

EFFECT OF SEEDING DATE ON YIELD, YIELD COMPONENTS
AND SOME AGRONOMIC CHARACTERS OF OIL SEED
RAPE (BRASSICA NAPUS L.)

by

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ABSTRACT

The results indicated that days to flowering were increased while days to maturity decreased by delaying seeding date. The tallest racemes, greatest number of pods per plant, greatest seed weight per plant and greatest seed yield per acre were obtained at the 3rd seeding date (Dec. 7 and Dec. 5 in 1977 / 78 and 1978/79 seasons), respectively. However, heaviest seeds were obtained from Dec. 22 and Dec. 20 seeding date for the two successive seasons. Seeding date had no significant effect on seed number per pod and seed oil content in both seasons.

The results indicated that seed yield was positively and highly significantly correlated with number of axillary racemes number of pods per plant and 1000-seed weight. Oil content was positively and significantly correlated with seed yield/ac, number of pods/ plant and 1000-seed weight, while it was negatively correlated with seed weight per plant.

INTRODUCTION

Rapeseed is one of the most important oil crops in the world. In India, it is sown as a winter or summer crop (Patil and Rajat 1978). In Canada, Cross (1964) reported that the highest seed yield of summer rape was obtained when seeding took place on May 8 and declined as seeding was delayed. Earlier seeding resulted in frost damage. Delay in seeding delayed maturity and reduced plant height and period of vegetative growth.

In England, Mendham and Scott (1975) found that seeding on September 14 gave the highest seed yield, delay in seeding

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reduced seed yield. However, seeding on August 12 gave highest yield/m², heaviest seeds and highest number of seeds per pod. On the other hand, oil content was not significantly affected by seeding date.

Kondra (1977) showed that the performance of rapeseed varieties differed when seeded on different dates and different locations.

Olsson (1960) found a higher positive correlation between seed yield and number of pods per plant. Clark and Simpson (1978) reported that seed yield was positively correlated with 1000-seed weight and stand at harvest, and negatively correlated with branches per plant, pods per plant and seeds per pod.

In Egypt, there is a great shortage with respect to edible oils. The local production of vegetable oils fall to face the increasing rate of the consumption. Increasing vegetable oil production could be achieved through increasing the productivity of well cultivated oil crops such as sesame, peanut, soybean and sunflower and trying to cultivate another new oil crops such as oil seed rape. Information about cultural treatments of rape under Egyptian condition is unknown. The present investigation aimed to know the suitable seeding date of oil seed rape during winter season in Giza location, Egypt.

MATERIALS AND METHODS

The experiments were conducted at the Agricultural Experiments and Research Center, Faculty of Agriculture, Giza, Egypt, during 1977/78 and 1978/79 seasons.

Toehwsky cultivar, imported from West Germany, was used in both seasons. The experiments were laid out as a complete randomised block design with four replications. The plot size was 3 x 3.5 m. The soil type was loamy clay in texture, pH range 7.8-7.9 and total N ranged from 0.11 to 0.12%. Seeds were drilled, at seed rate of 3 kg/ac, in rows 60 cm apart.

Seeding dates were November 7, Nov. 22, December 7, Dec. 22 and January 6 in 1977/78, and Nov. 5, Nov. 20, Dec. 5, Dec. 20 and Jan. 4 in 1978/79. Plants were hoed three times and nitrogen fertilizer was applied at rate of 45 kg N/ac. one month after seeding and just before 1st irrigation. Plants were irrigated 4 times at 30 days intervals.

Following characters were estimated :

- 1 - Days to first flower, days to maturity and seed yield/ac. were estimated on plot basis.
- 2 - At harvest time, 10 plants were randomly taken to determine length of terminal raceme, number of axillary racemes, number of pods per plant and 1000 - seed weight.
- 3 - Seed number per pod was determined by counting the average number of seeds in 10 pods sampled from each plant.

1960. 4 - Seed oil content was estimated according A.O.A.C.

The maximum, minimum and mean daily temperature at monthly intervals from November to May in 1977/78 and 1978/79 seasons at Giza location are shown in Table-1.

Table 1 : Monthly maximum, minimum and mean of temperature, in centigrades, at Giza location during the growth seasons.

Period	1977			1978			1979		
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
November	25.3	11.2	18.7	22.1	11.1	16.6	-	-	-
December	19.6	7.3	13.4	14.3	6.1	10.2	-	-	-
January	-	-	-	18.6	6.6	12.6	20.1	6.3	13.2
February	-	-	-	24.3	7.9	16.1	22.7	11.1	16.9
March	-	-	-	24.2	10.0	17.1	24.4	11.1	17.7
April	-	-	-	29.0	13.1	21.0	29.3	14.8	22.0
May	-	-	-	34.0	17.2	25.6	32.2	17.4	24.8

RESULTS AND DISCUSSION

The data in Tables 2 and 3 show the effect of seeding dates on yield, yield components and some agronomic characters of oil seed rape in 1977/78 and 1978/79 seasons, respectively.

1 - Effect on agronomic characters :

Data in Tables 2 and 3 cleared that days to flowering was increased as seeding date was delayed in both seasons. However, days to maturity was increased from 1st to 2nd seeding date and returned to decrease at 3rd, 4th and 5th ones. The reduction in growth season at the late seeding dates may be due to the relatively high temperature (Table 1) after flowering which led to reduction in the period from flowering to maturity. These results disagreed the results reported by Cross (1964) on the summer rape.

Tallest terminal racemes and greatest number of axillary racemes were observed at the 3rd seeding date (early Dec.) in both seasons. This phenomenon may be due to the initiation and development of racemes of these plants which took place during suitable climatic conditions rather than the earlier or later seedings.

2 - Effect on yield and yield components :

The data in Tables 2 and 3 show that the greatest seed yield per plant and per acre were obtained from the 3rd seeding date (Dec. 7 and Dec. 5 in 1977/78 and 1978/79 seasons). These results might be due to the greatest number of pods per plant

Table 2 : Effect of seeding dates on yield, yield components and some agronomic characters in 1977/1978 season.

Characters	Seeding date					
	Nov. 7	Nov. 22	Dec. 7	Dec. 22	Jan. 6	L.S.D. 0.05
Days to flowering	105.50	115.30	119.30	121.00	120.00	2.18
Days to maturity	162.50	170.00	158.00	156.30	155.30	2.31
Length of terminal raceme (cm) .	101.50	105.20	119.20	107.00	101.50	7.44
No. of axillary racemes	7.40	7.10	7.50	5.20	4.50	0.09
No. of pods per plant	219.00	217.00	244.00	139.00	78.00	77.60
No. of seeds per pod	14.40	17.70	15.20	16.20	17.50	n.s.
1000-seed weight (gm)	3.94	3.24	3.203	4.04	3.71	0.30
Seed yield per plant (gm)	12.60	9.39	15.10	9.00	8.10	1.25
Seed yield per acre (kg)	435.00	402.00	482.00	387.00	154.00	102.50
Seed oil content (%)	37.30	36.80	37.50	36.70	36.20	n.s.

Table 3 : Effect of seeding dates on yield, yield components and some agronomic characters in 1978/1979 season.

Characters	Seeding date					
	Nov. 5	Nov. 22	Dec. 5	Dec. 20	Jan. 4	L.S.D. 0.05
Days to flowering	104.80	114.30	117.30	119.30	119.80	2.00
Days to maturity	161.00	170.50	155.50	155.30	154.00	4.50
Length of terminal raceme	95.70	95.70	118.00	109.70	104.00	9.07
No. of axillary racemes (cm) ...	8.40	7.70	7.80	7.40	5.60	n.s.
No. of pods per plant	227.00	212.00	232.00	148.00	82.00	75.00
No. of seeds/pod	14.10	17.00	15.10	15.80	15.90	n.s.
1000-seed weight (gm)	2.85	3.18	3.33	3.98	3.59	0.15
Seed yield per plant (gm)	13.30	10.40	16.10	10.50	7.90	1.46
Seed yield per acre (kg)	450.00	453.00	375.00	210.00	65.00	65.00
Seed oil content (%)	36.50	36.60	36.70	35.90	35.70	n.s.

which was positively and highly significantly correlated with seed yield per plant and per acre (Table-4). For summer rape, Cross (1964) stated that the greatest seed yield was obtained at seeding date of May 8 in Canada. In England, Mendham and Scott (1975) found that winter rape gave highest seed yield when planted on Sept. 14.

Regarding the other yield components, number of seeds per pod was not significantly affected by seeding dates in both seasons. However, seeding on Dec. 22 and Dec. 20 in 1977/78 and 1978/79, respectively, showed the heaviest seeds (Tables 2 and 3). In England, Mendham and Scott (1975) stated that winter rape showed highest number of seeds/pod and heaviest seeds at seeding date of August 12.

3 - Effect on oil content :

The data in Tables-2 and 3 cleared that seed oil content was not significantly affected due to different seeding dates in both seasons. These results are in general agreement with those obtained by Mendham and Scott (1975). However, Kondra (1977) showed that the highest oil content of summer rape was obtained when it seeded on May 8, delaying seeding date decreased seed oil content.

4 - Correlation among the studied traits :

The data in Table-4 show that seed yield per acre was positively and significantly correlated with number of axillary racemes ($r = 0.81$), number of pods per plant ($r = 0.91$) and 1000-seed weight ($r = 0.78$). These results indicated that seed yield of rape could be increased by improving the characters viz., number of axillary racemes, number of pods per plant and 1000-seed weight. Oil yield of rape could be also improved through these traits because the correlation between seed oil content and seed yield per acre, number of pods per plant and 1000-seed weight was positive and significant (Table-4). These results are in general agreement with those obtained by Olsson (1960) who found a positive correlation between seed yield and number of pods per plant. While, Clark and Simpson (1978) found positive correlation between seed yield and 1000 - seed weight. However, he found a negative correlation between seed yield and number of pods per plant and number of seeds per pod.

Table 4 : Sample correlation coefficients smong yield and yield components of oil seed rape under different seeding dates (no. 10).

	1	2	3	4	5	6	7	8	9	10
1 Days to flowering	-	+ .07	- .09	+ .19	- .18	- .08	-.12	-.46	-.06	-.05
2 Days to harvesting		-	+ .48	+ .45	+ .54	+ .29	-.57	-.02	+ .34	-.23
3 Length of terminal raceme.				+ .03	+ .19					
4 No. of axillary racemes					+ .87**	-.14	+ .30	+ .48	+ .30	+ .29
5 No. of pods/plant						-.54	-.68**	+ .75**	+ .81**	+ .38
6 No. of seeds/pod						-.43	-.72**	+ .81**	+ .91**	+ .75**
7 1000-seed weight							+ .43	+ .71**	-.55	-.28
8 Seed weight / plant								-.57	+ .78**	+ .64**
9 Seed yield / ac.									+ .48	-.59*
10 Seed oil content.										+ .67*
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