Toba Pulp Lestari

TPL's Integrated Pest Management (IPM) approach

TPL is committed to adopting an integrated pest management program that prioritizes environmentally friendly biological and non-chemical methods where possible and seeks to minimize or avoid the use of chemical pesticides and other materials. TPL also committed to implementing documented procedures for the use of pesticides and other materials to ensure compliance with legal requirements and user instructions.

Programs of Integrated Pest Management (IPM) :

A. Regularly P&D Monitoring
B. Reducing chemical pesticides
C. Genetic P&D Controlling Method
D. Biological Controlling Methode

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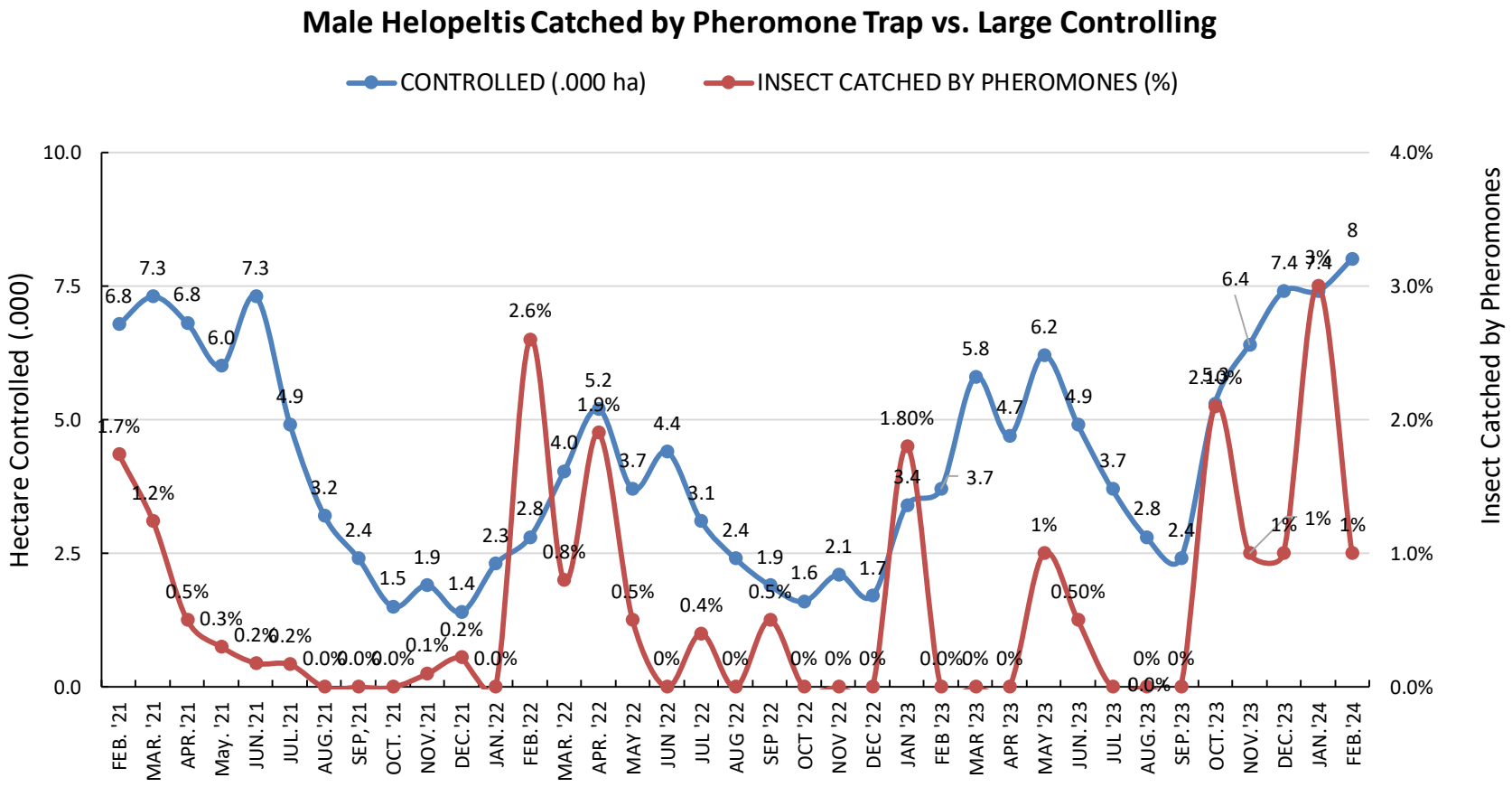
A. Regularly P&D Monitoring



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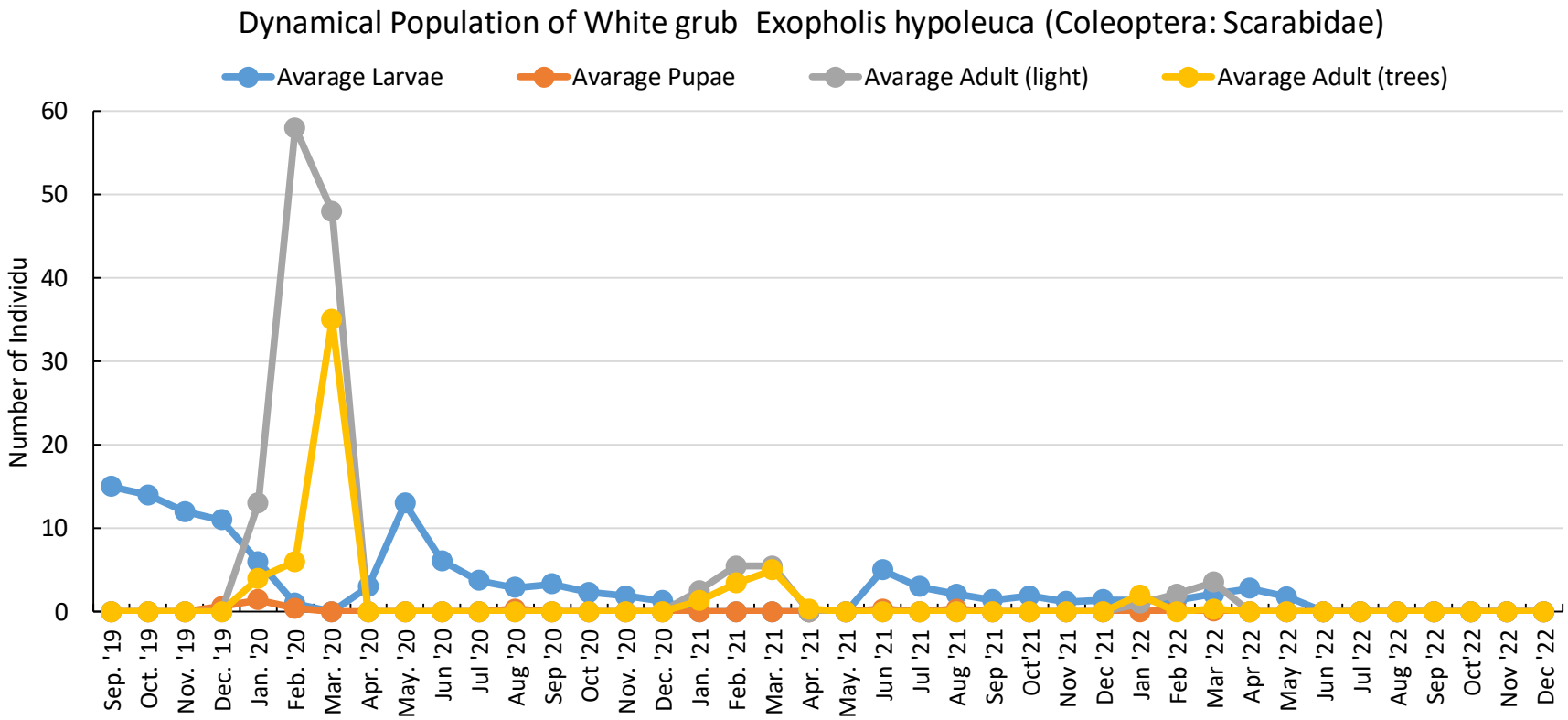
2. Monitoring Pest Beetle, *Exopholis hypoleuca*



1. Average Larvae (insect per 1x1x0.3 meter plot per month)
2. Average Pupae (insect per 1x1x0.3 meter plot per month)
3. Average Adult by Light Trap (beetle per day trapped)
4. Average Adult by plot sample 1x1x0.3 m, (bettle per plot per month)

Note: Monitoring after December 2022 did not find the Pest Beetle, Exopholis hypoleuca

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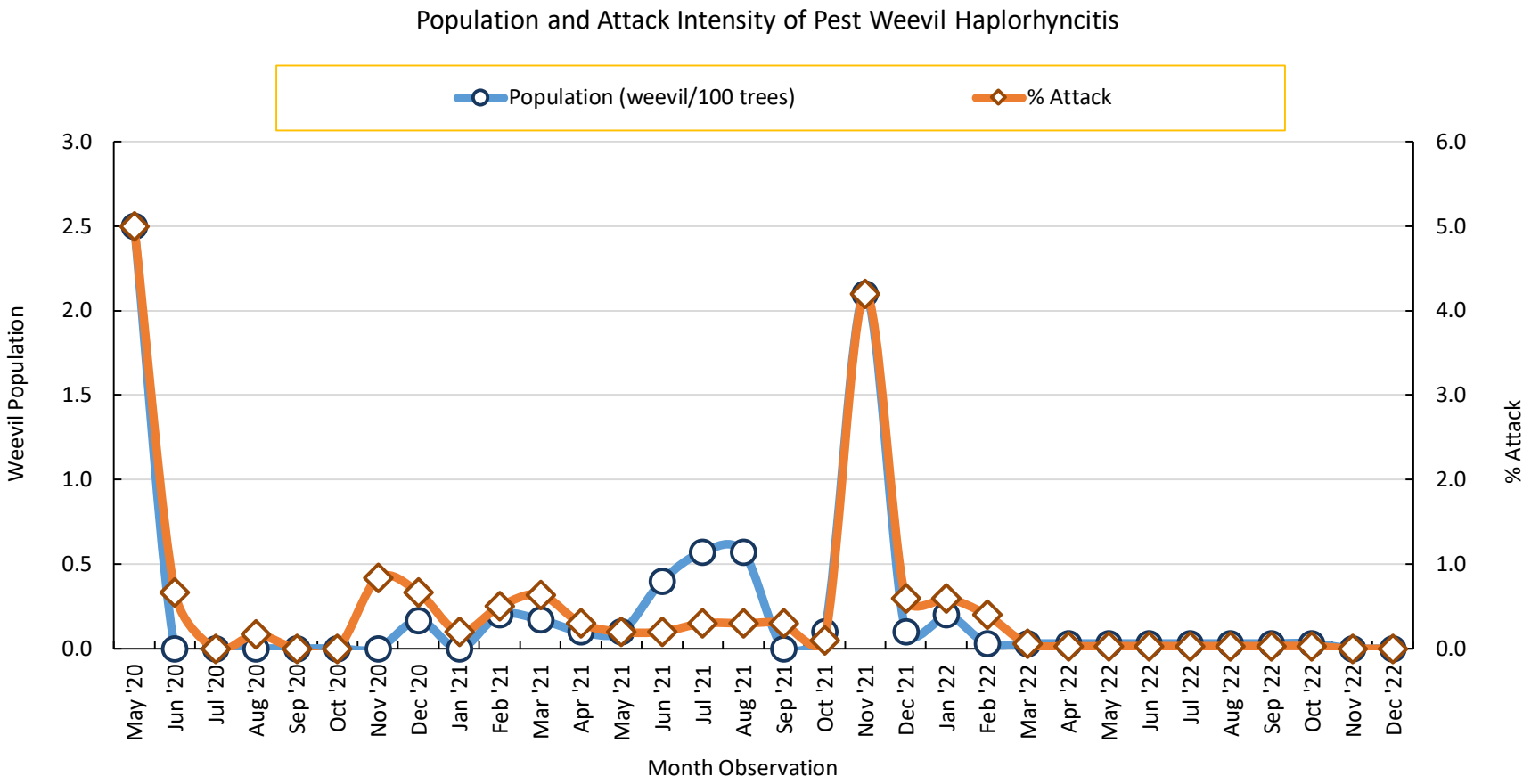
3. Pemantauan Hama Kumbang, Haplorhyncitis sp.



Note: Monitoring after December 2022 did not find the Pest Beetle, Exopholis hypoleuca

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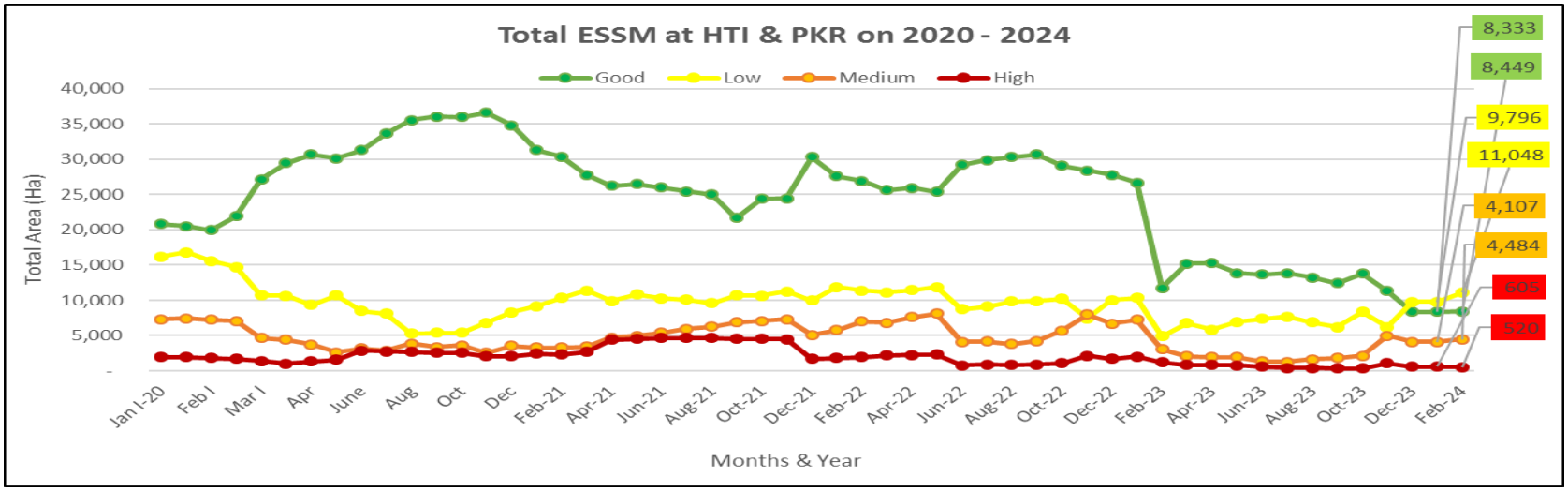
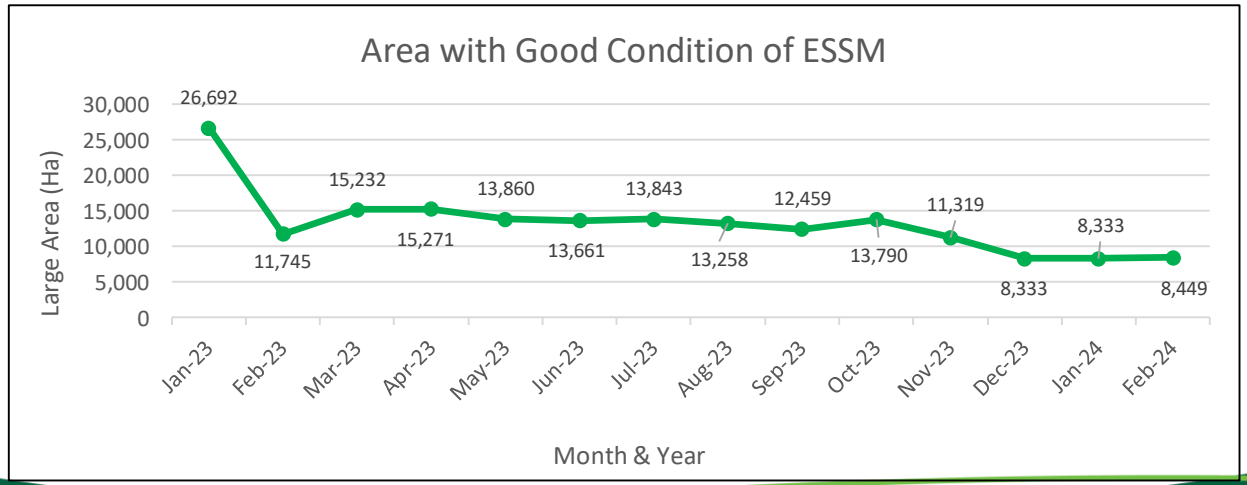
EUCALYPTS Scab Disease
(*Elsinoe necatrix*)

4. Monitoring Eucalypts Scab Shoot Malformation (Elsinoe necatrix)



- ESSM Severity During January 2023 to February 2024
- Starting February 2023, ESSM observations will be carried out at a maximum plant age of 2 years.



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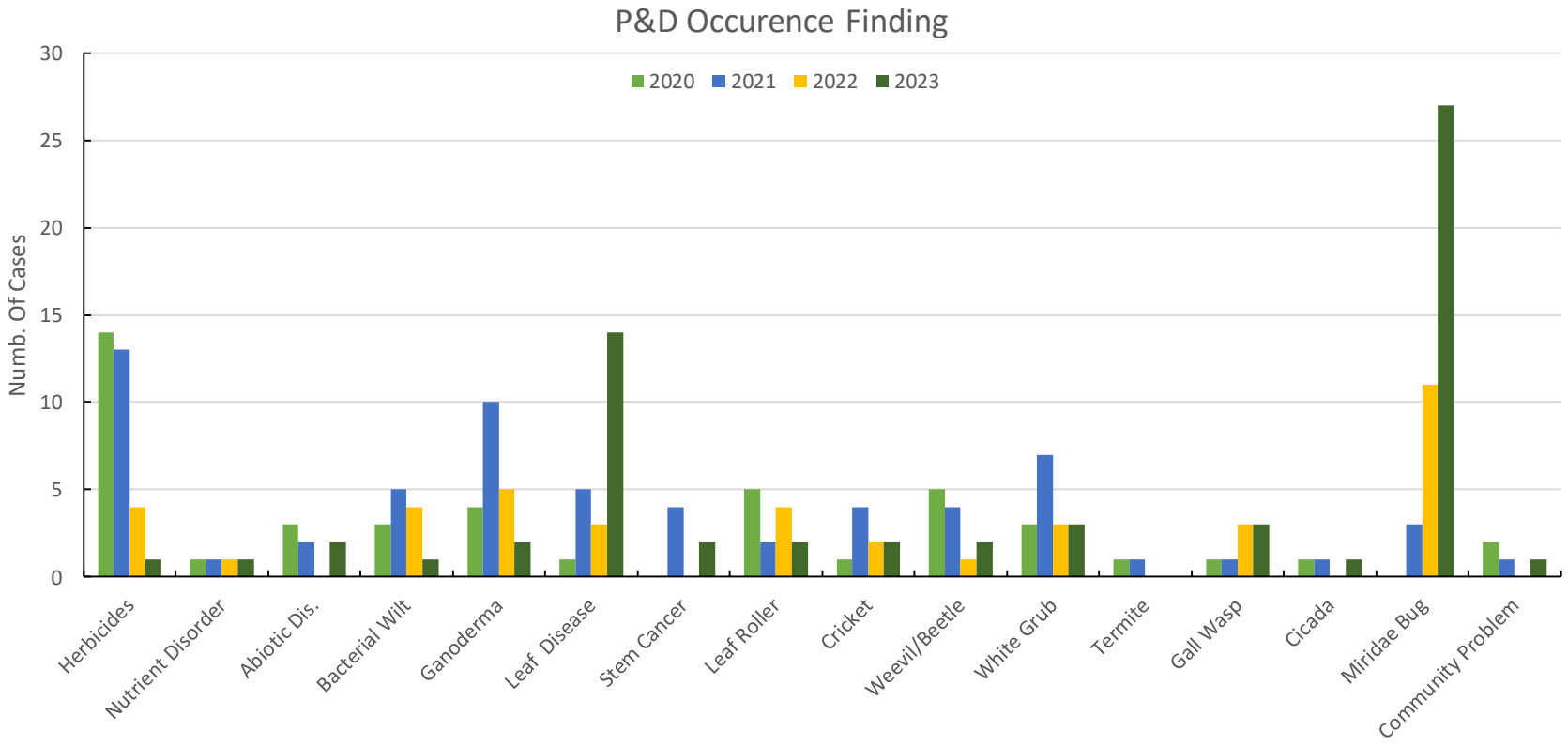
5. Monitoring and Solving Plant Pest, Diseases and Disorder.



This graph shows the 2 most common problems in 2023 are:

1. Miridae bug Helopeltis (27 findings)
2. Leaf diseases (14 Findings)

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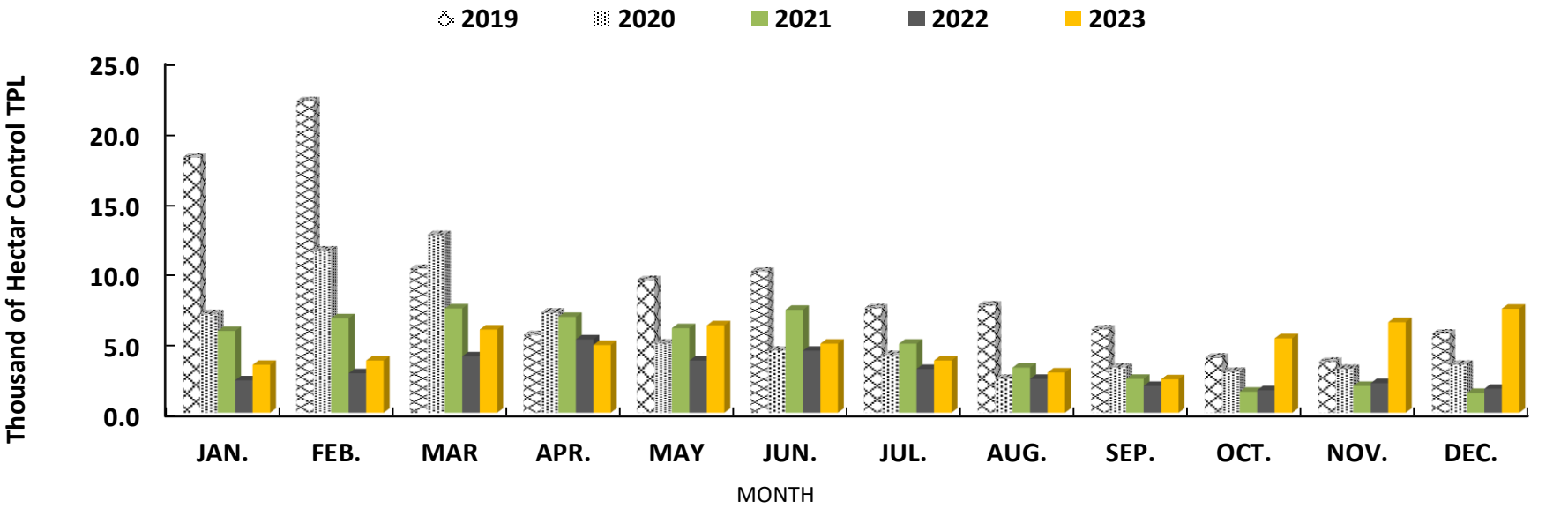
B. Reducing chemical pesticides

TPL is committed to developing operational procedures and standards related to monitoring, evaluation and review of pesticides and other materials, control of use, storage, handling, transportation/transfer and disposal. The graph below shows the trend of pesticide use to control pests on Eucalyptus trees (2019 – 2023).



1. Control of Sap Sucking Pests (Helopeltis sp.) based on Economic Threshold Levels
2. The numbers in the table show a decrease in Helopeltis control from year to year (2019-2022) and fluctuate in 2023.
3. Overall, control in 2023 is lower than control in 2019, 2020, & 2021, but there is an increase compared to 2022.

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C. Genetic P&D Controlling Method

Clonal Resistance Screening to Gall Wasp

Procedure Clonal Screening Resistance to Gall Wasp, *Ophellimus eucalypti* in the Screening House. Some pathogen screened directly in the field according to endemic area, sucah as, ELLS, Kirramyces, Ganoderma etc.

a. This screening aims to find clonal resistance to Gall wasp
b. Plant Protection has a screening target of 100 clones in 2020, 150 clones in 2021, 156 clones in 2022, and 186 clones in 2023.
c. The plantation only plants viable clones

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D. Biological Controlling Method

1. Mass Rearing of Sting Bug, *Sycanus* sp. (insect predator-generalist)

Predator Generralis; Adult Stage of *Sycanus*. Successfully developed at the Rearing House.

Sycanus Preying *Tenebrio molitor* at the Rearing House Entomology Laboratory, Porsea.

Location	Number of insects released 2024
Nursery	400

We use *Sycanus* species as natural predators

2. Developing Entomopathogen Fungus, *Cordyceps* sp.

White Grub attacked by *Cordyceps* sp. We brought this insect and purification in the Laboratory

Cordyceps sp. growing in the Artificial Media.
Experiment on going progress.

We use entomopathogenic fungi as natural predators of white grub pests, to reduce attacks by beetle larvae, Exopholis hypoleuca on the roots of Eucalyptus plants.