GROWTH AND DEVELOPMENT OF SPRING VARIETIES IN AUTUMN SOWING IN SOUTHERN SPAIN

By Manuel D. De La Guardia and Eduardo B. Perez-Torres
National Research Center for Oil Crops, I.N.I.A.
and Escuela T.S. de Ingenieros Agronomos
Córdoba University, Córdoba, Spain

In previous unpublished experiments several winter and spring cultivars of oilseed rape were employed at different sowing dates in Southern Spain. The best results were obtained when the spring cultivars were sown in autumn. Thurling (1974) reported that in Western Australia he had arrived at similar conclusions.

Since we are sowing foreign cultivars at different sowing dates from those in their respective countries of origin and in different seasonal and climatic conditions, we have started an experiment to study the growth and development of several rape cultivars. Here we present some of the results of the first growing season 1976-77.

In a sandy loam soil in the Guadalquivir valley near Córdoba, 6 spring rapeseed cultivars were sown at two different sowing dates (Oct. 15 and Nov. 20). One Canadian cultivar (Span) was Brassica campestris and the other five (Cresor, Crop, R-69, Tower and Erglu) were B. napus. The first three were French varieties, Tower was Canadian and Erglu was German. 8 kg/ha.of seed was employed and a sowing machine used. Each plot comprised ten 20m. rows spaced 33 cm. apart. Plots were arranged in a randomized complete block design for each sowing date with 3 replications.

The growing season was characterized by a particularly mild and rainy winter, the spring was extremely dry and the plant suffered drought stress at the end of the season. A light frost was observed at the end of March, after most of the plants had flowered.

The periodical counting of plants per m^2 showed a heavy inter-plant competition that resulted in a self-thinning of plants. At the beginning all the cultivars, in both sowings, had about 110 plants/m^2. After that, this number was decreased for all cultivars and reached a stable value of about 35 in the first sowing and 68 in the second. In the second sowing there was less self-thinning and the plants were smaller than in the first.

For each cultivar the number of days from sowing to initiation was recorded, this number is very close for both sowing dates, except for Span and Tower cultivars which present a difference of 5 and 9 days respectively from sowing to initiation between the sowings. As the plants from the second sowing grow in lower temperatures, the plant size at initiation was less than with the first sowing.

Flowering date was recorded when 50% of the plants had at least one flower in the main stem. Span and R-69 were the earliest cultivars since they flower in February (1st sowing). The other cultivars flowered in March (both sowings) except Erglu which flowered on April 5 in the second sowing.

Total dry matter was registered at flowering and was compared with the final dry matter. Span flowered with less percentage of total dry matter in the second sowing (20.5%) than in the first (39,7%) and this limited the potential size of the plant and the seed yield (Mendham and Scott, 1975). In the other cultivars the standing dry matter at flowering was about the same for the two sowings.

In the first sowing flowering occurred several days after the leaf area index (LAI) had arrived at its maximum value, but in the second sowing flowering and maximum LAI occurred almost simultaneously. In the latest sowing the LAI values dropped suddenly at the end of the period (probably by the drought), this is one of the reasons why the LAD values are smaller in the second sowing than in the first (Table 1). Five of the six cultivars reached the same or higher LAI values in the first sowing than in the second, and the other cultivar (Tower) had higher LAI in the second sowing, nevertheless the LAD number for this variety was also higher at first sowing.

TABLE 1.

LEAF AREA INDEX (LAI) AND LEAF AREA DURATION (LAD)

Cultivar	Sowing Date: 15 October LAI(max.)	15 October LAD(days)	20 November LAI(max.)	20 November LAD(days)
SPAN	2.1	143	1.7	84
ERGLU	2.2	196	2.2	117
CRESOR	2.9	264	2.4	152
R-69	1.7	146	1.7	84
CROP	2.3	196	2.2	136
TOWER	2.0	153	2.2	124

The final harvest was done in late May for the first sowing and in early June for the second. Span and R-69, the earliest cultivars, suffered seed loss from bird attacks and the yield was not presented. The total dry matter and the seed yield of the other four varieties are shown in Table 2. The two cultivars Erglu and Cresor gave better yield in the first sowing than in the second. These two varieties are relatively late varieties and suffered from drought in the second sowing. Tower reached more dry matter and seed yield in the second sowing, but the yield was low in spite of that fact.

TABLE 2.

TOTAL DRY MATTER AT HARVESTING AND SEED YIELD ($g.m.^{-2}$)

Cultivar	Sowing Date: 15 October Dry matter	15 October Seed	20 November Dry matter	20 November Seed
ERGLU	824	145	711	90
CRESOR	1043	237	873	208
CROP	920	162	898	170
TOWER	761	69	796	110

The partial correlation coefficient of seed yield and other characters for the four cultivars of Table 2 were calculated and appear in Table 3. Best correlations are obtained in the first sowing. The correlation between seed yield and total dry matter are in accordance with Thurling (1974), and Campbell and Kondra (1978) and the correlation with the LAI and LAD index agree with Thurling (1974). This indicates that the study of these indices is of interest as regards the study of new cultivars in our seasonal conditions.

TABLE 3.

COEFFICIENTS OF CORRELATION BETWEEN SEED YIELD AND OTHER CHARACTERS AT DIFFERENT SOWING DATES

Sowing date	Time to 50% flowering	LAI max.	LAD	Total dry matter	Harvest index
15 Oct.	-0.1	0.68*	0.86**	0.96**	0.88**
20 Nov.	-0.5	0.37	0.61*	0.70	0.92**

* P = 0.05 ** P = 0.01

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