

A Survey of Infestation of Gall Insect on Saptaparni (*Alstonia scholaris*) in Dehradun and Yamuna Nagar, (India)

Kanchan Chatterjee¹, Preeti Saxena²

¹Department of Zoology, SoAS, Devbhoomi Uttarakhand University, Manduwala, Dehradun, 248007, India

²Department of Chemistry, Doon (P. G.) College of Agriculture Science and Technology, Selaqui, Dehradun, 248011, India

Abstract: *Alstonia scholaris* commonly called as saptaparni in India is a wide spread ever green tree and shrub of family Apocynaceae. Plantation of most trees suffer from heavy damage due to insect pest outbreak. The major damage of the tree is gall disease caused by gall insect. Present study was done to evaluate the prevalence the gall insect on saptaparni in different areas of Dehradun Uttarakhand and Yamuna Nagar, Haryana by comparing morphological characters changes of leaves of the healthy tree present in that place to the total tree of *Alstonia scholaris* planted at that particular areas. Observations suggest that infestation was vary area to area in both Dehradun and Yamuna Nagar. It was higher in the Dhoolkot area and lower in the shisham bada and Sher Pur region in Dehradun. Higher infestation was observed in Chachruli and lower in Sushant city in Yamuna Nagar.

Keywords: Infestation, Gall insect, *Alstonia scholaris*, Satparna, *Pauropsylla tuberculata*

1. Introduction

Alstonia scholaris is an evergreen tree commonly called as scholar tree, blackboard tree, Indian devil, milkwood pine, saptaparni, satvan and satpatia (Albert et al.2011) Its bark is and milky secretion used in traditional medicine for relieving fever, jaundice, hepatitis, malaria, skin diseases, dysentery etc. (Arulmozhi S. et al.2008; Dey, A. (2011). Alkaloid present in the satparni are the active compounds and used to treat diseases in traditional and folk lore system (Dutta et al.1976).

The important alkaloid present in *Alstonia* is known as Alstonine (Pratyush et al.2011) is responsible for its anticancer property (Baliga 2010; Pratap et al.2013). However, the beauty and health of the tree is being impaired by the attack of insect pests (Price et al.1987). One of the important insect pest that cause damage to the tree by attacking on the fresh leaves is *Pauropsylla tuberculata* also called as gall insect (Chander 2014). It induces gall formation on each and every part of the tree including stem, leaves and inflorescence (Haldar et al.2018). The affected plants give ugly look and as a consequence, its planting is being abandon by several organizations and the young plants are also being removed from urban landscape. The gall insect *Pauropsylla tuberculata* comes under Hemiptera and has five nymphal instars, from egg to the last instar, display mechanisms that protect them from loss of humidity (Krishnan et al.2011). present study was carried out to show prevalence of *Pauropsylla tuberculata* in the various selected sites of Dehradun and Yamuna Nagar regions respectively.

2. Materials and Methods

Survey work:

Present study was carried out by survey work on different areas of Dehradun and Yamuna Nagar in the month of January 2024 to April 2024 and again in June 2024 to October 2024. samples of infected leaves and other infected parts were

collected from selected areas for the gall forming insect identification and to study the life cycle of the insect pest. During survey work the stages of gall at different places were also checked whether it was in initial stage or in mature galled stage of infestation during the survey time period. Total 10 sites were selected for the survey work in each of the selected regions.

Sampling of infected leaves:

Infected tress were identified and examined for the infection caused by insect agent *Pauropsylla tuberculata*, similar studies was done by Pandey in the recent years (2023), (Bhatnagar et al.2022). Leaves were collected of *Alstonia scholaris* from infected trees on different selected sites of Dehradun and Yamuna Nagar in the different time periods. The galls on leaves were dissected to observe the various developmental stages of gall insect. The nymphal stages were carefully dissected out and further preserved in formalin for studies. some of the infected leaves were dipped in water for the emergence of adult insect and covered with aluminium foil to prevent escaping of insect from the container. Galls were observed under microscope in the laboratory and on the basis of morphological characters of nymphs and adult, life cycle of insect was prepared.

3. Result and Discussion

During survey work it was observed that in the winter period (January to April) gall infection was greater than the summer period (June to October). It may be due to the temperature suitability for the egg laying and nymphal development at early winter time and emergence of insect at late winter time (Dhiman et al.2012). Major gall eruptions were recorded in the month of March as earlier findings of share similar data with Chatterjee et. al.2019. The youngest gall development stage was determined by smallest diameter, observed as a small bulged spot at the lower side of the leaf. Similar findings were of Singh and Sangha (2018). The eggs appear

white, oblong, narrow and acute at one end. The first instar or nymph undergo moulting to reach adult stage. The nymphs were yellow in colour and resides in the gall, The alterations in the leaves gall infection indicate the plasticity of plant tissues which may be induced and controlled by insects (Ruchita et al.2018). At the time of emergence the exit hole is made by the insect either on the ventral or dorsal surface of

the leaf. The largest diameter and opened gall was considered as the mature gall from which adult winged insect emerged out without pupal stage. Patterns of infestation of gall insect was studied by the Patankar and Andrew (2015) and gave valuable information about the gall insect infection in *Alstonia* sp.

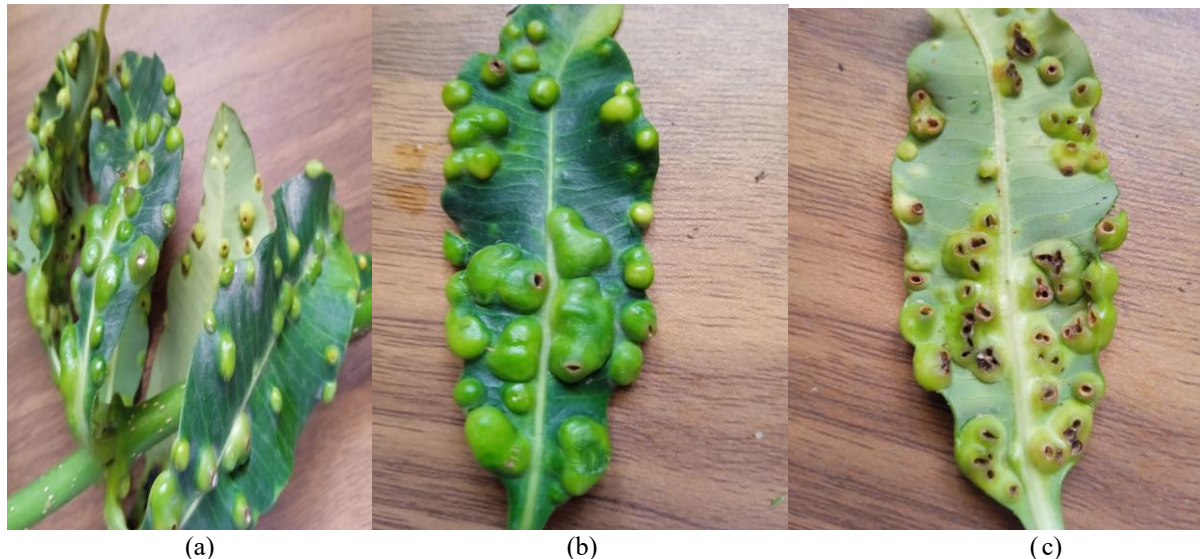


Figure 1: a. *Alstonia scholaris* leaves infected by gall insect. b. Dorsal view of leaf showing emergence of adult insect from the gall. c. Ventral view of the same leaf.

Table 1: Showing Percentage of Gall infection in Different areas of Dehradun

Area	Total number of trees	Number of Infected trees	Percentage of infection
Vikas nagar	30	13	43
Selaqui	26	16	44.66
Dhoolkot	59	52	88
Sinhniwala	22	2	9.09
Chakrata Road	86	25	47.44
Kishan nagar	20	14	70
ISBT	36	12	33.33
Clement town	28	6	21.42
Subash nagar	26	9	34.61
Survey chowk	38	9	23.68

Table 2: Showing Percentage of Gall infection in different areas of Yamuna Nagar

Area	Total number of trees	Number of Infected trees	Percentage of infection
Jagadhari	20	6	30
Sushant City	30	4	13.33
Model Town	30	12	40
Huda sector	40	8	20
Jindal Park	45	9	20
Kanshadi Village	55	22	40
Work Shop Road	46	20	43.47
Paper Mill	30	12	40
Railway Colony	34	16	47
Chachruli	50	35	70

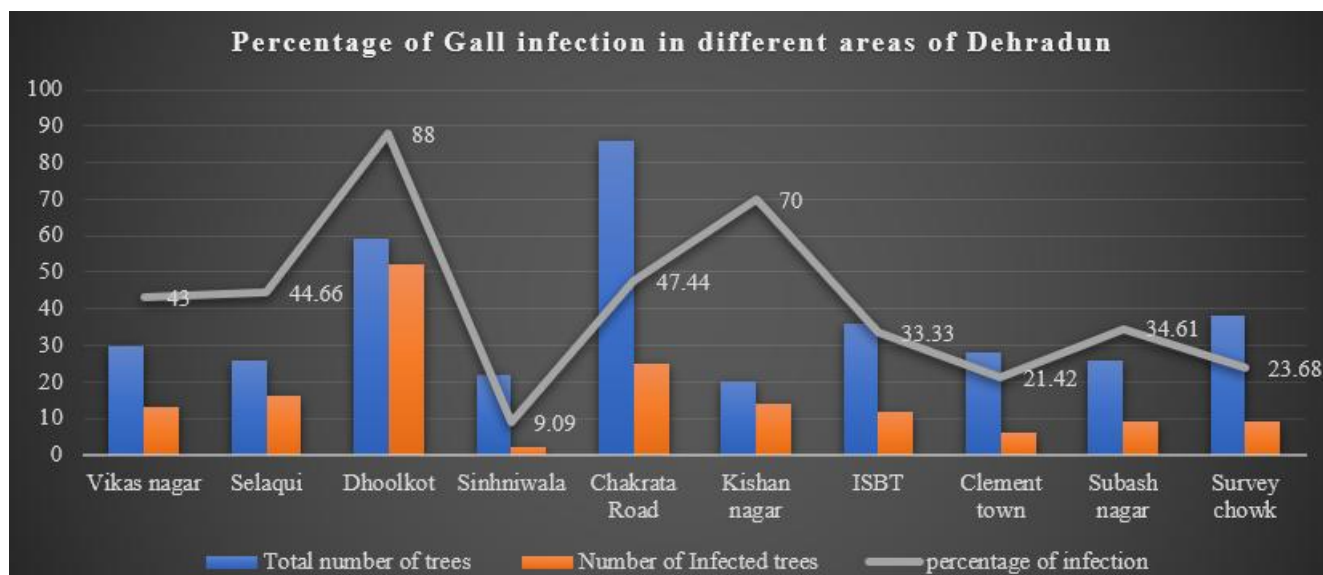


Figure 2: Showing percentage of infestation of gall insect on Satparna in Dehradun region

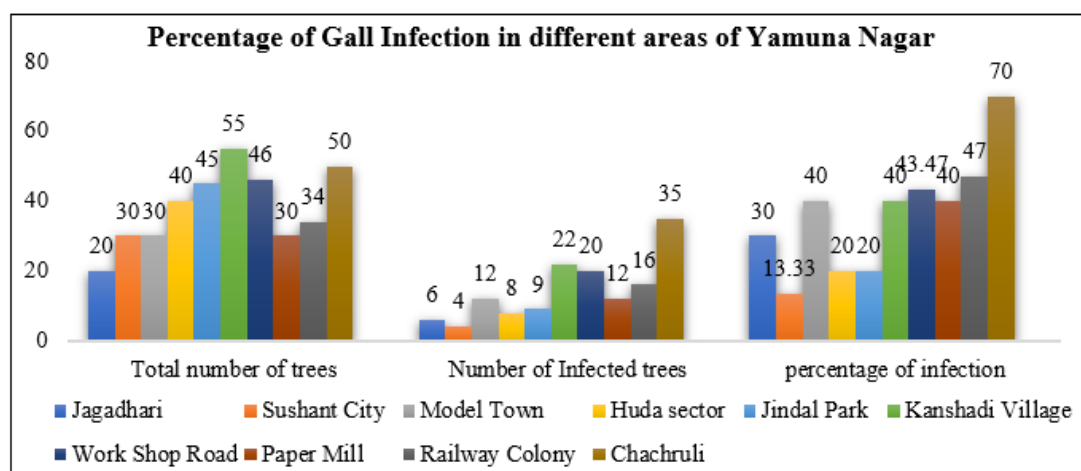


Figure 3: Showing percentage of infestation of gall insect on Satparna in Yamuna Nagar region

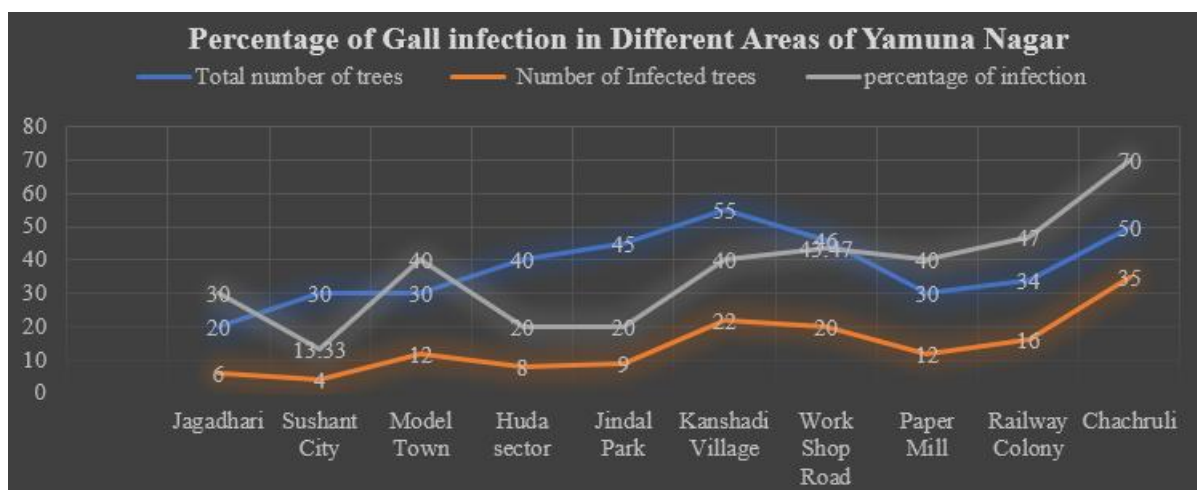


Figure 4: Showing percentage of infestation of gall insect on Satparna in Yamuna Nagar region

According to the study on prevalence of gall insect in the different areas of Dehradun it was found that greatest infection was found in Dhoolkot region (88%). In Kishan nagar region infection was also high (70%). In vikas nagar, Selaqui, Chakrata road, ISBT and Subhash nagar moderate infection was observed followed by other areas of Dehradun mainly Sinhniwala where lowest infection was recorded. The variation in the percentage of infection may be due to the

pollution, convenience of parasite in transportation from one tree to another healthy tree.

4. Conclusion

The Satparni (*Alstonia scholaris*) also known as devil's tree used in the traditional and modern therapeutic practices as

every part of the tree has enormous number of health benefits and is used to treat various types of respiratory diseases, fever, digestion problems and skin infections etc (Meena et al.2001). In the present study we try to investigate the overall condition of the plants or trees which are placed in the road side of the different surveyed area. Chauhan and Chauhan also studied the morphological study of gall induced in flower and fruit of Satparna in 2020, the insect gall morphology (Stone et al.2003). These trees are common in these areas and suffering from Gall infection which in turn ruins the ability of the tree to be used as a source of medicine for particular disease. It is suggested to prevent these trees from the infection by applying pesticides or other suitable measures of prevention. Infection can be spread from one tree to another so it is advisable to take the preventive measures as a safe guard by knowing the life history of insect and mode of infection in the particular time.

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