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Evaluation of Shallot (*Allium cepa* L. Aggregatum) Cultivars at Wag-Lasta District, North East Ethiopia

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Abstract: **Field experimenst were conducted in dry land areas of Waghimra; Sekota, Dehana and Bugna (Lalibela) during 2007 and 2008 cropping season. The objective of the experiment was to select well adaptive and high yielding shallot varieties for the areas. Two shallot varieties namely Hurruta and Negele including the local check were tested in randomized complete block design with three replications. The combined analysis of the mean over location and seasons showed that there was a statistical mean difference among the varieties in all parameters except days to maturity. Among the varieties tested, the largest bulb (2.72cm) was recorded by Negele cultivar followed by Hurruta (2.61cm). Hurruta cultivars gave the highest bulb yield (10.12 t ha^{-1}) followed by Negele (9.69 t ha^{-1}). The overall performance of the two cultivars was better that the local one. Hence, it is possible to recommend both Hurruta and Negele cultivars for rainfed production.**

Keywords: **Shallot, Cultivars, bulb yield.**

1. INTRODUCTION

On a global scale, shallot (*Allium cepa* L. Aggregatum group) is a minor alliaceous crop. However, in South East Asia – for example, Indonesia, Sri Lanka and Thailand – as well as in some African countries, such as Uganda, Ethiopia and Côte d'Ivoire, where onion seed is hard to produce, where onion culture is difficult and also where the growing season is too short for the production of bulb onion, the vegetatively propagated shallot is cultivated as an important substitute for bulb onion (Rabinowitch and Kamenetsky, 2002).

Shallot is one of the most widely cultivated bulb crops in Ethiopia. The production of bulb shallot is restricted to highland areas under rain-fed conditions. It is one of the most important cash crops and traditionally produced under rain-fed conditions in many regions of the country (Hararghe, Shoa, Arsi, Bale, Gojjam, etc.) by small farmers as income generating spice crop for flavoring local dishes (shimeles, 2014). They are grown primarily for the bulb, although the green tops may also be consumed. In Ethiopia, shallots and onions are used for flavouring the local stew, 'wot' and are used in many households almost daily (Woldetsadik, 2003).

The national average yield of bulb shallot is about 7 t ha^{-1} and the bulb yield is characterized by poor quality of mixed varieties varying in size, color, shape and storability and in most cases the crops are grown in usually moisture-stressed areas and yields are commonly very low (shimeles, 2014; Woldetsadik, 2003).

Wag-Lasta area is an area where rain fed production of common field crops is not much effective. Due to this, the yield of common field crops is low; which is enough neither for household consumption nor for local market to enhance their financial income. Despite this, some areas which have favorable environmental conditions for the production of shallot, the production is poor, even which is not enough to meet the local market.

Recently, the government is giving due attention for the production of cash crops especially horticultural crops to enhance the income of the farmers. Farmers have realized that the sale from these crops supplement farm incomes and it is a prospective business to them. Farmers are cultivating shallot in smaller amount in areas to meet the demand of local market. Hence, this research was conducted with the objective of evaluating and selecting shallot cultivars for their adaptability and high yielding.

2. MATERIAL AND METHODS

Methodology:

Description of the study area:

The study was conducted at Sayda Kebele of Sekota Woreda, Amdework of Dehana Woreda and Lalibela of Bugna Woreda, North Eastern Ethiopia. Sekota is located between 12^0 23' and 13^0 16' north longitudes and 38^0 44' and 39^0 21' east latitudes (Adefress *et al.*, 2000). The altitude varies from 1340 – 2200 meters above sea level while annual rainfall ranges between 700 – 1386 mm, falling mainly from July to September. The pattern and distribution of the rainfall is erratic and uneven. Average temperature ranges from 16 – 27^0C. The altitude of Amdework is 2140m asl and the latitude and longitude is 12.35’’ and 38.75’’, respectively with average rainfall of 882mm. The altitude of Lalibela is 2000m asl and the latitude and longitude is 12.03’’ and 39.03’’, respectively with average rainfall of 882mm (FAO, 2005).

Treatments and experimental design:

The experiment consisted of three cultivars of shallot namely, Negele, Hurruta and Local farmers cultivars and they were tested for their adaptability at Sayda, Dahna and Lalibela areas of Wag-Lasta District in 2008 and 2009 rainy season. The design of the experiment was Randomized Complete Block with three replications. The experiment was conducted on a plot size of 2.4m × 4m with spacing of 40cm×20cm b/n rows on the bed and b/n plants in a row, respectively. Fertilizer was applied at a rate of 200 Kg ha^{-1} of DAP & 150 Kg ha^{-1} Urea in split (half at planting & the other half 45 days after planting) (D/ZARC, 2002).

Data collection and analysis:

Data was recorded for days to maturity, number of bulb split $plant^{-1}$, bulb split diameter, bulb fresh weight and Bulb yield. The mean value of each parameter was computed and subjected to analysis of variance (ANOVA) using SAS statistical procedure (SAS, 2002) version 9.0. The statistical significance of the mean of each parameter was determined using F-test and DMRT was employed to compare means at 5% probability level.

3. RESULT AND DISCUSSION

Table 1: Mean square of days to maturity, number of bulb splits $plant^{-1}$, bulb split diameter (cm), bulb fresh weight (g) and Bulb yield (t ha^{-1})

Source of variation	Degrees of freedom	Days to maturity	Number of bulb splits $plant^{-1}$	Bulb split diameter (cm)	Bulb fresh weight (g)	Bulb yield (t ha^{-1})
Replication (Location)	6	1.43NS	0.94NS	0.02NS	109.39***	567.50***
Cultivars	2	1.91NS	18.17**	2.72***	961.73***	14604.25***
Error	24	4.73	2.28	0.11	8.16	90.64

*-Significant at ($P\leq0.05$), **-Significant at ($P\leq0.01$), ***-Significant at ($P\leq0.001$) and NS-Non significant

Days to maturity:

The combined analysis over years and location showed that variety did not have significant ($P\leq0.05$) effect on days to maturity (Table 1). This is in contrary to the results of Awale et al. (2011) who reported variability in days to maturity among shallot accessions.

Number of bulb splits $plant^{-1}$

Cultivars have highly significant ($P\leq0.01$) effect on number of bulb splits $plant^{-1}$ (Table 1). The highest number of bulb splits $plant^{-1}$ was recorded by Negele (8.69) cultivar followed by Hurruta (7.00) while the lowest number of bulb splits plant^{-1} (6.89) was recorded by the local cultivar (Table 2). Similar result has been reported by Gebru et al., (2014). This result is in line with the results of Shimeles (2014) who reported variability among the tested shallot accessions for bulb splits. A single shallot bulb contains several shoot initials (Rabinowitch and Kamenetsky, 2002) and this shoot production potential may vary among cultivars.

Bulb split diameter (cm):

The combined analysis of variance showed that cultivars had very highly significant ($P \leq 0.001$) effect on bulb split diameter (Table 1). The largest bulb split (2.72cm) was recorded by Negele cultivar followed Hurruta (2.61cm) by while the smallest bulb split (2.00cm) was recorded by the local cultivar (Table 2). Similar result has been reported by Awale et al. (2011) with Negele cultivar producing the largest bulbs among the tested shallot lines followed by Hurruta. The result is also in accordance with the report of Gebru et al., (2014).

Bulb fresh weight (g):

The result showed that variety had very highly significant ($P \leq 0.001$) effect on bulb fresh weight (Table 1). The heaviest bulb (22.86g) was recorded by Negele cultivar followed by Hurruta (20.15g) while the lightest bulb (9.06g) was recorded by the local cultivar (Table 2).

Bulb yield (t ha^{-1}):

The analysis of variance showed that cultivar had very highly significant ($P \leq 0.001$) effect on bulb yield (Table 1). The highest bulb production (10.12 t ha^{-1}) was recorded by Hurruta cultivar followed by Negele (9.69 t ha^{-1}) while the lowest bulb production (4.98 t ha^{-1}) was recorded by the local cultivar produced by the farmers (Table 2). This is similar with the results of Gebru et al., (2014) who reported higher bulb yield with Hurruta cultivar while Awale et al. (2011) reported higher yield with Negele cultivar. This result is in accordance to Shimeles and Lemma (2015) who reported significant difference among the shallot lines in marketable yield.

Table 2: Mean values of days to maturity, number of bulb splits plant^{-1}, bulb split diameter (cm), bulb fresh weight (g) and Bulb yield (t ha^{-1}) combined over years and location

Cultivars	Days to maturity	Number of bulb splits plant^{-1}	Bulb split diameter (cm)	Bulb fresh weight (g)	Bulb yield (t ha^{-1})
Negele	103.11	8.69^{a}	2.72^{a}	22.86^{a}	9.69^{a}
Hurruta	103.61	7.00^{b}	2.61^{a}	20.15^{b}	10.12^{a}
Local	103.72	6.89^{b}	2.00^{b}	9.06^{c}	4.98^{b}
LSD (5%)	NS	1.04**	0.22***	1.96***	6.55***
CV (%)	2.10	20.06	13.26	16.46	11.52

Means followed by same letters in a column are not significantly different at $p \leq 0.05$.

4. CONCLUSION

The combined analysis of the result over location and season showed significant variation among the parameters except for days to maturity. The largest bulb split was recorded by Negele followed by Hurruta cultivars. The highest bulb yield was recorded by Hurruta cultivar followed by Negele cultivars. Hence, farmers around the areas of Sayda, Dehana and Lalibela can use Hurruta and Negele cultivars to maximize their bulb productivity and production.

REFERENCES

[1] Adefress T., Agajjie T., Aster Y., Birhane K., Derege G., Elias Z., Mengistu A., and Worku A. 2000. Participatory Farming System Characterization and Interventions Options for Sekota district, Waghimra Zone, Amhara Region. Holeta Agricultural Research Center, Holeta, Ethiopia (Unpublished).

[2] Awale D., Sintayehu A. and Getachew T. 2011. Genetic varaibility and association of bulb yield and related traits in shallot (*Allium cepa* L. Aggregatum DON.) in Ethiopia. International Journal of Agricultural Research, 6(7): 517-536.

[3] Debre Zeit Agricultural Research Center (D/ZARC). 2002. Shallot production manual. Addis Ababa, Ethiopia

[4] FAO. 2005. New_LocClim: Local Climate Estimator. Rome, Italy.

[5] Gebru H., Simon T. and Tora M. 2014. Participatory Evaluation of Improved Shallot (Allium Cepa Var. aggregatum) Varieties and Their Bulb Size Effect on Yield and Yield Traits in Wolaita Zone, Southern Ethiopia. Journal of Biology, Agriculture and Healthcare, 4(13)

[6] Rabinowitch, H.D. and Kamenetsky, R. 'Shallot (Allium cepa, Aggregatum Group)'. Allium crops science: Recent advances, In: Rabinowitch, H.D. and Currah, L. 2002. 409-430.

[7] SAS. 2002. Statistical Analysis Software, Version 9.0. SAS Institute Inc., Cary, NC., USA.

[8] Shimeles, A. and Lemma, D. 2015. The performance of true seed shallot lines under two methods of planting at different environments of Ethiopia. Research Journal of Agriculture and Environmental Management, 4(3), 174-179.

[9] Shimeles, A. 2014. The performance of true seed shallot lines under different environments of Ethiopia. Journal of Agricultural Sciences, 59 (2), 129-139.

[10] Woldetsadik, K. 2003. Shallot (*Allium cepa var. ascolonicum*) Responses to Plant Nutrients and Soil Moisture in a Sub-humid Tropical Climate. Doctoral dissertation.