

Fruit Waste Management for Queensland Fruit Fly

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Fermentation is evaluated as a waste-management tool for Queensland Fruit Fly (QFF) in strawberries and raspberries.

Queensland Fruit Fly (*Bactrocera tryoni*) is a significant pest to the Victorian fruit industry affecting production and trade. QFF is a recent pest to the Yarra Valley and threatens both large and small businesses, as well as many urban gardens with back-yard fruit trees.

Some controls exist for management of QFF in fruit including cold storage, however some small business operations do not have the capacity for on-site cold storage for all pre-pack reject fruit or fallen fruit.

This study evaluated the use of fermentation as a low-cost on-farm alternative to kill an artificially heavy infestation of QFF larvae in strawberries and raspberries.

Methodology

Strawberries and raspberries were infested under controlled conditions at the DPI NSW laboratories.

Infested strawberries and raspberries were added to fermentation tanks to compare the impact of fermentation to non-fermented control samples on the emergence of QFF.



Figure 1 Strawberries laid down for QFF infestation

Results

Strawberries

Sampling was undertaken over 14 days at the BHI Biosecurity Centre of Excellence. Flies only emerged from

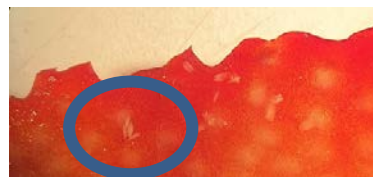


Figure 2 QFF eggs in a sample of strawberry

strawberry samples taken from the fermentation vessels at time zero and at day 1. Flies emerged from strawberry control samples taken from the first 7 days of sampling.

Raspberries

No flies were observed to emerge from samples taken from fermentation vessels at any time. Flies emerged from raspberry control samples taken from the first 4 days of sampling.

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Discussion

The effect of the treatment on the viability of QFF was observed from the first time point. No flies emerged from raspberries that had been submerged in the fermentation vessel, and no flies emerged from the strawberry treatment after one day of submersion. The immediate effect on viability may indicate that the cause of death is at least partly related to submersion and may be a combined effect of submersion and fermentation, however the design of this project did not allow for these two variables to be distinguished.

The complete destruction of viable QFF, in two days, in what would be considered in the field to be an extremely high level of infestation gives strong support for this methodology to be used for the management of reject raspberries or strawberries that may be, or are known to be, infested with QFF. Since the mechanism of destruction of QFF cannot be determined from this study, no extrapolation of these findings should be extended to the treatment of other fruits.

Conclusion

A combination of factors likely led to the killing of a high QFF infestation in strawberries and raspberries. No viable larvae could be recovered from fruit after two days of fermentation at which time alcohol was 4.5% or above in all samples. Berries that were submerged, and then immediately sampled, strongly inhibited the emergence of adult flies indicating that alcohol is probably not the sole cause of larvae death.

The study should give strawberry and raspberry growers confidence to use a simple fermentation barrel to treat fallen or pre-pack reject fruit with suspected QFF infestation.

Fermenting berries should be agitated daily to ensure berries do not sit above the fluid. Fermentation barrels should be vented via an air lock to release built up gases, and alcohol checked to ensure that levels are 4.5% or above.



Figure 3 Larvae on control strawberries



Figure 4 Fermenting strawberries and raspberries