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MONITORING OF ALATE MUSTARD APHID, *LIPAPHIS ERYSIMI* KALT. ON YELLOW STICKY TRAPS AND ITS RELATION TO ABIOTIC FACTORS

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ABSTRACT

The alate mustard aphid population was monitored using sticky traps from 2000-2001 to 2003-2004. The first appearance of alate aphid was recorded in the 50th standard week during 2001-2002 and in the 4th standard week during 2002-2003. The initial average population ranged from 0.93 to 19.42 aphids per trap and reached to peak variably depending upon the weather parameters from 9th to 12th standard week in different years of study.

Key words: Alate mustard aphid, sticky trap, weather parameters.

INTRODUCTION

Rapeseed and mustard crops are highly vulnerable to the mustard aphid (*Lipaphis erysimi* Kaltenbach) that is the key pest. Alate forms determine the initiation of infestation and intensity of attack on the *Brassica* crops. The aphid multiplies gradually and reaches to a peak during December to March in different agro-ecological regions of the country (Bakhetia and Sekhon, 1989). Kulkarny (1953) reported that a mean temperature ranging from 18.8°C to 20.8°C and relative humidity ranging from 60 to 70 per cent was favourable for aphid development. Atwal and Sethi (1963) stated that a temperature below 20°C was found favourable and above that was injurious for multiplication of the mustard aphid. Srivastava and Srivastava (1972) reported that a temperature of 17°C to 18°C and relative humidity between 61 and 83 per cent was found to be conducive for maximum occurrence of aphids. For ensuring effective and economical management of this serious pest in eastern Rajasthan, the alate population was observed and correlated to climatic factors prevailing during the study period.

MATERIALS AND METHODS

The experiment was conducted at National Research Centre on Rapeseed-Mustard, Bharatpur (Rajasthan) for four consecutive years *i.e.* from 2000-2001 to 2003-2004. Traps were made from empty round tin boxes of 1 Kg capacity and painted with yellow colour paint to attract the alate aphids. These traps were placed with the help of iron poles at the height of 2.0 meters above the ground level. The traps were fixed on the bunds/boundaries at the four sides *viz*. east, west, north and south directions of the field. A thin layer of transparent grease was smeared round the tin box twice a week and these traps were observed daily at 10 AM for the count of alate aphids, which adhered on these traps. Daily weather parameters were also recorded from the NRCRM observatory situated near the sticky traps installed and weekly means were worked out. The observations were recorded from October to April regularly on sticky traps.

RESULTS AND DISCUSSION

The alate mustard aphids differed in the timing of their appearance during the 4-year study. The aphid population initiated in the 51st SMW (2000-01), 50th SMW (2001-02), 4th SMW (2002-03) and the 2nd SMW (2003-04). The corresponding initial populations were 0.93, 2.16, 1.0 and 19.4 aphids traps. Similarly, the peak alate aphid population was recorded during the 12th SMW (2000-01) with 86.14 aphids/trap; 9th SMW (2001-02) with 405.6 aphids/trap; 10th SMW (2002-03) with 99.71 aphids/trap and 9th SMW (2003-04) with 847.25 aphids/trap. The population record clearly indicated an increase every alternate year. It was evident that the atrotic factors had a key role in regulating the aphid population.

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Table 1: Alate mustard aphid, *Lipaphis erysimi* in relation to meteorological variables during rabi-2000-2001

Standard Week	Average Aphid Population/trap	Maximum Temperature	Minimum Temperature (°C)	Maximum R.H. (°C)	Minimum R.H. (%)	Rainfall (mm)
51	0.93	24.37	7.14	92.00	29.85	0.00
52	1.36	28.44	6.65	96.97	52.14	0.00
1	3.23	15.15	5.38	98.71	74.00	0.00
2	1.20	18.97	2.57	99.00	41.14	0.00
3	1.23	21.34	2.31	98.71	35.28	0.00
4	5.34	22.23	4.40	90.57	28.14	0.00
5	5.36	22.6	4.83	93.00	30.42	0.00
6	7.23	24.48	4.48	85.28	23.71	0.00
7	28.51	25.00	8.06	87.43	38.28	0.00
8	61.65	27.81	11.16	86.57	33.57	0.00
9	65.33	26.03	7.94	85.43	21.28	0.00
10	49.21	30.16	8.81	80.86	15.71	0.00
11	52.06	31.51	12.14	81.43	23.28	0.00
12	86.14	32.98	14.60	77.86	19.00	0.00
13	41.00	31.91	15.88	71.86	22.43	0.00
14	9.77	36.36	16.38	58.71	11.28	0.00

* Population counts based on four traps.

Table 2: Alate mustard aphid, *Lipaphis erysimi* in relation to meteorological variables during rabi-2001-2002

Standard Week	Average Aphid Population/trap	Maximum Temperature	Minimum Temperature (°C)	Maximum R.H. (°C)	Minimum R.H. (%)	Rainfall (mm)
50	2.16	21.80	7.50	98.60	50.20	0.00
51	3.25	22.12	6.17	98.43	41.71	0.00
52	4.14	20.20	4.89	99.00	58.57	0.00
1	3.74	19.39	4.11	99.00	58.00	0.00
2	2.08	22.41	5.93	98.00	45.86	0.00
3	7.00	19.27	9.44	99.86	69.71	0.00
4	12.85	20.50	4.91	98.57	46.29	0.00
5	33.02	20.99	3.91	98.00	35.86	0.00
6	82.71	19.94	6.74	98.29	54.00	0.00
7	130.91	23.81	7.61	99.00	52.14	0.00
8	235.60	27.06	2.67	96.29	42.86	0.00
9	405.60	25.63	9.91	97.29	42.29	0.00
10	102.02	29.10	9.43	93.42	25.71	0.00
11	22.80	32.42	12.70	89.42	20.71	0.00
12	8.91	35.87	15.81	83.42	16.00	0.00
13	1.40	35.85	15.88	70.67	11.50	0.00

* Population counts based on four traps.

Several workers have reported the role of temperature and relative humidity on the incidence of mustard aphid (Rai, 1961; Pradhan and Pradhan, 1971; Atwal *et al.*, 1971; Srivastava and Srivastava, 1972; Roy, 1975; Bakhetia and Sidhu, 1983 and Ahuja, 1990). Average temperature of 20 to 26°C (maximum and 5.3–10°C (minimum) coupled with

Table 3: Alate mustard aphid, *Lipaphis erysimi* in relation to meteorological variables during rabi-2002-2003

Standard Week	Average Aphid Population/trap	Maximum Temperature	Minimum Temperature (°C)	Maximum R.H. (°C)	Minimum R.H. (%)	Rainfall (mm)
4	1.00	14.50	3.50	81.00	74.00	0.18
5	0.17	22.50	5.80	86.00	58.00	2.94
6	15.51	22.60	9.70	86.00	81.00	0.00
7	26.85	23.60	10.30	82.00	56.00	0.25
8	51.51	25.80	10.30	76.00	42.00	0.82
9	85.45	24.00	11.30	83.00	51.00	0.00
10	99.71	29.00	16.70	81.00	45.00	0.02
11	64.14	25.90	7.30	84.00	20.00	0.74
12	46.48	32.60	15.30	82.00	26.00	0.00
13	27.54	33.20	15.20	85.00	21.00	0.00
14	4.14	34.00	18.90	79.00	16.00	0.00

* Population counts based on four traps.

Table 4: Alate mustard aphid, *Lipaphis erysimi* in relation to meteorological variables during rabi-2003-2004

Standard Week	Average Aphid Population/trap	Maximum Temperature	Minimum Temperature (°C)	Maximum R.H. (°C)	Minimum R.H. (%)	Rainfall (mm)
2	19.42	21.22	5.67	94.85	53.14	0.00
3	28.85	17.57	8.57	97.14	77.14	0.00
4	60.57	18.17	5.77	93.28	63.42	0.00
5	77.14	19.18	5.64	90.57	48.42	0.00
6	64.00	23.78	3.60	89.85	35.00	0.00
7	220.28	25.10	7.00	89.00	38.00	0.00
8	515.28	28.50	9.00	89.00	27.00	0.00
9	847.25	31.60	10.10	84.00	21.00	0.00
10	347.28	32.20	100	80.00	29.71	0.00
11	171.57	37.30	14.30	81.00	16.00	0.00
12	17.00	39.10	17.10	51.00	14.00	0.00
13	1.00	36.20	15.00	47.00	10.00	0.00

* Population counts based on four traps.

65 to 70 per cent relative humidity was found conductive for rapid multiplication of mustard aphid (Anonymous, 1994). The present study conforms to the earlier work that weather parameters affects appearance and the intensity of mustard aphid population in eastern Rajasthan.

REFERENCES

Ahuja, D.B. (1990). Population dynamics of mustard aphid, *Lipaphis erysimi* (Kalt) on Indian mustard, *Brassica juncea*. *Indian Journal of Plant Protection,* **18**: 233-235.

Anonymous. (2005). Agricultural Statistics At A Glance. Directorate of Economics and Statistics (Agriculture Statistics Division), Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India. pp : 70-75.

Atwal, A.S., Choudhary, J.P. and Ramzan, M. (1971). Mortality factors in the natural population of cabbage aphids, *Lipaphis erysimi* Kalt. (Aphididae : Homoptera) in relation to parasites, predators and weather conditions. *Indian Journal of Agricultural Sciences,* **41**: 507-10.

Atwal, A.S. and Sethi, S.L. (1963). Predation by *Coccinella septempunctata* Linn. on the cabbage aphid, *Lipaphis erysimi* Kalt. in India. *Journal of Animal Ecology,* **32**: 484-488.

Anonymous, (1994). Annual progress Report, Rapeseed-mustard, All India Coordinated Research Project on Rapeseed-mustard, Bharatpur, 61 pp.

Bakhetia, D.R.C. and Sidhu, S.S. (1983). Insect pest and there management in rapeseed-mustard. *Journal of Oilseeds Research,* **6**: 269-299.

Kulkarny, H.L. (1953). Life histories studies of aphids. Proceeding of 40th Indian Science Congress, 3 pp. 196.

Prasad, S.K. and Pradhan, S. (1971). Distribution and sampling of mustard aphid, *Lipaphis pseudobrassicae* (Devis). *Indian Journal of Entomology,* **33**: 260-271.

Rai, B. (1961). Three enemies of rape and mustard. *Allahabad farmer,* **35**: 57-60.

Srivastava, A.S. and Srivastava, J.L. (1972). Ecological sudies on aphid, painted bug, and saw fly attacking mustard and rape in India. F.A.O. *Plant Protection Bulletin,* **20**: 136-140.