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## IMPACT OF INTEGRATED PEST MANAGEMENT (IPM) PRACTICES ON GALL FLY INFESTATION IN TASAR SERICULTURE

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### ABSTRACT

Infestation of Gall by the insect *Trioza fletcheri* minor in the tropical tasar silkworm food plants such as *Terminalia arjuna* (Arjun) and *T. tomentosa* (Asan) is very common and causing significant damage to the foliage this in turn impact on the total tasar cocoon production. The On Station Trial (OST) of IPM for Gall fly have been conducted during the year 2022-23 and 2023-24 in 10 locations at different tasar growing states for validation of IPM practices recommended for control of Gall fly in Tasar food plants. The insecticide, Dimethoate (Rogor) at 0.09% has been recommended for control of Gall fly and is in practice as chemical control measure of the pest since very long back. In recent year, it was observed that use of Dimethoate is not showing effectiveness in controlling the gall fly as the insect develop resistance to repeated use of insecticide. Therefore, necessity was felt to identify the effective insecticide for management of gall fly. The present IPM for control of gall infestation will increase the quantity and quality of leaf and cocoon productivity. Overall results of On Station Trial (OST) on Integrated Pest Management (IPM) package has shown 44.25 % reduction of gall infestation over the control at different trial centres during 2022-23 & 2023-24. Since results are encouraging, IPM package has been kept to popularize at large scale for the benefit of the farmers under On Farm Trial (OFT) during 2024-25.

**Keywords:** *Terminalia arjuna*, *Trioza fletcheri*, IPM, Acetamepid 20%SP and OST.

### Introduction

Infestation of Gall by the insect *Trioza fletcheri* minor in the tropical tasar silkworm food plants such as *Terminalia arjuna* (Arjun) and *T. tomentosa* (Asan) is very common and causing significant damage to the foliage this in turn impact on the total tasar cocoon production (Jadav *et al.*, 2009). The gall fly, *Trioza fletcheri* minor Crawford is a serious pest of tasar food plants causing 40-50% crop loss during peak period (August) in *T. arjuna* and *T. tomentosa*, the primary food plants of tasar. The gall induced by the nymphs of this insect pest cause foliar damage to the host plants, rendering the leaves unsuitable for silkworm feeding.

The gall fly *Trioza fletcheri* minor infestation is observed during rearing season i.e. from July - September causing severe foliage loss in heavy infestation (Kaushik *et al.*, 2012). The insecticide, Dimethoate (Rogor) at 0.09% has been recommended and is in practice as chemical control measure of the pest since very long back. In recent year, it was observed that use of Dimethoate is not showing effectiveness in controlling the gall fly as the insect develop resistance to repeated use of insecticide. Daneel *et al.* (2000) too studied the efficacy of different insecticides against mango gall fly. He observed the insecticide Lannate and Lebaycid effective in preventing the development of galls, with

only lesions remaining on the leaves. Joshi and Meshram (1991) evaluated some insecticides against tendu gall insect *Trioza obsoleta* Buckton (Homoptera: Psyllidae) and reported synthetic pyrethroids cypermethrin and fenvalerate (0.03%) at 15 day intervals gave the maximum number of gall free tendu leaves. Perusal of literature revealed that some of the insecticides viz., Dimethoate 0.09%, Fenthion 0.03%, Fenthothion 0.04% and Endosulfan 0.05 were tested against gall and Dimethoate 0.09% was found effective against gall and May–June beetle (Anonymous, 1983-84). Therefore, necessity was felt to identify the effective insecticide for management of gall fly. The present IPM for control of gall infestation will increase the quantity and quality of leaf and cocoon productivity. In order to manage the gall fly infestation a CSB funded research project Efficacy of selected insecticides in controlling the gall fly, *trioza fletcher* minor infesting tasar host plants was taken from 2016 to 2018. Among the selected insecticides, Acetamiprid 20% SP showed the best effectiveness against gall fly control and recommended to include in IPM programme for control of gall fly. Acetamiprid 20% SP has shown effectiveness against Gall fly when it is applied with Neem cake.

Therefore, the output of the Central Silk Board project i.e., the technology “Integrated Pest Management (IPM) practices for control of Gall fly infestation” has been selected for validation under On Station Trial (OST) programme of CSB-Central Tasar Research and Training Institute during the year 2022-23 & 2023-24.

### Materials and Methods

For the purpose of On Station Trials (OST) 10 different locations from tasar growing states i.e., CSB-RSRS- Baripada, Bhandara, Jagdalpur, Dumka, REC-Champa, REC, Kapishta, P4-Chakradharpur, BSMTC-Kharswan, BSMTC-Kathikund and TDF-Godda have been selected during the year 2022-2023. The On Station Trial (OST) has been conducted for two consecutive years i.e., 2022-23 & 2023-24 to evaluate the Integrated Pest Management (IPM) practices for control of Gall fly in Tasar sericulture. The following procedure followed during the evaluation of the technology under OST.

#### A) Activities carried out

1. Pruning: Delay the pruning of economic plantation in the month of April at the height of 4-6 ft.
2. Soil Application of Neem Cake @150kg/ha: Apply dried and powdered Neem Cake @150kg/ha by properly mixing in the soil near the plant in the last week of May month, before onset of the monsoon
3. Foliar application of Acetamaprid 20 % SP @ 0.2gm /lit of water:
4. Spray the solution of Acetamaprid 20 % SP @ 0.2gm /lit of water thrice at an interval of 15 days after leaf sprouting from 10th to 15th May (500 liters of water/ha)
5. Pluck and burn the infected leaves of the food plants: Pluck and burn the infected leaves of the food plants. (June to December).

#### B) Methodology used for calculation of pest incidence (PI):

1. Collection/recording of gall fly infestation data on Weekly / fortnightly interval
2. Sample size for evaluation of IPM of gall fly is 100 plants
3. The data is to be recorded from 3 fully formed branches of each plant
4. Numbers of total leaves are to be counted from each 3 branches of each plant and numbers of infested leaves are to be counted from same 3 branches of same plant
5. Data on infestation of gall fly of control plants (100 Plants) also to be recorded.

Based on these above observation pest incidences (PI) will be calculated as follows:

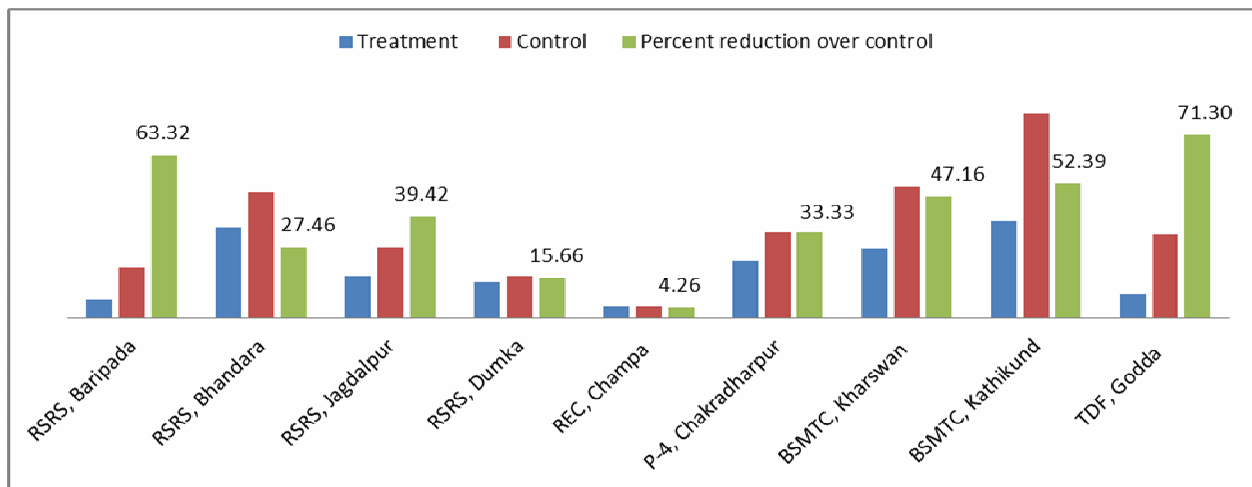
$$\text{Procedure for calculating PI: PI} = \frac{\text{No. of infested leaves}}{\text{Total No. of leaves observed}} \times 100$$

### Results and Discussion

The technology IPM for control of gall fly has been demonstrated under On Station Trial (OST) during the year 2022-23. Data observation showed that, the mean percent reduction of gall fly over control was recorded highest at TDF, Godda (71.30%) followed by RSRS, Baripada (63.32%) and BSMTC, Kathikund (52.39%). At the same time, lowest mean percent deduction over control (4.26%) has been recorded at CSB-REC, Seoni-Champa (Table-1 & Fig.-1). It is due to climatic variation and early sprouting of food plants at CSB-REC, Seoni-Champa location.

**Table 1:** Percent incidences of Gall fly during the year 2022-23

Location	Treatment	Control	Percent reduction over control
CSB-RSRS, Baripada	7.3	19.9	63.32
CSB-RSRS, Bhandara	35.4	48.8	27.46
CSB-RSRS, Jagdalpur	16.6	27.4	39.42
CSB-RSRS, Dumka	14.0	16.6	15.66
CSB-REC, Champa	4.5	4.7	4.26
CSB-P-4, Chakradharpur	22.2	33.3	33.33
CSB-BSMTC, Kharswan	27.0	51.1	47.16
CSB-BSMTC, Kathikund	37.8	79.4	52.39
TDF, Godda	9.3	32.4	71.30
<b>Mean</b>	<b>19.3</b>	<b>34.8</b>	<b>44.48</b>

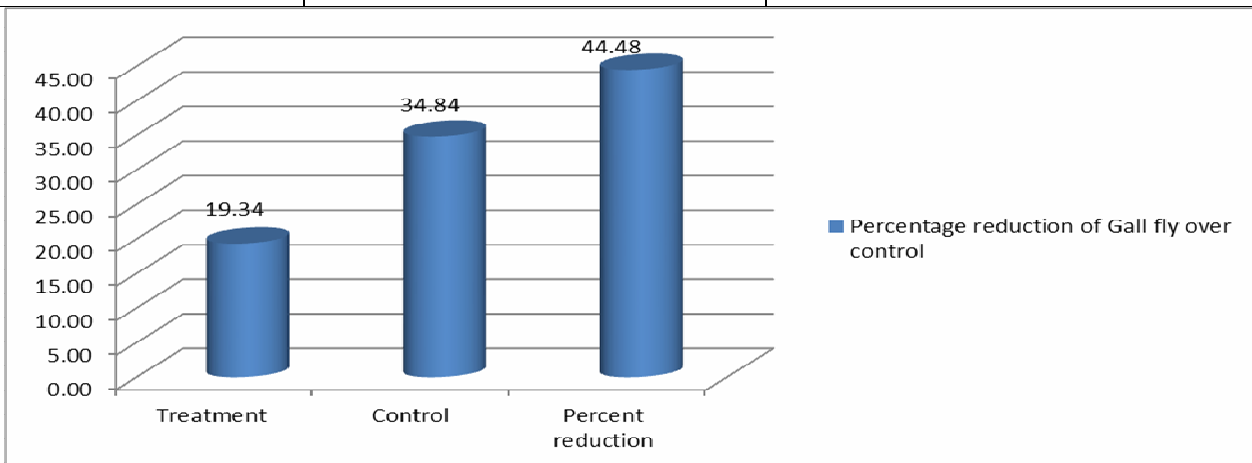
**Fig. 1 :** Percent incidences of Gall fly during the year 2022-23

Further, Pooled percent incidences of Gall fly during the year 2022-23 (Table-2 & Fig.-2) revealed that, Integrated Pest Management (IPM) was able to reduce 44.48 percentage of Gall fly over the control.

Therefore, it is clear indications that, IPM practice (Acetamaprid 20%SP & Neem cake) have significantly impacted to reduce the Gall fly incidence (Patel *et al.* 2020).

**Table 2:** Pooled percent incidences of Gall fly during the year 2022-23

Treatment	Control	Percent reduction over control
19.3	34.8	44.48

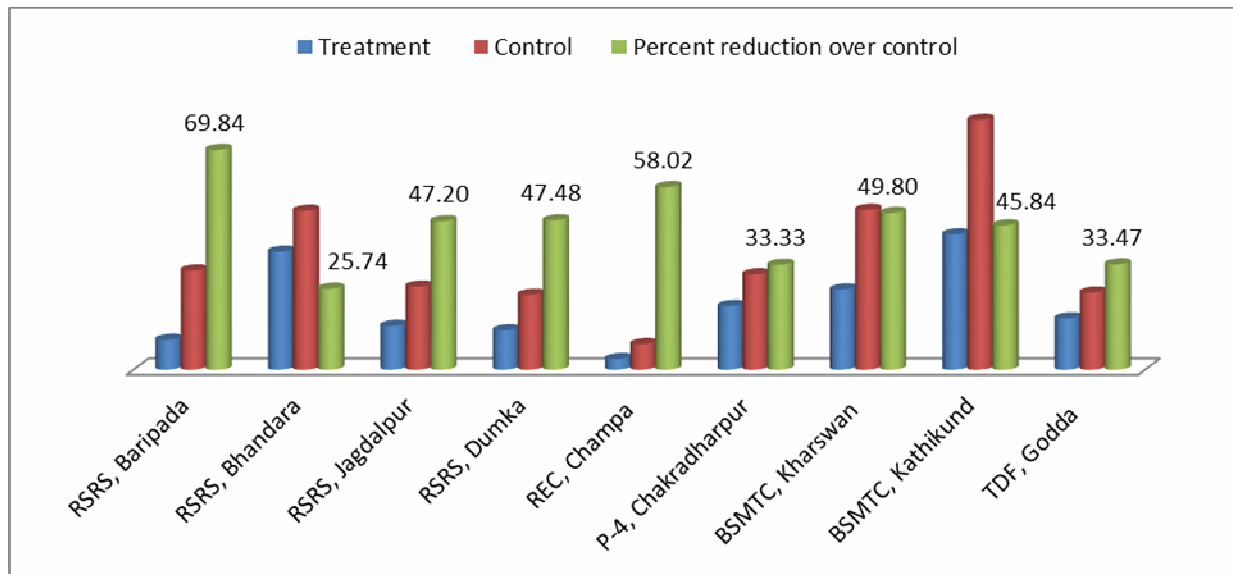
**Fig. 2 :** Pooled Percent incidences of Gall fly during the year 2022-23

The technology IPM for control of gall fly has been continued to demonstrate under On Station Trial (OST) during the year 2023-24 also. Data observation confirmed that, the mean percent reduction of gall fly over control was recorded highest at CSB-RSRS, Baripada (69.84%) followed by CSB-REC, Champa (58.02%) and CSB-BSMTC, Kharswan (58.02%). At

the same time, lowest mean percent deduction over control (25.74%) has been recorded at CSB-RSRS, Bhandara (Table-3 & Fig.-3). It is due to prolonged dry season and higher temperature at CSB-RSRS, Bhandara location. These results are supported with Jadhav *et al.*, 2013.

**Table 3 :** Percent incidences of Gall fly during the year 2023-24

Location	Treatment	Control	Percent reduction over control
RSRS, Baripada	9.50	31.50	69.84
RSRS, Bhandara	37.50	50.50	25.74
RSRS, Jagdalpur	13.94	26.40	47.20
RSRS, Dumka	12.50	23.80	47.48
REC, Champa	3.40	8.10	58.02
P-4, Chakradharpur	20.20	30.30	33.33
BSMTC, Kharswan	25.50	50.80	49.80
BSMTC, Kathikund	43.00	79.40	45.84
TDF, Godda	16.30	24.50	33.47
<b>Mean</b>	<b>20.20</b>	<b>36.14</b>	<b>44.10</b>



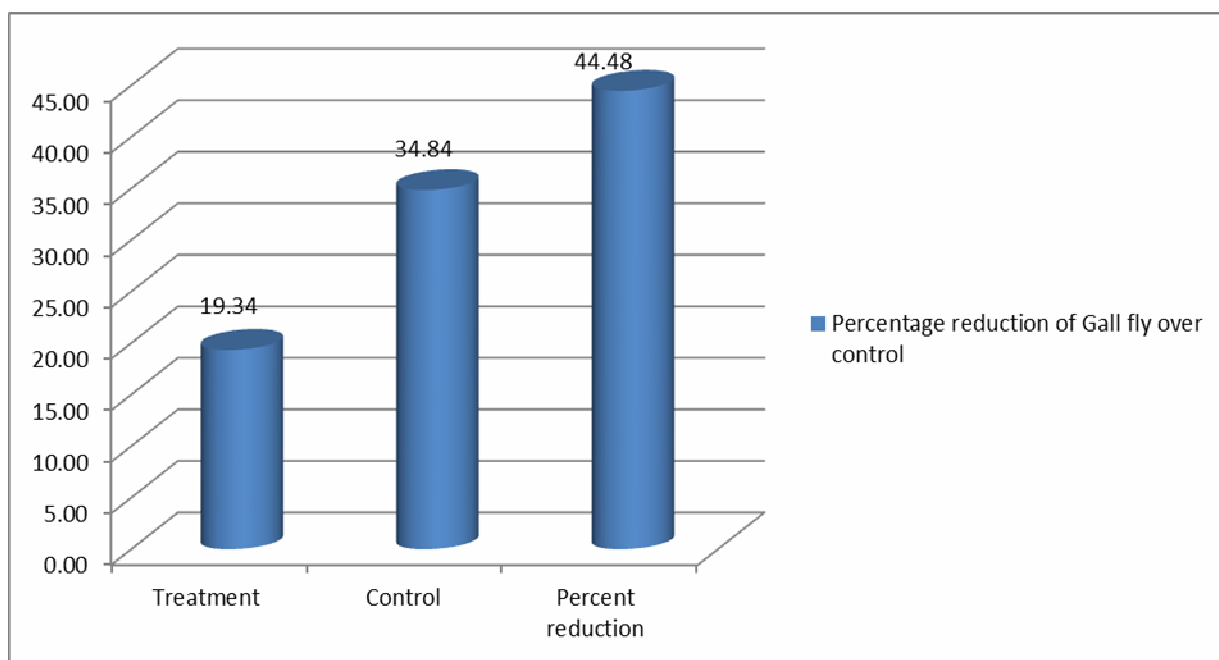
**Fig. 3 :** Percent incidences of Gall fly during 2023-24

Further, Pooled percent incidences of Gall fly during the year 2023-24 (Table-4 & Fig.-4) ensured that, Integrated Pest Management (IPM) was able to reduce 44.10 percentage of Gall fly over the control.

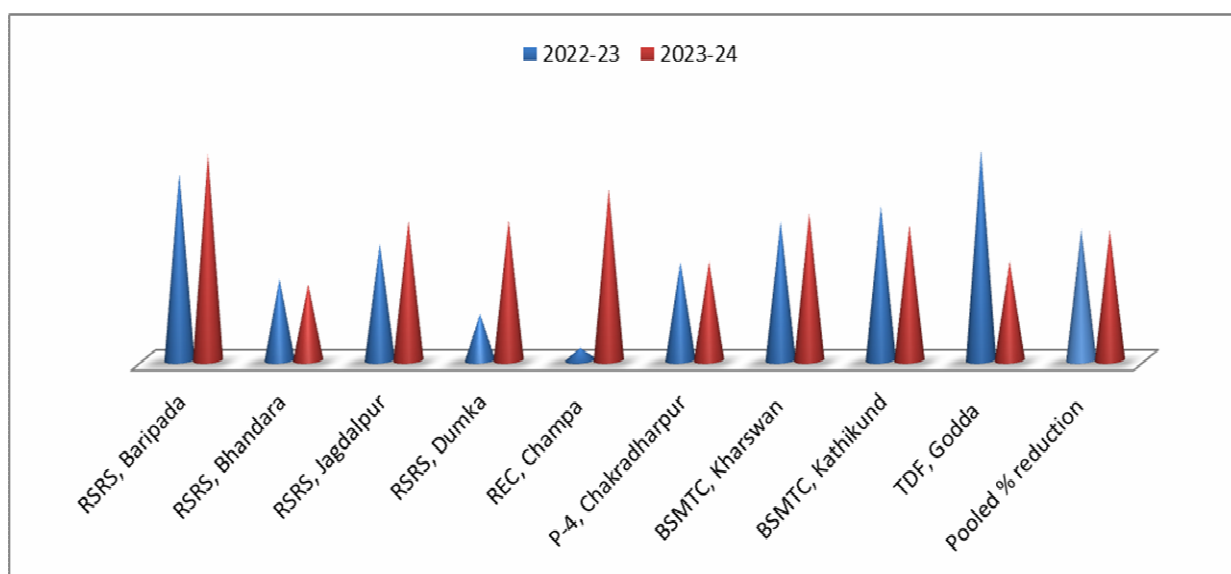
Therefore, it is clear indication that, IPM practices (Acetameprid 20%SP & Neem cake) has significantly impacted to reduce the Gall fly incidence.

**Table 4:** Pooled percent incidences of Gall fly during 2023-24

Treatment	Control	Percent reduction over control
20.20	36.14	44.10



**Fig. 4 :** Pooled percent incidences of Gall fly during 2023-24



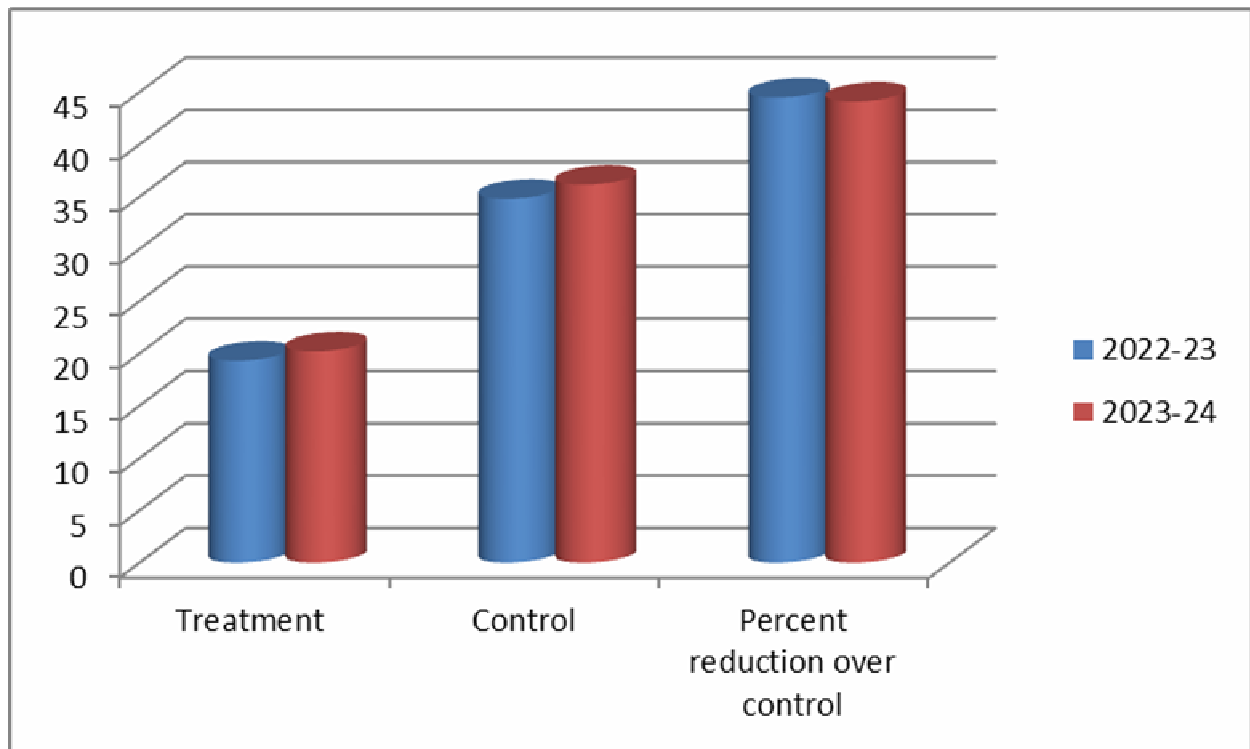
**Fig. 4 :** Pooled percent incidences of Gall fly during 2022-23 & 2023-24

Overall results mentioned in Table-5 & Fig.-5 indicated that, Integrated Pest Management (IPM) package has shown 44.25 % reduction of gall infestation over the control at different units/test/trial

centres during 2022-23 & 2023-24. Since results are encouraging, IPM package may be kept to popularize at large scale for the benefit of the farmers under On Farm Trial (OFT) during 2024-25.

**Table 5:** Pooled percent incidences of Gall fly during the year 2022-23 & 2023-24

Trial Year	Treatment	Control	Percent reduction over control
2022-23	19.3	34.8	44.48
2023-24	20.20	36.14	44.10
Mean	19.75	35.47	44.29
SD	0.45	0.67	0.19
Std. Error	0.32	0.47	0.13



**Fig. 5 :** Pooled percent incidences of Gall fly during 2022-23 & 2023-24

### Conclusion

An Integrated Pest Management (IPM) practice has reduced the Gall fly infestation in all OST locations and in both the year 2022-23 & 2023-24. The application of Acetamaprid 20 % SP along with Neem cake has significantly reduced the Gall fly infestation in tasar food plants. The technology IPM for gall fly management has validated under On Station Trial (OST). Further, this technology should be validated under On Farm Trials (OFT) for the benefit of poorest of the poor Tasar farmers.

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