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Abstract e-Book

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GRAIN LEGUME CROPS: A SUSTAINABLE PROTEIN SOURCE

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Abstract Text:

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.

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. An agronomic evaluation trial of chickpea varieties was established in the experimental fields of INIAV-Elvas. The trial included six varieties, three of which were developed by INIAV-Elvas and three provided by the partner Egocultum. The experimental design followed a randomized complete block scheme with three replications. The evaluation was performed on six traits: number of days to flowering and to maturity, flowering duration, plant height, 100 seed dry weight and seed yield. Additionally, the crude protein content of the chickpea seeds was determined, and the analysis also included seeds from four grasspea genotypes. Data were analysed by one-way ANOVA followed by Tukey's test.

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. Plant height ranged from 49.3 cm to 60.8 cm. Significant differences were observed in seed size, with the 100 seed dry weight ranging from 28.6 to 39.1 g. The yield of the six varieties varied between 1257 kg/ha and 2000 kg/ha. In this study, the Eldorado variety distinguished itself with the highest yield and the highest protein content in its seeds (22.7%).

With a higher protein content than chickpea seeds, grasspea emerges as a promising alternative for protein-rich diets. The analysed grasspea genotypes showed an average protein content close to 30%.

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.