GRAIN LEGUME CROPS: A SUSTAINABLE PROTEIN SOURCE

G. Pereira[1,2]*, M. Meneses[1], C. Barcelos[1], A. Bagulho[1,2]

[1]Instituto Nacional de Investigação Agrária e Veterinária, Estrada de Gil Vaz, 7350-901 Elvas, Portugal

[2]GeoBioCiências, GeoEngenharias Geoecnologias, FCT-UNL, 2829-516 Caparica, Portugal

* graca.pereira@iniav.pt

Breeding grain legumes plays a crucial role in enhancing agrobiodiversity and promoting ecosystem services. By developing resilient and high-yielding varieties, breeders can improve food security while reducing environmental impacts. Grain legumes, such as chickpea, cowpea, faba bean, grasspea, lentil, and pea, contribute to sustainable agriculture by fixing atmospheric nitrogen, improving soil fertility, and reducing the need for synthetic fertilizers. Additionally, diverse legume crops support pollinators and soil microbial communities, promoting biodiversity.

Objectives:

INIAV is a partner in the project SPIN - Sustainable Protein (PRR-C05-i03-I-000192), coordinated by the Instituto Politécnico de Santarém (IPS/ESAS). One of the objectives of the project is to promote the value of grasspea (*Lathyrus sativus* L.) and chickpea (*Cicer arietinum* L.) varieties, reinforcing their resilience and adaptability to climate change as reliable sources of sustainable protein.

Materials and Methods

Agronomic evaluation trial

- **6 varieties of chickpea: three were developed by INIAV-Elvas and three provided by the partner Egocultum.**
- **The trial was conducted in the experimental fields of INIAV-Elvas (38º53'N and 7º08'W)**
- **Randomized complete block design with three replications**
- **Size plot: 12m², seed density: 30 seeds/ m²**
- **Evaluation by 6 parameters: days to flowering, days to pod maturity, flowering duration, plant height, seed yield, 100 seed weight**
- **Data were analysed one-way ANOVA followed by Tukey's test**

Crude protein content

- **6 varieties of chickpea and 4 accessions of grass pea**
- **The protein content was determined using the Kjeldahl method**

Results

- **The results highlight significant genetic variability among the evaluated varieties.**
- **Concerning the beginning of flowering, the earliest varieties reached this stage in just 97 days after sowing, while the latest ones required 112 days.**
- **Significant differences were observed in seed size, with the 100 seed dry weight ranging from 28.6 to 39.1 g.**
- **The yield varied between 1257 kg/ha and 2000 kg/ha.**

Table 1- Phenological and yield traits evaluated in the chickpea agronomic trial

Variety	Origin	Days to flowering	Flowering duration (days)	Days to maturity	Plant height (cm)	100Seed weight (g)	Seed yield (kg/ha)	Protein content (%)
C Vouga	Egocultum	100,3 bc	42,7 abc	171,0 a	56,0 ab	37,2 a	1300	21,1
Eldorado	INIAV	106,3 ab	38,0 bcd	171,0 a	59,4 a	34,4 ab	2000	22,7
Elixir	INIAV	112,0 a	33,0 d	171,0 a	59,9 a	31,6 bc	1835	21,2
Elmo	INIAV	107,0 ab	36,0 cd	164,0 b	49,3 b	28,6 c	1566	21,1
Var A	Egocultum	97,0 c	46,0 a	169,7 a	56,1 ab	36,8 a	1257	21,2
Var C	Egocultum	97,0 c	44,0 ab	168,3 a	60,8 a	39,1 a	1890	20,7

In this study, the Eldorado variety distinguished itself with the highest yield and the highest protein content in its seeds (22.7%).

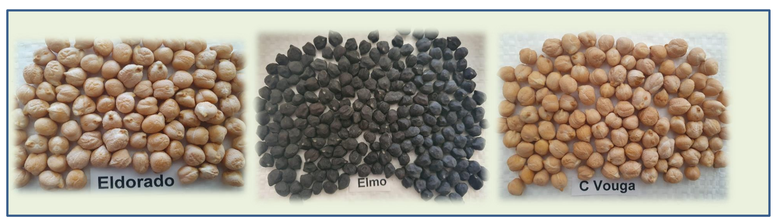

Table 2– Protein content of grasspea accessions

Accession	Origin	Protein Content (%)
Lat 4805	INIAV	29,5
Lat 4808	INIAV	29,9
Lat 4812	INIAV	30,6
Lat 4815	INIAV	29,8

Grasspea has more protein than chickpeas, making it a promising option for high-protein diets. The analysed grasspea accessions showed an average protein content close to 30%.

Final Considerations

Next year, chickpea and grasspea varieties will be evaluated in more locations to analyse the genotype × environment interaction and identify the best-adapted varieties for each region.

Acknowledgements: This research was support by **the project SPIN - Sustainable Protein (PRR-C05-i03-I-000192)**

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