Evaluating sterile male to wild type ratios of *Drosophila suzukii* for population suppression in a confined environment

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In 2026, we began to investigate sterile insect technique (SIT) as a management tool for spotted wing drosophila (SWD; *Drosophila suzukii*) in California strawberry production. SWD is an invasive vinegar fly that lays eggs into ripening fruit using their serrated ovipositor. Infested fruit is unrecognizable to the naked eye and mistakenly harvested, leading to rejections for the fresh and processing markets and increased preventative monitoring costs. Chemical management is the main tool used due to quick efficacy and residual effects on adult flies. However, there is significant need for nonchemical alternatives as current reliance on chemical management poses challenges for the future in California. SIT is a nonchemical approach for suppressing SWD populations that involves releasing large amounts of sterile males to mate with wild females, resulting in unfertilized eggs and lower reproductive capacity. There is limited information about the effectiveness for SIT use as a management tool in California strawberry production. This project aims to address this knowledge gap through generating data that will show the ratios of sterile males to wildtype males necessary for optimal use. This experiment is currently being conducted under USDA containment and permitting. Treatments consist of 5 ratios of sterile male to wildtype males (0:1 Control, 1:1, 10:1, 20:1, and 40:1) on blueberries, strawberries, and standard SWD diet. Temperature and humidity are consistent across all treatments and chosen to simulate California strawberry production climates. After exposure to sterile males for one week, the first generation of emerging SWD are collected, sexed, and counted for comparison among treatments. In strawberries, a 10:1 ratio reduces the population by nearly 40% compared to the control. In standard SWD diet, a 40:1 ratio reduces the population 60% compared to the control. In blueberries, a 40:1 appears to be the most effective compared to the other treatments. This experiment is in progress and will run until the end of 2026.

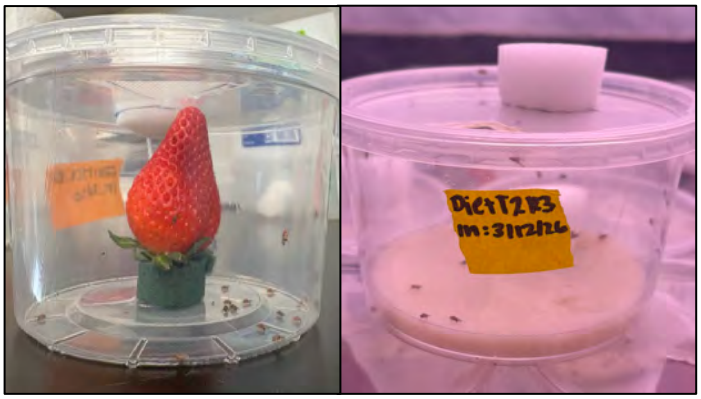


Figure 1. Arenas used to test the ability of the sterile insects to suppress oviposition. Left: the strawberry arena. Right: the diet arena. Both had foam plugs and mesh on the lid.

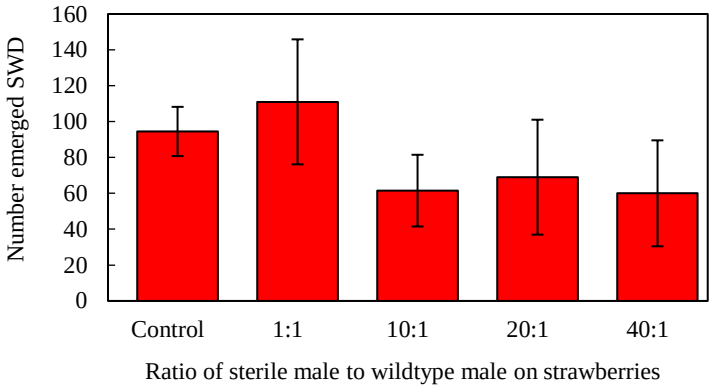


Figure 2. Emerged spotted wing drosophila adults from strawberries normalized by weight. Error bars represent the standard error of the mean.

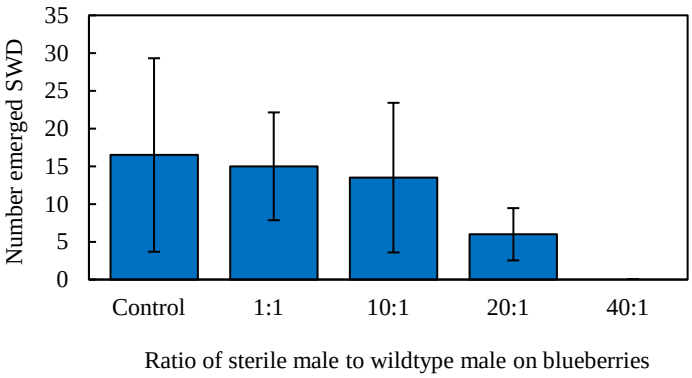


Figure 3. Emerged spotted wing drosophila adults from blueberries normalized by weight. Error bars represent the standard error of the mean.

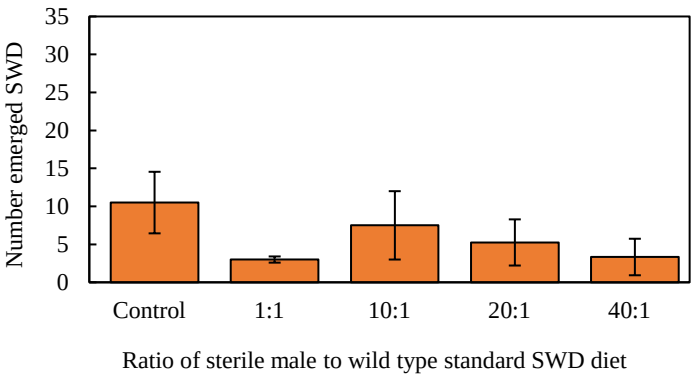


Figure 4. Emerged spotted wing drosophila adults from diet normalized by weight. Error bars represent the standard error of the mean.