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Study on Population density by the impact of climate ecological factors.

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Abstract

Observation & Monitoring for three consecutive years of the aphids and whitefly vectors in Lucknow showed sharp distinction in aphid and whitefly incidence. Aphid vectors were *Aphis craccivora*, *A. gossypii*. The temporal appearance of these aphids varied on the host plants. No trap catches were obtained during the summer season but *A. gossypii* survived in summer on *Solanum nigrum*. Whitefly (*Bemisia tabaci*) incidence fluctuated throughout the year with peak incidence in March-April, June and in September-October. Conditions favouring whitefly build up during these periods were variable. In the winter season (Dec. to Feb.) trap catches were low and only pupal instar were observed on *Hibiscus rosa-sinensis*.

Keywords: Population density, climate ecological factors, *Bemisia tabaci*, *Hibiscus rosa-sinensis*

1. Introduction

Aphids and whiteflies are important virus vectors and are highly influenced by meteorological conditions, the aphids preferring cool climate while the whiteflies favour warm humid conditions. The climate of Lucknow is characterized by three sharply defined seasons in a year, hot summer, monsoon, winter. These distinct climate conditions are different from those prevailing in other parts of India. There are very few reports on vector borne virus disease and on vector incidence from this region.

Materials And Methods

These involved vector incidences specially alate vectors of Aphids and whiteflies, experimental plots with cultivated plants and in glasshouse were examined throughout the year for their appearance and colonization. For monitoring purpose yellow sticky traps were used, card board traps used were of 30 cm x 20 cm.

Result

Temporal appearance of aphids on various hosts: The vector aphids most commonly encountered were *Aphis craccivora*, Koch, *Myzus persicae* (Sulz). *A. gossypii* had a wide host range and appeared from January onwards when the minimum and maximum temperature range was 7°C and 22°C respectively. All aphids generally disappeared with the onset of summer and increase in temperature.

Temporal appearance of whiteflies on various hosts: Whiteflies appeared on late winter plants from March-April onwards when the temperature ranged from 25°C to 30°C. They appeared on tomato and *Crotalaria juncea* (L.) (sunnhemp). The whitefly incidence was scanty on the plants during the rainy period in August-September but they reappeared in October-November.

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Aphids emergence on various hosts.

Month	Mean temperature °C		Aphid	Common host
	Max	Min		
January	22	8	<i>Aphis gossypii</i>	<i>Datura, Solanum nigrum, Solanum melongena</i>
March-April	37	18	<i>Aphis gossypii</i>	<i>Solanum nigrum, cucumis sativus, Lagenaria ciceraria</i>

Parameters of incidence

Parameters	Correlation coefficient (r)		
	2001	2002	2003
Mean temperature x whitefly incidence	+0.0106897	+0.3998670	+0.800259
Maximum temperature x whitefly incidence	+0.040276	+0.427652	+0.52210
Minimum temperature x whitefly incidence	-0.00069	0.404321	+0.69431
RH (8.30 A.M.) x whitefly incidence	-0.6997521	-0.132962	+0.0088
RH (5.30 P.M.) x whitefly incidence	-0.800211	-0.0805297	+0.69977

During the winter season (October to February) only the pupal stages were observed on leaves of *Hibiscus rosa sinensis* grown in hedges around the garden.

Incidence of alate aphids and whiteflies in relation to weather variable:

Trap catches from yellow sticky traps at fortnightly intervals for three consecutive years showed differences in population build up but distinct correlation with fluctuations in temperature and relative humidity. The aphids usually appeared in October or November. During all the three years of observation the aphid incidence was negatively correlated with mean, maximum and minimum temperature and positively correlated with the mean relative humidity recorded at 8.30 A.M. and 5.30 P.M.

Whitefly incidence

Trap catches of whiteflies indicated three peaks in a year, viz, in April, May-June, and in September-October (Fig.1.) No trap catches were obtained from December to February. The whitefly incidence was generally positively correlated with mean and maximum temperature and negatively correlated with relative humidity. Conditions broadly favoring whitefly incidence thus appear to be low relative humidity and high mean temperature during summer months, but during post monsoon period the whiteflies occur at higher relative humidity range.

Analytical Discussion

Aphids and whiteflies show sharp distinction in their occurrence in Lucknow in the plains of U.P. Aphids appear to prefer humid conditions with low temperature. *A craccivora* appeared in moderate climate conditions. *A gossypii* probably survives the summer as a black morph in the curled leaves of *S. nigrum* and this aphid appeared earliest on the winter hosts. It also has a wide host range and is the most prolific virus vector (Basu, 1991). The curled leaves of *S. nigrum* probably provide the microclimate needed for the aphid to survive the extreme summer.

References

1. Muniyappa, V. 1980. whiteflies. In *Vectors of Plant Pathogens*, (Ed.) Harris, K.F. and Maramorosch, K. Academic Press, 39-85
2. Summanwar, A.S. 1982. Whiteflies as vectors of plant pathogens. In *current trends in plant virology*, (Ed.)

singh, B.P. and Raychadhuri S.P. Today & Tomorrow Printers & Publishers, New Delhi, 59-72.

3. Nene, Y.L. 1972. A Survey of viral diseases of pulse crops in U.P. G.B. pant univ. agric, Tech Bull no 4, 191 pp.