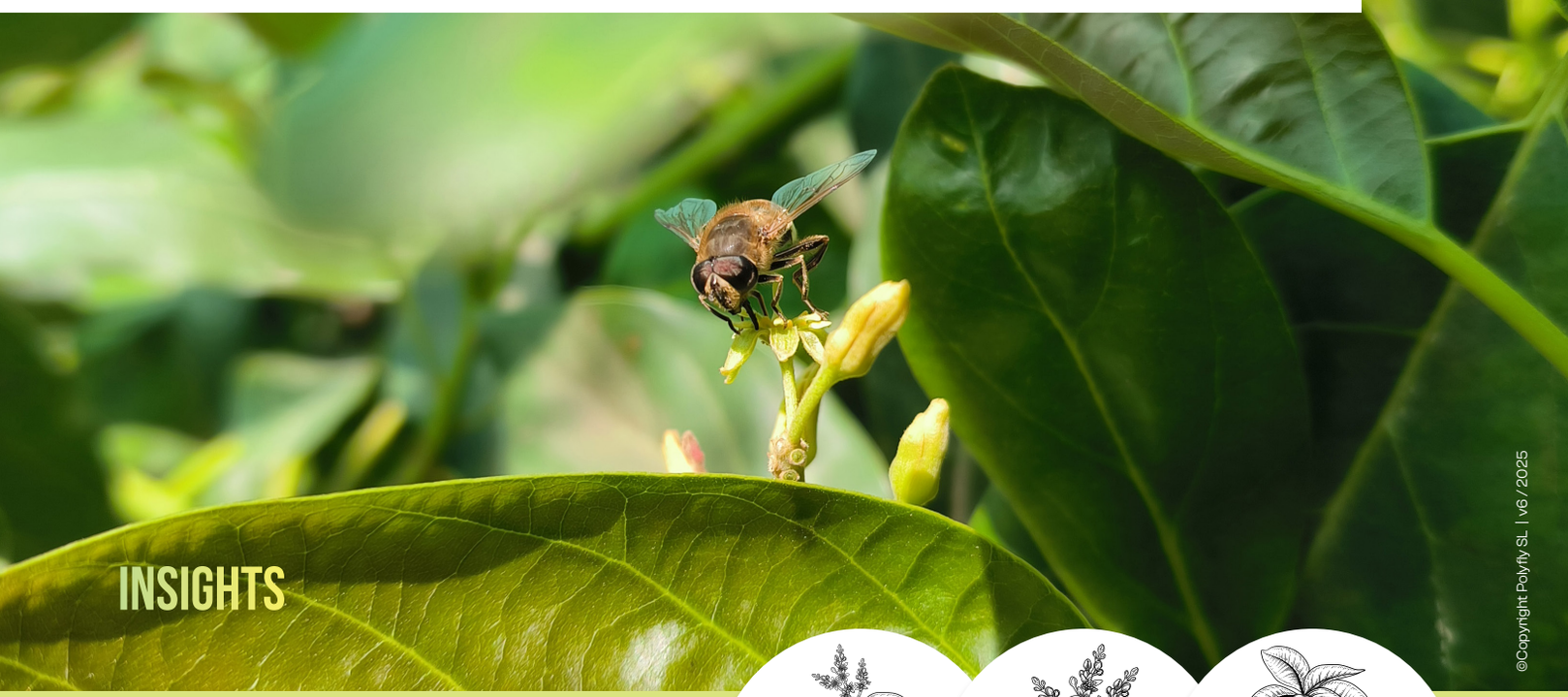
POLYFLY®

# AVOCADO

## Improved avocado production thanks to hoverfly pollination.

Evidence from trials demonstrate a significant increase in yield and profitability when hoverflies are released in commercial avocado orchards. Consecutive trials have consistently shown **increases of production exceeding 80% in netted plots**, resulting in a doubling of growers' revenue.



## INSIGHTS

## LOTS OF FLOWERS, FEW FRUITS

Avocado complex reproductive biology and its flowers' low attraction for ***Hymenoptera*** result in a very **low flower-to-fruit ratio of less than 1%.**


### BOOST FLOWER VISITS, FOSTER HARVEST

Well adapted and effective pollinators are needed to boost flower visitation rates and significantly increase crop productivity, even more so in netted plots.

### BOOST AVOCADO YIELD WITH HOVERFLIES

Hoverflies constitute a new class of managed pollinators that can drastically improve avocado yields and quality. Their efficiency is scientifically proven and numerous growers have already adopted them.

### MORE PROFIT, INCREASED RETURNS

Trials in commercial orchards have shown that hoverfly pollination can **increase the growers' annual return by 80%** (in netted plots).

### EASY-TO-USE HOVERFLY BOXES

Pollinating hoverflies are easy to implement and use, as they come in the form of **ready-to-emerge pupae**, packed in biodegradable boxes.

Polyfly.com

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# AVOCADO CASE STUDY

## HOVERFLIES: Top allies for avocado pollination

**Hoverfly-based pollination solutions are easy to implement and help deliver higher returns for the growers.**

Avocado production heavily relies on insect pollinators. With typically less than 1% of the flowers ultimately yielding a fruit, avocado often suffers from a chronic pollination deficit. While crop management practices like irrigation and fertilization are important, avocado productivity is very much limited by its complex reproductive biology and lack of effective pollinators.

Protecting avocado orchards with nets mitigates weather hazards (hail, wind...) and improves Integrated Pest & Pollination Management (IPPM). So far, the use of netting in avocado orchards has been hindered by the absence of managed pollinators that can perform well in such protected cropping systems.

Since 2017, Polyfly has devoted considerable R&D resources to demonstrate the efficiency of QUEENFLY® and GOLDFLY® as pollinators of challenging crops like avocado. Polyfly has developed sustainable rearing protocols that allow for the reliable supply of these alternative pollinators on a large scale, both outdoors and in protected settings.


Avocado Lamb Hass pollinated by hoverflies

## New managed pollinators to unlock avocado fruit set potential

| COMPARATIVE ADVANTAGES OF POLLINATORS IN AVOCADO | HOVERFLIES | BUMBLEBEE | HONEY BEE | MECHANICAL |
|---|---|---|---|---|
| Avocado attraction and compatibility | ✓ | ✗ | ✗ | ✓ |
| Avocado pollen transfer efficiency | ✓ | ~ | ~ | ~ |
| Safety of handling | ✓ | ✓ | ✗ | ✓ |
| Low manual labour / not labour intensive | ✓ | ✓ | ✓ | ✗ |
| Adapted to low temperatures | ✓ | ✓ | ✗ | ✓ |
| Adapted to high temperatures | ✓ | ✗ | ✓ | ✓ |
| Adapted to windy conditions | ~ | ~ | ✗ | ~ |
| Adapted to protected cropping conditions | ✓ | ✓ | ✗ | ✓ |
| Naturally occurring / native to most regions | ✓ | ✗ | ✓ | |

# HOVERFLIES CAN OUTPERFORM TRADITIONAL POLLINATORS

Polyfly Pollination Trials (2020-2023)

## COLLABORATIONS

Conducted in partnership with top research institutions (Institute for Mediterranean and Subtropical Horticulture "La Mayora", Wageningen UR) and avocado growers.

## PROVEN RESULTS

Trials consistently demonstrate that QUEENFLY® and GOLDFLY® significantly improve avocado pollination.

## BETTER POLLINATION WITH HOVERFLIES

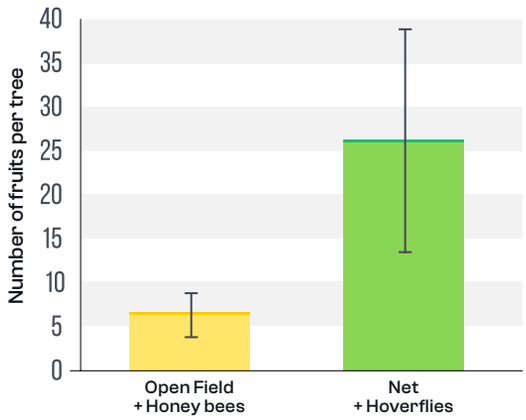
- Hoverflies led to higher initial fruit set.
- More flowers had pollen during the female phase compared to bumblebees (Hormaza 2018).

## TEMPERATURE ADAPTABILITY

- QUEENFLY® and GOLDFLY® can remain active throughout the day, even in unpredictable weather.
- They cover a wider temperature range than other pollinators.

## IMPACT ON CROSS-POLLINATION

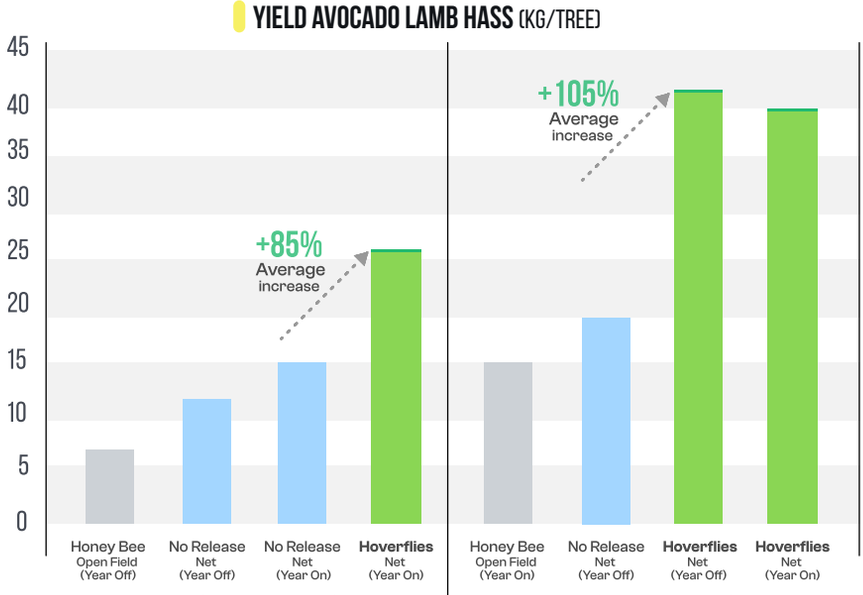
- Avocado trees have asynchronous male and female flower openings. The use of hoverflies significantly increases the chances of successful flower pollination.
- Extended hoverfly activity during the day increases the chances of cross-pollination, leading to better yields.


YIELD OF AVOCADO HASS
(Graph results from Eurostars)

"HOVERFLIES ARE HIGHLY EFFICIENT AVOCADO POLLINATORS AND THEY'RE NATURALLY PRESENT ON EVERY CONTINENT.


## YIELD AVOCADO LAMB HASS (KG/TREE)




YEAR, AGE OF TREE, BEARING YEAR, POLLINATOR AND TYPE OF ORCHARD
(In line with Cook et al. 2024 findings)

The avocado value proposition

## POLLINATION WITHOUT BORDERS

- QUEENFLY® and GOLDFLY® are native to most regions making them naturally occurring local pollinators.
- Releasing hoverflies enhances overall pollination activity, as different insect species stimulate each other and complement foraging behaviors.

## SAFE AND HARMLESS

- Despite their bee-like appearance (a defense against predators), hoverflies are completely harmless to humans and crops.

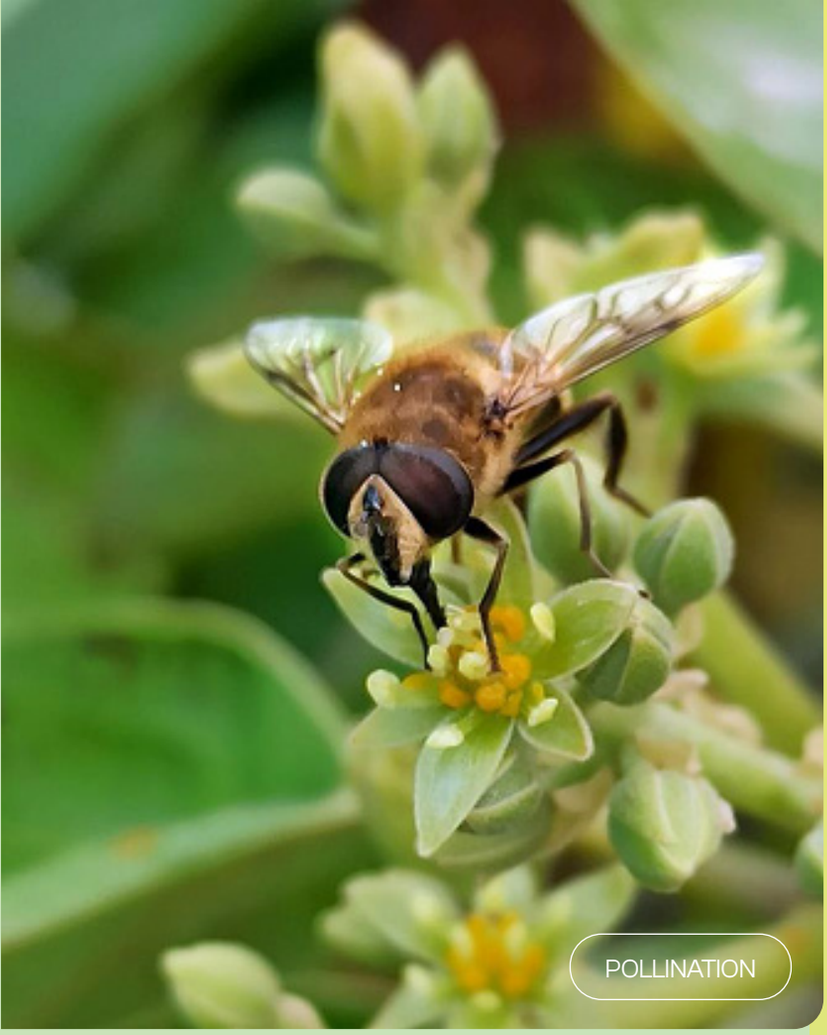
## SUSTAINABLE AGRICULTURAL SOLUTION

- Hoverflies are an innovative natural pollination solution for growers seeking to increase yields while maintaining sustainable farming practices.

## PROVEN YIELD INCREASES

- The use of hoverflies under netting demonstrated remarkable results, showing a yield increase of over 80% compared to using netting alone in avocado crops.
- Even more impressive, average yield increase of over 225% compared to open field cultivation.

eurostars™ NOVEL POLLINATORS WAGENINGEN UNIVERSITY & RESEARCH LA CAÑA IHSM La Mayora Instituto de Hortofruticultura Subtropical y Mediterránea UNIVERSIDAD DE MÁLAGA CSIC Consejo Superior de Investigaciones Científicas




POLYFLY®

## EFICIENCY

All avocado varieties

## PRODUCTS

Queenfly®

Goldfly®

## KEY SOLUTIONS

Higher crop yields

Suitable for protected environments

Natural solutions

Easy to use

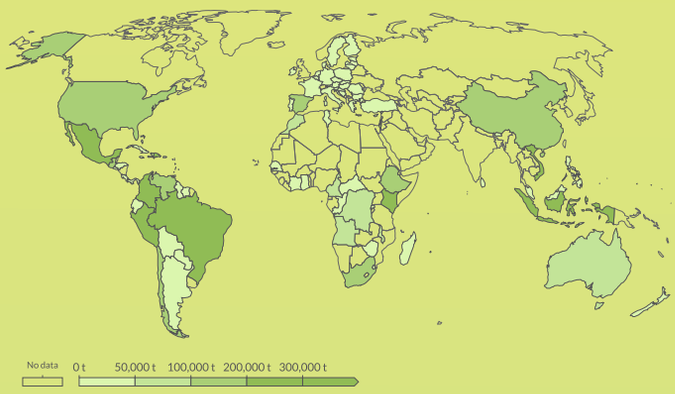
Boost pollination efficiency

Hoverfly pollination in netted plots

## WORLD AVOCADO PRODUCTION

Our World in Data

Avocado production is measured in tonnes.




Sources Food and Agriculture Organization of the United Nations (2023)
OurWorldinData.org/agricultural-production | CC BY

## POLYFLY'S MISSION

We enhance global food security by restoring natural pollination—an essential ecosystem service that boosts crop productivity while fostering on-farm biodiversity.

## SUSTAINABILITY

Integrated Pest and Pollinator Management (IPPM)

Boost natural pollination in your crops

Promote biodiversity

Eco-safe pollination

Climate-resilient pollinators

## CONTACT US

Thank you for taking the time to read this case study. If you want to know more, we can help:

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