Abstract

Field trials were conducted at the Teaching and Research Farm of the Kwara State University, Nigeria, during the 2013 and 2014 cropping seasons. The aim was to determine the effect of periods of weed interference on weed infestation, maize growth and yield. The experiment consisted of 10 treatments, namely, plots initially kept weed-free for 3, 6, 9 and 12 Weeks After Sowing (WAS) and subsequently left weedy until harvest and plots initially left weedy for 3, 6, 9 and 12 Weeks After Sowing (WAS) and subsequently kept weed--free till harvest. There were two control plots, one left weedy and the other kept weed-free till harvest. The treatments were laid out in randomized complete block design (RCBD) and replicated three times. Parameters measured were weed dry weight, maize plant height, leaf area, number of leaves/plant, cob weight, number of kernel rows/cob, 100 seed weight and grain yield. Results show that weed interference in maize for 6 WAS and beyond signiýcantly depressed growth parameters and grain yield. Plots left weedy or

To determine the effect of duration of weed interference on maize growth and yield

- To determine the critical period of weed interference in maize under the growing conditions of the southern Guinea savanna of Nigeria.

Materials and Methods

e experiment was conducted during the 2013 and 2014 cropping seasons at Kwara State University Teaching and Research Farm, Malete, (Lat. 08°71'N; Long. 04°44'E) in the southern Guinea savanna

***Corresponding author:** Imoloame EO, Department of Crop Production, College of Agriculture, Kwara State University, Malete, PMB 1530, Ilorin, Nigeria, Tel: +2347035478010; E-mail: oyaimoloame@yahoo.com

Received November 26, 2016; **Accepted** March 24, 2017; **Published** March 31, 2017

Citation: Imoloame EO, Omolaiye JO (2017) Weed Infestation, Growth and Yield of Maize (*Zea mays* L.) as Inþuenced by Periods of Weed Interference. Adv Crop Sci Tech 5: 267. doi: 10.4172/2329-8863.1000267

ecological zone of Nigeria. The experimental site is characterized by a bimodal rainfall pattern that peaks in June and September. The soil of the experimental site is sandy with low water holding capacity. The experiment consisted of ten treatments consisting of two components. The first component consisted of periods of weed interference such that plots were kept weed-free for initial 3,6,9 and 12 weeks after sowing (WAS) and subsequently left weedy until harvest, while the second component comprised of plots left weedy for initial 3, 6, 9 and 12 WAS and subsequently kept weed-free until harvest. There were two control treatments, namely plots left weedy and weed-free until harvest. These treatments were laid out in a randomized complete block design (RCBD) and replicated three times.

After ploughing and harrowing of the experimental field, it was leveled and marked out into plots of 4 m by 4 m each. A space of 0.5 m was left between plots, while a distance of 1 meter was left between replicates. Nutrients at the rate of 120 kg N, 60 kg P_2O_5 and 60 Kg ke

Weeding efficiency: Table 3 shows the effect of period of weed interference on weeding efficiency. In 2013, the weeding efficiency of plots kept weed-free for 3,6,9 and 12 WAS and the one left weedy for only 3 WAS had higher weeding efficiency, while plots left weedy for 6,9, 12 WAS and until harvest had lower weeding efficiency. The same trend was observed in 2014 and the combined, except that the weeding efficiency was reduced in plots kept weed-free for only 3 WAS.

	Weed Dry Matter kg/ha		
Treatment	**2013**	**2014**	**Combined[2]**
Wf -3-wd[3]	1066.7e[1]	2182.2b	1624bc
Wf -6-wd	476.7e	414.0c	445.3c
Wf -9-wd	180.7e	127.7c	154.2c
Wf -2-wd	79.3e	105.5c	92.4c
Wd-0-wf[5]	10.0e	0.0c	5.0c
Wd-3-wf[4]	280.6e	266.3c	273.5c
Wd-6-wf	1168.7d	1903.1b	1535.9bc
Wd-9-wf	1915.2c	2019.2b	1967.2ab
Wf -12-wd	2636.7b	2521.1b	2578.9a
Wf -0-wd[6]	3832.1a	4562.2a	4197.2a
SE(±)	143.68	331.03	427.8

1=Means followed by the same letter

Effect of period of weed interference on growth of maize

Plant height: Table 4 presents the effect of period of weed interference on plant height at 9 WAS and at harvest. It shows that plant height was significantly affected by period of weed interference at 9 WAS in 2013 but not in 2014. In 2013, and the combined, plots kept weed-free for 3,6,9, 12 WAS and that left weedy for 3 WAS produced plants that were significantly taller than plots left weedy for 6, 9, 12 WAS and until harvest. The same trend was observed at harvest in 2013, 2014 and the combined.

Number of leaves / plant: The effect of period of weed interference on the number of leaves/plant is presented on Table 5. It shows that period of weed interference had significant effect on number of leaves/plant at 9 WAS in 2013 and the combined and at 12 WAS in both years and the combined. Plots kept weed-free for 3, 6,9,12 WAS and that left weedy for 3 WAS produced significantly higher number of leaves than those left weedy for 6 WAS and beyond. Similar pattern was observed at harvest in both years and the combined.

Leaf area: At 9 WAS, in both years and the combined, weed-free till harvest produced significantly larger leaf area which was comparable to plots left weedy for 3 WAS and plots kept weed-free for 6 and 9 WAS. However, plots left weedy for 6,9,12 WAS and until harvest produced leaf area that was significantly smaller in both years and the combined. At 12 WAS, similar trend was recorded with maize kept weed-free for 3,6,9,12 WAS and weedy for 3 WAS producing comparable significant larger leaf with plots kept weed-free till harvest. Plots left weedy for 6 WAS and beyond produced significantly smaller leaf area in 2013 and the combined (Table 6).

Effect of period of weed interference on yield components

Cob weight and seed rows/cob: Period of weed interference had significant effect on cob weight seed rows per cob in both years and their combined (Table 7). Plots kept weed-free for 3,6,9,12 WAS and that left weedy for 3 WAS gave cobs that were significantly heavier than those from plots left weedy for 6,9,12 WAS and until harvest but were comparable with cobs from weed-free until harvest. Similar pattern was observed with the number of seed rows per cob in both years and the combined, as plots kept weed-free for 3,6,9,12 WAS and that left weedy for only 3 WAS and weed-free until harvest supported significantly higher number of seed rows compared with plots left weedy for 6,9,12 WAS and weedy till harvest, which produced significantly lower number of seed rows (Table 7).

	Weeding Efficiency (%)		
Treatment	**2013**	**2014**	**Combined**
Wf -3-wd	72.2	52.2	62.2
Wf -6-wd	87.6	90.9	89.3
Wf -9-wd	95.3	97.2	96.3
Wf -12-wd	97.9	97.7	97.8
Wd-0-wf	99.7	100	98.9
Wd-3-wf	92.7	94.2	93.2
Wd-6-wf	69.5	58.3	63.9
Wd-9-wf	50.0	56.2	53.1
Wd-12-wf	31.0	44.7	37.9
Wf -0-wd	100	100	100

Table 3: Effect of period of weed interference on weeding efficiency, 2013 and2014.

Effect of period of weed interference on 100-seed weight grain yield and percentage yield reduction

100-seed weight was significantly affected by period of weed interference in both years and their combined (Table 8). Plots kept weed-free until harvest produced seeds that were significantly heavier in both years and the combined but which were comparable with weed-free for 6,9,12 WAS and plots left weedy for only 3 WAS. However, treatments kept weed free for 3 WAS and plots left weedy for 6,9,12 WAS and weedy until harvest gave significantly lighter seeds.

Weed-free until harvest resulted in maximum grain yield in 2013 which was comparable with treatments kept weed-free for 3,6,9,12 WAS and weedy for only 3 WAS (Table 8). Plots left weedy for 6,9,12 WAS and until harvest gave grain yields that were significantly lower. The same trend was observed in 2014 and the combined, however, weed-free for 3 WAS produced significantly lower yield compared to the maximum. Plots kept weed-free for 6 and 9 WAS and weedy for only 3 WAS resulted in low percentage yield reduction of 5%, 3.9% and

	Plant height (cm)					
	9 WAS[1]			12 WAS		
Treatment	**2013**	**2014**	**Combined[3]**	**2013**	**2014**	**Combined**
Wf -3-wd[4]	175.3a[2]	124.0	149.7	172.7a	174.3ab	173.5a
Wf -6-wd	177.8a	152.2	165.0	178.6a	201.2a	189.9a
Wf -9-wd	180.1a	127.5	153.8	180.6a	193.1ab	186.9a
Wf -12-wd	167.3a	147.0	157.2	167.9a	185.3ab	176.6a
Wd -0-wf[6]	175.5a	163.8				

Leaf area (cm^2)						
Treatment	**9 WAS[1]**			**12 WAS**		
	2013	**2014**	**Combined[3]**	**2013**	**2014**	**Combined**
Wf-3-wd[4]	471.4b[2]	360.0ab	415.7bc	329.9ab	361.4ab	345.6ab
Wf-6-wd	529.7ab	374.9ab	452.3bc	350.4ab	455.7a	403.1a
Wf-9-wd	472.4b	459.0ab	465.7bc	319.2b	386.6ab	352.9ab
Wf-12-wd	492.3ab	399.9ab	446.1bc	412.6a	363.7ab	374.8ab
Wd-0-wf[6]	563.5a	722.1a	642.8a	354.3ab	369.0ab	361.7ab
Wd-3-wf[5]	543.5ab	470.6ab	521.8ab	380.0ab	397.6ab	388.8a
Wd -6-wf	275.4c	217.9b	246.6d	197.0c	250.1ab	223.8d
Wd-9-wf	243.7c	343.6b	293.7cd.97 0 Td(223.8deT)Tj11.19o.664 0 Td(343.6b)1 557.692 0 Td(246.6d)1Tjc			

14.5% respectively, while percentage yield reduction increased with increase in period of weed interference with weedy until harvest having

avoid high frequency of weeding and drudgery, the critical period of weed interference in maize has been found to be between 3 and 6 WAS and weeding twice at 3 and 6 WAS is recommended.

References

1. MINFAL (2003) Agricultural Statistics of Pakistan 2001-2002. Ministry of Food, Agricultural and Livestock Economic Wing. Islamabad, pp: 18-19.

2.