



Evaluation of Pineapple (*Ananas comosus* L.) Varieties at Teppi, South Western Ethiopia.

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ARTICLE INFO

Article No.: 032619053

Type: Research

DOI: 10.15580/GJAS.2019.4.032619053

Submitted: 26/03/2019

Accepted: 28/03/2019

Published: 01/11/2019

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Keywords: Adaptability; pineapple varieties; Teppi; yield.

ABSTRACT

Three varieties of pineapple were brought from Jimma Agricultural Research Center plant tissue culture and evaluated during 2015/2016 main cropping season at Teppi. The experiment was carried out to test the adaptability of improved pineapple varieties and to identify the best high yielding and pest and disease resistant/ tolerant variety/ies for the target area. The mean yield of tested varieties was ranged from 19.8tonne/ha for Queen to 70.4 tonne/ha for Smooth cayenne. The mean days to flowering was 406 days for smooth cayenne and 455 days for sugar loaf and Queen. The mean plant height was 82.33 cm for Queen to 113.93 cm for sugar loaf. The mean leaf length was 58.13 cm for Queen and 91.93 cm for Sugar loaf. The mean fruit length was 10.7 cm for Queen and 14.57 cm for Smooth Cayenne. The mean fruit diameter was 10.05 cm for Queen and 11.68 cm for Smooth cayenne. The mean average fruit weight was 1.01 kg for Queen and 1.65 kg for sugar loaf. Sugar loaf (69.7tonnes/ha) and Smooth cayenne (70.4tonne/ha) had highest mean yield. Therefore, Sugar loaf and Smooth cayenne are more preferable for farmers at the study area due to their good characteristics described above.

INTRODUCTION

Pineapple (*Ananas comosus* L. Merr.) belongs to Bromeliaceae family, which originated from South America, Southern Brazil, Northern Argentina and Praguay (Paull and Lobo, 2012). It is mainly grown for fresh and canned fruit and juice (Office of the gene technology regulator, 2003).It is a non-climacteric, parthenocarpic, multiple fruit, and is composed of some 100 to 200 berry-like fruit lets, attached to a central core

(Taufiq et al., 2015). Vegetatively pineapple is propagated by suckers, slips, or crowns (Eeckenbrugge and Leal, 2003). Pineapple grows up to 1-1.5 m tall. Its sweet taste and high content of vitamin B1, B2, B6 and C are the main reason for its popularity. Bromelain, a protein digesting enzyme that helps digestion at the end of a high protein meal is only found in Pineapple (Fouque, 1981). Pineapple has beneficial health effect on dyspepsia and nausea including morning sickness and motion sickness (Hossain et al., 2015). Pineapple

peel is used for the alkali extraction of ferulic acid (Rudra et al., 2015). World Pineapple production is concentrated in the tropical regions. Pineapple is grown in over 2.1 million acres in 82 countries according to (Ndungu, 2014). In countries like Hawaii, Philippines, Australia, South Africa, Puerto Rico, Kenya, Mexico, Cuba and Formosa smooth Cayenne cultivar is extensively cultivated (de Azevedo et al., 2007). Thailand is the largest producer of pineapple followed by Brazil and Costa Rica (Baruwa, 2013). In Africa, Nigeria is the leading producer and 7th in the world (FAO, 2011). In Ethiopia, the major pineapple production sites are located in the Southern and South Western part of the country. The farms are owned by private farmers and the state (Edossa, 1998). According to CSA data 2016/17 in Ethiopia, pineapple was planted by 70,584 farmers on more than 645.2ha. Farmers produce Pineapple in small scale on fragments of lands, whereas the state farms produce pineapple along with their main plantation (coffee or maize) (Edossa, 1998). Smallholder farmers are accustomed to working with pineapples as a cash crop in a mixed farming system for decades. Substantial pineapple cultivation is mainly practiced in the Southern parts of Ethiopia (Sidama and Gojeb) areas. In General, the consumption pattern of the Ethiopian population encourages the production of the pineapple mainly for regional markets (close to Ethiopia) and in the Arabic peninsular markets as fresh fruits and processing purposes (SNV BOAM 2, 2010- 2011). Pineapple national consumption figure also slightly rise because of general national growth in public spending and tourist preferences (Yonad Business Promotion and Consultancy, 2011). Therefore, to increase the crop productivity in different areas, continual identification and recommendation of the best and suitable crop technologies appeared to be essential. This can be achieved through adaptability tests and generation of new technologies. Though, there are many opportunities for the production of pineapple in the area, there is no improved varieties disseminated to users. Keeping this in view, the present study was conducted at Teppi Agricultural Research Center to test the performance of commercially released pineapple varieties for their adaptability in the area and for further dissemination to the users.

MATERIALS AND METHODS

Experimental site

The experiment was conducted at Teppi Agricultural Research Center during 2015/2016 main cropping seasons. Teppi is located in South Western Ethiopia in SNNP Regional State at an elevation of 1200 m above sea level and situated at Latitude of 7° 10, 54.5,, and Longitude of 35° 25, 28.2, E of Ethiopia with an annual average rainfall of 1559 mm and with maximum and minimum temperatures of 29.7 and 15.5°C, respectively (Figure 1). The soil of experimental site is reddish brown

sandy clay loam, classified as nitosol with PH range of 5.60 to 6.0.

Experimental Materials and Design

The experiment was conducted using three released pineapple varieties (Smooth cayenne, Queen and Sugar loaf). Slips used for planting were brought from Jimma Agricultural Research Center multiplied at Plant Tissue Culture. Slips of each variety were planted in Randomized complete block design in three replications, with 90cm*60cm*30cm spacing between rows, double rows and plants respectively. All agronomic management practices were applied equally for each variety as recommended.

Data Collected

Data was collected for 11 traits namely stand count at harvest, 50% flowering date, plant height, leaf length, fruit length, fruit diameter, fruit weight, marketable fruit number, marketable fruit weight, total fruit number, total yield Kg/plot. Some important metrological data including mean monthly rainfall (mm), mean maximum and minimum monthly temperature, mean % relative humidity and soil type were recorded.

Statistical Analysis

All necessary data were recorded and subjected to analysis. Analysis of variance was performed using the ANOVA procedure of SAS Statistical Software. Effects were considered to be significant in all if the P-values were < 0.05. Means were separated, using least significant difference test.

RESULTS AND DISCUSSION

All the measured traits showed significant differences among the tested varieties, except plant height, fruit diameter and fruit length (Table 1). The significance difference indicates the presence of variability for each of the characters among the tested varieties. All varieties showed significant difference for 50% flowering, leaf length, average fruit weight, total yield kg/plot, marketable yield kg/plot and total yield tonne/ha. Statistical analysis showed significant differences for yield among the varieties. The mean yield was 19.8 tonne/ha for Queen and 70.4 tonne/ha for Smooth cayenne. Based on mean yield, Smooth cayenne (70.4 tonne/ha) and Sugar loaf (69.7 tonnes/ha) had the highest mean yield while Queen was seriously affected by fruit fly (personal communication). This result is in agreement with Chadha (2001) which stated that, in hot humid areas pineapple yield was estimated to be more than 65 tonnes/ha in mono cropping system. The mean days to flowering was 406 days for smooth cayenne and 455 days for sugarloaf and Queen. The mean plant height was 82.33 cm for Queen and 113.93 cm for

sugarloaf. The mean leaf length was 58.13cm for Queen and 91.93cm for Sugar loaf. The mean fruit length was 10.7cm for Queen and 14.57cm for Smooth Cayenne. Research done in India indicated that, fruit length of "Mauritius" variety ranged from 14.73 to 15.95 cm (Priya et al., 2013). The mean fruit diameter ranged from 10.05 cm for Queen to 11.68cm for Smooth cayenne. The mean average fruit weight ranged from 1.01 kg for Queen to 1.65 kg for sugar loaf. Fruit weight (without crown) ranged from 0.99kg to 2.16kg (Priya et al., 2013).

Sugar loaf has the highest plant height, leaf length and fruit weight followed by Smooth cayenne. Smooth cayenne has the highest fruit length and fruit diameter. Smooth cayenne and Sugar loaf gave the highest yield, followed by Queen. According to Ndungu (2014), the most widely grown varieties are Smooth Cayenne and Queen, but in the past decades, MD2 commands the highest global trade in pineapples. The highest yield was obtained from Smooth cayenne; whereas the least yield was obtained from Queen Variety.

Table 1. Result summary of recorded traits.

Trt	Sch	Fld	Ph	LI	Fl	Fd	Fwt	Mno	Mwt	Totn	Tot kg	Ty qt/ha
Smooth cayenne	29 ^a	406 ^b	93.53 ^a	63.4 ^b	14.57 ^a	11.68 ^a	1.63 ^a	29 ^a	47.5 ^a	29 ^a	47.53 ^a	704.2 ^a
Sugar loaf	28.33 ^a	455 ^a	113.93 ^a	91.93 ^a	10.83 ^a	10.68 ^a	1.65 ^a	28.3 ^a	49 ^a	28.3 ^a	47.03 ^a	696.79 ^a
Queen	13 ^b	455 ^a	82.33 ^a	58.13 ^b	10.7 ^a	10.05 ^a	1.01 ^b	13 ^b	13.4 ^b	13 ^b	13.4 ^b	198.52 ^b
CV	10.54	0	14.43	13.04	15.5	12.06	8.37	10.54	12.14	10.54	12.14	12.14
LSD	5.6	0	31.61	21.05	4.23	2.95	0.27	5.6	9.9	5.6	9.9	146.81

NB: Trt= Treatment; Sch= stand count at harvest; Fld= flowering date; Ph= plant height; LI= leaf length; Fl= fruit length; Fd= fruit diameter; Fwt= Fruit weight; Mno= marketable number; Mwt= marketable weight; Totn= total number; Tot Kg= Total kg; Ty T/Ha = Total quintal/ha.

CONCLUSION

Even though some state farms are working in large scale, most of Ethiopian farmers are working with pineapple in a small scale. Furthermore, Farmers in SNNPR cultivated pineapple as a cash crop in a mixed farming system for decades. In general, according to this experiment, Sugar loaf and Smooth cayenne performed better in yield and yield related traits than Queen. The reason for the low yield of Queen Variety is that it was seriously affected by fruit fly. Therefore, these two varieties (Sugar loaf and Smooth cayenne) are preferable for farmers in the study area. Multiplication and dissemination of these varieties may enhance the production and productivity of pineapple in the area. Further study should be carried out with more varieties to improve pineapple production in the area.

ACKNOWLEDGEMENTS

The authors are grateful to Teppi Agricultural Research Center (TARC) for their financial support. All horticulture staff members are also duly acknowledged for their strong moral and technical support.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interest.

REFERENCES

- Baruwa OI (2013). Profitability and constraints of pineapple production in Osun State, Nigeria. *Journal of Horticultural Research* 21(2):59-64.
- Chadha KL (2001). Pineapple. The hand book of Horticulture. Directorate of information and publication of Agriculture. ICAR, New Delhi.
- Central Statistical Authority (CSA). 2016/17. Area under production of major crops. Statistical bulletin, Addis Ababa, Ethiopia.
- de Azevedo PV, de Souza CB, da Silva BB, da Silva VP (2007). Water requirements of pineapple crop grown in a tropical environment, Brazil. *Agricultural Water Management* 88(1-3):201-208.
- Edossa E (1998). Spice Research Achievements and Experiences. Research Report No. 33, IAR, Addis Ababa, pp. 16-19.
- Eeckenbrugge GCD, Leal F (2003). "Morphology, Anatomy and Taxonomy," In: D. P. Bartholomew, R. E. Paull, and K. G. Rohrbach, Eds., *The Pineapple: Botany, Production and Uses*, CAB International, Wallingford, pp. 13-32.

- Food and Agriculture Organization (FAO) (2011). Corporate Statistical Database (FAOSTAT) <http://www.fao.org>.
- Fouque A (1981). Les plantes medicinales presentes en forets guyanaie. *Fruits* 35(9):503-528.
- Hossain MF, Akhtar S, Anwar M (2015). Nutritional value and medicinal benefits of pineapple. *International Journal of Nutrition and Food Sciences* 4:84-88.

Cite this Article: Shamil A; Abebe G; Dereje G; Wakjira G (2019). Evaluation of Pineapple (*Ananas comosus* L.) Varieties at Teppi, South Western Ethiopia. *Greener Journal of Agricultural Sciences* 9(4): 357-360, <https://doi.org/10.15580/GJAS.2019.4.032619053>