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Efficacy of Triafamone18.52% SC on Weed Control and Yield in Direct Sown Rice

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Authors' contributions

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

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ABSTRACT

A field experiment was conducted for two consecutive years (2017 -18 and 2018-19) at Agricultural Research Station, Jangamaheswarapuram, Guntur Dist. Andhra Pradesh, India. The experiment consisted of nine treatments laid out in a complete randomized block design with four replications. The results revealed that Triafamone18.52 SC doses at a rate of 100 g *a.i.* ha^{-1} (T_5) and 50 g *a.i.* ha^{-1} (T_4) at the 2-3 leaf stage of weed were effective in controlling all the weeds and recorded significantly ($P<0.05$) lesserdry weight of weeds over the control during the study.

Keywords: Weed control; rice; productivity; weed loss.

1. INTRODUCTION

Weed losses are one of the main causes of low rice productivity. In India, weeds are the most serious and pervasive biological hindrance to agricultural production, accounting for 33% of all pest-related losses [1]. Infestation of weeds with direct-seeded rice (DSR) continues to be the key

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factor limiting its yield. The average production drop caused by weeds ranged from 12 to 72%, depending on the weed flora and how much competition the weeds offered to the crop [2]. In DSR, weed control remains a challenging issue because both rice and weeds emerge side by side. Any DSR production technique intending to increase productivity and profitability must employ an efficient early weed management strategy.

Due to labor shortages and high input costs, traditional weed management approaches are time-consuming, labor-intensive, expensive, and impractical to use over a large region. Traditional weed control methods are no longer workable due to rising industrialization and urbanization. Herbicidal weed control is preferred for its higher effectiveness, lower cost, and shorter time commitment. Choosing the right herbicides for the infestingweed is essential for effective weed control [3-6]. Thus, we evaluated the efficacy of Triafamone 18.52% SCon weed dynamics and yield of direct sown rice.

2. MATERIALS AND METHODS

A field experiment was conducted on clay loam soils at the Agricultural Research Station, Jangamaheswarapuram, Guntur Dist. Andhra Pradesh, India for two consecutive years (2017 - 18 and 2018-19). There were nine treatments, as follows in List 1.

Triafamone belongs to the ketosulfonamideherbicides. In plants, Triafamone is taken up by leaves and roots and is very quickly converted into an intermediate form by reduction of the keto group. Contrary to rice, in weeds, a 2nd metabolite is formed by N-demethylation whichinhibits acetolactate synthase (ALS).

A seed rate of 50 kg ha^{-1} was adopted and the cultivar was 'Samba mahsuri (BPT-5204)'. Seeds were weighed separately for each plot and sown in solid rows in the furrows opened by line markers at 25 cm intervals. All the herbicides were sprayed by using a knapsack sprayer with a flat-fan nozzle at a spray volume of 500 l ha^{-1}.

The efficacy of different treatments on weeds was evaluated at crop maturity. Quadrates (0.25 m^2) were placed in each plot at random to determine the weed density. Weed seedlings within these quadrates were counted and the efficacy of weed control treatments was evaluated by comparing the density with the untreated control. Weeds were cut at ground level, washed with tap water, oven-dried at 70 ^{0}C for 48 hours, and then weighed for biomass. The weed control efficiency was calculated using the formula given by Tawaha et al. [7]. The data on weeds were transformed by square root transformation by adding one before being subjected to ANOVA [8].

Weed control efficiency (WCE) indicates a reduction percentage in weed dry matter due to weed control treatments over unweeded control. Based on dry matter of weeds produced at 42 days after application the WCE was calculated as follows (AICRPWC, 1988).

$$\text{WCE}\ (\%) = \frac{\text{DWC} - \text{DWT}}{\text{DWC}} \text{x} 100$$

Where,

DWC = Dry weight of weeds in unweeded control
DWT = Dry weight of weeds in the treated plot.

List 1. List of treatment, Dose, and time of application

Treatment	Dose (g ha^{-1})	Time of Application
T_1: Untreated control	-	-
T_2: Triafamone 18.52 SC	30	2- 3 leaf stage of weed
T_3: Triafamone 18.52 SC	40	2- 3 leaf stage of weed
T_4: Triafamone18.52 SC	50	2- 3 leaf stage of weed
T_5: Triafamone18.52 SC	100	2- 3 leaf stage of weed
T_6: Pyrazosulfuron ethyl 10% WP	15	2- 3 leaf stage of weed
T_7: Cyhalofop Butyl 10% EC	80	2- 3 leaf stage of weed
T_8: Farmer practice (two hand weedings)	-	20 and 40 DAS
T_9: Weed free	-	-

3. RESULTS AND DISCUSSION

3.1 Weed Flora in Direct Sown Rice

The predominant 'weed species' that were observed in the experimental field during the investigation are *Echinochloa colonum*, *E. crusgalli, Dinerbaretroflexa, and Leptochloa chinensis* (grasses), *Cyperus rotundus,* and *C. difformis* (sedges), *Eclipta alba*, *Ammania baccifera* and *Trianthema portulacastrum* (broad-leaved weeds). However, *E. colonum* was the most predominant weed among the three groups at various stages of crop growth during both the years of study.Similar trend was close conformity of Ramesha et al*.* [9] and Murali Arthanari [10].

3.2 Weed Density (No. m^{-2})

Density of weeds were significantly (P<0.05) influenced by weed management treatments, and is presented in the corresponding tables (Tables 1 to 4). Weed density was recorded species-wise at 28 and 42 days post-application.

3.3 28 Days Post-herbicide Application (28 DAA)

At 28 DAA the density of grasses (*D.retroflexa)* sedges (*C.rotundus*and*C.difformis) and* broad-leaved weeds (*E.alba*, *A.baccifera*, and *T.portulacastrum)* were significantly (P<0.05) reduced in all the weed control treatments over weedy check. Among the herbicide-treated plots, the lowest weed density was recorded in T_5which was on par with T_4. The highest density of grasses was recorded in T_1 during the years of study.

3.4 42 Days Post-herbicide Application (42 DAA)

The data on weed density of grasses, sedges, and broad-leaved weeds at 42 days post-application is furnished in Tables 1, 2, 3, and 4. Significant reduction in weed density of grasses was observed in weed-free treatment (T_9) compared to othersand a lesser population of weeds was observed inT_1 during both the years of study.

The lowest density of weeds among the herbicidal treatments (*D.retroflexa, C.rotundus*, *C.difformis, E.alba*, *A.baccifera*, and *T.portulacastrum*)was observed with T_5followed by T_4 which maintained parity with each other. Untreated control (T_1) resulted in the significantly (P<0.05) highest density of weeds at 42 DAA during both the years of study. These findings were in agreement with Deivasigamani [11], Deivasigamani [12] and Murali Arthanari [10].

3.5 Weed Drymatter

Weed drymatter is an improved parameter to measure weed competition than weed density since it measures accurately the weed growth besides the resources depleted by the weeds.

The T_9 categorized as weed-free exhibited the lowest weed drymatter at 42 DAA over the rest and a significantly (P<0.05) higher dry weight of weed species was observed in T_1 compared to the rest during both the years of study.

At 42 DAA, T_5 (Triafamone 18.52 SC @ 100 g *a. i*. ha^{-1}at 2-3 leaf stage of weed) registered significantly (P<0.05) the lowest dry-weight weeds compared to T_3, T_6, T_7, and T_1 but, was on a par with treatment T_4 (Triafamone 18.52 SC @ 50 g *a. i*. ha^{-1}at 2-3 leaf stage of weed). None of the treatments were comparable to weed-free in reducing the total dry weight of total weeds. However, all the weed management practices were significantly (P<0.05) superior to T_1 in reducing the total dry weight of weeds. The results were following Deivasigamani [11].

3.6 Weed Control Efficiency (%)

Weed control efficiency of various weed management practices calculated at 42 days post-herbicide application during both the years of investigation are embodied in Table 7. At 42 DAA among the herbicide-treated plots, the highest weed control efficiency was recorded by T_5(Triafamone 18.52 SC @ 100 g *a.i*. ha^{-1}at 2-3 leaf stage of weed)which was on par with T_4(Triafamone 18.52 SC @ 50 g *a.i.* ha^{-1}at 2-3 leaf stage of weed) (61.25 and 60.88%) but significantly (P<0.05) superior to the rest during both years. Similar results were reported by Deivasigamani [12] and Mohapatra et al. [13].

Table 1. Density of weeds (No. m^{-2}) at different growth stages of direct seeded rice as influenced by weed management practices during *Rabi*, 2017-18 and *Kharif*, 2018-19

Treatments	Dose (g *a.i.* ha^{-1})	*Echinochloa colonum* 28 DAA		*Echinochloa colonum* 42 DAA		*Leptochloa chinensis* 28 DAA		*Leptochloa chinensis* 42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T_1.Untreated (control)	-	7.86 (61.5)	6.61 (43.5)	8.69(75.5)	7.54(56.5)	3.00 (8.8)	2.44 (5.5)	3.64 (13.0)	3.20(9.8)
T_2. Council Prime (Triafamone 18.52 SC)	30	4.73 (22.0)	3.97 (15.5)	5.90 (34.8)	5.11 (26.0)	2.79 (7.5)	2.58 (6.3)	3.35 (11.0)	2.85 (12.3)
T_3. Council Prime (Triafamone 18.52 SC)	40	4.17(17.0)	3.44 (11.5)	5.11(26.5)	4.61 (21.3)	2.66 (6.8)	2.52 (6.0)	3.08 (9.3)	3.10 (9.3)
T_4. Council Prime (Triafamone 18.52 SC)	50	3.73 (13.7)	2.72 (7.3)	4.52(20.5)	3.68 (13.3)	2.29 (5.0)	2.44 (5.5)	2.83 (7.8)	3.03 (8.8)
T_5.Council Prime (Triafamone 18.52 SC)	100	3.21(10.0)	2.32 (5.3)	3.87(14.8)	3.47 (12.0)	2.09 (4.0)	1.98 (3.5)	3.09 (9.3)	2.62 (6.5)
T_6.Pyrazosulfuron ethyl 10% WP	15	5.21 (27.3)	4.41(19.3)	6.47(42.0)	5.52 (30.3)	2.77 (7.3)	2.32 (5.0)	3.33 (10.8)	3.02 (8.8)
T_7.Cyhalofop Butyl 10% EC	80	2.29(5.3)	1.99 (3.8)	3.03(9.0)	2.73 (7.3)	2.00 (3.8)	1.79 (2.8)	2.67 (7.0)	2.44 (5.5)
T_8.Farmer practice (two hand weedings)	-	2.34(5.3)	2.52 (6.0)	2.91(8.3)	2.94 (8.3)	1.18 (1.0)	1.48 (1.8)	1.26 (1.3)	1.84 (3.0)
T_9.Weed free	-	0.71 (0.0)	0.71 (0.0)	0.71(0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)
SEm±	-	0.31	0.26	0.39	0.27	0.21	0.16	0.23	0.30
CD (P = 0.05)	-	0.91	0.77	1.14	0.80	0.63	0.47	0.68	0.87

Note: Data transformed to √x+0.5 transformations. Figures in parentheses are original values

Table 2. Density of weeds (No. m^{-2}) at different growth stages of direct seeded Rice as influenced by weed management practices during *Rabi*, 2017-18 and *Kharif*, 2018-19

Treatments	Dose (g *a.i.* ha^{-1})	*Dinebraretro flexa* 28 DAA		*Dinebraretro flexa* 42 DAA		*Cyperus rotundus* 28 DAA		*Cyperus rotundus* 42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T_1.Untreated (control)	-	2.86 (8.0)	2.62 (6.5)	3.49 (12.0)	3.33 (10.8)	4.25 (18.0)	3.39 (11.3)	5.23 (27.3)	4.54 (20.3)
T_2. Council Prime (Triafamone 18.52 SC)	30	1.87(3.3)	2.01 (3.8)	2.50(6.0)	2.62 (6.8)	3.45 (11.5)	2.58 (6.3)	4.19 (17.3)	3.23 (10.0)
T_3. Council Prime (Triafamone 18.52 SC)	40	1.61 (2.3)	1.56 (2.0)	2.23(4.8)	2.30 (5.0)	2.67 (7.0)	1.92 (3.5)	3.54 (12.5)	2.68 (7.0)
T_4. Council Prime (Triafamone 18.52 SC)	50	0.71 (0.0)	1.27 (1.3)	1.18(1.0)	1.55 (2.0)	2.18 (4.8)	1.76 (2.8)	2.93 (8.5)	2.27 (4.8)
T_5.Council Prime (Triafamone 18.52 SC)	100	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	2.45 (5.8)	1.70 (2.5)	2.68 (6.8)	2.36 (5.3)
T_6.Pyrazosulfuron ethyl 10% WP	15	2.42 (5.5)	2.52 (6.0)	3.48 (11.8)	3.02 (8.8)	4.00 (15.8)	3.12 (9.5)	5.06 (25.5)	3.90 (15.0)
T_7.Cyhalofop Butyl 10% EC	80	1.82 (3.0)	2.06 (4.0)	2.51 (6.3)	2.57 (6.3)	4.12(16.8)	3.31 (10.8)	5.14 (26.3)	4.21 (17.5)
T_8.Farmer practice (two hand weedings)	-	1.18 (1.0)	1.48 (1.8)	1.63 (2.3)	1.84 (3.0)	2.21 (4.5)	1.82 (3.0)	2.61 (6.5)	2.65 (7.0)
T_9.Weed free	-	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)
SEm±	-	0.20	0.19	0.24	0.20	0.29	0.22	0.28	0.23
CD (P = 0.05)	-	0.60	0.57	0.69	0.60	0.83	0.64	0.81	0.66

Note: Data transformed to √x+0.5 transformations. Figures in parentheses are original values

Table 3. Density of weeds (No. m^{-2}) at different growth stages of direct seeded Rice as influenced by weed management practices during *Rabi*, 2017-18 and *Kharif*, 2018-19

Treatments	Dose (g *a.i.* ha^{-1})	*Cyperus difformis* 28 DAA		*Cyperus difformis* 42 DAA		*Eclipta alba* 28 DAA		*Eclipta alba* 42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T_1.Untreated (control)	-	3.04 (9.0)	2.51 (6.0)	3.65 (13.0)	3.15 (9.8)	3.17 (9.8)	2.46 (5.8)	3.89(15.0)	3.24 (10.3)
T_2. Council Prime (Triafamone 18.52 SC)	30	1.82 (3.0)	2.54 (6.0)	2.90 (8.3)	3.12 (9.3)	2.46 (5.8)	2.38 (5.3)	3.18 (9.8)	3.03 (8.8)
T_3. Council Prime (Triafamone 18.52 SC)	40	1.61 (2.3)	2.12 (4.3)	2.22 (4.8)	2.69 (7.0)	1.84 (3.5)	2.28 (5.0)	2.28 (5.3)	2.89 (8.0)
T_4. Council Prime (Triafamone 18.52 SC)	50	1.18 (1.0)	1.76 (2.8)	1.94 (3.5)	2.08 (4.0)	2.02 (4.0)	1.70 (2.5)	2.67 (7.0)	2.27 (4.8)
T_5.Council Prime (Triafamone 18.52 SC)	100	1.18 (1.0)	1.70 (2.5)	1.77 (2.8)	2.22 (4.5)	1.50 (2.0)	1.63 (2.3)	2.10 (4.8)	2.10 (4.0)
T_6.Pyrazosulfuron ethyl 10% WP	15	2.70 (7.3)	2.42 (5.5)	3.51 (12.3)	3.11 (9.5)	2.46 (6.0)	2.44 (5.5)	3.28 (10.5)	3.03 (8.8)
T_7.Cyhalofop Butyl 10% EC	80	2.62 (6.5)	2.56 (6.3)	3.36 (11.0)	3.06 (9.0)	2.79 (7.5)	2.42 (5.5)	3.58 (12.8)	2.98 (8.5)
T_8.Farmer practice (two hand weedings)	-	1.18 (1.0)	1.54 (2.0)	1.56 (2.0)	1.84 (3.0)	1.18 (1.0)	1.40 (1.5)	1.55 (2.3)	1.92 (3.3)
T_9.Weed free	-	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)
SEm±	-	0.24	0.21	0.27	0.22	0.27	0.20	0.32	0.19
CD (P = 0.05)	-	0.71	0.61	0.78	0.64	0.79	0.58	0.92	0.56

Note: Data transformed to √x+0.5 transformations. Figures in parentheses are original values

Table 4. Density of weeds (No. m^{-2}) at different growth stages of direct seeded Rice as influenced by weed management practices during *Rabi*, 2017-18 and *Kharif*, 2018-19

Treatments	Dose (g *a.i.* ha^{-1})	*Ammannia baccifera* 28 DAA		*Ammannia baccifera* 42 DAA		*Trianthema portulacastrum* 28 DAA		*Trianthem aportulacastrum* 42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T_1.Untreated (control)	-	2.33 (5.3)	2.44 (5.5)	3.04 (9.0)	2.77 (7.3)	3.10 (9.3)	2.49 (5.8)	3.97 (15.5)	3.12 (9.3)
T_2. Council Prime (Triafamone 18.52 SC)	30	1.84 (3.0)	1.98 (3.5)	2.66 (6.8)	2.44 (5.5)	2.18 (4.5)	1.82 (3.0)	3.17 (9.8)	2.51 (6.0)
T_3. Council Prime (Triafamone 18.52 SC)	40	1.59 (2.3)	1.89 (3.3)	2.31 (5.0)	2.35 (5.3)	2.04(4.0)	1.79 (2.8)	2.87 (8.3)	2.48 (5.8)
T_4. Council Prime (Triafamone 18.52 SC)	50	1.27 (1.3)	1.45 (1.8)	1.89 (3.3)	1.76 (2.8)	1.82 (3.0)	1.56 (2.0)	2.43 (5.8)	1.98 (3.5)
T_5.Council Prime (Triafamone 18.52 SC)	100	0.84 (0.3)	1.22 (1.0)	1.35 (1.5)	1.73 (2.5)	1.81 (3.0)	1.70 (2.5)	2.52 (6.0)	2.17 (4.3)
T_6.Pyrazosulfuron ethyl 10% WP	15	2.20 (4.5)	1.92 (3.3)	2.71 (7.0)	2.48 (5.8)	2.09 (4.0)	1.70 (2.5)	2.71 (7.0)	2.22 (4.5)
T_7.Cyhalofop Butyl 10% EC	80	2.13 (4.3)	2.36 (5.3)	3.06 (9.3)	2.79 (7.5)	2.73 (7.3)	2.25 (4.8)	3.28 (10.8)	2.71 (7.0)
T_8.Farmer practice (two hand weedings)	-	0.71 (0.0)	0.97 (0.5)	0.97 (0.5)	1.31 (1.3)	1.56 (2.0)	1.56 (2.0)	2.18 (4.3)	1.70 (2.5)
T_9.Weed free	-	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)	0.71 (0.0)
SEm±	-	0.21	0.17	0.24	0.19	0.23	0.15	0.27	0.16
CD (P = 0.05)	-	0.62	0.51	0.70	0.55	0.66	0.44	0.80	0.47

Note: Data transformed to √x+0.5 transformations. Figures in parentheses are original values

Table 5. Dry weight of weeds (g.m$^{-2)}$ at 42 days after herbicide application of direct seeded Rice as influenced by weed management practices during *Rabi,* 2017-18 and *Kharif,* 2018-19

Treatment	Dose	*Echinochloa colonum*		*Leptochloa chinensis*		*Dinebra retroflexa*		*Cyperus rotundus*	
	(g *a.i.* ha^{-1})	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T_1.Untreated (control)	-	13.56 (183.41)	11.64 (135.31)	4.35 (19.04)	3.83 (14.60)	4.70 (23.25)	5.16 (26.42)	5.33 (28.50)	4.44 (19.29)
T_2. Council Prime (Triafamone 18.52 SC)	30	8.03 (64.87)	7.35 (54.54)	3.70 (13.29)	3.94 (15.18)	3.37 (11.16)	3.61 (13.67)	3.86 (14.67)	3.14 (9.39)
T_3. Council Prime (Triafamone 18.52 SC)	40	6.53 (42.60)	6.40 (41.23)	3.55 (12.36)	3.35 (10.82)	2.36 (5.46)	3.03 (8.98)	3.49 (11.80)	2.59 (6.47)
T_4. Council Prime (Triafamone 18.52 SC)	50	5.18 (27.43)	4.79 (22.66)	3.11 (9.47)	3.38 (11.10)	1.92 (4.08)	2.07 (4.15)	2.72 (7.34)	2.03 (3.66)
T_5.Council Prime (Triafamone 18.52 SC)	100	4.18 (17.44)	4.37 (19.01)	3.05 (9.01)	2.87 (8.05)	0.71 (0.00)	0.71 (0.00)	2.41 (5.36)	2.33 (5.09)
T_6.Pyrazosulfuron ethyl 10% WP	15	8.81 (79.06)	7.85 (61.55)	3.31 (10.89)	3.47 (11.86)	4.20 (17.58)	4.08 (16.30)	5.67 (31.99)	4.21 (17.53)
T_7.Cyhalofop Butyl 10% EC	80	3.27 (10.73)	3.83 (14.64)	3.04 (9.13)	2.53 (6.01)	3.21 (10.81)	3.37 (11.15)	5.37 (29.79)	4.34 (18.78)
T_8.Farmer practice (two hand weedings)	-	2.64 (7.13)	3.58 (12.77)	1.28 (1.29)	1.95 (3.39)	1.79 (2.84)	2.12 (4.00)	2.35 (5.17)	2.49 (5.98)
T_9.Weed free	-	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
SEm±	-	0.4718	0.3308	0.2262	0.2507	0.4052	0.2884	0.3316	0.2171
CD (P=0.05)	-	1.3772	0.9655	0.6603	0.7316	1.1826	0.8419	0.9680	0.6337

*Note: *Data transformed to √x+0.5 transformations. Figures in parentheses are original values.*

Table 6. Dry weight of weeds (g $m^{-2)}$ at 42 days after herbicide application of direct seeded Rice as influenced by weed management practices during*Rabi,* 2017-18 and *Kharif,* 2018-19

Treatment	Dose (g *a.i.* ha^{-1})	*Cyperus difformis*		*Eclipta alba*		*Ammannia baccifera*		*Trianthema portulacastrum*	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T_1.Untreated (control)	-	6.09 (37.46)	4.26 (18.48)	4.63 (21.5)	3.99 (16.1)	4.87 (23.55)	3.78 (13.84)	5.87 (34.48)	4.86 (23.32)
T_2. Council Prime (Triafamone 18.52 SC)	30	4.45 (19.44)	3.90 (14.75)	3.50 (11.8)	3.40 (11.2)	3.93 (15.18)	2.73 (7.02)	4.86 (23.26)	3.30 (10.72)
T_3. Council Prime (Triafamone 18.52 SC)	40	3.76 (14.24)	3.46 (11.82)	2.96 (8.8)	3.31 (10.6)	3.25 (10.27)	2.60 (6.50)	4.01 (16.74)	3.34 (10.78)
T_4. Council Prime (Triafamone 18.52 SC)	50	3.18 (10.12)	2.56 (6.50)	3.07 (9.6)	2.44 (5.5)	2.81 (8.13)	1.81 (2.85)	3.53 (12.81)	2.51 (5.95)
T_5.Council Prime (Triafamone 18.52 SC)	100	3.47 (11.97)	2.87 (7.87)	2.40 (6.5)	2.32 (5.0)	2.09 (4.60)	1.92 (3.21)	3.62 (12.74)	2.89 (7.90)
T_6.Pyrazosulfuron ethyl 10% WP	15	5.31 (28.26)	4.13 (17.32)	4.58 (20.5)	3.46 (11.6)	4.14 (17.79)	3.24 (10.04)	3.96 (15.49)	3.33 (11.02)
T_7.Cyhalofop Butyl 10% EC	80	5.48 (30.18)	3.95 (15.26)	4.15 (17.3)	3.60 (13.0)	4.45 (19.88)	3.81 (14.77)	4.84 (23.99)	4.05 (16.34)
T_8.Farmer practice (two hand weedings)	-	2.65 (6.71)	2.07 (3.80)	1.68 (2.8)	2.22 (4.6)	1.12 (0.94)	1.45 (1.63)	3.04 (8.79)	2.05 (3.86)
T_9.Weed free	-	0.71 (0.00)	0.71 (0.00)	0.71 (0.0)	0.71 (0.0)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
SEm±	-	0.3807	0.3155	0.3840	0.2807	0.3937	0.2298	0.3797	0.2315
CD (P=0.05)	-	1.1112	0.9210	1.1208	0.8193	1.1491	0.6706	1.1083	0.6756

*Note: *Data transformed to √x+0.5 transformations. Figures in parentheses are original values.*

Table 7. Dry weight of total weeds (g m^{-2}) and weed control efficiency (%) at 42 days after herbicide application of direct seeded Rice as influenced by weed management practices during *Rabi*, 2017-18 and *Kharif*, 2018-19

Treatments	Dose (g a.i. ha^{-1})	*Dry weight of total weeds 42 DAA		**Weed control efficiency 42 DAA	
		2017-18	2018-19	2017-18	2018-19
T_1.Untreated control	-	19.23 (371.2)	16.35 (267.4)	0.00 (0.0)	0.00 (0.0)
T_2. Council Prime (Triafamone 18.52 SC)	30	13.16 (137.5)	11.66 (136.4)	46.77 (53.1)	44.32 (48.8)
T_3. Council Prime (Triafamone 18.52 SC)	40	11.05(122.2)	10.37 (107.2)	54.42 (65.9)	50.64 (59.8)
T_4. Council Prime (Triafamone 18.52 SC)	50	9.22 (89.0)	7.89 (62.4)	60.88 (75.3)	61.25 (76.7)
T_5.Council Prime (Triafamone 18.52 SC)	100	8.23 (67.7)	7.49 (56.1)	64.58 (85.1)	62.69 (78.8)
T_6.Pyrazosulfuron ethyl 10% WP	15	14.83 (221.5)	12.53 (157.3)	38.96 (39.7)	39.85 (41.1)
T_7.Cyhalofop Butyl 10% EC	80	12.25 (151.8)	10.45 (110.0)	50.18 (58.8)	50.10 (58.7)
T_8.Farmer practice (two hand weedings)	-	6.01 (35.7)	6.31 (40.0)	71.76 (90.1)	67.42 (85.1)
T_9.Weed free	-	0.71 (0.0)	0.71 (0.0)	90.00 (100.0)	90.00 (100.0)
SEm±	-	0.61	0.33	2.07	1.39
CD (P = 0.05)	-	1.79	0.96	6.06	4.04

*Note: *Data transformed to √x+0.5 transformations. Figures in parenthesis are original values*
*** Data transformed to arc sine transformations. Figures in parentheses are original values*

4. CONCLUSIONS

The weed spectrum was mainly dominated by grasses followed by broad-leaf weeds and sedges in rice and all the weed management practices effectively controlled the grasses, broad-leaf weeds, and sedges. Among the herbicidal treatments grasses (*D. retroflexa)* sedges (*C. rotundus*and *C. difformis) and* broad-leaved weeds (*E. alba*, *A. baccifera*, and *T. portulacastrum) w*ere controlled effectively by Triafamone 18.52 SCat a rateof 100 g.ha^{-1}at the 2-3 leaf stage of weed (T_5) followed by T_4 (Triafamone 18.52 SCat a rateof 50 g.ha^{-1}at 2-3 leaf stage of weed).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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