Biological-based control for spotted wing drosophila, *Drosophila suzukii*, using RNAi technology with cost-effective dsRNA

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BACKGROUND

- Spotted wing drosophila (SWD), *Drosophila suzukii*, is an invasive pest originally from Asia. SWD has recently been found throughout America and in Europe.
- Unlike other fruit flies that attack rotten decaying fruit, SWD lays eggs in undamaged ripening fruit; cane berries, berries and other fruits such as cherries, plums, figs and peaches. Thus infesting fruit that are high value crops for the NW agriculture industries (Alston et al., 2010).
- SWD is an important economic pest for these growers as control relies heavily on costly insecticides.
- To reduce the use of insecticides and the potential for resistance, there is great need for alternative control measures that would have less of an environmental impact and would be cost effective to growers.

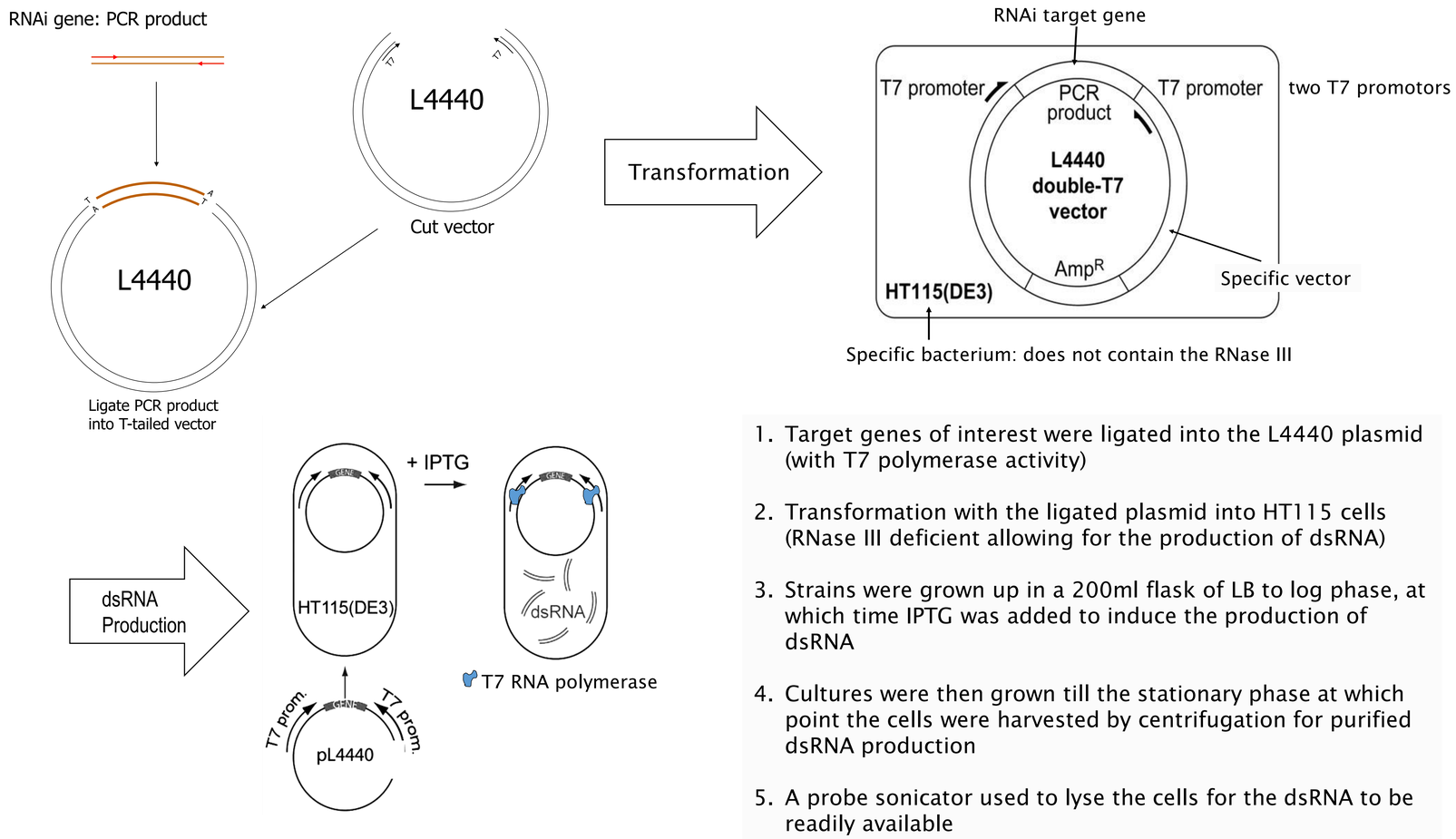
OBJECTIVES

There are three major challenges with an RNAi approach to pest management to consider:

1. Identifying RNAi targets from the target pests
2. Providing cost-effective RNAi materials (i.e. dsRNA)
3. Increasing the efficacy of RNAi delivery into the target pests

- **The purpose of this study is to develop cost-effective dsRNA production with RNAi technology to providing a biological-based control for SWD.**

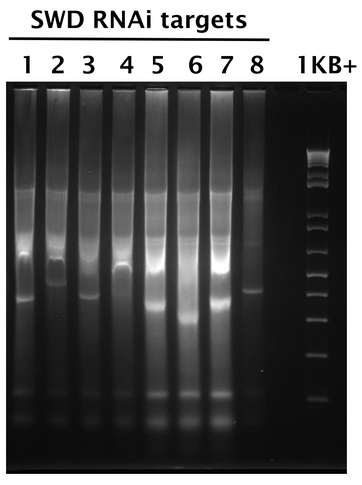
MATERIALS AND METHODS



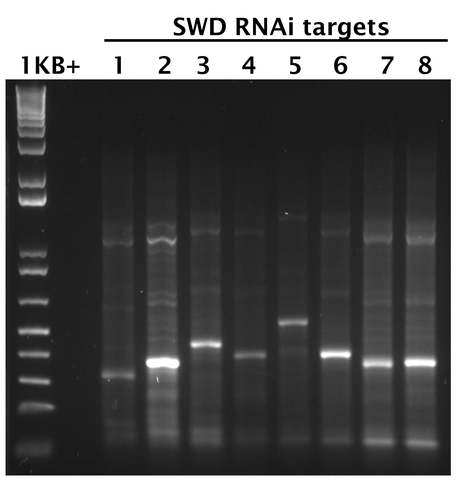
1. Target genes of interest were ligated into the L4440 plasmid (with T7 polymerase activity)
2. Transformation with the ligated plasmid into HT115 cells (RNase III deficient allowing for the production of dsRNA)
3. Strains were grown up in a 200ml flask of LB to log phase, at which time IPTG was added to induce the production of dsRNA
4. Cultures were then grown till the stationary phase at which point the cells were harvested by centrifugation for purified dsRNA production
5. A probe sonicator used to lyse the cells for the dsRNA to be readily available

RESULTS

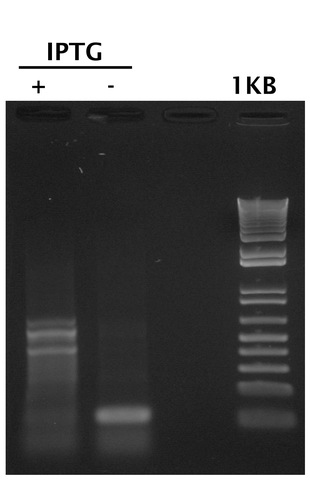
- Confirmed the target dsRNAs produced by IPTG induction in cells
- Produced on average 6 µg of dsRNA per ml of the culture



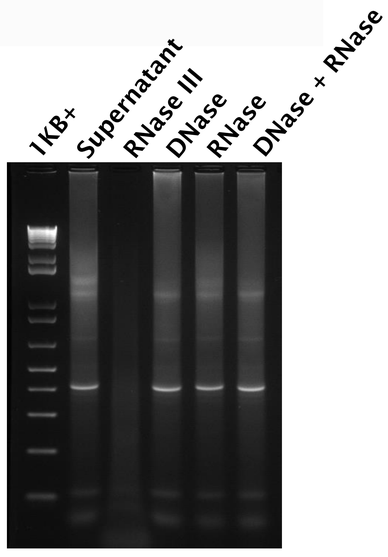
Supernatant of Lysed Cells



Extracted dsRNA from culture



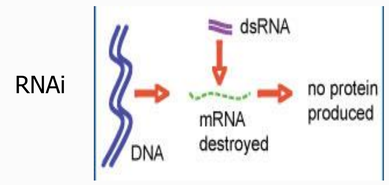
Induced dsRNA with IPTG



Confirmed dsRNA with treatment of endonucleases

DISCUSSION & FUTURE WORK

- Electrophoresis of the cell lysis supernatant showed the presence of the target dsRNA's, providing for a simple way to make the dsRNA readily available
- Large quantities of dsRNA are produced at a low cost with the cell lysis method compared to commercial kits
- Cell lysis is an easy and effective way to make the dsRNA readily available for use as an RNAi treatment



- A feeding stimulant can be used for the delivery vehicle of dsRNA as well as insecticidal agents against SWD flies

ACKNOWLEDGEMENTS

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