introduction of inter-row crops could be more income fetching. The verge of crop combination is applicable to maximize the utilization of growth resources per unit area and to improve the yield as well as to keep the soil in fruitful conditions [6]. Hence, sustainable productivity of crops is the need of the hour in the present context of Indian farming. So, we must explore every possibility for crop intensification with sustainable nutrition management to achieve sustainability.

2. MATERIALS AND METHODS

The experiments were conducted at the Instructional cum Research Farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.), India. The Farm is situated at 2l^{0}4'N latitude, 8l^{0}39'E longitude and 298 m altitude from the sea level. The region falls under the eastern plateau and hill region (Ago-climatic zone-7) of India.

The soil of the experimental field was *Vertisol*. The soil was neutral and the available nitrogen, phosphorus and potassium content were low, medium, and high, respectively. Baby corn G5414 hybrid, Green pea variety Dhanya green pearl, Cowpea variety Ankur Gomati and fenugreek variety Meghna were taken as test crops during investigations.

Detasseling is an important practice in baby corn production. It was done immediately after the appearance of the tassel to avoid pollination and fertilization. Detasseling was done by holding the tassels firmly with one hand and giving an upward jerk. This operation is necessary for getting good quality baby corn. Harvesting of baby corn was done after 3 – 4 days of silk emergence. Harvesting was done manually treatment-wise by removing the cobs from the plants. In all there were 3 pickings at an interval of 1-–3 days for complete removal of cobs. Harvesting was usually done in the morning when moisture percentage was high and temperature was low.

3. RESULTS AND DISCUSSION

The intercropping with different pulses had a significant effect on the growth attributes of baby corn. This was marked by a gradual increase in plant height, number of leaves, leaf area and LAI and dry matter accumulation plant^{-1}. Treatment T6: paired row baby corn + pea significantly produced taller plants and a higher number of leaves in comparison with the other treatments. Also, the other growth attributes *viz*., leaf area palnt^{-1}, Leaf Area Index and dry matter accumulation plant^{-1} were highly significant with the treatment T6. The treatment T8: paired row baby corn + cowpea and the treatment T2: paired row baby corn was statistically at par to T6 and was significantly superior over other treatments. Similar results with baby corn were marked with French bean by Natraj *et al.* (2011) in 2: 2 ratio [7]. The treatment T1 was found to be inferior with the least growth attributes i.e.

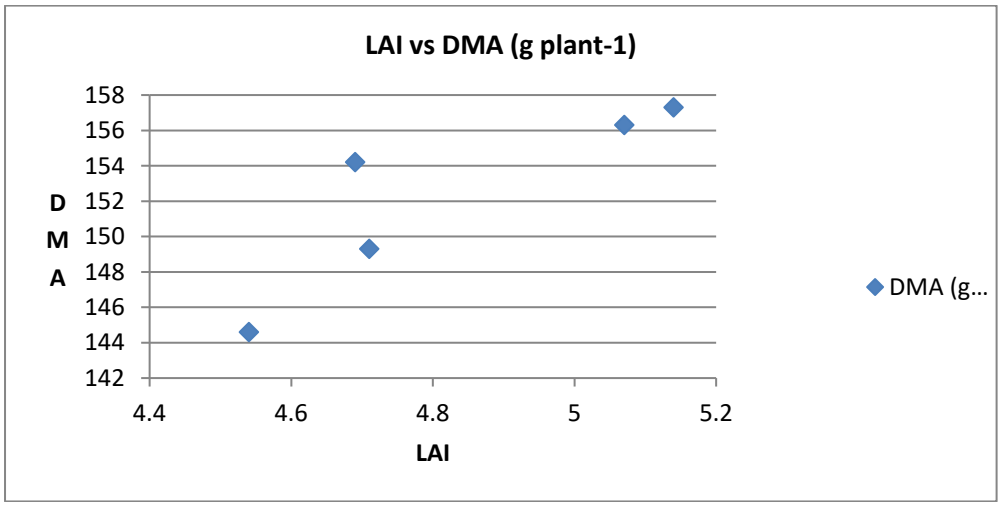
plant height, number of leaves plant^{-1}, leaf area plant^{-1}, LAI and dry matter accumulation. This seems possible due to proper allocation of space with optimum plant population combined with increased plant height provided more number of nodes and thus more number of leaves were generated under the treatment T6. T8 and T2. Similarly, higher leaf area plant^{-1} and LAI were a result of optimum utilization of growth resources due to proper space allocated for individual plants.Similar reports were observed in light interception of maize+soyabean (1:1) by Yogesh et al. [8]. The dry matter increased due to the cumulative effect of growth attributing features like plant height, number of leaves, and leaf area which plays a very important role in proper growth of plant and thereby increasing dry matter. Leaf area index and dry matter of baby corn plant were highly correlated with the coefficient of 0.87 (Graph 1). Crop Growth Rate in general increased with the plant growth with the advancement of crop age up to 60 DAS and declined thereafter. Similar findings have been also reported by Singh et al. [9], Ennin et al. [10], Eskandari and Ghanbari [11] and Hekmat et al. [12]. The treatment T6 resulted in more number of baby cobs per plant with higher cob length and cob weight plant^{-1} and was at par to treatment T8. and T2. The result was in accordance with experiment done on intercropping cowpea by Abd El- Lateef et al. [13], Kumar and Venkateswarlu [14]. Whereas the yield of intercrops like pea, cowpea and fenugreek were found to be superior in their sole planting as compared to intercrop treatments as the plant population under optimal conditions leads to an increase in yield [15,16].

Table 1. Growth attributes of baby corn as influenced by different intercrop

Treatment	Plant height (cm)	LAI	DMA (g plant^{-1})
T1: Sole baby corn	202.21	4.54	144.6
T2 : paired row baby corn	205.8	4.69	154.2
T6 : paired row baby corn + pea	210.4	5.14	157.3
T7 : paired row baby corn + fenugreek	203.9	4.71	149.3
T8: paired row baby corn + cowpea	206.3	5.07	156.3
SEm±	1.56	0.13	1.58
CD (P = 0.05)	5.10	0.44	5.14

Table 2. Yield attributes and yield of baby corn as influenced by different intercrop

Treatment	Cob length (cm)	Cob weight (g)	Baby corn cob yield (t ha^{-1})
T1: Sole baby corn	7.72	11.21	1.60
T2 : paired row baby corn	8.15	12.40	1.79
T6 : paired row baby corn + pea	8.80	13.69	1.92
T7 : paired row baby corn + fenugreek	8.03	11.72	1.63
T8: paired row baby corn + cowpea	8.51	12.49	1.85
SEm±	0.22	0.54	0.81
CD (P = 0.05)	0.71	1.76	0.26



Graph 1. Correlation between LAI and dry matter accumulation plant^{-1}

4. CONCLUSION

It could be concluded that baby corn is a good crop for Chhattisgarh plains and when sowing in the winter season, baby corn in a paired row along with pea as intercrop could be a beneficial practice for achieving sustainability and profitability in Chhattisgarh plain regions.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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