

## Weed control with sunflower (*Helianthus annuus* L.) residues and crop management in beans (*Phaseolus vulgaris* L.)

Ing. Anastasio Pérez Mayorquín\*, M. C. María Teresa Rodríguez González, Dr. J. Alberto Escalante Estrada, M.C. Ricardo Vega Muñoz, M.C. Carlos Ramírez Ayala<sup>3</sup>. Colegio de Postgraduados, Especialidad de Botánica, IRENAT. Montecillo, México. 56230 Tel y Fax 01(5) 95-2-02-47 exts.1300,1301 y 1316. E-mail: [pmayo@colpos.colpos.mx](mailto:pmayo@colpos.colpos.mx), [jasee@colpos.colpos.mx](mailto:jasee@colpos.colpos.mx), [mate@colpos.colpos.mx](mailto:mate@colpos.colpos.mx).

### Introduction

Traditionally, Mexicans have considered beans (*Phaseolus vulgaris* L.) a basic food, being an important source of proteins (20-24%), and large areas are devoted to bean production. However, production is limited by abiotic and biotic factors, among which are weeds that compete for space, light and nutrients. Production losses caused by weeds can be 50 to 100% (Brian, 1993), so that weed control is fundamental. In recent decades, the use of synthetic herbicides for weed control has increased, elevating production costs and causing serious damage to environment and human health.

The objective of this study was to determine the effect of the incorporation of sunflower residues and of topological arrangement of beans on weed population and bean yield.

### Materials and methods

#### 1. Location and climate

The study was conducted in an experimental plot at Montecillo, Mexico (10° 29' N; 98° 54' W, 2250 masl). Cv 'Bayomex' beans were sown on May 12 under rainfed conditions. Two population densities were tested: 12 and 24 plants m<sup>-2</sup> with 4.0 and 8.1 cm between plants. Plot area was 2 m<sup>2</sup> (1.6\*1.25).

The treatments consisted of the application of sunflower receptacle (0, 3, and 5 kg m<sup>-2</sup>). The experimental design was split plot with four replications. The variables under study were number of racemes, flowers and seeds, seed dry weight, and weight of 100 seeds.

### Results

The incorporation of 3.5 and 5 kg m<sup>-2</sup> of sunflower 14 days after sowing did not affect emergence, vegetative growth and yield of beans (Table 1). Similar results were found by Rodríguez, et al. (1998) and Tejeda (2000). The number of floral primordia increased 100, 300, 75, and 150% with low and high density and 3.5 and 5 kg m<sup>-2</sup> of receptacle, respectively. Raceme number also increased 7 and 11%. Number of pods per plant increased 61, 26, 36, and 35%. Number of seeds per plant increased 58, 19,

33, and 26%, and seed yield increased 80, 52, 65, and 59%, respectively, compared with the control.

### Conclusions

Application of up to 5 kg m<sup>-2</sup> of sunflower receptacle for weed control does not decrease seed yield of beans.

Table 1. Seed yield and its components in bean (*Phaseolus vulgaris* L.) as a function of incorporation of sunflower receptacle and population density, Montecillo, Mexico, 2000.

Table 1. Seed yield and its components in bean (*Phaseolus vulgaris* L.) in function of the incorporation of sunflower receptacle and population density. Montecillo, México, 2000

		NN	NRAC	TVP	NVV	NGVA	PSP	NGP	PSG	P100S
0	12	29.1	20.9	16.9	2.2	7	3.8	50.2	15	29
	24	32.2	26.4	19.2	3.6	11.9	7.1	59.5	17.8	29.9
3	12	28.2	22.4	27.3	5.3	9.2	8.6	79.7	27.1	34
	24	44.5	29.2	26.2	4	9.6	8.5	79.5	29.5	37
5	12	33	23.3	21.7	5.4	11.6	6	60.2	22.8	37.8
	24	34.3	21.3	26.1	6.6	23.1	8.5	75	28.4	37.8
<b>R</b>										
R	0	30.6	23.7	18	2.9	9.4	5.4	54.8	16.4	29.9
	3	36.3	25.8	26.7	4.6	9.4	8.5	79.6	28.3	35.5
	5	33.6	22.3	23.9	6	17.3	7.2	67.6	25.6	37.8
<b>D</b>										
D	12	30.1	22.2	21.9	4.3	9.2	6.1	63.4	21.7	34.2
	24	37	25.6	23.8	4.7	14.9	8	71.3	25.2	35.3
X GRAL.		33.5	23.9	22.9	4.5	12	7.1	67.3	23.5	34.9
<b>Probab. Of F</b>										
DP		NS	NS	NS	*2.7ab	NS	NS	NS	NS	NS
REC * DP		*6.6ab	NS	NS	NS	NS	NS	NS	NS	NS
REC * DP		NS	NS	NS	NS	*	NS	NS	NS	NS

NN= Number of nodes    NRAC= Number of raceme    TVP= total of pods for plant    NVV= Number of pods empty  
 NGVA= Number of grain empty    PSP= Dry weight pericarpio    NGP=Number of grain for plant    PSG= Dry weight of grain  
 P100S= Dry weight 100 seeds

### Literature Cited

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