



## SCREENING OF DIFFERENT VARIETIES/GENOTYPES FOR RESISTANCE AGAINST *HYADAPHIS CORIANDARI* ON FENNEL

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### ABSTRACT

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Ten varieties/genotypes of fennel were screened for their relative susceptibility to aphid, *Hyadaphis coriandari*. The data revealed that none of them found immune to the aphid attack. Based on the statistical categorization ( $X \pm \sigma$  of peak aphid population during the crop season), the varieties/genotypes RF-101, UF-205 and RF-143, were categorized as less susceptible had aphid population below 68.25 aphids per plant. The five varieties/genotypes viz., RF178, UF-207, FNL-15, RF-125 and FNL-14 harbored aphid population between 68.25 to 108.93 aphids per plant and were categorized as moderately susceptible. The varieties/genotypes UF-206 and FNL-12 had aphid population more than 108.93 aphids per plant were categorized as highly susceptible. The morphological characters were observed to correlate their relationship with aphid incidence. The days taken for 50 per cent flowering were positively correlated with aphid population being more number of days taken for 50 per cent flowering by FNL-12 (highly susceptible) and less by RF-101 (less susceptible). The umbels per plant were also positively correlated with aphid population being maximum in FNL-12 and minimum in RF-101. The seeds per umbel were negatively correlated with aphid population. The maximum number of seeds per umbel was recorded in RF-101 whereas; it was minimum in UF-206.

### INTRODUCTION

Fennel (*Foeniculum vulgare* Mill.) belongs to family *Apiaceae*, commonly known as *Saunf*, one of the important condiments produced in India for domestic and export purpose. It is native of Southern Europe and Mediterranean region; India is said to be the "Home of spices". In India it is cultivated in an area of 48.53 thousand hectare having an annual production of 62.25 thousand tones with a productivity of 1283 kg ha<sup>-1</sup> (Anonymous, 2008). Besides, India it is cultivated in Russia,

Germany, Italy, Japan, Argentina and U. S. A. (Pruthi, 1976). Rajasthan is the largest producer of fennel in India. In Rajasthan, it is cultivated in an area of 9095 ha with annual production of 7629 tones and productivity of 839 kg ha<sup>-1</sup> (Anonymous, 2008). The fennel growing districts in Rajasthan are Sirohi, Tonk, Jodhpur, Baran, Pali, Bikaner, Dausa, Alwar, Sawai Madhopur and Jaipur. The seed of fennel contain 9.5 per cent protein, 10.0 per cent fat, 18.5 per cent crude fibre, 42.3 per cent carbohydrates and 13.4

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per cent minerals and also rich in vitamins and volatile oil (Pruthi, 1976). Fennel seed for its fragrant odour and pleasant aromatic taste is widely used in soups, pickles, pastries, confectionaries, and meat dishes. Fennel is used as important ingredient in several allopathic as well as ayurvedic medicines. Dried fruits of fennel used as a masticating or for chewing alone or in *paans*.

Insects are one of the major limiting factors for higher production of fennel. Among the insect pests, aphid, *Hyadaphis coriandari* (Das) was reported as a major pest of fennel in Rajasthan and other parts of country. (Bhargava et al., 1971; Kanwat, 1988 and Jat, 1993; Kumar and Sagar, 1994; El-Kordy et al., 1999; Beltrame and Salto, 2000 and Choudhary, 2006). Since certain varieties are more preferred by a pest as compared to other or some may bear the losses caused by the pest, the study of the population of aphid on different varieties/genotypes of fennel would be done with a view to find out the least susceptible varieties against fennel aphid

#### MATERIALS AND METHODS

The present investigations were conducted at Agronomy Farm, College of Agriculture, Bikaner during *rabi*, 2008-09. The experiment was laid out in a randomized block design (R.B.D.). The seeds of 10 varieties/genotypes (treatments) were sown on 30<sup>th</sup> October, 2008 each replicated thrice. The plot size was 3 x 2 m<sup>2</sup> with the row to row and plant to plant distance of 40 and 15 cm, respectively. The observations on aphid population were recorded at weekly interval from the appearance of aphid till the harvesting of the crop. The aphid population was counted visually on three umbels (lower, middle and upper) of five plants were randomly selected and tagged in each plot the experiment was left for natural infestation. The data obtained on aphid population from the experimental field were transformed into  $\sqrt{x} + 0.5$  values (Panse and

Sukhatme, 1967) and recorded during the crop season was categorized on the basis of the mean of the peak aphid population  $\pm$  standard deviation.

Morphological characters of plants *viz.*, days to 50 per cent flowering, umbels per plant and seeds per umbel were recorded during the crop growth and at harvest of the crop from five randomly selected plants. The correlation coefficient (r) between peak aphid population with days to 50 per cent flowering, umbels per plant and seeds per umbel were also determined by subjecting the data to simple correlation coefficient (r).

#### RESULTS AND DISCUSSIONS

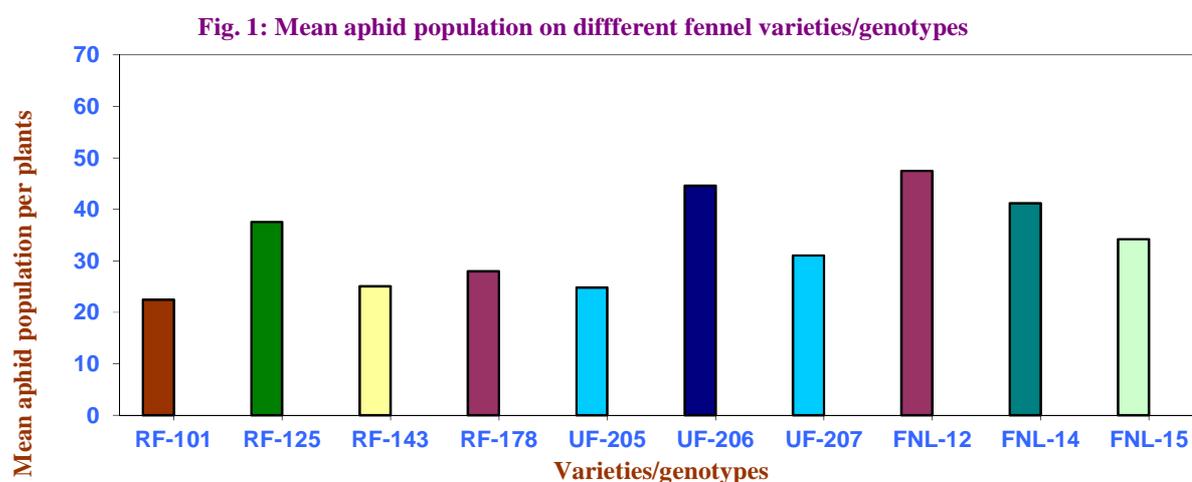
The data presented in Table 1 and Fig. 1 revealed that the ten varieties/genotypes of fennel were screened for their relative susceptibility to *H. coriandari* during *rabi* - 2008-09. The aphid population reached to its peak during third observation taken on 11<sup>th</sup> standard meteorological week where such range was between 61.90 to 118.25 aphids per plant. The minimum population (61.90) was observed on RF-101 and was comparable to UF-205 (68.07) and RF-143 (68.25) while, RF-143 differed significantly from RF-178, UF-207, FNL-15 and RF-125 which harbored 76.00, 83.20, 90.35 and 98.25 aphids per plant, respectively. The maximum population was recorded on FNL-12 (118.25) followed by UF-206 (114.50) and both were statistically at par to each other but FNL-12 differed significantly with FNL-14. The variability of susceptibility in fennel varieties/genotypes during peak aphid population was: RF-101 < UF-205 < RF-143 < RF-178 < UF-207 < FNL-15 < RF-125 < FNL-14 < UF-206 < FNL-12.

The results on relative susceptibility of fennel varieties /genotypes revealed that none of the variety or entry was found completely free from aphid attack. RF-101, UF-205 and RF-143 were found less susceptible whereas, UF-206 and FNL-12 were found highly susceptible. However, RF-178, UF-207, FNL-15, RF-125 and FNL-14 were existed moderately susceptible.

Table 1: Mean population of *H. coriandari* on different varieties/genotypes on fennel

Varieties/genotypes	Mean aphids population/ plant on different Varieties/genotypes						Mean
	Standard meteorological weeks of observations						
	(9)	(10)	(11)	(12)	(13)	(14)	
RF-101	3.33 (1.95)*	14.20 (3.83)	61.90* (7.89)	34.60 (5.92)	20.00 (4.52)	0.70 (1.09)	22.46 (4.79)
RF-125	8.35 (2.97)	26.45 (5.19)	98.25 (9.93)	56.85 (7.57)	32.10 (5.70)	3.35 (1.96)	37.56 (6.16)
RF-143	4.15 (2.15)	16.35 (4.10)	68.25 (8.29)	38.65 (6.25)	22.00 (4.74)	1.15 (1.28)	25.09 (5.05)
RF-178	5.10 (2.36)	18.45 (4.35)	76.00 (8.74)	42.55 (6.56)	24.33 (4.98)	1.55 (1.43)	28.00 (5.33)
UF-205	4.00 (2.12)	16.00 (4.06)	68.07 (8.28)	38.00 (6.20)	21.85 (4.72)	1.00 (1.22)	24.82 (5.03)
UF-206	10.75 (3.35)	32.60 (5.75)	114.50 (10.72)	67.20 (8.22)	37.45 (6.16)	4.95 (2.33)	44.58 (6.71)
UF-207	6.05 (2.55)	21.00 (4.63)	83.20 (9.14)	47.35 (6.91)	26.65 (5.21)	2.05 (1.59)	31.05 (5.61)
FNL-12	12.00 (3.53)	36.00 (6.04)	118.25 (10.89)	72.33 (8.53)	40.35 (6.39)	5.85 (2.51)	47.46 (6.92)
FNL-14	9.50 (3.16)	29.70 (5.49)	107.15 (10.37)	61.70 (7.88)	35.00 (5.95)	4.05 (2.13)	41.18 (6.45)
FNL-15	7.20 (2.77)	23.75 (4.92)	90.35 (9.53)	52.10 (7.25)	29.25 (5.45)	2.70 (1.78)	34.23 (5.89)
S. Em $\pm$	0.070	0.102	1.147	0.100	0.085	0.067	0.102
C.D. at 5%	0.20	0.30	0.43	0.35	0.25	0.20	0.30

\* Figures in parentheses are  $\log \sqrt{x+0.5}$  values \*\* Peak aphid population during crop seasons



The present finding are in agreement with that of Choudhary (2006) screened 15 varieties/entries of fennel for the relative susceptibility against aphid, and reported UF-178, UF-177 and RF-101 as least susceptible, whereas, UF-133 and local variety as highly susceptible. However UF134, UF-144, UF-179, HF-116, JF-234, JF-303, JF-332, NDF-6, RF-125 and GF-1 were existed moderately susceptible. Jain and Yadava (1988), Meena (1993) and Lekha (2002) also found significant differences among the coriander varieties/genotypes in their susceptibility to aphid.

The morphological characters viz., days to 50 flowering were positively correlated with aphid population in present investigation (Table2). The variation in resistance against aphid by different varieties of fennel may be due to early / late flowering habit. It has been reported that aphid incidence was generally more severe on the late flowering varieties than early flowering, because the aphid preferred to infest the inflorescence.

For the sake of convenience in expression, the peak aphid population on fennel varieties /genotypes recorded was categorized on the basis of formula:

$$\bar{X} \pm \sigma.$$

Where,  $\bar{X}$  = mean of peak aphid population (93.70),

$\sigma$  = Standard deviation (25.69)

The categorization were made as  $93.70 \pm 25.69$

**Table 2 Categorization of fennel varieties/genotypes against *H. coriandari***

S. No.	Aphid population per plant	Varieties	Category
1.	Below - 68.25	RF-101, UF-205 and RF-143	Less susceptible
2.	68.25 to 108.93	RF-178, UF-207, FNL-15, RF-125 and FNL-14	Moderately Susceptible
3.	Above – 108.93	UF-206 and FNL-12	Highly susceptible

The varieties /genotypes with aphid population below 68.25, 68.25 to 108.93 and above 108.93 aphids per plant were regarded as less susceptible, moderately susceptible and highly susceptible, respectively. In the present findings, the morphological characters, days to 50 per cent flowering ( $r = 0.896$ ) and umbels per plant ( $r = 0.695$ ) were positively correlated with peak aphid population. However, seeds per umbel had negative correlation. ( $r = -0.902$ ). The results of present finding are in agreement with that of Choudhary (2006) who found positive correlation of days to flowering and umbels per plant with peak aphid population. However, seeds per umbel had negative correlation. The present results also corroborates with those of Jain and Yadava (1988) concluded that the aphid incidence was generally greater on the late flowering varieties of coriander as compared to early flowering one also support the present finding.

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