Selection L67, a Pure Line with True Seed Type of the Ganxet Common Bean (*Phaseolus vulgaris* L.)

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Ganxet bean is a local commercial landrace grown in Catalonia (in the northeastern area of the Iberian peninsula), and greatly appreciated in Catalan cuisine, as evidenced by its high price. Its distinguishing morphological trait is the markedly hooked shape of the seed, from which its name derives ("ganxet" means little hook in the Catalan language). This trait is much more prominent in Ganxet than in white kidney type and is retained after cooking.

This bean arrived in Catalonia, probably during the 19th century, when Catalan emigrants brought the seed back from America and started its culture. Over time, blends with other varieties have arisen, and many transitional forms between Ganxet and non-Ganxet beans are currently found. Given this situation we wished to develop well-characterized Ganxet material to be sold under controlled guarantee.

Origin

Bean populations labeled as Ganxet were exhaustively sampled in Catalonia (Fig. 1A). Field and laboratory procedures provided information on seed morphology and nutritional traits, allowing us to evaluate the variability within and between populations (Casañas et al., 1997, 1998). A breeding process using individual selections within populations was later undertaken to achieve an enhanced hooked shape of the seed, the most characteristic trait of this landrace. In more advanced phases of the process (third and fourth generations of selection), agronomic, morphological, and culinary traits were considered. Seven pure lines were obtained, all having very accentuated Ganxet traits, although clear differences existed between them. Selection L67 was considered to be the most suitable pure line for immediate commercialization.

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Description

Selection L67 was chosen for its traditional use as a dried legume. Seeds are white, slightly flattened, markedly hooked, slightly glossy, and medium-large in size (52 g/100 seeds). Dark-green pods (mean length 15 cm) containing an average of 4.5 seeds are attached to

the stem by peduncles 12.5 cm long. Leaves are dark green and flowers are white. The plant is indeterminate in growth habit (CIAT IV type). Seeds are sown in mid-July, usually under irrigation with vertical plastic nets or cane structures to facilitate growth. Bloom occurs ≈ 45 d after sowing. Pods mature 60 d after bloom. Farmers normally harvest in mid-November and obtain yields of ≈ 3800 kg·ha⁻¹ under irrigation.

The standard reniform white kidney bean and L67 (Fig. 1B) were cultivated in two locations, four blocks per location trial, and compared for nutritional value (Table 1). Selection L67 had more total crude protein, less total dietary fiber, a higher proportion of soluble dietary fiber, more glucose, more sucrose, less starch, more raffinose, and more malic acid than did white kidney. No significant differences were found for the remaining traits studied (soluble protein/crude protein, ash, stachyose, fructose, succinic acid, fumaric acid, and citric acid).

Availability

Small quantities of seed of L67 can be obtained from the Dept. d'Agronomia, Escola Superior d'Agricultura de Barcelona.

Fig. 1. Bean seeds showing (A) variability within and among four Ganxet populations, and (B) a comparison of (left) L67 and (right) white kidney.

Table 1. Comparison of components of L67 and white kidney beans. (All values except ratios are expressed in g·kg⁻¹.)

Component	Cultivar		LSD ₀₅ ^z
	L67	White kidney	
Crude protein	293.2	256.1	17.9
Ratio soluble protein : crude protein	0.87	0.89	NS ^y
Dietary fiber	220.6	237.1	2.3
Ratio soluble dietary fiber : dietary fiber	0.47	0.42	0.02
Ash	38.8	40.8	NS
Sucrose	21.22	17.65	2.50
Glucose	0.82	0.27	0.14
Starch	250.7	304.2	11.3
Raffinose	2.60	1.95	0.53
Stachyose	20.22	18.23	NS
Fructose	0.11	0.03	NS
Succinic acid	0.12	0.06	NS
Fumaric acid	0.11	0.12	NS
Citric acid	10.22	14.02	NS
Malic acid	0.32	0.15	0.10

^zBased upon analysis of variance. Location and block were factored out.^yDifference nonsignificant at $P \leq 0.05$.

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