EFFECT OF NITROGEN DEPRIVATION IN THE FATE OF REPRODUCTIVE ORGANS IN BEANS (Phaseolus vulgaris L.) AND ITS RELATIONSHIP WITH YIELD AND ITS COMPONENTS.

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The abscission of reproductive organs is a physiological phenomena which diminishes dry bean yield from 45 to 80 percent (Binnie & Clifford, 1981). This reduction might be determined in part by a limitation in the availability of nutrients.

Westerman et al. (1983), pointed out that nitrogen (N) deficiency during flowering and pod development reduced yield by promoting the abscission of reproductive organs.

The objective of the present study is to determine the effect of an eight-day nitrogen deprivation upon the flowering dynamics and yield and its components in beans.

Materials and Methods. Cultivar Cacahuate-72, a variety with a determinate (Tipo I) growth habit and a 16-day flowering period was used. Plants were grown hydroponically, one per pot in a greenhouse using a complete nutrient solution (Steiner, 1984) and a perlite substrate. The experiment was completely randomized with five replications. One pot with its plant represented an experimental unit. The treated plants were watered with the complete nutrient solution except for an eight-day period during which the same solution but lacking nitrogen was employed. Before the use of this solution the pots were thoroughly flushed with tap water.

The treatments were applied as follows: a) in the preflowering period (PF), 8 days before the beginning of flowering; b) in the first half of the flowering period (I-FP); and c) in the second half of the flowering period (II-FP). The control was watered with complete solution throughout the growth cycle. Flower buds were tagged and their fate was followed. At physiological maturity the grain yield, seed number, seed size, number of normal and empty pods, as well as the number of abscised reproductive organs were determined.

Results. The control produced, per plant, 18.2 normal pods, 93.2 seeds and 28.6 g of seeds with an average (5 observations) weight of 330 mg/seed. The nitrogen deprivation treatment reduced the number of reproductive organs, especially in the PF treatment (Fig. 1) However, neither the number of normal (harvestable) -pods nor the seed size and seed number showed significant differences compared to the control. In the PF treatment the lower number of flower buds was compensated by an increase in pod setting due to a lower percentage of abscission of young pods,
especially those arising from flower buds formed in the second half of the flowering period. Analysis of complementary data might help to explain the results.

Number of reproductive organs per plant. The total for each bar corresponds to the number of flower buds produced per plant. The figures within the bar represent the percentage of abscission for each organ. Each datum represents the average from 5 plants. PF = Preflowering; IFP First half of flowering; IIIP Second half of flowering period.

Figura 1.

LITERATURE CITED

