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SEASONAL CHANGES IN THE HONEY DEW SECRTETION BY THE NYMPHS OF *TRIOZA FLETCHERI* INSIDE THE YOUNG, MATURE AND OLD GALLS OF *TREWIA NUDIFLORA*

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ABSTRACT

Honeydew is a sugar-rich sticky liquid, secreted by aphids, some scale **insects** and psyllids as they feed on plant sap. It is a waste product having sugary substances, excreted by the insects to concentrate food. Many other organisms feed on this sugary solution such as ants and in return they protect the insects from predators. In the present investigation season wise (summer and winter) secretion of honey dew by the insect *Trioza fletcheri*, within the galls of *Trewia nudiflora*, is being described.

KEYWORDS: *Trioza fletcheri*, *Trewia nudiflora*, honey dew.

INTRODUCTION

Trioza fletcheri is a gallinacoues insect pest of a forest tree, *Trewia nudiflora*, which makes the galls on the dorsal surface of the leaves. The newly hatched nymphs starts to feed on the ventral surface of the leaves, and finally make the gall by closing itself inside the gall. The 1st to 5th instar nymphs continuosly feed inside the gall. Galls develops as a result of salivary enzymes action in the plant tissue which results a cancerous growth in a localized area. These galls are the sink for nutritional sbstances to be feed by gall insects. The physiological activities of the nymphs are carried out inside the gall. After maturity the 5th instar nymph comes out of the gall for moulting to change into adult. Within the gall, the nymphs secrete a white condensed liquid called honey dew, which is rich in sugar substance. It is excreted by aphids, some scale insects and psyllids as they feed on plant sap. It is a waste product excreted by the insects to concentrate the food for enzyme action. For concentration these have filter chamber in their alimentary canal. Generally ants drink the honeydew and in

return they protect the insects from predators. Earlier some other workers reported honey dew secretion *Viz.* El-Desouky Ammar *et al* (2013, 2015), Maria Villa *et al*.(2017), and Wäckers FL (2005). In the present investigation season wise secretion of honey dew by *Trioza fletcheri*, within the induced galls of *Trewia nudiflora,* is studied.

METHODOLOGY

The samples of the infected galled leaf were collected in polythene bags from Chamgadar Tapoo, and Satyanarayan Forest range, Haridwar, during summer and winter. The samples were brought to the laboratory for examination. Around 50 young, mature and old galls formed by *Trioza fletcheri* on the leaf of *Trewia nudiflora,* were dissected under Dewinter Stereoscopic Zoom Microscope, to observe the quantity of honey dew secreted, size of the droplet, thickness of the droplets, season wise. Photographs of the dissected galls, nymph and honey dew secreted by the nymphs were taken with the help of Dewinter Camera, attached with the stereoscopic zoom microscope. Videography of the nymphs while secreting honey dew was also done.

RESRULTS AND DISCUSSION

During the investigation it was observed that the quantity of the honey dew varies a lot during winter and summer, which also depend on the stage of nymph.

1. Honey dew secretion in summers in young and matre galls:- The 1st and 5th instar nymphs of ***Trioza fletcheri*** resides inside the young and mature galls, where these feed on the sap of the gall. Only 5th instar nymphs after maturity comes out of the gall for moulting into adult. Due to weather changes during summers , the physiology of the excretion is also affected up to large extent. Rise and falls in the temperature, humidity, sunlight and day length affects the physiology of the insects. Around 50 young and mature galls were dissected under microscope. It was observed that, during summers, very less amount of honey dew is excreted. The droplets of the honey dew are transparent, aqua color, very small in size. Generally 1-2 droplets are seen within a gall. This is to maintain the homeostasis of the body.

2. Honey dew secretion in summers in old galls:- Around 50 old galls were dissected under microscope. The old galls were found without honey dew, as the 5th instar nymphs comes out from the gall for moulting, through the gall opening on ventral side. Through the lacerated opening small ants used to feed on honey dew.

3. Honey dew secretion in winters in young and mature galls:- In winter season the 1st to 5th instar nymphs feed more on the sap of the galls formed by it, which results in more excretion. More pressure is applied by the nymphs to suck, which causes the formation of large droplets. Around 50 young and mature galls were dissected under microscope, and it was observed that the nymphs secretes more honey dew in comparison to the summer. The size of the droplet of honey dew is observed large and pouch like. One to six droplets of honey dew are recorded in a single gall. The droplets are white and thick. The liquid filled inside the droplets becomes sticky during winters, and some young nymphs are found trapped inside it.

4. Honey dew secretion in winters in old galls:- Around 50 old galls dissected under microscope. Some old galls recorded with honey dew after leaving the gall by 5th instar nymphs. The droplets are large, more in numbers and thick, so it can be remain as it is for some time. Later on it is consumed by the insects present on the leaf. In several cases fungus growth was also observed on the honey dew. Due to which black mould formation occur. Such leaves turns yellow and fall later on.

It was further observed that as the size of the nymph increases from the 1st to 5th, quantity and size of the honey droplets increases due to the increased demand of food.

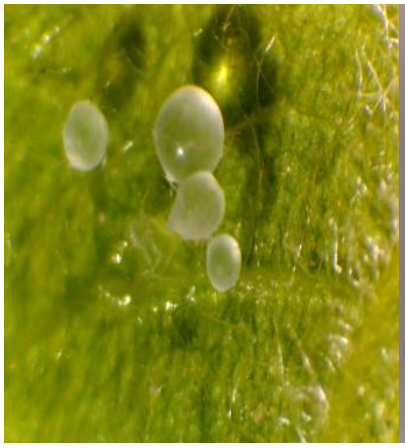

Fig. 1.

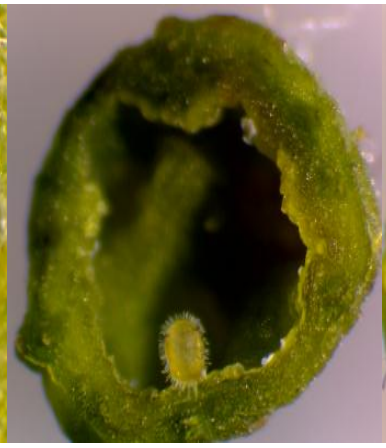

Fig. 2.

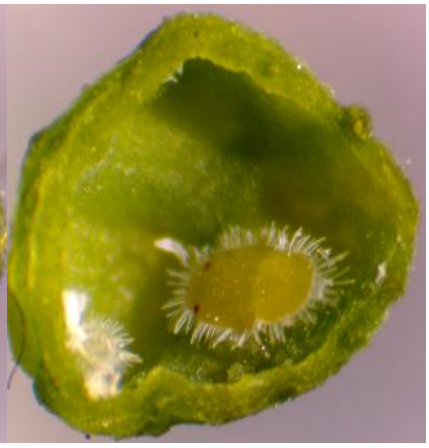

Fig. 3.

Fig. 4.

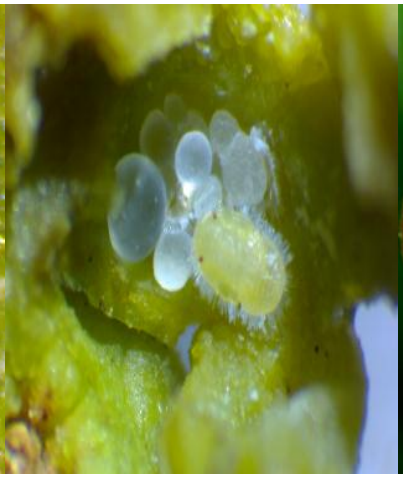

Fig. 5.

Fig. 6.

(Fig.1) Droplets of honey dew during summer (Fig.2) Gall in summer with 1st instar nymph inside and without honey dew (Fig.3) Gall in summer with 3rd instar nymph and without honey dew (Fig.4) 3rd instar nymphs secreting honey dew during winters (Fig.5) 3rd instar nymphs with large honey dew droplets during winters (Fig.6) Gall filled with large droplets during winters.

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REFERENCES

1. El-Desouky Ammar, Rocco Alessandro, Robert G. Shatters Jr, David G. Hall, 2013. Behavioral, Ultrastructural and Chemical Studies on the Honeydew and Waxy Secretions by Nymphs and Adults of the Asian Citrus Psyllid, *Diaphorina citri* (Hemiptera: Psyllidae) https://doi.org/10.1371/journal.pone.0064938.

2. El-Desouky Ammar. Honeydew excretion behavior in males and females of Asian citrus psyllid. DOI: 10.13140/RG.2.1.1442.9601, 2015.
3. Maria Villa, Sónia A. P. Santos, António Mexia, Albino Bento, José Alberto Pereira, Wild flower resources and insect honeydew are potential food items for *Elasmus flabellatus* Agronomy for Sustainable Development, 2017; 37: 15.
4. Wäckers FL. Suitability of (extra-) floral nectar, pollen, and honeydew as insect food sources. In: Wäckers FL, van Rijn PCJ, Bruin J (eds) Plant-provided food for carnivorous insects: a protective mutualism and its applications. Cambridge University Press, Cambridge, 2005; 17–74.