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DOI: https://doi.org/10.64388/IREV9I11-1717564

Effect of Weed Control Methods on the Performance of Selected Varieties of Maize (Zea mays L.) At Jalingo and Gombe North-Eastern Nigeria

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Abstract- ***A Field experiments was conducted at Jalingo (Taraba State) and Gombe (Gombe State), Nigeria. During 2023 and 2024 raining season. In Jalingo the experiment was conducted at the Teaching and Research Farm, Taraba State University and Dadin Kowa area in Gombe. This study was conducted to evaluate the effect of weed control methods on the performance of selected varieties of Maize (Zea mays L.). To assess weed flora composition and population dynamics in maize fields at 3, 6, and 9 weeks after sowing (WAS). Weed species were identified and grouped into broadleaf, grasses, and sedges. The results demonstrate marked spatial variation in weed community structure and successional trends, emphasizing the need for location-specific weed management strategies in maize production systems of northeastern Nigeria. The experimental design was a split- plot design (SPD) replicated three times. The total experimental area was, 26m x 73m and plot size was 3m x 3.5m with a distance of 2m between replicates and 1m between plots, respectively. Maize varieties :V1 (=Sammaz 29), V2(= Sammaz 34), V3 (= Sammaz 53), V4 (=Sammaz 54), V5(= Tzer White) and V6(=Tzer Yellow (QPM)) were allocated to the main plot and while weed control methods application rates l used 150 ml per knapsack sprayer (PRE (=Alachlor, POE(= Glyphosate) at kg/ha,PPO(= Paraquats at kg/ha, SPT (=Sweet potato), RHW (=Recommended hand weeding) and UWC (= Unweeded control) at kg/ha, were randomly assigned to subplot replicated three times. Data collected includes plant height, leaf area, dry grass weight, Maize total ground biomas (MTGB) 100 seed weight and grain yield (Kg/ha). Data obtained were subjected to analysis of variance (ANOVA) using SAS software and their means were separated using DMRT. Results obtained revealed significant variations in maize plant parameters, due to maize variety, weed control methods. V1 (Sammaz 29 under mean combined Jalingo and Gombe over the two (2) years identified significant performance than other variety in term of growth and yield which recorded (2676.8Kg/ha) whereas PRE treatment indicated the highest with (2803.3Kg/ha) and the least goes to UWC (2229.5Kg/ha). Therefore Variety V1 observed the highest grain yields whereas V6 indicated the tallest plant height. However V1, V6, PRE, POE and RHW are recommended for cultivation and weed control at both Jalingo and Gombe.***

Keywords: ***Maize Variety, Weed Flora, Population Dynamics, Savanna Ecology, Jalingo, Gombe***

I. INTRODUCTION

Maize (Zea mays L.) belongs to the grass family poaceae and is believed to have originated from Mexico or Central America and spread to West Africa by early European traders in the 16" century (Saleem, 2022). It is the world's third most important crop after rice (Oryza sativa L.) and wheat (Triticum aestivum L.), A total of 951.6 million metric tonnes of maize are produced worldwide, with 1.5 tonnes/ha in Africa, 1.7 tonnes/ha in India, slightly more than tonnes/ha in Latin America, 12.5 tonnes/ha in the USA and in Nigeria, with an annual production of 11.3 tonnes/ha (FAOSTAT, 2023).

Maize is the most important cereal crop in Sub-Saharan Africa (SSA) as documented by Dauda and Ahmed, (2024). It is high yielding, easy to process, readily digested and cheaper than other cereals. Every part of maize plant has economic value; the grain, leaves, stalk, tassel and cob can all be used to produce a large variety of food and non- food products . In industrialized countries, maize is largely used as livestock feed and as raw material for industrial products (Bates, 2022), while in developing countries it is mainly used for human consumption and poultry feed (Luis and Reigner, 2024).

Green maize (fresh on the cob) is eaten parched, baked, roasted or boiled, playing an important role in filling the hunger gap after the dry season (Saidu and Isa, 2022). Maize production in West and Central Africa has witnessed a phenomenal increase in the last two decades, the level of production was low before as at 2010, but the level has seriously increased (Goswami et al., 2023). Maize grain contains about 70% carbohydrate, 10% protein, 4% oil, 2.3% crude fibre, 10.4% albuminoides and 1.4% ash depending on the variety ((Bukar and David, 2022). The grain has significant quantities of vitamin A, nicotic acid, riboflavin, Vitamin B, vitamin C, ascorbic acid, vitamin E. It is low in calcium and fairly high in phosphorous (Baquest et al., 2023).

II. MATERIALS AND METHODS

The experiments were carried out in two locations Jalingo and Gombe in North- Eastern Nigeria. Jalingo field trial was conducted at Taraba State University Teaching and Research Farm in the Department of Agronomy Jalingo is located in the Northern Guinea Savanna ecological zone of Nigeria and lies between Lat. 8'3800"N; Long 10°46 00"E). Jalingo has annual rainfall ranges from 800 - 1,063.2mm from the months of April to October. (Adebayo and Orunoye, 2022). Gombe field trial was conducted at Dadin Kowa (Lat. 10'15'N; Long 11'15'E. Gombe is located in the Northern Guinea Savannah ecological zone of Nigeria. Gombe has annual rainfall ranges from 850 - 1000mm from the months of May to October, (Kwari et al., 2022). The experimental materials consisted of six varieties of maize:-V1 (SAMMAZ 29); V2 (SAMMAZ 34); V3 (SAMMAZ 53); V4 (SAMMAZ 54); V5(TZER-WHITE) and V6(TZER-YELLOW) Quality protein maize (QPM). These varieties have varying degree of yield potential maturity period, drought tolerant, and striga tolerance resistance and were obtained from the Institute for Agricultural Research (IAR) Samaru, Zarian, Kaduna state, (first four) and the remaining two varieties from Federal University Kashere, Gombe state Nigeria. The seeds from both sources were certified seeds; sweet potatoes vines were obtained at Kasuwan Bera while the six weed control methods were PRE, POE, PPO, SPT, RHW and UWC.

The experimental design used was a split of plot design (SPD) in randomized complete block design replicated three times. The total experimental area was 26m x 73m. Each plot size was 3m x 3.5m.The varieties were randomly assigned to each replication as main plot. The weed control options were randomly assigned within each main plot. Five plants per plot were randomly tagged for periodic observations during crop growth stages, at 3, 6 and 9 WAS. Maize growth parameters assessed were; plant height, number of leaves, leaf area and fresh grass weight. Yield and yield components measured were; Maize above ground biomass, 100 seed weight, and yield grain (kg/ha). Data collected were subjected to analysis of variance (ANOVA) using SAS software and their means were separated using DMRT.

III. RESULTS AND DISCUSIONS

Effect of Maize Varieties and Weed control methods on Plant height of maize were computed and analyzed for combined location in Jalingo and Gombe within the 2023 and 2024 Raining Season. The results of the Varieties (V1-V6) and Weed control methods (PRE - UWC), are presented in Table 1. Jalingo at Weed control methods RHW gave the tallest (123.68cm) and the shortest was observed in UWC. Gombe at 3, 6 and 9WAP, V6 identified better than the others in term of plant height, Therefore, at Weed control methods (WCM), PRE recorded better (126.22cm) and the least goes to RHW.

Table 2. Jalingo at 3WAP 2024, the shortest plant height is pointed out in V1(18.01), therefore at Weed Control Methods (WCM), the shortest was observed in PRE. At 6WAP, V6 gave the tallest and the shortest is recorded in V1(32.31cm). Under Weed Control Methods (WCM), PRE observed better.

At 9WAP, V4 shown the tallest (128.04cm) and the shortest indicated in V2 (117.50cm). However, at Weed Control Methods, PPO recorded better height while the shortest indicated in UWC (113.68cm).

Gombe at 3WAP, the varietal effect shown that V2 observed better, whereas at Weed Control Methods, PRE shown better (19.17cm). At 6WAP, V5 and V4

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DOI: https://doi.org/10.64388/IREV9I11-1717564

indentified better than the rest. At Weed Control Methods, SPT and POE observed better than the rest. At 9WAP, V5 is better (160.28cm). At Weed Control Methods, PRE (167.97CM and shortest goes to POE (148.37cm), respectively.

Average across location at 3WAP, V2 shown better. Therefore, at Weed control methods, which is highly significant.

Average across location, at 6WAP, the shortest indicated in V1 (41.07cm). However, at Weed Control Methods, SPT shown better. Average across location, at 9WAP, the varietal effect V5 observed better than the rest. Therefore, at Weed Control Methods, RHW is the least (18.38cm).

Table 1: Effect of Variety and Weed Control Methods on Plant height (PH) (cm) of Maize at Jalingo and Gombe in 2023 Raining Season.

Variety	Jalingo			Gombe			Mean		
	3	6	9	3	6	9	3	6	9
V1	16.68b	34.14c	104.03b	17.97b	40.74b	117.73ab	17.32c	37.44d	110.88b
V2	18.50ab	42.01b	106.67b	19.30ab	44.10b	115.35b	18.90a-c	43.05bc	111.01b
V3	19.86a	44.26b	112.23b	19.94ab	45.63b	115.14b	9.90ab	44.94b	113.68b
V4	19.20a	39.91bc	126.21ab	18.81ab	38.98b	110.72b	19.02ab	39.45cd	118.47b
V5	18.33ab	41.45b	104.94b	18.44ab	39.41b	114.56b	18.39bc	40.43b-d	109.75b
V6	20.32a	52.23a	144.48a	20.72a	54.09a	134.23a	20.52a	53.16a	139.36a
WEED CONTROL METHODS									
PRE	19.23ab	50.0ab	113.40a	19.44a	43.53a	126.22a	19.34ab	42.26ab	119.81a
POE	19.70a	47.01a	116.18a	19.68a	46.90a	115.27a	19.69ab	46.99a	115.73a
PPO	16.93b	38.93b	114.31a	18.24a	40.94a	110.78a	17.59c	39.94b	112.54a
SPT	18.25ab	41.88ab	117.96a	18.38a	43.54a	121.01a	18.31bc	42.71ab	119.49a
RHW	18.75ab	41.39ab	123.68a	19.37a	44.63a	123.09a	19.06a-c	43.01ab	123.38a
UWC	20.07a	43.72ab	113.03a	20.07a	43.42a	111.36a	20.07a	43.57ab	112.20a
VxWCT	ns	Ns	Ns	Ns	*	Ns	***	ns	Ns

Means with same letters are not significantly differences from each other according to DMRT at p≤0.05 V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

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DOI: https://doi.org/10.64388/IREV9I11-1717564

Table 2: Effect of Variety and Weed Control Methods on Plant height (PH) (cm) at Jalingo and Gombe 2024 Raining Season

	Jalingo			Gombe			Mean		
Variety	3	6	9	3	6	9	3	6	9
V1	18.01a	32.31d	118.53b	18.12a	49.84a	160.18a	18.07a	41.07b	139.35a
V2	18.35a	40.34bc	117.50b	19.08a	51.11a	158.34a	18.72a	45.72ab	137.34a
V3	18.06a	42.64b	121.48ab	18.79a	50.85a	159.91a	18.42a	46.74ab	140.69a
V4	18.34a	35.03cd	128.04a	19.03a	53.21a	146.39a	18.69a	44.12ab	137.22a
V5	18.36a	39.89bc	126.67ab	18.84a	54.52a	160.28a	18.60a	47.20ab	142.10a
V6	18.30a	49.65a	125.12ab	18.84a	47.93a	154.08a	18.57a	48.79a	139.19a
WEED CONTROL METHODS									
PRE	17.86a	40.43a	121.77ab	19.17a	50.38a	167.97a	18.52a	45.41a	144.87a
POE	18.95a	39.99a	125.83a	18.60a	51.57a	148.37b	18.77a	45.78a	136.44a
PPO	18.07a	39.82a	127.01a	18.92a	50.23a	158.02ab	18.49a	45.03a	142.52a
SPT	18.08a	40.28a	122.17a	18.44a	52.91a	157.67ab	18.26a	46.60a	139.92a
RHW	18.01A	39.68a	126.88a	18.83a	51.13a	153.73ab	18.42a	45.41a	18.38ab
UWC	18.45a	39.65a	113.68b	18.75a	51.22a	152.17ab	18.60a	45.44a	19.23a
VxWCT	ns	Ns	Ns	ns	*	ns	***	ns	Ns

Means with same letters are not significantly differences from each other according to DMRT at p≤0.05 V1=Sammaz 29,V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

Fig 1: Plant Height Measurement

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DOI: https://doi.org/10.64388/IREV9I11-1717564

Effect of Variety and Weed Control Methods on Leave Area (LA) cm2 at Jalingo and Gombe 2023 Raining Season

Effect of Variety and Weed control methods on Leaf area of maize were computed and analyzed at Jalingo and Gombe location. The results as presented in Table 3 showed that for Varieties V1-V6 and Weed control methods PRE - UWC. Jalingo at 3, 6 and 9WAP, the least leaf area indicated in V5 (1465.6cm2). However at Weed Control Methods, PRE Plots gave the higher and the least is recorded in PPO (285.11cm2). At Gombe in 3, 6 and 9WAP, V6 is better, while the least goes to V2 (1356.2cm2).Therefore at Weed Control Methods, PPO gave the highest (1763.6cm2).

The results as presented in Table 4, showed that for Varieties V1-V6 and Weed control methods PRE - UWC.

At Jalingo 2024, at 3WAP, V5 (105.93cm2) is better and the least indicated in V2 (86.09cm2). At Weed Control Methods, POE performed better. At 6WAP, V2 (197.98cm2) shown better them the rest of the varieties. At Weed Control Methods, the least recorded in POE Plots (179.10cm2). At 9WAP, V6 (665.5cm2) recorded better, under Weed Control Methods, indicated RHW (671.9cm2).

Gombe 2024, at 3WAP, V1 (107.84cm2) shown better and Weed Control Methods, UWC (104.88cm2) shown better performance. At 6WAP, the least identified in V2 (161.58cm2). However at Weed Control Methods SPT recorded better (190.25cm2). At 9WAP, V5 (505.80cm2) indentified better Variety whereas Weed Control Methods, PPO (505.62cm2) is better than the rest of varieties.

Average across location at 3WAP, the Varieties recorded the same performance ,but V1 is better whereas the least identified in V2 (90.55cm2). Therefore at Weed Control Methods, POE shown better. At 6WAP, Average across location, V3 (187.94cm2) identified better under Weed Control Methods showing similar performance, but RHW observed different.

Average across location at 9WAP, the Varietal effect observed the same pattern, while V6 (577.35cm2) also at Weed Control Methods, RHW (592.71cm2) observed better in performance.

Table 3: Effect of Variety and Weed Control Methods on Leave Area (LA) cm2 at Jalingo and Gombe 2023 Raining Season

	Jalingo			Gombe			Mean		
Variety	**3**	**6**	**9**	**3**	**6**	**9**	**3**	**6**	**9**
V1	342.95a	1672.0b	6206.9a	434.83a	1684.6ab	6708.8a	388.89a	1678.3ab	6457.9ab
V2	282.09a	1483.6b	6392.9a	331.00a	1356.2b	6320.6a	306.55a	1419.9c	6356.8b
V3	340.58a	1522.3a	6811.6a	443.60a	1543.3ab	6592.9a	392.09a	1532.8bc	6702.3ab
V4	362.90a	1648.6b	6811.3a	356.02aab	1539.8ab	7092.4a	359.46a	1594.2bc	6951.8ab
V5	332.62a	1465.6b	6251.8a	388.82ab	1722.3a	6371.4a	360.72a	1594.0cb	6311.6b
V6	407.88a	1968.8a	6861.1a	378.30ab	1804.0a	7344.1a	393.09a	1886.4a	7102.6a
WEED CONTROL METHOD									
PRE	477.77a	1644.7a	6798.0a	402.12a	1529.5a	6772.2a	439.94a	1587.1a	6785.1a
POE	329.47ab	1784.0a	6434.3a	430.07a	1430.3a	6693.4a	379.77ab	1607.2a	6563.8a
PPO	285.11b	1474.2a	6307.1a	333.10a	1763.6a	7249.2a	309.10b	1618.9a	6778.2a
SPT	358.05ab	1588.6a	6362.0a	361.48a	1597.7a	6553.5a	359.76ab	1593.2a	6457.7a
RHW	286.71b	1545.4a	6404.4a	395.75a	1625.1a	6323.1a	341.23a	1585.2a	6363.7a
UWC	331.92ab	1724.0a	7029.8a	410.06a	1704.0a	6838.8a	370.99ab	1714.0a	6934.3a
VxWCT	ns	*	ns	ns	ns	ns	ns	ns	ns

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DOI: https://doi.org/10.64388/IREV9I11-1717564

Means with same letters are not significantly differences from each other according to DMRT at p≤0.05 V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz

54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

Table 4 Effect of Variety and Weed Control Methods on Leave Area (cm2) of maize at Jalingo and Gombe 2024 Raining Season

	Jalingo			Gombe			Mean		
Variety	3	6	9	3	6	9	3	6	9
V1	104.31a	176.65a	430.1a	107.84a	189.71a	504.99a	106.07a	183.18a	467.54a
V2	86.09b	197.98a	438.5a	95.00a	161.58b	499.95a	90.55b	179.78a	468.34a
V3	101.02ab	189.72a	446.8a	105.44a	186.15a	508.25a	103.23ab	187.94a	477.54a
V4	99.91ab	195.52a	411.7a	100.77a	171.52ab	488.98a	100.34ab	183.52a	450.34a
V5	105.93a	183.14a	444.4a	92.73a	190.15a	505.80a	99.33ab	186.64a	474.24a
V6	96.21ab	183.67a	665.5a	93.43a	184.04a	483.98a	94.86ab	183.86a	577.35a
WEED CONTROL METHOD									
PRE	104.98a	189.12ab	431.3a	99.02a	178.79a	497.18	101.10a	183.96a	464.23
POE	105.47a	179.10b	426.5a	98.86a	179.34a	501.33a	102.26a	179.22a	461.73a
PPO	92.28a	184.63ab	423.8a	103.62a	182.38a	505.62a	97.95a	183.51a	464.72a
SPT	95.96a	184.14ab	444.6a	100.10a	190.25a	499.34a	98.03a	187.20a	471.95a
RHW	99.01a	202.86a	671.9a	89.04a	182.11a	508.84	94.03a	192.48a	592.71a
UWC	95.77a	186.82ab	438.9a	104.88a	170.29a	480.87	100.32a	178.56a	459.90a
VxWCT	ns	Ns	ns	Ns	ns	ns	ns	Ns	ns

at p≤0.05 V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

Effect of Variety and Weed Control Methods on Dry Grass Weigh (DGW) no/m2 of Grass at Jalingo and Gombe location 2023 and 2024 Raining Season

The results is presented in Table 5.

Effect of Variety and Weed control methods on Dry Grass Weigh (g/m2) (DGW) were computed and

analyzed at Jalingo and Gombe location 2023 and 2024. The results as presented in Table 5, showed

that for Varieties V1-V6 and Weed control methods PRE - UWC.

At Jalingo in 2023, the Varietal effect showed that V3 observed better than the rest with (11.32 g/m2), however at Weed Control Methods, UWC, observed better performance (18.78g/m2) and the least indicated in PPO.

Gombe 2023, V1 is better than the others, whereas under Weed Control Methods, UWC identified the highest with (22.12 g/m2) and the least is recorded in RHW with (6.82g/m2). Average across location the heaviest indicated in V2 with (10.98g/m2), whereas at Weed Control Methods UWC gave the heaviest with (20.45g/m2).

Jalingo 2024, V4 recorded better than the rest with (40.05 g/m2). Therefore, Weed Control Methods. observed in UWC with (52.72g/m g/m2) and the lest goes to POE with (19.53 g/m2)

Gombe 2024, V6 gave better performance than others (70.61g/m2) and the least identified in V5 with (21.75g/m2). However, under Weed control methods, UWC recorded more performance with (138.35 g/m2)

Average across location, V6 performed the best among the Varieties with (45.52g/m2). However, at Weed Control Methods, UWC indicated the heaviest (95.54g/m2).

Mean combined, Jalingo and Gombe over the two (2) Years, the Varietal effect identified the same trend, whereas V2 observed the best performance with (27.80 g/m2) and least was obtained in V5 (16.96 g/m2). Therefore at Weed Control Methods, UWC observed the heaviest (57.99g/m2).

Table 5: Effect of between Variety and Weed Control Methods on Dry Grass Weigh (DGW) (g/m2) of Grass at Jalingo and Gombe location 2023 and 2024 Raining Season

	2023			2024			Mean (Combine)		
Variety	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean
V1	8.26a	12.26a	10.26a	20.74a	31.67a	26.21a	14.50a	21.96a	18.23a
V2	11.28a	10.67a	10.98a	21.63a	69.95a	45.10a	16.46a	39.47a	27.80a
V3	11.32a	10.26a	10.79a	23.47a	29.78a	26.62a	17.39a	20.02a	18.71a
V4	7.89a	10.30a	9.10a	40.05a	47.09a	43.57a	23.97a	28.70a	26.34a
V5	8.45a	10.54a	9.50a	27.37a	21.75a	24.64a	17.91a	15.99a	16.96a
V6	8.16a	10.93a	9.54a	21.82a	70.61a	45.52a	14.99a	39.92a	27.28a
WEED CONTROL METHOD									
PRE	9.00b	8.85b	8.93b	19.59b	25.56b	22.57b	14.30b	17.21b	15.75b
POE	6.78b	9.74b	8.26b	19.53b	22.43b	20.89b	13.16b	15.71b	14.39b
PPO	5.61b	8.94b	7.27b	20.94b	24.68b	22.81b	13.28b	16.81b	15.04b
SPT	9.58b	8.49b	9.04b	21.91b	29.48b	25.69b	15.74b	18.99b	17.36b
RHW	5.62b	6.82b	6.22b	20.39b	25.25b	22.75b	13.01b	15.77b	14.37b
UWC	18.78a	22.12a	20.45a	52.72a	138.35a	95.54a	35.75a	80.24a	57.99a
VxWCT	Ns	**	***	ns	Ns	ns	ns	Ns	Ns

Means with same letters are not significantly differences from each other according to DMRT at p≤0.05 V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

Fig 2: Knapsack Sprayer

Fig 3: Quadrat Taking

Effect of Variety and Weed Control Methods on Maize Total Biomass (MTB) (g/m2) Yields sample 5 plants of Maize at Jalingo and Gombe location 2023 and 2024 Raining Season.

Effect of Variety and Weed control methods on Maize Total Biomass (MTB) in g/m2 were computed and analyzed, at Jalingo and Gombe location 2023 and 2024. The results as presented in Table 6, showed that for Varieties V1-V6 and Weed control methods PRE - UWC.

At Jalingo 2023, the Varietal effect indicated the same trend whereas V5 recorded better performance among others with (185.78 g/m2) likewise at Weed Control Methods shown the same trend but RHW gave the heaviest (187.46 g/m2) and least observed in UWC (163.96 g/m2).

Gombe 2023, the Variety effect observed similar direction, whereas V6 pointed out more better than the rest with (175.62 g/m2) and the least indicated in V5 (140.29 g/m2). Therefore at Weed Control Methods, PPO observed the heaviest (173.73 g/m2). Average across location, V3 gave the higher impact among the rest with (174.36 g/m2) under the Weed Control Methods, RHW pointed out the heaviest (177.80 g/m2), whereas the least goes to UWC with (148.55 g/m2).

Jalingo 2024, V4 observed the heaviest than the other Varieties with (142.86 g/m2), while the least indicated in V5 (117.19 g/m2), however at Weed Control Methods, SPT observed the highest than the rest, whereas the least was recorded in UWC (85.54 g/m2).

Gombe 2024, the Varietal effect indicated the same trend, whereas V4 identified the heaviest among others (1198.84g/m2). Therefore at Weed control methods, POE gave the highest performance (1197.03 g/m2).

Average across location , V6 identified better than the rest with (417.85 g/m2) while the least goes to V4 (370.85 g/m2), whereas under Weed control methods SPT pointed out the heaviest (424.38 g/m2).

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DOI: https://doi.org/10.64388/IREV9I11-1717564

Jalingo and Gombe over two (2) Years the Varietal effect are the same, but V6 gave more performance among others with (295.65 g/m2) whereas the least goes to V4 (270.11 g/m2). However at Weed Control Methods, PRE shown more effect than the rest with (299.53 and least was observed in UWC (230.41 g/m2

Table 6: Effect of Variety and Weed Control Methods on Maize Total Biomass (MTB) g/m2 of Grass at Jalingo and Gombe location 2023 and 2024 Raining Season

	2023			2024			Combine		
Variety	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean
V1	171.83a	162.59a	167.21 a	124.69a	705.20a	414.95a	148.26a	433.89a	291.08a
V2	170.49a	148.78a	159.63 a	123.24a	667.28a	387.49a	146.86a	400.62a	271.96a
V3	179.53a	169.19a	174.36 a	125.69a	630.50a	378.10a	152.61a	399.85a	276.23a
V4	177.89a	160.84a	169.37 a	142.86a	598.84a	370.85a	160.38a	379.84a	270.11a
V5	185.78a	140.29a	163.04 a	117.19a	674.89a	388.07a	151.48a	399.96a	273.97a
V6	171.41a	175.62a	173.46 a	122.56a	730.51a	417.85a	146.98a	453.06a	295.65a
WEED CONTROL METHOD									
PRE	180.01ab	172.83ab	176.42 a	128.05a	717.23a	422.64a	154.03a	445.03a	299.53a
POE	175.33ab	155.61ab	165.47 ab	135.00a	697.03a	399.48a	155.16a	410.39a	279.13a
PPO	171.36ab	173.73a	172.54 a	129.54a	704.23a	416.88a	150.45a	438.98a	294.71a
SPT	178.81ab	152.59ab	166.07 ab	144.28a	704.48a	424.38a	161.54a	436.42a	297.05a
RHW	187.46a	168.14ab	177.80 a	133.83a	643.28a	381.27a	160.65a	398.92a	278.11a
UWC	163.96b	133.13b	148.55b	85.54b	539.01a	312.28a	124.75b	336.07a	230.41a
VxWCT	Ns	Ns	Ns	Ns	ns	ns	Ns	ns	Ns

Means with same letters are not significantly differences from each other according to DMRT at p≤0.05 V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planti

Effect of Variety and Weed Control Methods on 100 Seed Weight at Jalingo and Gombe location 2023 and 2024 Raining Season

Effect of Variety and Weed control methods on 100 Seed Weight were computed and analyzed at Jalingo and Gombe location 2023 and 2024. The result are presented in Table 7 showed that for Varieties V1-V6 and Weed control methods PRE - UWC. At Jalingo 2023, the Varietal effect identified that V4 recorded the highest weight among others

with(20.60g), however at Weed Control Methods, PRE observed the highest with (20.68g), while the least goes to POE with (19.22g).

Gombe 2023, the Varieties observed similar performance, but V5 indicated the highest (19.29g) whereas the least recorded in V3 with (17.08g). However at Weed Control Methods, UWC recorded the highest with (19.77g). Average across location the Varietal effect observed that V1 recorded better than the rest with (19.67g), therefore at Weed control methods, PRE pointed out the heaviest (19.65g). Jalingo 2024, V6 identified the heaviest among others (20.28g) and at Weed Control Methods, RHW recorded the highest (20.58g) the least goes to UWC (18.72g/m2). Gombe V6 is shown better performance than the rest (24.66g), however at Weed Control Methods, UWC gave (24.54g). Jalingo and Gombe over two (2) years, the Varietal effect were highly significant throughout the experiment, V1 recorded the highest number of 100 seed weight with (20.99g), therefore at Weed Control Methods, RHW identified more effective than the others with (20.80g), respectively.

Table 7: Effect of Variety and Weed Control Methods on 100 Seed Weight at Jalingo and Gombe location 2023 and 2024 Raining Season

	2023			2024			Mean (Combine)		
Variety	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean
V1	20.54a	18.80 a	19.67a	19.99a	24.65a	22.32a	20.27a	21.72a	20.99a
V2	18.68a	18.39 a	18.53a	19.84a	23.90ab	21.81a	19.26a	21.07a	20.15a
V3	19.96a	17.08 a	18.52a	19.30a	23.53ab	21.42a	19.63a	20.31a	19.97a
V4	20.60a	17.83 a	19.21a	18.94a	24.42a	21.68a	19.77a	21.12a	20.45a
V5	19.29a	19.29 a	19.29a	19.25a	21.95b	20.56a	19.27a	20.59a	19.92a
V6	20.52a	18.04 a	19.28a	20.28a	24.66a	22.41a	20.40a	21.26a	20.82a
WEED CONTROL METHOD									
PRE	20.68ab	18.63 ab	19.65a	19.79ab	22.84a	21.32a	20.23ab	20.74a	20.49a
POE	19.22b	18.14 ab	18.68a	19.75ab	24.04a	21.77a	19.49a	20.92a	20.18a
PPO	21.66a	16.42 b	19.04a	18.92ab	23.62a	21.27a	20.29ab	20.02a	20.15a
SPT	18.39b	18.22 ab	18.30a	19.85ab	24.01a	21.93a	19.12ab	21.11a	20.12a
RHW	20.41ab	18.26 ab	19.33a	20.58a	24.17a	22.32a	20.49a	21.13a	20.80a
UWC	19.24b	19.77 a	19.50a	18.72b	24.54a	21.63a	18.98b	22.16a	20.57a
VxWCT	*	ns	ns	*	***	ns	***	ns	ns

Means with same letters are not significantly differences from each other according to DMRT at p≤0.05 V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed

control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

Effect of Variety and Weed Control Methods on Grain Yield (Kg/ha) at Jalingo and Gombe in 2023 and 2024 Raining Season

Effect of Variety and Weed control methods on grain yield kg/ha were computed and analyzed at Jalingo and Gombe location 2023 and 2024. The results are presented in Table 8 showed that for Varieties V1-V6 and Weed control methods PRE - UWC.

At Jalingo in 2023 the Varietal effect were significant but V3 recorded the highest Maize Grain Yield (MGY) with (2320.8 Kg/ha) and the least indicated in V5 plot (1624.4 Kg/ha). However at Weed control methods, PPO observed the highest (2686.9kg/ha) and the least goes to POE (1651.7kg/ha).

At Gombe the Varietal effect shown that V1 is far better than the other varieties with (2336.4 Kg/ha) but the least identified at V3 (1540. 6Kg/ha, therefore under weed control methods, PRE recorded the highest (2498.2kg/ha) the least goes to SPT (1631.4kg/ha). Average across location in 2023 are the same in Varietal effect, whereas V1 gave the highest performance with (2315.4kg/ha) and the least pointed out in V5 (1901.5kg/ha. However at Weed control methods, PRE pointed out the highest (2530.6kg/ha).

Table 8: Effect of Variety and Weed Control Methods on Grain Yield (Kg/ha) at Jalingo and Gombe in 2023 and 2024 Raining Season

	2023			2024			Mean (Combine)		
Variety	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean	Jalingo	Gombe	Mean
V1	2294.5a	2336.4a	2315.4a	1774.6a	4301.7a	3038.1a	2034.5a	3319.0a	2676.8a
V2	1701.5a	2159.5ab	1930.5a	1492.2a	4068.7a	2780.5a	1596.9a	3114.1a	2355.5a
V3	2320.8a	1540.6b	1930.7a	1512.5a	3825.7a	2669.1a	1916.6a	2683.2a	2299.9a
V4	2163.4a	2116.7ab	2140.1a	1640.5a	4277.0a	2958.7a	1901.9a	3196.9a	2549.4a
V5	1624.4a	2178.6ab	1901.5a	1844.2a	3511.8a	2678.0a	1734.3a	2845.2a	2289.8a
V6	2270.7a	1949.4ab	2110.0a	1653.5a	4118.3a	2885.9a	1962.1a	3033.8a	2498.0a
WEED CONTROL METHODS									
PRE	2563.1ab	2498.2a	2530.6a	1757.6a	4394.5a	3076.0a	2160.3a	3446.3a	2803.3a
POE	1651.7c	1858.3ab	1755.0c	1821.0a	3883.4a	2852.2a	1736.4ab	2870.8a	2303.6ab
PPO	2686.9a	1918.5ab	2302.7ab	1512.6ab	3719.9a	2616.2a	2099.7a	2819.2a	2459.5ab
SPT	1825.3c	1631.4b	1728.4c	2057.2a	4373.3a	3215.3a	1941.3a	3002.4a	2471.8ab
RHW	1936.8bc	2326.6ab	2131.7abc	1628.9ab	3714.3a	2671.6a	1782.8ab	3020.4a	2401.6ab
UWC	1711.5c	2048.4ab	1879.9bc	1140.1b	4017.8a	2579.0a	1426.8b	3033.1a	2229.5b
VxWCT	ns	ns	*	ns	ns	ns	*	ns	ns

Means with same letters are not significantly differences from each other according to DMRT at $p \leq 0.05$ V1=Sammaz 29, V2=Sammaz 34, V3= Sammaz 53, V4=Sammaz 54, V5=Tzer White and

V6=Tzer Yellow (QPM), PRE = Alachlor, POE = Glyphosate, PPO = Paraquats, SPT = Sweet potato (Smother Crop), RHW = Recommended hand weeded, UWC = Unweeded control, WCM = Weed control methods* WCM = Variety verse weed control methods and WAP =Weeks after planting.

IV. CONCLUSION

The variation observed between the two locations underscore the strong influence of environmental conditions on weed community composition. Overall, effective weed management in maize must consider species-specific dominance patterns and seasonal succession to minimize yield losses.

V. RECOMMENDATIONS

Variety V1 (SAMMAZ 29) for maize grain yield (MGY) and Variety V6 (Tzer yellow) (QPM) for the tallest plant height is hereby recommended in the study areas for Varieties stated.

Farmers in both Jalingo and Gombe should adopt PRE, POE and RHW for the weed control method.

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DOI: https://doi.org/10.64388/IREV9I11-1717564