

## Efficacy of Triafamone 18.52% SC on Weed dynamics and yield of direct sown rice

### 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 to find out the efficacy of Triafamone 18.52% SC on weed and yield enhancement in direct sown rice. The experiment consisted of 9 treatments laid out in complete randomized block design with four replications. Results of the experiment revealed that Triafamone 18.52 SC @ 100 g a.i. ha<sup>-1</sup> (T<sub>3</sub>) and Triafamone 18.52 SC @ 50 g a.i. ha<sup>-1</sup> (T<sub>4</sub>) applied at 2-3 leaf stage of weed were effective in controlling all the weeds and also recorded significantly lesser dry weight of weeds over the control during both the years of study.

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### 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 (Verma *et al.*, 2015). Infestation of weeds with direct-seeded rice (DSR) continues to be the key factor limiting its yield. According to recent estimations, 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 (Ramachandra *et al.*, 2014). In DSR, weed control remains a challenging issue because rice and weeds both emerge at the same time. Any DSR production technique intending to increase productivity and profitability must employ an efficient early weed management strategy.

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Due to labour shortages and high labour input costs, traditional weed management approaches are time-consuming, labour-intensive, expensive, and impractical to use over a large region. Traditional weed control methods are no longer workable due to the rising industrialization and urbanisation. Herbicidal weed control is chosen due to its higher effectiveness, lower cost, and shorter time commitment. Choosing the right herbicides for the type of weed flora infesting the crop is essential for effective weed control (Jyothi Basu *et al.*, 2020<sup>a</sup>, 2020<sup>b</sup>, 2020<sup>c</sup>, 2021). In this view, the current study was undertaken to find the efficacy of Triafamone 18.52% SC on weed dynamics and yield of direct sown rice

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### MATERIALS AND METHODS

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

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

Treatment	Dose (g ha <sup>-1</sup> )	Time of Application
T <sub>1</sub> : Untreated control	-	-
T <sub>2</sub> : Triafamone 18.52 SC	30	2 to 3 leaf stage of weed
T <sub>3</sub> : Triafamone 18.52 SC	40	2 to 3 leaf stage of weed

T <sub>4</sub> :Triafamone18.52 SC	50	2 to 3 leaf stage of weed
T <sub>5</sub> :Triafamone18.52 SC	100	2 to 3 leaf stage of weed
T <sub>6</sub> :Pyrazosulfuron ethyl 10% WP	15	2 to 3 leaf stage of weed
T <sub>7</sub> :Cyhalofop Butyl 10% EC	80	2 to 3 leaf stage of weed
T <sub>8</sub> :Farmer practice (two hand weeding's)	-	20 DAS and 40 DAS
T <sub>9</sub> :Weed free	-	-

Triafamone belongs to the keto sulfonanilide herbicides. 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 2<sup>nd</sup> metabolite is formed by N-demethylation, and this metabolite strongly inhibits acetolactate synthase (ALS).

A seed rate of 50 kg ha<sup>-1</sup> 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 interval. All the herbicides were sprayed by using knapsack sprayer with a flat-fan nozzle at a spray volume of 500 l ha<sup>-1</sup>.

The efficacy of different treatments on weeds was evaluated at crop maturity. Quadrates (0.25 m<sup>2</sup>) 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 °C for 48 hours and then weighed for biomass. The weed control efficiency was calculated using the formula given by Tawahaet *al.* (2002). The data on weeds were transformed by square root transformation by adding one before being subjected to ANOVA (Gomez and Gomez 1984).

Weed control efficiency (WCE) indicates percent reduction 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 by using the following formula and expressed in percentage (AICRPWC, 1988).

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

Where,

DWC = Dry weight of weeds in unweeded control

DWT = Dry weight of weeds in treated plot.

## Results and Discussion

### Weed Flora in Direct sown Rice

The predominant 'weed species' that were observed in the experimental field during investigation are *Echinochloa colonum*, *Echinochloa crusgalli*, *Dinerbaretroflexa* and *Leptochloa chinensis* (grasses), *Cyperus rotundus* and *Cyperus difformis* (sedges), *Eclipta alba*, *Ammaniabaccifera* and *Trianthemaportulacastrum* (broad leaved weeds). However,

*Echinochloa colonum* was the most predominant weed among all the three groups at various stages of crop growth during both the years of study. Similar trend was close conformity of Ramesha *et al.* (2019) and Murali Arthanari(2023).

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### Weed Density(No. m<sup>-2</sup>)

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

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#### a). 28 days after herbicide application (28 DAA)

At 28 DAA the density of grasses (*Dinerbaretroflexa*) sedges (*Cyperus rotundus* and *Cyperus difformis*) and broad leaved weeds (*Eclipta alba*, *Ammaniabaccifera*, and *Trianthemaportulacastrum*) were significantly reduced in all the weed control treatments over weedy check. Among the herbicide treated plots the lowest weed density was recorded in treatment T<sub>5</sub> (Triafamone 18.52 SC @ 100 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed) which was on par with treatments T<sub>4</sub> (Triafamone 18.52 SC @ 50 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed). The highest density of grasses was recorded in weedy check (T<sub>1</sub>) during both the years of study.

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#### b). 42 days after herbicide application (42 DAA)

The data on weed density of grasses, sedges and broad leaved weeds at 42 days after application is furnished in Table 1, 2, 3 and 4. Significant reduction in weed density of grasses was observed in weed free treatment (T<sub>9</sub>) compared to all the other weed management practices that also registered lesser population of weeds over weedy check (T<sub>1</sub>) during both the years of study.

The lowest density of weeds among the herbicidal treatments (*Dinerbaretroflexa*, *Cyperus rotundus*, *Cyperus difformis*, *Eclipta alba*, *Ammaniabaccifera*, and *Trianthemaportulacastrum*) was observed with T<sub>5</sub> (Triafamone 18.52 SC @ 100 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed) followed by T<sub>4</sub> (Triafamone 18.52 SC @ 50 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed) which maintained parity with each other. Untreated control (T<sub>1</sub>) resulted in the highest density of weeds and was significantly higher than rest of the weed management practices at 42 DAA during both the years of study. These findings were in agreement with the views expressed by Deivasigamani(2016<sup>a</sup>), Deivasigamani(2016<sup>b</sup>), Murali Arthanari(2023).

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### 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.

Among all the weed management practices the treatment T<sub>9</sub> categorized as weed free exhibited the lowest weed drymatter at 42 DAA over rest of the treatments and significantly higher dry weight of weed species was observed under weedy check (T<sub>1</sub>) compared to rest of the treatments during both the years of study.

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At 42 DAA the treatment T<sub>5</sub> (Triafamone 18.52 SC @ 100 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed) registered significantly the lowest dry weight weeds compared to treatments T<sub>3</sub>, T<sub>6</sub>,

T<sub>7</sub>, and T<sub>1</sub> but, was on a par with treatment T<sub>4</sub> (Triafamone 18.52 SC @ 50 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed). None of the treatments were comparable to weed free in reducing total dry weight of total weeds. However, all the weed management practices were significantly superior to weedy check (T<sub>1</sub>) in reducing the total dry weight of weeds. The results are conformity with the findings of Deivasigamani (2016<sup>b</sup>)

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### Weed control efficiency (%)

Weed control efficiency of various weed management practices calculated at 42 days after 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 of 62.69 and 64.85 per cent was recorded by the treatment T<sub>5</sub> (Triafamone 18.52 SC @ 100 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed) which was on a par with treatment T<sub>4</sub> (Triafamone 18.52 SC @ 50 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed) (61.25 and 60.88 %) but significantly superior to rest of the treatments during both the years of study. Similar results were also reported by Deivasigamani (2016<sup>b</sup>) and Mohapatra *et al.* (2021).

### Conclusions

On the basis of foregoing studies, it is concluded that:

- The weeds 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 (*Dinerbaretroflexa*) sedges (*Cyperus rotundus* and *Cyperus difformis*) and broad leaved weeds (*Eclipta alba*, *Ammaniabaccifera*, and *Trianthemaportulacastrum*) was controlled effectively by Triafamone 18.52 SC @ 100 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed (T<sub>5</sub>) followed by T<sub>4</sub> (Triafamone 18.52 SC @ 50 g a.i. ha<sup>-1</sup> at 2-3 leaf stage of weed).

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### References

- Deivasigamani S. 2016<sup>a</sup>. Bio-efficacy and phytotoxicity of triafamone and ethoxysulfuron in transplanted Rice (*Oryza sativa*). *International Journal of Multidisciplinary Research and Modern Education*. 2(1):274-279.
- Deivasigamani S. 2016<sup>b</sup>. Study of bio-efficacy and Phytotoxicity of New Generation Herbicides on Triafamone and Ethoxysulfuron in Direct Seeded Rice (*Oryza sativa*). *IRA-International Journal of Applied Sciences*. 3(2):106-112.
- Gomez K. A and Gomez A. A. 1984. Statistical Procedures for Agricultural Research (2 ed.). John Wiley and sons, New York, 680 p.

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Jyothi Basu, B., Prasad, P.V.N., Murthy, V.R.K., Ashoka Rani, Y and Prasad, P.R.K. 2020<sup>a</sup>. Productivity of direct seeded rice in response to various weed management practices and their residual effect on greengram. *Journal of Rice Research*. 13 (1): 66-74.

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Jyothi Basu, B., Prasad, P.V.N., Murthy, V.R.K., Ashoka Rani, Y and Prasad, P.R.K. 2021. Efficacy of sequential application of herbicides on weed management, rice nutrient uptake and soil nutrient status in dry direct-seeded ricegreengram sequence. *Indian Journal of Weed Science*. 53(4): 398–404.

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Jyothi Basu, B., Prasad, P.V.N., Murthy, V.R.K., Ashoka Rani, Y and Prasad, P.R.K. 2020<sup>b</sup>. Evaluation of sequential application of herbicides for controlling complex weed flora in direct sown rice. *Indian Journal of Plant Protection*. 48(4): 482–490.

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Jyothi Basu, B., Prasad, P.V.N., Murthy, V.R.K., Ashoka Rani, Y and Prasad, P.R.K. 2020<sup>c</sup>. Bioefficacy and Phytotoxicity of Herbicides in Rice and Their Residual Effect on Succeeding Greengram. *International Journal of Agriculture Sciences*. 12(11): 9940–9944.

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Mohapatra, S., Tripathy, S.K., TripathyS. and MohantyA.K. 2021. Effect of sequential application of herbicides on productivity and profitability of transplanted rice. *Indian Journal of Weed Science*. 53(2): 129–134.

Murali Arthanari P. 2023. Weed management with Triafamone herbicide in transplanted rice ecosystem. *Emirates Journal of Food and Agriculture*. 35(4): 351-356.

Ramachandra C, Shivakumar N and Ningaraju GK. 2014. Effect of herbicides and their combination on weed dynamics in rice-based cropping system. *Indian Journal of Weed Science* 46(2): 123–125.

Ramesha, Y.M., Anand, S.R., Krishnamurthy D and Manjunatha Bhanuvally 2019. Weed management effect to increase grain yield in dry direct-seeded rice. *Indian Journal of Weed Science*. 51(1): 6–9.

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Tawaha A. M., Turk M. A and Maghaireh G. A. 2002. Response of barley to herbicide versus mechanical weed control under semi arid conditions. *Journal of Agronomy and Crop Science*. 188: 106–112.

Verma SK, Singh SB, Meena RN, Prasad SK, Meena RS and Gaurav. 2015. A review of weed management in India: The need of new directions for sustainable agriculture. *The Bioscan* 10(1): 253–263.

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UNDER PEER REVIEW

Table 1. Density of weeds(No. m<sup>-2</sup>) 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 <sup>-1</sup> )	<i>Echinochloa colonum</i>		<i>Echinochloa colonum</i>		<i>Leptochloa chinensis</i>		<i>Leptochloa chinensis</i>	
		28 DAA		42 DAA		28 DAA		42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> . 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 <sub>2</sub> . 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 <sub>3</sub> . 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 <sub>4</sub> . 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 <sub>5</sub> . 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 <sub>6</sub> . 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 <sub>7</sub> . 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 <sub>8</sub> . 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 <sub>9</sub> . 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)
<b>SEm+</b>	-	0.31	0.26	0.39	0.27	0.21	0.16	0.23	0.30
<b>CD (P = 0.05)</b>	-	0.91	0.77	1.14	0.80	0.63	0.47	0.68	0.87

Note: Data transformed to  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values

Table 2. Density of weeds(No. m<sup>-2</sup>) 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 <sup>-1</sup> )	<i>Dinebraretroflexa</i>		<i>Dinebraretroflexa</i>		<i>Cyperus rotundus</i>		<i>Cyperus rotundus</i>	
		28 DAA		42 DAA		28 DAA		42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> . 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 <sub>2</sub> . 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 <sub>3</sub> . 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 <sub>4</sub> . 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 <sub>5</sub> . 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 <sub>6</sub> . 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 <sub>7</sub> . 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 <sub>8</sub> . 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 <sub>9</sub> . 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)
<b>SEm+</b>	-	0.20	0.19	0.24	0.20	0.29	0.22	0.28	0.23
<b>CD (P = 0.05)</b>	-	0.60	0.57	0.69	0.60	0.83	0.64	0.81	0.66

Note: Data transformed to  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values

Table 3. Density of weeds(No. m<sup>-2</sup>) 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 <sup>-1</sup> )	<i>Cyperus difformis</i>		<i>Cyperus difformis</i>		<i>Eclipta alba</i>		<i>Eclipta alba</i>	
		28 DAA		42 DAA		28 DAA		42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> . 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 <sub>2</sub> . 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 <sub>3</sub> . 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 <sub>4</sub> . 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 <sub>5</sub> . 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 <sub>6</sub> . 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 <sub>7</sub> . 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 <sub>8</sub> . 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 <sub>9</sub> . 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)
<b>SEm+</b>	-	0.24	0.21	0.27	0.22	0.27	0.20	0.32	0.19
<b>CD (P = 0.05)</b>	-	0.71	0.61	0.78	0.64	0.79	0.58	0.92	0.56

Note: Data transformed to  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values

Table 4. Density of weeds(No. m<sup>-2</sup>) 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 <sup>-1</sup> )	<i>Ammanniabaccifera</i>		<i>Ammanniabaccifera</i>		<i>Trianthemaportulacastrum</i>		<i>Trianthemaportulacast rum</i>	
		28 DAA		42 DAA		28 DAA		42 DAA	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> . 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 <sub>2</sub> . 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 <sub>3</sub> . 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 <sub>4</sub> . 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 <sub>5</sub> . 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 <sub>6</sub> . 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 <sub>7</sub> . 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 <sub>8</sub> . 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 <sub>9</sub> . 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)
<b>SEm±</b>	-	0.21	0.17	0.24	0.19	0.23	0.15	0.27	0.16
<b>CD (P = 0.05)</b>	-	0.62	0.51	0.70	0.55	0.66	0.44	0.80	0.47

Note: Data transformed to  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values

Table 5: Dry weight of weeds ( $\text{g m}^{-2}$ ) 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 <sup>-1</sup> )	<i>Echinochloa colonum</i>		<i>Leptochloa chinensis</i>		<i>Dinebraretroflexa</i>		<i>Cyperus rotundus</i>	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>4</sub> 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 <sub>5</sub> 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 <sub>6</sub> 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 <sub>7</sub> 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 <sub>8</sub> Farmer practice (two hand weeding)	-	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 <sub>9</sub> 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  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values.

Table 6: Dry weight of weeds ( $\text{g m}^{-2}$ ) 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 <sup>-1</sup> )	<i>Cyperus difformis</i>		<i>Eclipta alba</i>		<i>Ammanniabaccifera</i>		<i>Trianthemaportulacastrum</i>	
		2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>4</sub> 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 <sub>5</sub> 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 <sub>6</sub> 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 <sub>7</sub> 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 <sub>8</sub> 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 <sub>9</sub> 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  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values.

Table 7. Dry weight of total weeds ( $\text{g m}^{-2}$ ) 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. $\text{ha}^{-1}$ )	*Dry weight of total weeds		**Weed control efficiency	
		42 DAA		42 DAA	
		2017-18	2018-19	2017-18	2018-19
T <sub>1</sub> Untreated control	-	19.23 (371.2)	16.35 (267.4)	0.00 (0.0)	0.00 (0.0)
T <sub>2</sub> Council Prime (Triafamone 18.52 SC)	30	13.16 (137.5)	11.66 (136.4)	46.77 (53.1)	44.32 (48.8)
T <sub>3</sub> Council Prime (Triafamone 18.52 SC)	40	11.05 (122.2)	10.37 (107.2)	54.42 (65.9)	50.64 (59.8)
T <sub>4</sub> Council Prime (Triafamone 18.52 SC)	50	9.22 (89.0)	7.89 (62.4)	60.88 (75.3)	61.25 (76.7)
T <sub>5</sub> Council Prime (Triafamone 18.52 SC)	100	8.23 (67.7)	7.49 (56.1)	64.58 (85.1)	62.69 (78.8)
T <sub>6</sub> Pyrazosulfuron ethyl 10% WP	15	14.83 (221.5)	12.53 (157.3)	38.96 (39.7)	39.85 (41.1)
T <sub>7</sub> Cyhalofop Butyl 10% EC	80	12.25 (151.8)	10.45 (110.0)	50.18 (58.8)	50.10 (58.7)
T <sub>8</sub> Farmer practice (two hand weedings)	-	6.01 (35.7)	6.31 (40.0)	71.76 (90.1)	67.42 (85.1)
T <sub>9</sub> Weed free	-	0.71 (0.0)	0.71 (0.0)	90.00 (100.0)	90.00 (100.0)
<b>SEm<sub>±</sub></b>	-	0.61	0.33	2.07	1.39
<b>CD (P = 0.05)</b>	-	1.79	0.96	6.06	4.04

Note: \*Data transformed to  $\sqrt{x+0.5}$  transformations. Figures in parenthesis are original values

\*\* Data transformed to arc sine transformations. Figures in parenthesis are original values