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Yield Potential of Lablab cultivars: The cases of southern Ethiopia

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ABSTRACT

The purpose of the study was to evaluate the Lablab cultivar's yield in different parts of southern Ethiopia. A 3x2 m plot size was used to sow twelve Lablab cultivars that were acquired from the International Livestock Research Institute and check varieties from the Bako Agricultural Research Center. In the summer of 2021-2022, three locations-Adola subsite, Gobicha, and Kiltu Sorsa, as well as on farms in the two years that followed-all employed randomized complete block designs with three replications. Data on dry matter yield and other relevant characteristics were gathered. SAS statistical software (version 9.1) was used to do an analysis of variance on the gathered data. Except a non-significant (p>0.05) difference for plant height, the combined analysis results showed significant (p≤ 0.05) differences for plant height, number of branches, and leaf to stem ratio among the investigated cultivars. The results showed that, across all evaluated locations, cultivars 11620 (15.43 t/ha) and 14486 (11.12 t/ha) had the highest forage dry matter production. Both cultivars 11620 and 14486 had higher leaf-to-steam ratios. Cultivars 11620 and 14486 generally had high mean performance and yields in all evaluated areas. Cultivars 14486 and 11620 were thus chosen for the study area.

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1. INTRODUCTION

Animal production is the main component of agriculture that can support the livelihoods and security of large numbers of people in a developing country (Mengistu *et al*., 2021). However, insufficient animal production is mainly due to less nutritional and management practices, disease and parasitic occurrence, low productivity and genetic potential, and lack of extension services (Haile, 2011). Among these constraints, inadequate quantity and quality of feedstuff were identified as a major limiting factor to the development of livestock production and productivity (Duguma *et al*., 2012), and the most bottleneck of livestock farming in Ethiopia is the shortage of livestock feeds in terms of amount and quality, especially during the dry season (Alemayehu *et al*., 2017). Ethiopian livestock primarily rely on low-quality natural pastures and crop residues (CSA, 2021), leading to reduced animal productivity due to poor nutrition and low feed intake. Lablab has great potential as a forage crop species because of its higher forage yields than cowpea and its ability to adapt to different agro-ecologies (Adebisi *et al*., 2004). Production patterns of lablab have been on a decline due to genetic, agronomic, eroded cultural factors, reduced research focus, economic, market, less awareness of the nutritional value, lack of improved varieties, poor management practices, and improvement, as well as the variation in the climate patterns (Bhatt *et al*., 2019).

Due to numerous obstacles that restrict the demand for livestock feeds, there was an uneven and insufficient supply of feed for the current cattle, especially in the research area (Southern Oromia). The absence of enhanced, highly productive, and widely adaptable fodder genotypes is one of the difficulties. This compels farmers to raise their animals on natural pasture, grazing, and crop wastes, which are low-quality feed sources. This emphasizes the necessity of focused efforts to find enhanced, high-yielding forage types with superior nutritional content and resilience to biotic and abiotic stressors. Additionally, assessing lablab genotype performance in various research area conditions may close the improved forage gaps. Therefore, the present study was initiated to estimate the magnitude of genotype, environment and genotype by environment interaction for forage yield and yield components of Lablab yield stability across different environments.

2. MATERIALS AND METHODS

2.1. Description of the Study Locations

In the midland of Adola Woreda, the study was carried out for two years at three different locations. The studied sites, which range in altitude from 1450 to 1900 m.a.s.l., are representative of the sub-humid mid-altitude primary crop growing area. The region experiences a bimodal rainfall pattern, with the first and most significant rain falling between April and August and the second rain falling between September and November. The district receives 1084 mm of rainfall annually and is categorized into highland (11%), midland (29%), and lowland (60%) agroecologies (Adola district, 2011). The study site's average annual minimum and maximum temperatures are 15.93 °C and 9.89 °C, respectively. Basaltic soil (Nitisols) and Orthic Aerosols are the two main types of soil in the region (Etefa and Dibaba, 2011).

2.1.1. Treatments and Experimental Design

Genetic materials comprised 12 cultivars, including standard checks; were evaluated at 6 locations over two consecutive years (2021-2022). A randomized complete block with three replications was used across all locations. Each genotype was sown in 6 rows; 2m length with 1.8m width and 30cm inter-row spacing. Seed rates of 20 kg ha^{-1} and fertilizer rates of 100 DAP Kg ha^{-1} were applied at the time of planting.

2.1.2. Sources of planting materials

The materials used for this study were obtained from the ILRI. The Lablab cultivars, and the checks (Gabisa and Beresa), were acquired from the Bako agricultural research center.

2.1.3. Data collections

Agronomic data like date, number of branches per plant, number of leaves per plant, leaf-to-stem ratio, plant height (cm), dry matter yield (t/ha), number of pods per plant, seed yield (kg/ha), and others were carefully collected. Forage sampling was taken at the 50% flowering stage, and seed sampling was conducted at the maturity stage of the plant. In all plots, sampling was done from the middle of the four rows, excluding the guard rows.

2.1.4. Herbage dry matter yield determination

Herbage yield was harvested 10 cm above the ground and weighed in the field using a sensitive balance. Fresh sub-samples will be taken from each plot separately, weighed, and chopped into pieces (2-5 cm) for dry matter determination. The weighed fresh sub-samples (FWss) were oven-dried at 60^0C for 72 hours and re-weighed (DWss) to estimate dry matter yield.

The dry matter yield (t/ha) = (10 x TotFW x DWss / HA x FWss)) (Tarawali *et al.*, 1995).

Where: TFW = total fresh weight from the plot in kg
DWss = dry weight of the sample in grams
FWss = fresh weight of the sample in grams.
HA = Harvest area in square meters and
10 is a constant for the conversion of yields in kg m^2 to tons/ha

2.1.5. Methods of data analysis

The values on agronomic parameters and dry matter yields were statistically evaluated by analysis of variance (ANOVA) using the general linear model procedure of Statistical Analysis Software to perform ANOVA (SAS 9.2). Means were separated using least significant differences at $p < 0.05$.

3. RESULTS AND DISCUSSION

3.1. Herbage Yield of Lablab cultivars

The result of the combined analysis of variance showed that the highest herbage dry matter yield was obtained from cultivar 11620 (15.43 t/ha) and cultivar 14486 (11.12 t/ha) (Table 1). It showed 129.9% and 61.2% herbage dry matter yield advantage over the standard checks, Beresa and Gabis, respectively. This difference might be due to the genetic potential of the genotypes. The changes in the yield rank of the cultivar across the test environments revealed that there was a high genotype by environment interaction in terms of dry matter yield.

3.2. Composite agronomic performances of the cultivars

The combined analysis of variance for the agronomic attributes assessed across the environments (Table 1). Except for non-significant differences in plant height, the cultivars showed highly significant differences in the number of branches, leaf-to-stem ratio, and number of pods across the environments. Plant height at forage harvest was found to be consistent between cultivars ($p>0.05$). This could be because of how the environment affects the physiological growth and development of fodder crops.

The studied cultivars' average herbage dry matter yield tons/hectare in various environments ranged from 1.44 to 15.43 tons/ha-1. Cultivar 11620 had the highest dry matter yield of 15.43 t/ha, while cultivar 14486 had the lowest, at 11.12 t/ha and 1.44 t/ha, respectively. The two cultivars with the greatest yield advantages over the standard checks are 11620 and 14486, with yield advantages of 129.9% and 61.2%, respectively, over the standard checks Beresa and Gebisa. The current study's findings are consistent with Ogedegbe *et al*. (2011)'s earlier report, which stated that the maximum dry matter output was 10.2 t/ha.

According to Muir (2002), rainfall has a significant impact on the dry matter yields of warm-season legumes. However, the dry matter yields of lablab found in this study fell within the range of values (1.8-12.9 DM t ha-1) reported by Mihailovic *et al*. (2016). However, for various Lablab species, lower dry matter yields of 6.8 and 6t ha-1 were recorded (Hidosa *et al*., 2016). Similarly, in the sub-humid climate of western Oromia, a forage dry matter yield of 5.4 t ha-1 was observed for lablab (Tulu *et al*., 2018). Because leaves have more nutrients and less fiber than stems, the leaf-to-stem ratio has a big impact on the forage's nutritional value. The leaf to steam ratio's mean varied between 0.38 and 0.91. Both cultivars 11620 and 14486 had higher leaf-to-steam ratios. The findings showed that the leaf-to-stem ratio has a significant impact on food choice, forage intake, and quality (Zailan *et al*., 2018). The possible variances of the cultivars with environmental interactions could be the cause of the differences found among the cultivars studied.

Table 1. Average dry matter yield of herbage and agronomic characteristics for Lablab cultivars throughout two years, 2021 and 2022

Cultivars	**PH**	**NBRCH**	**LSR**	**DMY t/ha**
Gabis	100.69	4.de	0.38e	1.44d
10979	100.26	4.7bcde	0.75abc	6.45c
10953	95.92	5.3abc	0.66bcd	6.86c
11620	100.88	6.48b	0.85ab	15.43a
Barasa	99.79	3.8e	0.53de	6.87c
11630	97.38	4.6bcd	0.68bcd	6.43c
14489	100.58	5.3bcd	0.69bcd	6.98c
14486	99.63	5.83ab	0.91a	11.12b
11612	97.72	4.3cde	0.74abcd	7.28c
14465	94.37	4.5cde	0.73abcd	6.55c
14474	100.07	4.7bcde	0.71abcd	6.87c
Mean	98.7	4.9	1.06	7.4
C.v	17.3	23.4	4.98	3.84
LSD	11.22	0.76	3.4	1.87

Means in a column within the same category having different superscripts differ ($p<0.05$); DM t/ha=dry matter yield tone per hectare; LSD=Least Significance difference; CV=coefficient of variation.

4. CONCLUSION AND RECOMMENDATION

The combined analysis of variance revealed that there were significant differences in dry matter yield performances among the tested lablab cultivars. This suggests that specific cultivars do not perform consistently across various environmental conditions, or that different genotypes may react differently in a particular environment. The significant impact of cultivars on dry matter yield indicates the potential for selecting cultivars with superior yield performance. Consequently, cultivars 14486 and 11620, which demonstrated high dry matter yields, are recommended for the study area.

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Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

Alemayehu Mengistu, Gezahagn Kebede, Fekede Feyissa, and Getnet Assefa. "Overview of improved forage and forage seed production in Ethiopia: lessons from fourth livestock development project." 2017: 217-226. http://www.ijagbio.com/

CSA (Central Statistical Agency). Agricultural sample survey 2021/2022. Report on livestock and livestock characteristics (private peasant holdings). Statistical bulletin. Addis Ababa, Ethiopia II. 2022.

Duguma Belay, Azage Tegegne, and B. Hegde. Smallholder livestock production system in Dandi district, Oromia Regional State, central Ethiopia. Read and write. 2012; 20:25-6.

Etefa Yazachew and Dibaba Kashun. 2011. Physical and socio-economic profile of Guji zone districts. Oromia Bureau of Planning and Economic Development. The National Regional Government of Oromia, Finfinne, Ethiopia, Africa.

Haile Aynalem “Breeding strategy to improve Ethiopian Boran cattle for meat and milk production”, 2011; 26:46. Available: http://mahider.ilri.org/handle/10568/3141.

Hidosa, D., Brehanu T., and Mengistu M., 2016. On Farm Evaluation and Demonstration of Improved Legumeforage Speciesin Irrigated Lowlands of BenaTsemay Woreda, South Omo Zone, International Journal of Research and Innovations in Earth Science, 3(2):39-43.

Mengistu Shimelis, Ajebu Nurfeta, Adugna Tolera, Melkamu Bezabih, Abera Adie, Endalkachew Wolde-Meskel, and Mesfin Zenebe."Livestock production challenges and improved forage production efforts in the Damot Gale District of Wolaita Zone, Ethiopia." Advances in Agriculture. 2021; 1 (2021): 5553659. https://doi.org/10.1155/2021/5553659.

Mihailovic, V., Mikic, A., Ceran, M., Cupina, B., Djordjevic, V., Marjanovic-Jeromela, A., Mikic, S., Peric, V., Savic, A., Srebric, M. and Terzic, S., 2016. Some aspects of biodiversity, applied genetics and agronomy in hyacinth bean (Lablab purpureus) research. 13:3-55.

Ogedegbe, S.A., Ogunlela, V.B., Olufajo, O.O. and Odion, E.C., 2011. Herbage yield of lablab (Lablab purpureus L. Sweet) as influenced by phosphorus application, cutting height and age in a semi-arid environment, Nigeria. International Journal of Agricultural Research, 6(11):789-797.

SAS, 2002. (9.2 version). SAS Users’ guide, Statistical Analysis System (SAS) Institute, Inc, Cary, NC. Cary.

Tarawali S. A., Tarawali G., Lirbi, A. and Hanson J. 1995. Method for the evaluation of forage legumes, grasses, and fodder trees for feed use as livestock feed International Livestock Research Institute; Nairobi, Kenya.

Tulu, A., Werku, T., Mekonnen, D., Wakgari, K., Gutu, F., and Alemayehu, K. (2018). Herbage yield potential, crude protein yield and feeding value of selected Lablab purpureus cultivars grown under sub-humid climatic condition of western Oromia, Ethiopia. International Journal of Advance Agricultural Research, 6(7), 93–100.

Zailan, M.Z., Yaakub, H. and Jusoh, S. 2018. Yield and nutritive quality of Napier (Pennisetum purpureum) cultivars as fresh and ensiled fodder. *Journal of Animal and Plant Sci*ence, 28:63-72.

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