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Comparison of Different Canola (*Brassica napus* L.)Varieties for Resistance Against Cabbage Aphid (*Brevicoryne brassicae* L.)

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ABSTRACT

The study was carried out during 2002-2003 crop season under the ecological conditions of Multan, Pakistan on 10 canola varieties in the field. Sampling for aphid was done weekly from late February to late March. None of the variety was completely free from aphid (*Brevicoryne brassicae* L.) infestation. Although number of aphids per 10 cm inflorescence was not different among the varieties, maximum seasonal mean aphid population was recorded on Con-I (57.8 aphids), followed by Oscar (55.9 aphids), Con-III (50.5 aphids), Dunkeld (48.9 aphids), Shiralee (45.5 aphids), Westar (41.9 aphids), Con-II (41.6 aphids), Rainbow (36.9 aphids), and Abaseen (35.7 aphids). Minimum aphid population (30.7 aphids / 10 cm inflorescence) was found on K-S-75.

Key Word: Canola; *Brassica napus* L; Resistance; Varieties; Cabbage aphid; *Brevicoryne brassicae* L.

INTRODUCTION

Canola oil, used for cooking and in margarine, is free from cholesterol and reduces cholesterol level in human blood (Syed *et al*., 1999). Pakistan is deficient in edible oil. Local production stood at 0.606 million tons during previous crop year, which was sufficient to meet 29% of the demand and rest of the demand (71%) was met through import (Anonymous, 2003). Increasing local production of oilseed crops can reduce this exchequer.

Canola crop is attacked by a number of pests; among these aphids are more serious. Three species of aphids, i.e., cabbage aphid (*Brevicoryne brassicae* L.), turnip aphid (*Lipaphis erysimi* Kalt.) and green peach aphid (*Myzus persicae* Sulz.) are more abundant and widely distributed (Rehman *et al*., 1987). Of these, cabbage aphid is the most destructive to the members of Brassicaceae. It forms large colonies on leaves, stems and inflorescence, causes severe distortion of leaves and thus heavy losses to the crops. Aphid infested plants show slow growth, which results in seed yield loss of 9-77%. Aphids also cause an 11% reduction in seed oil content (Kelm & Gadomski, 1995).

To overcome these problems, method of biological management such as development of aphid resistant varieties is becoming very popular (Yue & Liu, 2000). This method is not only cost effective but also environmentally safe and compatible with other methods of pest control (Maurya, 1998; Kumar & Sharma, 1999). Keeping in view the importance of canola crop, its yield losses and insect pest severity, it was deemed important to screen the available germplasm for resistance against aphids. So, the main objective of the present study was to screen out the most resistant and / or the susceptible canola cultivars with a view of using them, as a base for some future studies on integrated pest management of aphids.

MATERIALS AND METHODS

The experiment was conducted at the Experimental Farm, University College of Agriculture, Bahauddin Zakariya University, Multan during the crop season 2002-03. The experiment was laid out in a Randomized Complete Block Design with four replicates. The seeds of 10 canola (*Brassica napus* L.) varieties (treatments), viz. Dunkeld, Rainbow, Oscar, Westar, Shiralee, Con-I, Con-II, Con-III, KS-75 and Abaseen were sown in rows by hand drill on 16th October 2003. Plot size was 4.57 m x 1.82 m. Plot to plot distance was 0.91 m. Each plot consisted of four rows with row-to-row distance of 45 cm. Plant-to-plant distance was 10 cm. One bag each of DAP and urea per acre were applied at the time of sowing. The cultural practices were performed through out the growing season uniformly in all the plots.

To determine the degree of resistance, aphid population was recorded at weekly intervals from initiation of aphid attack till maturity. Top 10 cm of shoots of six randomly selected plants (three from each of the two central rows) were beaten gently five times with a 15 cm long stick of pencil thickness. Separated aphids were collected on a piece of white paper sheet and counted. Seasonal mean aphid population was calculated by dividing the total number of aphids counted by the number of sampling dates during the study. The data were subjected to statistical analysis by using ANOVA and LSD test (Steel & Torrie, 1981) to evaluate the effect of canola varieties on aphid population.

RESULTS AND DISCUSSION

Population of cabbage aphid on different sampling dates was non-significantly different on all the tested varieties of *Brassica napus* (Table I). On 23rd February, the number of aphids per 10 cm inflorescence ranged from 5.52 on Abaseen to 23.21 on Dunkeld, while on 1st March, the number ranged from 12.12 on Abaseen to 50.00 on Shiralee.

On 8th March, minimum aphid population of 30.13 was observed on Abaseen, while the maximum of 75.75 was observed on Oscar. On 15th March, it varied form 36.13 on KS-75 to 95.00 on Con-I. On 23rd March, population ranged from 25.50 on KS-75 to 90.58 on Con-I. Seasonal mean population (aphid / top 10 cm inflorescence) was also non-significantly different on all the tested varieties (Fig. 1). These data disagree from those of Hamed and Khattak (1993), Niaz *et al*. (1996) and Aheer *et al*. (1999) for cabbage aphid attack. These differences in the results could be due to differences in the test material / varieties and ecological conditions for the two studies.

None of the variety was free from the attack of *B. brassicae*. However, minimum seasonal mean population was recorded on the variety KS-75 (30.7 aphids), while it was maximum on Con-I (57.8 aphids). Paula *et al*. (1995) found that net reproduction rate and population increase of *B. brassicae* was low on resistant than susceptible varieties of Kale. KS-75 had less aphid population showing some degree of resistance as compared to other varieties Khattak and Hamed (1993) reported that the susceptibility of a crop to insect pests depends on multiple factors including biotic, abiotic and ecological. The most important amongst these could be the crop genetic potential, insect species and the prevailing environment. Therefore, KS-75 is advised to sow early in the season to avoid heavy aphid population.

CONCLUSIONS

Mean number of cabbage aphid per 10 cm of inflorescence on different canola varieties was non-significantly different on different sampling dates. Also the mean seasonal population did not differ in the tested varieties. The variety KS-75 had relatively lower number of aphids and thus was regarded as relatively resistant compared to others.

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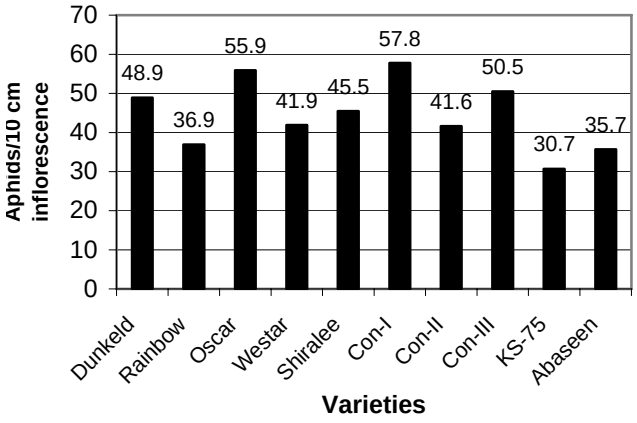
Table I. Mean number of *B. brassicae* per top 10 cm inflorescence of canola on different sampling dates at Multan

Variety	Sampling Date				
	23/02/03	01/03/03	08/03/03	15/03/03	23/03/03
Dunkeld	23.21 n.s	36.21 n.s	40.81 n.s	85.75 n.s	58.50 n.s
Rainbow	12.50	18.04	45.87	45.17	62.83
Oscar	20.17	26.13	75.75	88.83	68.42
Westar	12.67	21.84	32.04	67.21	76.00
Shiralee	10.83	50.00	41.23	62.08	63.13
Con-I	15.17	43.13	57.63	95.00	90.58
Con-II	7.29	32.25	44.79	63.17	60.37
Con-II	11.04	25.92	54.46	91.46	69.09
KS-75	13.79	32.04	58.83	36.13	25.50
Abaseen	5.52	12.12	30.13	56.71	62.63

ns.= non-significantly different.

Fig. 1. Mean seasonal population of *Brevicoryne Brassicae* per 10 cm inflorescence of different canola varieties at Multan during 2003



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