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Evaluation of seed-oil and yield parameters of some nigerian sesame (*sesamumindicumlinn*.) Accessions

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ABSTRACT: Twelve Accessions of Sesame Collected from different five states in Northern Nigeria (Kaduna, Niger, Nassarawa, Benue, Kogi) were evaluated for their seed-oil and yield components during the Cropping Season of 2012 using a Randomized Block Design (RBD) with three Replications. The Objectives of the Experiment were to investigate the Characteristics and performance of all the accessions entries On Seed-Oil and Yield Parameters. Data collected included Number of Flowers/Plant, Number of Capsules/Plant, Length of Capsules /Plant, Weight of Capsules/Plant, Number of Seed/Capsule and Percentage Oil. While the Accessions NG03, NG-04, NA-01 and BE-02 had the least means with the Number of Flowers/Plant and Number of Capsules /Plant, The highest seed-oil Content were recorded for NG01 (57%), NG02 (57.5%), KG02 (57%), KD (56.5%) and BE01 (56%). This is an indication that these Accessions have good potential for high seed yield and Oil content. The identified accessions would be passed onto breeders for utilization in the Sesame improvement programmes in Nigeria.

Key Words: Accessions, Sesamumindicum L., Seed-oil, Yield Parameters

INTRODUCTION

Sesame (Sesamumindicum) is an annual plant which is considered one of the most important and oldest oil crops that belong to the Pedaliaceae family (Noorkaet al., 2011). It is considered to be the oldest oil seed plants and has been under cultivation in Asia for over 5000 years (Bistetal 1998). The crop has early origins in East Africa and in India (Nayar and Mehra, 1970; Bedigian, 2003). Today, India and China are the world's largest producers of sesame, followed by Myanmar, Sudan, Uganda, Nigeria, Pakistan, Tanzania, Ethiopia, Guatemala and Turkey. World production fluctuates due to local economic, crop production disturbance and weather conditions.Sesamum is described as the "Queen of oilseeds" because it contains high oil (38-54%), protein (18-25%), calcium, phosphorous, oxalic acid and excellent qualities of seed oil and meal (Prasad, 2002). Sesamum seed oil has long shelf life due to the presence of lignans (Sesamin, Sesaminol, Sesamolinol), which have remarkable antioxidant function, resisting the oxidation.. Nowadays, it is widely cultivated as an oil crop in tropical and subtropical climate.In reality, sesame is mostly grown under moisture stress with low management input by small holders (Cagrgan, 2006).). In Nigeria, sesame is often reffered to as Benniseedand it is widely used and very popular in parts of north, where it is usually grown. The local names are (Riddi in Hausa), (Ishwa in Tiv), (yamati or Eeku in Yoruba), (igorigo in Igbira), (Anufi in Gbagi), (Esso in Nupe) (Falusi &Salako 2001). The seeds which yield half of their weight in oil are most commonly used in soups while the young leaves are used as soup vegetable, the stem and oil extracts are used in making local soups.

MATERIALS AND METHODS

MATERIALS

Collection of Sesame seeds

The sesame (SesamumindicumL.) germplasm accessions used in this study were collected from local farmers in the growing regions in collaboration with the Agric Development Project (ADP) of the states of the Northern part of Nigeria, namely Kaduna, Niger, Kogi,Benue, and Nassarawa, of Nigeria.

Experimental Design

The Factorial experiment was adopted with a total of 12 Accessions combinations. The arrangement used was randomized block design with thirty (36) pots per block, each accession was replicated in three (3), making a total of 108 pots. Ten seeds were planted per pot (i.e. five per hole in a pot).Three weeks after planting; each pot was thinned to two plants per pot.

Collection of Data

The following data were taken during the period of study;
Number of flowers per plant
Length of capsule (in cm)
Number of seeds per capsule using direct counting
Number of capsules per plant by direct counting
Weight per capsule were taken using electric weighing balance
percentage oil (Using soxhlet extractor)

Figure1. Seeds and Capsules of the 12 sesame Accessions studied

Table1. means of some yield parameters of sesame accessions collected

Accessions	No of capsules/ plant	No of flowers/ plant	length of Capsule(cm)	weight of capsule (g)	Number of seed/capsule
KD	33.00 ± 20.64^{a}	36.00 ± 22.41^{a}	2.45 ± 0.25^{ab}	0.17 ± 0.04^{c}	55.00± 5.64^{ab}
NG-01	27.00 ± 16.02^{a}	28.00 ± 14.07^{a}	2.43 ± 0.23^{a}	0.11 ± 0.05^{e}	54.00 ± 12.00^{ab}
NG-02	30.00 ± 15.80^{a}	35.00 ± 11.37^{a}	2.60 ± 0.23^{a}	0.19 ± 0.08^{c}	53.00 ± 11.86^{ab}
NG-03	18.00 ± 9.34^{b}	21.00 ± 5.63^{b}	2.52 ± 0.27^{ab}	0.22 ± 0.08^{ab}	53.00 ± 14.46^{ab}
NG-04	19.00 ± 13.59^{b}	20.00 ± 4.43^{b}	2.58 ± 0.14^{a}	0.25 ± 0.04^{a}	60.00 ± 7.92^{a}
NA-01	16.00 ± 8.78^{b}	19.00 ± 6.40^{b}	2.19 ± 0 .24^{c}	0.13 ± 0.03^{de}	51.00 ± 11.14^{ab}
NA-03	26.00 ± 11.63^{a}	27.00±10.03^{a}	2.42 ± 0.23^{ab}	0.16± 0.04^{cd}	48.00 ± 9.48^{c}
BE-01	25.00 ± 10.35^{a}	28.00 ± 17.02^{a}	2.36 ± 0.29^{b}	0.16 ± 0.05^{cd}	58.00 ± 16.52^{ab}
BE-02	18.00 ± 12.19^{b}	21.00 ± 5.63^{b}	2.23 ± 0 .23^{c}	0.21 ± 0.04^{ab}	51.00 ± 7.82^{bc}
KG-01	21.00 ± 8.66^{a}	26.00 ± 13.03a	2.48 ± 0.32^{ab}	0.25 ± 0.05^{a}	60.00 ± 14.13^{a}
KG-02	29.00 ± 14.23^{a}	32.00 ± 15.63^{a}	2.43 ± 0.23^{ab}	0.19 ± 0.04^{bc}	50.00 ± 8.31^{bc}

*values are mean±sd. values followed by the same letter(s) within the same row do not statistically differ at the 5% level according to dmrt, analyzed for the accessions collected

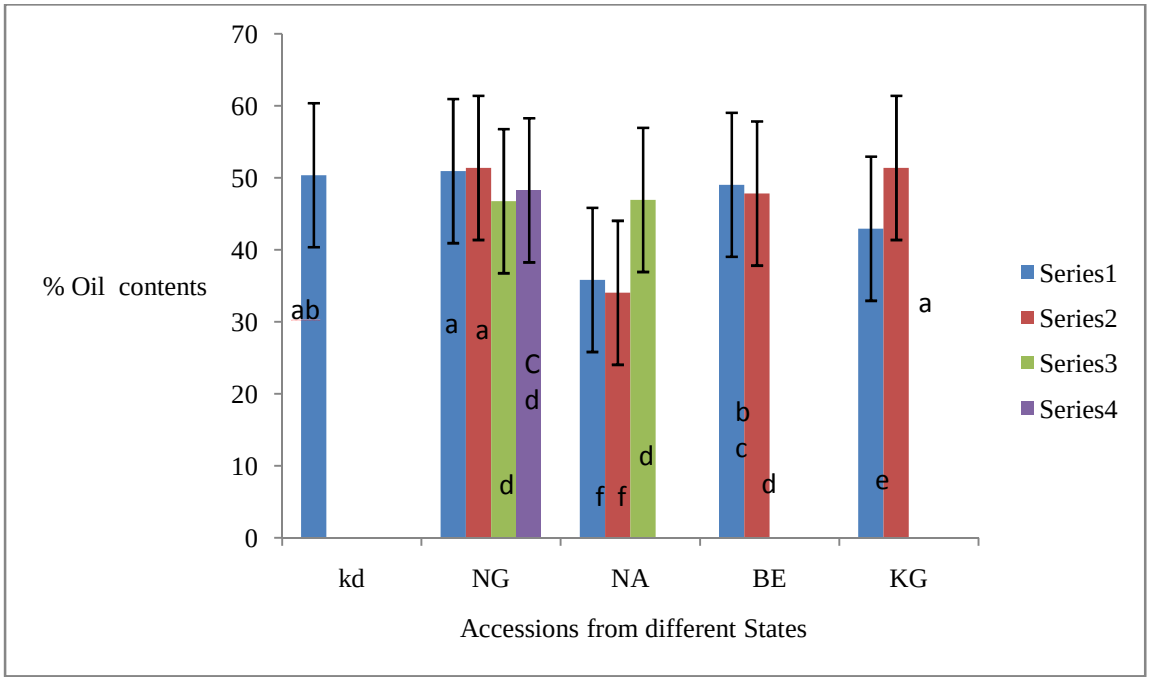

Figure2. Percentage oil (%±sd) of the twelve accessions collected from different states

RESULTS AND DISCUSSIONS

The number of flowers per plant and the number of capsule per plant were statistically uniform among all the Accessions at P<0.05 level of significance. The Accessions NG-03, NG-04, NA-01, and BE-02 had the least mean but the highest mean was observed in the remaining Accessions.However, the Accessions with the highest capsule length was observed in NG-02 and NG-04 with the means (2.60) and (2.58) while BE-02 and NA-01 Showed the least capsule length with the means (2.23) and (2.19) respectively. Although no statistical differences were observed among the Accessions at P<0.05 level of significance. The result showed that the Accession NG-04 and KG-01 had the highest weight of capsule with the means (0.15a) and (0.16a) respectively, and no significant differences were observed in NG-02, NG-03, and KG-02 at P<0.05 level of significant statistically. Similarly,The highest number of seed per capsule was observed in NG-04 (60.00a) and KG-01(60.00a) while the least was observed in NA03 (48.00) but no statistical differences were observed at P<0.05 level of significance. The results of the percentage oil from the sesame accessions collected indicated some variations statistically; there were significant differences among the accession.

However, the accession NA01 (40%) and NA02 (38%) had the lowest percentage oil at ($p>0.05$) .although these values are not significantly different, but they are different from all other values of the accessions statistically.

In addition, NG01 (57%), NG02 and KG02 (57%) and had the highest percentage oil, these values are statistically the same but are statistically different from all other values of the accessions at ($p>0.05$) level of significant. There were no statistical differences observed among NG03 (52.2%), NA03 (52.5%), BE02 (53.5%), NG04 (54%) and (54.5%) respectively at ($p>0.05$) but they are different from all other accessions statistically.

The Accession KG01 was statistically different from all other accessions with 48% of its oil content, while NG04, BE01, and KD were not different statistically but are different from all other accessions at ($p>0.05$) level of significant (Fig 1.2). The variations observed in the number of capsules per plant is in line with the work of Gupta and Gupta (1977) on Sesamum, Rasailyet al. (1986) on soybean, Yadav&Srivastava (2002) on chick pea varieties. The variation in Capsule number may be due to pod bearing ability of the genotype itself and varied response to environmental conditions and nutritional status of the soil to some extent. However, Number of flowers and number of capsules per plant is one of the most contributing characters for seed yield of sesame for plant breeding programs. The seed colour is one of the important parameters useful in varietal identification. Based on the variations in the seed colour, the Accessions studied have black , light brown, and creamy white. Similar color variations were reported earlier by Mohammed and Alam (1933), Rhind&Thein (1933) in sesame and Arunkumaret al. (2005) in pearl millet hybrids and their parental lines. The Oil percentage obtained in this study is consistent with the reports from previous researchers. For example,(24.30% -58.85%) oil content reported by Alege, & Mustapha., (2013) on assessment of genetic diversity in Nigerian sesame using proximate analysis was in line with the (37.1% - 57.5%) observed on the same genotype in this study.

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