Int.J.Curr.Microbiol.App.Sci (2022) *11*(08): 166-175

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 11 Number 08 (2022)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2022.1108.016

Effect of Agronomical Manipulations on Weed Density, Weed Dry Matter Accumulation and Yield of Transplanted Rice (*Oryza sativa* L.) Field under Midland

Sandeep Kumar*, Adikant Pradhan, T. Chandrakar, Thalesh kumar and Om Prakash Bhaskar

S.G. College of Agriculture and Research Station, Indira Gandhi Krishi Vishwavidyalaya, Kumhrawand, Jagdalpur-494 005, C.G., India

**Corresponding author*

Keywords

agronomical manipulations, weed density, weed dry matter, transplanted rice

Article Info

Received:
xx July 2022
Accepted:
xx July 2022
Available Online:
xx August 2022

A B S T R A C T

Effect of agronomical manipulations were evaluated in Instructional cum Research Farm, S. G. College of Agriculture and Research Station, Kumhrawand, Jagdalpur, Chhattisgarh, India under RCBD (Randomized Complete Block Design) with four replications in transplanted rice (*var. MTU-1001*) during *kharif* season 2018. Result revealed that hand weeding twice @ 20 and 40 days after transplanting provide wide spectrum weed control than remaining treatments except bispyribac-sodium @ 80 g /ha at 15 DAT which was at par to that of hand weeding twice. The dry matter of grasses, sedges and broad leaved weeds in weedy check plot had higher than other treatments during the course of observation. The crop growth parameters (tillers, leaf area index) and yield attributes (panicle length, grain/panicle, panicle weight) and grain yield were recorded highest in hand weeding twice at 20 and 40 day after transplanting (4.27 t/ ha) than rest of treatments except application of bispyribac- sodium @ 80 g/ ha at 15 days after transplanting (4.03 t/ ha) which were 40.94% and 32.77% increased in yield over control. The result suggested that hand weeding is most effective methods for weed management in transplanted rice and the bispyribac sodium @80 g/ha was the best broad spectrum herbicide in order to minimize the diverse weed flora in transplanted rice.

Introduction

Rice (*Oryza sativa* L.) is a most widely cultivated cereal in Chhattisgarh and it is predominantly grown by transplanting seedlings (Choudhary and Dixit, 2018) in India with an area of 44.8 million hectares, production of 104.4 million tones and productivity of 2390 kg ha^{-1}. In Chhattisgarh, it is grown in an area of 3.74 m hectares with a production of 3.36 millions tones and productivity of 2212 kg ha^{-1} (Anonymous, 2014) Whereas, in Bastar district, the area under *kharif* paddy was about 137.60 thousand hectare, production is 244.70 thousand tones with productivity of 1778 kg/ha (Anonymous, 2012). The average yield of rice in India is very low due to several constraints among them weeds are the major factor and it is more harmful than insect, fungi and disease. In rice, uncontrolled weed growth cause 33-

45% grain yield reduction (Manhas *et al.*, 2012; Mukherjee, 2006)

Weed management is one of the most important and suggestive practices for increasing rice production. Among different weed management strategies, hand weeding play important role in weed management in transplanted rice but it is time taking and labour tanking process and transplanted rice infested with wide range of weed species because of this the broad spectrum herbicide like bispyribac-sodium is a affective and profitable option for weed control.

The major weed flora observed in the experimental plot are *panicum repens* among grasses, *Cyperus rotundus*, *Cyperus difformis* and *Fimbristylis miliacea* among sedges and *Marcelia minuta, Rotala indica* and *Ammania baccifera* among broad leaved weeds. Bhuvneshwari *et al.,* (2009) reported that, 30- 60 DAT is critical period of crop weed competition while reduction in grain yield due to unchecked weed infestation in transplanted rice is varied between 29 to 63%. In view of all above aspects; an experiment was carried out during the *kharif* season of year 2018.

Materials and Methods

A field experiment was conducted during *Kharif* season 2018 at Instructional cum Research Farm, S. G. College of Agriculture and Research Station, Kumhrawand, Jagdalpur, Chhattisgarh, India under RCBD (Randomized Complete Block Design) with four replications. Bastar lies at $19^0$10' N latitude and $81^0$95' E longitude with an altitude of 552 meter above mean sea level.

The study area receives average annual rainfall of 1359.4 mm with average annual temperature of 23.45^{o}C. The soil of the experimental site was *inceptisols* with 0.52% organic matter, and pH of 6.5. Available N, P and k content of soil was 284.5, 8.84 and 255.50 kg/ha, respectively.

Rice *var. 'MTU-1001'* (135 day's duration) seedlings of 25 days were transplanted in 20X10 cm planting geometry. A fertilizer dose of 80:60:40 kg N, P_2O_5 and K_2O/ha is applied, P_2O_5 and K_2O were supplied at basal and N was applied with three splits [50% basal, 25 % at tillering (40 DAT) and 25% at panicle initiation stage (60 DAT)].

At sampling time (30 and 60 day after transplanting; DAT) a quadrate of 1 m^2 was placed at two place of each plot to determine weed density and weed dry matter of different weed species. Weed dry weight was recorded after sundried and finally oven dried the weed sample at 65 °C for 48 hour.

Plant height, LAI at 60 DAT, Tiller /hill, Panicle /hill, Penicle length (cm), Grains/ panicle, CGR (g /plant/day) at 60-90 DAT, RGR (g/ plant/day) at 60-90 DAT were recorded. Grain and straw yield (t/ha), and harvest index was recorded after harvesting.

Results and Discussion

Weed density

The major weed flora in the experimental field comprised grasses, *viz. Panicum repens*, Sedges, *viz., Cyperus difformis*, and *Fimbristylis miliacea* and broad leaved weeds, *viz., Marsilea minuta*, *Ammania baccifera* and *Rotala indica* and other weeds *viz.,. Cyperus iria*, *Ludwigia octovalis*, *Echinocloa crussgali, Comelina diffusa* and *Eclipta alba* were low in density. The composition of grasses, sedges and broad leaved weeds in weedy check plot were higher than remaining treatments during observation recorded. The data pertaining to weed density at 30 and 60 DAT were recorded on grasses, sedges and broad leaved weeds, were found significant variation in density of weeds over weed flora composition regardless grassy, sedges and broad leaved weed under influence of weed management practices at 30 and 60 DAT.

At 60 DAT, the weed density of *Cyperus difformis, Marsilea minuta, Fimbristilis miliacea, Ammania ceccifera, Rotala indica* and other weeds were remarkably reduced in number as treatments imposed. The highest weed density was recorded in

weedy check with *Panicum repens* (8.24), *Marsilea minuta* (19.33), *Cyperus difformis* (16.91), *Fimbristylis miliacea* (9.74), *Ammania baccifera* (8.97), *Rotala indica* (7.79) and others (10.73) which were significantly reduced as weed management practices included with higher magnitude under hand weeding twice at 20 and 40 days after transplanting, in weed control of *Panicum repens* (2.90), *Marsilea minuta* (3.88), *Cyperus difformis* (3.00), *Fimbristylis miliacea* (1.68), *Ammania baccifera* (3.37), *Rotala indica* (3.08) and others (2.71) being on par with application of bispyribac- sodium @ 80 g ha-1 at 15 DAT. The lowest weed biomass was noticed in hand weeded plot. Similar result was reported by Syama *et al.*,(2014).

Dry matter of weed

Production of dry matter by weeds was recorded at 30 and 60 DAT and data are presented in Table 3 and 4. The major weed floras in the experimental field were remarkably influenced by application of agronomical manipulations at 30 and 60 DAT. The dry matter of grasses, sedges and broad leaved weeds in weedy check plot had higher than other treatments during the course of observation.

The data pertaining to dry matter at 30 and 60 DAT were recorded significant in accumulation of dry matter of weeds regardless grassy, sedges and broad leaved categories, due to agronomical manipulation and herbicide application. The maximum weed dry matter was recorded under control (no weeding) (1.31, 1.23, 0.00, 1.06, 1.27, 1.27, 1.49 and 1.87, 5.14, 5.47, 1.19, 1.86, 1.79, and 4.10 g/m^2 at 30 and 60 DAT).

However, hand weeding twice at 20 and 40 days after transplanting lowered dry matter (1.15, 1.35, 1.44, 1.02, 1.28, 1.29 and 1.40 g /m^2 for *Panicum repens,, Cyperus difformis, Fimbristilis miliacea, Marsilea minuta, Ammania baccifera, Rotala indica* and others, respectively at 60 DAT and application of bispyribac-sodium @ 80 g ha-1 at 15 DAT was equally effective in lowering weed dry matter as 40 days water imponding 10 days after transplanting. This is due to earlier suppression of weed flora by imponding water restricted growth weed seedling as well as germination of weed bank for next flush (Yan *el al*., 2010; Dorji *et al.,* 2013 and Bhagat *et al.,* 1999). Dry matter accumulation at 30 DAT was also recorded on weed flora and increased the dry matter at 60 DAT as compare to 30 DAT.

Hand weeding twice at 20 and 40 days of transplanting was recorded lower dry matter of *Panicum repens* (1.15 g), *Cyperus difformis* (1.06 g), *Fimbristilis miliacea* (0.00 g), *Marsilea minuta* (1.01 g), *Ammania baccifera* (1.10 g), *Rotala indica* (1.09 g) and others (1.08 g) over rest of treatments being at par with bispyribac-sodium @ 80 g ha-1 at 15 DAT on grassy weed (1.22 g of *Panicum repens*), sedges (1.08 g, and 0.00 g of *Cyperus difformis* and *Fimbristilis miliacea,* respectively) and broad leaved weeds (1.02 g, 1.12 g, and 1.12 of *Marsilea minuta*, *Ammania baccifera* and *Rotala indica*, respectively). The better performance of this treatment could be attributed to reduce weed competition at initiation stage by application of bispyribac-sodium. (Antralina *et al.,* 2015; Das *et al.,* 2015).

Effect on yield and yield attributes

Yield attributes such as number of panicle, number of filled grain /panicle, panicle length, chaffy grain /panicle were influenced by different agronomical manipulations. It was observed that, panicles were longer, more number of filled grains/ panicle, fewer chaffy grains were recorded. The maximum number of panicle/ hill was recorded with hand weeding twice @ 20 and 40 days after transplanting (5.41) which was significantly superior over rest of treatments, being on par to application of bispyribac- sodium @ 80 g /ha at 15 days after transplanting (5.33). Ambika paddy weeder at 20 and 40 DAT (4.66) and water imponding of 40 days 10 days after transplanting (4.58) were at par with each other in attaining number of panicles/hill. The minimum number of panicles/hill was observed in no weeding (3.98). Similar trend was noticed with panicle length.

Table.1 Effect of agronomical manipulations on weed density of rice at 30 DAT

Treatment.	Weed density (m^{-2}) at 30 DAT						
	Grassy weed	Sedge weed		Broad leaved weed			Others
	Panicum repens	*Cyperus difformis*	*Fimbristylis miliacea*	*Marcelia minuta*	*Ammania baccifera*	*Rotala indica*	
T1- Ambika paddy weeder at 20 and 40 DAT	2.38 (4.68)	1.46 (1.16)	0.71 (0.00)	1.90 (2.65)	1.98 (2.99)	1.85 (2.49)	1.86 (2.52)
T2- Bispyribac- sodium @ 80 g ha-1 at 15 DAT	2.24 (4.05)	1.28 (0.67)	0.71 (0.00)	1.36 (0.89)	1.76 (2.10)	1.42 (1.05)	1.74 (2.04)
T3- Hand weeding twice at 20 and 40 DAT	2.08 (3.37)	1.30 (0.75)	0.71 (0.00)	1.76 (2.27)	1.52 (1.34)	1.28 (0.66)	1.38 (0.94)
T4- water imponding of 40 days, 10 DAT	2.67 (6.16)	1.59 (1.58)	0.71 (0.00)	2.13 (3.60)	2.13 (3.66)	1.63 (1.71)	2.67 (6.16)
T5- No water imponding	2.47 (5.16)	1.76 (2.14)	0.71 (0.00)	2.20 (3.88)	2.12 (3.52)	2.15 (3.67)	2.47 (5.16)
T6- Control (no weeding)	3.15 (8.97)	2.34 (4.57)	(0.71 (0.00)	2.70 (6.41)	2.57 (5.76)	2.71 (6.41)	2.82 (7.02)
SEm±	**0.04**	**0.04**	**-**	**0.13**	**0.12**	**0.10**	**0.09**
CD (P=0.05)	**0.14**	**0.14**	**-**	**0.41**	**0.39**	**0.31**	**NS**

*Figures in parenthesis are original values,

Table.2 Effect of agronomical manipulations on weed density of rice at 60 DAT

Treatment.	Weed density (in m^2) at 60 DAT						
	Grassy weed	Sedge weed		Broad leaved weed			Others
	Panicum repens	*Cyperus difformis*	*Fimbristylis miliacea*	*Marcelia minuta*	*Ammania baccifera*	*Rotala indica*	
T1- Ambika paddy weeder at 20 and 40 DAT	2.46 (5.09)	2.67 (6.17)	1.86 (2.49)	2.59 (5.71)	2.38 (4.68)	2.33 (4.46)	2.13 (3.55)
T2- Bispyribac- sodium @ 80 g ha-1 at 15 DAT	2.19 (3.81)	2.07 (3.33)	1.62 (1.63)	2.39 (4.76)	2.24 (4.05)	2.08 (3.37)	1.98 (2.96)
T3- Hand weeding twice at 20 and 40 DAT	1.97 (2.90)	1.99 (3.00)	1.63 (1.68)	2.20 (3.88)	2.08 (3.37)	2.01 (3.08)	1.92 (2.71)
T4- water imponding of 40 days, 10 DAT	2.50 (5.27)	2.13 (3.57)	2.65 (6.07)	3.00 (8.06)	2.67 (6.16)	2.16 (3.69)	2.36 (4.59)
T5- No water imponding	2.55 5.55	3.40 (10.61)	3.04 (8.30)	3.42 (10.74)	2.47 (5.16)	2.49 (5.23)	2.62 (5.89)
T6- Control (no weeding)	3.03 (8.24)	4.22 (16.91)	3.27 (9.74)	4.50 (19.33)	3.15 (8.97)	2.96 (7.79)	3.42 (10.73)
SEm±	**0.04**	**0.04**	**0.06**	**0.06**	**0.04**	**0.02**	**0.08**
CD (P=0.05)	**0.14**	**0.13**	**0.19**	**0.19**	**0.14**	**0.07**	**NS**

*Figures in parenthesis are original value

Table.3 Effect of agronomical manipulations on dry matter of weed at 30 DAT

Treatment.	Weed dry matter (g m^{-2}) at 30 DAT						
	Grassy weed	Sedge weed		Broad leaved weed			
	Panicum repens	*Cyperus difformis*	*Fimbristylis miliacea*	*Marcelia minuta*	*Ammania baccifera*	*Rotala indica*	Others
T1- Ambika paddy weeder at 20 and 40 DAT	0.51 (1.22)	0.21 (1.09)	0.00	0.04 (1.02)	0.42 (1.19)	0.33 (1.15)	0.45 (1.20)
T2- Bispyribac- sodium @ 80 g ha-1 at 15 DAT	0.50 (1.22)	0.17 (1.08)	0.00	0.05 (1.02)	0.26 (1.12)	0.27 (1.12)	0.34 (1.15)
T3- Hand weeding twice at 20 and 40 DAT	0.34 (1.15)	0.14 (1.06)	0.00	0.02 (1.01)	0.21 (1.10)	0.20 (1.09)	0.17 (1.08)
T4- water imponding of 40 days, 10 DAT	0.54 (1.23)	0.26 (1.12)	0.00	0.07 (1.03)	0.52 (1.23)	0.23 (1.10)	0.84 (1.35)
T5- No water imponding	0.68 (1.29)	0.26 (1.12)	0.00	0.10 (1.04)	0.48 (1.21)	0.43 (1.19)	1.12 (1.45)
T6- Control (no weeding)	0.73 (1.31)	0.52 (1.23)	0.00	0.13 (1.06)	0.62 (1.27)	0.64 (1.27)	1.25 (1.49)
SEm±	**0.02**	**0.01**	-	**0.004**	**0.02**	**0.01**	**0.01**
CD (P=0.05)	**0.08**	**0.04**	-	**0.01**	**0.06**	**0.03**	**NS**

*Figures in parenthesis are original values,

Table.4 Effect of agronomical manipulations on dry matter of weed at 60 DAT

Treatment.	Weed dry matter (g m^{-2}) at 60 DAT						
	Grassy weed	Sedge weed		Broad leaved weed			Others
	Panicum repens	*Cyperus difformis*	*Fimbristylis miliacea*	*Marcelia minuta*	*Ammania baccifera*	*Rotala indica*	
T1- Ambika paddy weeder at 20 and 40 DAT	1.04 (1.42)	1.86 (1.69)	1.36 (1.53)	0.10 (1.04)	1.17 (1.46)	1.02 (1.42)	1.36 (1.53)
T2- Bispyribac- sodium @ 80 g ha-1 at 15 DAT	0.60 (1.26)	0.97 (1.40)	1.62 (1.61)	0.06 (1.03)	0.86 (1.36)	0.80 (1.34)	1.16 (1.46)
T3- Hand weeding twice at 20 and 40 DAT	0.34 (1.15)	0.83 (1.35)	1.10 (1.44)	0.05 (1.02)	0.66 (1.28)	0.69 (1.29)	0.99 (1.40)
T4- water imponding of 40 days, 10 DAT	0.98 (1.40)	1.26 (1.50)	3.47 (2.10)	0.11 (1.05)	1.36 (1.53)	0.88 (1.36)	1.63 (1.61)
T5- No water imponding	0.98 (1.40)	3.36 (2.08)	4.63 (2.36)	0.16 (1.07)	1.31 (1.51)	1.31 (1.51)	1.66 (1.78)
T6- Control (no weeding)	1.69 (1.87)	2.47 (5.14)	2.53 (5.47)	0.43 (1.19)	1.69 (1.86)	1.66 (1.79)	2.25 (4.10)
SEm±	**0.04**	**0.04**	**0.08**	**0.01**	**0.04**	**0.04**	**0.04**
CD (P=0.05)	**0.13**	**0.13**	**0.24**	**0.03**	**0.12**	**0.12**	**0.13**

*Figures in parenthesis are original values,

Table.5 Effect of agronomical manipulations on yield and yield attributes of rice

Treatment	Plant height	LAI at 60 DAT	Tiller hill-1	Panicle hill-1	Panicle length (cm)	Grains /panicle	CGR (g/ plant/day) at 60- 90 DAT	RGR (g plant/1 day/1) at 60-90 DAT	Grain Yield (t/ha)	Straw Yield (t/ha)	Harvest Index (%)
T1	96.51	3.37	6.21	4.66	19.68	127.17	0.22	0.01	3.88	4.34	47.12
T2	97.38	3.77	6.80	5.33	20.32	128.00	0.27	0.01	4.03	4.58	46.76
T3	98.73	3.89	7.35	5.41	21.32	132.50	0.33	0.01	4.27	4.81	47.05
T	96.01	3.24	6.15	4.58	19.06	125.00	0.22	0.01	3.74	4.27	46.63
T5	95.50	3.09	5.81	4.39	19.02	119.42	0.23	0.01	3.53	4.22	45.44
T6	92.50	2.93	5.41	3.98	18.09	98.83	0.20	0.01	3.03	4.09	42.66
SEm ±	**0.12**	**0.11**	**0.07**	**0.12**	**0.48**	**1.73**	**0.02**	**0.00**	**1.09**	**0.87**	**0.87**
CD (P=0.05)	**0.37**	**0.35**	**0.22**	**0.38**	**1.47**	**5.28**	**0.07**	**NS**	**3.32**	**2.67**	**2.66**

Two hand weeding increased panicles and its length significantly over remaining treatments due to higher number of tillers which converted further into panicle helps in increasing number and application of bispyribac-sodium also showed similar in producing panicles being statistically resemblance. Similar results have been reported by (Gill *et al.*, 1992). On other hands, seed /panicle was higher when two hand weeding was done at 20 and 40 DAT having significantly more than control (98.83) and on par with Ambika paddy weeder at 20 and 40 DAT (127.17), bispyribac- sodium @ 80 g/ ha at 15 days after transplanting (128.00) and water imponding of 40 days, 10 days after transplanting.

Seedes/ panicle was found to be higher in all treatments except control (98.83), because these treatments are positively suppressing the other flora available in vicinity of crop increased seed per panicle (Mamun, 1988). Test weight of rice was not significantly influenced by imposing treatments (Table-5) and data indicated that hand weeding twice (20 and 40 DAT) gave higher test weight (25.52 g) and the lowest was in control treatment (23.69 g) owing to higher magnitude of unsuppressed growth of crop led to little higher test weight with two hand weeding which was not found significant.

Hand weeding twice at 20 and 40 days after transplanting produced significantly higher grain yield (4.27 t/ ha) than rest of treatments except application of bispyribac- sodium @ 80 g/ha at 15 days after transplanting (4.03 t/ ha) which were 40.94% and 32.77% increase in yield over control under influence of hand weeding twice (20 and 40 DAT) and bispyribac-sodium @ 80 g /ha at 15 DAT, respectively. Whereas, Ambika paddy weeder at 20 and 40 DAT and water imponding of 40 days, 10 days after transplanting were statistically similar in producing grain yield. The lowest grain yield was recorded with control plot (3.03 t/ ha). The higher grain yield was produced by two hand weeding which is directly depend on various growth and yield parameters expressing their integrated influence with the increment in supply of proper growth resources to rice crop, thus improved yield component as a result higher grain yield was obtained. These findings are also similar to Gill *et al.*, (1992). Similar trend was followed with straw yield. The straw yield and HI (harvest index) was higher again with two hand weeding at 20 and 40 DAT (48.16 q ha-1 and 47.05%) followed by bispyribac- sodium @ 80 g /ha at 15 DAT (4.58 t/ha and 4.67). Hand removal of weeds from rice field at 20 and 40 DAT may also improve rice grain and straw yield by providing weed free environment led to availability of growth resources. Similar results reported by Mishra (2016).

Maximum Harvest Index (HI) was recorded with Ambika paddy weeder at 20 and 40 days after transplanting (47.12%) which was significantly superior and comparable to hand weeding twice at 20 and 40 DAT (47.05%), bispyribac-sodium @ 80 g /ha at 15 DAT (46.76%), water imponding of 40 days, 10 days after transplanting (46.63%) and no water imponding (45.44%). The lowest HI was recorded with control (42.66%). The significantly higher HI was recorded with Ambika paddy weeder may be due to decreasing straw yield as compared to other treatments.

References

Anonymous 2012. Agricultural Statistics at a Glance. Directorate of Economics and Statistics, Department of Agriculture and Cooperation. Pp. 65-66.

Anonymous. 2014. FAO. STAT Database, Food & Agriculture Organizations of the United Nation, Rome, Italy,: 48-49.

Antralina, M., Istina, I. N., Yuwariah, Y. and Simarmata, T. 2015. Effect of Difference Weed Control Methods to Yield of Lowland Rice In The Sobari. Procedia Food Science, 3: 323– 329.

Bhagat, R. M., Bhuiyan, S. I. and Moody, K. 1999. Water, tillage and weed management options for wet seeded rice in the Philippines. Soil & Tillage Research, 52: 51-58.

Bhuvneshwari J, Chinnusamy C and prabhakaran N

K. 2009 Effect of dose and time of orthosulfuron application on weeds and yield of rice. *Proceedings of National symposium on weed threat to environment, Biodiversity and Agricultural Productivity. 2-3 August, 2009.* Tamil Nadu agricultural university, Coimbatore, India.

Chaudhary V K. and Dixit A. 2018, herbicide weed management effect on weed dynamics, crop growth and yield in direct seeded rice. *Indian journal of weed science* 50 (1): 6-12.

Das, R., Bera, S., Pathak, A. and Mandal, M. K. 2015. Weed Management in Transplanted Rice through Bispyribac Sodium 10% SC and its Effect on Soil Micro flora and Succeeding Crop Blackgram. *Int.J. Curr. Microbiol. App. Science, 4(6): 681-688.*

Dorji, S., Chauhan, B. S., Baltazar, A. M., and Johnson, D. 2013. Effect of flooding depth and pretilachlor rate on emergence and growth of three rice weeds: junglerice (*Echinochloa colona*), smallflower umbrella sedge (*Cyperus difformis*), and ludwigia (*Ludwigia hyssopifolia).* Canadian Journal of Plant Protection, 1(2), 43-48.

Gill, P. S., Bhangoo, B. S. and Boparai, B. S. 1992. Weed control efficacy of tridiphane and fluroxypyr in transplanted rice *(Oryza sativa). Indian J.Agron.* 37(3): 573-575.

Mamun, A. A. 1988. Farmers' concepts of weeds and weed control in Jawar village in Kishoregonj. Agricultural and Rural Development in Bangladesh. Japan Intl. Co-operation Agency, Dhaka, Bangladesh. JSARD Pub. No 8. pp. 77-78.

Manhas, S S. Singh, G. Singh, D and Khajuria, V. 2012 effect of tank mixed herbicides on weeds and transplanted rice (*Oryza sativa* L.). *Ann. Agric.res. New ser.*, 33:25-31.

Mishra, L. N. 2016. Assessment of chemical and non-Chemical Weed management strategies in direct- Seeded aerobic rice (*Oryza sativa* L.). M.Sc. (Ag.) Thesis. Indira Gandhi Krishi Vishwavidyalaya, Raipur.

Mukherjee, M. 2006 Weed management strategy in rice –a review. *Agriculture Review* 27 (4: 247-257).

Syama, S. Meuon, Prameela, P. and Abratram, C. T. 2014. Weed control in wet seeded rice by post-emergence herbicides. *Indian J. Weed Sci., 46(2): 169-171.*

Yan, C., Ding, Y., Wang, Q., Liu, Z., Li, G., Muhammad, I. and Wang, S. 2010. The impact of relative humidity, genotypes and fertilizer application rates on panicle, leaf temperature, fertility and seed setting of rice. J Agric Sci., 148: 329-339.

How to cite this article:

Sandeep Kumar, Adikant Pradhan, T. Chandrakar, Thalesh kumar and Om Prakash Bhaskar. 2022. Effect of Agronomical Manipulations on Weed Density, Weed Dry Matter Accumulation and Yield of Transplanted Rice (*Oryza sativa* L.) Field under Midland. *Int.J.Curr.Microbiol.App.Sci.* 11(08): 166-175. doi: https://doi.org/10.20546/ijcmas.2022.1108.016