

Current Environmental Issues and Challenges



EDITORS

Dr. Vilas V. Patil

Dr. Praveen G. Saptarshi

Dr. Digvijay S. Kumbhar

Mr. Agastirishi B. Toradmal

Dr. Ashok Kumar Verma



ISBN- 978-81- 954002-9-4

OCCURRENCE OF APHIDS IN AND AROUND KARJAT, MAHARASHTRA

Pawar S. L.¹ Patil S.S.²

1&2, Department of Zoology Dada Patil Mahavidyalaya Karjat, Dist. Ahmednagar - 414 001.

Email ID- pawar.suman3@gmail.com

ABSTRACT

An investigation is conducted from the month of July 2021 to March 2022 to record the existence and affluence of aphids with their associated host plants in the agricultural fields around Karjat, Maharashtra. The aphids are the sap suckers and are considered as a notable agricultural pest of great importance. About 11 species of aphids belonging to family Aphididae are found during the field investigation. It is observed that, of the 11 species recorded, 5 species of aphids are more detrimental and in turn they disturb major host plants like Milkweed, Butterfly weed, Rubber wine belonging to family Asclepiadaceae, acacia, alfalfa, almendron, green bean of Fabaceae and Hibiscus, Gossypium, Alcea of family Malvaceae and datura, ground cherry, tomato, potato, brinjal of family Solanaceae are the most noteworthy floral species favoured by aphids in the area of Karjat of Ahmednagar district of Maharashtra where the study is conducted. For this survey, the area about 10-12 km area towards east, west, south and north from Karjat of Ahmednagar district was designated. The documentation of aphids is completed by using standard taxonomic keys. The composed data is concise in tabular form.

KEYWORDS: Malvaceae, Fabaceae, Solanaceae, Asclepiadaceae, Aphids, Host plants.

INTRODUCTION

Aphids or plant lice establish one of the most important groups of phytophagous insects because of their polymorphism, host alternation, heteroecious behaviour and reproductive behaviours. They are extraordinary for their role as largest group of insect vector of vegetal viral diseases. These insects are measured as obligatory floral parasites. Several impairment signs are observed in flora as a result of aphid invasions. They relish more or less diverse distribution. Aphids feed by sucking plant juices, causing distortion of young leaves and stunting new growth. Hence, aphids are considered as serious agricultural and horticultural pests (Hill, 1997). The sap-suckers or belongs to order Hemiptera and family Aphidiae are small, slow-moving, soft-bodied inconspicuous insects with piercing-sucking mouthparts that feed in groups near the tips of new shoots and flower buds. They transmit various floral viruses that are pathogenic to their hosts (Schepers, 1987), Honey dew excreted by the aphids attracts saprophytic fungi which cover the leaves leading to reduction of photosynthetic capacity of the host plant (Schepers, 1987).

About 4702 species of aphids are recorded in the world (Agarwal, B. K., 2007) and about 300 species are known as vectors of 300 different viruses, infecting large number of plants (Eastop V.F., 1977) and (A. J. Dhembare, et.al, 2012). Thus, the present investigation reveals some of the aphid species affecting the flora of Karjat and its nearby localities.

Material and Method:

The present investigation is related to the study of aphids from four different sites around Karjat in Ahmednagar district from the state of Maharashtra by considering the limit of 10-15 km to east, west, south and north during July 2021 to February 2022. During this investigation, mostly the leafy vegetables, fruits plants, flowering plants, grasses, weeds, herbs and shrubs are taken into consideration for collection of aphids.

The observed aphids with their host plant material are collected using fine forceps and stored in vials containing 70% ethyl alcohol (A. J. Dhembare, et. al, 2012). The collected aphids are observed under microscope and identified using aphid identification keys (Blackman, R.L. & Eastop, V.F. 2006) and by using internet source.

RESULTS AND DISCUSSION:

The aphid species appear to be more diverse during the cooler months than any other period of the year. There is profusion in insect biodiversity due to specific agricultural zones developed by the farmers in and around Karjat. The village is fenced by number of agronomic and floral farms. Survey of these fields in and around Karjat is conducted for a particular period i.e. during July 2021 to March 2022.

The aphids were observed causing damage to their host plants in agricultural fields, floral farms, gardens and floral grassland. During this survey, it is observed that the crops like sorghum, bajra, wheat, soyabean, maize, castor and brinjal as well as flowers like rose and chrysanthemums having high market value are found to be infested by aphids. 11 species of aphids are collected and identified along with their host plants.

It is observed that the existence of aphids is more in the month of October to March although there were fluctuations in the raining pattern in this study year. Because of the polyphagous feeding habit, aphids are serious pest of almost all agricultural crops as well as floral farms (Minks and Harrewijn, 1987). As they feed upon different parts of plant like leaves, stem, fruits, flowers, blossoms and even roots (Blackman and Eastop, 2000). They cause severe damage to the commercial crops as well as to other host plants.

About 34 host plant species were recorded and it was observed that *Aphis gossypii* became the most common aphid species attacking about 10 plants species in this survey. It is also observed that the winter season is favourable for the growth of aphids as the population of aphids is recorded more in the month of December and January of the investigation period.

Several vegetable farms Around Karjat village producing vegetables like brinjal, lady's finger, tomato, cabbage, green peas, etc. are found damaged by different species of aphids. The severe infestation was observed in Chrysanthemum farm by *A. gossypii* and *Microsiphoniellasanborni* while the cash crop like soyabean was badly destroyed by *A. gycines*.

For prevention of such crop pests, farmers are applying different insecticides. Due to the excessive application of such insecticides, the quality of crop, vegetables or fruits

gets badly affected with some other problems like residues in water, soil, destruction of natural enemies of these pests as well as ecosystem disturbance of that location (Palikhe, 2012). Hence the proper management of aphids through biological control is needed. There should be an integrated pest management programme against aphids and other insect pests along with the applications of eco-friendly pesticides so that the production of crop, its quality and ecosystem of the farm can remain in good condition.

Thus, the conducted survey provides the information about the polyphagus aphid species and their different host plants. By using this information, the changing crop pattern can control the infestation of aphids at certain level, which will result in proper production of crops having good market value, and the farmers can yield considerable production of their crops. Aphids can also be controlled with biological methods, for example, ladybugs that prey on these pests. This approach is more eco-friendly but shows limited control over large infestations.

Table 1: List of host plants and the aphids found associated with them.

Sr.No	Aphid species	Host plants	Common names of host plants
1	<i>Aphis gossypii</i>	<i>Daturametel(L.)</i>	Angel’s trumpet
		<i>Solanumelongea(L.)</i>	Brinjal
		<i>Ricinuscommunis(L.)</i>	Castor
		<i>Hibiscus rosa-sinensi</i>	China rose
		<i>Chrysanthemum sp. (</i>	Chrysanthus
		<i>Gossypiumhirsutum(L.)</i>	Cotton
		<i>Hibiscus mutabalis</i>	Cotton rose mallow
		<i>Cucumissativus(L.)</i>	Cucumber
		<i>Abelmaschuseculent</i>	Lady’s finger
	<i>Urticadioica. (L.)</i>	Stinging nettle	
2	<i>Aphis crassivora</i>	<i>Cajanuscajan(L.Mills</i>	Pigeon pea
		<i>Vignaunguiculata(L.)</i>	Cow pea
		<i>Ocimum sanctum (L.)</i>	Tulsi
3	<i>Aphis nerii</i>	<i>Zea mays (L.)</i>	Maize
		<i>Triticumaestivum(L.)</i>	Wheat
		<i>Vincarosea(L.)</i>	Periwinkle
		<i>Citrus limonium(L.)</i>	Lemon
		<i>Gomphocarpus sp.</i>	Cotton bushes,
		<i>Asclepias(E.mey.)</i>	Milk weeds
4	<i>Aphis fabae</i>	<i>Lycopersiconesculentum(L.)</i>	Tomato
		<i>Tagetesrecta(L.)</i>	Marigold
		<i>Helianthus annuus(L.</i>	Sunflower
		<i>Chenopodium album (L.)</i>	Pigweed
5		<i>Gossypiumhirsutum(L.)</i>	Cotton

	<i>M.persicae</i>	<i>Solanum melongena</i> (L.)	Brinjal
		<i>Brassica oleracea</i> (L)	Cabbage
		<i>Momordica charantia</i>	bitter gourd
		<i>Carica papaya</i> L	Papaya
		<i>Spinacia oleracea</i> (L.)	Spinach
6	<i>Acyrtosiphon pisum</i>	<i>Pisum sativum</i>	pea aphid
7	<i>Aphis helianthi</i>	<i>Helianthus annuus</i>	Sunflower aphid
8	<i>Macrosiphum rosae</i>	<i>Rosa indica</i>	Rose aphid
9	<i>Macrosiphoniella sanborni</i>	<i>Chrysanthemum</i>	Chrysanthus
10	<i>Aphis glycines</i>	<i>Glycine max</i>	Soyabean
11	<i>Toxoptera aurantii</i>	<i>Citrus limonium</i> (L.)	Lemon

REFERENCES

1. A. J. Dhembare , J, Dhumal And I I Mujawar, (2012). An Annotated List of Aphid Fauna of Ahmednagar Area Maharashtra. Indian Streams Research Journal, Vol 2, Issue. 7, Aug 2012.
2. A. J. Dhembare, J. Dhumal And I. I. Mujawar, (2012). Faunistic Survey of Aphid Fauna (Hemiptera: Aphididae) and Their Host Association in Ahmednagar District, Maharashtra. Golden Research Thoughts Vol. 2, Issue. 3, Sept 2012.
3. Agarwal, B. K. (2007). Phenotypic plasticity in aphids (Homoptera: Insecta): components of variations and causative factors. Cur. Sci. 93: 308-313.
4. Blackman, R. L. And Eastop, V. F. (2000). Aphids on the world's crops: an identification guide. Second edition. John Wiley, Chichester, 446 pp.
5. Blackman, R. L. And V. F. Eastop. (2006). Aphids on the World's Herbaceous Plants and Shrubs. John Wiley & Sons, Ltd. West Sussex, U.K. 1439 pp.
6. Eastop V.F. (1977). Worldwide importance of aphids as virus vectors. In Aphids as virus vectors. Ed. Harris, K.F. and Maramorosch, K. Academic Press, London. 559 pp
7. Hill, D. S. (1997). The Economic Importance of insect. Chapman and Hall: London.
8. Minks, A. K And Hareewijn. P (1987). In: Aphids, their control: biology, natural enemies and control. Elsevier, Amsterdam, Oxford, New York, Tokyo. Vol.B. pp. 171-310.
9. Palikhe, B. R. (2012). Challenges and options of pesticide use: In the context of Nepal. Lanschaftsokologie and Umweltforschung, 3: 130-141.
10. Rajendra Singh (2000)- Biodiversity of Indian insects with special reference to aphids (homoptera: aphididae)- J. Aphidol. 14: 113-123, 2000 The Aphidological Society, India Gorakhpur ISSN 0970-3810.
11. Schepers, A. (1987). Damage caused by aphids. Pp. 87-101 in World Crop pest. Aphids: Their Biology, Natural Enemies and Controlled by W. Helle. Vol. 2C. Elsevier: Amsterdam

EDITORS



Dr. Vilas V. Patil
I/C Principal,
Maratha Shikshan Parishad, Pune
Shri Shahu Mandir Mahavidyalaya,
Parvati, Pune-411007 (Maharashtra)



Dr. Praveen G. Saptarshi
Professor Emeritus
Sustainability Management
Indian Institute of Cost and Management Studies & Research
(IndSearch), Pune 411004
Visiting Professor at Salisbury University, MD, USA



Dr. Digvijay S. Kumbhar
Assistant Professor,
Department of Zoology,
Rayat Shikshan Sanstha's,
Dada Patil Mahavidyalaya, Karjat,
Dist.- Ahmednagar (Maharashtra)



Mr. Agastirishi B. Toradmal
Assistant Professor,
Department of Geography,
Rayat Shikshan Sanstha's,
Dada Patil Mahavidyalaya, Karjat,
Dist.- Ahmednagar (Maharashtra)



Dr. Ashok Kumar Verma
Ex Head, Department of Zoology,
Govt. Post Graduate College Saidabad-Prayagraj (Uttar Pradesh)
Editor-in-Chief
International Journal of Biological Innovations (IJBI)

Nature Light Publications

(International Publication)

Head office

309, West 11, Manjari Vsi Road,
Manjari Bk, Haveli, Pune, 412307

Sub-Branch Office

05/01, Kaldate Complex Karjat – Ahmednagar Road,
Karjat, Dist.- Ahmednagar 414402

Phone: +91 9922489040 / 9822489040

Email: naturelightpublications@gmail.com

Website- www.naturelightpublications.com



9 788195 400294 > NL004