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Research Article

Evaluation of Improved Sesame Varieties (*Sesamum indicum*) under Rain Fed Condition in Ari and South Omo Zone, South Ethiopia

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Abstract

The field experiment was conducted in Ari and South Omo Zones at Debub Ari District (Jinka Agricultural research center site) and at Malle District, Beneta keble in 2023/24 under rain fed condition with the objective of evaluating, recommending, adaptable and high yielding varieties for the growers in the study area of Ari and South Omo Zones. Thirteen improved sesame varieties were used in the experiment and evaluated using randomized completed block design in three replications. Important data were collected and analyzed using SAS software. The combined analysis of variance result showed that, there were significant differences among the varieties for all the traits except thousand seed weight. The maximum average mean yield of 1163.5 kg ha^{-1} was obtained from Gonder -1 variety followed by Obsa 1142.1 kg ha^{-1} variety. These two varieties had a yield advantage of 61.02 % and 58.05 % over standard check respectively while variety Hachalu (591.7 kg ha^{-1}) had the lowest average mean yield. As a result, Gonder-1 and Obsa varieties were recommended for further demonstration for farmers' investors, agro-pastoralists and sesame producers under rain fed condition in Ari and South Omo Zone and other similar agro ecologies.

Keywords: *Growth and yield Parameters, performance evaluation, sesame varieties, variance.*

1. Introduction

Sesame (*Sesamum indicum*) is an annual oil crop with a short growing season. And it is known as "queen of oil seeds" due to its high quality, unsaturated and stable oil (Belayneh et al., 2024). It is belongs to the Pedaliaceae family and the genus Sesamum, allowing to evidence, Ethiopia is the origin of cultivated sesame (Bedigian, 2015). Ethiopian sesame is among the highest quality in the world, as seeds are naturally produced at near-organic levels (Fantaye et al., 2018). Sesame seed can contain up to 50% oil and 25% protein (Hassen, 2022). It is an important oil crop in Ethiopia and for the national economy as an industrial crop, a source of oil, food and feed, and a cash crop; despite the fact that production and area harvested have been declining since 2010 (Mohammed,2022). Ethiopia's major sesame growing regions include North Gonder, Western Tigray, Pawe, Blese, Assosa, and Wellega. While; Gibe valley, Jinka plain, and North Omo lowlands are potential growing areas for future sesame in Ethiopia (FAOSTAT, 2022). Next to coffee, sesame seed is the second largest export crop for Ethiopia and it is an important cash crop as it has an excellent demand in the international market and is utilized by domestic oil production ((FAOSTAT, 2022). Sesame is grown in over 78 countries across six continents, covering an area of approximately 14 million hectares and producing approximately 6.8 million metric tons in 2020 (Dagmawi et al., 2015). Sudan, India, China, Myanmar, Nigeria, the United Republic of Tanzania, Ethiopia and Uganda are the world's leading sesame seed producers. Similarly, sesame is grown on 9.7 million hectares in Africa, with a total production of 4.3 million metric tons and a 42.5 percent yield; and Africa accounts for a portion of sesame production. However, in Ethiopia production/yield quantities of sesame seed have been decreasing from 2010 to 2020 (Woldesenbe et al., 2015). Ethiopia's average sesame productivity is very low in comparison to the rest of the world. Many factors contribute to its failure, including: high yielder improved/climate resilience sesame variety/ies in particular, indeterminate flowering nature, capsule shattering at maturity, and biotic and abiotic stresses (FAOSTAT, 2022). Despite its superior economic importance and has great potential in improving farmers' income, in South Omo

Zone and Ari Zone areas sesame is grown almost exclusively by smallholders using unimproved sesame landraces and traditional management practices and its production and still remains below the national average (4750 kg ha^{-1}) (Mesera and Mitiku,2017). To increase the production and productivity of sesame crop, the experiments was done with an objective of to evaluate and recommend, adaptable, high yielding and disease resistant sesame varieties for the growers in the study area of Ari and South Omo Zones.

2. Materials and Methods

2.1. Description of the study area

The field experiment was conducted in Malle district and Debube Ari District (Jinka Agricultural research center) site during the 2023/24 Mehar cropping seasons. Malle District astronomically, between 5°08′–6°01′ North latitude and 36°30′–37°0′ East longitude with altitude of 600-1500 m.a.s.l. There are two major agro ecologies namely “kola” and “Woynadega” 85% and 15% found in the district respectively. The mean annual RF ranges between 800-1200mm and the mean annual temperature ranges between18-350c. The district has very small, erratic and variable rainfall, and high ambient temperature. Were as, Jinka Agricultural Research Center site geographical coordinates are 36^0 33’-370 67’E and 5^0 46’-60 57’N with an altitude of 1450 meter above sea level. The rain distribution of the area is bimodal with the main rainy season extending from March to May and the second cropping season from July to October. The average annual rainfall of the area for the last ten years was 1326.7 mm with two seasons, while the monthly mean temperatures of 22.4ºC (National Metrological Agency Hawassa Brach, 2024).

2.2. Treatments and experimental design

Thirteen improved varieties were evaluated under the study areas. These varieties are Dangure, Abasena, Obsa, Hachalu, Yale, Benshangul-1, Setit-1, Setit-2, Huarc-4, Gondar-1, Gida Ayana, Baha Necho, and Humera 1(as standard check) using Randomized complete block design (RCBD) with three replications. Experimental unit comprised ten rows of 4 meters length and 5m width with row-to-row spacing 40 cm and plant-to-plant spacing 10 cm respectively. The recommended seed rate of 5 kg ha $^{-1}$ were used and 100 kg ha^{-1} of DAP and 50 kg ha^{-1} urea was applied at plating.

2.3. Data collection

2.3.1. Growth parameters

Days to 90% flowering: the number of days starting from emergence up to 90% of the plants in each plot becomes flowered. Days to 90% maturity: the number of days starting from emergence up to 90% of the plants in each plot becomes matured. Plant height at maturity: this growth parameter is the stature of the plants in centimeter (cm) from the ground up to the top of the selected plants. Length of the capsule bearing zone: the stature of the plant from the first pod-bearing zone to the tip of the plant was measured using a meter tape of the selected plant. Capsule Length: the length of the Capsule from bottom to top of the selected capsule.

2.3.2. Seed yield and yield components

Five central rows were harvested for determination of seed yield. Seed yield was adjusted to 14% moisture content. Five plants were randomly selected from the three central rows to determine yield and yield components. number of capsules per plant: refers to the total number of capsules in a given plant counted at the time of maturity from single plant. Number of productive primary branches per plant: number of productive branches primary with one or more number of capsules in single plant. number of seeds per capsule: the average number of sesame seeds counted per capsule and the average number of seeds collected from five plants and one capsule from each plant. grain yield: the total grain yield (kg ha $^{-1}$) harvested from the central plot area. Thousand seed weight: the average weight of thousand seed weight (1000) seeds randomly collected from the harvested grain yield in grams

2.3.3. Statistical analysis

The GLM algorithm of SAS version 9.2 (SAS, 2009) was used to evaluate crop yield and other associated trait data that was obtained from both locations. LSD (Least Significant Difference) was used to calculate the mean separation at 5% probability level.

Table 1. List of breeding materials/varieties used during the study year

Varieties	Source / Origin	Year of release
OBSA	BARC/OARI	2010
DANGURE	Pawe ARC/EIAR	2015
ABASENA	WARC/EIAR	1990
HUMERA-1 (as local check)	Humera ARC/TARI	2011
SETIT-1	Humera ARC/TARI	2011
GIDA AYANA	Humera ARC/TARI and Asossa ARC/EIAR	2018
GONDAR -1	Gonder ARC/ARARI	2016
BENSHANGUL1	Humera ARC/TARI and Asossa ARC/EIAR	2016
HACHALU	Bako ARC/ORARI	2021
YALE	Bako ARC/ORARI	2019
SETIT-2	Humera ARC/TARI	2016
HUARC-4	BARC/OARI	2017
BAHA NECHO	Haramaya University	2016

3. Results and Discussion

3.1. Analysis of variance

Prior to the combined analysis of variance, homogeneity of error variances was tested and all of the traits showed homogeneous error variances. Having this confirmation, the data were pooled across locations and combined analysis of variance were performed and presented in Table 1. The mean squares obtained in combined analysis of variance were used to separate variety effects, location and their interactions. The mean squares from the combined analysis of variance over the two locations showed statistically significant ($P \leq 0.05$) difference between locations for day to flowering but none significant difference for days to maturity, plant height, length of capsule bearing zone, number of primary branches per plant, number of capsule per plant, number of seed per capsule yield and thousand seed weight. The combined analysis of variance over the two locations revealed significant differences ($P \leq 0.05$) among varieties for most of the studied traits except thousand seed weight which was none significant difference. The presence of significant differences among the tested varieties might be due to the existence difference in genetic potential among varieties, for that fact characters may be differ in their genetic properties. Besides, environmental influences might be the possible causes of their significant differences. This result was agreed to the finding of Awoke and Muhaba (2022). The combined analysis of variance of variety and location interaction effect revealed none significant differences for all traits. The none significant differences result in days to maturity and plant height were similar with the research finding of (Teklu et al., 2014).

3.2. The average mean value results for the two-location

3.2.1. Growth parameters

Days to flowering: from the average mean performance on flowering date: significant variation was observed among the varieties (Table. 3). Variety SETIT-2 (36) flowering early while longest time duration for flowering date was observed to variety Benshangul-1 (52.33 days). Maturity date: in combined analysis of variance result there was statically none significant variation was observed among varieties in days to maturity. (Table 3). This result finding was in line to Hassen (2022) who observed none significant variations among sesame varieties. Plant height: in terms of plant height, the analysis of variance result showed significant differences among varieties. The longest plant height was recorded to variety Benshangul-1 (162.53 m) while the shortest plant height was measured to variety Humera -1 (125.10 m). This variation may be to the differences in the growing environment, climatic conditions and genetic make-up of the varieties. The significant variation in sesame varieties on plant height result was similar to the research finding of Mesera and Mitiku (2015) who stated that, there is a significant variation difference among varieties and similar results was reported by Hassen (2022) there were significant variation in sesame varieties on plant height and this result is in line with Fiseha and Muez (2019) who indicated that plant height significantly difference among sesame varieties. Similarly, Erigit *et al.,* (2017) who reported that, significantly difference in plant height among sesame varieties. Length of capsule bearing zone: The longest length of capsule bearing zone was recorded to variety Obsa (100.80 m) and the shortest length of capsule bearing zone was measured to variety Humera -1 (84.53 m). Capsule length: the combined analysis of variance showed significant differences among varieties. The longest capsule length was recorded to variety Setit-2 (2.97cm) while the shortest length of capsule length was measured to variety Benshangul-1 (2.51 cm).

3.2. 2. Yield and yield related components

Number of capsule per plant: The maximum average number of capsule per plant was counted to variety Obsa (178.83) and Gonder-1 (177.30) while the minimum number of capsule per plant was counted to variety Setit-1 (93.93). This result finding was in line with finding of Teklu (2014); Awoke and Muhaba (2022) they suggested that, the difference on number of capsules per plant might be due the fact that the number of capsules per plant regulated by the genotypes of sesame or existence of suitable climatic conditions. The result is also corroborated with Begum *et al*. (2001) who reported that, variation in number of capsules per plant evaluated for different sesame varieties due to the existence of suitable climatic conditions for the varieties in the tested area. Similarly,Weres (2020) who reported that, significant differences among sesame varieties in the number of capsules per plant due to the genetic difference of the varieties. Number of primary branches per plant: the combined analysis of variance result showed that there were significant differences among varieties. The maximum number of primary branches per plant was counted to variety Obsa (7.26) while the minimum number of primary branches per plant was counted to variety was Huarc-4 (3.23). The difference in number of primary branches among the varieties were similar to the finding of Awoke and Muhaba (2022) who described that, the difference in number of primary branches most probably due to the existence dissimilarity in genetic composition among them, for that fact characters may be differ in their genetic properties to response formation of branch. Number of seed per capsule: the combined analysis of variance result showed that, there were significant differences among varieties. From the evaluated varieties, the maximum number of seed per capsule was counted to variety Obsa (67.16) and the minimum number of seed per capsule was counted to variety Humera-1 (50.93). Yield: the combined analysis of variance result showed that, there were significant differences among the varieties. The interaction of variety with the location is a critical factor that discourages breeders and geneticists because it complicates the plant variety development program for most crops in order to produce a stable variety across locations and seasons. (Mohammed, 2022). The average sesame grain yield result ranged between 591.7 kg ha^{-1} (Hachalu) and 1163.5 $Kgha^{-1}$ (Gonder -1). The highest average mean yield 1163.5 kg ha^{-1} was obtained from Gonder -1 variety followed by Obsa 1142.1 kg ha^{-1} variety. These two varieties had a yield advantage of 61.02 % and 50.05% over standard check respectively. While, variety Hachalu (591.7 kg ha^{-1}) had the lowest average mean yield than from the other evaluated varieties. (Table6). Many similar studies have indicated that varieties have significant impact on yield components. This yield difference result was agreed to the finding of Ismaan et al., (2020) and Tadesse and Misgana (2020) who observed a significantly difference among sesame varieties. Thousand seed weight: The analysis of variance revealed that, significant difference among varieties. The maximum weight of a thousand seed was recorded by Gonder-1 and Obsa (2.28 and 2.25gm) respectively while, the lowest weight of a thousand seed was recorded by abasena and Gida Ayana (1.83) (Table 6).

Table 2. Analysis of variance (ANOVA)

SV	DF	Df	DM	PH	LCBZ	CL	NCPP	NPBP	NSPC	GY	TSW
Rep	2	25.9	13.3	5.5	345.7	0.08	2517	5.42	36.45	54102	0.099
L	1	467.7*	1822^{ns}	1008^{ns}	482^{ns}	0.69^{ns}	2309^{ns}	23.48^{ns}	29.29^{ns}	103097^{ns}	0.0128^{ns}
V	12	147.56*	20.07*	859.9*	111*	0.07*	5759*	9.327*	101.5*	170608*	0.1137^{ns}
V*L	12	13.4^{ns}	11.78^{ns}	181^{ns}	125^{ns}	0.04^{ns}	4226^{ns}	1.07^{ns}	33.3^{ns}	65893^{ns}	0.0892^{ns}
Error	50	18.7	5.67	56.68	126.5	0.03	562.9	0.576	84.99	25918	0.11603

Note: *SV =source of variation, DF= degree of freedom, Df = days to flowering, DM =days to maturity, PH =plant height, LCBZ=length of capsule bearing zone, CL= capsule length, NCPP= Number of capsule per plant, NPBPP=number of primary branches per plant, NSPC= number of seed per capsule, GY= grain yield and TSW= thousand seed weight, V= variety, L = location, * = interaction.*

Table 3. The average means value of days to flowering, days to maturity and plant height

Varieties	DF			DM			PH (cm)		
	Jinka	Malle	Average mean	Jinka	Malle	Average mean	Jinka	Malle	Average mean
OBSA	52.33 ab	48.33 ab	50.33 a	104.33 abc	97.66 c	101.00 a	145.13 c	156.00 ab	150.57 bc
DANGURE	52.66 ab	47.00 ab	49.83 a	105.33 ab	96.00 ab	100.67 ab	162.80 a	151.80 abc	157.30 ab
ABASENA	53.00 ab	49.00 ab	51.00 a	104.67 ab	96.33 ab	100.50 ab	153.47 ab	148.13 abc	150.80 bc
HUMERA-1	44.66 c	40.00 b	42.33 b	102.00 bcd	90.33cd	96.17cd	129.47 d	120.73 f	125.10 d
SETIT-1	44.66 c	40.66 ab	42.66 b	103.33 abcd	93.33 abcd	98.33 abcd	142.73 c	119.93 f	131.33 d
GIDA AYANA	53.00 ab	49.00 ab	51.00 a	106.67 a	91.66 bcd	99.17 bcd	163.00 as	144.87 bcd	153.93 abc
GONDAR -1	51.33 b	48.00 ab	49.66 a	106.33 a	95.66 ab	101.00 ab	162.87 a	137.60 cde	150.23 bc
BENSHANGUL	53.33 ab	49.33 ab	52.33 a	106.00 a	93.33 abcd	99.67 abcd	162.13 a	162.93 a	162.53 a
HACHALU	53.00 ab	49.00 ab	51.00 a	103.33 abcd	96.33 ab	99.83 ab	149.67 bc	144.53 bcd	147.10 bc
YALE	52.66 ab	48.66 ab	50.66 a	104.00 abc	93.33 abcd	98.67 abcd	145.20 bc	153.93 ab	149.57 bc
SETIT-2	43.33 c	48.66 ab	36.00 c	101.00 cd	97.00 a	99.00 a	132.00 d	131.00 def	131.50 d
HUARC-4	44.33 c	41.00 ab	42.66 b	100.00 d	89.66 d	94.83 d	129.33 d	126.07 ef	127.70 d
BAHA NECHO	52.66 ab	48.66 ab	50.66 a	104.00 abc	94.66 abc	99.33 abc	151.00bc	137.80 cde	144.40 c
LSD(0.05	2.18	10.09	5.74	3.34	4.67	4.00	10.07	14.63	11.27
CV (%)	2.61	13.26	10.45	1.92	2.94	6.03	4.19	6.15	6.75

Note: *DF=days to flowering, DM =days to maturity, PH = plant height, NS none significant. Means with the same letters within the columns are not significantly different at* $P \leq 0.05$.

Table 4. The averages mean value of length of capsule bearing zone, capsule length and number of capsule per plant

Varieties	LCBZ (cm)			CL (cm)			NCPP		
	Jinka	Malle	Average mean	Jinka	Malle	Average mean	Jinka	Malle	Average mean
OBSA	92.33ab	109.27 a	100.80 a	2.62 bcd	2.70 bc	2.66 bc	118.07 cde	239.60 a	178.83 a
DANGURE	103.60a	91.73 ab	97.67 ab	2.58 bcd	2.82 abc	2.70 bc	112.00 cde	163.80 de	137.90 abcd
ABASENA	93.33ab	88.27 ab	90.80 ab	2.62 bcd	2.79 abc	2.70 ab	138.60c	183.60 bcde	161.10 ab
HUMERA-1	89.00 ab	80.07 b	84.53 b	2.72 abc	2.69bc	2.70 bc	102.13 cde	78.67 h	90.40 e
SETIT-1	102.00a	78.33 b	90.17 ab	2.73 ab	2.90 ab	2.81 ab	97.93 de	89.93 gh	93.93 de
GIDA AYANA	95.40ab	87.80 b	91.60 ab	2.70 abc	2.70 bc	2.70 bc	133.67 cd	190.13 abc	161.90 ab
GONDAR -1	88.00b	90.00 ab	89.00 ab	2.64 bcd	2.74 abc	2.69 bc	184.53 a	170.07 fg	177.30 a
BENSHANGUL1	94.33 ab	94.33 ab	94.33 ab	2.50 cde	2.51 c	2.51 c	112.53 cde	173.93 cde	143.23 abc
HACHALU	92.33 ab	88.87 ab	90.60 ab	2.35 e	2.93 ab	2.64 bc	109.73 cde	149.60 ef	129.67 bcde
YALE	96.27 ab	88.80 ab	92.53 ab	2.46d e	2.79 abc	2.63 bc	116.87 cde	216.73 ab	166.80 ab
SETIT-2	94.27 ab	86.67 b	90.47 b	2.88 a	3.06 a	2.97 a	117.33 cde	92.50 gh	104.92 cde
HUARC-4	98.33 ab	96.93 ab	97.63 ab	2.62 bcd	2.94 ab	2.78 ab	90.00 e	108.07 gh	99.03 cde
BAHA NECHO	93.67 ab	87.13 b	90.40 ab	2.46 de	2.78 abc	2.62 bc	129.20 cde	203.33 bcd	166.27 ab
LSD (0.05	15.31	21.19	13.25	0.22	0.32	0.24	40.52	37.480	46.41
CV (%)	9.47	14.00	12.44	5.33	6.89	7.90	18.48	14.39	9.28

Note: *LCBZ= length of capsule bearing zone, CL= capsule length, NCPP = number of capsule per plant. Means with the same letters within the columns are not significantly different at* $P \leq 0.05$.

Table 5. The averages mean value of number of primary branches per plant and number of seed per capsule

Varieties	NPBPP			NSPC		
	Jinka	Malle	Average mean	Jinka	Malle	Average mean
OBSA	6.60^{ab}	7.93 ^{a}	7.26 ^{a}	60.00 ^{ab}	74.33^{a}	67.16^{a}
DANGURE	4.86^{cde}	7.26^{ab}	6.06^{bc}	64.46a	58.26^{ab}	57.96^{abc}
ABASENA	4.60^{de}	5.20^{efg}	4.90^{cde}	56.00 ^{ab}	56.06b	56.03^{bc}
HUMERA-1	2.93^{fg}	3.73^{h}	3.33^{g}	51.00^{b}	50.86	50.93^{c}
SETIT-1	3.13^{fg}	4.06^{gh}	3.60^{fg}	61.73 ^{ab}	58.73^{ab}	60.23^{abc}
GIDA AYANA	4.80^{cde}	4.60^{fgh}	4.70^{def}	59.80 ^{ab}	64.33^{ab}	62.06^{ab}
GONDAR -1	4.93^{cde}	5.66^{cdef}	5.30^{bcd}	67.33^{a}	65.33^{a}	64.33^{ab}
BENSHANGUL1	4.93^{cde}	6.40^{bcde}	5.66^{bcd}	60.26^{ab}	61.13^{ab}	60.70^{abc}
HACHALU	4.00ef	6.60^{bcd}	5.30^{bcd}	58.93 ^{ab}	59.06^{ab}	59.00^{abc}
YALE	5.66^{bcd}	6.93^{abc}	6.30^{ab}	57.66^{ab}	63.06^{ab}	63.76^{ab}
SETIT-2	3.13^{fg}	4.40^{fgh}	3.76^{efg}	58.13^{ab}	59.80^{ab}	58.96^{abc}
HUARC-4	2.53^{g}	3.93^{gh}	3.23^{g}	56.33 ^{ab}	58.73^{ab}	57.33^{abc}
BAHA NECHO	5.93^{bc}	5.60^{def}	5.76^{bcd}	57.00 ^{ab}	59.26 ^{ab}	58.13^{abc}
LSD (0.05)	1.23	1.33	1.17	13.33	37.48	9.94
CV (%)	15.66	14.21	10.26	13.38	17.39	14.42

Note: *NPBPP= number of primary branches per plant, NSPC=number of seed per capsule. Means with the same letters within the columns are not significantly different at* $P \leq 0.05$.

Table 6. The averages mean value of yield and thousand seed weight

Varieties	GY (kg/ha)			TSW (gm)			Yield Advantage (%)
	Jinka	Malle	Average mean	Jinka	Malle	Average mean	
OBSA	984.1^{b}	1300.0 ^{a}	1142.1^{a}	2.33^{ab}	2.16	2.25	58.05
DANGURE	1166.67^{a}	800.0^{bc}	950.0^{abc}	2.16^{abc}	2.00	2.08	
ABASENA	1064.3^{ab}	1016.7^{b}	1040.5^{abc}	2.50^{a}	2.00	1.83	
HUMERA-1	650.8^{d}	794.4^{bc}	722.6^{ef}	2.00^{abc}	2.00	2.00	
SETIT-1	1079.4^{ab}	727.8^{cd}	903.6^{cde}	2.16^{abc}	2.00	2.08	
GIDA AYANA	1059.5^{ab}	1016.7^{b}	1038.1^{abc}	1.66 ^{c}	2.00	1.83	
GONDAR -1	1293.7^{a}	1033.3^{ab}	1163.5^{a}	2.4b ^{a}	2.26	2.28	61.02
BENSHANGUL1	968.3^{b}	905.6^{bc}	936.9^{bcde}	2.16^{abc}	2.16	2.16	
HACHALU	694.4^{cd}	488.9^{d}	591.7^{f}	2.00^{abc}	2.00	2.00	
YALE	611.1^{d}	855.6^{bc}	733.3^{def}	2.00^{abc}	1.83	1.91	
SETIT-2	932.5^{bc}	961.1^{bc}	946.8^{bcd}	2.00^{abc}	2.00	2.00	
HUARC-4	1000.0^{b}	783.3^{bc}	891.7^{cde}	1.66^{c}	2.16	1.91	
BAHA NECHO	1162.7^{ab}	972.2^{bc}	1067.5^{abc}	2.00^{abc}	2.00	2.00	
LSD (0.05	546.41	277.87	215.10	0.55	NS	NS	
CV (%)	16.63	18.39	19.98	16.23	17.15	16.3	

Note: *GY = yield, TSW= thousand seed weight. Means with the same letters within the columns are not significantly different at* $P \leq 0.05$.

4. Conclusion and Recommendation

The combined analysis of variance result showed that, there were statistically significant differences among the varieties for the traits of days to maturity, plant height , number of capsule per plant, days to flowering, length of capsule bearing zone, capsule length, number of primary branches per plants, number of seed per capsule and grain yield considered in this study and none significant differences among the varieties for the traits of thousand seed weight .The highest average mean grain yield 1163.5 kg ha^{-1} was obtained from Gonder -1 variety followed by Obsa 1142.1 kg ha^{-1} variety. These two varieties had a yield advantage of 61.02% and 58.05 % over standard check (Humera -1 as local check) respectively while, variety Hachalu (591.7 kg ha^{-1}) had the lowest mean grain yield than from the other evaluated varieties. As a result, Gonder-1 and Obsa varieties were recommended for further demonstration for farmers' investors, agro-pastoralists and sesame producers under rain fed condition in Ari and South Omo Zone and other similar agro ecologies.

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Conflict of Interest

The authors declare no conflicts of interest.

Fig. 1. Performance Status of the experiment at Ari Zone, Debube Ari District (Jinka Agricultural research center site

Fig.2. performance Status of the experiment at South Omo Zone, Malle District at Beneta keble

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