

INTRODUCTION

- ✓ This work was carried out in the province of Almería (Spain), which has more than 33,464 ha of greenhouses, with bell pepper and tomato crops representing 37.2% and 25.6%, respectively, of the total area.
- ✓ This is why the introduction of other crops is necessary for the diversification of horticultural crops in the area.
- ✓ The “garrofón” bean or lima bean corresponds to the species *Phaseolus lunatus* L. and is native to Central and South America.
- ✓ In Spain, it is mainly cultivated in the Valencian Community, mainly because its tender and tasty beans, known as “garrofós”, are used as an ingredient in the preparation of “paellas” (typical culinary dish of Valencia). The fruits are green pods containing several kidney-shaped seeds.
- ✓ The objectives of the trial were to evaluate, characterize, and select the accessions that were best adapted to greenhouse growing conditions and to the climatic conditions of the province of Almería, with milder winters than in its traditional growing area.



Cultivation of *Phaseolus lunatus* in glasshouses



Detail of ‘garrofón’ bean pods

MATERIALS AND METHODS



SEED TYPE:

“Pintat” (Pintado). Has dark brown spots irregularly distributed over the entire outer seed coat

“De la cella” (De la ceja). Is identified by having one end dark brown to black, close to the radicle lobe of the embryo.

“Ull de perdiu” (Ojo de perdiz). Has a characteristic purple eye surrounding the hyloseminal área.

- ✓ The trial was carried out in greenhouse with a metal structure and a 10x20 wire polyethylene mesh cover, sanded soil and a surface area of 1000 m².
- ✓ The yield of 7 cultivars of “garrofón” bean was evaluated, 5 of them from the University Institute for the Conservation and Improvement of Valencian Agrodiversity (COMAV) and 2 commercial cultivars from Intersemillas (Table 1), with three replicates per cultivar, randomly distributed in the greenhouse.
- ✓ Planting was carried out on 13/11/2023 with a planting frame of 4x4 m between root balls and two seeds per root ball.
- ✓ The harvesting period was from 23/05/2024 to 5/07/2024, determining fruit production.
- ✓ An analysis of fruit quality was carried out by determining the physical quality parameters of the pod (length, width, weight and number of kernels per pod) and of the kernel (length, width, thickness, weight and firmness). As for the chemical-nutritional quality, it was carried out on the grain and the parameters measured were: soluble solids, pH and acidity and vitamin C.

Table 1. List of local and commercial cultivars, and seed type.

CULTIVARS	SEED TYPE
BGV016529*	“De la cella”
BGV016340*	“Pintat”
BGV014551*	“Ull de perdiu”
BGV012848*	“Ull de perdiu”
BGV008283*	“De la cella”
Pintada**	“Pintat”
Peladilla**	“Blanca”

* COMAV

**Intersemillas S.L.

RESULTS

PRODUCTION

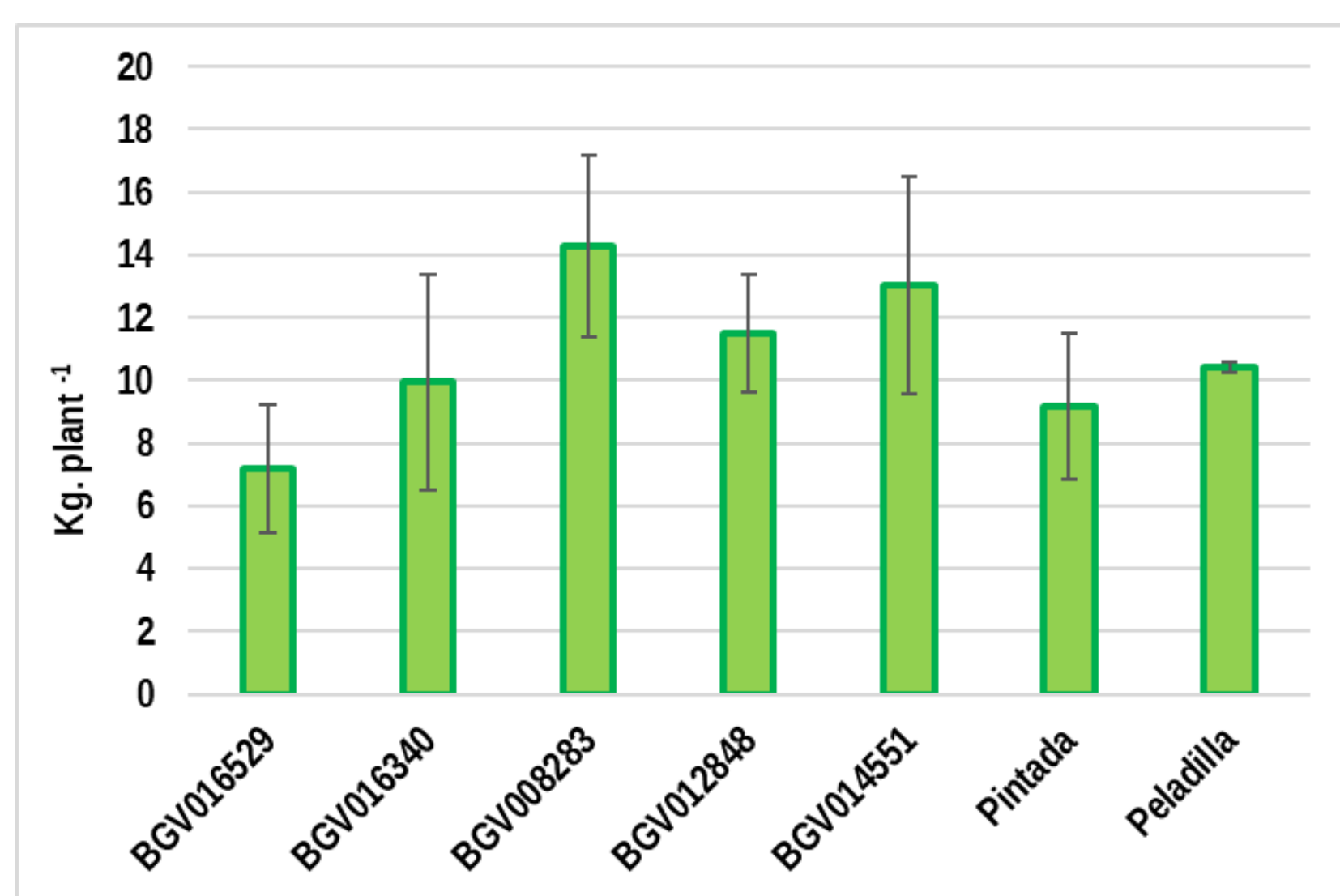


Figure 1. Cumulative average yields per plant. No significant difference for a $p \leq 0.05$ (LSD test)

PHYSICO-CHEMICAL AND NUTRITIONAL PARAMETERS

Table 2. Physical pod parameters (weight, length, width and number of grains per pod) obtained for each of the cultivars. Different letters in the same column reflect significant differences at $p \leq 0.05$ (LSD test).

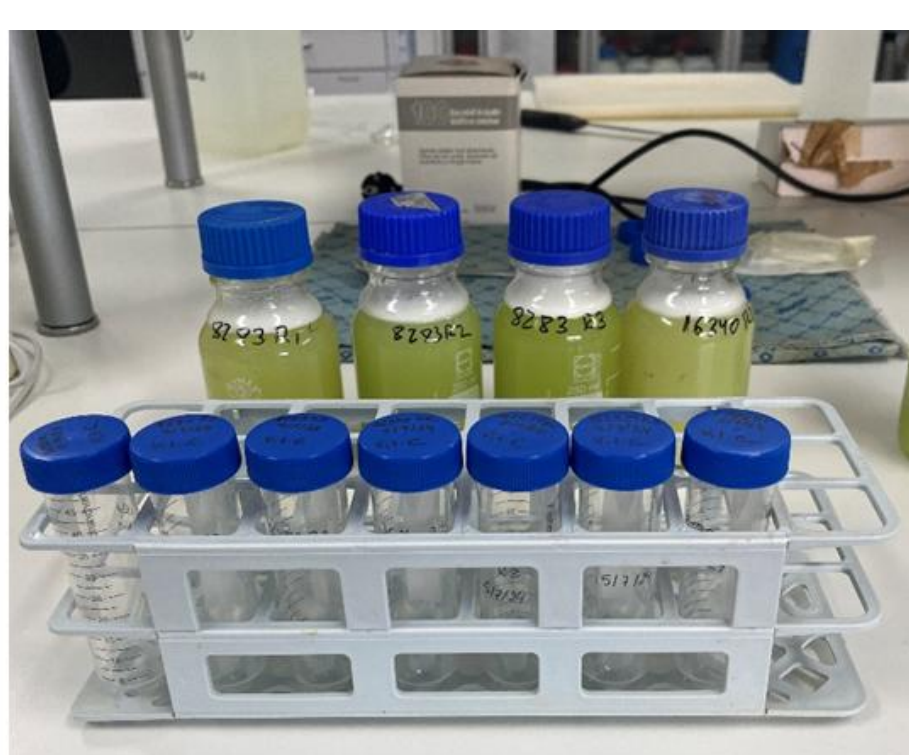
Cultivars	Weight (g)	Length (cm)	Width (cm)	Number of grains/pod
BGV016529	20,5 a	15,7 c	3,25 a	3,5 b
BGV016340	18,9 a	14,8 bc	3,19 a	3,3 b
BGV014551	20,2 a	16,1 c	3,14 a	3,6 b
BGV012848	21,5 a	15,6 c	3,18 a	3,7 b
BGV008283	16,2 a	13,4 ab	3,05 a	3,3 b
Pintada	20,3 a	15,5 c	3,23 a	3,5 b
Peladilla	19,7 a	12,9 a	3,30 a	2,4 a

Table 3. Physical grain parameters (grain weight, length, width and firmness) obtained for each of the cultivars. Different letters in the same column reflect significant differences at $p \leq 0.05$ (LSD test).

Cultivars	Weight (g)	Length (cm)	Width (cm)	Firmness (Newton)
BGV016529	3,01 b	3,17 bc	1,87 a	31,86 a
BGV016340	2,70 ab	3,05 ab	1,82 a	31,05 a
BGV014551	2,40 a	3,01 ab	1,75 a	26,97 a
BGV012848	2,60 a	3,13 bc	1,77 a	26,79 a
BGV008283	2,50 a	2,93 a	1,77 a	29,39 a
Pintada	2,70 a	3,05 ab	1,83 a	31,56 a
Peladilla	3,80 c	3,32 c	2,13 b	35,00 a

Table 4: Chemical and nutritional parameters (acidity, pH, soluble solids and ascorbic acid) obtained for each cultivar. Different letters in the same column reflect significant differences at $p \leq 0.05$ (LSD test).

Cultivars	Acidity (%)	pH	Soluble solids (°Brix)	Ascorbic acid (mg AA/100 g p.f.)
BGV016529	0,03 a	6,57 a	1,27 a	0,44 a
BGV016340	0,03 a	6,25 a	1,44 ab	0,37 a
BGV014551	0,04 a	6,33 a	1,41 ab	0,41 a
BGV012848	0,05 a	6,14 a	1,47 ab	0,40 a
BGV008283	0,03 a	6,24 a	1,36 ab	0,42 a
Pintada	0,03 a	6,13 a	1,60 bc	0,36 a
Peladilla	0,03 a	6,57 a	1,76 cb	0,39 a



CONCLUSIONS

- ✓ The “garrofón” bean crop has adapted perfectly to the conditions of protected cultivation under netting and to the climatic conditions of our area.
- ✓ The average accumulated production per plant in our November plantation ranges between 7.1 and 14.2 kg, with no significant differences between cultivars.
- ✓ The analyses of physical and chemical parameters show differences between cultivars, in pod length, in weight and °Brix of the bean and in the number of grains, therefore, the locust bean can be adapted to different consumer requirements.
- ✓ These cultivars are a viable alternative for farmers to diversify horticultural crops, while introducing novel and healthy products to the markets.