



**COLD TREATMENT AS A PHYTOSANITARY MEASURE FOR THE MANAGEMENT
OF *DROSOPHILA SUZUKII***

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Cold treatment as a phytosanitary measure for the management of *Drosophila suzukii*

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Growing and Protecting New Zealand



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Outline

1. Introduction
2. Risk Assessment
3. Management options analysis
4. Developing an effective measure
5. Monitoring operational effectiveness
6. Conclusions

Introduction

A case study about a small fly with a potentially big impact for New Zealand



Drosophila suzukii was recognised by New Zealand as an emerging pest of concern associated with table grapes in late 2009

Risk Assessment: *Drosophila suzukii*

- The pest is not present in New Zealand
- It is only one of two known *Drosophila* species worldwide known to attack healthy ripening or ripe fruit
- It has a wide host range and can attack many fruit crops which are commercially grown in New Zealand
- Hosts include grapes, stonefruit (cherries, nectarines, peaches, plums) and berry fruit (strawberries, raspberries)
- New Zealand imports these hosts from various countries throughout the year

Risk Assessment: *Drosophila suzukii*

- The pest is a temperate climate species
- It could easily establish in New Zealand if it were to enter with imported hosts including table grapes
- There is no effective eradication or pest control methods and damage to hosts could be extensive
- The establishment of this species could disrupt access to a number of key markets for New Zealand and also interfere with current export integrated pest (IPM) management programmes

Risk Assessment: *Drosophila suzukii*

Assessment of existing pathway phytosanitary measures for table grapes

Existing Measure	Assessment
PFA for fruit flies	Not applicable to <i>D. suzukii</i>
In-field pest control for specific pests	Efficacy on <i>D. suzukii</i> unknown (some markets only)
SO ₂ /CO ₂ fumigation for venomous spiders	Efficacy on <i>D. suzukii</i> unknown (some markets only)
Phytosanitary inspection	Likely to detect adults and old puncture sites but may be difficult to detect a new puncture in very recently infested fruit

Risk Assessment: Conclusion

Existing phytosanitary measures were insufficient, on their own, to manage the risk posed by *Drosophila suzukii* larvae or insufficient information existed for determining effectiveness against the pest

Treatment Option Analysis: Cold Treatment

- Early trials on small numbers of eggs and larvae showed that *Drosophila suzukii* was killed by exposure to low temperatures for four days
- Overwintering only occurs in adults and adults were assessed as less likely to remain with the fruit following harvest
- Cold treatment can be tolerated by many imported fruits, such as grapes, and can be applied after fruit is packed

Treatment Option Analysis: Cold Treatment

- Cold storage and shipping temperatures were consistent with optimal treatment temperatures
- Large volumes of host fruit are transported to New Zealand by sea freight in refrigerated containers, therefore treatment could occur in-transit

Cold Treatment + Existing Measures/Activities

- For table grapes, cold treatment phytosanitary measures are supported by in-field pest control activities for other pests, post-harvest practises, pre- and post-shipment phytosanitary inspection

FOR EXAMPLE:

- Some table grape export markets fumigate with SO₂/CO₂ (1:6%) to manage venomous spiders
- SO₂/CO₂ is known to show some efficacy against *D. melanogaster* [and more recently *D. suzukii* adults and larvae]

Treatment Option Analysis: Conclusion

Cold treatment was a feasible option as a phytosanitary measure for *Drosophila suzukii* associated with imported table grapes

The measure was likely to provide the necessary level of protection required by New Zealand and be the least trade restrictive of all options considered

Developing An Effective Cold Treatment Measure

Phytosanitary measures developed were based on:

- Limited research data
- Analysis of the effect of other phytosanitary measures and activities e.g. SO₂/CO₂ fumigation
- Additional supporting verification activities

Developing An Effective Cold Treatment Measure

- The development of cold treatment phytosanitary measures for *Drosophila suzukii* has been an iterative process since early 2010
- Further [Probit 9] efficacy data has become available to support a reduction in treatment time since the initial measure was developed
- Specifications for number of temperature sensors, positions, calibration, accuracy etc. were provided by New Zealand to trading partners
- New Zealand has worked closely with trading partners and importers to develop the least trade restrictive measures

Developing An Effective Cold Treatment Measure

DROSOPHILA SUZUKII TREATMENT SPECIFICATIONS for table grapes imported into New Zealand since 2010

Date	Treatment Specification
2010	<p>The core temperature of the fruit to be held continuously at one of the following temperature/ time combinations before transit or during transit to New Zealand:</p> <ul style="list-style-type: none">• 0.00°C or below for 10 days• 0.55°C or below for 11 days• 1.11°C or below for 12 days [replaced in 2012 by new option]

Developing An Effective Cold Treatment Measure

DROSOPHILA SUZUKII TREATMENT SPECIFICATIONS for table grapes imported into New Zealand [current measures]

Date	Specification
2012	SO ₂ /CO ₂ (1:6%) fumigation for 30 minutes at a minimum of 16°C followed by cold treatment at a fruit pulp temperature <ul style="list-style-type: none">• [minus] $-0.5^{\circ}\text{C} \pm 0.7^{\circ}\text{C}$ for 6 days
2013 [option added]	SO ₂ /CO ₂ (1:6%) fumigation for 30 minutes at a minimum of 16°C followed by cold treatment at a fruit pulp temperature of <ul style="list-style-type: none">• $0.9^{\circ}\text{C} \pm 0.7^{\circ}\text{C}$ for <u>12</u> days [aligns with transit time to NZ]

[NB: It is acceptable for cold treatment to be performed at temperatures lower than the set range]

Monitoring Operational Effectiveness

- Since 2010, most exporters chose to treat in-transit to ensure that the product quality was maintained on arrival in New Zealand
- In-transit treatment of table grapes has been successful with relatively few consignments exceeding the upper temperature requirements
- New Zealand has worked with exporting NPPOs, scientists and importers to determine the cause of initial minor issues with in-transit treatment of table grapes

Monitoring Operational Effectiveness

Table grape exporters resolved early issues with in-transit cold treatment failures and developed a code of practise to limit failures. These included:

- Defining the age of containers to be used
- Supplying appropriate information/instructions to shipping companies re treatment parameters
- Optimal loading parameters to ensure adequate airflow

Conclusions

- Cold treatment is an efficacious phytosanitary measure for managing *Drosophila suzukii* larvae associated with imported table grapes
- In-transit shipping times align with treatment requirements for the convenience of importers and exporters
- Other host-specific pre- and post-harvest activities and phytosanitary measures support the management of the pest