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Evaluation of new Sesame varieties for growth and yield performance in summer season in Afgoi, Somalia

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Abstract: *To gauge new sesame varieties under field condition, an experiment was conducted during the summer (Hagaa) season (July-September) 2016 at the experimental farm of Somali Agriculture Technical Group (SATG), Afgoye, Somalia. Yield and yield contributing characters of the varieties were observed during the trial. A randomized complete block design with 4 replications was used. A complete of six sesame varieties were used for the trial. The new varieties were Setit, Yemeni variety, Nigerian variety, Humeera, and Abasen while the local variety was used as a control. Results from the experiment revealed that plant height, number branches^{-1}, number of capsules^{-1}, capsule length, capsule height, seed yield and Straw yield were significantly different among varieties. The tallest plant height (95.25 cm) was found in local variety while all-time low plant height (67.00 cm) was observed in Abasena variety. It had been observed that Local and Yemen had the foremost branches plant^{-1} (4.25) while the lowest number of branches plant^{-1} was found in Setit variety (3.00). It had been also witnessed that Nigerian variety showed the very best number of capsules Plant^{-1} while Abasena variety gave lowest Number of capsules Plant^{-1} (30.50). The very best capsule length was found in Humera and Setit varieties (3.50 cm) while the lowest capsule length was found in Abasena variety (2.75 cm). The very best first capsule height was detected at Local variety (47.00 cm) while the lowest first capsule height was found at Humera variety (24.00 cm). It had been detected that Yemen variety showed the absolute best yield (1877 kg/ha). The remarkable growth and yield performance of sesame from summer season (Hagaa) trial was observed at Yemeni varieties. Those variety overall showed significant growth and yield and appear to be promising variety for the country.*

Key words: ***sesame, varieties, yield characters***

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I. Introduction

Sesame (Sesamum indicum L.; Pedaliaceae family) is an annual plant considered as one among the foremost important and oldest oil crops (Noorka., 2011). It's been cropped in Asia for over 5000 years (Bisht., 1998). The carboxylic acid composition of its oil varies considerably among different cultivars worldwide (Yermanos & Saeeb, 1972). After oil extraction, the remaining meal contains 35 to 50% protein, and is rich in tryptophan and methionine. Benniseed coats are rich in calcium (1.3%) and supply a valuable source of minerals (Johnson., *et al*, 1979).The addition of sesame to the high lysine meal of soybean produces a well-balanced animal feed. In Africa, the three largest producer of Sesame are Sudan, Uganda and Nigeria (FAO., 2005). In Somalia, sesame is usually mentioned as Sisin and is widely used and really popular in parts of the South, where it's commonly grown. It's one among the most cash crops cultivated in Somalia. It's processed into oil. It contains about 50-60% of oil. It's marketable and exported hugely to Dubai and Other countries within the word. The crop is very drought tolerant, grows well in most quite soils, regions and is compatible to different crop rotations. Actually, sesame is usually grown by small holders in low rainfall areas and with low management inputs (Cagırgan., 2006). However, the sesame production in Somalia is below expectation and therefore the potential might be considerably higher. The low production is because of variety of reasons like low inputs and poor management (e.g. low or non-fertilization, irrigation, pest control etc.), occurrence of biotic and a biotic stresses and more importantly, a scarcity of an appropriate breeding program (Pham., *et al*, 2010). The crop is grown under a variety of environments, which probably affects its performance. The environmental factors that influence sesame productivity include climatic factors like temperature, rainfall and

day length, soil types and management practices like plant densities, time of sowing, irrigation, fertilizers, herbicides and fungicides, some of which may partially mitigate others (Geleta. *et al*., 2002). Nowadays, many sesame varieties are ready within the world market. These are including local varieties and commercial varieties. However, the cultivation of improved varieties is restricted in Somalia due to insufficient varietal information. The farmers still grow local varieties with low yields. Therefore, adequate knowledge of production technology also nearly as good quality cultivars will help the farmers to enhance yield or increase sesame production in Somalia. Since sesame may be a vital product for oil, bakery, tahini (sesame paste), pharmaceutical and many other uses within the world, it's necessary to introduce new improved varieties which will help the Somali sesame from low farm yield level to the level of level of upper yield performance.

II. Methods And Materials

This experiment was conducted during the Hagaa season (July-September 2016) at the experimental farm of Somali Agriculture Technical Group (SATG), Afgoye. Afgoye is situated about 30 kilometers west of Mogadishu, the nation's capital. The Shabelle River passes through the middle of the town. The experiment was conducted in Hagaa season. The soil of the experimental site is clay loam in texture with pH (8.32), Total Nitrogen (0.15%), Phosphorus (5.58 ppm), Potassium (625 ppm) and Organic Matter (2.56%). Seeds of six sesame varieties viz. HUMEERA, ABASEN, SETIT, NIGERIAN, LOCAL and YEMENI were sown. The experiment was laid out in RCBD with 4 replications. The size of unit plot was 37.1 m² with Spacing between Plots 1.3 m. The total number of treatments was 6 with total of 24 plots. The whole area was divided into 24 plots. The replications were separated by 2m and plots were separated by 1.3 m distance. Seeds for the Hagaa trial were sown on 22 June 2016 in solid lines. Space between rows was 0.65m while space between plants was 0.20 m. The Row length with each plot was 9.5m. Three to five seeds were sown per hill. Missing hills were sown with seeds to maintain desired plant population. To avoid losses of seeds, harvesting was done when 75% of the capsules turned yellow. The data on agronomic parameters and yield components of sampled plants such as plant height, branches plant^{-1}, number of capsules Plant^{-1}, Number of Seeds Capsule^{-1}**,** seed yield/ha, Stover yield and harvest index were recorded. The harvested plants were segmented into components such as straw (leaf, branch and stem together) and seed. The straw and capsule were then dried in the sun for 72 hours and weighed. The seeds were also dried in the sun and weighed. The seed weight was adjusted at 8% moisture content.

Data was collected from Average of six plants-1 plot. Plants were separated into their component parts (leaf, stem, branch, flower and capsule). Sample plants were collected from second and third rows. The first rows were avoided from sampling for border effect. The data were analyzed statistically by F-test to examine whether the treatments were significant. The mean comparisons of the treatments were evaluated by DMRT (Duncan's Multiple Range Test). The analysis of variance (ANOVA) for different parameters was done by a computer package programme 'R LANGUAGE'.

III. Results And Discussions

Table 1: Effect of varieties on growth parameters

Varieties	Plant Height(cm)	Number of branches plant^{-1}	Number of capsules Plant^{-1}	Capsule Length(cm)	First capsule Height (cm)	Number of Seeds Capsule^{-1}
Humera	73.75 bcd	3.50bc	62.75 ab	3.50 a	24.00 b	62.50ab
Abasena	67.00 d	3.25bc	30.50 c	2.75 b	44.00 a	62.75ab
Setit	82.00 abc	3.00c	48.50 bc	3.50 a	29.75 b	60.00b
Nigerian	69.75 cd	3.75ab	78.50 a	3.25 ab	30.50 b	61.00ab
Local	95.25a	4.25a	63.75 ab	3.00 ab	47.00 a	67.50a
Yemen	84.75 ab	4.25a	75.50 a	3.00 ab	43.50 a	66.50ab
Level of significant	**	**	**	**	**	NS
CV (%)	12.40	12.20	11.51	10.92	9.25	7.54

* *= highly significant at p<0.01
NS= not significance
CV= Coefficient Variation

Varieties have shown a big effect on plant height (Table 3). The tallest plant height (95.25 cm) was found in local variety while the lowest plant height (67.00 cm) was observed in Abasena variety. On the opposite hand Humera, Setit, Nigerian, and Yemen varieties have shown plant height of 73.75, 82.00, 69.75 and 84.75 cm respectively. These results are in accordance with the findings of (Caliskan, Isler, Arslan, & Arioglu, 2004), who reported plant height variation was observed in varieties under treatment.

The number of branches plant^{-1} was significantly influenced by crop varieties (Table 1). It had been observed that Local and Yemen had the most branches plant^{-1} (4.25) while the lowest number of branches plant^{-1} was found in Setit variety (3.00). Humera variety gave branch number of 3.50 while Abasena and Nigerian variety gave number of branches of 3.25 and 3.75 respectively. These results are in line with those of (El-Naim, 2010) who demonstrated that varieties difference in number of branches plant^{-1} was significant.

The number of capsules plant^{-1} was significantly influenced by varieties (Table 1). It was observed that Nigerian variety showed the highest number of capsules Plant^{-1} while Abasena variety gave lowest Number of capsules Plant^{-1} (30.50). On the other hand Humera, Setit, Local and Yemen varieties gave number of branches plant^{-1} of 62.75, 48.50, 63.75 and 75.50, respectively. Tahir et al., (2012) revealed that number of capsules Plant^{-1} was influenced by varieties.

Capsule length was significantly different among varieties (Table 1). The highest capsule length, which is the same, was found in Humera and Setit varieties (3.50 cm) while the lowest capsule length was found Abasena (2.75 cm). On the hand, Local and Yemen varieties showed the same capsule length (3.00 cm). Likewise, the first Capsule height was significantly influenced by crop varieties. The first maximum capsule height was detected at Nigerian variety (47.00 cm) while the lowest first capsule length was found at Humera variety (24.00 cm). Other varieties, Abasena, Setit, Local, and Yemen varieties gave a capsule height of 44.00 cm, 29.75 cm, 47.00 cm, and 43.50 cm, respectively.

There was no significant difference in varieties in terms of number of seeds capsules^{-1}. The highest number of seeds capsule^{-1} was observed at Local variety (67.50) while lowest number of varieties was found at Setit variety (60.00). The remaining varieties, Humera, Abasena, Nigerian, and Yemen varieties have shown number of seeds capsule-1 of 62.50, 62.75, 61.00, and 66.50, respectively.

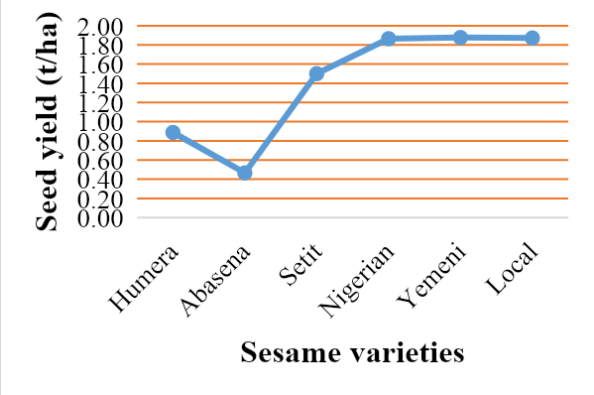

Figure 1: Effects of varieties on seed yield.

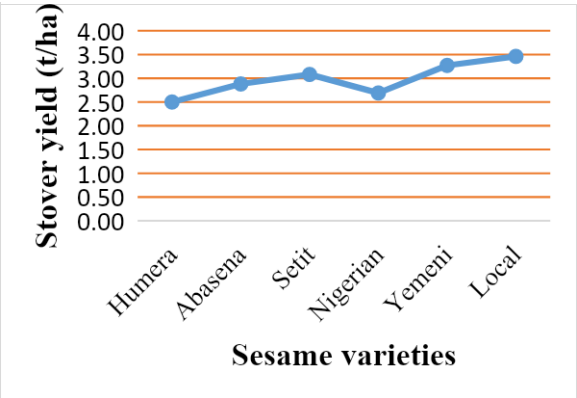

Figure 2: Effects of varieties on Straw yield

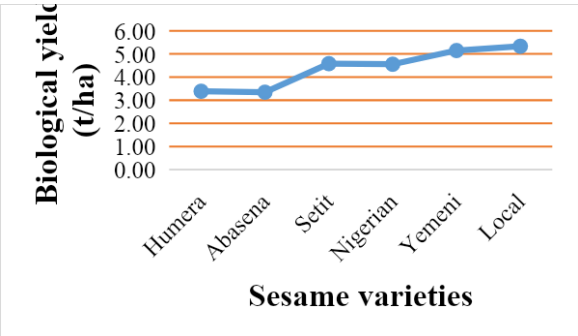

Figure 3: Effects of varieties on biological yield

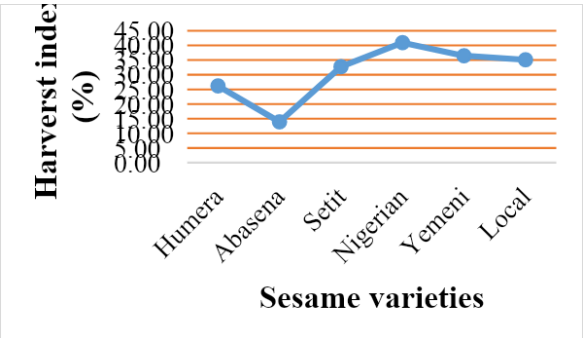

Figure 4: The effects of varieties on HI

Seed yield (kg ha^{-1}) was significantly influenced by sesame varieties (Figure 1). It was observed that Yemen variety showed the highest yield (1.88 t/ha). On the other hand the lowest yield (0.47 t/ha) was recorded with Abasena variety. The result obtained from Local, Nigerian, and Setit varieties showed intermediate results compared to Humera variety. Straw yield was not significantly influenced by crop varieties (Figure 2). It was observed that Local variety showed the highest Stover yield (3.46 t/ha) which was not significantly different from Yemen variety (3.27 t/ha). But the lowest Stover yield of 2.50 t/ha) was recorded for Humera variety. However, there is significant variation among varieties in terms of biological yield (Figure 3). The highest biological yield of 5.33 t/ha was observed at Local variety while the lowest biological yield of 3.35 t/ha was recorded for Abasena variety. Finally, there is significant

variation among varieties in accordance to harvest index (Figure 4). The highest harvest index of 40.94% was found at Nigerian variety while the lowest harvest index of 13.93% was observed at Abasena variety. Many similar studies have indicated that varieties have significant impact on yield components (Baker, and Briggs, 2007), (Nandita *et a*l., 2009) and (Saharia, and Thakuria, 1988).

IV. Conclusions

The study was conducted to evaluate the response of new sesame varieties for growth and yield. The results for analysis of variance showed that there were highly significant differences among the varieties for most characters considered. Parameters like plant height, number of branches per plant, number of capsules per plant, capsule length, capsule height, seed yield and straw yield were significantly different among varieties. It was observed that the sesame variety from Yemen would be the most promising variety for growing the summer season. However, the productivity of this particular variety could be possibly availed in other cropping seasons. Thus, studies would be essential to look for other alternative methods that would help increase the productivity of the variety.

References

[1]. Baker, R. J., & Briggs, K. G. (2007). Effects of Plant Density on the Performance of 10 Barley Cultivars. Crop Development Ctr., Univ. of Saskatchewan, Saskatoon, Sask. S7N 0W0, and professor, Dep. of Plant Science, Univ. of Alberta, Edmonton, Alta. T6G 2H1, respectively.

[2]. Bisht, I., Mahajan, R., Loknathan, T. (1998). Diversity in Indian sesame collection and stratification of germplasm accessions in different diversity groups. Genetic Resources and Crop Evolution 45, 325–335. https://doi.org/10.1023/A:1008652420477

[3]. Cagırgan. (2006). Screening for resistance to fusarium wilt induced mutants and world collection of sesame under intensive management. Turkish Journal of Field Crops, 2010, 15(1): 89-93.

[4]. Caliskan, S., Isler, N., Arslan, M., & Arioglu, H. (2004). . (Effect of Planting Method and Plant Population on Growth and Yield of Sesame (Sesamum indicum L.) in a Mediterranean Type of Environment. Asian Journal of Plant Sciences, 3, 610-614.

[5]. El-Naim, A. (2010). Effect of Plant Density on the Performance of Some Sesame (Sesamum indicum L.) Cultivars under Rain Fed. Research Journal of Agriculture and Biological Sciences.

[6]. Food and Agricultural Organisation of the United Nations (2005). FAOSTAT Database. Available online at <http:/apps.Fao.org/default.htm>

[7]. Geleta, B.M., Atak, M.A., Baenziger, P.S., Nelso, L.A., Baltenesperger, D.D., Eskridge, K.M., Shipmam, M.J. and Shelton, D.R. 2002. Seeding rate and genotype effects on agronomic performance and end- use quality of winter wheat. Crop Sci., 42: 827-832.

[8]. Johnson, L.A., Suleiman, T.M. & Lusas, E.W. (1979). Sesame protein: A review and prospectus. J Am Oil Chem Soc 56, 463–468. https://doi.org/10.1007/BF02671542

[9]. Nandita, R. S., Abdullah, M. ., Mamun, H. a), & Jahan, S. (2009). Yield Performance of Sesame (Sesamum Indicum L.) Varieties at Varying Levels of Row Spacing. Agrotechnology Discipline, Khulna University, Khulna, Bangladesh.

[10]. Noorka, I. R., Hafiz, S.I. and El-Bramawy, M. A. S. 2011. Response of sesame to population densities and nitrogen fertilization on newly reclaimed sandy soils. Pak. J. Bot., 43(4): 1953-1958.

[11]. Pham, D.T., Nguyen, T.T.D., Carlsson, A.S. & Bui, M.T. (2010). Morphological evaluation of sesame (Sesamum indicum L.) varieties from different origins. Australian Journal of Crop Science 4(7), 498-504.

[12]. Saharia, & Thakuria, T. M. (1988). . Effect of plant density and spatial arrangement on seed yield of cowpea (Vigna unguiculata L. Walp). J. Amer. Hort. Sci.

[13]. Tahir M, Saeed U, Ali A, Hassan I, Naeem M, Ibrahim M, Rehman H, Javeed MR. 2012. Optimizing sowing date and row spacing for newly evolved sesame (Sesamum indicum L.) variety TH-6.PakJ life Soc Sci10:1-4

[14]. Yermanos, D. M., Hemstreet, S., Saeeb, W., Huszar, C.K. (1972). Oil content and composition of the seed in the world collection of sesame introductions. Journal of American Oil Chemistry Society 49:20-23.

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