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Short communication

The use of artificial shelters to control the apple blossom weevil *Anthonomus pomorum*

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Abstract

*The apple blossom weevil (*Anthonomus pomorum *L.) has a single generation per year and undergoes a prolonged dormant period from early summer to the following spring, seeking shelter in natural refuges. In older, traditional orchards with long-established trees, adults commonly overwintered beneath rough bark or leaf litter, while modern high-density systems provide few such sites. We tested hand-made PVC tube bundle shelters installed in May and removed in winter. Across five orchard trials, one shelter per tree reduced infested flowers by ~70% the following spring. Multi-year, large-scale implementation did not lower overall populations, highlighting the need for optimisation and understanding of off-orchard overwintering.*

Keywords: Curculionidae, Anthonomus, mass trapping, non-chemical control

Introduction

The apple blossom weevil (*Anthonomus pomorum* L.) has a single generation per year and enters a prolonged dormant period from early summer until the following spring. During this period, adults seek sheltered overwintering sites in and around orchards. In older, traditional orchards with long-established trees, weevils commonly overwintered beneath the rough bark or in leaf litter (Töpfer et al., 2000). Modern high-density systems provide far fewer such refuges, prompting us to investigate whether installing artificial shelters on apple trees in late spring, and removing them in winter, could reduce *A. pomorum* populations by eliminating the overwintering adults they contain. Our research addressed three key questions:

1. Shelter design: Which materials and designs are attractive to the weevils while remaining affordable, reusable, compact and easy to handle?
2. Efficacy: How does the shelter method affect infestation levels compared with untreated plots, and what proportion of the population can be removed?
3. Long-term impact: If applied consistently, can the technique keep weevil populations at low levels or reduce them over multiple years?

Material and Methods

A series of experiments was conducted between 2018 and 2025 in both organic and conventional orchards, in close collaboration with fruit growers. Preliminary trials tested a range of shelter designs and materials to identify the most effective and practical option. Based on these screenings, the final design—ten 20 cm lengths of black PVC tree-tying tube, folded in half, tied with a nylon cable tie, and attached to the lower part of the tree with a tabbed rubber band—was selected for its high weevil capture rates, low bycatch, durability, and ease of handling.

Efficacy of this design was assessed in five trials (=orchards), each arranged as a randomised block with three to six replicates per orchard and plots of at least 900 m² to

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minimise adult migration. One shelter per tree was installed in May 2021; in treated plots, shelters were removed in February 2022 along with the weevils inside, while shelters in control plots remained in place. Weevil pressure was assessed by counting infested flowers in May 2021 and May 2022. Long-term impact was evaluated by treating entire orchards annually, with flower infestation monitored each year to estimate population trends.

Results and Discussion

A wide range of materials and designs was tested to identify the most effective shelter. Bundles of reed attracted the highest numbers of weevils but were bulky and decomposed quickly, limiting reuse. Other materials, such as corrugated polypropylene sheets in various colours and sizes, consistently captured few weevils. Shelters made from black PVC tying tube, widely used by growers to fix trees to stakes, performed best. Comparison of different tube diameters indicated that an outer diameter of ~4.5 mm was optimal. The standard shelter consisted of ten 20 cm lengths of tube, folded in half, tied with a nylon cable tie, and attached to the tree with a tabbed rubber band ("Tree-Fix").

Across five trials in different orchards and apple cultivars, installing one shelter per tree in May and removing it the following February reduced the number of infested flower buds by approximately 70% the following spring. To prevent summer migration of weevils into treated plots, shelters were also installed in the reference plots; this may have slightly overestimated efficacy by providing additional overwintering opportunities.

However, long-term, large-scale implementation over multiple years did not result in a net decrease in *A. pomorum* populations. This suggests that further optimisation of shelter deployment and a better understanding of overwintering behaviour beyond orchard boundaries are needed. The efficacy of the shelter method also depends on the presence of alternative refuges in the orchard: the fewer alternative hiding places there are, the more effective the method will be. Older orchards provide more refuges, such as rough bark, burrknots, and wounds from pruning or fruit tree canker (*Neonectria ditissima*). To further increase the efficacy of artificial shelters, it may be advisable for new plantations to use smooth poles and to avoid using bamboo or hollow tying tubes for tree support.

The shelter method remains a promising targeted, non-chemical control option, which can complement other ecological and cultural measures to reduce reliance on insecticides.

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References

Töpfer, S., Gu, H., & Dorn, S. (2000). Selection of hibernation sites by *Anthonomus pomorum*: preferences and ecological consequences. *Entomologia experimentalis et applicata* **95**: 241-249.

Citation of the full publication

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