COMUNICACIONES

EMS- induced dwarf mutant of dry beans (Phaseolus vulgaris L.)

Sumario. En la generación M_2 de la variedad de frijol negro 'Porrillo Sintético', tratada con sulfonato de etilmetano, un mutante enano fue identificado. El mutante muestra reducción general en la altura y demás partes de la planta. El carácter es controlado por un gen dominante.

Resumo. Na geração M_2 de variedade de feijão preto 'Porrillo Sintético', tratado con sulfonato de etil metano, um mutante anão foi identificado. O mutante mostra redução geral na altura e demais partes da planta. O caráter é controlado por um gene dominante.

In the absence of natural variability, induction of variability by physical or chemical mutagens can be of great help in accelerating the efforts for breeding better and high yielding plant types. The present communication deals with a dwarf mutant of dry beans induced by ethylmethane sulfonate.

Materials and methods

Presoaked seeds of a black bean variety 'Porrillo Sintético' were treated with 0,7 per cent EMS solution (pH 6,8) for 6 hrs at 25°C. After washing with distilled water, the seeds were given a period of 17 hr recovery on moist filter paper and planted in a greenhouse. The individually harvested selfed progenies of M_1 were planted in the field and the dwarf mutant was identified in M_2 generation.

Results and discussion

Morphology of the mutant: The dwarf mutant has relatively slow growth compared to the control and has a general reduction in plant height, internode length, length of petiole and rachis, resulting in overlaping of leaves (Fig. 1). The leaves are dark green and wrinkled. Though the flower morphology was not modified, the length of raceme is reduced and also there is a marked reduction in pod length (Fig. 2). The seed and pod size is reduced and seeds within the pod are very compactly arranged.

A comparison of the mutant and control for various morphological and yield characters is presented in Table 1. An increase in node number and decrease in plant height, internode length, length of raceme and pod length was observed for the mutant. Besides, the number of pods per plant, seeds per pod and 10 seed weight of the mutant was lesser than that of the control.

Fig. 1.—*Dwarf mutant (right) and control (left).*

Table 1.—Morphological and yield characters of mutant and control.*

Genotype	Plant height (cm)	Node Nº	Internode length (cm)	Length of Raceme (cm)	Nº pods /plant	Pod length (cm)	Nº seeds /pod	10 seed wt. (g)
Dwarf mutant	20.3	19.9	0.4	1.8	10.8	4.2	6.0	1.3
Control	75.3	14.7	1.8	7.1	20.6	9.5	7.0	2.0

* The observations are based on mean of 10 plants

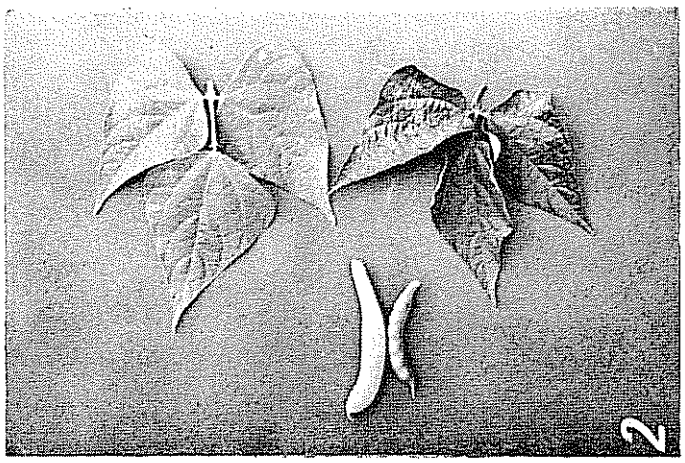

Fig. 2.—*Leaf and pod morphology of dwarf mutant (right) and control (left).*

Inheritance of dwarf character. The originally identified dwarf mutant segregated into normal and dwarf types. In the next generation, the normal segregant did not show further segregation, whereas some of the dwarf plants showed further segregation, indicating that dwarf growth habit is dominant over normal type. This is further confirmed from the evidence that, when a commercial variety, with indeterminate growth habit is croseed with dwarf mutant the F_1 plants show dwarf growth habit.

The dwarf mutant, in certain morphological aspects, resembles the compact mutant, reported by Moh and Alan (1). The compact mutant induced by γ-radiation is reported to be controlled by a recessive gene. Apparently, the compact character and the dwarfness are controlled by different genes resulting in similar phenotypes.

The dwarf character can be of great use for improving plant type of commercial varieties with prostrate growth habit, thereby contributing for development of upright plant types with better light interception and suited for mechanical harvesting.

Summary

In the M_2 generation of a black bean variety 'Porrillo Sintético', treated with ethylmenthane sulphonate, a dwarf mutant was identified. The mutant exhibits a general reduction in the height and various other parts of the plant. The character is controlled by a dominant gene.

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S. TARA MOHAN
INSTITUTO AGRONÔMICO DO PARANÁ
CAIXA POSTAL 1331
86100 LONDRINA, PARANÁ
BRASIL

REFERENCE

1. MOH, C. C. and ALAN, J. J. Bean mutant induced by ionizing radiation. VII Compact Mutant. Turrialba 21:478-480. 1971.

Effect of polyethylene glycol induced moisture stress on the germination of some tropical seeds*

Sumario. Se germinaron semillas de ocho especies tropicales de cultivos y de malezas en soluciones acuosas, de 0 a -3,5 bar, de polietileno glicol-6000 para simular una sequía. La germinación de todas las especies disminuyó conforme decrecían los potenciales. Una tensión de humedad de 1 bar provocó una caída significativa en el porcentaje de germinación de 70-100 a 0 bar hasta 0-10 por ciento.

Introduction

Drought is commonly blamed as a cause of germination failure, yet the way in which seeds are killed by drought is far from clear (3). The amount of soil moisture needed for successful seed germination differs considerably among crop species (5) and varieties (11, 13). With the increasing frequency of drought occurrence in the Sahelian region of Nigeria, availability of water at the time of seed germination is critical. There is a need therefore to establish a range of soil moisture tensions for the germination of seeds in this region. In this regard, Slatyer (12) suggests that

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