Finding niches for drought tolerant, short-season lablabs in semi-arid farming systems of Eastern Africa

A. Sennhenn[1*], J.J.O. Odhiambo[2], D.M.G. Njarui[3], B.L. Maass[4], A.M. Whitbread[1]

[1]Georg-August University Goettingen, Crop Production Systems in the Tropics, Germany
[2]Department of Soil Science, University of Venda for Science and Technology, Thohoyandou, South Africa
[3]Kenyan Agricultural Research Institute (KARI), Katumani, Machakos, Kenya
[4]International Center for Tropical Agriculture (CIAT), Nairobi, Kenya

1. Introduction

Benefits of the multi-purpose legume - *Lablab purpureus*

- Ability to fix atmospheric N [green manure, short-term fallow, …]
- Protein rich grains and healthy vegetable leaf and pod products
- High quality animal forage
- High agro-morphological and physiological diversity

BUT: Lack of adequate characterization data for short-season lablab varieties

2. Objectives

To collect key agronomic information, including photoperiod sensitivity estimates for potential short-season lablab varieties.
New knowledge to be captured in crop-soil models (APSIM).
Model assisted scenario analysis used to devise low risk cropping strategies for drought prone farming regions.

3. Materials and methods

a. Lablab field evaluation – Limpopo Province South Africa

- Three field evaluations from 2002 to 2008 in Limpopo Province
- Germplasm: 33 lablab accessions
  [Australian Tropical Forage Genetic Resource Centre, (ATFGRC), Australia]
- Objective to select early flowering grain types
- Measurements: aboveground biomass production as DM, days to flowering, physiological maturity, seed and pod yield

3. Materials and methods

b. Lablab photoperiod sensitivity evaluation - Germany

- Growth chamber pot experiment to determine day length x variety interactions [7 accessions x 4 day lengths x 3 replicates]
- Germplasm: Q6880B, CPI52513, CPI52535, CPI52554, CPI81364, CPI60795, Highworth
- Day length durations: 10, 12, 14, 16 h @ 28°C
- Measurements: time to flowering, dry matter (DM) per pot at flowering

4. Results – a. Field evaluation

Table 1: Highest yielding and shortest season accessions from 3 evaluations [time to flowering and physiological maturity in days after planting (DAP), aboveground biomass production as DM, seed yield and pod number].

Accession	Flowering (DAP)	Maturity (DAP)	DM (kg ha^{-1})	Seed yield (kg ha^{-1})	No. of pods plant^{-1}
CQ 3620	63-68	84-99	4734	574-819	18.60
Q 6880B	43-65	65-102	1359	532-933	12.90
CPI 52513	52-73	91-99	610	227-1400	29.20
CPI 52514	65-66	101	1857	462-519	24.90
CPI 52535	65-66	100	1811	52-360	8.90
CPI 52551	51	102	4068	440	23.20
CPI 52552	60-70	88-99	1825	576-1100	18.60
CPI 52554	66-73	90-105	4261	382-1900	15.10
CPI 60795	59-65	75-99	4708	571-731	24.60
CPI 81364	50-61	74-102	5002	100-1133	6.60

From 33 accessions evaluated, ten were found to be consistently early flowering (43 – 70 days after planting), maturing (65 – 102 DAP) and high yielding (seed yield: 331 – 1900 kg ha^{-1}) [Table 1; Whitbread et al., 2011].

4. Results – b. Photoperiod sensitivity

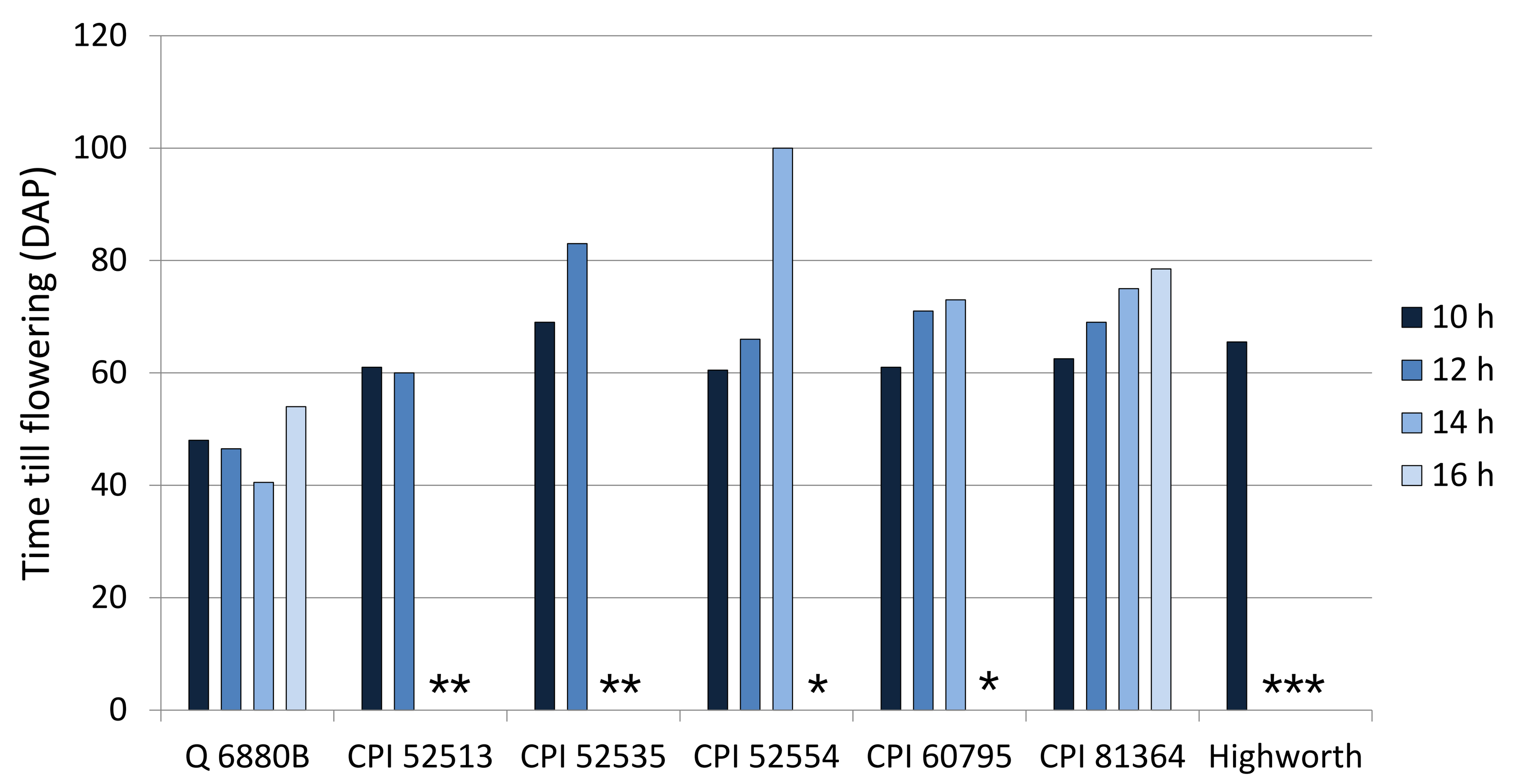

Fig. 1: Time till flowering in day after planting evaluated for seven lablab accessions at different day lengths (10, 12, 14, 16 h)
* indeterminate

The photoperiod response is highly variable among the evaluated lablab germplasm accessions. Whereas Q 6880B and CPI 81364 were consistently early flowering, others flowered under short day conditions but were indeterminate under long day conditions (Fig. 1).

5. Conclusions and future perspectives

- Providing new crop options to farmers in vulnerable areas of Eastern Africa is a food security priority.
- Lablab offers a diverse range of consistently early flowering and high yielding varieties; these are known to be more drought tolerant than the commonly used grain legumes such as beans and cowpeas.
- On farm testing, consumer acceptance and the development of agronomic packages and crop models will help to identify niches for short season accessions.

Poster presented at the ISFM conference Nairobi, Kenya 2012

* Contact: Anne.Sennhenn@agr.uni-goettingen.de

Reference: Whitbread et al. (2011). *African Journal of Range & Forage Science*, 28: 21-28.