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CHANGES IN SHAPE, SIZE AND COLOR OF THE GALLS INDUCED BY *TRIOZA FLETCHERI* CRAWFORD, ON *TREWIA NUDIFLORA*, DURING SUMMER AND WINTER

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ABSTRACT

Trioza fletcheri is a gallinaceous insect which makes foliar galls on a forest tree, *Trewia nudiflora*. The galls are formed on dorsal side of the leaf and pouch like. Shape, size and colour of the gall varies according to the season (Winter, Summer, Rainy). Maximum gall formation occurs in July to September. In winter colour of the gall changes from greenish to pinkish red due to phenolic compound development which trap heat of the sun to warm nymphs inside the gall.

KEYWORDS: Gall, Trewia nudiflora, Trioza fletcheri.

INTRODUCTION

Trioza fletcheri Crawford (Hemiptera: Homoptera: Psyllidae) is a gallinaceous insect of forest tree ***Trewia nudiflora*** Linn. (Euphorbiaceae) which causes extensive damage to the foliage of the plant. According to the Lefroy (1909) galls are easily recognizable as quite distinct bodies associated always with a particular insect and for each species of inhabitant assuring peculiar form. Many species cause plant deformities in the form of regular galls on the host plant and such galls are abundant, colourful and often grotesque upon trees or plants. According to Mani (1954), the physiology of galls is usually formed on meristemetic tissue and as the results of abnormal cell multiplication depending of the differences in growth movements. Galls are single outgrowths swelling of elongate organs or folds, rolls or pouch like out pocketing of flat structure like leaf blades etc.

In ***Trewia nudiflora*** galls generally occurs in groups on the dorsal surface of the leaf. These galls are epiphyllous reticulate globolose and unilocular, flask shaped with wide opened cavity. Gall formation reduces the photosynthetic activity of the plant and affects its growth

adversely. 1st instar nymphs of ***Trioza fletcheri*** injects enzymes through saliva which induces metastasis and hyperplasia (restricted cancerous growth). The galls formation takes place throughout the year, but seasonal changes also affect the formation of gall, their shape, size and color.

The host plant ***Trewia nudiflora*** (Euphorbiaceae) is tall arbor and deciduous tree which is found in the tropical districts of India, Malaysia and China Eastern and Southern region of river Ganga and in Burma also. It is of great economic value to mankind. In Haridwar district, it occurs in Haridwar proper and near river Ganga and in Satyanarayana forest range near Saung and Suswa Rivers.

Galls made by ***T. fletcheri*** cause deformities in the leaves, makes unfit for photosynthesis and 50-70% damage results to the plant foliage. Various studies are carried on insect induced gall by **Eric Day *et. al.*** (2015), **Shih T-H *et. al.*** (2018**), Subhopriya *et. al.*** (2017), Suparna *et. al*. (2018). In present paper an effort is made to describe some aspects of the galls induced by ***T. fletcheri*** on this plant leaves.

MATERIALS AND METHEDS

The samples of gall infected leaves were collected from Chamgadar Tapoo, Haridwar, thorought the year. The samples were kept in polythene bags, and were brought to the laboratory and washed properly with water and wiped off with tissue paper. The samples were analysed and observed according to the number of the galls observed in summers and winters. Size and color of the young mature and old galls are also recorded.

RESULTS AND DISCUSSION

Shape, Size and Color of the Galls Induced by *T. fletcheri* during summers on *T. nudiflora* from April- October

On getting the the favourable climatic conditions, such as temperature, R.H. and light, the insect becomes active and reproduce at full swing.Hence in this season, the percentage of the gall formation is increased to maximum. The months of March and April is peak time for infestation and growth of the galls and insects.The organism is very active during this time. The size of galls is larger (3.343 mm) than the galls formed during winter season (0.924mm). During this season, the new and soft leaves also grows on the host plant which are full of sap and provide the suitable site for egg laying and infestation. The color of the galls was reported greenish to yellowish and light brown in few cases.

Changes In Galls During May And June: As the temperature remain high throughout the day. During this season, the population of the pest is reduced to minimum. Gall formation is also affected to maximum extent. Hight temperature and very low humidity affect the rate of reprodutcion, egg laying, hatching of the eggs and new generation of the pest. The leaves of the host plants also becomes very hard in summer season. Minimum galls are formed during this period. The color of the gall was observed from light yellowish greenish to green and larger in size.

Changes In Galls During July And August: This season is very suitable for the pest. On set of the rain enhance humidity, provide a suitable environmental condition for the spread of the pest and host both. The host plant becomes more greenish in rainy season having full foliage. New and soft leaves also grows in rainy season which provide optimum conditions for the spread of pest. Maximum number of galls are formed during this season. The color of the galls was observed green, redish green and yellow.

Shape, Size and Color of the Galls Induced by *T. fletcheri* During Winters on *T. nudiflora* from November – March

Although, the phenomenon of gall formation takes place throughout the year, but in winter season less number of galls are reported. The growth of the galls was observed very slow, due to the unfavorable climatic conditions. Small galls were formed in winter season (0.924mm), as the gall forming insect becomes very less active. Besides the shape and size, the number of galls formation was also observed to be affected up to 50% in winter season. The egg laying and mating capacity of the adult insect , and feeding capacity of devoloping nymph inside the gall is reduced in winter season. Nymphs prolonge their nymphal period.

Shape of the Gall: Seasonal changes also affects the shape of the galls. In the present investigation it was observed that shape of the gall was irregular agglutinus agglomerated masses were formed frequently.

Size of the Galls: The size of the galls formed in winter was reported relatively small (L=2.594, W=1.413mm).

Color of the Galls: Color of the galls changes from greenish to pinkish reddish due to the development of phenolic compound which trap more sun heat to warm nymph inside the gall. This is an adaptation in insect.


Fig. 1


Fig. 2


Fig. 3


Fig. 4


Fig. 5


Fig. 6


Fig. 7


Fig. 8


Fig. 9


Fig. 10


Fig. 11


Fig. 12


Fig. 13


Fig. 14


Fig. 15


Fig. 16

Fig. 17 **Fig. 18** **Fig. 19** **Fig. 20**

Fig. 1-8: Shape size & color of the galls induced by *T. fletcheri* during summer. Fig. 9-20 Shape size & color of the galls induced by *T. fletcheri* during winters.

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