Journal of Plant Protection
Vol. 31, No. 2, Summer 2017, P. 33

نشریه حفاظت گیاهان (علوم و صنایع کشاورزی)
جلد ۳۱، شماره ۲، تابستان ۱۳۹۶، ص. ۳۳

Resistance of Four Canola Genotypes Against Cabbage Aphid *Brevicoryne brassicae* (L.)

S.H. MousaviAnzabi[1]*

Received: 04-03-2015
Accepted: 07-02-2017

Introduction: Canola (*Brassica napus* L.) is one of the prominent oil seed plants in Iran. This plant has good agricultural and food nourishment properties, such as resistant to drought, cold and salinity stresses and low level of cholesterol. Cabbage waxy aphid *Brevicorynebrassicae* (L.) is the most important and cosmopolitan pest of cruciferous crops. This aphid is reduced 9 to 77% grain yields and up to 11% oil content. Developing environmental-friendly methods, such as deploying insect-resistant varieties to pest control was advised by scientists. Resistant varieties decrease production costs and can be integrated with other pest control policies in IPM programs. In a greenhouse experiment plants of cabbage, cauliflower wassusceptible host plant and broccoli, turnip, rapeseed, showed resistance to cabbage aphid. With the aim of identifying the existence of resistance resources, a laboratory study was conducted to evaluate the effects of seven canola genotypes on biological parameters of cabbage aphid. Detected resistant variety could be used as a resistance source.

Material and Methods: In order to resistancy evaluation of canola, genotypes contain "RGS","Hyola-308","Hyola-401" and "Sarigol" to cabbage aphid, two experiments was conducted under field and greenhouse conditions in Kahriz region of West Azerbaijan province in 2010.In this study infestation index and tolerance in Field conditions and antibiosis study in greenhouse conditions was evaluated.To study antibiosis, genotypes were planted in pots with 10 replications based on completely random design and cabbage aphid population intrinsic rate of increase (r_m) was calculated. As followed: (Lotka 1924): $1=\sum_{\beta}^{\alpha} e^{-rx} l_x m_x$other population parameters computed by Carey (1993) method.

Field experiment contains10 replications wereperformed based on complete randomized blocks experimental designs that five of them were under natural infestation and five others, free of infestation (control). To evaluate the mechanism of genotype resistance, infestation index and functional yield loss in the field was used. Infestation rate was measured as followed:

$Ii = P \times L \times N$

P was the percentage (%) of infested canola plant, L; mean length (cm) of infested stem and N; the number of aphid at per centimeter. Infestation indices values were normalized with $\sqrt{Ii+0.5}$. To calculate mean length of infested stems, 10 plants were selected randomly each plot. For measuring of mean aphid population per centimeter, 100 infested stems were randomly selected. Infestation percentage obtained with the accounting of infested plants on plots, that had more than one-centimeter infestation. Functional yield loss calculated as followed:

$$\text{Functional plant loss} = \frac{Control - stress}{control} \times 100$$

Finally, PRI calculated (Webster et al., 1987). Combined analysis of variance was done byMSTAT-C software. Also, excel was used to drawing charts and some calculations.

Results and Discussion: ANOVA of the normalized data showed the highly significant differences ($p\leq1\%$) in infestation index rates among the studied genotypesand sampling times. The analysis of the resulted data of yield loss and its component indices based on Complete Random Blocks Design indicated significant differences ($p\leq1\%$) between genotypes. The simple ANOVA of theantibiosis experiment data indicated significant differences ($p\leq1\%$) in population intrinsic rates of growth (r_m) of cabbage aphid. Finally, the genotype of "Sarigol"had the highest Plant resistance index (PRI) in comparison withother genotypes. Intrinsic rate of increase (rm) depends on the percentage of surviving nymph, developmental time, duration of nymph and fecundity of insect. Therefore this character is an important component of resistance to reflect antibiosis effects and determining the degree of resistance. In their experiment, Okapi was known resistant genotype. To evaluate canola genotype resistance to cabbage aphid different methods were applied by researchers including: number of existence colonies and aphid in primary of infestation stage, colonies with more than two centimeters infestation

1- Assistant Professor Agriculture Department, Khoy Branch, Islamic Azad University, Khoy, Iran
(*- Corresponding Author Email: mousavianzabi@gmail.com)

and index that contains the percentage of infestation in a plot multiplied by means of infected stem length.

Yield and yield loss are the main factors that can indicate tolerance or susceptibility of genotypes. In PRI evaluation all case of genotypes resistance to pest such as antibiosis, antisenseand tolerance was studied, it seems PRI is a good method to know resistance degree of genotypes.

Keywords: Antibiosis, Infestation index, Plant resistance index, Tolerance, West Azerbaijan