POST HARVEST LOSSES IN RAPESEED CAUSED BY APHID PESTS

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Abstract

Mustard aphid, Lipaphis erysimi /Kalt./ and green peach aphid, Myzus persicea Sulzar appeared as the major aphid pests on Brassica campestris Var.brown "sarson" in Haryana, India. Incidence of L.erysimi and M.persicae resulted in 5.62 per cent and 2.93 per cent reduction in oil content of the damaged seeds. Protein content was severely affected by both the aphid species under those agronomic practices where nitrogenous fertilizer was not applied for the plants i.e. unfertilized irrigated /only irrigation/ and unfertilized-unirrigated condition. Total losses in protein contents of damaged seeds were 4.30 and 1.89 per cent for L. erysimi and M.persicea, respectively. The reduction in sugar content was more pronounced. Sugar content was 85.11 per cent less in damaged seeds for L.erysimi incidence and 72.34 per cent for M.persicea. Surprisingly there was an increase in free fatty acid /FFA/ content for the both aphid species in damaged seeds. The increase was 26.21 per cent for L.erysimi and 26.65 per cent for M.persicea incidence over protected seeds which resulted in rancidity of oil in damaged seeds.

Introduction

Mustard aphid, Lipaphis erysimi /Kalt./ is considered as the important limiting factor in decimating the production of rapeseed and mustard in India. Besides the losses in seed yield /35.4 to 73.3 per cent/ it also causes ample loss in the quality of seeds, which usually goes unnoticed /Peswani at.al., 1968; Nath and Saha, 1974; Bakhetia,1983/. Thus during the present studies the attempt have been made to ascertain the qualitative losses in Brassica campestris

caused by mustard aphid, L.erysimi and green peach aphid, Myzus persicae /Sulzer/.

Methods and materials

Rapeseed, B.campestris Var.brown "Sarson" /BSH-I/ was grown under 4 sets of agronomic practices i.e. fertilized /60 kg N/ha/, irrigated /one irrigation 40 days after sowing/, fertilized; unirrigated, unfertilized; irrigated and unfertilized; unirrigated conditions at the experimental farm of Haryana Agricultural University, Hisar, India. The experiment was laid out in randomized block design in a plot size of 5.1 x 5 m and was replicated 6 times. Spacings of 30 x 15 CM /rows x plants/ were maintained. The crop was allowed to be infested with aphids, as no plant protection measures were undertaken.

The infested plants with each aphid species under each set of agronomic practices were brought to the quality laboratory at harvest. Seed samples were dried at 80°C, ground and sealed in glass vails. The oil content was estimated by N.M.R. /Nuclear Magnetic Resonance/. Nitrogen content was estimated by conventional Kjeldhal's method while crude protein was calculated by multiplying the figures for nitrogen content by 6.25. Total sugars were estimated by the method described by Hulme and Narian /1931/. Free fatty acids were determined by the method of A.O.A.C. /1960/.

Results and discussion

Mustard aphid, L.erysimi caused more qualitative yield losses in rapeseed as compared to green peach aphid, M.persicae /Table I/. The pertinent reason for it was the lower population of M.persicae per plant as compared to L.erysimi. The incidence of erysimi resulted in more reduction in oil content /5.62 per cent/ than M.persicae /2.93 per cent/, Table 2/. Peswani et.al., 1968, and Nath and Saha, 1974 also found that the damaged seeds of mustard by L.erysimi had less oil content. Feeding by both the aphid species affected the protein content, but no apparent loss was noticed under those treatments where

nitrogen was applied to the plants at sowing time. This suggested that reduction in protein content of seeds was compensated by the additional nitrogen application. Even than the damage in protein content was noticed 1.89 and 4.30 per cent in case of L.erysimi and M.persicae respectively. Sugar content was the most preferred by both the aphid species for feeding. L.erysimi incidence resulted in /72.34 per cent/ reduction in sugar content of seeds whereas M.persicae caused 85.11 per cent reduction. Surprisingly M.persicae preferred more to the protein and sugar contents as compared to L.erysimi, while the population of farmer was quite low. Thereby suggests that even the low incidence of M.persicae should not be ignored. However, Nath and Saha /1974/ were of the view that with the increased degree of mustard aphid infestation the protein and sugar contents of damaged seeds of mustard increased.

Free fatty acid /F.F.A./ content was observed more /26.21 and 26.65 per cent in case of M.persicae and L. erysimi, respectively/ in the damaged seeds. The increase in F.F.A. was the resultant of the hydrolysis of oil/fat /tryglicroids/ which was possibly accelarated by the increase in the activities of lypease enzyme, by the feeding of aphids. These findings are in line with Singh et.al. /1980/ who observed the increase in F.F.A. contents of damaged seeds of mustard by Bagrada cruciferarum /Kirk./.

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Table 1. Population of aphid pests under various agro - - management practices in rapeseed.

Agronomic practice	AV.aphids population/plant /centraltwing/ 5 days before harvest	
	L.erysimi	M.persicae
Fertilized, irrigated	114.42	17.44
Fertilized, unirrigated	93.60	28.74
Unfertilized, irrigated	96.65	15.94
Unfertilized, unirrigated	102.27	13.34

Table 2. Qualitative yield losses caused by aphids in rapeseed

A. Lipaphis erysimi (Kalt.)

Character	Set of agronomic practices				Standard No. aphid incidence	Percent decrease/ increase
	Fertilized; irrigated	Fertilized; unirrigated	Unfertilized; irrigated	Unfertilized; unirrigated		
Oil content(percent)	45.83	43.78	44.73	45.07	47.52	5.62
Sugar content (Percent)	1.44	1.65	1.02	1.50	5.07	72.34
Free Fatty Acid(Percent)	0.858	0.702	0.776	0.805	0.620	26.65×
Protein content (Percent)	25.75	25.56	24.06	23.25	25.14	1.89
B. Myzus Persicae (Sulzer)						
Oil content (Percent)	46.14	45.68	46.38	46.32	47.52	2.93
Sugar content(Percent)	0.67	1.46	0.00	0.89	5.07	85.11
Free fatty Acid(Percent)	0.772	0.765	0.759	0.834	0.620	26.21 *
Protein content(Percent)	25.81	24.50	23.56	22.38	25.14	4.30

× Percent increase over standard.