The New Zealand Institute for Plant & Food Research Limited

Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

# Survival of *Pseudomonas* bacteria in beehives

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KVH
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# Introduction

# Bees and Psa

Pollen + Psa

Bees will collect Psa-contaminated pollen

Bees will deposit contaminated pollen on flowers

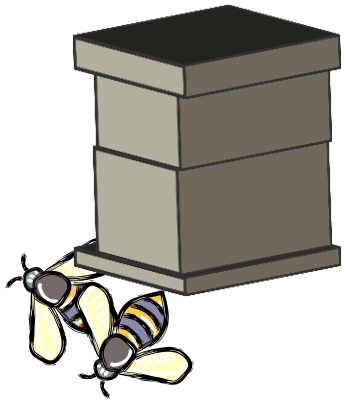
?

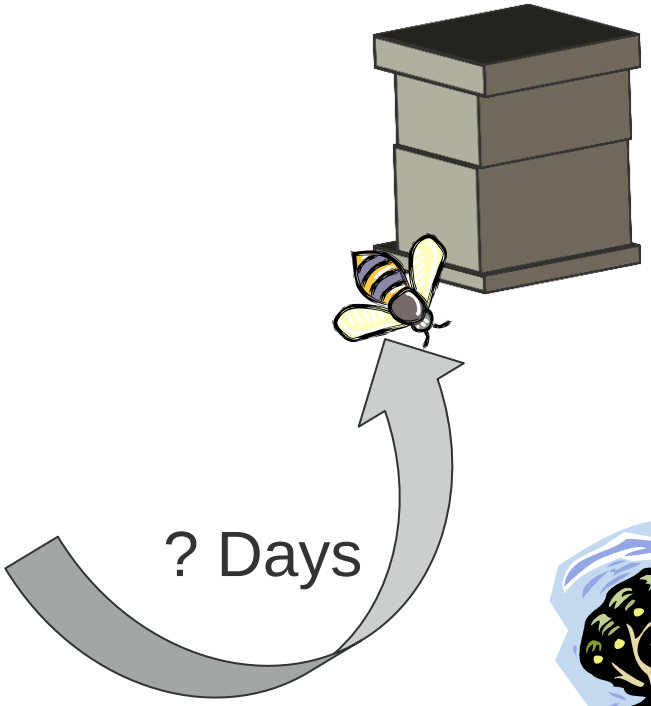
Infected flowers

?

Infected vines

# What is the role of bees in spreading Psa?





# Research Questions

1) How long does Psa survive in beehives?

2) Can Psa be spread in a hive from one group of pollen foragers to another group?

**Psa**

Two hives

**Pss**

Five hives

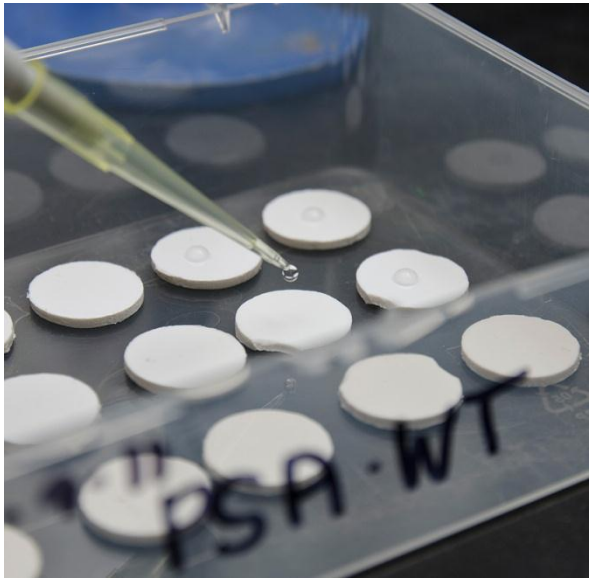
# Experimental Setup

## 1) Survival of Psa & Pss

**Outer:**
-Caged bees
-Discs
-Control discs

**Brood:**
-Caged bees
-Discs

Caged Bees Discs

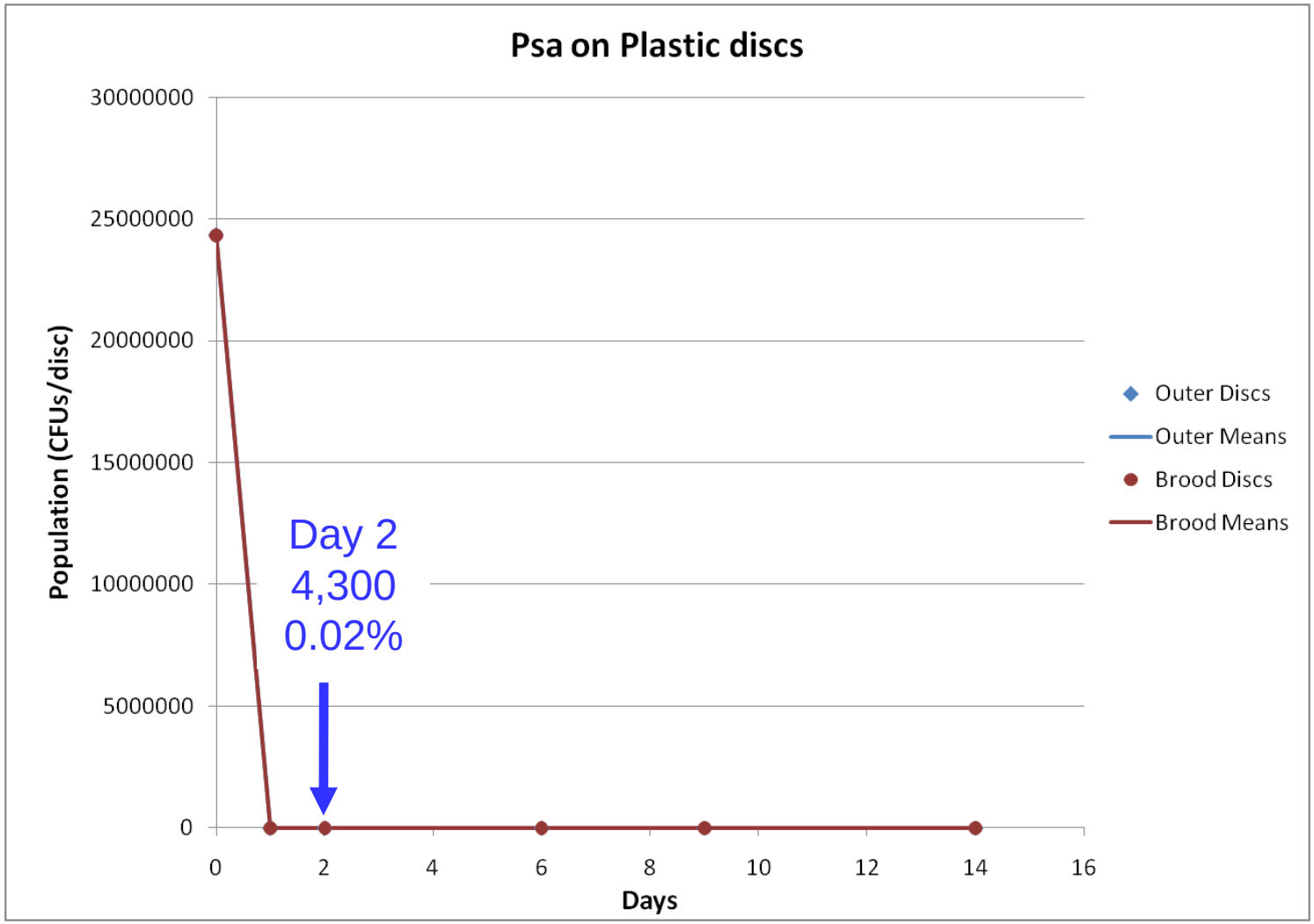



## 2) Spread within hive

Pss hives only:
- Marked bees with pollen
- Unmarked bees

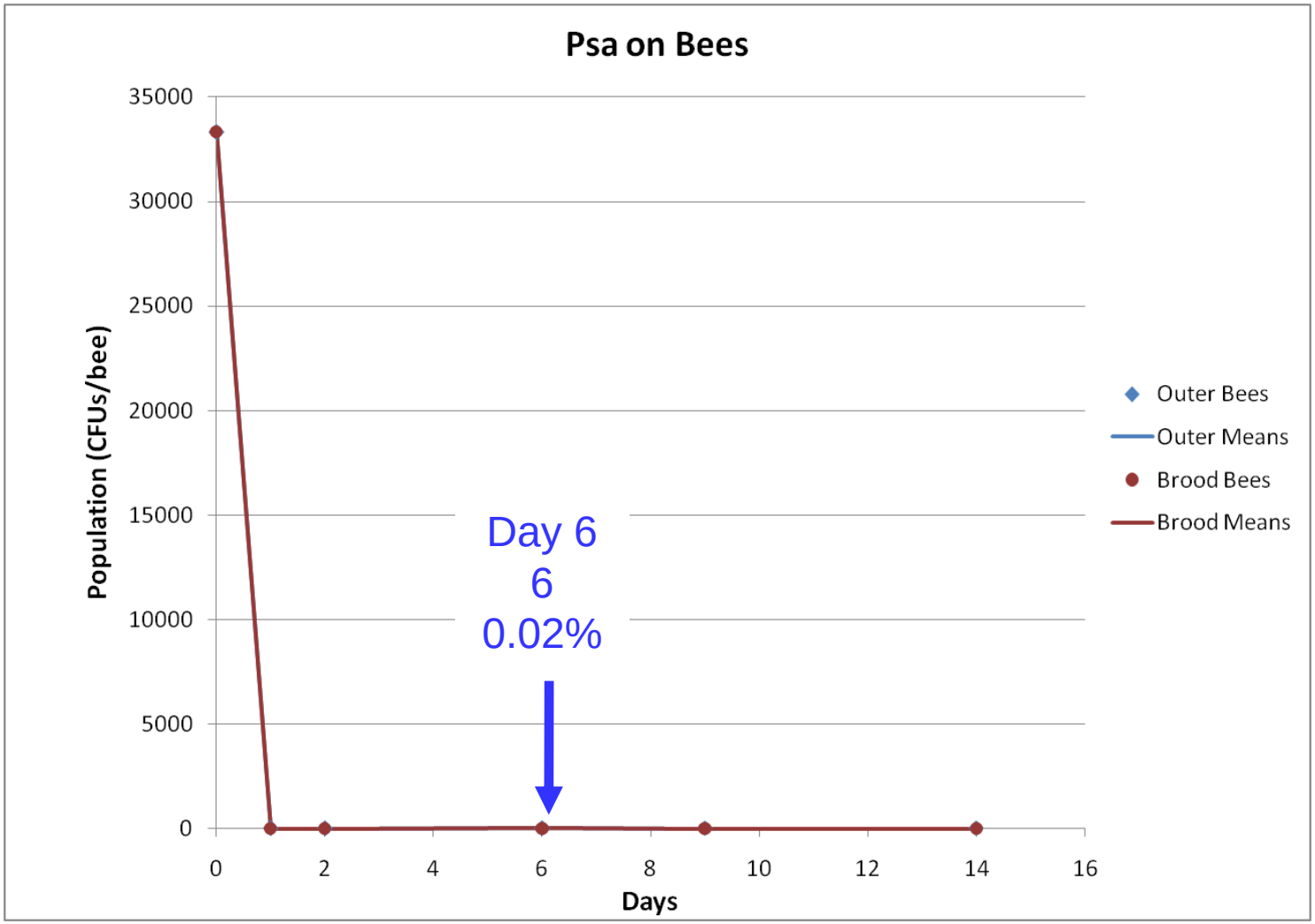
# 1) Survival of Psa on discs

**Psa**



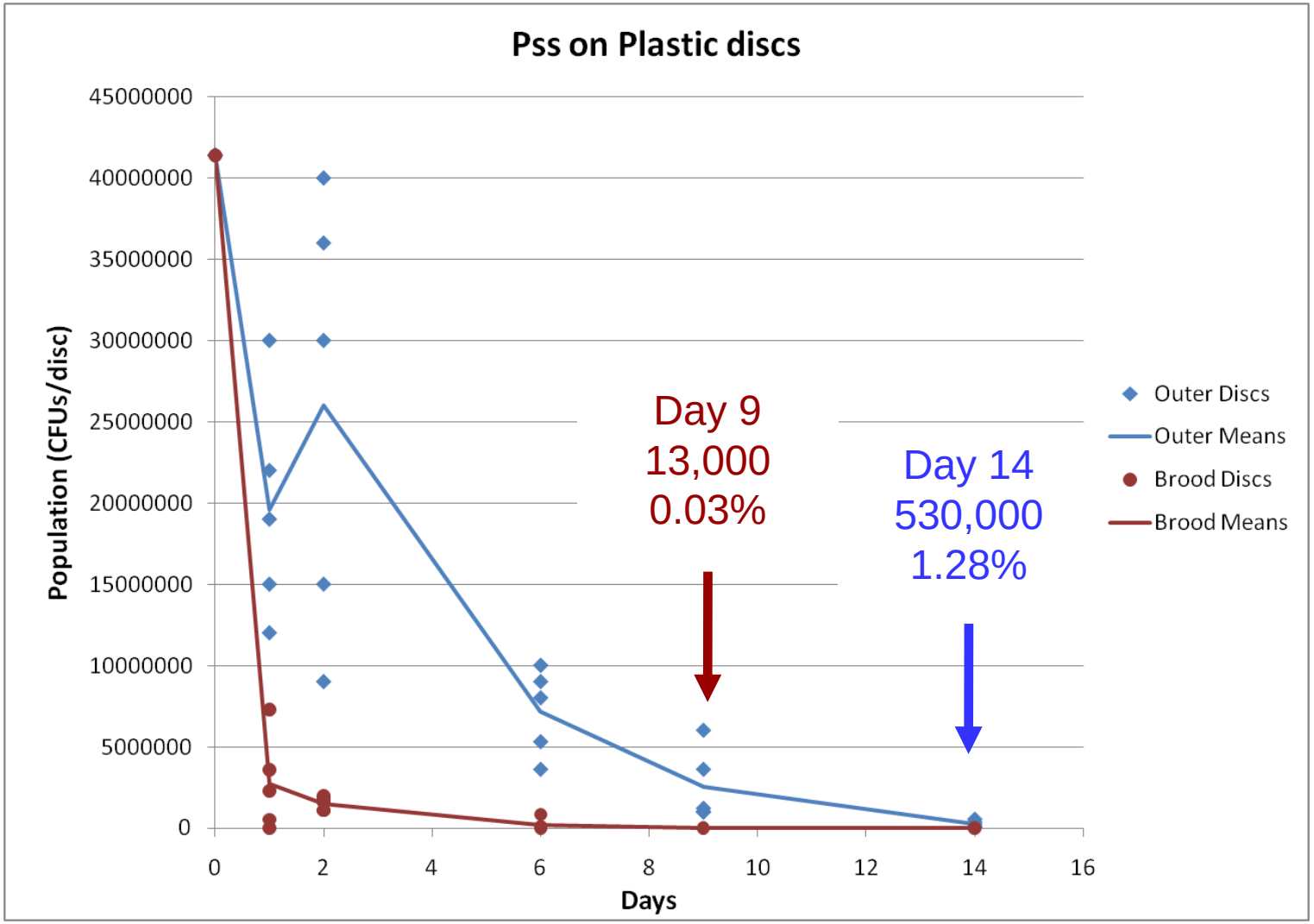
# 1) Survival of Psa on caged bees

**Psa**



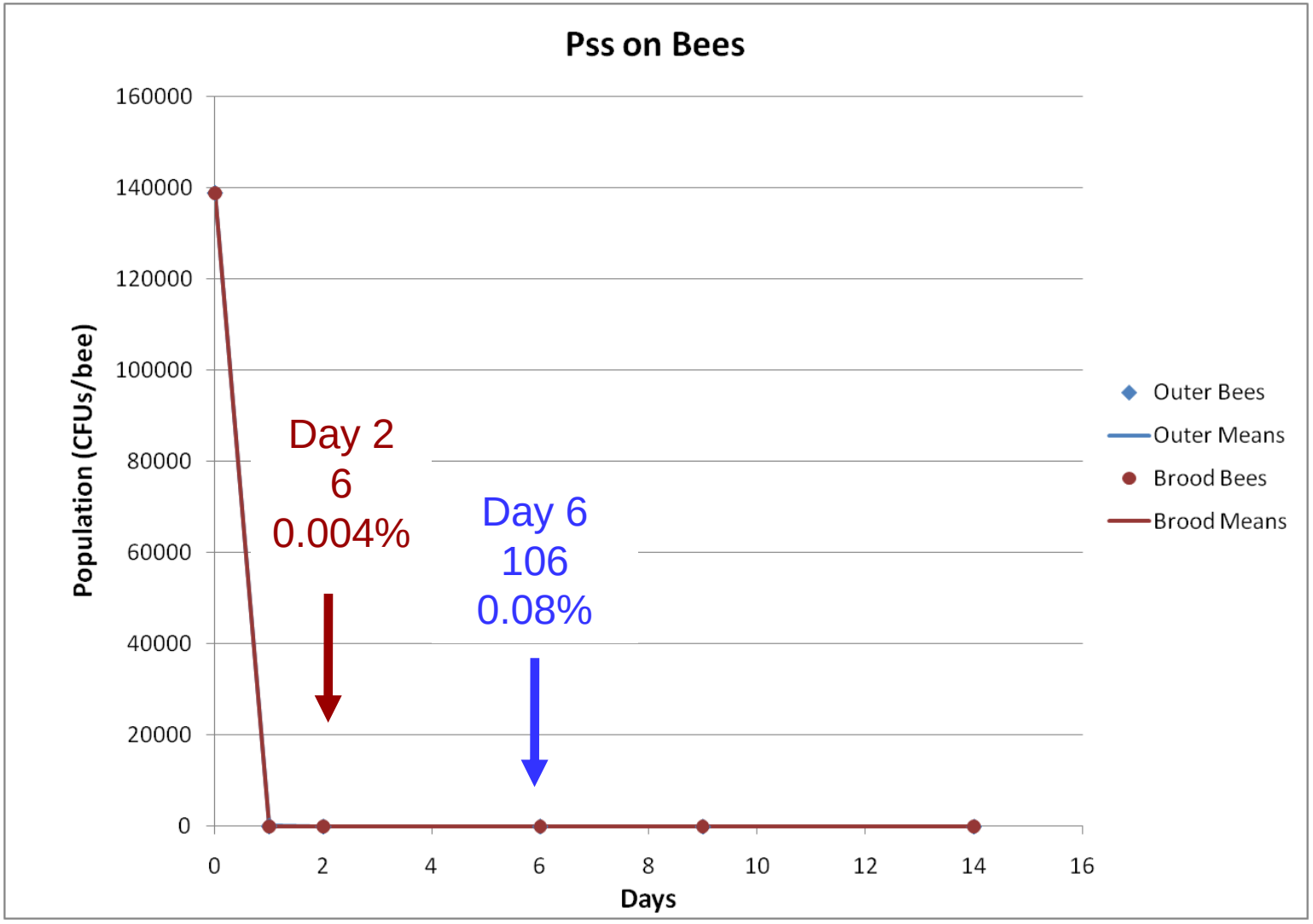
# 1) Survival of Pss on discs

Pss



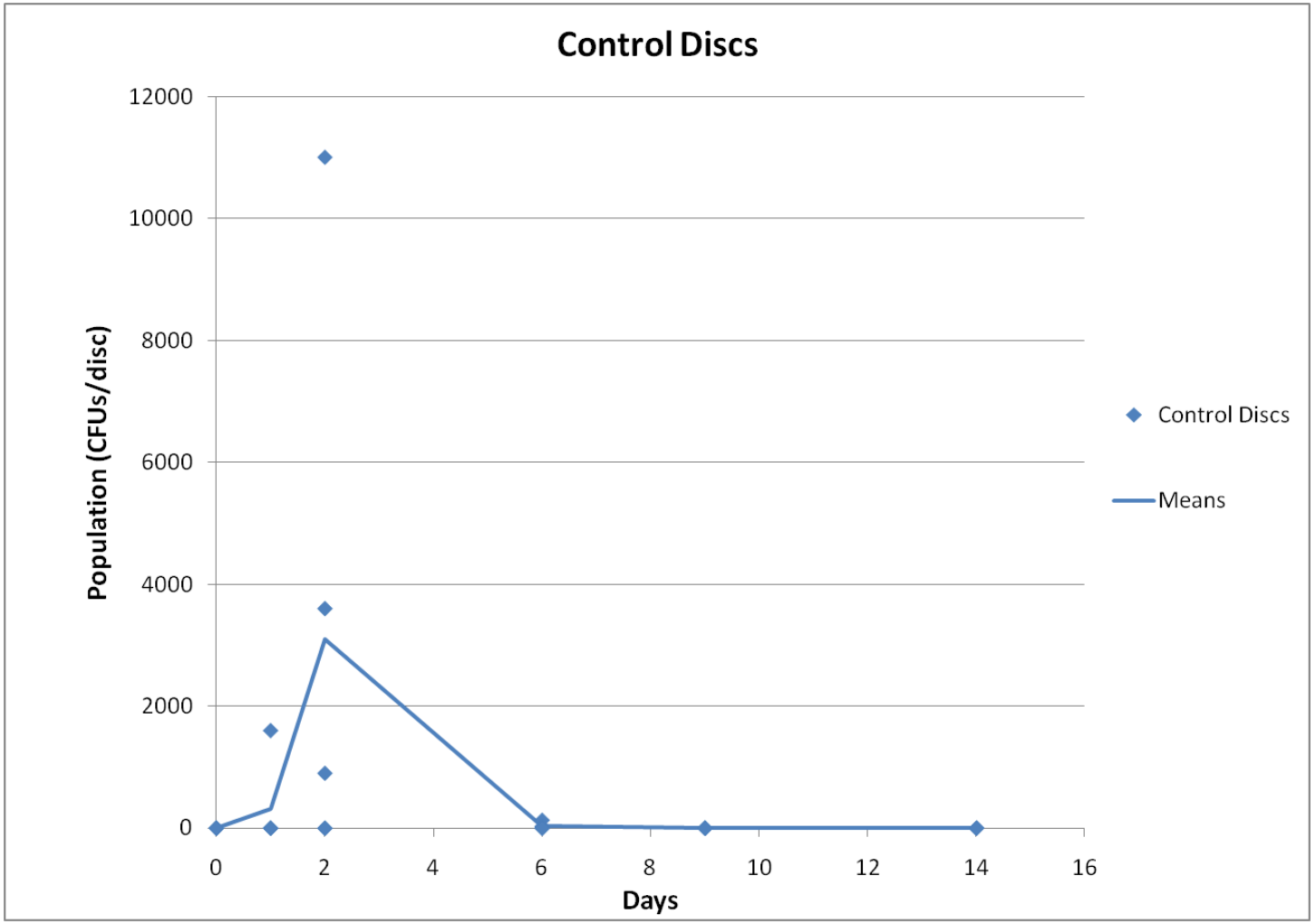
# 2) Survival of Pss on caged bees

**Pss**



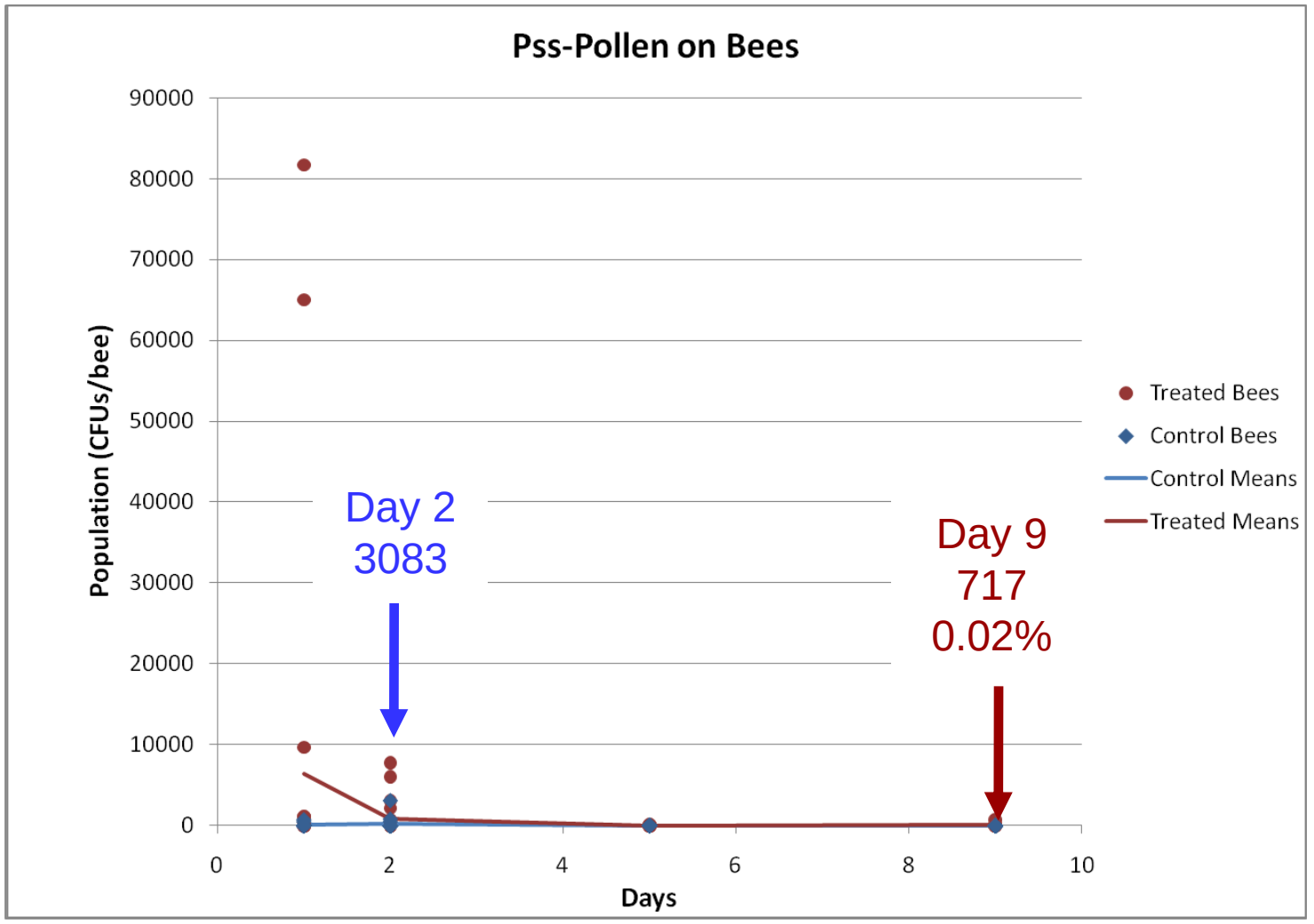
# 2) Contamination of control discs

Pss



# 2) Pss-contaminated pollen on bees

Pss



# Summary

1) **Survival in beehives**

•**Less than 0.5% remained on bees after 24 hours**

•**Nine days** after inoculation, Pss and Psa bacteria were no longer detectible on bees

•**Six days** after inoculation, Psa was no longer detectible on discs. **14 days** after inoculation, Pss was still detectible on discs

•Both Pss and Psa survived longer in the outer edges of beehives

2) **Spread within hive**

•Bacteria were spread through the hive for up to **nine days** and bees showed contamination more than **nine days** later

# Key Points

After 24 hours, very little bacteria can be found on bees, but repeated movement of Psa into the hive could increase bacteria levels.

Psa could potentially last for periods up to 2 weeks on surfaces within the hive.

Bacteria is quickly spread throughout the hive, so there would be no benefit in restricting multiple use of hives within infected zones.

Stand down periods of between 6-9 days should lead to substantial reductions in Psa within the hive.

# KVH Recommendations

- Hives used within a PZ should not be used again in any orchard outside a PZ. Any hives leaving a PZ should be removed to an area that is a least 5km from an orchard.
- Hives placed within a PZ may be used again within the same PZ with adherence to orchard hygiene protocols.
- Hives placed in an orchard outside a PZ may be used again with adherence to orchard hygiene protocols
- A proposed six day stand-down period may be applied to hives moving between regions. Recommendations will be made available ASAP.

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