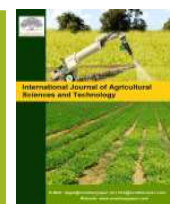




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Research Paper

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## Registration of Dolichos Lablab (*Lablab purpureus* (L) sweet) Variety 'Foyesa'

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### Abstract

Dolichos lablab (*Lablab purpureus* (L) sweet) is one of the most important forage legumes used for livestock feed in crop-livestock production systems. It is a high-yielding forage legume commonly used as a supplementary feed. Thus, the newly released variety named 'Foyesa' was evaluated with the standard check varieties (Gebis-17 & Doli-I) at six locations to assess forage biomass yield, stability, tolerance to major diseases and pests during cropping season of 2023. The result indicated that the new variety gave a high forage dry matter yield than the standard check varieties at each location and combined locations. The new variety was consistently superior in dry matter yield than standard check varieties which showed that better stability under diverse environmental conditions. It had 13.12 ton/ha forage dry matter yield and showed yield advantage of 14 % over the standard check variety. It had mean herbage dry matter yield in the range of 12.60-15.24 tons/ha on research field and 11.45-13.50 tons/ha on farmer fields. The new variety also gave high seed yield (1324.7 kg/ha) with yield advantage of 20.17% over the standard check variety. The current study also stated that the crude protein content of the new variety (Foyesa) obtained (30.44 %) was found to be adequate and satisfactory. Generally, Foyesa variety was found to be a high yielder, high protein content, stable and tolerant to major lablab diseases and pests. Considering all these merits, the Ethiopian Variety Release Standing Committee approved the release of Dolichos lablab genotype ILRI-14490 with the breeder name "Foyesa" in 2024 to be cultivated and used in Low-midlands areas of East Hararghe Zone and similar agro-ecologies of Ethiopia.

**Keywords:** Dry matter yield, Disease, Pests, Seed yield, Yield advantage, Variety release

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### 1. Introduction

In mixed crop-livestock systems of Ethiopia, livestock feed supply is mainly dependent on crop residues, natural pastures, and other agricultural by-products. However, the quantity and quality of natural pastures feed resources is declining from time to time as most of the available land is cultivated for crop production (Tolera et al., 2012). The dominant livestock feed resources now days crop residues are characterized by high fiber and low crude protein contents (Dereje et al., 2010). Thus, supplementation of these crop residues with leguminous forage crops can improve protein deficiency as legumes contain high levels of crude protein (Solomon et al., 2005). They are also superior in

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vitamin and minerals and highly digestible even at later stage of growth, thus providing livestock with balanced diets. Lablab is one of the forage legumes used for this purpose. The lablab leaf has about 21 to 38% and the seed contains about 20 to 28% crude protein (Cook et al., 2005).

Lablab is a high-yielding forage legume that can be grazed, harvested for hay or silage, or used as a green manure and break crop in sub-tropical and tropical farming systems (Chakoma et al., 2016). It is commonly used as a supplementary feed (Tulu et al., 2018), for intercropping with cereal crops (Mpairwe et al., 2002) and is considered to have significant potential for the sustainable intensification of smallholder crop/livestock production systems (Ewanisha et al., 2007; Nord et al., 2020). Cultivating in this way is also very useful for weeds control and increasing soil fertility. Lablab is also used for the control of insect pests (Qureshi et al., 2016). Lablab prolific root system remains in the soil after harvest and enriches the soil with organic carbon (Pasternak, 2013; Cook et al., 2020). Lablab can grow in drought conditions with altitude up to 2000 m a.s.l. (Maass et al., 2010). Lablab is considered to cope better with drought conditions compared to some of the more widely grown legumes such as cowpeas (Maass et al., 2010). However, lack of stable and high yielding varieties with diseases and pests tolerant is a major problem constraining the widespread cultivation and use of lablab in Eastern Oromia.

It is believed that there is substantial level of genetic variability in yield, disease and pest tolerance, and quality within *Dolichos lablab* (*Lablab purpureus* (L) sweet) germplasms. Thus, a total of ninety two (92) accessions of *Dolichos lablab* (*Lablab purpureus* (L) sweet) were collected from International Livestock Research Institute and tested for their adaptability, yield performance and quality, diseases and pests tolerance at Fedis agricultural Research Center in different locations. Finally one accession namely ILRI-14490 identified for its wider adaptability, yield, nutritional quality, diseases, pests and stress tolerance to be released as new variety. Therefore, this study was aimed to evaluate the forage yield performance, nutritive value, agro-ecological adaptation, diseases and pests tolerance of *Dolichos lablab* genotype ILRI-14490 with two standard check varieties (Gebis-17 and Doli-I) to release and register as new variety of *Dolichos lablab* for the study areas and other similar agro-ecologies.

## 2. Materials and Methods

### 2.1. Description of the Study Areas

The variety verification trial was done at on-station and sub-station of Fedis agricultural research center, and on-farm during cropping season of 2023/24. The study was conducted at three districts namely; Fedis (Boko research station and on-farm), Babile (Erer sub-station and on-farm) and Sofi (on farm). The brief descriptions of the study sites are presented in Table 1.

Sites	Longitude	Latitude	Altitude (m.s.a)	Annual rainfall (mm)	Min-Max T <sup>o</sup>
Fedis	42°04'24.3"E	9°07'51.611"N	1050-2100	500-900	13-29°c
Babile	42°19'25"E	9°13'09"N	950-2000	450-850	15-38°c
Sofi	42°15'0"E	9°09'3"N	800-1800	600-870	10-28°c

Note: m.s.l. = meter above sea level; Min T<sup>o</sup> = Minimum temperature; Max T<sup>o</sup> = maximum temperature.

### 2.2. Experimental Design and Treatments

The treatments were sown at six locations namely; Belina Arba, Umar kule, Ifadin, Harawe, Boko station and Erer sub-station. One candidate variety (ILRI-14490) selected from national variety trial study was sown with two standard check varieties (Gebis-17 and Doli-I). The experiment was sown on a plot area of 10 m x 10 m in single plot. The space between rows and plants was 0.4 m and 0.2 m, respectively. The space between plots and blocks was 1 m and 1.5 m, respectively. 100 kg of NPS per hectare fertilizer was applied at planting at each location. The treatments were hand weeded twice during cropping season. Other recommended management practices were also applied uniformly.

## 3. Results and Discussion

### 3.1. Varietal Origin

Foyesa (ILRI-14490) was collected from International Livestock Research Institute and the two standard checks (Gebis-17 and Doli-I) were collected from Bako and Melkasa Agricultural Research Center, respectively.

### 3.2. Agro-Morphological Characteristics and Yield Performance

The released variety, Foyesa (ILRI-14490) is characterized by a dark brown seed color and an average plant height of 134 cm. It took about 120 days to 50 % flowering or forage harvest. The leaf to stem ratio of the released variety is 1.35. The current study showed that Foyesa variety gave a higher forage dry matter yield with average of 13.12 ton/ha and showing yield advantage of 14 % over the standard check variety at each location and combined across locations which indicate that it had better adaptability and stability under diverse environmental conditions. The new variety (Foyesa) also gave high seed yield (1324.7 kg/ha) with yield advantage of 20.17% over the standard check variety. The current study also stated that the crude protein content of Foyesa (ILRI-14490) variety obtained (30.44 %) was found to be adequate and satisfactory. Generally, the new variety was found to be a high yielder, high protein content, stable and

**Table 2: Agro-Morphological and Forage Quality Description of New Dolichos Lablab (*Lablab purpureus* (L) Sweet) Variety, Foyesa**

Crop	Dolichos lablab ( <i>Lablab purpureus</i> (L) sweet)
Variety	Foyesa (ILRI-14490)
Agronomic and Morphological Characteristics	
Adaptation Area	Lowlands - Midlands
Altitude (m.a.s.l)	1300 – 2000
Rainfall (mm)	450 – 900
Seeding Rate (kg/ha)	25- 30
Spacing Between Rows (cm)	40
Spacing Between Plants (cm)	20
Planting Date	Early June
<b>Fertilizer Rate (kg/ha)</b>	
• NPS	100
Plant Height at Forage Harvest (cm)	134
Days to Harvesting (50% flowering)	120
Forage Dry Matter Yield (ton/ha)	
• Research Station	13.92
• Farmers' Field	12.47
Crop Disease and Pest Reaction	
Tolerant to Major Lablab Disease and Pests	
Fodder Quality (%)	
• Ash	12.89
• CP	30.44
• NDF	44.63
• ADF	28.15
• ADL	9.58
Year of Release	2024
Breeder/Maintainer	Fedis Agricultural Research Center

tolerant to Dolichos lablab diseases and pests. The national variety releasing committee evaluated the applicant documents (data submitted) and the trial at field conditions in October, 2023. Based on their evaluation reports; the National Variety Release Standing Committee approved the candidate variety (ILRI-14490) for release and registration with the breeder name 'Foyesa' in April, 2024 for wider cultivation and use in Low-midlands of East Hararge Zone and similar agro-ecologies of Ethiopia. This variety is maintained and distributed to users by Fedis Agricultural Research Center (Table 2).

### 3.3. Reaction to Diseases and Pests

The new variety released and the standard checks were evaluated for their disease and pests reaction starting from the initial stage (nursery) the study to verification stage. All of them are found to be tolerant to major diseases and pests which can affect the yields of the crop.

## 4. Conclusion

The applicant documents of the national variety trial and the variety verification trial undertaken over locations were evaluated by the national variety releasing committee as per the guidelines of the variety releasing and registration of the country during the 2023 cropping season. Based on their evaluation results, the Foyesa variety which had better performance in terms of forage biomass yield and diseases and pests tolerance is released in April, 2024 for production in low-midlands of the study areas and similar agro-ecologies of the country. The breeder seed of the released variety is maintained by Fedis Agricultural Research Center.

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## Competing Interests

Authors have declared that no competing interests exist.

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