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Relative Resistance among 22 *Brassica napus* Cultivars against Turnip Aphid, *Lipaphis erysimi* Kalt

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Abstract: The experiment on relative resistance and susceptibility among 22 cultivars of *Brassica napus* was laid down and it was observed that cultivars shiralee and hybrid were susceptible to turnip aphid, while the other cultivars were resistant or partially resistant to turnip aphid at leaf stage. The cultivars crusher, hybrid and shiralee were highly susceptible at flowering and the cultivars sponser, deffender, shiralee and cyclone were highly susceptible at seed formation and the oscer and cyclone were susceptible at seed maturity stage. As a whole the cultivar shiralee was highly susceptible while the cultivars hybrid, cyclone, RNB-9604D, deffender and oscer were intermediately susceptible. Similarly the cultivars sponser, CON-III, crusher, KS-75, BULLT, 19-H, dunkled and BLN-971 were partially resistant and the cultivars Yol-9, rainbow, CON-I, CON-II, CCS-01 and BLN-877 showed relative resistance among all 22 cultivars of *Brassica napus* against turnip aphid, *Lipaphis erysimi* Kalt.

Key words: *Brassica napus*, *Lipaphis erysimi* Kalt, relative resistance, susceptibility

Introduction

Rapeseed belongs to family Cruciferae, commonly known as the "Sarson". The term generally refers to *Brassica campestris* and *Brassica napus* is also known as brown sarson (Hatam and Abbasi, 1994). Mankind has been quite familiar with the brassica since the earliest times. These crops play an important role in the oilseed sector, as it is the major source of edible oil. They are also valued for their leaves, stems, flowers, roots, seeds and also as vegetables. They are moreover used as fodder and have medicinal and ornamental value (Huxley *et al.*, 1992).

Pakistan is facing the crucial shortage in edible oil. Presently, the domestic production for edible oil meets only 34% of country's requirements and continued to import large quantities of edible oil to fulfill the local demand at a cost of Rs. 21.4 billions in the form of foreign exchange during 2000-2001 (Anonymous, 2000-2001). The shortage of edible oil is increasing day by day as a result of growing population in the country. Canola belonging to brassica oilseeds can play a significant role in this direction. Rapeseed and mustard crops are conventionally grown for edible vegetable oil and their green leaves are used both for human food and animal fodder (Nasir *et al.*, 1998). These contribute about 16-18 percent edible oil in the domestic production. Presently, it is being cultivated over an area of 327.3 thousand hectares with an annual production of 297.3 thousand tons (Anonymous, 1999-2000).

Aphids are widely distributed throughout the world with the greatest number of species in the temperate regions (Baranyovits, 1973) and they causes 70-80% yield losses in the Sindh province (Rustmani *et al.*, 1998). The turnip aphid, *Lipaphis erysimi* Kalt, is very serious pest of *Brassica napus* in India and Pakistan and reduces the yield by 48-78% (Prasad and Phadke, 1984). Turnip aphid *Lipaphis erysimi* Kalt; is recognized as one of the major constraints in increasing the mustard and rapeseed production in the India (Mathur and Singh, 1986).

In this research, studies were conducted on host plant resistance and susceptibility i.e., relative preference and non-preference among 22 cultivars of the *Brassica napus* (canola) against the turnip aphid, *Lipaphis erysimi* Kalt. As a control measure, plant resistance creates minimal environmental disturbance, as detrimental effects are not produced.

These studies are certainly helpful for the farmers for their choice of best resistant and high yielding cultivars of *Brassica napus*.

Materials and Methods

The trials for the comparative studies on 22 cultivars of canola rapeseed against turnip aphid, *Lipaphis erysimi* Kalt; were conducted in the experimental area of National Oilseed Research Programme at National Agricultural Research Center, Islamabad during autumn 2000-2001. The experiment was laid down in a

randomized complete block design with three replications. The plot size was 2 x 5m² for each variety with 45cm row-to-row distance. Twenty two cultivars of *Brassica napus* (Canola) including dunkled, cyclone, BLN-877, sponser, 19-H, hybrid, shiralee, oscer, CON-III, KS-75, SPS-5, CCS-01, rainbow, BLN-971, CON-II, YOL-9, vanguard, crusher, RNB-9604D, BULLT, deffender and CON-1 were tested to evaluate the relative resistance and susceptibility against turnip aphid, *Lipaphis erysimi* Kalt; among these cultivars.

The cultivar shiralee was kept as standard susceptible check. The crop was raised under recommended agronomic practices, which were kept uniform for all the cultivars.

For data collection, five plants were randomly selected from each treatment and observed at weekly interval. Nymphs and adult aphids were removed with camel hairbrush on a white paper sheet at different plant growth stages i.e. leaf, flowering, seed formation and maturity stages. Number of aphids were counted and released in the same plot. The plants once observed were not selected for subsequent observation. Yield of all the cultivars was recorded after the harvest. Data were analyzed statistically by using the SPSS 7.5 for windows 98.

Results and Discussion

Leaf stage, the cultivars CCS-01, rainbow, BLN-971, CON-II, YOL-9, vanguard, crusher, RNB-9604D, BULLT, deffender and CON-I showed resistance to turnip aphids while the cultivars dunkled, cyclone, BLN-877, sponser, 19-H, oscer, CON-III, KS-75, SPS-5 showed intermediate susceptibility and the cultivars hybrid and shiralee attracted significantly higher number of aphids than the other cultivars and are susceptible at leaf stage of the crop (Table 1). At flowering stage CCS-01 Rainbow, BLN-971, CON-II, YOL-9, vanguard, BULLT, deffender, CON-I, dunkled cyclone, BLN-877, sponser and 19-H showed partial susceptibility to turnip aphid than the crusher, oscer, CON-III, KS-75 were intermediately susceptible to the turnip aphid and the most susceptible cultivars include hybrid, shiralee and RNB-9604D. Similarly at seed formation stage the cultivar cyclone showed higher susceptibility while the cultivars shiralee, sponser and 19-H were intermediately susceptible and the cultivars CON-III, SPS-5, CCS-01, BLN-971 were partially resistant while all other cultivars were resistant to turnip aphid at seed formation stage.

At seed maturity stage oscer and cyclone were most susceptible and the cultivars 19-H, vanguard and crusher were highly resistant to turnip aphid. Based upon Hsiao (1999) the attack of turnip aphid was different at different stages and it was maximum at blooming flowering stage.

The overall performance of cultivars regarding their relative susceptibility and relative resistance (Table 2) depicts that cultivar shiralee is highly susceptible to turnip aphid *Lipaphis erysimi* Kalt;

Table 1: Mean number of turnip aphid on different crop stages

Name of cultivars	Leaf stage	Flowering stage	Seed formation stage	Seed maturity stage
Dunkled	19.56	35.86	28.00	6.70
Cyclone	10.36	26.16	101.80	14.90
BLN-877	14.86	31.83	25.90	4.80
Sponser	11.20	35.93	65.95	7.55
19-H	14.56	31.06	52.75	1.90
Hybrid	25.00	75.83	23.25	2.50
Shiralee	25.43	66.90	61.10	8.55
Oscer	11.76	43.56	36.75	11.10
CON-III	16.56	42.56	43.60	4.70
KS-75	16.70	47.23	33.25	3.85
SPS-5	11.13	34.46	46.75	9.90
CCS-01	8.70	22.50	43.10	7.40
Rainbow	10.00	29.96	21.80	3.05
BLN-971	8.40	25.90	46.75	4.75
CON-II	9.73	24.50	32.95	7.10
YOL-9	8.00	21.70	29.25	4.20
Vanguard	6.40	38.86	43.30	2.95
Crusher	7.83	60.60	30.45	2.90
RNB-9604D	8.53	53.30	60.64	6.86
BULLT	9.50	28.23	47.60	5.65
Deffender	9.20	32.93	86.60	9.75
CON-I	8.50	30.66	25.60	4.30

Table 2: Mean number of turnip aphid at 22 cultivars of *Brassica napus*

Name of cultivars	Mean population
Dunkled	15.60 ± 4.19a
Cyclone	16.96 ± 5.19a
BLN-877	17.76 ± 5.05a
sponser	18.68 ± 3.98a
19-H	19.46 ± 4.84a
Hybrid	20.16 ± 4.45a
Shiralee	20.53 ± 6.76a
Oscer	22.83 ± 8.57a
CON-III	23.62 ± 5.06a
KS-75	24.62 ± 9.04a
SPS-5	24.94 ± 6.50a
CCS-01	25.04 ± 6.22a
Rainbow	26.60 ± 8.95ab
BLN-971	27.20 ± 10.40ab
CON-II	27.44 ± 8.68ab
YOL-9	28.84 ± 8.55ab
Vanguard	31.84 ± 8.92bc
Crusher	31.91 ± 10.90bc
RNB-9604D	34.19 ± 11.20bc
BULLT	34.30 ± 13.40bc
Deffender	35.41 ± 13.60bc
CON-I	41.63 ± 10.40c

Means followed by different letters are significantly different at $P \leq 0.05$

while the cultivars cyclone, hybrid, oscer and RNB-9604D are intermediately susceptible, the cultivars sponser, CON-III, crusher and KS-75 showed partial resistance and the cultivars dunkled, BLN-877, SPS-5, CCS-01, rainbow, BLN-971, CON-II, YOL-9, Vanguard showed relative resistant against turnip aphid *Lipaphis erysimi* Kalt. According to Amjad and Peters (1992) the relative resistance among 36 cultivars of the brassica napus was evaluated

and the cultivar UCD-313/3 performed the best relative resistance to turnip aphid. Among the mustard genotypes *Brassica napus* genotypes showed susceptibility to turnip aphid Rohilla and Singh (1999).

It is concluded that the cultivar shiralee with highest population of turnip aphid showed highest susceptibility, while the cultivars hybrid, oscer and RNB-9604D with less population showed intermediate susceptibility and the cultivars sponser, CON-III, crusher, KS-75 with lesser population showed partial resistance and the cultivars dunkled, BLN-877, SPS-5, CCS-01, rainbow, BLN-971, CON-II, YOL-9, vanguard with least population were resistant to turnip aphid.

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