

# By-catch in pheromone traps for pest Lepidopterans in forests



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## Pest monitoring

More than 7,000 pheromone traps are deployed annually in oak and pine forests throughout Germany to monitor forest-damaging Lepidopterans. These traps use sexual attractant to lure male target organisms (TO) (Fig. 1). During mass propagation, by-catches of carrion beetles (Silphidae) or wasps (Vespidae) are often observed. Due to a lack of standardised recording, little is known about the influence on non-target organisms (NTO).

In order to assess the influence of pheromone traps on NTO, by-catch from traps to monitor pest Lepidopterans in



Fig. 1: VarioTrap® pheromone trap for monitoring forest pest Lepidopterans. (R. Fritz)

### Oak (*Quercus* spp.)

- *Lymantria dispar*
- *Agriopsis leucophaearia*
- and **Pine** (*Pinus sylvestris*)
- *Lymantria monacha*
- *Panolis flammea*



was analysed for the first time. The data was collected as part of the project DiMoTrap between 2022 and 2024 in Hesse, Lower Saxony and Saxony-Anhalt.

During the respective main flight period (*P. flammea*: 01.03.-31.05., *A. leucophaearia*: 01.02.-31.03., *L. dispar/monacha*: 01.07.-30.08) trap groups consisting of 2 or 3 standard traps (with pheromone bait) and an additional control trap (unbaited) were established in selected stands (Fig. 2) and emptied on a weekly basis. In addition, weather data (temperature/humidity) were recorded. The catches were identified to family level.

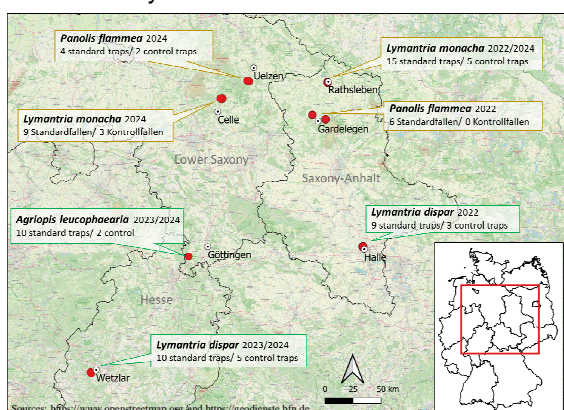


Fig. 2: Map of monitoring sites in pine and oak forests.

## First results

- In forestry used stands, there was no difference in the number of by-catch between control and standard traps.
- The amount of TOs was at least 1.4 times higher than the amount of NTOs (exception: in *P. flammea* the number of TOs is generally low).

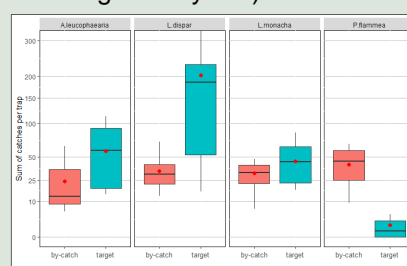


Fig. 3: Boxplots for the sum of bycatch (red) and target species (blue).

- Spring:
  - Regardless of tree and trap type, Sciaridae & Mycetophilidae dominated the by-catch.
  - The amount of TO had no effect on the number of by-catch.
- Summer:
  - In unmanaged and structurally rich oak stands surveyed, there was a positive correlation between by-catch quantity and TO (Fig. 4). Here, Muscidae, Vespidae and Sarcophagidae were most frequently found as by-catch.
  - This pattern could also be found in managed pine stands with low structural richness. (Fig. 5).

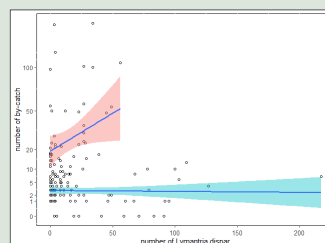


Fig. 4: Correlation between the amount of by-catch and the amount of *L. dispar* in oak stands with natural development (red) and a commercial forest (blue).

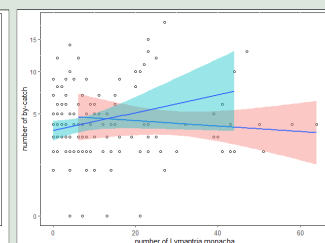


Fig. 5: Correlation between the amount of by-catch and the amount of *L. monacha* in pine stands without undergrowth (blue) and with undergrowth (red).

- The richness of by-catches was higher than in spring season.
- The composition of by-catch differed between control and standard traps.
- In the managed stands, Phoridae and Muscidae were occasionally frequent by-catches.

## Conclusions/Outlook

Preliminary results indicate that stand structure has an important influence on by-catch in pheromone traps for pest Lepidopterans. Although by-catch rates did not differ between control and pheromone traps, the difference in richness suggests an effect of the pheromone or the amount of targeted pest species. How the amount and diversity of by-catch changes with weather conditions an increasing population density of the pest butterflies is a question for future research.

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