

POD CLASS DEFINITION BASED ON LENGTH AND WIDTH IN COMMON BEANS (*Phaseolus vulgaris* L.)

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Plant architecture improvement is one of the objectives of the bean breeding program. Among the various advantages presented by an erect bean plant type relates to the fact that pods do not touch the ground, which, in consequence, contributes to prevent rotting and harvest losses, assuring good grain quality. Pod size is related to this aspect and represents one of the plant traits that varied the most with species domestication. Wild *Phaseolus* relatives present much smaller pods than cultivated ones. The establishment of standards defining pod classes according to pod dimensions appears to be a valuable criterion to plant characterization besides being a practical and objective plant descriptor.

The objective of this work was to indicate acceptable limits to classify pod size utilizing pod measurements (length and width) analysis from 273 common bean genotypes with grains from several commercial Brazilian classes represented by cultivars and lines morphologically characterized in experiments conducted at Embrapa Arroz e Feijão, in Goiânia, GO, Brazil.

Evaluation was performed using 20 pods per genotype. Length was measured from the peduncle connection point to pod apex, excluding the pod beak, and width was taken on the middle portion of the pod, utilizing a Mitutoyo Digimatic Caliber. To examine the data distribution into classes from genotype length evaluation, two criteria were used: the average \pm 1 standard deviation ($A \pm 1SD$); and average \pm 2 standard deviation ($A \pm 2SD$).

Results obtained indicated an average pod size of 10.2 cm, with maximum and minimum values ranging from 15 to 7.5 cm. Utilizing the value ($A \pm 1SD$), it was verified that 73.6% fit into the intermediate class size, 12.1% into short, and 14.3% into long. When values were established by the second criterion ($A \pm 2SD$), classification was 94.5%, 0%, and 5.5%, respectively, into intermediate, short, and long pod classes. These results indicate that ($A \pm 1SD$) criterion is better suited to pod classification, setting pod length as follows: < 8.79 cm - **short**; 8.80 to 11.55 cm - **intermediate**; and >11.55cm - **long** (Figure 1).

In terms of width, the average value obtained was 9.13mm, with maximum and minimum values ranging from 16 to 4.1mm. Even though not being related to plant architecture, pod width may be used to pod classification. However, the fact that this trait is less variable than pod length suggested a third criterion [$(A \pm 0,5 SD) + (A \pm 1 SD)$] to set class limits, in addition to the two ones previously used to classify pod length ($A \pm 1SD$) and ($A \pm 2SD$). Using ($A \pm 1SD$), 7.3%, 83.9%, and 8.8% were classified, respectively, as slender, intermediate, and wide. When width limits were set using the second criterion ($A \pm 2SD$), width distribution was 94.1% as intermediate, 1.1% as slender, and 4.7% as wide. Finally, when the third criterion was used it allowed pod width discrimination into five classes (Figure 2), as follows: 7.3% **very slender** (< 7.84 mm); 16.1% **slender** (7.85 - 8.49mm); 56.4% **intermediate** (8.50 - 9.77mm); 11.4% **wide** (9.78 - 10.42mm); and 8.8% **very wide** (> 10.42mm).

Such characteristics as erect plant type, resistance to lodging, uniformity of maturation, dehiscence resistance and desirable first pod insertion, associated to small sized pods without grain size reduction, are well suited to mechanical harvest and to achieve good product quality with high commercial value.

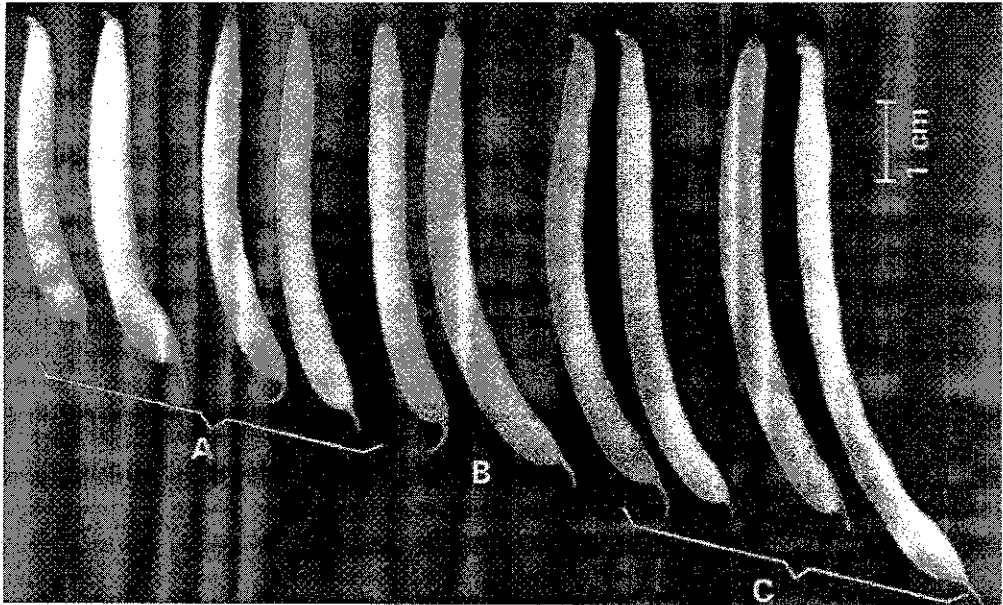


Figure 1. Common bean pod length classes: A - short; B - intermediate; C - long.

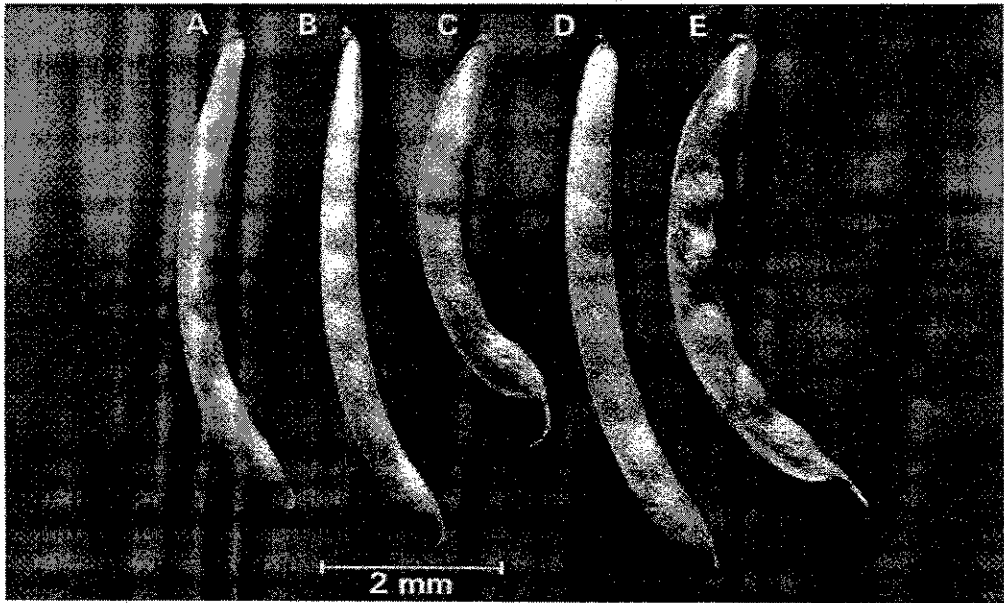


Figure 2. Common bean pod width classes: A - very slender; B - slender; C - intermediate; D - wide; E - very wide.