

SEED QUALITY TRAITS OF BEAN GENOTYPES GROWN IN THE CENTRAL HIGHLANDS OF MEXICO

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In the past, the aim of the Bean Breeding Programs in Mexico was to develop cultivars with high and stable yield and resistant to adverse environmental conditions, diseases and insects. At the present, a major concern is given to grain commercial type, cooking and nutritional quality of beans. Seed size, shape, color, cooking time and broth appearance are important traits which influence the acceptability of cultivars by consumers. Traits like protein content are also important for the nutritional value of beans. It is our endeavor to develop cultivars with the same or higher protein content as commercial cultivars.

In order to plan adequate combinations in our breeding program, it becomes necessary to fully characterize parental genotypes. In this note we report on the quality traits of 50 common bean and one *Phaseolus coccineus* cultivars grown under irrigation at INIFAP's Experimental Station near Texcoco, Mexico. Genotypes were replicated twice and for planting they were grouped on the basis of phenology. The soil at the site was fertilized at the rate of 100 kg/ha of each Urea and P₂O₅. Data were recorded on the physical traits of seeds (100-seeds weight and volume, and shell content), protein content and technological parameters (water absorption, cooking time and solids content in the broth). For seed characterization the methods described by Guzmán *et al.* (1993); Elías *et al.* (1986), and Larry and Charles (1974), were utilized.

Significant differences were found among cultivars for all determined traits (Table 1). Cultivars Blanco Tlaxcala (*P. coccineus* L.), Perry Marrow, Kaboon and Bayo Zacatecas II showed the largest seed size, meanwhile ICA Zerinja, Negro Lolotla (a weedy type) and lines V 8025 and TLP 22 of tropical origin showed the smallest seed size.

Most cultivars showed cooking times lower than 120 min; short cooking times were associated with a high water absorption capacity. Genotypes Bayo Victoria, Bayo Zacatecas II, line BY91023 and Phavul 820, all of them from the semiarid highlands of Mexico, showed cooking times ranging between 207 and 164 min. Cultivars Redlands Pioneer and ICA Zerinja were the softest materials, with cooking times of 46 min.

Broths obtained during grain cooking showed large variation in agreement with their solids content. In general, large seeded cultivars showed a tendency to have higher broth solids content. The variation in shell content was also high, ranging from 5.6 to 11.4 %. In some cases a higher shell content was related to longer cooking times, *i.e.* Negro Lolotla

with 11.4% shell content and 182 min cooking time. While, Perry Marrow, Kaboon and ICA Zerinza with short cooking times from 47 to 63 min showed the lowest shell content.

Table 1. Mean, minimum and maximum values for quality traits in 51 bean genotypes.

Trait	Mean	Minimum	Maximum
100 grain wt. (g)	35.64	16.40	88.40
100 grain vol. (cc)	28.47	12.00	76.00
Cooking time (min)	91.16	46.00	207.00
Water sorption capacity (%)	83.13	6.79	125.32
Seed Shell content (%)	8.23	5.55	11.36
Broth solid content (%)	0.63	0.16	5.71
Seed Protein content (%)	23.36	18.44	28.72

Protein data agreed with those reported by Bressani *et al.* (1960) (a range of 16 to 30%); genotypes G 2333, Negro Lolotla and lines Ren 27 and J 117 showed the highest protein content, 28.8, 28.5, 28.0 and 27.5%, respectively.

Superior genotypes according to specific traits will be used in the Bean Breeding Program as parents, with the aim of incorporating superior quality traits to adapted materials. Redlands Pioneer and ICA Zerinza can be used as a source of short cooking time; G 2333, Negro Lolotla, Ren 27 and J 117 as sources of high protein content; and Perry Marrow, Kaboon and ICA Zerinza as sources of low shell content and short cooking time.

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