

Effect of sowing schedule and integrated nutrient management on productivity, profitability and soil health in rainfed baby corn (*Zea mays*)–horse gram (*Macrotyloma uniflorum*) cropping sequence

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ABSTRACT

A field experiment was conducted during the rainy (*kharif*) seasons of 2012 and 2013 at Ambikapur, Chhattisgarh, to work out the effect of sowing schedule and integrated nutrient-management systems on the productivity and profitability of baby corn (*Zea mays* L.)–horse gram [*Macrotyloma uniflorum* (L.) Verdc.] cropping system. The experiment was laid out in a split-plot design with 4 treatments of sowing schedule (1st week of July, 2nd week of July and 3rd week of July and 4th week of July) in main plots and 4 levels of fertility (Recommended dose of fertilizer (RDF), 125% of RDF, RDF + 5 t FYM, 125% of RDF + 5 t FYM) with 3 replications. The horse gram was taken as *utera* crop sown just before harvesting of baby corn of each sowing schedule by using common starter dose (20-50-20 kg N-P-K/ha). Baby cob, baby corn, green fodder of baby corn plants, horse gram yield and economics were higher in sowing of first schedule (1st week of July) which showed parity with second (2nd week of July) and third (3rd week of July) sowing schedule but significantly superior to the fourth sowing schedule, i.e. 4th week of July. Further, application of 125% RDF + 5 t FYM significantly increased the baby cob, baby corn, green fodder, horse gram yield over 100% RDF and 125% RDF, but was at par with that obtained with 100% RDF + 5 t FYM. Combined effect of sowing of the first schedule of baby corn and horse gram and application of 125% RDF + 5 t FYM resulted in significantly higher baby corn-equivalent yield in terms of system productivity (2.8 t/ha) which was comparable to sowing of the second schedule with 125% RDF + 5 t FYM (2.7 t/ha), sowing of the third schedule with 125% RDF + 5 t FYM (2.3 t/ha), sowing of the first schedule with 100% RDF + 5 t FYM (2.7 t/ha), sowing of the second schedule with 100% RDF + 5 t FYM (2.5 t/ha) and sowing of the first schedule with 125% RDF (2.5 t/ha). Hence sowing of baby corn on the first schedule (1st week of July) with 125% RDF + 5 t FYM followed by horse gram revealed the maximum system productivity in terms of baby corn-equivalent yield (2.8 t/ha) and net profit (₹173,000/ha). As regards to nutrient management in baby corn and horse gram system, the maximum nutrient uptake (205.7 kg N, 35.5 kg P and 222.8 kg K/ha) and soil fertility status after final harvesting of cropping system (256.19 kg N, 9.1 kg P₂O₅ and 281.00 kg K₂O/ha) were registered under 125% RDF + 5 t FYM.

Key words : Baby corn, Green fodder, Horse gram, Net returns, System productivity, Soil health

Rainfed agriculture has a prime place in Indian agriculture, contributing 67% area and 42% in national food grain production. Chhattisgarh occupies 13.78 million ha area with a cultivable land of 4.67 million ha. It is estimated that approximately 1.41 million ha can be potentially irrigated, covering 30% of entire cropped area. There is adequate rainfall ranging from 1,200 mm to 1,600 mm which is more than the national average of 1,100 mm. There is need for development and adoption of eco farming techniques, which are ecologically sound, environ-

mentally safe and economically efficient. Besides adoption of proper input-management technologies, diversification or intensification through crops of diverse nature may be a good proportion to break the monotony of the system (Tripathi and Singh, 2008). Among the field crops, legume involves much less energy requirement and crop rotation with legume is assumed to be energetically favourable to those without legumes due to reduced fertilizer inputs.

Corn is a versatile crop, which finds a place in the human diet, animal feed, fodder and industrial raw material. Due to changing food preferences in Indian life style the urban population is switching to new food items: the

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'Baby corn' is a new addition to Indian foods. A baby corn is dehusked maize ear, harvested within 2–3 days of silking, i.e. prior to fertilization. High nutritive value, eco-friendly, and crispy nature of baby corn has made it special choice for various traditional and continental dishes apart from canning in elite society. As the product is freshly consumed, the quality of the corn is considered to be the most important. Timely harvesting is very crucial for quality of baby corn for marketing and harvesting large amount of baby corn at a time will deteriorate the quality as well as heavy monetary loss. Being a short-duration crop, it easily fits in an intensive cropping system and in addition to baby corn it provides green, soft, succulent, nutritious, palatable felicitous fodder to cattle (Das *et al.*, 2008). Cultivation of baby corn is gaining popularity in peri-urban areas owing to its export potential besides a huge employment generation. Being a short-duration crop (50–60 days) and short-duration pulse crop like horse gram can be included and sown just before harvesting of baby corn as *utera* crop. Horse gram is the most protein-rich pulse consumed by tribal peoples grown mostly in dry agricultural lands. Traditional medicinal texts describe its use for asthma, bronchitis, leucoderma, urinary discharge, kidney stones and heart disease. The net monetary return of a cropping system can be quantified and qualified by sound planning for sustainable systems.

Baby corn is new introduction, particularly as short-duration crop; so efforts are required to standardize and economize its cultivation. Although the agronomic requirements like plant geometry and nitrogen levels (Dar *et al.*, 2014), integrated nutrient management (Saha and Mondal, 2006) and weed-control methods (Barod *et al.*, 2012) for baby corn has been worked out for irrigated conditions, but work on intensive cultivation of baby corn and horse gram (as *utera* crop) at different sowing schedules and at different nutrient management systems having both inorganic and organic sources has not been done for rainfed conditions. Therefore, the present experiment was undertaken to find out the effect of sowing schedule and different integrated nutrient management systems on the system productivity, net returns, and soil physio-chemical properties in Northern Hill region of Chhattisgarh.

MATERIALS AND METHODS

The present investigation was conducted during the rainy (*kharif*) seasons of 2012 and 2013 at the Research Farm, RMD Collage of Agriculture and Research Station, Ambikapur, Chhattisgarh (23°18' N and 83°15' E and at 611 m above mean sea-level). The soil of experimental field was sandy loam. Chemical analysis of the soil (top 15 cm) showed an acidic pH (5.7), organic carbon 0.56%, 234 kg/ha available N, 8.4 kg/ha P₂O₅ and 268 kg/ha K₂O.

The meteorological data recorded at meteorological observatory of the station indicated that rainfall received during the crop seasons was 1,120 mm (53 rainy days) and 1,000.2 mm (50 rainy days) in 2012 and 2013 respectively. The crop experienced mean weekly maximum temperature ranging from 24.1 to 31.7°C and 24.4 to 32.0°C during 2012 and 2013 respectively whereas mean weekly minimum temperature ranging from 4.7 to 20.4°C and 6.1 to 23.6°C during 2012 and 2013 respectively. The field experiment was laid out in a split-plot design with 4 treatments of sowing schedule (1st week of July, 2nd week of July and 3rd week of July and 4th week of July) in main plots and 4 levels of fertility levels [recommended dose of fertilizer (RDF), 125% of RDF, RDF + 5 t FYM, 125% of RDF + 5 t FYM) with 3 replications. The recommended dose of fertilizer (RDF) given to the crop was 150-60-40 kg N-P₂O₅-K₂O/ha. Baby corn variety 'Syngenta 5414' was sown at one-week intervals starting from 3rd July and 5th July in 2012 and 2013 respectively. Horse gram ('Indira Kulthi-1') was taken as *utera* crop sown 45 days after sowing of each schedule at an interval of 1 week as main plot treatment. Inorganic and organic source of nutrients were applied as per treatments. Nitrogen as per treatment was applied in 3 splits. Half dose of nitrogen along with full dose of phosphorus and potassium was applied at the time of sowing of baby corn. The remaining dose of nitrogen was applied equally in 2 splits, at 30 and 45 days after sowing. Common dose of nutrients 20-50-20 kg N-P₂O₅-K₂O/ha was applied as starter dose at the time of sowing of horse gram which was taken as *utera* crop. Baby corn was sown at spacing of 50 cm with plant-to-plant spacing of 20 cm to maintain the plant population of 100,000 plants/ha using 20 kg seeds/ha, whereas horse gram was sown 45 days after sowing of each sowing schedule on both sides of baby corn maintaining 25 cm spacing and plant-to-plant spacing of 10 cm using 12 kg seeds/ha. Gap filling and thinning were done within 10 days after sowing to maintain the optimum plant population. Weeds were controlled in baby corn by pre-emergence application of atrazine (1.5 kg a.i./ha) to control the initial weed flushes, whereas latter weed flushes were controlled by mechanical weeder at 25 days after sowing and no weed-management practices were done in horse gram. Regular detasseling was done just after tassel emergence to avoid fertilization. Five plants were tagged randomly from each plot for recording of growth and yield attributes. Immature baby corns were harvested within 2–3 days after silk emergence and same were counted, weighed dehusked and baby corn yield was recorded. Standard yield of baby corn referred to those corn which were straight, having 7–10 cm length and 1–1.5 cm diameter mostly preferred for marketing purpose (Mondal *et al.*

2006). The baby corn yield was calculated by adding the yield from all the pickings. Total green fodder yield was calculated by adding tassel weight, husk weight and green fodder weight of plants/plot at the time just after final pickings. Gross returns, net returns and benefit: cost ratios were calculated on the basis of prevailing market price of inputs and produce. To compute the productivity of system baby corn-equivalent yield (BCEY) was obtained by dividing the economic value of the produce (yield of produce \times price of produce) with the price of baby corn. System productivity was worked out by adding baby corn yield and baby corn-equivalent yield of total green fodder of baby corn, horse gram grain or horse gram straw of respective year. Economics of different treatments was worked out on the basis of input and output on the prevailing market price. Nutrient contents, viz. N, P and K, of baby corn and horse gram were determined by following standard procedure. The uptake of these nutrients was estimated from concentrations of nutrients and dry matter of baby corn and horse gram. The soil was analyzed by adopting standard procedure at the initial stage and after the second year of horse gram harvesting to monitor the change in nutrient status from initial value. All data obtained in the cropping sequence experiment for 2 consecutive year of study were statistically analyzed using *F*-test, the procedure given by Gomez and Gomez (1984), critical difference (CD) values at $P=0.05$ were used to determine the significance of differences between treatment means.

RESULTS AND DISCUSSION

Yield attributes

Sowing schedule significantly affected the yield attributes of baby corn as well as horse gram taken as *utera* crop. Yield attributes, viz. number of baby corns/plant, weight of baby cob, weight of baby cobs/plant, weight of baby corn and weight of baby corn/plant, decreased from sowing of the first schedule (1st week of July) to fourth schedule (4th week of July). Sowing of the first schedule (1st week of July) was statistically at par with the second (2nd week of July) and the third schedule (3 week of July); however, it was significantly superior to the fourth schedule, i.e. 4th week of July (Table 1). Similarly, the yield attributes of horse gram, viz. branches/plant, pods/plant, pod length, seeds/pod and 1,000-seed weight, decreased from the first schedule of sowing to the fourth schedule; however, the first sowing schedule was statistically at par with the second and third schedule and was significantly superior to the fourth schedule (Table 1). It seems possible that earlier sowing of crop might have provided longer duration for better growth attributes, viz. plant height, number of green leaves and dry matter/plant (data not reported) and consequently enhanced the yield attributes of baby corn and horse gram.

Application of 125% RDF + 5 t FYM significantly increased the yield attributes, viz. number of baby corns/plant, weight of baby cob, weight of baby cobs/plant, weight of baby corn and weight of baby corn/plant over

Table 1. Yield attributes of baby corn and horse gram as influenced by sowing schedule and integrated nutrient-management system (pooled data of 2 years)

Treatment	Baby corn					Horse gram				
	Baby cobs/plant	Weight of baby cob (g)	Weight of baby cobs/plant(g)	Weight of baby corn (g)	Weight of baby corns/plant (g)	Branches/plant	Pods/plant	Pod length (cm)	Seeds/pod	1,000-seeds weight (g)
<i>Sowing schedule of body corn (main plot)</i>										
1st week of July (1st schedule)	2.7	37.5	100.3	7.8	20.8	7.7	70.5	5.4	6.0	19.9
2nd week of July (2nd schedule)	2.5	35.8	91.0	7.4	18.9	7.5	63.6	5.0	5.5	19.6
3rd week of July (3rd schedule)	2.3	32.9	76.6	6.8	15.9	7.2	56.2	4.7	5.5	19.0
4th week of July (4th schedule)	2.1	28.5	59.0	5.9	12.4	6.7	49.9	4.3	4.7	18.7
SEm \pm	0.12	1.9	8.1	0.5	1.7	0.2	5.2	0.2	0.1	0.3
CD ($P=0.05$)	0.42	6.6	27.9	1.6	5.9	0.7	16.3	0.6	0.6	0.9
<i>Integrated nutrient management (sub plot)</i>										
100% RDF	2.1	31.9	67.7	6.8	14.5	6.7	55.5	4.7	5.0	18.7
125% RDF	2.3	32.6	78.2	6.9	16.4	7.0	57.2	4.8	5.3	19.0
100% RDF + 5 t FYM	2.5	34.6	85.5	7.1	17.7	7.5	61.0	4.9	5.5	19.6
125% RDF + 5 t FYM	2.7	35.4	95.7	7.2	19.4	7.8	65.5	5.1	5.7	19.9
SEm \pm	0.06	0.6	2.9	0.09	0.5	0.1	1.4	0.1	0.1	0.1
CD ($P=0.05$)	0.21	1.9	11.5	0.3	1.8	0.4	5.3	0.2	0.2	0.4

RDF, Recommended dose of fertilizer

100% RDF and 125% RDF; however, it was at par with 100% RDF + 5 t FYM (Table 1). In horse gram, grown as utera crop, the maximum yield attributes, viz. branches/plant, pods/plant, pod length, seeds/pod and 1,000-seed weight, were observed under 125% RDF + 5 t FYM treatment of baby corn which was significantly superior to 100% RDF and 125% RDF treatments but comparable with 100% RDF + 5 t FYM treatment. Optimum supply of nutrients throughout the crop-growth period owing to the combination of organic and inorganic sources resulted in higher yield attributes (Choudhary *et al.*, 2011).

Baby cob, baby corn, fodder yield and yield of horse gram

Sowing schedule had significant influence on yields of baby cob, baby corn, green fodder and horse gram. Baby corn and baby cob yield decreased from sowing of the first schedule (1st week of July) to the fourth schedule (4th week of July); however, sowing of the first schedule (1st week of July) was statistically at par with the second (2nd week of July) and the third schedule (3rd week of July) and significantly superior to fourth schedule, i.e. 4th week of July (Table 2). Yield of baby corn and baby cob from sowing of the first, second and third schedule was comparable due to longer vegetative growth and higher yield attributes. Similarly, the maximum green fodder was obtained from sowing of the first schedule which was at par with the second and third schedule. Horse gram yield decreased from first schedule of sowing to the fourth schedule but the first sowing schedule was statistically at par

with the second and third schedule and significantly superior to the fourth schedule (Table 2).

The maximum baby corn and baby cob yield was recorded under 125% RDF + 5 t FYM, being significantly superior to 100% RDF and 125% RDF but comparable to 100% RDF + 5 t FYM (Table 2). This could be owing to the favourable effect of integrated nutrient-management system organic and inorganic sources on yield attributes, viz. baby corns/plant, weight of baby cob, weight of baby corn and weight of baby corn/plant (Table 2). Similar trend was obtained for total green fodder yield of baby corn. In horse gram, grown as utera crop, the maximum yield (grain and straw) was recorded under 125% RDF + 5 t FYM treatment applied in baby corn which was significantly superior to 100% RDF and 125% RDF treatments but comparable with 100% RDF + 5 t FYM treatment. This result confirms the findings of Singh *et al.* (2010).

System productivity

System productivity of the cropping system (baby corn–horse gram) was significantly affected due to different sowing schedules (Table 2). The highest system productivity was recorded under the first sowing schedule (1st week of July) which was statistically at par with the second (2nd week of July) and the third schedule (3rd week of July); however, it was significantly superior to the fourth schedule, i.e. 4th week of July (Table 2). The highest baby corn-equivalent yield was attributed with the combined effect of baby corn yield, fodder yield and horse

Table 2. Effect of sowing schedule and integrated nutrient-management system on yield and economics of baby corn and horse gram (pooled data of 2 years)

Treatment	Baby cob yield (t/ha)	Baby corn yield (t/ha)	Baby corn green fodder yield (t/ha)	Horse gram grain yield (t/ha)	Baby corn-equivalent yield (t/ha)			Economics of system ($\times 10^3$ ₹/ha)		
					(Baby corn + fodder)	Horse gram	System productivity	Gross returns	Net returns	Benefit: cost ratio
<i>Sowing schedule of baby corn (main plot)</i>										
1st week of July (1st schedule)	10.0	2.0	40.1	1.00	2.2	0.38	2.6	204.6	152.9	2.7
2nd week of July (2nd schedule)	9.1	1.8	35.7	0.93	1.982	0.35	2.3	186.2	134.5	2.5
3rd week of July (3rd schedule)	7.6	1.6	31.0	0.85	1.7	0.33	2.0	159.4	104.7	1.9
4th week of July (4th schedule)	5.9	1.2	27.3	0.82	1.3	0.30	1.6	128.8	74.1	1.5
SEm \pm	0.8	0.2	3.9	0.05	0.2	0.02	0.2	13.8	14.7	0.3
CD (P=0.05)	2.8	0.6	9.9	0.16	0.6	0.05	0.6	47.8	49.7	0.9
<i>Integrated nutrient management (sub plot)</i>										
100% RDF	6.6	1.5	29.6	0.79	1.5	0.30	1.8	145.6	94.8	1.8
125% RDF	7.6	1.6	32.5	0.87	1.7	0.32	2.0	163.5	110.8	2.1
100% RDF + 5 t FYM	8.9	1.7	34.7	0.92	1.7	0.35	2.2	176.0	122.3	2.2
125% RDF + 5 t FYM	9.5	1.9	37.2	1.03	2.0	0.38	2.4	193.9	138.2	2.5
SEm \pm	0.3	0.1	1.4	0.04	0.1	0.01	0.1	5.6	5.5	0.1
CD (P=0.05)	0.8	0.2	3.7	0.12	0.2	0.03	0.2	20.4	18.3	0.3

RDF, Recommended dose of fertilizer

gram yield.

Different integrated nutrient-management systems had significant effect on system productivity of different component of baby corn–horse gram cropping system (Table 2). The maximum system productivity was recorded under 125% RDF + 5 t FYM which was significantly superior to 100% RDF and 125% RDF; however it was comparable to 100% RDF + 5 t FYM treatment (Table 2). Islam and Munda (2012) reported increase in system productivity owing to combined application of organic and inorganic fertilizer on preceding crop and residual effect of organic fertilizer on succeeding crop.

Interaction

The system productivity was significantly influenced by the interaction effect of sowing schedule of baby corn–horse gram (*utera*) system and different integrated nutrient-management systems (Fig 1). Combined effect of sowing of first schedule of baby corn and horse gram and application of 125% RDF + 5 t FYM recorded significantly higher system productivity (2.8 t/ha) which was comparable to sowing of the second schedule with 125% RDF + 5 t FYM (2.7 t/ha), sowing of the third schedule with 125% RDF + 5 t FYM (2.3 t/ha), sowing of the first schedule with 100% RDF + 5 t FYM (2.7 t/ha), sowing of the second schedule with 100% RDF + 5 t FYM (2.5 t/ha) and sowing of the first schedule with 125% RDF (2.5 t/ha). The higher system productivity of the cropping system with the corresponding treatment combinations of higher dose of NPK fertilizer with FYM could be attributed to the adequate supply of nutrients and left these nutrients as residue for succeeding horse gram crop. This led to higher yield of both the crops, ultimately increased the system productivity of the system. This results confirms the findings of Aruna and Mohammad (2005).

Application of FYM and higher dose of NPK fertilizer

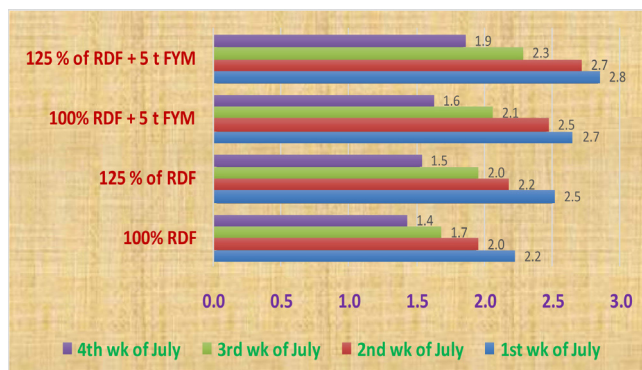


Fig. 1. Interaction effect of sowing schedule and integrated nutrient-management system on system productivity of baby corn and horse gram (CD for sowing schedule at the same rate of nutrient-0.5; CD for nutrient system at the same sowing schedule-0.3)

in baby corn had left these nutrients as residues which increased N, P and K contents of plant due to greater availability of these nutrients in the root zone and absorption by the crops. Islam and Munda (2012) also reported similar findings.

Economics

Mean data on gross return, net return, and benefit: cost ratio of 2 years study on sowing schedule and integrated nutrient management in baby corn–horse gram cropping system were compared among different treatment (Table 2). Sowing of baby corn at the first schedule (1st week of July) followed by horse gram as *utera* recorded the maximum gross return, net return and benefit: cost ratio which was statistically at par with the second (2nd week of July) and the third schedule (3rd week of July) but significantly superior to the fourth schedule, i.e. 4th week of July. This could be ascribed to higher yield of baby corn, green fodder and horse gram under the first schedule of baby corn sowing followed by horse gram. Among integrated nutrient-management systems, 125% RDF with 5 t FYM had maximum gross returns, net returns and benefit: cost ratio which was statistically comparable with 100% RDF with 5 t FYM but significantly superior to the other nutrient management systems. This was owing to higher yield of baby corn, green fodder and horse gram under the treatment 125% RDF with 5t FYM. Similar results were reported by Singh *et al.* (2010).

Nutrient uptake pattern of baby corn

Pooled mean data for total N, P and K uptake (kg/ha) by baby corn and horse gram showed that maximum uptake of N, P and K was registered under sowing of baby corn at the first schedule (1st week of July) which showed parity with the second schedule (2nd week of July). This was mainly because of the higher growth and yield attributes under favourable condition of earlier sowing schedule. However, the least uptake was recorded under sowing at the fourth schedule of baby corn.

Application of 125% RDF + 5 t FYM and 100% RDF + 5 t FYM recorded statistically similar N, P and K uptake. However, the least uptake was recorded under 100% RDF applied to baby corn. Higher value of available N, P and K due to integrated nutrient sources might be a result of building in organic carbon, solubilization of simple and available form, acidifying action of FYM on native phosphorus at the time of decomposition making more phosphorus available for crop and reduction of potassium fixation (Thakur *et al.*, 2011).

Nutrient uptake pattern of horse gram

The total N, P and K uptake by horse gram was signifi-

cantly affected by sowing schedule and integrated nutrient-management treatment applied in baby corn. The maximum uptake of N, P and was recorded under sowing of horse gram at the first schedule and it was statistically at par with the second schedule sowing. The minimum uptake was registered under the last sowing schedule of horse gram which was because of lower growth and lower yield of horse gram under this treatment (Table 3).

Significantly higher N, P and K uptake recorded under 125% RDF + 5 t FYM showed parity with 100% RDF + 5 t FYM and the least uptake N, P and K uptake under 100% RDF. Application of FYM and higher dose of NPK fertilizer in baby corn had left these nutrients as residues which increased N, P and K contents of plant due to greater availability of these nutrients in the root zone and absorption by the crops. Islam and Munda (2012) also reported similar findings.

Soil fertility status after harvesting

After completion of 2 successive years of cropping system, soil was analyzed to study the effect of sowing schedule and integrated nutrient-management system on fertility status (Table 3). Available N, P and K were not influenced by sowing schedule. The integrated nutrient-management system registered differences on fertility status. Application of 125% RDF + 5 t FYM recorded the highest increase in N (9.48%), P (8.33%) and K (4.85%) over the initial which was at par with 100% RDF + 5 t FYM. The lowest values of these primary nutrients were registered with the 100% RDF and closely followed by 125%

RDF and under both the cases it was lower than the initial status of soil. The higher soil fertility status of soil after harvesting under corresponding treatment combinations of higher dose of NPK fertilizer with FYM and biological nitrogen fixation by horse gram and left these nutrients as residue in soil. Gawai and Pawar (2007) also reported the beneficial effect of integrated nutrient management and biological nitrogen fixation on available N, P and K content of soil under sorghum–chickpea cropping system.

It is therefore concluded that sowing of baby corn on the first schedule (1st July) with 125% RDF + 5 t FYM showed the maximum system productivity in terms of baby corn-equivalent yield, net profit and benefit: cost ratio. Since harvesting large amount of baby corn at a time will deteriorate the quality, marketing problem as well as heavy monetary loss. Based on the present study, sowing of baby corn in different schedules, i.e. first (1st week of July), second (2nd week of July) and third (3rd week of July) in combination with 125% RDF + 5 t FYM produced comparable higher net profit for farmers of Northern hills of Chhattisgarh and make baby corn available for market for long period along with horse gram which is the main source of pulse (protein) for tribal peoples.

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Table 3. Effect of sowing schedule and integrated nutrient-management system on nutrient uptake by crops (pooled data of 2 years) and soil fertility status after 2 years of cropping

Treatment	Nutrient uptake (kg/ha)						Soil fertility status (kg/ha)		
	Baby corn			Horse gram			Available	Available	Available
	N	P	K	N	P	K	N	P	K
<i>Sowing schedule (main plot)</i>									
1st week of July (1st schedule)	166.6	29.6	217.7	50.6	7.9	20.8	216.7	8.4	262.8
2nd week of July (2nd schedule)	148.8	26.5	194.2	45.5	7.1	18.6	221.1	8.5	264.8
3rd week of July (3rd schedule)	129.0	22.9	168.6	40.9	6.5	16.8	226.7	8.7	266.7
4th week of July (4th schedule)	112.1	19.6	147.2	38.6	6.1	15.9	235.2	8.8	268.7
SEm±	5.9	1.1	5.8	1.0	0.2	0.4	6.1	0.2	4.1
CD (P=0.05)	21.7	3.9	26.8	3.5	0.5	1.3	NS	NS	NS
<i>Integrated nutrient management (subplot)</i>									
100% RDF	122.6	21.6	160.5	38.2	6.1	15.9	188.6	8.1	249.0
125% RDF	135.1	23.9	176.7	42.1	6.6	17.3	211.2	8.3	258.1
100% RDF + 5 t FYM	144.1	25.6	188.3	44.6	7.0	18.2	243.6	8.8	275.0
125% RDF + 5 t FYM	154.8	27.5	202.2	50.9	7.9	20.6	256.1	9.1	281.0
SEm±	4.0	1.1	3.5	1.1	0.2	0.4	4.2	0.1	2.5
CD (P=0.05)	11.8	2.4	15.5	3.3	0.5	1.2	13.0	0.4	6.4
Initial status of soil							234.0	8.4	268.0

RDF, Recommended dose of fertilizer

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