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RESPONSE OF TWO SPECIES OF RAPE TO DIFFERENT LEVELS OF NITROGENOUS AND PHOSPHORUS FERTILIZER IN DIFFERENT PLANTING DATES

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INDTRODUCTION

The incidence of different fertilizer application levels and different times of sowing on the yield of a rape crop is an important event that must be known when improving the crop yield. Previous works carried out by the National Department of Oilseed Crop held in Córdoba (Spain) showed great interest for approaching this problem in our region.

Several workers in Japan Iwata and Igita (1972), in Germany by Makowski (1973), in Australia Thurling (1974), in Norway Stabbetorp (1973) and in Chile Valdivia (1975) had undertaken similar approaches to this problem, but these data were not transferred to our situations due to the great variability of environmental conditions in which the plants had grown.

In this work we present the data obtained on the effect of different fertilizer levels (N and P) and different times of sowing on the yield of two species of rape.

MATERIALS AND METHODS

The experiment was performed in an experimental zone situated in south-east Spain (Sevilla), where the soil was classified as "entic pelloxerert" (U.S.D.A. 1975).

Two species (Brassica campestris L. var. Span and Brassica napus L. var Tower) were sown on three dates: November 5, December 23 and February 12, and applying 0;100 and 200 units of Nitrogen; 0;100 and 200 units of Phosphorus and 100 units of Potassium per hectare. The applications were made in the following way: 50% of N_2; 100% of P_2O_5; 100 % of K_2O, before sowing and the 50% of N_2 remaining at initiation of stem elongation.

The experiment was designed in a randomized block system with four repetitions per treatment. The elemental plot measured 7 x 4 m and at harvest time two rows of each side were put aside and one metre in each extreme.

Main phenological observations appear resumed in Table 1.

Average daily temperatures during this period ranged from 7.0° C to 26.1°C; relative humidity averaged from 65% to 80%; average radiation ranged from 168.0 to 474.6 cal/cm^2, wind speed was 57 to 164 km/day. Total precipitation was 417.8 mm; 296.2 mm and 209.8 mm for the three sowing dates respectively.

TABLE 1

PHENOLOGICAL OBSERVATIONS

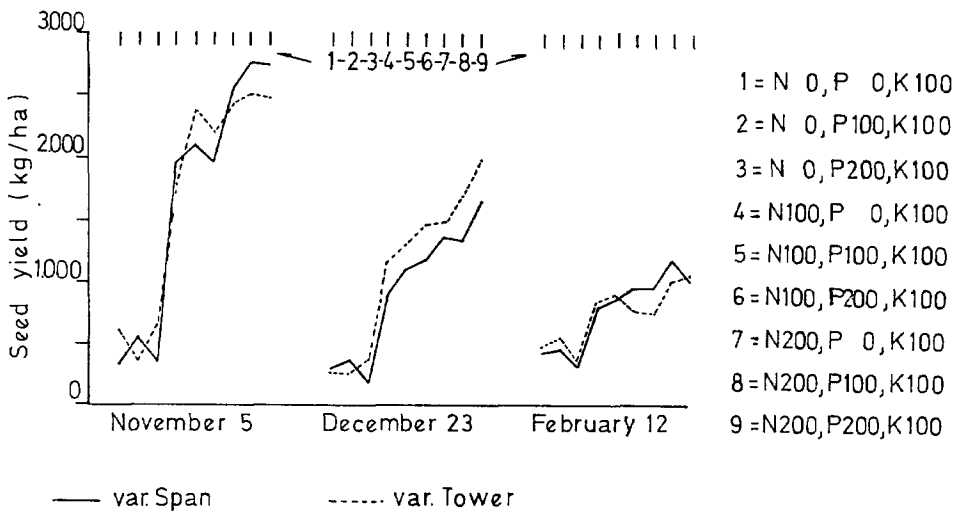
Observations	DATE OF SOWING					
	November 5		December 23		February 12	
	Span	Tower	Span	Tower	Span	Tower
Seedling	24-XII	24-XII	10-II	10-II	28-II	28-II
Stem Elongation	10-II	20-II	29-III	9-IV	6-IV	14-IV
Flowering	25-II	6-III	16-IV	23-IV	21-IV	29-IV
Harvesting	11-VI	28-VI	19-VI	30-VI	15-VII	26-VII

RESULTS AND DISCUSSION

The effect of the time of sowing and levels of Nitrogen and Phosphorus fertilizer on the seed production is shown in Fig. 1, it should be observed that the first time of sowing (November 5) was significantly higher than the other two. The third time of sowing (February 12) was significantly lower than the second one (December 23).

FIG. 1

SEED YIELD (KG/HA)



The differential rainfall distribution which occurred in the different period studied can provide a reasonable explanation of this. Total rainfall during the experimental period corresponding to the first date of sowing (November 5) reached 417.8 mm which was very similar to the potential evapotranspiration of the crop (492.6 mm). In addition, the rainfall distribution was similar to the rate of water losses by the crop, that is, 35% of the total volume from seedling to flowering and 65% remaining from flowering to harvesting (Insua and Muriel, 1978). However, during the experimental period corresponding to the second and third sowing (December 23 and February 12), the rainfall was only 296.2 mm and 207.8 mm respectively and its distribution was very erratic.

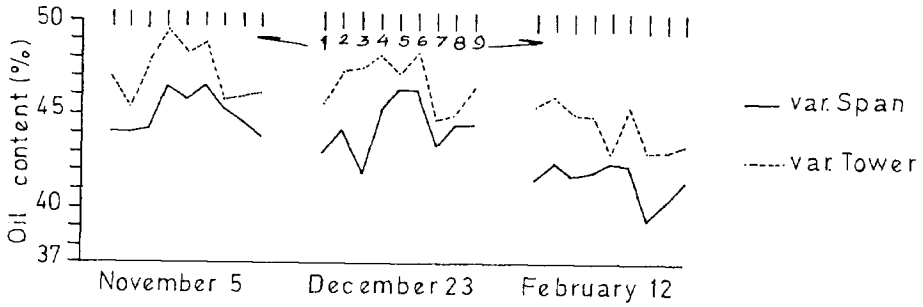
Maximum seed production of 2,782 kg/ha of the Span variety and 2,526 kg/ha of the Tower variety were obtained, with a fertilizing application of Nitrogen 200, Phosphorus 100 and Potassium 100 units per hectare, however, the differences were not significant with respect to N 100, P 100 and K 100 treatment.

Seed production obtained in plots fertilized with N 0 regardless of the amount of P was significantly lower than in those which received either N 100 or N 200.

The level of phosphoric fertilizer did not show a clear incidence on the seed oil content in any of the tested varieties, however, a tendency to increase was observed (a maximum of 46% in the Span variety and 49% in the Tower variety)when the application of the Nitrogenous fertilizer was 100 units per hectare.

FIG. 2

OIL CONTENT OF SEEDS (%)



Taking into consideration the above-mentioned data it is possible to say that the best time for the sowing of rape under our particular conditions is during the first fifteen days of November, and that the optimal levels of N, P and K fertilizers seem to be N 100, P 100 and K 100 units per hectare.

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