BIOMASS AND SEED YIELD OF Phaseolus vulgaris L. AND THEIR RESPONSE TO NITROGEN AND POPULATION DENSITY.

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Nitrogen fertilization is a factor of importance for crop production. In some regions of Mexico, it has been demonstrated that yield of dry beans was increased with nitrogen (Escalante, 1992). On the other hand, with increased population density, the yield also increases (Aguilar et al., 1984), but no all (Escalante,1985). So, the purpose of this work, was to study the effect of nitrogen fertilization and the population density on the biomass, yield and its components in beans.

MATERIALS AND METHODS

The experiment was conducted in the field during the rainy season in Chapingo, México.. Two varieties were studied : Michoacán 12A3 (M12), a type II, indeterminate bush bean (56 days a flowering and 114 days to maturity) and Cacahuate 72 (C72), a type I, determinate bush bean, plant (45 days a flowering and 94 days to maturity). Nitrogen fertilization (N+) (urea at 100 kgN/ha) was applied before sowing. The soil at natural fertility was the control (N0). The population densities were: 8.3 (LD) and 16.6 (HD) plant/m2. Treatments were allocated in a split-split-plot design with 4 replicates. Planting was done on may 8, 1992. The biomass, harvest index (HI), yield and its components were the variables analyzed.

RESULTS AND DISCUSSION

Figure 1a shows that M12 and C72 increase the biomass with N+ and with high population density. The highest biomass was obtained with the treatment M12N+HD. The HI was highest in N+HD for M12, while it was reduced with C72N+HD (Figure 1b). Perhaps severe water stress, caused by drought during the flowering stage of C72, prevented a greater yield expression and produced a reduction in the HI . In this manner, the increase in the seed yield obtained with N+ and HD was less for C72 than for M12 (table 1). The increase in the seed yield was related to a greater seed number (r=0.83**) and pod number (r=0.78**) obtained also with these treatments. This indicates that, under these conditions the late flowering bush bean could have the greatest response to these agronomic practices.

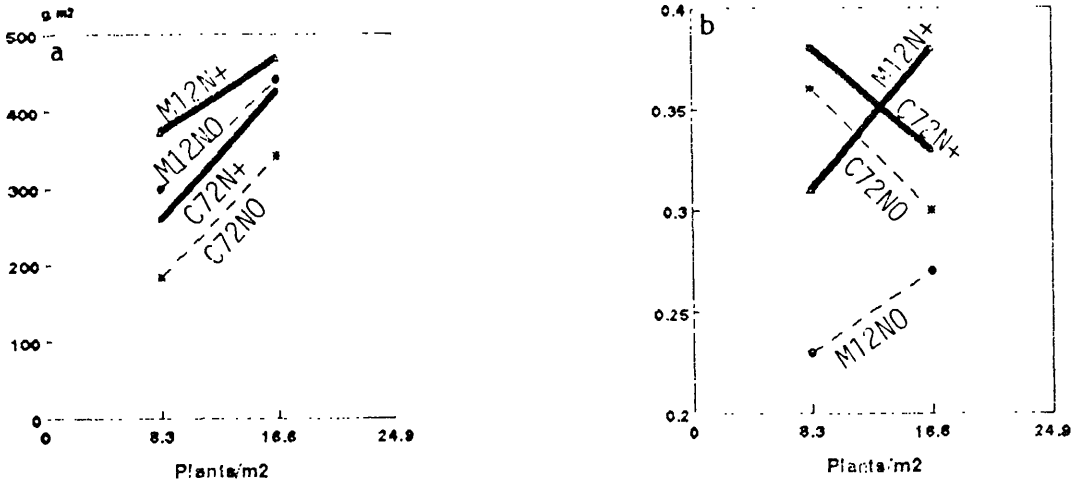

Figure 1. Biomass (a) and Harvest Index (b) in relation to nitrogen and population density.

TABLE 1. Yield and Components in dry beans in relation to nitrogen fertilization and population density.

Genotype	Nit	D	Yield/m²	Seeds/m²	Pods/m²
C-72	No	LD	68	159	55
		HD	103	238	87
	N+	LD	100	348	84
		HD	141	313	96
M-12	No	LD	70	359	115
		HD	117	680	181
	N+	LD	117	670	176
		HD	180	1007	262
Prob. F	Genotype (G)		NS	**	**
	Nit (N)		**	**	**
	G * N		NS	NS	**
	Density (D)		**	**	**
	G * D		**	**	**
	N * D		NS	NS	NS
	G * N		NS	NS	NS

NS.-Differences not statistically significant
* $P < 0.05$; ** $P < 0.01$

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