



# Masterclasses Facilitate the Adoption of Farm Biosecurity in Strawberry

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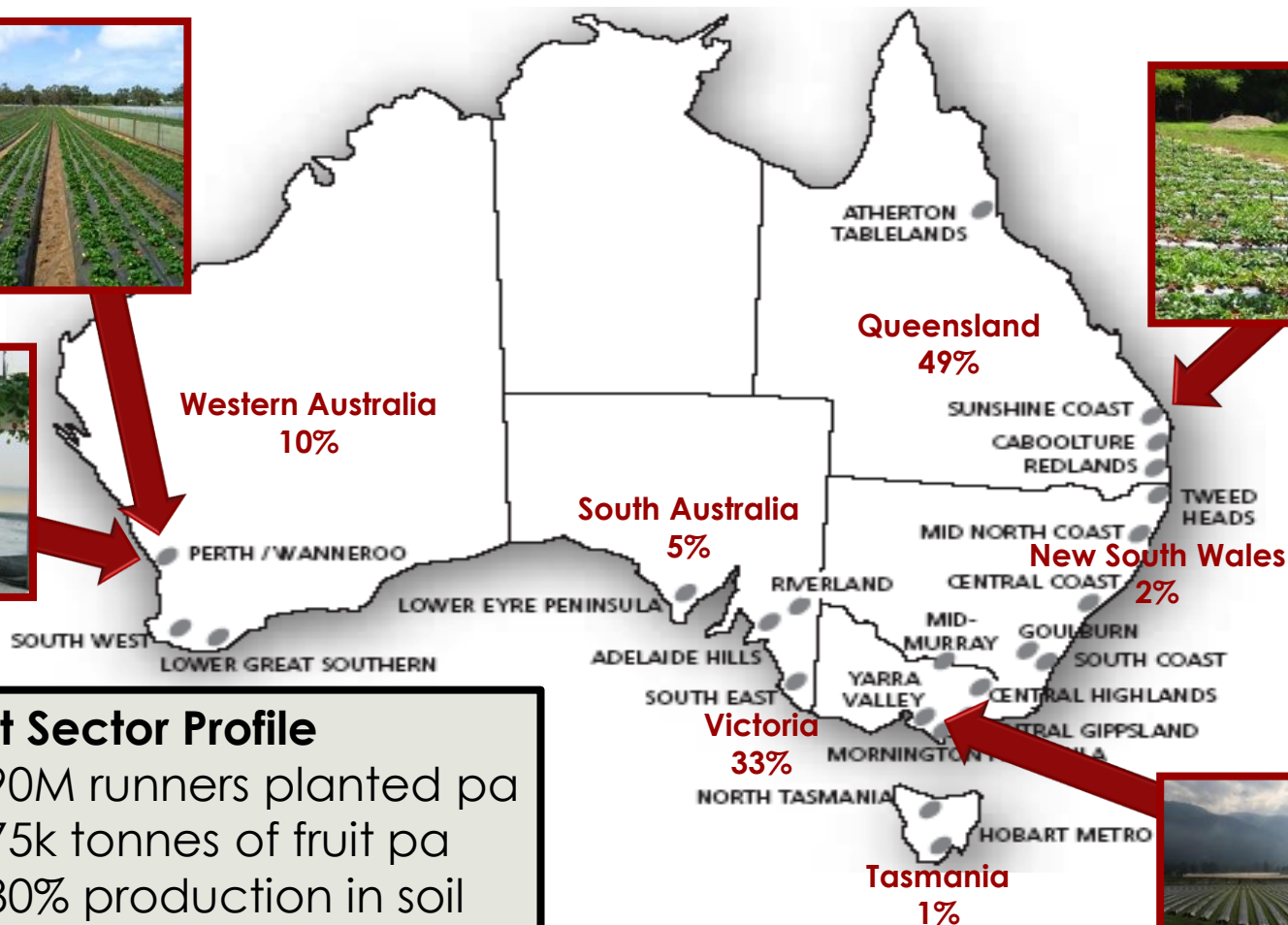


# What is Farm Biosecurity?

- Farm biosecurity is a set of hygiene measures designed to protect a property from the entry and spread of pests, diseases, and weeds.
- It is an important component of integrated strategies to manage soil-borne diseases.



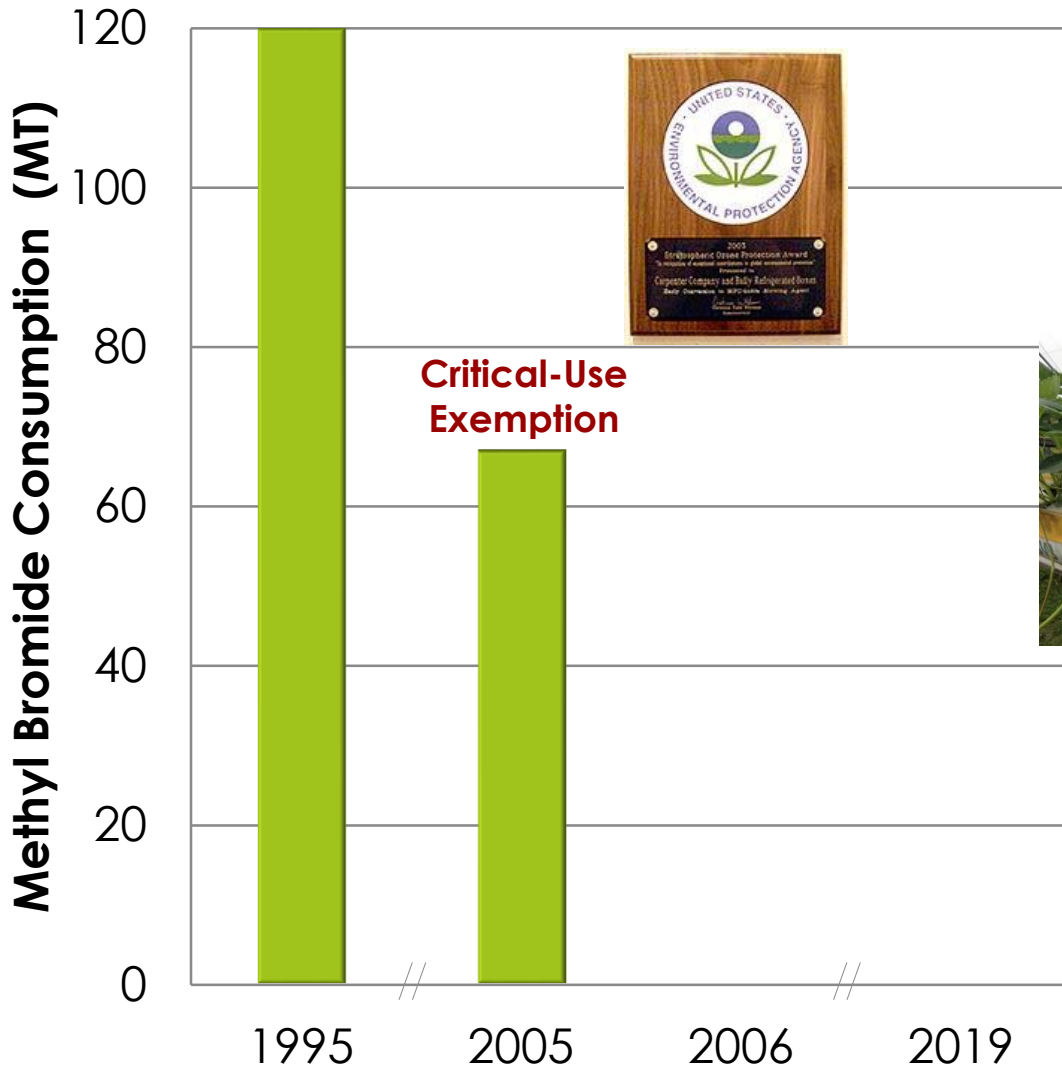
# Strawberry Production in Australia



## Fruit Sector Profile

- 90M runners planted pa
- 75k tonnes of fruit pa
- 80% production in soil
- Majority fumigate soils
- Valued at \$450 M pa

# Phase-out of Methyl Bromide in the Australian Strawberry Fruit Sector

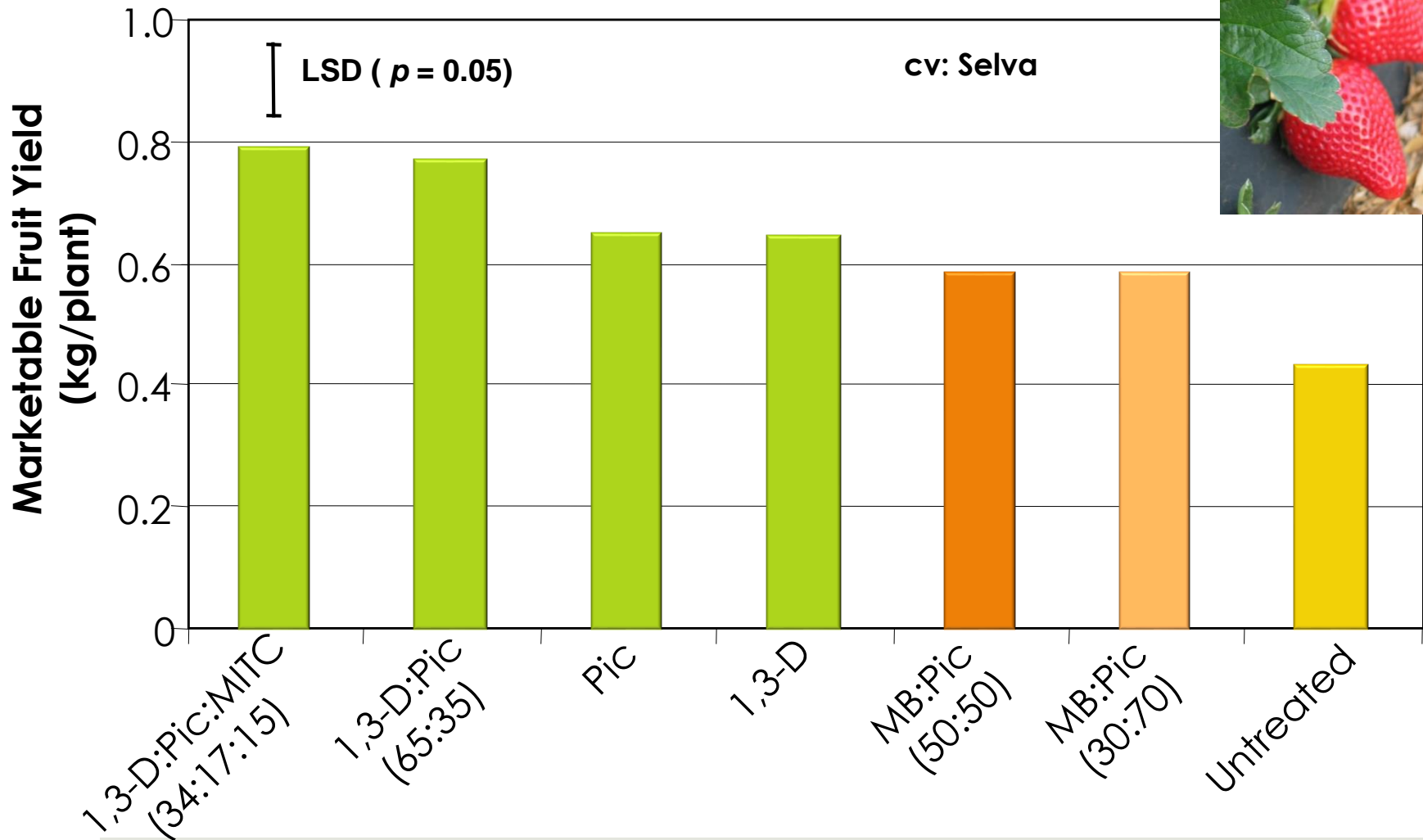


## Substitutes Adopted in 2019

- 1,3-D / Pic (shank or drip)
- Metham (drip)
- EDN
- Soil-less production



# Yield Response (2003) – Strawberry Fruit



# MB Alternative - 2005

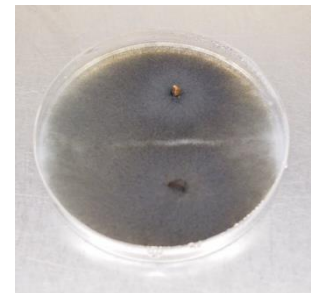


# Challenges with MB Substitutes in the Australian Strawberry Fruit Sector

- Increased importance of previously obscure pathogens following MB phase-out - *Fusarium oxysporum* f.sp. *fragariae*, *Neopestalotiopsis rosa*, and *Macrophomina phaseolina*



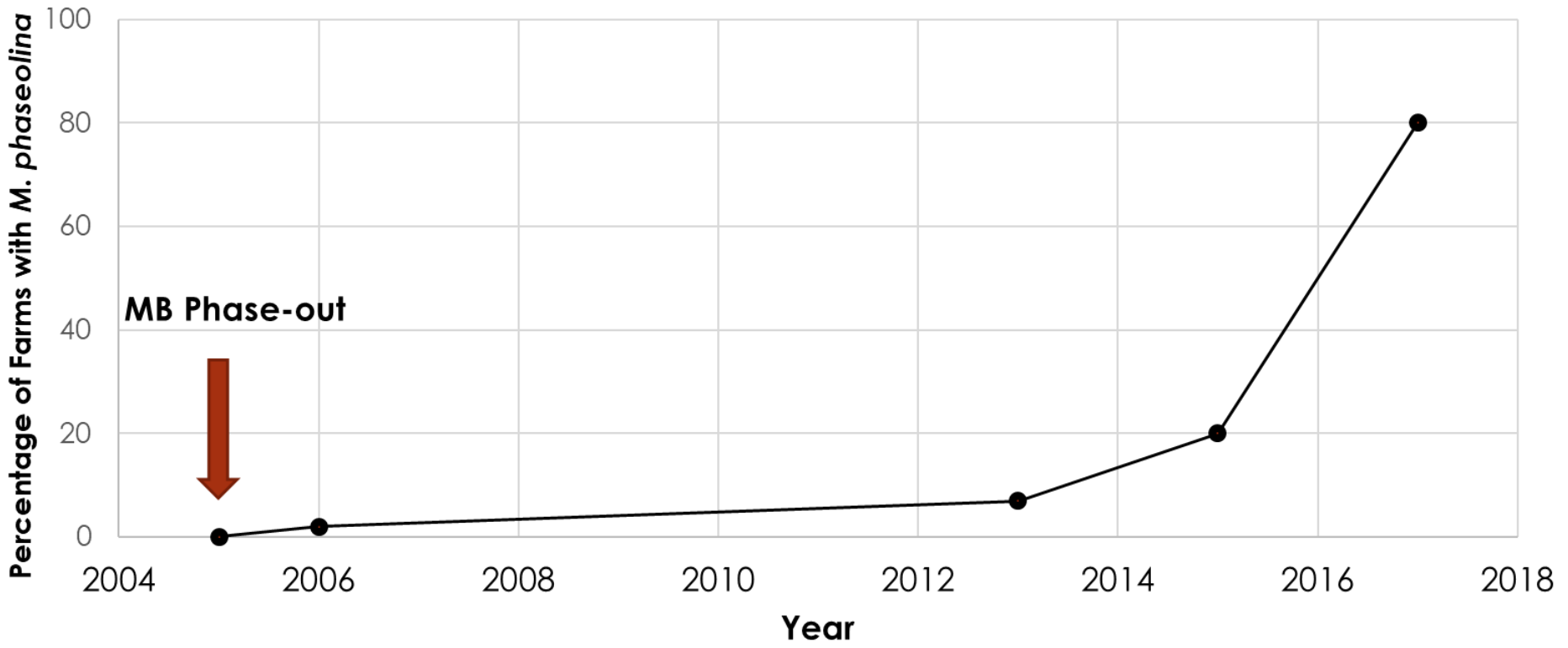
**Fusarium Wilt**



**Charcoal Rot**



# Increase in the importance of Charcoal Rot in Victorian Strawberries





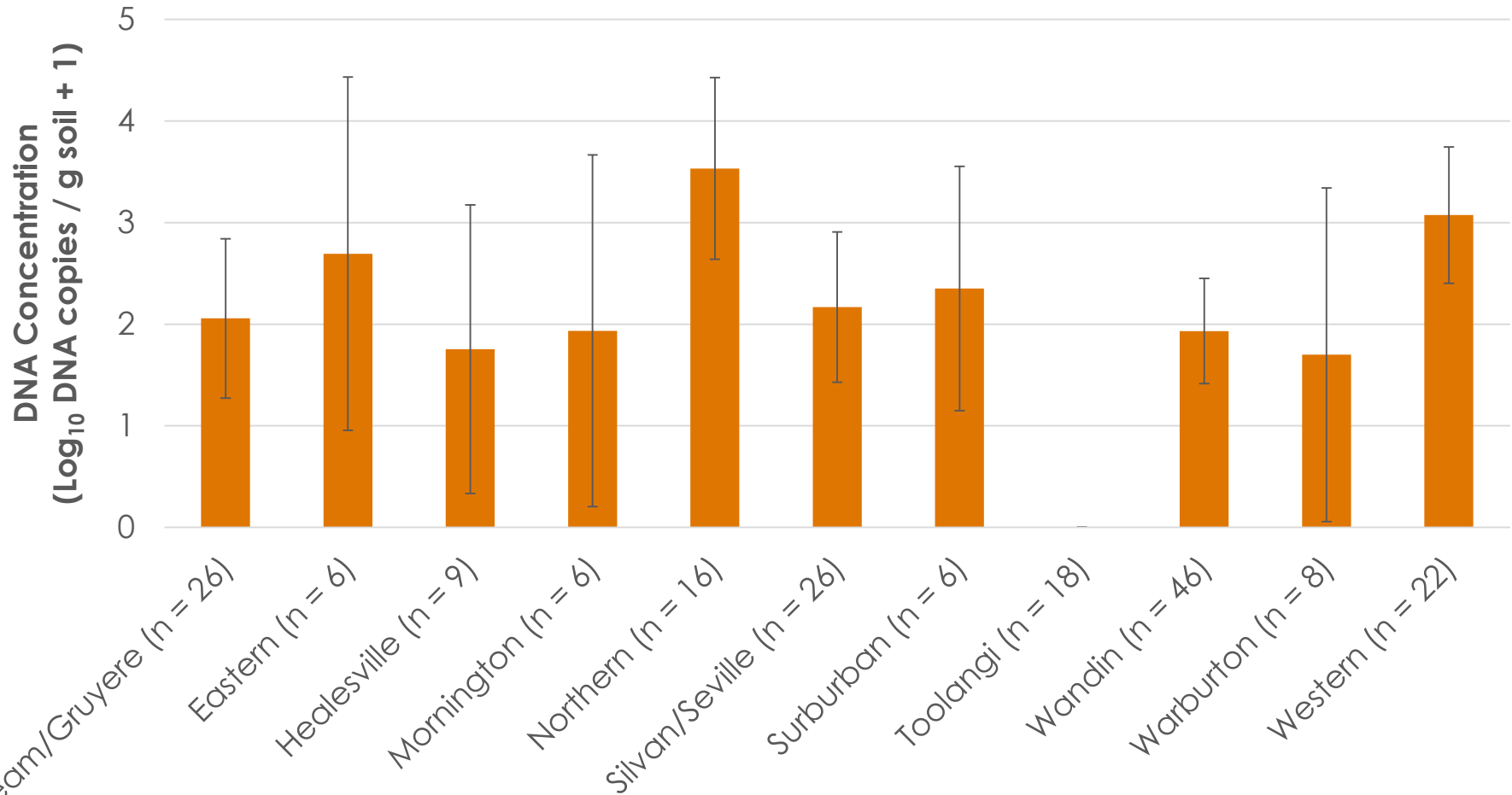
# Summary of results for Victoria (2017)

- 80% of growers' properties had soil infested with *M. phaseolina*.
- *M. phaseolina* was detected in every strawberry growing district in Victoria except in the nurseries at Toolangi that use MB.
- The average incidence of charcoal rot in strawberries across Victoria was 18%, resulting in a loss in revenue of \$20M pa.



# Distribution of Macrophomina across Victoria (2017)

## DNA of Mp in Soil



# Distribution of Charcoal Rot across Victoria (2017)

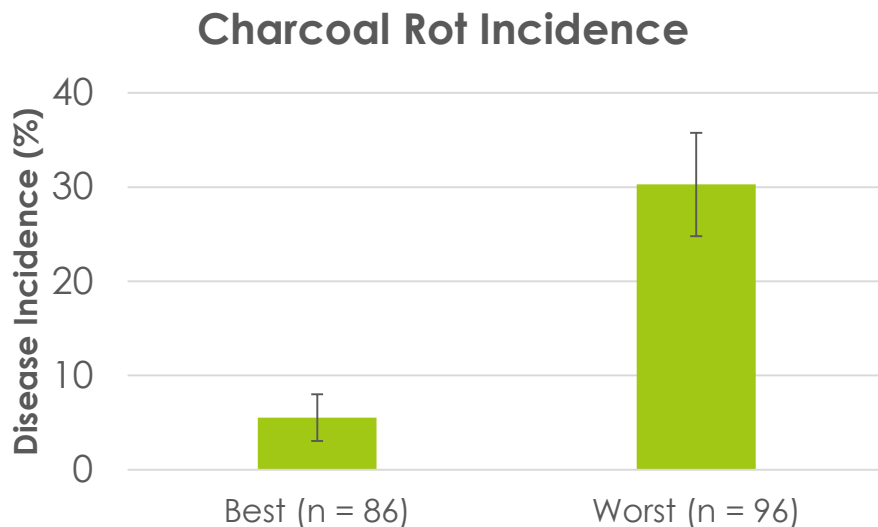
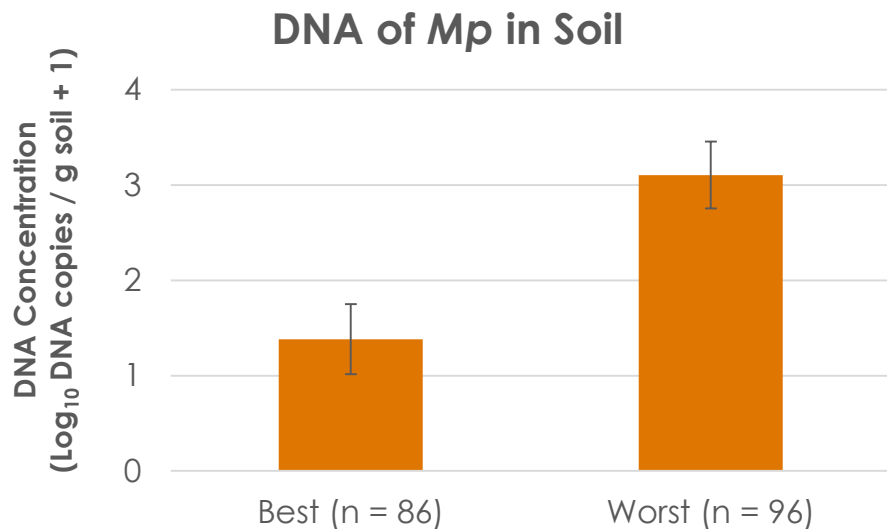


# Opportunities to Improve Farm Biosecurity

- Complacency to farm biosecurity due to growers' previous reliance on methyl bromide
- Growers sometimes share farm equipment & farm workers
- Highly variable wash down procedures for farm equipment
- Use of alternative hosts of *M. phaseolina* as green manures or wind break crops (e.g. sorghum)
- Variable management of soil in non-fumigated inter-rows
- Returning infected strawberry plants to soil



# Variation in Charcoal Rot within Farms



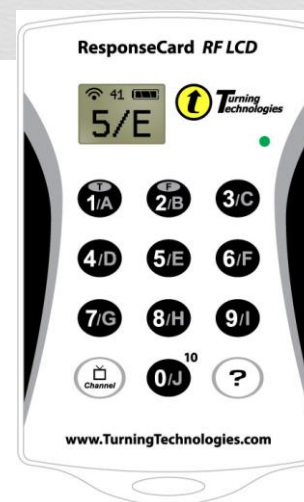
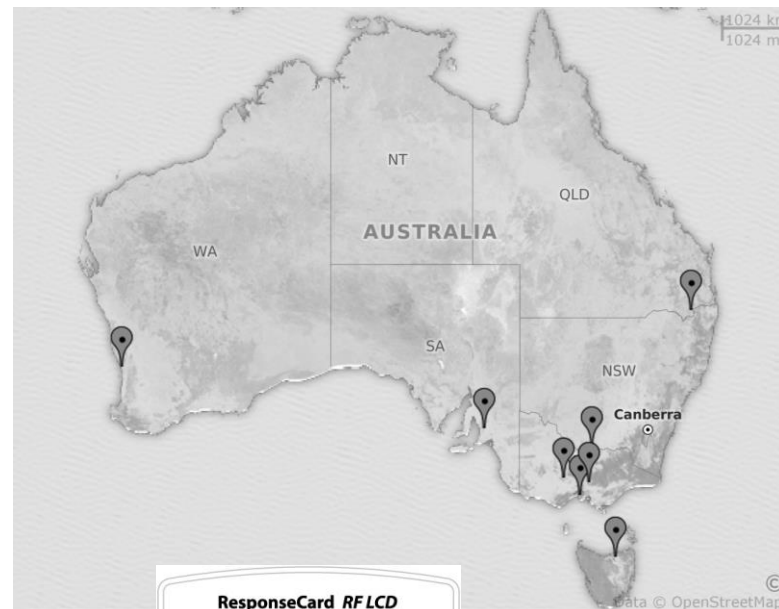
# Aim of Extension Project (2018-19)

- To improve strawberry growers' awareness of farm biosecurity
- To increase adoption of biosecurity practices that minimise the movement of infested soil from farm to farm, and field to field

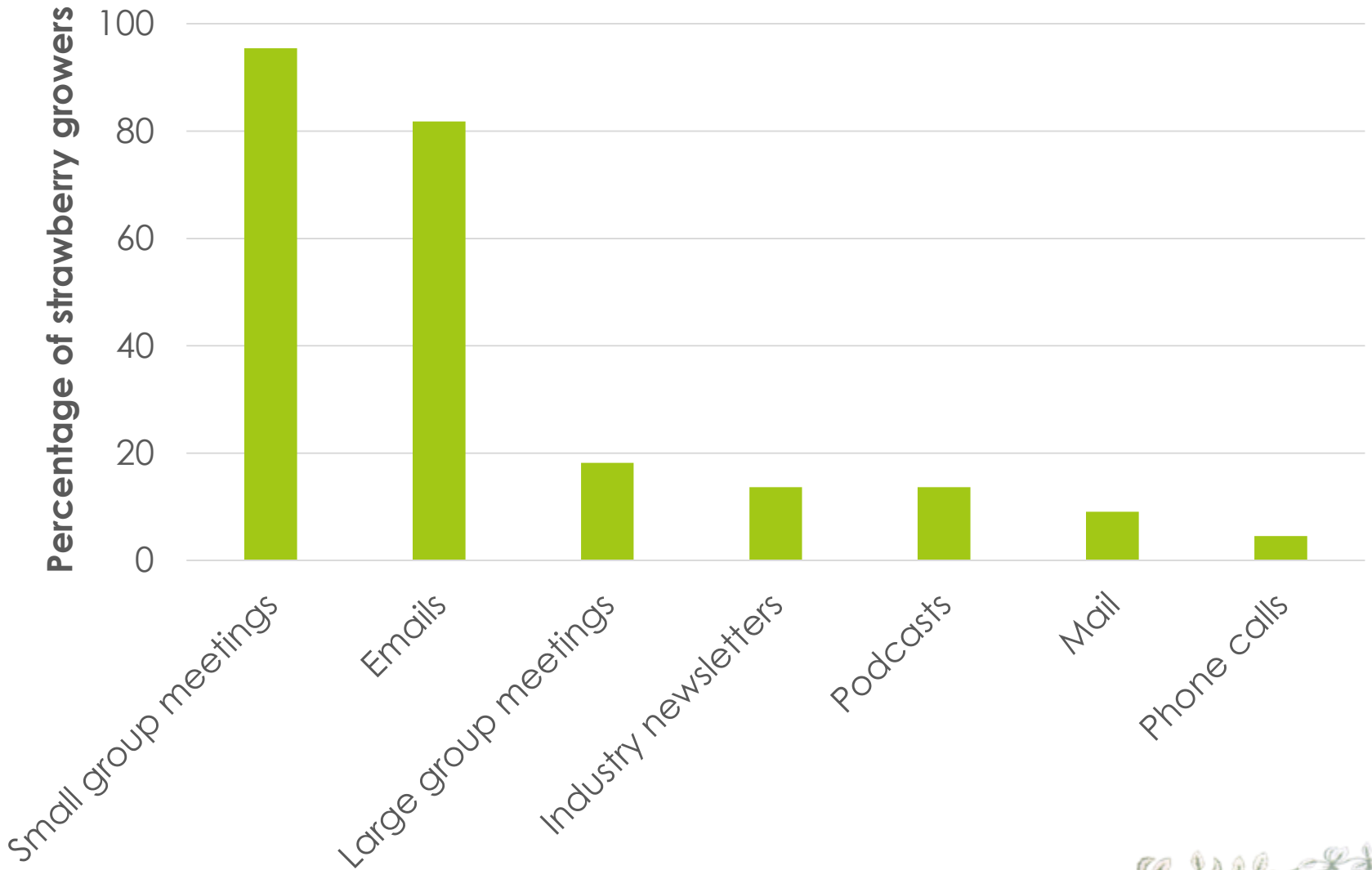


# Features of the Biosecurity Masterclasses

- Workshops with small groups of growers (10-30) in regional areas
- Twelve locations nationally
- Educational and participatory approach
- Translators where English was a second language
- Participation by local agronomists, extension officers and chemical resellers (influencers)
- Interactive to record grower feedback

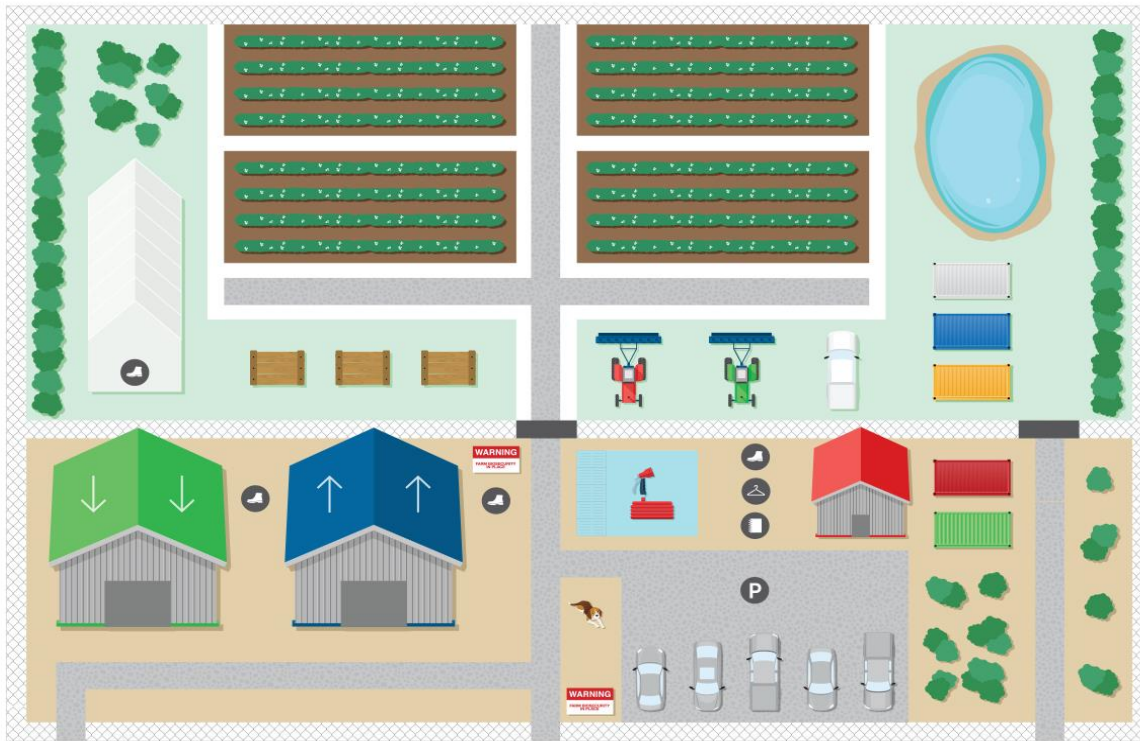


# Growers' Preferred Communication Methods





# Farm Biosecurity Discussion Points



***Consider the critical control points for managing the movement of infested soil on your property***

- Property access
- Biosecurity signs
- Property zoning
- Cleaning vehicles & equipment
- Foot baths and covers
- Removal of infected material
- Management of inter-row
- Staff training



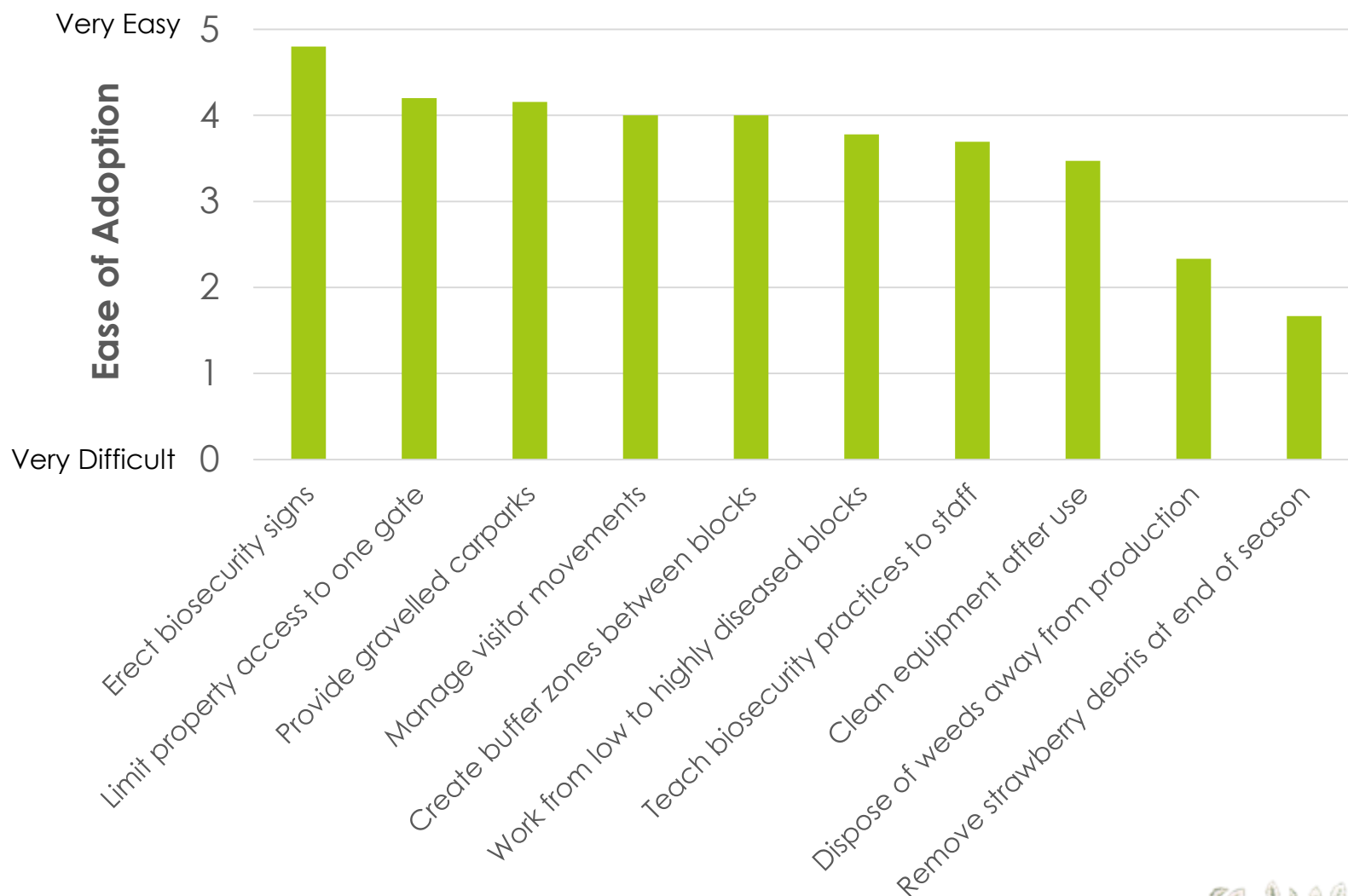
# Example of Key Messages on Farm Biosecurity: Paddock Zoning



***Conduct farm operations from areas of low disease towards areas of high disease. Then wash down your equipment. This will reduce the risk of spreading infested soil to areas of low disease on your property.***



# Grower Feedback at the Masterclasses



# Grower Involvement at the Masterclasses

- High rates of attendance by growers (65% of fruit growers)
  - Workshops held at centres close to growers
  - Translators
  - Small groups of growers who knew each other
  
- High rates of participation by growers (>90% contributed to discussions, all used the response cards)
  - Small groups created an informal environment
  - Facilitated discussions
  - Grower to grower discussions
  
- Participation by agronomists and chemical resellers was important
  - Provided continuity of key messages after the workshops
  - 68% of growers seek information on soil-borne diseases from local agronomists, resellers and fumigators,



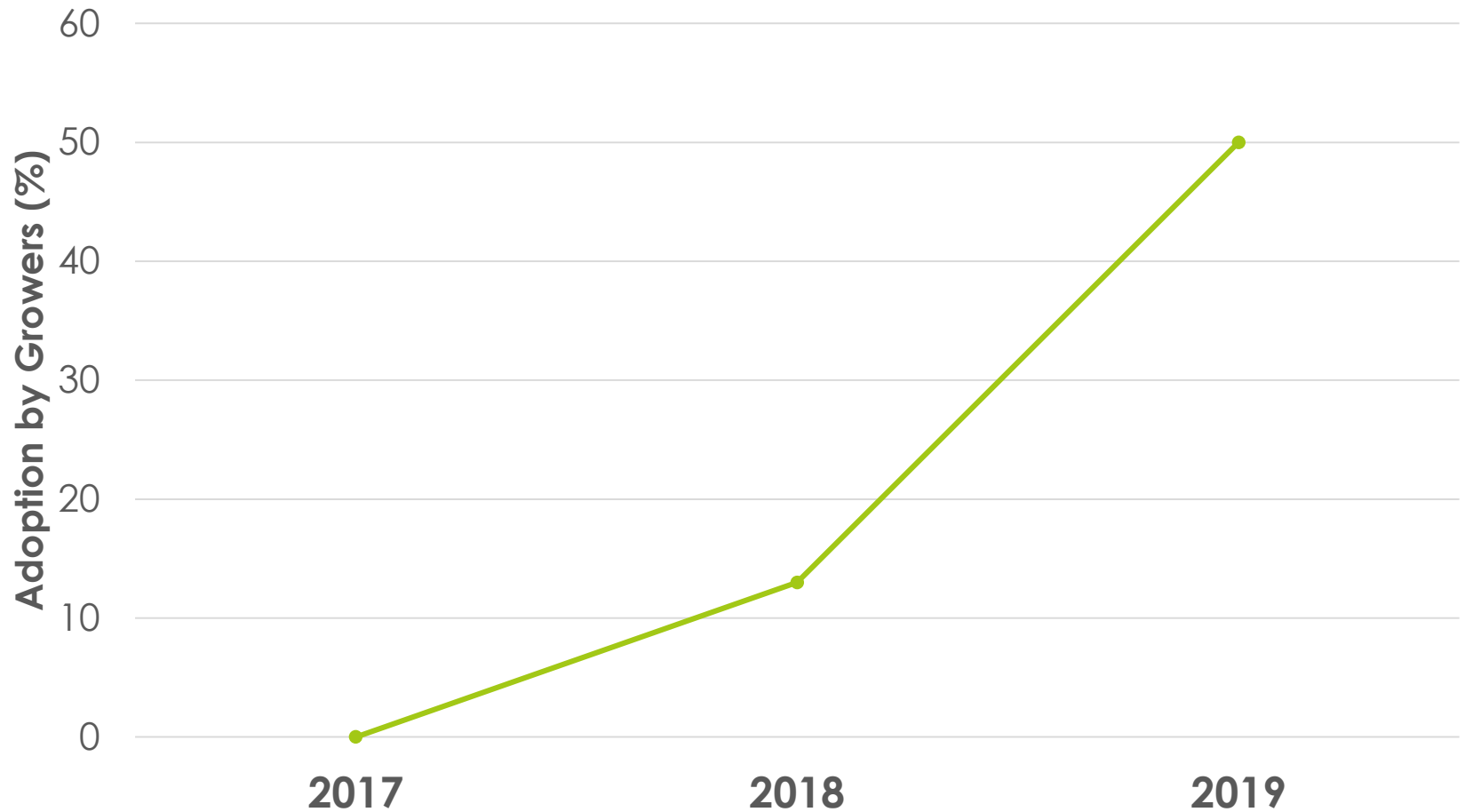
# Effectiveness of Participatory Approaches

- Microscope demonstrations on the biology and survival structures of soil borne pathogens (to understand the risk of infested soil)
- Use of biosecurity tools (correct use of foot baths, booties, farm registers, etc)
- Photograph quiz on 'Guess this Disease' (to emphasise the importance of correct diagnostics)
- Participation in experiments using soil columns and detection tubes on the ability of TIFs for increase the effectiveness and safety of fumigants

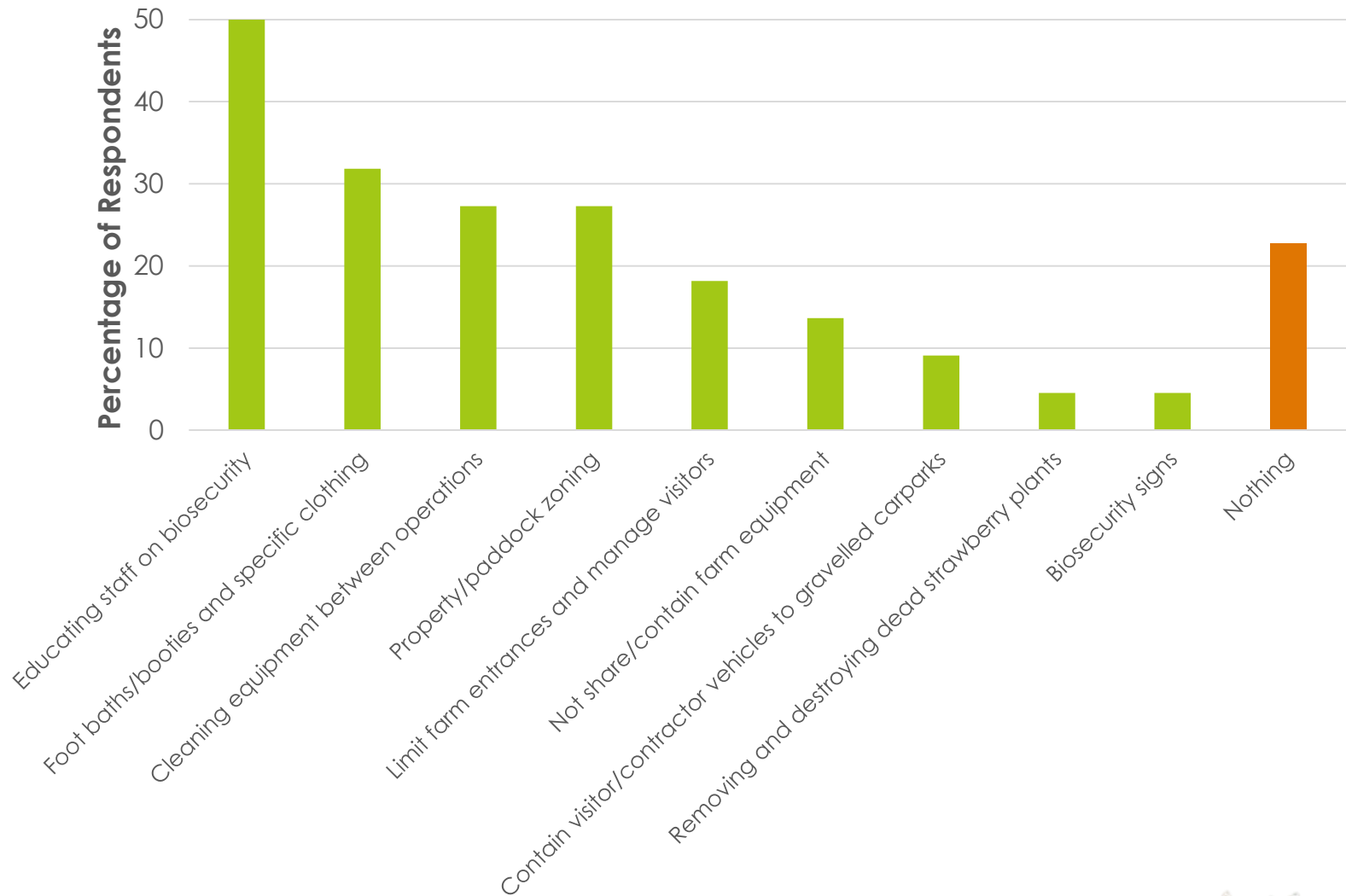


# Adoption of TIF

## Victorian Strawberry Fruit Industry



# Grower Adoption of Farm Biosecurity Practices (3 months after workshops)



# Directions for Future Extension

- Extensive survey for soil-borne diseases in 2020 and adoption of biosecurity practices by strawberry growers.
- Education of utility providers and labour contractors on farm biosecurity.
- Manual on farm biosecurity practices for minimising the spread of soil-borne diseases of strawberry
- Cross-industry interactions between growers on farm biosecurity





# Summary

- Soil-borne diseases have increased in importance in the Australian strawberry fruit industry following the phase-out of methyl bromide.
- Growers need greater awareness and adoption of farm biosecurity practices because they can no longer rely on methyl bromide to do the job.
- Masterclasses with small groups of growers using educational and participatory approaches were effective in increasing adoption of farm biosecurity.
- Farm biosecurity is one component of an integrated system to manage soil-borne pathogens in strawberry.

