YIELD OF ACHA (*Digitaria iburua* Kippis Stapf or Black Fonio) ACCESSION UNDER DIBBLING METHOD OF PLANTING AT DIFFERENT SEED RATES.

BY

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INTRODUCTION

1. Acha (fonio) is ancient and indigenous to West Africa[1,2].
2. Its cultivation record dates back to 7,000 years[3].
3. It is a low input demanding crop[1,2].
4. The crop grow opportunistic cold on marginal land and in areas with unreliable rainfall.[1,2]
5. The crop can grow on all types of marginal soil except waterlogged (Acute soil[1,2].
6. In West Africa, yields of, 882,000ha, 14,200mt, 17,120hg, 380,000ha, 10,221mt, 4,400ha, and 17,200ha for Benin, Burkina Faso, Cote de Ivoire, Guinea, Mali, Niger and Senegal[1,2].
7. In Nigeria, Acha is grown on 143,000ha, annual yield of 83,000mt and yield of 550kg/ha[1,2].
8. The world land area, global and average yields are 4,284,200ha, 528,572mt and 157kg/ha.[1,2]
9. The yield of the crop is generally low (400 – 800kg/ha.)[1,2].
10. It is in the ecologically and economically important family of the grasses or monocotyledons[1,2].
11. It is the most vital food material worldwide[1,2].
12. As it is the only cereal that is rich in methionine and cysteine [7.2%][1,2].
13. The crop is also rich in micro nutrients (Mg, Fe, Zn and Mn) than other cereal crops[1,2].
14. It is a combined diet for the diabetics in view of it low methionine and cysteine contents[1,2].
15. In Nigeria, the broadcast method of planting is the most popular method of planting.
16. It is necessary and imperative to explore other methods of planting to compare yield increase as a result of planting procedure.
17. This study was to carry out to assess the yield of 2-Acha by dibbling method of planting under different seed rates.

METHODOLOGY

1. Two trials were conducted in 2011 and 2012 cropping seasons at Riyom, Plateau State Nigeria.
2. Field activities included land clearing, ploughing and harrowing.
3. The design was a RCBD consistence complete block design) and replicated three times.
4. Plot size was 3.0m by 4.0m.
5. The acha accession used was G-mdri (local).
6. Treatments consisted of seven seed rates and one planting method.
7. A basal application of NPK (12: 12: 12) fertilizer at 20kgha^{-1} was made at six weeks after sowing.
8. Weeds were removed by hand pulling at 4, 8 and 12 WAS.
9. Data were collected on tillers, days to 50% flowering, panicle length, number of spikes, length of spikes, plant height and grain yield.
10. The data collected were subjected to statistical analysis using ANOVA and least significant difference at 0.05% probability (Steel and Torrie, 1960) was used to compare treatment means.

MAJOR FINDINGS

1.More tillers were recorded at 15 and 13kgha^{-1} seed rates in 2011, 2012 and the average but lower in the control[1].

Plants were significantly ($P = 0.05$) taller at 3kgha^{-1} in 2011, the mean and 13 kgha^{-1} seed rates in 2012 and shorter at 23kgha^{-1} seed rate in the mean[1,2] (Table 1).

2. Seed rates of 23kha^{-1} in both years and 33kgha^{-1} seed rate in the mean had significantly (P 0.05) higher number of days to 50% flowering[2].

Panicle length was observed to be significantly ($P = 0.05$) higher at 23kgha^{-1} in 2011 and 13kgha^{-1} in 2012 seed rates and lower at 23kgha^{-1} seed rate[1,2] (Table 2).

3. Number of spikes per plant was significant at 33, 13 and 23kgha^{-1} seed rates in 2011, 2012 and the mean and lowest in the control[2].

Length of spikes was significantly ($P = 0.05$) higher at 3 and 13kgha^{-1} seed rates in 2011, 2012 and the mean and lower in the control[1,2] (Table 3).

4. Grain yield was significantly higher at 23kgha^{-1} seed rate in both years and the average but the lowest grain yield in the control[1,2] (Table 4).

CONCLUSION

Acha (fonio) (*D. iburua*) can be planted by dibbling method.

The seed rate of 23kgha^{-1} seed rate is recommended for dibbling method of planting acha.

Dibbling method of planting acha produced higher yield than the broadcast method.

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Table 1 Effects of treatments on number of tillers and plant height at maturity

Treatments	Number of tillers per plant			Plant height at maturity (cm)		
	2011	2012	combined	2011	2012	Combined
Control	9.67	6.27	7.97	89.8	87.67	87.8
3×3	10.00	7.73	11.86	89.8	93.3	84.8
13×3	10.67	11.40	13.02	93.3	94.6	93.8
23×3	10.67	10.93	11.7	92.3	93.3	87.8
33×3	13.73	9.37	13.77	87.3	89.8	93.3
3×3	13.00	7.73	10.33	91.3	91.8	88.8
13×3	13.77	7.60	11.67	89.8	93.1	91.5
23×3	10.73	7.5	11.77	87.7	93.7	90.8
33×3	11.96	7.87	9.29	93.8	7.33	92.7
LSD(0.05)	2.7	10.34	20.21	9.8	9.01	9.46

Fig 1: Dibbling

Table 2 Effect of treatments on number of days to 50% Flowering and panicle length per plant (cm)

Treatments	No 50 % panicle emergence			Panicle length per plant (cm)		
	2011	2012	Combined	2011	2012	Combined
Control	83.67	83.67	83.67	25.27	25.78	24.17
3×3	83.67	83.56	82.17	24.73	24.15	47.77
13×3	83.67	84.67	84.55	48.8	48.8	48.8
23×3	85.56	85.67	83.56	24.93	21.17	24.98
33×3	85.56	85.56	83.33	24.47	24.93	25.98
3×3	84.67	83.67	84.55	48.8	48.84	48.8
13×3	**82.44**	**84.8**	**82.33**	23.53	23.79	24.82
23×3	82.56	84.22	82.82	23.58	48.3	24.44
LSD(0.05)	2.3	20.75	2.33	2.3	2.39	2.39
CV(%)	14.15	12.83	16.48	7.7	10.23	14.58

Fig 2: Dibbling

Table 3 Effect of treatments on number of spikes and length of spikes per plant

Treatments	Number of spikes per plant			Length of spikes per plant (cm)		
	2011	2012	Combined	2011	2012	combined
Control	7.33	6.27	6.33	12.23	12.98	12.56
3×3	8.33	8.87	8.98	14.23	14.31	13.68
13×3	9.67	11.7	9.9	13.93	14.28	13.95
23×3	9.33	9.33	9.8	13.97	13.93	14.38
33×3	9.33	9.27	11.6	13.23	14.27	13.46
3×3	9.33	9.27	9.77	13.98	13.96	13.73
13×3	9.97	9.97	9.33	13.93	11.27	13.43
23×3	9.8	10.23	9.93	13.73	13.93	12.93
33×3	9.8	10.23	9.93	2.32	2.34	1.6
LSD(0.05)	1.9	1.1	1.9	9.98	10.07	12.43
CV(%)	12.6	9.21	12.6	9.98	10.07	12.43

Fig 3: Dibbling

Table 4 Effects of treatments on grain yield (kgha^{-1})

Treatments	Grain yield (kgha^{-1})		
	2011	2012	combined
Control	421.24	379.58	400.41
3×3	559.46	520.56	527.51
13×3	1,010.56	991.07	971.75
23×3	1,234.72	1,020.59	1,106.65
33×3	1,401.94	1,180.44	1,198.91
3×3	1,100.56	1,000.56	1,000.51
13×3	1,001.11	1,010.72	1,006.72
23×3	1,070.91	1,010.56	1,062.56
33×3	1,010.91	1,010.56	1,062.56
LSD(0.05)	70.27	72.47	70.58
CV(%)	12.3	12.24	12.56

Fig 4: Dibbling

Acha(Fonio) at Vegetative Stage

Fully Exerted Acha (Fonio) Panicle

Acha (Fonio) at Physiological Maturity