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Forage Yield and Quality of Maize Varity

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Abstract

This study was conducted in gedarif research station farm for two seasons in 2011 and 2012. The objective was to find the relationship among genotypes yield from dry matter and rain fall amount and distribution. The results showed significant differences for the five types of maize at two parameters. This was indicated by number of leaves and dry weight. The results showed highly significant differences between the two species and the rest of the other on the both season 2011 and 2012. The study concluded that, maize varity and genotype can be used as indicators for plant yield and biomass as proved in the crop of the study. The study recommended that varity Hudiba I and Hudiba 2 can be used as practical mean to assess utilization level as expressed by growth performance indicators including dry matter and biomass from maize varity forage crop.

Keywords

Genotype, Leave Number, Dry Matter, Varity, Treatment

Subject Areas: **Environmental Sciences**

1. Introduction

Maize is genetically and phenotypically diverse. In populations containing only a small proportion of the variation present in the entirety of maize, progress based on phenotypic selection is being realized. This is exemplified by consistent gains in hybrid yields [1], and through progress in long-term selection experiments, such as the Illinois long-term selection study for grain oil and protein content [2], selection for prolificacy [3], and selection for seed size [4]. Phenotypic diversity in maize for yield, composition, and morphological traits has also been documented in multiple diversity panels [5], and in analysis of structured populations such as the nested association mapping (NAM) population, which represents diverse maize types [6]. Understanding the genetic factors that underlie this extensive phenotypic diversity and allow for continual improvement in populations is essential for efficient manipulation of maize to meet the demands of the increasing human population and the need to adapt to global climate changes.

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In Sudan, maize has been known and grown for a long time in small scale, at different locations under rain fed, flood and irrigation conditions. It is less popular as food; hence it receives little attention as potential food crop. Maize had a lower priority in the agricultural development plans due to a number of factors including low yield potential, limited local use, lack of endurable for long period of storage and low market price. They have opinion that the lake lines adapt to a high yield potential of good resistance to pressure as main factors limiting the production of main maze in some African countries.

The rain fall is the main factor that limits maize production in Gedarif State (**Figure 1**). The objective of the study is to find the relationship among genotypes yield and rain fall amount and distribution.

2. Material and Method

The experiment was conducted under rain fed condition at Gedarif Research Station farm, where laid out randomized complete block design (RCBD) four replications. The experimental plot consisted of 5 ridges each 5 m long spaced 0.75 m Sowing method and planting density: 2 seeds placed in holes spaced at 20 cm on one side of the ridge.

Nitrogen fertilization: Urea, 98 kg/fedan added Three weeks after sowing date. Before sowing seeds were treated with gaucho. Sowing date was at (15/July). The experiments were weeded twice, after two weeks, and four weeks from sowing. Two seasons, 2011 and 2012.

Data analysis: M-stat statistical software Package will be used. Data of herbaceous plant variables will be arranged in randomized completely block design (RCBD) in factorial experiment (four range sites × 3 season).

Duncan multiple range test will be used for means separation.

Data for vegetation measurement will be assessed using standard range measurements equations (**Table 1** and **Table 2**).

Treatments:

Five maize genotypes comprising 2 hybrids and three checks as follows:

Plot No (code)	Entry name	Source
1	HiTech 2031 (Hybrid)	HiTech-Egypt
2	HiTech 2055 (Hybrid)	HiTech-Egypt
3	PAN 6026 (Hybrid Check)	Pannar Seed co.
4	Hudiba I (Check)	A R C
5	Hudiba 2 (Check)	A R C

Figure 1. Gedarif Estate.

Table 1. Amount and rain fall distribution at Gdarif Station (2011).

Month	Amount of rainfall (mm)	Rainy days
June	25.5	4
July	80.4	9
August	84	8
September	51	6
October	77.8	4
Total	318.4	31

Source: Gedarif meterological station.

Table 2. Amount and rain fall distribution at Gdarif Station (2011).

Month	Amount of rainfall (mm)	Rainy days
June	7.5	2
July	83.0	5
August	80.4	5
September	223.6	15
October	86.1	3
Total	480.6	30

Source: Gedarif meterological station.

3. Results and Discussion

General: the study to be fined the relationship between five maize genotypes comprising 2 hybrids and three checks as follows yield and rain fall amount and distribution.

Flowering 50%:

According to **Table 3** no significant value between genotype in season 2011 the same in season 2012 no significant value show in **Table 4**.

Plant height:

According to **Table 3** the highest value in treatment number four and five (Hudiba I (Check), Hudiba 2 (Check)) but no significant between all genotype also in season 2011 no significant shown in **Table 4**.

Plant number:

According to **Table 3** in season 2011 the higher value in treatment number one (HiTech 2031 (Hybrid)) but in season 2012 the higher value in treatment number five and four respectively [Hudiba 2 (Check), Hudiba I (Check)] shown in **Table 4**. There is no significant between all genotype.

Leave number:

In season 2011 according to **Table 3** the highest number in the treatment number four and five respectively also in season (2012) the highest value in treatment number four and five respectively shown in **Table 4**. There is highly significant between treatment number four, five and other treatment.

Yield (Dry weight)

In season 2011 according to **Table 3** the highest value in the treatment number five and four respectively and there is significant between treatment number four, five and other treatment also in season 2012 the highest value in treatment number four and five respectively and there is significant between treatment number four, five and other treatment shown in **Table 4**.

4. Conclusion

The study concluded that, maize variety and genotype can be used as indicators for plant yield and biomass as proved in the crop of the study.

Table 3. Season 2011.

Treatment	Flowering 50%	Plant height	Plant number/m^2	Leave number	Yield/kg/fedan
HiTech 2031 (Hybrid)	58.750	97.250	12.400	15.750	2.115
HiTech 2055 (Hybrid)	60.500	109.250	11.400	16.250	2.378
PAN 6026 (Hybrid Check)	62.500	87.750	11.250	15.250	2.340
Hudiba I (Check)	58.750	112.500	10.750	28.500	4.342
Hudiba 2 (Check)	58.250	107.500	10.250	28.250	4.397
Sign	ns	ns	ns	**	**
C.V	5.76	28.65	23.51	11.38	11.42
Stander error	1.5389	13.7310	1.776	1.0583	0.1590

Table 4. Season 2012.

Treatment	Flowering 50%	Plant height	Plant number/m^2	Leave number	Yield/kg/fedan
HiTech 2031 (Hybrid)	59.250	110.250	10.500	11.750	1.870
HiTech 2055 (Hybrid)	58.500	119.500	10.500	15.000	2.233
PAN 6026 (Hybrid Check)	61.750	72.500	10.750	15.250	2.117
Hudiba I (Check)	60.500	113.250	11.000	26.750	4.483
Hudiba 2 (Check)	58.750	105.250	11.500	25.250	4.912
Sign	ns	ns	ns	**	**
C.V	5.74	25.86	16.67	14.08	10.67
Stander error	1.5346	12.0453	0.8042	1.1818	0.1490

5. Recommendation

The study recommended that genotype Hudiba I and Hudiba 2 can be used as practical mean to assess utilization level as expressed by growth performance indicators including dry matter and biomass from maize varity forage crop.

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