

Title Comparison of low oxygen controlled atmosphere treatments on the mortality of first instar Queensland Fruit Fly (*Bactrocera Tryoni* (Froggatt)) at 3 °C in cherry fruit

Author John B. Golding, Andrew Jessup, Lorraine Spohr, Shashirekha Satyan, Huertas Maria Diaz-Mula

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Abstract

Queensland Fruit Fly *Bactrocera tryoni* (Froggatt) (QFF) is a major quarantine pest for some Australian cherry producers. Treatments to combat infestation can often affect fruit quality, restrict marketing flexibility and affect grower returns. Our previous work has shown that a postharvest combination treatment of high carbon dioxide (CO₂) at 3°C for varying lengths of time before storage in air was effective at killing first instar QFF larvae. The controlled atmosphere storage treatment in these previous studies utilised 95% CO₂ with 1 % oxygen (O₂) at 3°C. In this experiment, fruit were infested with QFF first instar larvae then treated in controlled atmosphere drums at 3°C with either (a) 1 % O₂ with 95% CO₂, (b) 1 % O₂ with 99% nitrogen (N₂) or (c) air (21 % O₂/ 78% N₂). After two days treatment, all the fruit were transferred from the drums and placed in air storage at 3°C for up to 10 days. The 95% CO₂ treatment resulted in 100% mortality of the QFF larvae by 6 days of cold storage, whereas in the fruit treated with 1 % O₂ with N₂ or air, complete mortality of the QFF larvae was reached at the 10 day assessment. The results show that the short-term 1% O₂ in 95% CO₂ treatment at 3°C was more effective in reducing the time in cold disinfestation than the 1 % O₂ in either N₂ or air.