

EFFECT OF VICHETE 5G AND RIFIT 500 EC ON THE OCCURRENCE AND PHYTOSOCIOLOGICAL ATTRIBUTES OF WEEDS IN RICE FIELD

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Abstract

Two herbicides namely Vichete 5G (12.5, 25.0, 50.0 kg/ha) and Rifit 500 EC (0.5, 1.0 L/ha) were applied in BRRI Dhan 28 in the field to follow their effects on the occurrence and phytosociological attributes of weeds. A total of 29 weed species belonging to 22 genera covering 10 families was found to occur. 28 weed species under 21 genera and 9 families, 16 weed species under 14 genera and 6 families and 26 weed species under 21 genera and 10 families were assessed during 1st, 2nd and 3rd weedings respectively. 12 Species (*Eragrostis uniolooides*, *Marsilea quadrifolia*, *Cyperus tenuispica*, *Murdania nudiflora*, *Fimbristylis miliacea*, *Rotala densiflora*, *Cyperus iria*, *Setaria pumilla*, *Fimbristylis diphylla*, *Leptochloe chinensis*, *Monochoria hastata* and *Oryza rufipogon*) were recorded in first weeding but not found in second weeding. *Cyperus rotundus*, *Panicum paludosum*, *Cyperus difformis*, *Marsilea quadrifolia* and *Echinochloa crusgalli* were found to be present at control only. They were controlled by the use of both herbicides. However, the number of weed species was found to reduce in the 2nd weeding in comparison to 1st one in all the treatments. Between the two weedicides, 50.0 kg/ha of Vichete 5G was relatively better than other doses of Vichete 5G and Rifit 500 EC and more effective to control weed species in 1st and 2nd weedings. In first weeding phytosociological attributes were highest in *Schoenoplectus erectus* and lowest in *Rotala densiflora*. In second weeding phytosociological attributes were highest in *Eleocharis congesta* and lowest in *Panicum paludosum* and *Lindernia hyssopiodes* while phytosociological attributes were highest in *Fimbristylis miliacea* and lowest in *Marsilea quadrifolia* of third weeding.

Key words: Vichete 5G, Rifit 500 EC, Weeds, BRRI Dhan 28, Phytosociological attributes

Introduction

Weeds cause problems in rice growing areas in the world, weed grasses and broad leaf weed reduces yield and quality of rice (Smith 1970). Losses due to weeds in Aus rice, range from 58% to complete failure of the crops (Mian and Ahasan 1969 and BRRI 1981). The total loss due to weed competition in Aus rice of Bangladesh is 1716 thousands ton of rough rice per year. Crop loss due to weed competition was most severe from 10 to 20 days after emergence. The main problems confronting farmer is that seeds

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of these weeds are set before harvesting of the crop from the field. Amarjit *et al.* (1994) observed that poor weed control is one of the major factors for yield reduction of rice depending on the type of weed flora and their intensity.

The traditional methods of weed control in rice field in Bangladesh are land tillage and hand weeding which are time consuming and expensive as well (Chowdhury *et al.* 1995). In the paddy field due to narrow spacing and hooding, hand weeding and mechanical hoeing is difficult and herbicides offer more practical, effective and economic means of controlling weeds (Nadeem 1998). Therefore, there is a great urge for the use of herbicides to control weeds in paddy field. Information regarding Vichete 5G and Rifit 500 EC is scanty in Bangladesh. So, a field experiment was designed to assess their efficiency on the occurrence and phytosociological attributes of weeds in BRRI Dhan 28 rice field.

Materials and Methods

A field experiment was done following a Complete Randomized Design using six treatments each with three replications (Block). 40 days old seedlings of BRRI Dhan 28 paddy were transplanted from seedbed to the prepared field. Two healthy seedlings were transplanted per hill. Row to row and hill to hill distance were 20 cm × 20 cm. Plot size was 4m × 4m and in each plot there were 400 hills. The recommended basal dose of fertilizers (Urea-160 kg/ha, T.S.P.-110 kg/ ha, M.P.-110 kg/ha and Zinc Sulphate-30 kg/ ha) used by BRRI (2008) was applied to the experimental fields. Herbicides namely Vichete 5G and Rifit 500 EC were applied after 3 days of transplantation as per treatment at the rate of T₀-control, T₁-12.5 kg/ha, T₂-25.0 kg/ha and T₃-50.0 kg/ha of Vichete 5G; and T₄-0.5 L/ ha and T₅-1.0 L/ha of Rifit 500 EC. Irrigation, weeding and other cultural practices were practiced when required.

Weedings were done after 30, 60 and 105 days after transplantation. The weeds were collected and the number of each weed species was recorded. The phytosociological attributes namely Density, Relative Density, Frequency, Relative Frequency, Abundance, Relative Abundance and Importance Value percent (IV %) were assessed from weeds of samples and computed according to Krebs (1978).

Results and Discussion

The occurrence and quantitative estimation of weeds of different treatments at first (W₁), second (W₂) and third (W₃) weedings have been assessed (Tables 1- 6). In first weeding

a total of 28 weed species under 21 genera and 9 families was collected from six different treatments in BRRI Dhan 28 field of the present investigation (Table 1).

Occurrence of weed species: It is revealed from Table 1 that total number of weed species were 614, 456, 345, 188, 163 and 160 in T₁, T₀, T₂, T₅, T₄ and T₃ respectively under Cyperaceae. The highest number of weed species of Cyperaceae was found in T₁. In Poaceae, the highest number of weed species was collected in T₁ (348) followed by T₄ (229), T₃ (160), T₅ (159), T₀ (135) and T₂ (76). In Pontederiaceae, the highest number of weed species was found in T₂ (34) followed by T₁ (33), T₅ (17), T₄ (16), T₃ (14) and T₀ (12). The highest number of weed species was observed in T₁ (09) followed by T₅ (04) under Scrophulariaceae. In T₀ and T₂ the number of weed species was same (03). In Marsileaceae, the maximum number of weed species was found in T₄ (05) followed by T₃ (04), T₂ (03) and T₅ (01). The highest number of weed species was observed in T₀ (150) followed by T₁ (31) and T₂ (03) under Rubiaceae, where the number of weed species was equal (01) in T₃ and T₅. In Onagraceae, the maximum number of weed species was obtained in T₁ (18). In T₂ and T₅ the number of weed species was similar (14) but in control the number of weed species was 09. The highest number of weed species was observed in T₁ (12) under Commelinaceae. In T₂, T₄ and T₅ the number of weed species was equal (03) and was almost equal to control (02). In Lythraceae, the number of weed species was observed only in T₁ (01) but not found in any other treatment. However spp. of Scrophulariaceae and Onagraceae in T₃ and T₄, Marsileaceae in T₀ and T₁, Rubiaceae in T₄ and Commelinaceae in T₅ were not found.

Quantitative estimation of weed species showed that application of Vichete 5G and Rifit 500 EC caused a drastic reduction in their abundance. The reduction decreased from 767 to 487 and 339; and 767 to 416 and 387 due to 25.0 and 50.0 kg/ha of Vichete 5G and 0.5 and 1.0 L/ha of Rifit 500 EC respectively (Table 1). However, application of 12.5 kg/ha of Vichete 5G stimulated their growth from 767 to 1060. Similarly the lowest dose of Rifit 500 EC (0.5 L/ha) also promoted the growth of weeds in comparison to higher dose (1.0 L/ha) markedly from 387 to 416 (Table 1). It is also apparent from Table 1 that *Cyperus rotundus*, *Fimbristylis diphylla*, *Cyperus difformis*, *Fimbristylis dichotoma*, *Paspalum scrobiculatum*, *Setaria pumilla*, *Leptochloe chinensis*, *Oryza rufipogon*, *Lindernia hyssopoides*, *Lindernia antipoda*, *Marsilea quadrifolia* and *Rotala densiflora* were nil or almost nil or trace due to treatment of Vichete 5G and Rifit 500 EC or due to dormancy or unfavorable conditions of seed germination.

Table 1. Effect of Vichete 5G and Rifit 500 EC on occurrence of weeds in BRRI Dhan 28 grown in Boro season during first weeding.

Species Serial Number	Name of species	Name of family	Number of weed species					
			Treatments					
			Vichete 5G (kg/ha)			Rifit 500 EC (L/ha)		
T ₀ (0.0)	T ₁ (12.5)	T ₂ (25.0)	T ₃ (50.0)	T ₄ (0.5)	T ₅ (1.0)			
01	<i>Schoenoplectus erectus</i> Roxb.	Cyperaceae	243	546	330	148	145	177
02	<i>Cyperus tenuispica</i> Steudel.		03	00	03	03	04	01
03	<i>Eleocharis congesta</i> D. Don.		187	61	00	03	00	00
04	<i>Fimbristylis miliacea</i> L. Vahl.		00	01	03	00	04	02
05	<i>Kyllinga memuralis</i> J. R. and G. Farster.		18	06	00	00	00	00
06	<i>Cyperus iria</i> L.		03	00	04	04	08	06
07	<i>Cyperus rotundus</i> L.		02	00	00	00	00	00
08	<i>Fimbristylis diphylla</i> Vahl.		00	00	00	00	02	00
09	<i>Cyperus difformis</i> L.		00	00	04	00	00	01
10	<i>Fimbristylis dichotoma</i> (L.) Vahl.		00	00	01	02	00	01
	Sub-total		456	614	345	160	163	188
11	<i>Ischaemum rugosum</i> Salisb.	Poaceae	102	320	66	122	182	133
12	<i>Eragrostis unioides</i> (Retz.) Nees.		08	03	03	17	12	09
13	<i>Echinochloa crusgalli</i> (L.) Beauv.		09	00	00	12	02	09
14	<i>Leersia hexandra</i> Swartz.		00	06	04	07	08	06
15	<i>Panicum paludosum</i> Roxb.		00	15	08	00	24	01
16	<i>Paspalum scrobiculatum</i> Lamk.		15	01	00	00	00	00
17	<i>Setaria pumilla</i> (Poir) Roem and Schult.		01	00	00	02	00	00
18	<i>Leptochloe chinensis</i> L. Nees.		00	01	01	00	01	00
19	<i>Oryza rufipogon</i> Griff.		00	02	00	00	00	01
	Sub-total		135	348	82	160	229	159
20	<i>Monochoria vaginalis</i> (Burnt. f.) Kirk.	Pontederiaceae	12	33	33	14	12	17
21	<i>Monochoria hastata</i> Solms.		00	00	01	00	04	00
	Sub-total		12	33	34	14	16	17
22	<i>Lindernia hyssopiodes</i> L. Hains.	Scrophulariaceae	00	00	00	00	00	04

Contd.

Species Serial Number	Name of species	Name of family	Number of weed species					
			Treatments					
			Vichete 5G (kg/ha)			Rifit 500 EC (L/ha)		
T ₀ (0.0)	T ₁ (12.5)	T ₂ (25.0)	T ₃ (50.0)	T ₄ (0.5)	T ₅ (1.0)			
23	<i>Lindernia antipoda</i> (L.) Alston.		03	09	03	00	00	00
	Sub-total		03	09	03	00	00	04
24	<i>Marsilea quadrifolia</i> L.	Marsileaceae	00	00	03	04	05	01
25	<i>Hedyotis corymbosa</i> (L.) Link.	Rubiaceae	150	31	03	01	00	01
26	<i>Ludwigia adscendens</i> L. Hara.	Onagraceae	09	18	14	00	00	14
27	<i>Murdania nudiflora</i> (L.) Brenan.	Commelinaceae	02	12	03	00	03	03
28	<i>Rotala densiflora</i> (Roth) koehne.	Lythraceae	00	01	00	00	00	00
	Total		767	1066	487	339	416	387

Phytosociological attributes of weed species

Total number of individual species : The highest total number (1589) of individual species was found in *Schoenoplectus erectus*. The total number (05) of individual species was similar in *Monochoria hastata* and *Cyperus difformis*. The lowest total number (01) of individual species was found in *Rotala densiflora* (Table 2).

Density: The density of species ranged from 264.83 (*Schoenoplectus erectus*) to 0.17 (*Rotala densiflora*). The density of other species was in intermediate range in the first weeding (Table 2).

Frequency of occurrence (F%) : The frequency of occurrence was observed 100% in 4 species; 83.33% in 5 species; 66.67% in 5 species; 50% in 4 species; and 33.33% in 6 species. The lowest frequency of occurrence (16.67%) was in case of 4 species. (Table 2).

Abundance: The highest abundance (264.83) was found in all the treatments and it was *Schoenoplectus erectus*. In *Fimbristylis miliacea*, *Monochoria hastata* and *Cyperus difformis* the abundance (2.5) was found similar. The lowest abundance (1.00) was obtained in *Rotala densiflora* and *Leptochloe chinensis* (Table 2).

Relative Density (RD %) : In *Schoenoplectus erectus* the relative density was found to be the highest (45.89%) in all the treatments. It appeared that the lowest RD (0.03 %) was in *Rotala densiflora* and all other species fall into intermediate range (Table 2).

Relative Frequency (RF %) : The highest relative frequency (0.06 %) was obtained in 4 species. The RF was found to be 0.05% in 5 species; 0.04% in 5 species; 0.03% in 3 species and 0.02% in 6 species. The lowest RF (0.01%) was found in 4 species (Table 2).

Relative Abundance (RA %) : In *Schoenoplectus erectus* relative abundance was found highest (39.46%) and in *Fimbristylis miliacea* , *Monochoria hastata* and *Cyperus difformis* the RA (0.37 %) was same. The lowest RA (0.15%) was found in *Rotala densiflora* and *Leptochloe chinensis* (Table 2).

Importance Value (IV%) : It is apparent from Table 2 that among the 28 weed species the maximum IV (28.47%) was observed in *Schoenoplectus erectus* and the lowest IV (0.06%) was found in *Rotala densiflora*.

Table 2. Effect of Vichete 5G and Rifit 500 EC on phytosociological attributes of weeds in first weeding.

Species Serial No.	Total no. of individual species	No. of treatments in which species occurred	Density	Frequency of occurrence (F%)	Abundance	Relative Density (RD%)	Relative Frequency (RF%)	Relative Abundance (RA%)	Importance Value (IV%)
01	1589	06	264.83	100	264.83	45.89	0.06	39.46	28.47
02	14	05	2.33	83.33	2.80	0.40	0.05	0.42	0.29
03	251	03	41.83	50.00	83.67	7.25	0.03	12.47	6.57
04	10	04	1.67	66.67	2.50	0.29	0.04	0.37	0.23
05	24	02	4.00	33.33	12.00	0.69	0.02	1.79	0.83
06	25	05	4.17	83.33	5.00	0.72	0.05	0.75	0.51
07	02	01	0.33	16.67	2.00	0.06	0.01	0.30	0.12
08	02	01	0.33	16.67	2.00	0.06	0.01	0.30	0.12
09	05	02	0.83	33.33	2.50	0.14	0.02	0.37	0.18
10	04	03	0.67	50.00	1.33	0.12	0.03	0.20	0.12
11	925	06	154.17	100	154.17	26.71	0.06	22.97	16.58
12	52	06	8.67	100	8.67	1.50	0.06	1.29	0.92
13	32	04	5.33	66.67	8.00	0.92	0.04	1.19	0.51
14	31	05	5.17	83.33	6.20	0.90	0.05	0.92	0.62
15	48	04	8.0	66.67	12.00	1.39	0.04	1.79	1.07
16	16	02	2.67	33.33	8.00	0.46	0.02	1.19	0.56
17	03	02	0.50	33.33	1.50	0.09	0.02	0.22	0.11
18	03	03	0.50	50.00	1.00	0.09	0.03	0.15	0.09
19	03	02	0.50	33.33	1.50	0.09	0.02	0.22	0.11
20	121	06	20.17	100	20.17	3.49	0.06	3.00	2.18
21	05	02	0.83	33.33	2.50	0.14	0.02	0.37	0.18
22	04	01	0.67	16.67	4.00	0.12	0.01	0.60	0.24
23	15	03	2.50	50.00	5.00	0.43	0.03	0.75	0.40
24	13	04	2.17	66.67	3.25	0.38	0.04	0.48	0.30
25	186	05	31.0	83.33	37.20	5.37	0.05	5.54	3.65
26	55	04	9.17	66.67	13.75	1.59	0.04	2.05	1.23
27	23	05	3.83	83.33	4.60	0.66	0.05	0.69	1.40
28	01	01	0.17	16.67	1.00	0.03	0.01	0.15	0.06
Total	3463								

Note: Species serial number of Table 1 and Table 2 indicate same name of species.

A total of 16 weed species under 14 genera and 6 families was collected in second weeding (W₂) from all the treatments (Table 3).

Occurrence of weed species: It is apparent from Table 3 that total number of weed species were 4736, 323, 154, 117, 93 and 45 in T₀, T₁, T₄, T₅, T₂ and T₃ respectively under Cyperaceae. The highest number of weed species of Cyperaceae was found in T₀. In Poaceae, the highest number of weed species was obtained in control (376) and the lowest value (21) was recorded in 50.0 kg/ha of Vichete 5G. The other treatments were in intermediate range. In Pontederiaceae, the highest number of weed species was found in control (264) and the lowest number was in 50.0 kg/ha of Vichete 5G. The maximum

Table 3. Effect of Vichete 5G and Rifit 500 EC on occurrence of weeds in BRR I Dhan 28 grown in Boro season during second weeding.

Species Serial Number	Name of species	Name of family	Number of weed species					
			Treatments					
			Vichete 5G (kg/ ha)			Rifit 500 EC (L/ ha)		
T ₀ (0.0)	T ₁ (12.5)	T ₂ (25.0)	T ₃ (50.0)	T ₄ (0.5)	T ₅ (1.0)			
01	<i>Schoenoplectus erectus</i> Roxb.	Cyperaceae	260	129	48	28	66	61
03	<i>Eleocharis congesta</i> D. Don.		2975	136	01	04	63	31
05	<i>Kyllinga memuralis</i> J. R. and G. Farster.		01	00	01	00	01	01
07	<i>Cyperus rotundus</i> L.		00	00	00	00	08	00
09	<i>Cyperus difformis</i> L.		1407	00	00	00	00	00
10	<i>Fimbristylis dichotoma</i> (L.) Vahl.		93	58	43	13	16	24
	Sub-total		4736	323	93	45	154	117
11	<i>Ischaemum rugosum</i> Salisb.	Poaceae	276	70	00	21	58	06
13	<i>Echinochloa crusgalli</i> (L.) Beauv.		69	01	34	00	18	27
14	<i>Leersia hexandra</i> Swartz.		21	00	16	00	00	00
15	<i>Panicum paludosum</i> Roxb.		01	00	00	00	00	00
16	<i>Paspalum scrobiculatum</i> Lamk		09	10	00	00	00	00
	Sub-total.		376	81	50	21	76	33
20	<i>Monochoria vaginalis</i> (Burnt.f.) Kirk.	Pontederiaceae	264	44	15	12	125	85
22	<i>Lindernia hyssopioides</i> L. Hains.	Scrophulariaceae	00	00	01	00	00	00
23	<i>Lindernia antipoda</i> (L.) Alston.			32	06	00	69	18
	Sub-total			32	07	00	69	18
25	<i>Hedyotis corymbosa</i> (L.) Link.	Rubiaceae	00	00	00	17	00	00
26	<i>Ludwigia adscendens</i> L. Hara.	Onagraceae	54	12	00	03	25	10
	Total		5280	448	150	86	324	178

number of weed species was observed in T₀ (114) followed by T₄ (69), T₁ (32), T₅ (18) and T₂ (07) under Scrophulariaceae. In T₃, no weed species was found. In Rubiaceae, the number of weed species was observed only in T₃ (17) but not found in any other treatments. In Onagraceae, the maximum number of weed species was obtained in control (54) and that of the lowest (03) in treatment receiving 50.0 kg/ha of Vichete 5G and treatment of 25.0 kg/ha of Vichete 5G showed no weed species at all.

Quantitative estimation of weed species showed that application of Vichete 5G and Rifit 500 EC caused a drastic reduction in their abundance. The reduction decreased from 5280 to 150 and 86; and 5280 to 324 and 178 due to use of 25.0 and 50.0 kg/ha of Vichete 5G ; and 0.5 and 1.0 L/ha of Rifit 500 EC respectively (Table 3). However application of lowest dose of Vichete 5G (12.5 kg/ha) and Rifit 500 EC (0.5 L/ha) promoted the growth of weeds better than other higher doses of Vichete 5G and Rifit 500 EC.

Data presented in Table 3 indicates that the number of weeds decreased markedly with the increase of rate of Vichete 5G and Rifit 500 EC during second weeding. The trend of weeds generation showed little difference when compared with that of first weeding. The effect of treatments is very similar to all the species of four families counted. It is interesting to note that *Kyllinga memuralis*, *Cyperus rotundus*, *Cyperus difformis*, *Leersia hexandra*, *Panicum paludosum*, *Paspalum scrobiculatum*, *Lindernia hyssopiodes* and *Hedyotis corymbosa* were either nil or very few due to treatments of Vichete 5G and Rifit 500 EC.

Phytosociological attributes of weed species

Total number of individual species: The highest number (3210) of individual species was observed in *Eleocharis congesta*. The lowest total number (01) individual species was in *Lindernia hyssopiodes* and *Panicum paludosum* (Table 4).

Density: In *Eleocharis congesta* the density was found highest (535) and the lowest density (0.17) was found in 2 species namely *Lindernia hyssopiodes* and *Panicum paludosum*. The rest of the species was in intermediate range (Table 4).

Frequency of occurrence (F %): The frequency of occurrence was observed to be 100% in 6 species. The frequency of occurrence was 83.33% in 2 species, 66.67% in 1 species and 33.33% in 3 species. The lowest frequency of occurrence (16.67%) was found in 4 species. (Table 4).

Abundance: The highest abundance (703.50) was found in *Cyperus difformis* only and the lowest abundance (1.0) was found in 3 species. (Table 4).

Relative Density (RD%): The relative density was found to be highest (45.58%) in *Eleocharis congesta* and the lowest relative density (0.01%) was recorded in 2 species. (Table 4).

Relative Frequency (RF%): The relative frequency was highest (0.10%) in 6 species. The relative frequency was 0.08% in 2 species, 0.07% in 1 species and 0.03% in 3 species. The lowest relative frequency (0.02%) was recorded in 4 species. (Table 4).

Relative Abundance (RA%): In *Cyperus difformis*, the relative abundance was found to be maximum (41.62%) and that of the lowest (0.06%) was found in *Lindernia hyssopiodes*, *Panicum paludosum* and *Kyllinga memuralis* (Table 4).

Importance Value (IV%): From Table 4 it is apparent that among the 16 weed species the maximum IV (25.78%) was in *Eleocharis congesta*. The lowest IV (0.03%) was found in *Panicum paludosum* and *Lindernia hyssopiodes*.

Table 4. Effect of Vichete 5G and Rifit 500 EC on phytosociological attributes of weeds in second weeding.

Species Serial Number	Total no. of individual species	No. of treatments in which species occurred	Density	Frequency of occurrence (F%)	Abundance	Relative Density (RD%)	Relative Frequency (RF%)	Relative Abundance (RA%)	Importance Value (IV%)
01	592	06	98.67	100	98.67	8.41	0.10	5.84	4.78
03	3210	06	535.00	100	535.00	45.58	0.10	31.65	25.78
05	04	04	0.67	66.67	1.00	0.06	0.07	0.06	0.06
07	08	01	1.33	16.67	8.00	0.11	0.02	0.47	0.20
09	1407	02	234.50	33.33	703.5	19.98	0.03	41.62	20.54
10	247	06	41.17	100	41.17	3.51	0.10	2.44	2.02
11	431	06	71.83	100	71.83	6.12	0.10	4.25	3.49
13	149	06	24.80	100	24.83	2.12	0.10	1.47	0.90
14	37	02	6.17	33.33	18.50	0.53	0.03	1.09	0.55
15	01	01	0.17	16.67	1.00	0.01	0.02	0.06	0.03
16	19	02	3.17	33.33	9.50	0.27	0.03	0.56	0.29
20	545	06	90.83	100	90.83	7.74	0.10	5.37	4.40
22	01	01	0.17	16.67	1.00	0.01	0.02	0.06	0.03
23	239	05	39.83	83.33	47.80	3.39	0.08	2.83	2.10
25	17	01	2.83	16.67	17.00	0.24	0.02	1.00	0.42
26	104	05	17.33	83.33	20.80	1.48	0.08	1.23	0.93
Total	7011								

Note: Species serial number of Tables 3 and 4 indicate same name of species.

A total of 26 weed species under 21 genera and 10 families was collected in third weeding from all the treatments. (Table 5).

Occurrence of weed species: From Table 5 it is evident that total number of weed species was 1670, 791, 697, 600, 337 and 181 in T₄, T₀, T₅, T₁, T₃ and T₂ respectively under Cyperaceae. Moreover, the maximum number of weed species of Cyperaceae was found in treatment receiving 0.5 L/ha of Rifit 500 EC. In Poaceae, the highest number of

Table 5. Effect of Vichete 5G and Rifit 500 EC on occurrence of weeds in BRRI Dhan 28 grown in Boro season during third weeding.

Species Serial Number	Name of species	Name of family	Number of weed species Treatments					
			Vichete 5G (kg/ ha)				Rifit 500 EC(L/ha)	
			T ₀ (0.0)	T ₁ (12.5)	T ₂ (25.0)	T ₃ (50.0)	T ₄ (0.5)	T ₅ (1.0)
01	<i>Schoenoplectus</i>	Cyperaceae	217	465	82	44	57	88
02	<i>erectus</i> Roxb.		03	00	11	03	11	00
	<i>Cyperus</i>							
	<i>tenuispica</i>							
	Steudel.							
03	<i>Eleocharis</i>		09	33	04	20	31	02
	<i>congesta</i> D.							
	Don.							
04	<i>Fimbristylis</i>		519	88	81	239	960	451
	<i>miliacea</i> L.							
	Vahl.							
05	<i>Kyllinga</i>		00	00	00	00	19	25
	<i>memuralis</i> J.							
	R.and G.							
	Farster.							
06	<i>Cyperus iria</i> L.		21	11	02	24	553	118
07	<i>Cyperus</i>		00	00	00	00	05	01
	<i>rotundus</i> L.							
08	<i>Fimbristylis</i>		12	00	00	00	05	09
	<i>diphylla</i> Vahl.							
09	<i>Cyperus</i>		10	03	01	07	29	03
	<i>difformis</i> L.							
	Sub-total		791	600	181	337	1670	697
11	<i>Ischaemum</i>	Poaceae	294	68	45	48	88	461
	<i>rugosum</i> Salisb.							
12	<i>Eragrostis</i>		52	07	05	44	43	88
	<i>unioloides</i> (Retz.)							
	Nees.							
13	<i>Echinochloa</i>		03	00	00	00	00	00
	<i>crussgalli</i> (L.)							
	Beauv.							
14	<i>Leersia</i>		21	00	00	00	30	30
	<i>hexandra</i>							
	Swartz.							
15	<i>Panicum</i>		85	114	114	154	750	68
	<i>paludosum</i>							
	Roxb.							
16	<i>Paspalum</i>		03	00	00	00	03	00
	<i>scrobiculatum</i>							
	Lamk.							

Contd.

Species Serial Number	Name of species	Name of family	Number of weed species					
			Treatments					
			T ₀ (0.0)	T ₁ (12.5)	T ₂ (25.0)	T ₃ (50.0)	T ₄ (0.5)	T ₅ (1.0)
17	<i>Setaria pumilla</i> (Poir) Roem and Schult.		00	00	00	02	00	00
18	<i>Leptochloe chinensis</i> L. Nees.		01	00	00	01	14	01
	Sub-total		459	189	164	249	928	648
20	<i>Monochoria vaginalis</i> (Burnt. f.) kirk.	Pontederiaceae	04	07	03	04	04	05
22	<i>Lindernia hyssopiodes</i> L. Hains.	Scrophulariaceae	00	00	02	00	00	00
23	<i>Lindernia antipoda</i> (L.) Alston.		01	00	00	00	03	00
	Sub-total		01	00	02	00	03	00
24	<i>Marsilea quadrifolia</i> L.	Marsileaceae	01	00	00	00	00	00
25	<i>Hedyotis corymbosa</i> (L.) Link.	Rubiaceae	00	00	02	00	00	00
26	<i>Ludwigia adscendens</i> L. Hara.	Onagraceae	03	00	02	05	25	03
27	<i>Murdania nudiflora</i> (L.) Brenan.	Commelinaceae	14	00	38	33	198	158
28	<i>Rotala densiflora</i> (Roth) koehne.	Lythraceae	331	11	299	209	780	420
29	<i>Eriocaulon compressum</i>	Eriocaulaceae	00	00	00	00	00	02
	Total		1600	914	688	833	3604	1928

weed species was estimated in treatment receiving 0.5 L/ha of Rifit 500 EC and other treatments were in intermediate range. In Pontederiaceae the highest number of weed species was observed in T₁ (07) followed by T₅ (05). In T₀, T₃ and T₄ the number of weed species was same (04) but in T₂ the number of weed species was found to be 03. In Scrophulariaceae, the highest number of weed species was recorded in T₄ (03) followed by T₂ (02) and T₀ (01). No weed species was recorded in T₁, T₃ and T₅. In Marsileaceae, the number of weed species was observed only in T₀ (01) but not found in any other treatment. In Rubiaceae, the number of weed species was observed only in T₂ (02) but not

found in any other treatment. In Onagraceae, the highest number of weed species was observed in T₄ (25) followed by T₃ (05). In T₀ and T₅ the number of weed species was same (03) but in T₂ the number of weed species was recorded to be 02. In T₁, no weed species was occurred. In Commelinaceae, the highest number of weed species was obtained in T₄ (198) followed by T₅ (158), T₂ (38), T₃ (33) and T₀ (14). In T₁, no weed species was occurred. In Lythraceae, the highest number of weed species was obtained in T₄ (780) followed by T₅ (420), T₀ (331), T₂ (299), T₃ (209) and T₁ (11). In Eriocaulaceae, *Eriocaulon compressum* was observed only in T₅ (02) but not found in any other treatment. *Eriocaulon compressum* was absent in 1st and 2nd weedings but appeared in 3rd weeding. This might be due to dormancy or unfavorable conditions of seed germination.

Quantitative estimation of weed species showed that application of Vichete 5G caused a reduction in their abundance. The reduction was from 1600 to 688 and 833 but application of Rifit 500 EC caused promotion in weed abundance. It might be concluded that Rifit 500 EC was not effective till third weeding. It is apparent from Table 5 that *Kyllinga memuralis*, *Cyperus rotundus*, *Fimbristylis diphylla*, *Echinochloa crusgalli*, *Paspalum scrobiculatum*, *Setaria pumilla*, *Lindernia hyssopiodes*, *Lindernia antipoda*, *Marsilea quadrifolia*, *Hedyotis corymbosa* and *Eriocaulon compressum* belonging to 6 families were either nil or few due to treatment of Vichete 5G and Rifit 500 EC.

Phytosociological attributes of weed species

Total number of individual species: The highest number (2338) of individual species was observed in *Fimbristylis miliacea*. The total number (02) of individual species obtained was same in 4 species. The lowest number (01) of individual species was found in *Marsilea quadrifolia* (Table 6).

Density: In *Fimbristylis miliacea*, the density was found to be highest (389.67). In 4 species, the density (0.33) was same. The lowest density (0.17) was found in *Marsilea quadrifolia* (Table 6).

Frequency of occurrence (F%) : The frequency of occurrence was observed 100% in 12 species; 83.33% was in 1 species; 66.67% was in 2 species and 50% was in 2 species. The lowest frequency of occurrence (16.67%) was observed in rest of the 6 species (Table 6).

Abundance: The highest abundance (389.67) was found in *Fimbristylis miliacea*. In case of 5 species, the abundance (02) was same. The lowest abundance (01) was found in *Marsilea quadrifolia* (Table 6).

Relative Density (RD%): In *Fimbristylis miliacea*, the highest relative density (24.71%) was recorded. In 4 species, RD (0.02%) was found to be same. The lowest RD (0.01%) was observed in *Marsilea quadrifolia* (Table 6).

Relative Frequency (RF%): The relative frequency was found to be highest (0.06%) in 12 species; 0.05% was in 1 species; 0.04% was in 2 species; 0.03% was in 2 species and 0.02% was in 2 species. The lowest RF (0.01%) was recorded in 6 species (Table 6).

Relative Abundance (RA %): In *Fimbristylis miliacea* the relative abundance was found to be highest (23.87%). In 5 species, the RF (0.12%) was observed same. The lowest RF (0.06%) was in *Marsilea quadrifolia* (Table 6).

Importance Value (IV%): Among the 26 weed species the maximum IV (16.21%) was observed in *Fimbristylis miliacea* . In 4 species, IV (0.05%) was similar. The lowest IV (0.03%) was found in *Marsilea quadrifolia* (Table 6).

Table 6. Effect of Vichete 5G and Rifit 500 EC on phytosociological attributes of weeds in third weeding.

Species Serial Number	Total no. of individual species.	No. of treatments species occurred	Density	Frequency of occurrence (F%)	Abundance	Relative Density (RD%)	Relative Frequency (RF%)	Relative Abundance (RA%)	Importance Value (IV%)
01	953	06	158.83	100	158.83	10.07	0.06	9.73	6.62
02	28	04	4.67	66.67	7.00	0.30	0.04	0.43	0.26
03	99	06	16.50	100	16.50	1.05	0.06	1.01	0.71
04	2338	06	389.67	100	389.67	24.71	0.06	23.87	16.21
05	44	02	7.33	33.33	22.00	0.47	0.02	1.35	0.60
06	729	06	121.50	100	121.50	7.71	0.06	7.44	5.07
07	06	02	1.00	33.33	3.00	0.06	0.02	0.18	0.09
08	26	03	4.33	50.00	8.67	0.27	0.03	0.53	0.28
09	53	06	8.83	100	8.83	0.56	0.06	0.54	0.39
11	1004	06	167.33	100	167.33	10.61	0.06	10.25	6.97
12	239	06	39.83	100	39.83	2.53	0.06	2.44	1.68
13	03	01	0.50	16.67	3.00	0.03	0.01	0.18	0.07
14	81	03	13.50	50.00	27.00	0.86	0.03	1.65	0.85
15	1285	06	24.17	100	214.17	13.58	0.06	13.12	8.92
16	06	02	1.00	100	3.00	0.06	0.06	0.18	0.10
17	02	01	0.33	16.67	2.00	0.02	0.01	0.12	0.05
18	17	04	2.83	66.67	4.25	0.18	0.04	0.26	0.16
20	24	06	4.00	100	4.00	0.25	0.06	0.25	0.19
22	02	01	0.33	16.67	2.00	0.02	0.01	0.12	0.05
23	04	02	0.67	33.33	2.00	0.04	0.02	0.12	0.06
24	01	01	0.17	16.67	1.00	0.01	0.01	0.06	0.03
25	02	01	0.33	16.67	2.00	0.02	0.01	0.12	0.05
26	38	05	6.33	83.33	7.50	0.40	0.05	0.46	0.30
27	441	06	73.50	100	73.50	4.66	0.06	4.50	3.07
28	2050	06	341.67	100	341.67	21.67	0.06	20.43	14.22
29	02	01	0.33	16.67	2.00	0.02	0.01	0.12	0.05
Total	9461								

Note: Species serial number of Table 5 and Table 6 indicate same name of species.

Among 28 weed species of first weeding, 16 species were recorded at T₀ and T₄, 17 species were at T₁, 18 species were at T₂ and T₅ and 13 species were at T₃. The lowest number of weed species (13) was found at T₃ where 50.0 kg/ha of Vichete 5G was applied. In quantitative analysis of weeds species of first weeding, *Schoenoplectus erectus* was found to occur in all the treatments where the number of individual weed species was highest (1589) and density, frequency of occurrence, abundance, relative density, relative frequency, relative abundance and importance value were also found to be highest. The number of individual weed species was found to be lowest (01) in *Rotala densiflora* where the density, frequency of occurrence, abundance, relative density, relative frequency, relative abundance and importance value were lowest.

Among 16 weed species of second weeding, 13 species were recorded at T₀, 10 species were at T₁ and T₄, 9 species were at T₂ and T₅, and 7 species were at T₃. The highest number of weed species (13) was found at T₀ where no herbicide was used. The lowest number of weed species (07) was found at T₃ where 50.0 kg/ha of Vichete 5G was applied. In quantitative analysis of weed species of second weeding, *Eleocharis congesta* was found to occur in all the treatments where the number of individual weed species was highest (3210) and density, frequency of occurrence, abundance, relative density, relative frequency, relative abundance and importance value were also found to be highest. The number of individual weed species was lowest (01) in *Panicum paludosum* and *Lindernia hyssopiodes* where density, frequency of occurrence, abundance, relative density, relative frequency, relative abundance and importance value were also lowest.

Among 26 species of third weeding, 20 species were recorded at T₀ and T₄, 10 species were at T₁, 15 species were at T₂, 16 species were at T₃ and 18 species were at T₅. The maximum number of weed species (20) was found at T₀ and T₄ where no herbicide was used and 0.5 L/ha of Rifit 500 EC was applied respectively. The lowest number of weed species (10) was found at T₁ where 12.5 kg/ha of Vichete 5G was applied. In quantitative analysis of weeds species of third weeding, *Fimbristylis miliacea* was found to occur in all the treatments where the number of individual weed species was highest (2338) and density, frequency of occurrence, abundance, relative density, relative frequency, relative abundance and importance value were found highest. The number of individual weed species was found lowest (01) in *Marsilea quadrifolia* where density, frequency of occurrence, abundance, relative density, relative frequency, relative abundance and importance value were also lowest.

The results of the present investigation agreed favorably well with the works of other workers. Mamun *et al.* (1986) observed that the principal weed in the direct seeded Aus rice field was *Cyperus rotandus* which constituted 68.22% of the weed vegetation but in the present investigation *Cyperus rotandus* was found rare in wet land of paddy in all the treatments of different weedings. The presence species of *Lindernia*, *Cyperus*, *Fimbristylis*, *Ludwigia* and *Rotala* in the different weedings of this investigation

corroborates with the findings of Rahman *et al.* (1996) who also observed the presence of these weed species in Aman, Boro and Aus paddy. The density of *Echinochloa crusgalli* was found low. In contrast, Radanachaless and Mercado (1980) observed considerable density of *Echinochloa crusgalli* in rice field in multiple cropping pattern. Ahmed and Moody (1982) also reported that *Leptochloa chinensis*, *Monochoria vaginalis* and *Echinochloa* spp. were dominant weed in the upland rice but these species were not found dominant in the present investigation.

Overbeck (1962 and 1964) who noted that all the principle of herbicides now in use appears to act primarily on some phase or another of the growth process. Crafts (1961) also noted that successful herbicidal chemicals are stable or their toxic reaction products in the plant are stable. He also observed that herbicide deranges the physiology of a plant over a period long enough to kill it.

From the above discussion, it may be concluded that the mode of action of two herbicides in controlling weeds in BRRRI Dhan 28 field are different. The effects differ with concentrations and nature of herbicides. Between two herbicides, 50.0 kg/ha of Vichete 5G was relatively better and effective to control weeds species in BRRRI Dhan 28 rice field.

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