



Growth and economics of baby corn as influenced by weather variables, planting geometries and dates of sowing in Northern Karnataka

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Abstract: A field experiment was conducted during *kharif* season of 2014 -15. The experiment was laid out in split plot design involving two spacing viz., S_1 : 60 cm x 15 cm and S_2 : 45 cm x 20 cm as main plots and eight sowing dates as sub plots viz., D_1 : First fortnight of June, D_2 : Second fortnight of June, D_3 : First fortnight of July, D_4 : Second fortnight of July, D_5 : First fortnight of August, D_6 : Second fortnight of August, D_7 : First fortnight of September and D_8 : Second fortnight of September. June 1st fortnight sowing (D_1) was recorded significantly higher plant height, number of green leaves, leaf area, leaf area index, total dry matter production, grain yield, fodder yield and economic parameters compared to rest of the treatments while, 2nd fortnight of September (D_8) sowing was recorded significantly lower growth parameters.

Key words: Planting geometries, Dates of sowing, Plant height, Total dry matter, LAI, Economics

Introduction

Baby corn is the ear of maize (*Zea mays* L.) plant harvested young, especially when the silks have either not emerged or just emerged, and no fertilization has taken place, depending on the cultivar grown. The dehusked young ears of baby corn can be eaten as a vegetable, whose delicate sweet flavour and crispiness are much in demand. Importantly, baby corn is free from pesticides and its nutritional value is comparable to popular vegetables like cauliflower, cabbage, tomato, eggplant and cucumber. Its by-products such as tassel, young husk, silk and green stalks provide good cattle feed. Baby corn crop owing to its more profitability than grain maize is helpful in raising the income of the farmers (Pandey *et al.*, 2000). Many crop management factors affect the yield of this crop. For higher production, the influence of weather elements particularly the temperature on crop growth and development and by their own productivity is well established. So planting time may affect the productivity of baby corn. At the same time, because it is grown in harsh environments, the potential for meeting growing demand by expanding the area sown is limited. Among the various management practices, the major non monetary inputs for enhancing the corn production is optimum time of sowing and optimum spacing which modifies the growth environment by way of regulating the natural endowments like light, temperature and moisture.

Crop growth and development are influenced by many weather parameters, the temperature is identified as one of the most important factor which affects its growth and development. The growth rate and development of a crop is a function of energy receipt and thermal regime in any given crop. The duration of a particular stage of growth is directly related to temperature and this duration of particular species could be predicted using the sum of daily mean air temperatures. The air temperature based indices like growing degree days (GDD), phenothermal index (PTI), heat use efficiency (HUE) *etc.* can be successfully used for describing phenological behavior and other growth parameters like leaf area development, biomass

production, seed yield *etc.* Agronomic requirements of baby corn could be similar to that of grain maize except for higher population density, higher fertilization and early harvesting. Baby corn as a cash crop fits in well for intensive agro ecosystems where small farmers can grow three or more crops in highly diverse cropping system (Nataraj *et al.* 2011). Crop diversification and value addition as backed by food processing industry. An interesting recent development is growing baby corn for vegetable purpose. Living standards of people and shift in food habit from non vegetarian to vegetarian makes popularity of baby corn cultivation. Though the baby corn is more popular worldwide, agro-techniques to achieve higher production is the need of the day (Thavaprakash *et al.* 2008).

Materials and Methods

A field experiment was conducted during *kharif* season of 2014 -15 at Main Agricultural Research Station (MARS) Dharwad district of Karnataka at 15°29' N latitude, 74°59' E longitudes and at an altitude of 689 m above mean sea level on deep black soil. The experiment was laid out in split plot design involving two spacing viz., S_1 : 60 cm x 15 cm and S_2 : 45 cm x 20 cm as main plots and eight sowing dates as sub plots viz., D_1 : First fortnight of June, D_2 : Second fortnight of June, D_3 : First fortnight of July, D_4 : Second fortnight of July, D_5 : First fortnight of August, D_6 : Second fortnight of August, D_7 : First fortnight of September and D_8 : Second fortnight of September. During the experimental year (2014), rainfall of 962.20 mm was received which was 250.76 mm more than the normal. The rainfall during cropping period (June-December) was 708.5 mm which was well distributed during crop growth period. The land was ploughed with the help of tractor by using mould board plough and disc plough then cultivar was passed to crush the clods and to get the fine tilth. The land was leveled and the field was laid out in to experimental plots as per the plan and then bunds were formed to all the plots.

The soil of the experimental site was black clay soil with pH (7.21), EC (0.29 dS m⁻¹), available N (224 kg ha⁻¹), P₂O₅ (33 kg ha⁻¹)

Table-1: Meteorological parameters in cropping period

| Dates of sowing | Rainfall (mm) | Mean temperature (°C) | | Relative humidity (%) | Growing degree days (GDD) |
|--|---------------|-----------------------|------------------|-----------------------|---------------------------|
| | | T _{max} | T _{min} | | |
| D ₁ : First fortnight of June | 4.2 | 31.3 | 21.8 | 73.5 | 115.7 |
| D ₂ : Second fortnight of June | 8.3 | 30.3 | 21.2 | 74.7 | 110.0 |
| D ₃ : First fortnight of July | 10.5 | 28.6 | 20.7 | 82.8 | 102.6 |
| D ₄ : Second fortnight of July | 71.2 | 25.4 | 20.9 | 89.7 | 92.2 |
| D ₅ : First fortnight of August | 74.8 | 25.4 | 20.9 | 89.9 | 91.6 |
| D ₆ : Second fortnight of August | 29.9 | 28.6 | 20.4 | 82.7 | 101.5 |
| D ₇ : First fortnight of September | 25.9 | 25.4 | 20.2 | 89.1 | 89.5 |
| D ₈ : Second fortnight of September | 3.1 | 28.1 | 20.0 | 82.0 | 98.3 |

and K₂O (450 kg ha⁻¹). The FYM @ 10 t ha⁻¹ was applied 15 days prior to sowing and mixed well in the soil. The fertilizer dose 150:75:50 kg ha⁻¹ N: P₂O₅: K₂O and ZnSO₄ and FeSO₄ @ 25 kg ha⁻¹ were applied to the crop. Fifty per cent of nitrogen and full quantity of P₂O₅ and K₂O were applied just before the sowing as basal application. The nutrients were supplied in the form of urea, DAP and muriate of potash. The remaining 50 per cent of nitrogen was top dressed at 28 days after sowing through urea. The furrows were opened with the help of marker as per the spacing. Seeds of Baby corn G-5417 (Baby corn hybrid of Syngenta Pvt. Ltd.) was used for sowing with recommended seed rate of 25 kg ha⁻¹. There was three irrigation given in first sowing date, two in second sowing date, one in third sowing date and no irrigation given in fourth sowing date, two irrigation each in fifth and sixth sowing date, one irrigation in seventh sowing date and two irrigation in last sowing date.

Daily meteorological observations like rainfall, maximum and minimum temperature, relative humidity were recorded in the meteorological observatory. The time taken for the different biometrical observations like plant height and total dry matter production were recorded at different growth stages of the crop. Accumulated growing degree days (GDD) were determined by using base temperature as of 10°C for baby corn (Panse and Sukhatme, 1985). Biometric observations were taken at different growth stages of crop. Leaf area was measured from the base to the tip. Leaf breadth was taken at the widest point of the leaf lamina. The product of the leaf length and breadth was multiplied by the factor 0.75 (Saxena and Singh, 1965) and the sum of leaf area of all the leaves was expressed as dm² per plant. LAI was calculated as per the procedure given by Sestak *et al.* (1971). The economics were worked out on the basis of baby corn yield and green biomass yield. Correlation coefficients between growth stages and sowing dates with weather variables were worked out as per the statistical procedures (Panse and Sukhatme, 1967). The prevailing market price of baby corn and stover were considered. The data collected at different growth stages of crop were subjected to statistical analysis as described by Panse and Sukhatme (1967).

Results and Discussion

Meteorological parameters: In agriculture, heat units are often expressed as growing degree days (GDD). The accumulated thermal units (Table 1) revealed that the GDD differed with respect to different dates of sowing. GDD required for entire season was higher in first fortnight of June compared to rest of the sowing dates and it was almost same for the second fortnight of June. This was due to environmental factors, especially temperature during the period of

seed development and maturation resulted in higher GDD (Mehdi Dahmardeh, 2012). GDD for second fortnight of July and first fortnight of August did not differ in the cropping period. Accumulated GDD from sowing to harvest was 801.4 degree days in the cropping season.

Biometric parameters: The grain yield is an end product, which obviously depends upon the dry matter production at different stages of crop growth and its distribution into reproductive parts. Dry matter production and distribution is the result of different growth parameters like plant height, number of leaves, leaf area and leaf area index which contributes directly towards the photosynthetic potential of the plant.

Effect of planting geometries on baby corn growth parameters:

At all the growth stages, total dry matter production per plant did not differ significantly with planting geometries. This was due to dry matter accumulation in leaves; stem and reproductive parts did not differ significantly with planting geometries. The dry matter production was influenced by the plant height, number of leaves, leaf area, and leaf area index which also did not differ significantly with planting geometries (Antaravalli *et al.*, 2002). This was mainly due to similar plant population maintained in both the planting geometries and there was less inter and intra plant competition for growth factors particularly for moisture (Golada *et al.*, 2013).

Effect of sowing dates on growth parameters of baby corn:

Plant height differed significantly at all the growth stages with sowing dates (Table 2). At harvest, among the various planting dates, June 1st fortnight sowing (D₁) was recorded significantly higher plant height (173.5 cm) than other sowing dates (Table 2). While, 2nd fortnight of September sowing (D₈) was recorded significantly the least plant height (153.1 cm). Similar trend was observed at 30 and 45 DAS. This was due to early sowing of baby corn did not infested with diseases like leaf blight and cold weather. The early sowing leads to better growth of baby corn within the optimum range of soil moisture, temperature and relative humidity (Zinta Gaile, 2012). Leaf blight at its early stages of growth and due to cold effect on the later part of growth was the main reason for reduced plant height at later sowing dates. Similar results were also observed by Shirkhani *et al.*, 2012 and Peykarestan and Seify, 2012 in maize. June 1st fortnight (D₁) sowing was recorded significantly higher number of leaves per plant (8.4, 10.1 and 12.0 respectively) at 30, 45 DAS and at harvest as compared to later sowing dates (Table 2). Whereas, September 2nd fortnight (D₈) sowing was recorded significantly lower number of leaves at 30, 45 DAS and harvest (5.9, 7.9 and 10.5 respectively). The cold weather and leaf blight at its early stages of growth and due to cold effect on the later part of growth was the main reason for reduced plant height at later sowing

Table-2: Plant height and Number of leaves at different growth stages as influenced by planting geometries and sowing dates in baby corn

| Treatment | Leaf area of baby corn (dm ² /plant) | | | | | | | | | | | | | | | | | |
|--------------------|---|----------------|------------|--------------|----------------|----------------|-------|--------------|---------------------|----------------|------------|------------|-----------------|----------------|------------|-------------|-----|------------|
| | 30 DAS | | | | 45 DAS | | | | At harvest (60 DAS) | | | | Leaf area index | | | | | |
| | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | | |
| D ₁ | 44.2 | 45.4 | 44.8 | 124.7 | 125.1 | 124.7 | 124.9 | 173.6 | 173.3 | 173.5 | 10.2 | 10.1 | 12.0 | 11.9 | 12.0 | 11.1 | | |
| D ₂ | 42.5 | 43.8 | 43.2 | 117.6 | 115.9 | 116.7 | 116.7 | 170.3 | 169.9 | 170.1 | 6.9 | 6.8 | 9.0 | 8.9 | 9.0 | 11.8 | | |
| D ₃ | 41.2 | 42.7 | 41.9 | 114.2 | 115.3 | 114.2 | 114.7 | 167.9 | 167.4 | 167.6 | 6.8 | 6.8 | 8.6 | 8.7 | 8.7 | 11.4 | | |
| D ₄ | 40.9 | 41.6 | 41.2 | 114.8 | 111.4 | 113.1 | 113.1 | 165.6 | 165.0 | 165.3 | 6.6 | 6.6 | 8.6 | 8.6 | 8.4 | 11.2 | | |
| D ₅ | 40.8 | 41.1 | 41.0 | 108.2 | 110.0 | 109.2 | 109.1 | 162.5 | 161.9 | 162.2 | 6.4 | 6.5 | 8.3 | 8.3 | 8.3 | 10.8 | | |
| D ₆ | 40.1 | 40.1 | 40.1 | 105.0 | 109.3 | 107.2 | 107.2 | 157.4 | 157.3 | 157.4 | 6.1 | 6.3 | 8.2 | 8.0 | 8.1 | 10.7 | | |
| D ₇ | 38.1 | 37.1 | 37.6 | 101.2 | 101.9 | 101.5 | 101.5 | 155.8 | 155.2 | 155.5 | 6.1 | 6.1 | 8.1 | 8.0 | 8.0 | 10.6 | | |
| D ₈ | 37.3 | 34.6 | 36.0 | 98.6 | 99.6 | 99.1 | 99.1 | 153.3 | 153.0 | 153.1 | 6.0 | 5.9 | 7.9 | 7.8 | 7.9 | 10.2 | | |
| Mean of DS | 40.65 | 40.8 | | 109.9 | 111.7 | 109.9 | | 163.3 | 162.9 | | 6.7 | 6.6 | 8.6 | 8.6 | 8.6 | 11.4 | | |
| Comparing means of | S.Em+ | CD | (P = 0.05) | S.Em+ | CD | (P = 0.05) | S.Em+ | CD | (P = 0.05) | S.Em+ | CD | (P = 0.05) | S.Em+ | CD | (P = 0.05) | S.Em+ | CD | (P = 0.05) |
| (S) | 0.4 | NS | | NS | 0.48 | NS | NS | 0.15 | NS | NS | 0.1 | 0.1 | NS 0.1 | NS | NS | 0.1 | NS | NS |
| (D) | 0.8 | 2.3 | | 3.76 | 1.3 | | | 0.73 | 2.11 | | 0.2 | 0.5 | 0.3 | 1.0 | 0.9 | 0.3 | 0.9 | NS |
| (S X D) | 1.1 | NS | | NS | 1.83 | NS | NS | 1.03 | NS | NS | 0.2 | 0.2 | NS 0.5 | NS | NS | 0.4 | NS | NS |

S: Plant geometry
S₁: 60 cm x 15 cm
S₂: 45 cm x 20 cm
D: Sowing dates of baby corn
D₁: First fortnight of June
D₂: Second fortnight of June
D₃: First fortnight of July
D₄: Second fortnight of July
D₅: First fortnight of August
D₆: Second fortnight of August
D₇: First fortnight of September
D₈: Second fortnight of September
NS: Non significant

dates. Similar results were also observed by Shirkhani *et al.*, 2012 and Peykarestan and Seify, 2012 in maize. Among the various planting dates, June 1st fortnight (D₁) sowing was recorded significantly higher leaf area (28.1, 57.0 and 69.3 dm² plant⁻¹ respectively) at 30, 45 DAS and at harvest than later sowing dates (Table 3). While, 2nd fortnight of September (D₈) sowing was recorded significantly the least leaf area in all growth stages (19.1, 35.9 and 50.7 dm² plant⁻¹ respectively) the same trend was also followed in case of leaf area index. This might be due to optimum range of both maximum and minimum temperature at early date of sowing (Mehdi Dahmardeh, 2012). But delayed sown plants suffered from higher disease (leaf blight) incidence at early growth stages of crop. Also delayed sown crop was experienced cold effect during grand growth period which led to decrease in leaf area and leaf area index (Mostafa Amjadian *et al.*, 2013).

Among the sowing dates, June 1st fortnight (D₁) sowing was recorded significantly higher dry matter production per plant (28.6, 54.9 and 92.3 g plant⁻¹ respectively) at 30, 45 DAS and at harvest compared to other sowing dates (Table 4). However, dry matter production was decreased as sowing dates was delayed from first sowing date to last sowing date. September 2nd fortnight (D₆) sowing was recorded significantly lower dry matter production per plant at 30, 45 DAS and at harvest (26.1, 39.6 and 66.9 g plant⁻¹ respectively). Significant differences in growth parameters at different growth stages of baby corn was the main reason for higher dry matter production. The growth parameters of baby corn were not influenced by interaction effects of planting geometries and sowing dates. Among the various sowing dates, June 1st fortnight (D₁) sowing was recorded significantly higher yield of baby corn with husk (8709 kg ha⁻¹) than other dates of sowing (Table 4) which was 23.21 per cent higher than the least yield (7069 kg ha⁻¹) obtained in case of sowing at September 2nd fortnight (D₆) June 2nd fortnight (D₂) (8644 kg ha⁻¹) and July 1st fortnight (D₃) (8457 kg ha⁻¹) sowing were on par with June 1st fortnight sowing. The reduction in yield due to delayed sowing might be attributed to reduction in the yield contributing characters like cob weight, cob length and cob girth which might be the result of reduction in dry matter accumulation in reproductive parts (Mostafa Amjadian *et al.*, 2013). The reduction in dry matter attributed to cold weather observed in case of delayed sowing. Similar kind of result was observed by Shirkhani *et al.*, 2012 and Peykarestan and Seify, 2012 in maize.

In case of fodder yield, among the various sowing dates, June 1st fortnight (D₁) sowing was recorded significantly higher fodder yield of baby corn (21.6 t ha⁻¹) which was 46.74 per cent higher than the least fodder yield (14.7 t ha⁻¹) obtained during September 2nd fortnight (D₆) sowing (Table 4). This was due to lower dry matter accumulation in plant. Similar kinds of result observed by Farsiani *et al.*, 2011 in sweet corn. Interaction effects of planting geometries and sowing dates were non significant with respect to baby corn yield and baby fodder yield.

Economics :

Effect of planting geometries on economics of baby corn cultivation: The cost of cultivation remained same for all the treatments. Gross return, net returns and B:C ratio did not differ significantly with planting geometries. This was due to non significant results in cob yield and fodder yield with respect to planting geometries.

Table-3: Leaf area and Leaf area index at different growth stages as influenced by planting geometries and sowing dates in baby corn

| Treatment | Leaf area index | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|----------------|-------------|-------|----------------|----------------|-------------|-----|---------------------|----------------|-------------|----------|----------------|----------------|------------|-------|----------------------------|----------------|------------|------|------------|------------|------|----------|
| | 30 DAS | | | | 45 DAS | | | | At harvest (60 DAS) | | | | 30 DAS | | | | 45 DAS at harvest (60 DAS) | | | | | | | |
| | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | | | | |
| D ₁ | 28.5 | 27.8 | 28.1 | 0.4 | 57.0 | 57.0 | 57.0 | 0.2 | 69.7 | 68.9 | 69.3 | 0.8 | 3.2 | 3.1 | 3.1 | 0.007 | 6.3 | 6.3 | 6.3 | 0.03 | 7.7 | 7.7 | 0.16 | |
| D ₂ | 27.3 | 27.5 | 27.4 | 0.4 | 52.0 | 51.3 | 51.7 | 0.3 | 67.7 | 67.6 | 67.7 | 0.8 | 3.0 | 3.1 | 3.0 | 0.02 | 5.8 | 5.7 | 5.7 | 0.05 | 7.5 | 7.5 | 0.26 | |
| D ₃ | 26.5 | 26.3 | 26.4 | 0.6 | 47.1 | 47.3 | 47.3 | 0.4 | 66.1 | 64.9 | 65.5 | 1.2 | 3.0 | 2.9 | 2.9 | 0.03 | 5.3 | 5.2 | 5.3 | 0.07 | 7.3 | 7.2 | 0.76 | |
| D ₄ | 24.6 | 24.4 | 24.5 | NS | 45.2 | 45.9 | 45.6 | NS | 63.4 | 61.1 | 62.2 | 0.8 | 2.7 | 2.7 | 2.7 | 0.03 | 5.0 | 5.1 | 5.1 | 0.07 | 7.0 | 6.8 | NS | |
| D ₅ | 23.7 | 23.6 | 23.6 | NS | 43.7 | 42.7 | 43.2 | NS | 58.6 | 57.5 | 58.0 | 0.8 | 2.6 | 2.6 | 2.6 | 0.03 | 4.9 | 4.8 | 4.8 | 0.07 | 6.5 | 6.4 | NS | |
| D ₆ | 22.5 | 22.2 | 22.3 | NS | 41.4 | 42.4 | 41.9 | NS | 55.7 | 55.4 | 55.5 | 0.8 | 2.5 | 2.5 | 2.5 | 0.03 | 4.6 | 4.7 | 4.7 | 0.07 | 6.2 | 6.2 | NS | |
| D ₇ | 20.9 | 20.2 | 20.5 | NS | 38.5 | 38.7 | 38.6 | NS | 52.4 | 52.6 | 52.5 | 0.8 | 2.3 | 2.2 | 2.3 | 0.03 | 4.3 | 4.3 | 4.3 | 0.07 | 5.8 | 5.8 | NS | |
| D ₈ | 19.6 | 18.6 | 19.1 | NS | 36.4 | 35.4 | 35.9 | NS | 50.8 | 50.6 | 50.7 | 0.8 | 2.2 | 2.1 | 2.1 | 0.03 | 4.0 | 3.9 | 4.0 | 0.07 | 5.7 | 5.6 | NS | |
| Mean of DS | 24.2 | 23.8 | 24.0 | | 45.2 | 45.1 | 45.1 | | 60.6 | 59.8 | 60.2 | | 2.7 | 2.7 | 2.7 | | 5.0 | 5.0 | 5.0 | | 6.7 | 6.6 | | |
| Comparing means of | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) |
| (S) | 0.1 | NS | | 0.4 | NS | | 0.2 | NS | | 0.2 | NS | | 0.007 | NS | | 0.03 | NS | | 0.03 | NS | | 0.16 | NS | |
| (D) | 0.2 | 0.6 | | 0.4 | 1.2 | | 0.3 | 0.8 | | 0.3 | 0.8 | | 0.02 | 0.07 | | 0.05 | 0.13 | | 0.05 | 0.13 | | 0.26 | 0.76 | |
| (S X D) | 0.3 | NS | | 0.6 | NS | | 0.4 | NS | | 0.4 | NS | | 0.03 | NS | | 0.07 | NS | | 0.07 | NS | | 0.37 | NS | |

S: Plant geometry
 S₁: 60 cm x 15 cm
 S₂: 45 cm x 20 cm
D: Sowing dates of baby corn
 D₁: First fortnight of June
 D₂: Second fortnight of June
 D₃: First fortnight of July
 D₄: Second fortnight of July
DAS: Days after sowing
 DAS: First fortnight of August
 DAS: Second fortnight of August
NS: Non significant

Table-4: Total dry matter production, yield with husk and fodder yield as influenced by planting geometries and sowing dates in baby corn

| Treatment | Total dry matter production (dm ² /plant) | | | | | | | | | | | | Baby corn yield with husk (kg ha ⁻¹) | | | | Fodder yield (t ha ⁻¹) | | | | | | | |
|--------------------|--|----------------|-------------|-------|----------------|----------------|-------------|------|---------------------|----------------|-------------|----------|--|----------------|----------------|-------|------------------------------------|----------------|----------------|------|----------------|----------------|------|----------|
| | 30 DAS | | | | 45 DAS | | | | At harvest (60 DAS) | | | | S ₁ | | S ₂ | | Mean | | S ₁ | | S ₂ | | Mean | |
| | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD | S ₁ | S ₂ | Mean | CD |
| D ₁ | 28.8 | 28.3 | 28.6 | 0.4 | 55.4 | 54.4 | 54.9 | 0.2 | 92.4 | 92.1 | 92.3 | 0.8 | 87.63 | 86.55 | 87.09 | 0.26 | 22.5 | 20.7 | 21.6 | 0.16 | 20.7 | 19.8 | 20.2 | 0.4 |
| D ₂ | 28.1 | 27.8 | 28.0 | 0.4 | 52.0 | 51.5 | 51.7 | 0.3 | 87.3 | 86.7 | 87.0 | 0.8 | 86.76 | 86.11 | 86.44 | 0.26 | 21.4 | 19.8 | 20.6 | 0.16 | 19.8 | 18.6 | 19.2 | 0.4 |
| D ₃ | 27.7 | 27.7 | 27.7 | 0.6 | 49.7 | 48.8 | 49.3 | 0.4 | 82.1 | 82.2 | 82.2 | 0.8 | 85.02 | 84.12 | 84.57 | 0.26 | 20.4 | 18.6 | 19.5 | 0.16 | 18.6 | 17.8 | 18.2 | 0.4 |
| D ₄ | 27.4 | 27.3 | 27.4 | NS | 47.6 | 45.7 | 46.6 | NS | 79.7 | 78.6 | 79.2 | 0.8 | 83.77 | 82.83 | 83.30 | 0.26 | 19.7 | 17.8 | 18.7 | 0.16 | 17.8 | 17.7 | 17.7 | 0.4 |
| D ₅ | 27.0 | 27.1 | 27.1 | NS | 45.6 | 44.5 | 45.1 | NS | 76.8 | 76.2 | 76.5 | 0.8 | 81.03 | 80.67 | 80.85 | 0.26 | 18.5 | 17.0 | 17.7 | 0.16 | 17.0 | 17.3 | 17.1 | 0.4 |
| D ₆ | 26.7 | 26.7 | 26.7 | NS | 43.9 | 42.9 | 43.4 | NS | 73.2 | 71.6 | 72.4 | 0.8 | 78.04 | 76.66 | 77.35 | 0.26 | 18.0 | 16.7 | 17.3 | 0.16 | 16.7 | 17.3 | 17.0 | 0.4 |
| D ₇ | 26.5 | 26.4 | 26.4 | NS | 42.7 | 40.9 | 41.8 | NS | 70.3 | 68.8 | 69.6 | 0.8 | 74.48 | 74.3 | 74.3 | 0.26 | 17.0 | 15.4 | 16.2 | 0.16 | 15.4 | 16.2 | 15.8 | 0.4 |
| D ₈ | 26.2 | 26.1 | 26.1 | NS | 40.6 | 38.7 | 39.6 | NS | 67.3 | 66.5 | 66.9 | 0.8 | 70.89 | 70.49 | 70.69 | 0.26 | 15.0 | 14.5 | 14.7 | 0.16 | 14.5 | 14.7 | 14.6 | 0.4 |
| Mean of DS | 24.2 | 23.8 | 24.0 | | 45.1 | 45.1 | 45.1 | | 59.8 | 59.8 | 59.8 | | 2.7 | 2.7 | 2.7 | | 5.0 | 5.0 | 5.0 | | 6.7 | 6.6 | | |
| Comparing means of | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) | S.Em+ | CD | (P=0.05) |
| (S) | 0.14 | NS | | 1.48 | NS | | 0.16 | NS | | 0.16 | NS | | 36.2 | NS | | 0.26 | NS | | 0.26 | NS | | 1.6 | NS | |
| (D) | 0.14 | 0.41 | | 1.62 | 4.69 | | 0.38 | 1.09 | 130.2 | | 0.58 | | 373.5 | | | 0.58 | | | | | | | | |
| (S X D) | 0.20 | NS | | 2.29 | NS | | 0.53 | NS | | 0.53 | NS | | 184.1 | NS | | 0.814 | NS | | 0.814 | NS | | | | |

S: Plant geometry
 S₁: 60 cm x 15 cm
 S₂: 45 cm x 20 cm
D: Sowing dates of baby corn
 D₁: First fortnight of June
 D₂: Second fortnight of June
 D₃: First fortnight of July
 D₄: Second fortnight of July
DAS: Days after sowing
 DAS: First fortnight of August
 DAS: Second fortnight of August
NS: Non significant

Table-5: Gross return, net return and B:C ratio of baby corn as influenced by planting geometries and sowing dates

| Treatment | Gross return (Rs. ha ⁻¹) | | | Net return (Rs. ha ⁻¹) | | | B:C ratio | | |
|------------------------|--------------------------------------|----------------|---------------|------------------------------------|----------------|---------------|----------------|----------------|------------|
| | S ₁ | S ₂ | Mean | S ₁ | S ₂ | Mean | S ₁ | S ₂ | Mean |
| D ₁ | 191017 | 187585 | 189301 | 143685 | 140253 | 141969 | 4.0 | 4.0 | 4.0 |
| D ₂ | 188483 | 186108 | 187295 | 141151 | 138776 | 139963 | 4.0 | 3.9 | 4.0 |
| D ₃ | 184331 | 181223 | 182777 | 136999 | 133891 | 135445 | 3.9 | 3.8 | 3.9 |
| D ₄ | 181322 | 178091 | 179706 | 133990 | 130759 | 132374 | 3.8 | 3.8 | 3.8 |
| D ₅ | 174972 | 173211 | 174092 | 127640 | 125879 | 126760 | 3.7 | 3.7 | 3.7 |
| D ₆ | 168649 | 165002 | 166825 | 121317 | 117670 | 119493 | 3.6 | 3.5 | 3.5 |
| D ₇ | 160881 | 165639 | 163260 | 113549 | 118307 | 115928 | 3.4 | 3.5 | 3.5 |
| D ₈ | 152249 | 151112 | 151680 | 104917 | 103780 | 104348 | 3.2 | 3.2 | 3.2 |
| Mean of DS | 175238 | 173496 | | 127906 | 126164 | | 3.7 | 3.7 | |
| For comparing means of | S.Em+ | CD (P = 0.05) | | S.Em+ | CD (P = 0.05) | | S.Em+ | CD (P = 0.05) | |
| Plant geometry (S) | 603.81 | NS | | 603.81 | NS | | 0.01 | NS | |
| Sowing dates (D) | 2565.79 | 7432.8 | | 2565.79 | 7432.8 | | 0.05 | 0.16 | |
| Interaction (S x D) | 3628.57 | NS | | 3628.57 | NS | | 0.08 | NS | |

S: Plant geometry; D: Sowing dates of baby corn, DAS: Days after sowing; NS: Non significant; S₁: 60 cm x 15 cm; S₂: 45 cm x 20 cm; D₁: First fortnight of June; D₂: Second fortnight of June; D₃: First fortnight of July; D₄: Second fortnight of July; D₅: First fortnight of August; D₆: Second fortnight of August; D₇: First fortnight of September; D₈: Second fortnight of September

Effect of sowing dates on economics of baby corn cultivation

: Among the various planting dates, June 1st fortnight (D₁) sowing was recorded significantly higher gross returns in baby corn production (Rs.1,89,301ha⁻¹) than other sowing dates (Table 5). This was attributed to higher cob yield and fodder yield were recorded with this treatment (Ganajaxi *et al.*, 2010). While, 2nd fortnight of September (D₈) sowing was recorded significantly lower gross returns in baby corn production (Rs. 1,51,680 ha⁻¹). This was due to lower cob yield and fodder yield in this treatment (Zinta Gaile, 2012). The same trend was followed in case of net returns and B:C ratio as the cost of cultivation was similar for all the treatments. The economics of baby corn cultivation were not influenced by interaction effects of planting geometries and sowing dates.

The present study shows that GDD required for entire season was higher in first fortnight of June compared to rest of the sowing dates and it was almost same for the second fortnight of June. GDD for second fortnight of July and first fortnight of August did not differ in the cropping period. 1st fortnight sowing (D₁) was recorded significantly higher plant height, number of green leaves, leaf area, leaf area index, total dry matter production, grain and fodder yield compared to rest of the treatments.

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