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EVALUATION OF THREE SELECTED POST EMERGENCE HERBICIDES FOR WEED CONTROL ON RICE (*Oryza sativa* L.) VARIETIES IN JEGA SUDAN SAVANNA ZONE OF NIGERIA

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ABSTRACT

Background: Rice is an important crop for resource poor farmers across Africa and Asia. The crop is susceptible to weeds that severely reduce yields, because of their competition with the crop for moisture, nutrients, sunlight and space. **Methodology:** The trial was conducted in the screen house of Teaching and Research Farm of Kebbi State University of Science and Technology Aliero located at Jega during the rainy season of 2018/2019 to evaluate three selected post emergence herbicides for weed control on rice (*Oryza sativa* L.) in Sudan Savanna zone of Nigeria. Treatments consisted of two rice varieties (Faro 44 and Faro 52), three herbicides namely BRACER, BRACERPLUS and NOMINEEGOLD. Each of the herbicides was applied at three levels; BRACER 250ml/ha, 275ml/ha and 300ml/ha, BRACERPLUS 129ml/ha, 142ml/ha and 155ml/ha NOMINEEGOLD 200ml/ha, 300ml/ha and 400ml/ha; with hand weeding at 4 and 8WAS` and weedy check as control. Ten kilogram (10kg) of the soil was measured and filled into each of the sixty-six pots that were placed equidistant to one another in the screen house. **Results:** Thirteen (13) weed species were identified in the weed flora, among the weeds, 8 (61.54%) were broad leaf, 4 (30.77%) were grasses and 1 (7.79%) was sedge. Application of Nomineegold at 0.3 l ha⁻¹ produced higher plant establishment count, also Nomineegold at 0.4 l ha⁻¹ recorded the highest weed control efficiency (WCE) of 87.96% among the chemical weed control treatments, while Bracer plus applied at 0.142 l ha⁻¹ produced the highest crop dry matter of 34.83g. Faro 52 produced higher weed control efficiency than Faro 44. **Conclusion:** 1. Nomineegold at 0.4 l ha⁻¹ recorded the highest weed control efficiency (WCE) of 87.96% is recommended among the chemical weed control treatments, 2. Bracerplus applied at 0.142 l ha⁻¹ produced the highest crop dry matter of 34.83g at 10 WAS.

KEYWORDS: Evaluation, post emergence herbicide, rice varieties, sudan savanna, weed control,

INTRODUCTION

Rice is a staple for more than 60 % of the worlds' seven billion people and more than 90% of this rice is consumed in Asia (Mohanty, 2013; Chauhan *et al.*2014). During the year 2017 nearly 482 million metric tonnes of paddy were produced worldwide (Anon., 2018a). Although rice protein ranks high in nutritional quality among cereals, protein content is modest. The minerals, vitamins and other constituents of rice except carbohydrate are reduced by milling (Anon. 2012). In Nigeria, rice is important for several reasons including being a major contributor to internal and sub- regional trade (Oko *et al.*, 2012). Two types of rice have been mainly cultivated in Nigeria; the African rice (*Oryza glaberrima*) and Asian rice (*Oryza sativa*) (Oko *et al.*, 2012). In recent times, however new rice varieties have also been introduced including the West African Rice Development Association's (WARDA) hybrid rice varieties e.g. New rice for Africa (referred to as NERICA) which are inter specific hybrid between the African and the Asian rice.

Rice farmers choose varieties adapted to the region's length of growing season, soil, altitude and the depth of water in the field (Oko *et al.*, 2012). Farmers in developing countries usually sow rice seeds in small seed beds, then transplant the seedling into flooded field that have been levelled. For this study, Faro 44 and Faro 52 were chosen because of their yield potentials and adaptability in the study Area.

Of the biotic and abiotic stresses that pose constraints to rice production, weeds are the most prominent of them across the ecologies in terms of yield reduction, labour demand and cost of control (Akinyemiju and Igori 1986; Pandey, 2009). Oyebanji and Oluyemisi (2018) cited in Islam *et al* (2005) that about 20% of production costs incurred by farmers are attributed to weed control during growing season. In sub-Saharan Africa, 2.2 million tonnes of rice yield is lost annually as a result of uncontrolled weeds (Oyebanji and Oluyemisi 2017). About 28-74% of rice yield is lost due to uncontrolled weed growth in transplanted lowland rice, while 48-100% loss in upland ecosystems (Rodenburg and Johnson 2009).

Weeds are real constraints to rice production (Kwesi and De Datta, 1991). Improved weed control can increase rice yields by 15-23% depending on the agro-ecosystem (Rodenburg and Johnson 2009). As an alternative to hand weeding and other methods of controlling weeds among farmers, herbicides offer a practical and economical option for reducing crop losses and production cost (Akinyemiju and Igori, 1986; Akobundu, 1987, Kolo, 2004). The use of herbicides in rice cultivation is gaining widespread acceptance among rice farmers worldwide including Nigeria. The conventional method of weed control in rice, i.e. hand weeding is very laborious, expensive and inefficient. Chemical weed control can be considered as a better alternative (Singh, and Singh 1993). Use of chemicals to control weed has been found

to be effective and economical (Singh and Mani, 1981). Brar and Mishra (1989) reported that chemical weeding is easier, saves time and economical as compared to hand weeding alone. Weed control using herbicides offers an advantage to save labour and money. It is regarded as cost effective method of weed control as opined by Ahmed *et al.*, (2000). Sharma and Bhunia (1999) stated that herbicides gave significant control of weeds when applied one day after transplanting rice. Post emergence herbicides are a major tools used to control weeds in rice. The growth stage of weed species may have an effect on herbicide efficacy by influencing uptake and metabolism of herbicides (Singh and Singh, 2004). Diclofop, for example, was more effective on green foxtail (*Setaria viridis* (L.) Beauv.) and wild oat (*Avena fatua* L.) when applied at an early growth stage (Friesen *et al.*, 1976). Conversely, trifloxysulfuron was more effective on yellow nut sedge (*Cyperus esculentus* L.) at late application stages (Singh and Singh 2004). Generally, the herbicide efficacy is lower when applied on bigger weeds. The herbicide degradation rate may be faster in big plants, and herbicide rates may need to be increased to achieve the desired level of control (Singh and Singh, 2004). Therefore, optimum time of herbicide application and range of herbicides may help control these weeds effectively (Gopal *et al.* 2010). New herbicides for weed control in rice have been developed and there is the need to test their efficacy. The herbicides BRACER 10 SC, BRACER PLUS 16 OD and

NOMINEE GOLD 10 SC all have same active ingredient known as *bispyribac at* different concentration. These herbicides are selective and post emergence.

BRACER; has active ingredient as bispyribac-sodium (chemical name 2,6-bis{(4,6-dimethoxy-2-pyrimidinyl oxy)benzoic acid 100g a.i./l , it kills weed growing with rice. The herbicide is effective on sedges, grasses and broadleaves its dosage rate ranges from 250-300ml ha⁻¹, while its spray rate (L/ha in water volume) is between 160-320 l. Its time of application is 7-15days after seeding/transplanting. Its dilution rate is 10ml per 16l of water. Rate and spray volume can be increased when spraying is going to be done 10 days after planting. The herbicide has a pre-harvest interval period of 60 days.

BRACERPLUS 16 OD (160 g a. i /l.) is the second herbicide to be tested in this study, in addition to bispyribac sodium 4%, it has an additional active ingredient which is called cyhalofop (chemical name (R)-2-[4-cyano-2-fluorophenoxy] propanoic acid)-butyl-12%. The herbicide is also effective on sedges, grasses, and broadleaves weeds. Its dosage rate ranges from 129-155 ml ha⁻¹, its time of application is 10 days after sowing, dilution rate is 8ml per 16l. Both Bracer and Bracer plus are manufactured in China by Hefei Xiangyu Chemical Company Limited.

NOMINEEGOLD 10 SC. It is Post Emergence herbicide for Rice, its active ingredient is bispyribac sodium (100g a. i./l), dosage rate is 300ml ha⁻¹. The herbicide is applied when the soil is saturated with water but not flooded. Irrigation should be done 1-3 days after application and should be kept

flooded for at least 3-4 days. Best application is achieved when weeds have between 3 and 5 leaves. The dilution rate of the herbicide is 100-200l ha⁻¹ of water for good application. It is used for the control of broadleaves, grasses and sedges in rice field.

Weed control is one of the major labour demanding farm operations in rice production; the labour requirement is very costly and may not be available at the time of need (Yawale *et al.*, 2019). Although no single weed control method can give effective and satisfactory weed control in all ecologies, however, chemical weed control may provide a better alternative, because it is fast, cheap, easy and more effective, Lagoke, *et al.*(1991). The aim of the study is to evaluate three selected post emergence herbicides on rice varieties at different concentration of the herbicides, while the specific objectives are to:

- i determine effect of herbicides on weed suppression on growth of rice
- ii evaluate effect of variety on weed suppression on growth of rice
- iii identify weeds associated with rice growth in the Study area.

MATERIALS AND METHOD

Experimental site

Experiment was conducted during the dry season of 2019/2020 in the Screen house of Teaching and Research Farm of Kebbi State University of Science and Technology Aliero located at Jega (lat. 12^o 18.64'N: long.04^o 29.85', 262 m above sea level). The area is characterised with erratic and scanty rainfall that lasts for about 5 months (May – September) and

long dry period (October – April). The climate of the area is semi-arid with average rainfall of 550-650mm per annum. The relative humidity ranges from 21- 47% and 51- 79% during the dry and rainy seasons respectively. Temperature averages between 14 – 30 °C during dry season and 27-41°C during the rainy season (NNN, 2012).

Treatments and Experimental Design

Treatments consisted of two rice varieties (Faro 44 and Faro 52), three herbicides namely BRACER (Bispyribag sodium, chemical name 2,6-bis{(4,6-dimethoxy-2-pyrimidinyl)oxy}benzoic acid 100g a.i./l), BRACERPLUS (chemical name 2,6-bis{(4,6-dimethoxy-2-pyrimidinyl)oxy}benzoic acid (40g a.i./l) -4% and cyhalofop (chemical name (R)-2-[4-cyano-2-fluorophenoxy] propanoic acid)-butyl(120g a.i./l)-12% and NOMINEE GOLD (Bispyribag sodium, chemical name 2,6-bis{(4,6-dimethoxy-2-pyrimidinyl)oxy}benzoic acid 100g a.i./l). Each of the herbicides will be applied at three levels; BRACER 250ml(25g a.i./l), 275ml(27.5g a.i./l) and 300ml (30g a.i./l), BRACERPLUS 129ml(20.64g a.i./l.), 142ml(22.72 g a. i./l) and 155ml(24.8 g a.i./l) NOMINEE GOLD 200ml(20.0 g a.i./l), 300ml(30 g a. i./l) and 400ml(40 g a.i./l); with hand weeding at 4 and 8WAS and weedy check imposed as control. The treatment was laid out in a completely randomised design with three replications.

Cultural practice

Seed sowing

Three seeds each were sown directly into five holes (that are 15 cm from one another) drilled into each plastic pot. Ten

days after germination, the fifteen seedlings were thinned to five plants per pot. Supplying was done where poor germination of rice seedlings was observed.

Watering

Watering was done using a 10-litre watering can. Irrigation was done at as when due.

Hand Weeding

Hand weeding was done at 4 and 8 Weeks After Sowing (WAS) according to treatment. Weeds were washed cleaned air dried and fresh weight was recorded and subsequently oven dried at 70 °C weighed until a constant weed dry matter weight was achieved.

Fertilizer Application

Application of 100:50:50 kg ha⁻¹ NPK was done in split doses. The first half application of N (50 kg), and full dose of P₂O₅ and K₂O (50 kg) were applied at the basal stage. The second half of N was applied at maximum tiller stage and at panicle initiation stage using urea (46%) as source.

Herbicide Application

Each of the herbicides was applied at three levels; BRACER 250ml ha⁻¹, 275ml ha⁻¹ and 300ml ha⁻¹, BRACERPLUS 129ml ha⁻¹, 142ml ha⁻¹ and 155ml ha⁻¹; NOMINEE GOLD 200ml ha⁻¹, 300ml ha⁻¹ and 400ml ha⁻¹ according to treatment at 6- weeks after sowing. Application was done once only during the cultivation period. This was done by arranging the pots with similar treatment together and herbicide will then be applied after calibration.

The rice crop was harvested at 10 weeks after sowing (WAS) manually by

carefully by uprooting the crops after a soaking watering to avoid losing the roots.

Data Collection

Observation for Weed Parameters

Weed Identification

Weed incidence in the pots were assessed, identified and recorded with the aid of weed album by Akobundu and Agyakwa, (1987).

Weed count

Weed Count was taken and weeds were classified into broadleaved, grasses and sedges.

Weed dry Matter

Weed dry matter were taken after application of treatment at six weeks after sowing when the affected weeds were completely dry and at harvest to determine weed biomass after the study. The weed samples collected will be 10 WAS oven dried at 70°C to a constant weight and weighed to obtain the weed dry matter.

Weed Control Efficiency (WCE): It is a derived parameter that compares different treatments of weed control on the basis of weed dry weight across them. It is an estimate of weed competition/control in crops

$$WCE = \frac{DMC - DMT}{DMC} \times 100$$

Where, DMC is weed dry matter in unweeded treatment and

DMT is weed dry matter in a weed control treatment (Das, 2008).

Observation for Crop growth parameters

Plant Establishment count

Plant establishment count was taken 10 (ten) days after sowing (DAS). Re-

supplying was done where poor germination of rice seedlings was observed.

Phytotoxic effect on Crop

Crop injury was scored on a scale of 0-5. 0 represents no crop killed or affected while 5 means all the crops are killed per pot.

Crop dry matter at 10WAS

The Straw yield or crop dry matter was taken from the five plants of each pot after harvesting at 10 WAS and means was calculated.

Data Analysis

Data generated was subjected to analysis of variance procedure (ANOVA) as described by Steel and Torrie (1984) and differences between treatment means were separated using Duncan Multiple Range Test (DMRT) at 5% level of probability as described by Gomez and Gomez (1984). The relationships between characters were determined through simple correlation analysis as described by Little and Hills (1978).

Results: Weed species identified in the pot experiment at Jega during the dry season of 2019/2020 and their phytosociological characters are presented in Table 1. A total of 13 weed species were identified in the pot experiment conducted in the screen house of the Teaching and Research Farm of Kebbi State University of Science and Technology Aliero located in Jega. Among the weeds 8 (61.54%) were broad leaf, 4 (30.77%) were grasses and 1 (7.79%) was sedge. The results obtained showed that *Digitaria horizontalis*, *Alternanthera sessilis*, *Hackelochloa granularis*, *Vicoa leptoclada* and *Ludwigia hyssipifolia* followed each other in their

densities. Although *D. horizontalis* was the most frequent of all the weeds, it was followed by *A. sessilis*, *H. granularis*, *V. leptoclada* and *Celosia leptostachya* in that order. Although *D. horizontalis* is most frequent (F), *V. leptoclada* was on the other hand most abundant followed by *C. leptostachya*.

Plant establishment

Plant establishment count of rice as affected by weed control treatments and variety at Jega is presented in Table 2. The result showed that the highest number of established plants was from hand weeded treatment which was followed by both applications of Bracerplus at 0.142 l ha⁻¹ and 0.155 l ha⁻¹, then Bracer at 0.275 l ha⁻¹, Bracer at 0.3 l ha⁻¹ and Bracer plus at 0.129 l ha⁻¹. The least established plant was with the weedy check.

Crop injury score

Rice crop injury score as affected by weed control treatments and variety at Jega is presented in Table 2. Application of Nominee gold at 0.4 l ha⁻¹ resulted to the highest crop injury though not statistically different from all other herbicides control treatments. The result showed that crop injury on all the herbicide treatment was comparable but there was significant difference ($p \geq 0.05$) between the herbicide treatment and hand weeded and weedy check treatment. Both hand weeded and weedy check recorded null injury because no herbicide was applied to either treatments. There was significant difference between the rice varieties on crop injury. The effect of the treatment was significantly higher on Faro 52 than Faro 44 this may suggest that Faro 52 was more

susceptible to the effect of the herbicide over Faro 44.

There was no interaction between weed control treatment and rice varieties during the study period.

Crop dry matter at 10WAS

Rice crop dry matter as affected by weed control treatments and variety at Jega is presented in Table 2. The result showed a significant difference in dry matter among the treatments. The hand weeded treatment produced significantly higher crop dry matter than any of the chemical weed control treatments and the control. However applying Bracer plus at 0.142 l ha⁻¹ produced the highest dry matter among the post emergence herbicide treatments but statistically comparable to applying Bracer plus at 0.155 l ha⁻¹. Application of Bracer at 0.275 l ha⁻¹, 0.300 l ha⁻¹, Bracer plus at 0.129 l ha⁻¹, Nominee gold at 0.200 and 0.300 l ha⁻¹, were all statistically similar. There was significant difference in crop dry matter between the herbicide treatments, and hand weeded treatment. There was a significant difference observed between the varieties in crop dry matter produced. Faro 44 significantly produced higher crop dry matter compared to Faro 52.

Weed dry matter at 6 WAS

Table 3 presents the influence of weed control treatments and variety on weed dry matter at 6 WAS and weed control efficiency in rice at Jega during the 2019/2020 dry season. The result showed significant difference among the treatments in weed control efficiency. No significant difference was observed in weed dry matter at 6 WAS although hand weeded treatment produced the highest

weed dry matter followed by (fb) Nominee gold applied at 0.300 l ha⁻¹ fb Nominee gold applied at 0.400 l ha⁻¹ fb Nominee gold applied at 0.200 l ha⁻¹ in that order. Nominee gold applied at 0.3 l ha⁻¹ produced highest weed dry matter among the post emergence herbicide applied while Bracer at 0.250 l ha⁻¹ produced the least weed dry matter after the application of the treatment (i.e. 6WAS). However hand weeded treatment produced the highest weed dry matter at 6 WAS over other weed control treatments. The weedy check records no weed dry matter because no weed control treatment was applied to it.

Weed control Efficiency

Table 19 presents the result for weed control efficiency as influenced by weed control treatments and variety in rice at Jega during the 2019 dry season. The result showed applications of rates of Bracer and Bracerplus with the exception of Bracer plus at 0.155 l ha⁻¹ had comparable weed control efficiencies with Nominee gold at 0.200 and 0.300 l ha⁻¹ these were significantly different with hand weeded treatment which was highest and statistically comparable to application of Nominee gold at 0.400 l ha⁻¹. Among the post emergence herbicides Nominee gold applied at 0.4 l ha⁻¹ produced the best weed control efficiency fb Bracer plus at 0.155 l ha⁻¹ fb Bracer plus at 0.142 l ha⁻¹ fb Nominee gold at 0.300 l ha⁻¹. The herbicide that was most inefficient weed control efficiency was Bracer applied at 0.3 l ha⁻¹. Hand weeded control and application of Nominee gold at 0.4 l ha⁻¹ had similar weed control efficiency and significantly

controlled weeds more efficiently than all other control treatments. The weedy check produced the least weed control efficiency among the weed control treatments. This is because no weed control strategy was imposed on the treatment. There was significant difference in the interaction of weed control treatments and variety at Weed control efficiency.

Discussion

Influence of weed control methods on the establishment of Rice (*Oryza sativa* L.)

Results from the study indicate that the influence of weed control methods did not significantly affect plant establishment. This may be attributed to the fact that treatment was not applied at the time data was taken. Treatment was applied six weeks after sowing while data was taken at ten days after sowing when the rice seeds had germinated.

Crop dry matter

Among the post emergent herbicides applied, bracer plus applied at 0.142 l ha^{-1} produced the highest crop dry matter similar to dry matter produced when bracerplus was applied at 0.155 l ha^{-1} . Although hand weeded treatment produced the highest dry matter among the weed control methods, bracerplus applied at 0.142 l ha^{-1} and applied at 0.155 l ha^{-1} produced higher crop dry matter than the weedy-check treatment. However, in Brasil Langaro *et al.*, (2018) reports from his findings that the herbicide bispyribac-sodium causes the greatest injury and the greatest reduction in rice plant height.

Weed control efficiency

Weed control efficiency was comparable between the chemical weed control treatment and the hand weeded treatment. Hand weeded treatment produced highest weed control efficiency over the herbicidal treatment. The herbicidal treatments were statistically comparable between one another even with Nominee gold at 0.4 l ha^{-1} which portrayed the highest weed control efficiency (WCE) of 87.96% among the chemical weed control treatments. Application of Bracerplus at 0.155 l ha^{-1} was next in efficiency (70.16%) to Nominee gold fb Bracer at 0.25 l ha^{-1} (60.74%) and Nominee gold at 0.2 l ha^{-1} (60.07%) which were comparable to one another. The treatment with least WCE was Bracer at 0.300 l ha^{-1} (43.86%) fb Bracer plus at 0.129 l ha^{-1} (49.05%). Nadeem *et al.*, (2017) reports that; The best weed control (94.8-98.1%) was achieved with two sprays (21 & 40 DAS) of post emergence herbicide (bispyribac sodium) followed by single application (21 DAS) of the same herbicide which gave weed control of 77.5 to 82.3 %. orthosulfamuron, penoxsulam and ethoxysulfuron as post emergence herbicides were found more effective against broad leaf weeds and sedges than grasses.

Conclusion:

1. Nomineegold at 0.4 l ha^{-1} recorded the highest weed control efficiency (WCE) of 87.96% is recommended among the chemical weed control treatments. Bracerplus applied at 0.142 l ha^{-1} produced the highest crop dry matter of 34.83g at 10 WAS than any other chemical weed control treatment.

2. Faro 52 produced higher weed control efficiency than Faro 44.
3. Thirteen weed species were identified as the weed flora associated with rice growth

in the study area. Among the weeds, 8 (61.54%) were broad leaf, 4 (30.77%) were grasses and 1 (7.79%) was sedge.





Table 1: Weeds Identified and their respective attributes in potted rice at Jega in 2019/2020 dry season

S/N	SPECIES IVI	D	F	A	RD	RF	RA	
Broad Leaf								
1.	<i>Alternanthera sessilis</i> (L.)	6.50	45.00	1.23	8.55	20.30	6.23	35.08
2.	<i>Celosia leptostachya</i> (B.)	0.72	5.00	1.50	0.95	2.26	7.62	10.82
3.	<i>Larpetea ovalifolia</i> (S.)	0.24	1.67	1.00	0.32	0.75	5.08	6.15
4.	<i>Ludwigia abyssinica</i> (A.)	0.24	1.67	1.00	0.32	0.75	5.08	6.15
5.	<i>Ludwigia hyssipifolia</i> (G.)	3.13	1.67	1.44	4.12	9.77	7.34	21.23
6.	<i>Stylosanthes guianensis</i> (A.)	1.00	1.67	1.00	0.32	0.75	5.08	6.15
7.	<i>Vicoa leptoclada</i> (W)	3.85	26.67	2.67	5.07	12.03	13.54	30.64
8.	<i>Portulaca oleraceae</i> (L.)	0.24	1.67	1.00	0.32	0.75	5.08	6.15
Grasses								
9.	<i>Digitaria horizontalis</i> (W)	8.66	60.00	1.09	0.32	27.07	5.54	44.01
10.	<i>Hackelochloa granularis</i> (L)	5.77	40.00	1.26	7.60	18.04	6.42	32.06
11.	<i>Leptochloa caeraluscens</i> (S.)	0.24	1.67	1.00	0.32	0.75	5.08	6.15
12.	<i>Setaria longiseta</i> (P.)	0.24	1.67	1.00	0.32	0.75	5.08	6.15
Sedges								
13.	<i>Cyperus difformis</i> (L.)	0.24	1.67	1.00	0.32	0.75	5.08	8.15



Table 2: Effect of weed control treatments and variety on plant establishment count, crop injury score and crop dry matter @ 10WAS at Jega 2019/2020

Treatment	Rate (l ha ⁻¹)	Plant establishment Count	Crop Injury Score	Crop Dry matter 10WAS (g)
Weed control treatments				
Bracer-1	0.250	73.33	1.33ab	20.91cd
Bracer-2	0.275	75.56	1.17ab	24.68bcd
Bracer-3	0.300	72.22	1.50a	22.71bcd
Bracer plus-1	0.129	72.22	1.16ab	26.25bcd
Bracer plus-2	0.142	76.67	0.50ab	34.83b
Bracer plus-3	0.155	76.67	0.83ab	32.31b
NomineeGold-1	0.200	70.00	1.50a	25.4bcd
NomineeGold-2	0.300	68.89	1.00ab	24.00bcd
NomineeGold-3	0.400	67.78	1.83a	15.91d
Handweeded	-	81.11	0.00b	58.10a
Weedy check	-	68.69	0.00b	31.30bc
SE±		7.397	0.413	3.693
Significance		NS	*	*
Variety				
Faro 44		59.59b	0.57b	33.65a
Faro 52		86.46a	1.39a	23.87b
SE±		3.144	0.175	1.569
Significance		*	*	*
Interaction				
W x V		NS	NS	NS

Means followed by the same letter(s) in a treatment group are not significantly different at 5% level of significance using DMRT

NS= non significant

Table 3: Effect of Weed control treatments and variety on Weed dry matter 6WAS, and Weed Control Efficiency, at Jega 2019

Treatment	Rate (1 ha ⁻¹)	Weed DM6WAS (g)	Weed control Efficiency (WCE %)
Weed Control Treatments			
Bracer-1	0.250	0.55	60.74c
Bracer-2	0.275	1.07	57.72c
Bracer-3	0.300	0.97	43.86c
Bracer plus-1	0.129	0.63	49.05c
Bracer plus-2	0.142	0.87	62.82c
Bracer plus-3	0.155	1.08	70.16bc
NomineeGold-1	0.200	1.20	56.38c
NomineeGold-2	0.300	1.38	60.07c
NomineeGold-3	0.400	1.30	87.96ab
Hand weeded	-	1.45	100.00a
Weedy check	-	0.00	0.00
SE±		0.395	8.045
Significance		NS	*
Variety			
Faro 44		0.95	57.12
Faro 52		1.09	60.83
SE±		0.168	3.420
Significance		NS	NS
Interaction			
W x V		NS	NS

Means followed by the same letter(s) in a treatment group are not significantly different at 5% level of significance using DMRT

NS= Non significant

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