Int.J.Curr.Res.Aca.Rev.2020; 8(9): 84-90

EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 (Online) Volume 8 Number 9 (September-2020)

Journal homepage: http://www.ijcrar.com

doi: https://doi.org/10.20546/ijcrar.2020.809.010

Effect of Inter-Row Spacing on Seed Cane Yield and Yield Components of Sugar Cane (*Saccharum* spp. hybrid) Varieties at Omo-Kuraz, Southern Ethiopia

Zinabu Tadesse*, Amare Girma and A. Q. Khan

Plant Science Department, College of Agricultural Sciences, Arba Minch University, Ethiopia

**Corresponding author*

Abstract

Improving seed cane yield per unit area is among the major agronomic practices to improve the benefit of sugarcane production under a given environment. Hence, a field experiment was conducted at Omo-Kuraz-two sugar estate during 2018/19 cropping season to evaluate effect of inter-row spacing on yield and yield components of seed cane of sugarcane varieties. Treatments consisted of three cane varieties (B52-298, C86-12, and N14) and five inter-rowspacing (85cm, 100cm, 115cm, 130cm and 145cm) which were arranged in a split-plot design with three replications. Main plots and subplots received variety and inter-row spacing treatments, respectively. Three-budded cane setts were used for planting. Data on yield and yield components were measured at eight months after planting and analyzed using SAS 9.0 software. Maximum significant sett yield/ha (621,247) was recorded from planting of N14 variety at the narrowest inter-row spacing (85cm) followed by the value (580,431) obtained from planting of the same variety at 100cm inter-row spacing. Statistically similar and higher values of sett yields /ha were also recorded due to planting of B52-298 variety at 100cm (546,671) and at 85cm (550,822) and C86/12 variety at 85cm (537,473). It can be concluded that planting the tested varieties at the narrowest (85cm) inter row spacing would enable sugarcane growers to maximum sett yield/ha in the study area and other similar environments.

Article Info

Accepted: 10 August 2020
Available Online: 20 September 2020

Keywords

N14, number of buds, Internode number, Sett

Introduction

Sugarcane (*Saccharum* spp.), is a cash crop providing a major source of income for many countries and currently, the production area of this crop is tremendously increasing about 102,741 ha in Ethiopia (ESC, 2019).Currently, 325-400 thousand metrictons of sugar has been produced annually in Ethiopia; it covers a maximum of only 58%, though only 7 kg is being supplied for the annual demand for domestic consumption. The per capita consumption of sugar in Ethiopia is about 10 kg (ESC, 2019) and the deficit is imported from abroad to satisfy the current total domestic demand of 650-700 thousand tons. Despite this fact, the country has huge production potentials and opportunities which include specifically identified irrigable suitable fertile areas of 1,400,000 ha as well as abundant resources of water and ample labor, the government has given higher attention to the sector (ESC, 2019). To utilize these opportunities and reverse the current situation; the country is on the process of establishing new sugar plantations in different regions of the country having area coverage of 235,000 ha in addition to expanding the existing ones (ESDA, 2007).

Fast adoption of newly introduced and improved varieties along with its packages is one of the basic and crucial issues for better productivity any crop.

Row spacing has a direct effect on available light, plant population, and canopy development, which ultimately affects weed growth, photosynthetic capacity, and dry matter yield (Tollenaar *et al.*, 1994 and Murphy *et al.*, 1996)and imparts its role to minimize the seed requirement for planting (Netsanet, 2009). The widerow spacing farming system has delivered small profits because of lowcane yields obtained. This is because the wide row spacing provides a poor geometry that does not intercept all the available light. The narrow row spacing is of particular interest because it describes a planting strategy that increases the number of setts planted above the rate used for standard rowspacing (KESREF, 2000).In Ethiopia, 145cm inter-row spacing is commonly practiced in all sugar industries including OmoKuraz sugar estate whereas other countries are using lower inter row spacing up to 50cm. Sugarcane varieties were not studied in terms of inter-row spacing to maintain optimum seed cane yield in the study area. The present study was undertaken to identify the effect of inter-row spacings on growth, yield, and yield components of seed cane.

Materials and Methods

Description of the Study Area

The experiment was conducted at Omo Kuraz Sugar Estate (OKSE) during 2018/2019 cropping season. The site is situated in the plain areas of the lower Omo-Gibe Basin of the SNNPR, South Omo Administrative Zone of Selamago district at a distance of around 765 km away from Addis Ababa in the south direction. It is situated at latitude of 5° 53’52”N and longitude of 36° 00’ 39”E and its elevation is 462 m.a.s.l. The area has an eight-year monthly average of a mean maximum temperature, minimum air temperature, rainfall and evapotranspiration are 34.39°c ,22.97°c, 1004.16mm and 4.72mm/day, respectively. Selected physicochemical properties of soil of the study area is illustrated in Table 1.

Procedures, treatments and experimental design

The field of virgin land clearing, sub-soiling, plowing, rough leveling, harrowing, precision leveling, and furrowing operations was executed by its standard technical norm interval by the organization of sugar estate. The furrow was executed at a uniform depth, spacing, and slope, straight and perpendicular to the hydro flume for the irrigation system to be used. To attain the required work quality, the operation was done at optimum soil moisture and Planting was executed immediately with its required technics. Frequent visits to the experimental field for decision and management practices were conducted to the concern of the activities. The healthy stalk planting materials were selected from 7.5 months young seed cane field at Omo-Kuraz for planting material. All agronomic cultural practices were executed as per the conventional practices of the plantation department.

The treatments consisted of five levels of row spacings (85cm, 100cm, 115cm, 130cm and 145 cm) and three sugarcane varieties namely: B52-298, C86-12 and N14 which were arranged in split plot design with three replications. Varieties and row spacing were assigned to the main plot and subplot, respectively. 1.5m, 1m, and 1.5m distances were maintained between main plots, subplots and replications, respectively. Crop management practices were performed based on Ethiopian sugarcane plantation standards.

Data collection and analysis

Data were collected on number of buds, number of tillers, stalk population, stalk length (plant height), length of internodes, internode number, stalk diameter, stalk weight, sett yield per stalk and sett yield per hectare. All measured parameters were subjected to analysis of variance (ANOVA) using statistical analysis computer software version 9.0, (SAS, 2004). Duncan’s Multiple Range Test (DMRT) was used to compare means whenever ANOVA result shows significant variation of in the parameters due to the treatment effects at 5% probability level.

Results and Discussion

Effect of Inter-row Spacing on Yield and Yield Components of Seed Cane Varieties

Main effects of variety on tillering and stalk parameters

Tiller number /m^2, tiller number per plant, stalk length, stalk diameter and stalk weight were significantly differed among sugarcane varieties (Table 2) where as the interaction effect of inter-row spacing and variety were insignificant on these parameters. The maximum numbers of tillers m^{-2} (41.33) and the number of tiller/plant (12.53) were recorded from variety B52-298 and N14 whereas the minimum tiller numbers m^{-2}(33.92) and the number of tiller/plant (10.47) were obtained from variety C86-12, respectively.

The significant variation in tiller number m^{-2}due to variety effect might be attributed to a large number of tillers which induce competition for light, moisture, and nutrient; and the survival of the tillers after the competition of the varieties reported as by Abiy *et al.*, (2014), differences in the genetic make-up of the varieties (Ahmed *et al.*, 2010) and might also be attributed to inefficient use of the land space (Azhar *et al.*, 2007).

The maximum significant stalk length (234.89cm) was recorded due to variety B52-298 which was in statistical parity with stalk length from variety C86-12 (233.71) whereas the minimum stalk length (228.65cm) was obtained from N14 variety (Table 2). The significant variation in stalk length due to variety effect might be attributed to the relative growth difference of varieties in different agro-ecologies (Feyissa *et al.*, 2014; Worku and Chinawong, 2006) and the differences in the ability of a variety to extract nutrients different soil to exhibit its potential under a given condition and also its adaptability in a given environment (Kakde, 1985) and due to genetic differences (Mehareb *et al.*,2018).

A maximum significant stalk diameter (2.77cm) was recorded from variety C86-12 which was in statistical parity with stalk diameter obtained from variety N-14 (2.74) whereas the minimum stalk diameter (2.54cm) was obtained from variety B52-298 (Table 2). The significant variation in stalk diameter due to variety effect might be attributed to the genetic make-up of varieties (Essam, 2016 and Mohamed *et al.*, 2017).

The maximum significant stalk weight (1.20kg) was recorded from variety C86-12 whereas minimum stalk weight (1.01kg) was obtained from variety B52-298 (Table 2). The significant variation in stalk weight due to the effects of variety might be attributed to the genetic structure of varieties (Essam, 2016 and Muhammad *et al.*, 2002).

Main effects of variety on tillering and stalk parameters

Main effect of inter row spacing also significantly influenced tiller number per m^2, tiller number per plant, stalk length and stalk weight (Table 3). However, the interaction effect of inter-row spacing and variety were insignificant on these parameters. The maximum (45.14) and minimum (31.90) numbers of tillers m^{-2} were obtained from the inter-row spacing of 85cm and 145cm, respectively. Increasing inter-row spacing resulted in a significant reduction of tiller number m^{-2}but, in a significant increase of tiller number/plant. The reduction in tiller number m^{-2} with an increase in inter-row spacing could be attributed to lower plant population per unit area in wider row spacing as reported by Netsanet *et al.*, (2014) and Feyissa *et al.*, (2008). On the other hand, the increment in the number of tillers per plant with increase inter row spacing might be associated with availability more growth resources under wider row spacing.

The maximum (241.57cm) and minimum (216.29cm) length of the stalk were obtained from an inter-row spacing of 85cm and 145cm, respectively. Contrarily, increasing inter-row spacing from 85cm to 145cm was observed to significantly increased in Stalk weight from 0.99 kg to 1.16 kg. The reduction in stalk length and increment in stalk weight with increase in inter-row spacing might be attributed to better availability of growth resources including light under wider inter-row spacing resulting in shorter but thicker stalks as reported by Essam (2016) and Netsanet and Samuel (2014).

Interaction effect of treatments on stalk population, internode length, bud numbers and internode numbers

Stalk population/ha, internode length, number of buds per plant, internode number per plant, sett yield/stalk and sett yield /ha were significantly affected by the interaction effects of inter row spacing and sugarcane varieties (Table 4). The maximum significant value of the stalk population (241,176) was obtained from variety N14 at an inter-row spacing of 85cmfollowed by the value (205.833) due to inter- row spacing of 100cm in the same variety whereas the minimum value of stalk population (118,774) resulted from variety C86-12 at spacing 145cm (Table 4). The variation in stalk population among varieties in response to increasing inter-row spacing could be attributed to their genetic variability to respond to high planting densities (Netsanet *et al.*, 2012 and Raskar and Bhoi, 2003).

Similarly, the maximum value of internode length (13.36cm) was obtained in N14 variety at an inter-row spacing of 85cm whereas the minimum internode length (8.76cm) resulted from variety B52-298 at a spacing of 145cm.

Table.1 Selected physicochemical properties of soil of the study site (0-30cm)

Physical properties			
Sand	Clay	Silt	Textural class
10	80	10	Clay
Chemical properties			
Parameter	Value	Parameter	Value
pH	7.59	CEC [cmol(+) kg-1]	40.68
EC (ds/m)	0.18	Exchangeable bases [cmol(+) kg^{-1}]	
Organic Carbon (%)	1.71	*Na+*	1.05
Organic Matter (%)	2.95	*K+*	2.00
Total Nitrogen (%)	0.05	*Ca2+*	28.40
Available P (ppm)	5.86	*Mg2+*	9.20

Table.2 Variations in tillering and stalk parameters among sugarcane varieties

Treatment Variety	Tiller number /m2	Tiller number /plant	Stalk length (cm)	Stalk diameter (cm)	Stalk weight (kg)
B52-298	41.33^{a}	11.80^{a}	234.89^{a}	2.54^{b}	1.01^{c}
C86-12	33.92^{b}	10.47^{a}	233.71^{a}	2.77^{a}	1.20^{a}
N14	36.53^{ab}	12.53^{a}	228.65^{b}	2.74^{a}	1.06^{b}
Grand Mean CV (%)	37.26 15.47	11.60 18.22	232.41 1.64	2.68 5.49	1.09 2.29
SE(±)	1.57	0.30	1.31	0.03	0.01
P≤0.05	**	***	**	***	***

Means within columns followed by the same letter(s) are not significantly different at P ≤ 5%, according to DMRT. CV = Coefficient of variation, SE (±) = Standard error, P= Probability, ** = highly Significant (P≤0.01), *** = highly Significant (P≤0.001).

Table.3 Main effects of inter-row Spacing on tillering and stalk parameters of sugarcane

Row spacing	Tiller number /m2	Tiller number /plant	Stalk length (cm)	Stalk weight (kg)
85 cm	45.14^{a}	9.33^{c}	241.57^{a}	0.99^{d}
100 cm	38.12^{ab}	10.67^{bc}	238.88^{ab}	1.06^{c}
115 cm	37.72^{ab}	11.67^{abc}	234.62^{bc}	1.10^{b}
130 cm	33.42^{b}	12.33^{ab}	230.70^{c}	1.12^{b}
145 cm	31.90^{b}	14.00^{a}	216.29^{d}	1.16^{a}
Grand Mean	37.26	11.6	232.41	1.09
CV (%)	14.97	10.16	2.18	4.40
SE(±)	2.02	0.39	1.69	0.02
P≤0.05	**	***	***	***

Means within columns followed by the same letter(s) are not significantly different at P ≤ 5%, according to DMRT. CV = Coefficient of variation, SE (±) = Standard error, P= Probability, ** = highly Significant (P≤0.01), *** = highly Significant (P≤0.001).

Table.4 Effect of inter-row spacingon yield and yield components of seed cane of sugarcane varieties

Treatment combination: Variety	Treatment combination: row spacing	Stalk population /ha	Internode length (cm)	Number of buds /plants	Internode number /plant	Sett yield /stalk	Sett yield (number /ha)
B52-298	145 cm	119,157^{f}	8.76^{f}	14.90^{bc}	13.87^{bc}	3.30^{bc}	391,705^{h}
B52-298	130 cm	173,718^{d}	10.40^{cde}	13.80^{def}	12.78^{de}	2.93^{cde}	507,885^{cde}
B52-298	115cm	177,053^{d}	12.25^{ab}	13.83^{de}	12.80^{de}	2.93^{cde}	518,064^{cd}
B52-298	100cm	180,556^{d}	12.40^{ab}	14.10^{cd}	13.08^{cd}	3.03^{cd}	546,671^{bc}
B52-298	85cm	193,464^{c}	12.48^{ab}	13.57^{defg}	12.55^{def}	2.87^{def}	550,822^{bc}
C86/12	145 cm	118,774^{f}	9.35^{ef}	13.57^{defg}	12.55^{def}	2.87^{def}	338,592^{i}
C86/12	130 cm	120,085^{f}	10.59^{cde}	15.57^{ab}	14.55^{ab}	3.53^{ab}	422,044^{gh}
C86/12	115cm	124,155^{f}	10.81^{cd}	16.10^{a}	15.08^{a}	3.73^{a}	458,555^{efg}
C86/12	100cm	143,889^{e}	10.89^{c}	14.90^{bc}	13.92^{bc}	3.30^{bc}	475,792^{def}
C86/12	85cm	148,366^{e}	11.16^{bc}	15.90^{ab}	14.87^{ab}	3.63^{ab}	537,473^{bc}
N14	145 cm	119,157^{f}	9.42^{def}	12.50^{gh}	11.50^{fg}	2.50^{fg}	297,727^{i}
N14	130 cm	124,786^{f}	10.29^{cde}	12.30^{h}	11.23^{g}	2.40^{g}	300,873^{i}
N14	115cm	174,638^{d}	10.42^{cde}	12.70^{fgh}	11.70^{fg}	2.57^{efg}	448,490^{fg}
N14	100cm	205,833^{b}	12.45^{ab}	13.50^{defg}	12.47^{def}	2.83^{def}	580,431^{ab}
N14	85cm	241,176^{a}	13.36^{a}	12.80^{efgh}	11.73^{efg}	2.60^{efg}	621,247^{a}
G. Mean		157,654	10.73	14.00	12.98	3.00	466,425
CV (%)		3.21	6.88	4.10	4.41	6.80	6.10
SE(±)		2,919.6	0.438	0.331	0.330	0.118	16429.20
	P≤0.05	***	*	***	***	***	***

Means within columns followed by the same letter(s) are not significantly different at P ≤ 5%, according to DMRT. G=Grand, CV = Coefficient of variation, SE (±) = Standard error, P= Probability,* = Significant (P≤0.05), *** = highly Significant (P≤0.001).

Regarding number of buds, planting C86-12 variety at inter-row spacings of 85cm, 100cm, 115cm, and 130cm showed a statistically similar number of buds which were significantly higher over the values recorded from other treatment combinations. Contrarily, the minimum number of buds (12.30) was obtained from N14 variety planted at 130cm inter-row spacing (Table 4).

Maximum significant number of internodes (15.08) was obtained from variety C86-12 planted at an inter-row spacing of 115cm whereas the minimum number of internodes (11.23) resulted from variety N14 at an inter-row spacing of 130cm (Table 4).

The significant variation in internode length, number of buds and number of internodes due to variety effect under different levels of inter-row spacing might be attributed to difference in relative growth of varieties (Feyissa *et al.*, 2014; Worku and Chinawong, 2006) and the differences in the ability of a varieties to extract nutrients from different soil under a given growing condition and their adaptability in a given environment (Kakde, 1985).

Setts yields per stalkand per hectare

Both sett yield per stalk and stalk yield per ha, were significantly influenced by the interaction effects of inter-row spacing and sugarcane varieties (Table 4). Accordingly, the maximum value of setts per stalk (3.73) was obtained from variety C86-12 at an inter-row spacing of 115cm which was in statistical parity with values obtained from the planting of the same variety at 85cm, 100cm and 130cm inter-row spacing, whereas the minimum sett yield per stalk (2.40) was resulted from planting of N14 variety at 130cm inter-row spacing (Table 4).

On the other hand, the maximum significant sett yield/ hectare (621,247)was recorded from planting of N14 variety at the narrowest inter-row spacing (85cm) followed by the value (580,431) obtained from planting of the same variety at 100cm inter-row spacing (Table 4). Statistically similar and higher values of sett yields /ha were also recorded due to planting of B52-298 variety at 100cm (546,671) and at 85cm (550,822) and C86/12 variety at 85cm (537,473).

Contrarily, the minimum sett yield per hectare (297,727) was resulted from variety N14 at spacing of 145cm (Table 4).The observed higher values of sett yield /stalk and seed yield /ha under narrower inter-row spacing could be attributed differences among the varieties in light interception and efficiency of conversion of intercepted radiation to net dry matter production (Anon, 2000;El-Shafai and Ismail, 2006; Essam, 2016 and Omoto *et al.*, 2013) and growing environment. Generally, the significant improvement in sett yield /ha of seed cane could be associated with substantial improvement in tiller number /m^2, stalk population/ha, stalk length and internode length of the tested varieties due to narrower inter-row spacing. This can be further supported by a very highly significant ($P < 0.001$) and positive linear relationship of sett yield /ha with number tillers /m^2 ($r = 0.50$***), stalk population ($r = 0.83$***), stalk length ($r = 0.72$***) and internode length ($r = 0.74$***).

In conclusion, this study clearly indicates that planting the tested varieties at narrowest inter-row spacing (85cm) can maximize sett yield/ha. Moreover, planting N14 and B52-298 varieties at 100cm inter-row spacing can also be used to reduce initial seed cane requirement without any significant sett yield loss in the study area and other similar environments. On the other hand, testing the response of C86/12 variety to inter-row spacings below 85cm is also required to make sound conclusion since the maximum sett yield was observed from planting of this variety at the lowest level of inter-row spacing (85cm).

Acknowledgement

The authors would like to express their gratitude to Dr. Meseret Fanta for her valuable suggestions and comments towards the improvement this manuscript.

References

Abiy Getaneh, Feyissa Tadesse and Netsanet Ayele., 2014. Agronomic Performance Evaluation of Ten Sugarcane Varieties under Wonji-Shoa Agro-Climatic Conditions. Sugarcane Agronomist, Sugarcane Breeder, Research and Training Directorate, *Wonji. Scholarly Journal of Agricultural Science*, 5(1):16-21.

Ahmed, Z. A., Ahmed, A. M. and Osman, M. S. H., 2010. Optimum inter-row spacing and number of ploughings for two promising sugarcane varieties. Sugar Crops Res. Inst., ARC, Giza, Egypt. 89 (1).

Anon.,2000. Cultural operations. In Annual report of the Mauritius Sugar Industry Research Institute.18-19.

Azhar, M., Ishfaq, M., IQBAL, J. and Shafi N. M., 2007. Agronomic Performance and Juice Quality of Autumn Planted Sugarcane (*Saccharum officinarum* L.) as affected by flat, ditch, and pit planting under different spatial arrangements. *Int. Journal Agri. Biol*., 9(1):167-169.

El-Shafai A.M.A. and Ismail A.M.A., 2006. Effect of row spacing on yield and quality of some promising sugarcane varieties. *Egypt Journal Appl. Sci.,* 21 (11): 32-46.

Essam, A. and El-lattief., 2016. Yield and yield attributes of sugarcane as affected by some crop management Treatments. Agronomy Department, Faculty of Agriculture, South Valley University, Qena, *Egypt. Int. Journal Research in Engineering and Applied Sciences*, 6 (12):11-19.

Ethiopian Sugar Corporation (ESC)., 2019. Ethiopian sugar industry profile. *Hewan printing press*. www.ethiopiansugar.com. Pp. 5-17.

Ethiopian Sugar Development Agency (ESDA)., 2007. Assessment Report on Service Delivery of the former Research Unit and suggestions on the future direction of the research Directorate. Ethiopian Sugar Development Agency, Ethiopia, 1-8.

Feyissa Tadesse, Tadesse Negi, and Aregaw Assefa., 2008. Preliminary study on Sugarcane Variety performance at the Tendaho sugar estate project.

Proc. Ethiopia sugar Ind. Benin. Conference, 1:156-165.

Feyissa Tadesse, Zinaw Dilnesaw, Yohanis Mekonnenet, Tadesss Negi, Meberatom Fetwi, Netsanet Ayele and Abey Getanh., 2014. Performance Evaluation of Sugarcane Varieties (Cuban origin) at Wonji-Shoa, Metahara and Finchaa Sugarcane Plantations, ESCRT Wonji-Ethiopia, Global Advanced Research Journals.

Kakde, J.K., 1985. Sugarcane Production. Akola, Metropolitan Book Co. Ltd. New Delhi 384 p.

KESREF. 2000. Meteorological statistics. Kenya Sugar Research Foundation, Kibos, Kenya.

Mehareb, E. M., El-Bakry, A., Mohamed, Y. and Hanan., 2018. Performance of sugarcane variety G.2003-47 (Giza3) under different levels of phosphorus fertilizer. *Journal of Biol. Chemi. and Environ. Sci.*, 13 (1): 563-583.

Mohamed, B. D. and Ahmed, A. Z., 2002. Influence of planting seasons and nitrogen fertilizer levels on the productivity of three sugar cane varieties. Egypt. Appl. Sci., 17 (3): 64-77.

Mohamed, H. Y., El-Bakry, A., Fahmy, A. M. and Mehareb, E. M., 2017. Yield and quality of sugarcane varieties as affected by potassium, silicate, and infestation with Chilo Agamemnon. *Journal of Biol. Chemi. & Environ. Sci*., 12 (4): 563-583.

Murphy, S.D., Y. Yakubu, S.F. Weise, and C.J. Swanton., 1996. Effect of planting patterns and inter-row cultivation on com-petition between corn (Zea mays) and late emerging weeds. Weed Sci., 44:865–870.

Netsanet Ayeleand Samuel Tegene. 2014. Effect of Number of Buds per Sett and Intra-row Spacing of Setts on Yield and Yield Components of Sugarcane. Ethiopian Sugar Corporation, Research Directorate, Agronomy and Crop Protection Team, Wonji, Ethiopia. *Inter. J. of Agri. Scie. and Natural Resources*, 5:115-121.

Netsanet Ayele., 2009. Effect of Number of Buds per Sett and Intra-row Spacing of Setts on Yield and Yield Components of Sugarcane. MSc Research Report. Haramaya University.

Netsanet Ayele, Abiy Getaneh and Tadesse Negi.,2013. Effect of Sett Spacing on Yield and Yield Components of Some Sugarcane Varieties at Metahara and Finchaa Sugar Estates annual research report, 1-14.

Netsanet Ayele, Abiy Getanehand Tadesse Negi., 2014. Influence of Intra-row Row Setts Spacing on Yield and Yield Components of Some Sugarcane Varieties at Finchaa Sugar Estate. *ARP Journal of Science and Technology*, 4(1):39-44.

Omoto, G., Auma, E. O., and Muasya, R. M., 2013. Effect of Row Spacing on Seedcane yield and yield Components in Western Kenya. Kenya Sugar Research Foundation, Kisumu. Eldoret University, Proc S Afr Sug Technol Ass, 86:149 – 155.

Raskar, B. S. and Bhoi, P. G., 2003. Yield attributes of sugarcane as influenced by intra-row spacings, fertilizer levels, and planting materials. Indian Sugar, 53 (5):327-331.

SAS.2004. SAS proprietary Software. SAS Institute, Inc., Cary, NC, USA.

Tollenaar, M., Dibo, A., Aguilara, Weise, S. and Swanton, C., 1994. Effect of crop density on weed interference in maize. Agron. J, 86:591–595. doi:10.2134/agronj1994.00021962008600040003x

Worku Burayuand Chinawong., 2006. Agronomic Performances and Industrial Characteristics of Sugarcane Varieties Under Finchaa Valley Conditions, Oromiya, East Africa. *Kamphaengsaen Acadamy Journal*, 4(1):27.33.

How to cite this article:

Zinabu Tadesse, Amare Girma and Khan, A. Q. 2020. Effect of Inter-Row Spacing on Seed Cane Yield and Yield Components of Sugar Cane (*Saccharum* spp. hybrid) Varieties at Omo-Kuraz, Southern Ethiopia. *Int.J.Curr.Res.Aca.Rev*. 8(9), 84-90. doi: https://doi.org/10.20546/ijcrar.2020.809.010