Effect of Sowing Date on yield and Insects Infestation Of Some Different Rapeseed Cultivars

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ABSTRACT

This investigation was conducted during 1999/2000 and 2000/2001 at El-Serw Agricultural Research Station, north of Egypt. The purpose was to study the impact of sowing dates (1st Oct., 10th Oct., 1st Nov., 15th Nov. and 1st Dec.) on growth, yield and insects (aphids and beetles) infestation during flowering of three rapeseed cultivars (*Brassica napus*) e.g.El-Serw4, Pactol and Line 213 (early, med, late flowering respectively) . Results revealed that sowing dates significantly affected all estimated characters in the two seasons. Early sowing dates (1st and 15th Oct. as well as 1st Nov.) were associated with the lowest insects (aphids and beetles) infestation. The highest seed and oil yields/ha were obtained with sowing rapeseed on 1st Nov. However, the late sowing (1st Dec.) resulted in the highest insects infestation and the lowest seed and oil yields/ha. The examined cultivars significantly varied in days to flowering, growth and yield. El-Serw4 produced the highest seed , oil yields/ha and the lowest insects infestation in both seasons of study. In general, it can be recommended with sowing El-Serw 4 on 1st Nov. to minimize aphids and beetles infestation and to produce the highest seed and oil yields production under this study conditions.

Key wards: *Brassica napus* ,sowing date, infestation, aphids, beetles, seed and oil yields.

INTRODUCTION

Sowing date of rapeseed (*Brassica napus*) is an important determinant of length of growing season, insect's infestation, seed and oil yields in rapeseed. Decreasing yields with delayed sowing date have been reported in previous studies (Mendham et al. 1981; Walton et al. 1999 and Farre, *et al* 2001). Leto *et al.* (1995) found that sowing on mid-November produced the highest seed yield / ha compared with sowing on 31 October, 30 November or mid-Dec. Nehra *et al.* (1997) found that seed yield of *Brassica campestris,* L. decreased as sowing date was delayed. Sharief and Keshta (2002) stated that early sowing of canola on 5th Nov. resulted in marked increases in plant height, number of branches / plant as well as seed yield / plant, seed, biological and oil yields, compared with that sown on 15th Oct. and 25th Nov. However, the highest seed oil percentage was obtained from early planting on mid-Oct. Leilah, *et al* (2003a) stated that early sowing of mid Oct. was associated with the highest leaf area, plant duration, plant height, number of lateral branches and pods / plant, seeds / pod, 1000-seed weight, seed weight/ plant as well as seed and oil yields/h. CV Marnoo exceeded others cultivars in seed yield and seed oil content. Leilah *et al* (2003b) under the conditions of Saudi Arabia stated that canola genotypes significantly varied in seed and oil yields/ha. Pactol CV recorded the highest number of pods/plant and 1000-seed weight. Meanwhile, El-Serw8 surpassed the other two-tested canola cultivars in plant height, stem diameter, seed weight/plant and harvest index. Maximum seed and oil yields/ha were produced from Pactol and Al-Serw8 without marked differences.

The present investigation was setup to find out the suitable sowing date and the best rapeseed cultivar that could be applied to raise the production and to minimize the degree of insect (aphids and beetles) infestation under the north of Egypt conditions.

MATERIALS AND METHODS

Two field experiments were carried out during the two winter seasons of 1999/2000 and 2000/2001 at El-Serw Agricultural Research Station, north of Egypt. The purpose was to study the effect of five sowing dates, i.e., 1st Oct., 10th Oct., 1st Nov., 15th Nov. and 1st Dec. on growth, yield and some insects e.g. aphids (*Rhopalosiphum peseudubrassicea* Davis) and beetles (*Potsia copria* &*Tropinal asqualia*) infestation during flowering of three double zero rapeseed cultivars, namely El-Serw 4 (early flowering), Pactol (med flowering) and Line 213 (late flowering). A regular split plot design with for replicates was used. The main plots were assigned to sowing dates, while the sub plots were assigned to the examined rapeseed cultivars. The experimental unit included 7 ridges 60 cm in width and 5.0 m length, occupying an area of 21.0 m^2. All agricultural practices were done as recommended for ordinary rapeseed production under flooded irrigation. Days from sowing to 50% flowering were estimated. At harvest, five guarded plants were labeled from each experimental unit, seed yield (g/plant) and 1000-seed weight (g) were estimated. Plants in the two central ridges in each

plot were harvested for seed yield/m^2, which converted to record seed yield (t/ha). Seed oil percentage was determined according to A.O.A.C. (1984), Oil yield (t/ha), was calculated by multiplying seed yield (t/ha) by seed oil percentage. Levels of aphids and beetles infestation were recorded during flowering stage.

Obtained data were subjected to the proper analysis of variance, according to Gomez and Gomez (1984). The least significant difference (NLSD) procedure at 0.05 % level of significant was used to compare the treatment means. Computations were done using SAS, Version 8 (SAS, 2001).

RESULTS AND DISCUSSION

Data in Table 1 show significant differences for sowing date on aphids and beetles infestation percentages, number of days from sowing to 50 % flowering and seed weight/plant in both seasons. Aphids and beetles infestation percentages were significantly increased as sowing date delayed after 1st Nov. The highest aphids and beetles infestation percentages were noticed with the latest sowing date (1st Dec.) which reached 13 and 27.5% for aphids and beetles, over both seasons, respectively. Sowing of 15th Nov. came in the second rank in the infestation with aphids and beetles, recording 7.8 and 9.8 % for aphids and beetles, over both seasons, respectively. However, the differences in aphids and beetles infestation noticed with the first, second and third sowing dates were not significant in both seasons. The increase of insects (aphids and beetles) infestation with the delay of sowing date might be attributed to the increase in temperature and the relative humidity particularly at flowering period which promoted the aphids and beetles infestation. The data shows that C.v. Serw4 has the lowest insect's infections because it's flowering earliness. Early (1st Oct.) and late (1st Dec.) sowing dates were associated with marked decreases in number of days from sowing to 50 % flowering. The longest period to 50 % flowering was noticed with sowing plants on 1St Nov. In both seasons of study, early and intermediate sowing dates (from 1st Oct. to 15th Nov.) resulted in significant increase in seed weight/plant, compared with the latest sowing date (1st Dec.). The highest seed weight/plant (30.2 g, over both seasons) was obtained with the third sowing date (1st Nov.). However, sowing dates of 15th Oct. and 15th Nov. came in the second and third ranks without significant differences in seed yield/plant, which recorded 29.7 and 28.2 g/plant, respectively. Data in Table 2 show that 1000-seed weight, seed oil content as well as seed and oil yields/ha were significantly affected by sowing dates in both seasons of study. 1000-seed weight was markedly decreased with the latest sowing date (1st Dec.). The differences in 1000-seed weight obtained with the early and intermediate sowing dates were not significant. Seed oil content was also decreased with the latest sowing date (1st Dec.). Sowing canola on 15th Oct. and 1st Nov. was associated with the highest mean of seed oil contents (42.6% and 42.9%) in the first and second seasons, respectively. Similar results were reported by Sharief and Keshta (2002) and Leilah, *et al* (2003) reporting that the early sowing date (5th Nov. – 15th Oct.) was associated with the highest seed weight/ plant and 1000-seed weight. Maximum seed (3352.5and 3205.0 kg/ha) and oil yields (1423.2 and 1373.8 kg/ha) in the first and second seasons were obtained with sowing canola on 1st Nov. However, sowing dates on 15th Oct. and 15th Nov. came in the second and third ranks without significant differences in seed and oil yields/ha, which recorded 3275.0 and 3047.5 kg seeds/ha and 1395.8 and 1296.4 kg oils/ha in the first and second seasons, respectively. The increase in seed yield with the early sowing of 15th Nov. might be due to the long plant duration and the suitable climatic conditions for canola growth, especially at flowering period and seed formation stages and hence 1000-seed weight was increased in the addition to the less infestation with aphids and beetles. On the contrast, the decline in seed and oil yields caused by delayed sowing (1st Dec.) was due to the reduction in growth duration which associated with the great reduction in seed weight/plant and 1000-seed weight. Similar findings were reported by Sharief and Keshta (2002) and Leilah, *et al* (2003).

The tested canola cvs. significantly varied in percentages of aphids and beetles infestation, number of days from sowing to 50 % flowering, seed weight/plant, seed oil content as well as seed and oil yields/ha, and this was obvious in both seasons of study (Tables 1 & 2). On the other side, 1000-seed weight was not affected by the examined canola cultivars, in the two seasons. Aphids and beetles infestation was significantly varied among the examined canola cultivars, in both seasons. The minimum infestation with both of aphids and beetles was noticed with El-serw4, pactol came in the second rank in its infestation with aphids and beetles, while the highest aphids and beetles infestation percentages were observed with Line 213. Over both seasons, the longest period to 50 % flowering (111 days) was associated with Line 213; however Pactol cultivar ranked the second (103 days). Meanwhile, El-Serw4 was the earliest cultivar in days to 50 % flowering (89 days). The highest seed weight/plant (29.2 g) was obtained from El-Serw4, followed by Pactol (26.6 g/plant). On the contrast, the lowest seed weight/plant (25.0 g) was obtained from Line 213. The highest seed oil content (42.9%) was obtained from Pactol, followed by El-Serw4 who came in the second rank producing 42.4 %, while the lowest seed oil content (41.7%) was taken from Line 213.

Table 1. Aphids and beetles infestation (%), number of days from sowing to 50 % flowering and seed weight (g/plant) as affected by sowing dates and rapeseed cultivars in 1999/2000 (I) and 2000/2001(II) seasons.

	Aphids infestation %		Beetles infestation %		Days to 50% flowering		Seed weight (g/plant)	
Treatments	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
Sowing date								
1 Oct.	0.0	0.0	0.0	1.3	93.2	96.2	29.1	22.7
15 Oct.	0.0	0.0	0.0	0.0	99.6	102.5	30.7	28.7
1 Nov.	4.7	0.8	1.0	4.3	105.8	106.5	32.8	27.6
15 Nov.	6.5	9.0	6.3	13.3	105.8	102.9	29.7	26.6
1 Dec.	13.1	12.8	30.4	24.5	98.1	97.1	20.8	20.4
LSD 5%	3.9	3.8	4.7	4.3	3.2	1.6	3.9	3.8
Canola cultivars								
El-Serw4	2.7	0.2	3.9	6.4	87.0	90.6	30.4	28.0
Pactol	4.1	4.9	8.1	8.8	103.8	101.3	28.7	24.4
Line 213	7.9	8.5	10.7	10.9	110.8	111.2	26.7	23.3
LSD 5%	1.5	1.8	1.8	2.6	1.9	1.4	2.9	1.2

Table 2. Averages of 1000-seed weight (g), seed oil content and oil yields (kg/ha) as affected by sowing dates and rapeseed cultivars in 1999/2000 (I) and 2000/2001(II) seasons.

	1000-seed weight (g)		Seed oil %		Seed yield (kg/ha)		Oil yield (kg/ha)	
Treatments	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
Sowing date								
1 Oct.	3.3	3.4	41.9	42.4	3061.7	2960.8	1283.4	1253.3
15 Oct.	3.3	3.7	42.6	42.5	3275.0	3047.5	1395.8	1296.4
1 Nov.	3.4	3.4	42.5	42.9	3352.5	3205.0	1423.2	1373.8
15 Nov.	3.4	3.2	42.5	42.2	3252.5	2616.7	1382.3	1104.8
1 Dec.	3.0	3.0	41.9	41.5	2110.8	2164.2	885.8	899.4
LSD 5%	0.3	0.3	0.4	0.3	228.0	198.7	95.3	88.3
Canola cultivars								
El-Serw4	3.3	3.5	42.3	42.4	3268.5	3243.5	1383.9	1375.2
Pactol	3.1	3.3	42.9	42.8	2948.5	2574.0	1265.9	1103.9
Line 213	3.5	3.3	41.6	41.7	2814.5	2579.0	1172.6	1077.5
LSD 5%	N.S	N.S	0.2	0.2	178.6	192.5	74.5	79.4

El-Serw4 was the high yielder cultivar in seed (3256 kg/ha) and oil (1379.6 kg/ha), in both seasons. It markedly surpassed both of Pactol and Line 213. However, the differences in seed and oil yields/ha obtained from Pactol and Line 213 did not reach the level of significance at 5 % level of probability in the two seasons. The superiority of El-Serw4 in seed yield / ha might be attributed to its superiority in seed weight/plant because of its wide adoptability to the soil, climatic conditions and the lowest infestation percentage of aphids and beetles.

3. The interaction between sowing dates and rapeseed cultivars effects: The interaction between sowing dates and rapeseed cultivars had significant effects on aphids and beetles infestation as well as seed and oil yields/ha in both seasons. Data graphically illustrated in Fig. 1 show that the lowest aphids and beetles infestation percentages were shown with El-Serw4 in the early sowing dates (1st and 15th Oct.), while the highest infestation percentages were found with Line 213 in the latest sowing date (1st Dec.). Maximum seed and oil yields/ha were produced from El-Serw4 when sown on 1st Nov (Fig. 2). On the other side, minimum seed and oil yields /ha were obtained from Line 213 in the latest sowing date (1st Dec.).

In general, it can be stated that sowing El-Serw4 on 1st Nov. was the recommended treatment for raising seed and oil yields of canola and to minimize the aphids and beetles infestation Under the environmental conditions of the present study.

Fig. (1): Aphids (A) and Beetles (B) infestation (%) in some rapeseed cultivars in different sowing dates.

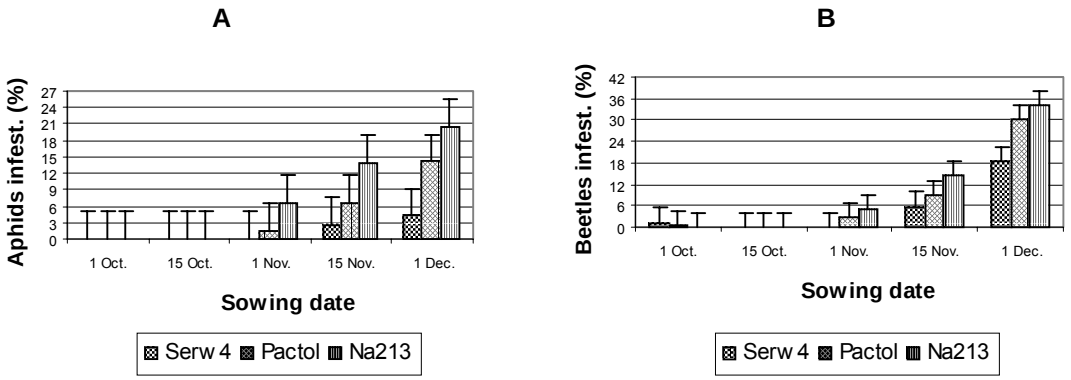
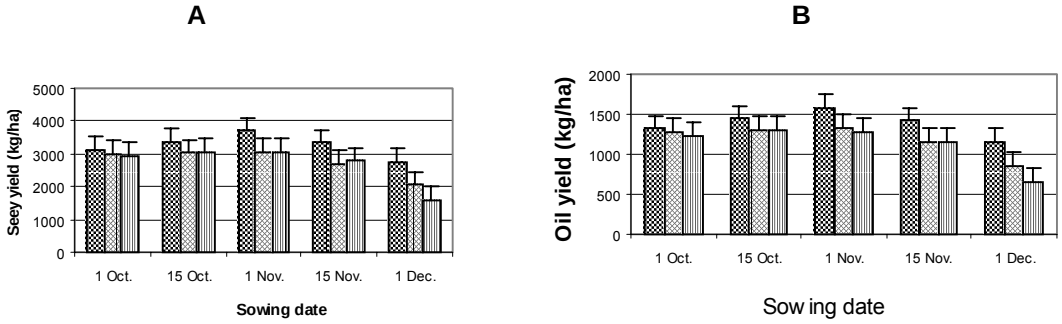


Fig. (2): Seed (A) and oil (B) yields (kg/ha, over both seasons) in relation to the interaction between sowing dates rapeseed cultivars.



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