BEAN (*PHASEOLUS VULGARIS* L.) YIELD REDUCTION BASED ON WEED INTENSITY COMPETITION

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INTRODUCTION

The presence of weeds has been shown to lead to reductions in crop yield (Serrano *et al.*, 2001). The size of this reduction will depend on the intensity of the interspecific competition generated by the weeds population. In other crops mathematical models have been generated to evaluate this relation (Cousens, 1985). Nevertheless, since that the crop sensitivity to the weed competition will depend on the crop species, crop variety and weed species that occurred in the crop should be looking a model for each growth conditions and crop. Therefore, to determine the model that explains the degree of reduction of the bean yield *Flor de Durazno* (recommended by Campos *et al.*, 1998 for highlands and rainfall conditions), based on the weeds population was the objective of the present study.

MATERIALS AND METHOD

Sowing Time of bean (*Phaseolus vulgaris* L.) *Flor de Durazno* of determinate growth habit, type I, pink with beige color of seed, seed size of 410-530 mg and seed protein of 26% was on May 26, 2006, under rainy conditions in Montecillo, Mex.(19°29' N, 98°45'W, 2.250 ms of altitude, tempered to semi-arid climate). The density was 33 plants by m² in rows of 40 cm apart in a Fluvisol type. All the plots were fertilized with 100-100-00 of NPK. Once the species of weeds had the appropriate size to be identified (30 days after sowing time, das) was come to give the following treatments of weed elimination (E): 1) without elimination (0%E), complete competition; 2) 100% E, without competition; 3) 75% E, 25% of competition; 4) 50%E, 50% of competition; and 5) 25%E, 15% of competition. The design was a randomized blocks with four replicates. The phenology and the grain bean yield (dry matter, g) were evaluated.

RESULTS AND DISCUSSION

The bean phenology was not affected by the weed competition with weeds. The beginning of flowering occurred 28 das and physiological maturity 100 das. The weeds population for complete competition (comp) (0% E) was of 166 plants by m²; 75% comp, 123 plants by m²; 50% comp, 79 plants by m²; 25% comp, 41 plants by m²; and without competition (0% comp). The bean yield reduction was of 93, 85, 77, 60 and 0%, respectively. The bean yield was of 20, 41, 63, 110 and 277 g m⁻², respectively. The saturation growth rate model (*Y* = (ax)/(b+x)) was the one that showed to a determination coefficient (*R²*=0.98) highest to explain this relation (Figure 1), which differs to the *Y*=(*ID*)/(1+ (*ID*/a)) reported previously for other crops, growth conditions and different weed species in competition (Cousens, 1985). The competition beans-weeds was by 70 days. Eleven weeds species in the experimental area were registered. The highest important by abundance order were: *Simsia amplexicaulis* (cav) Pers, *Chenopodium* sp, *Amaranthus hybridus* L., and some species of graminés.

CONCLUSION

The saturation growth rate model was the one that better predicts the losses of yield bean *Flor de Durazno* with base to weed density.
Figure 1.- Bean yield reduction and weed population. Montecillo Méx. México. Summer 2006.

\[ Y = \frac{(112.9X)}{(36.3+X)} \]

\[ R^2 = 0.98 \]

Weed m\(^2\)

Yield reduction (%)

LITERATURE CITED

