Assessing the Efficacy of *Ganaspis brasiliensis* as a Biocontrol Agent for *Drosophila suzukii* in North Carolina

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Background

Spotted wing drosophila (SWD), a small vinegar fly with the potential to damage many fruit crops, is native to eastern Asia. Unlike most species of vinegar flies which attack overripe or damaged fruit, SWD is unique as females can lay eggs in healthy fruit using a large, serrated ovipositor. Movement of larvae inside the fruit makes it soft and unmarketable. Detection of a single SWD larva in the fruit can cause the rejection of an entire shipment, leading to high financial risk for farmers of impacted crops. SWD control presents multiple challenges. Insecticides can be ineffective targeting only adults and not the eggs / larvae inside the fruit. SWD can go from egg to adult in under 2 weeks, and an adult female can lay over 300 eggs. SWD can encapsulate and kill eggs of native parasitoids, so research has focused on classical biocontrol for this species. *Ganaspis brasiliensis* (Gb), a solitary larval parasitoid of SWD found in overlapping ranges in east Asia, was approved for release by the USDA in 2021. In 2022, we initiated a program to rear Gb and release against SWD in NC. We have just completed our second season of field releases.

Female SWD with serrated ovipositor
Image by Martin Cooper
https://www.flickr.com/photos/m-a-r-t-i-n/

Gb reproductives on infested fruit

Vial of Gb

The Plan:

- Rear and release Gb at research stations growing berries in NC
- Determine whether Gb can establish self-sustaining populations and provide some measure of control
- Collaborate with researchers across the US and Canada to share results and strategies

Rearing Gb:

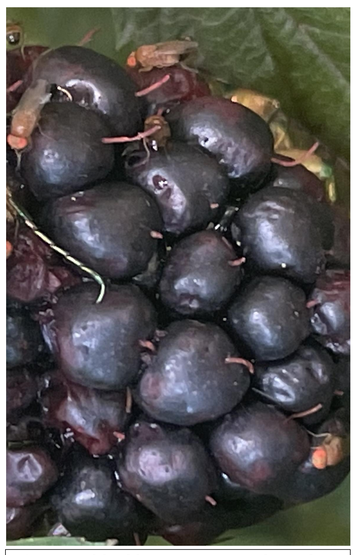
- Maintain an SWD colony
- Allow flies to infest blueberries
- Add Gb reproductives to infested berries
  - New wasps emerge within 30 days

Gb Release:

- Release Gb at research stations 3-5 times per season dependent on SWD load and fruit condition

Post-Release Monitoring:

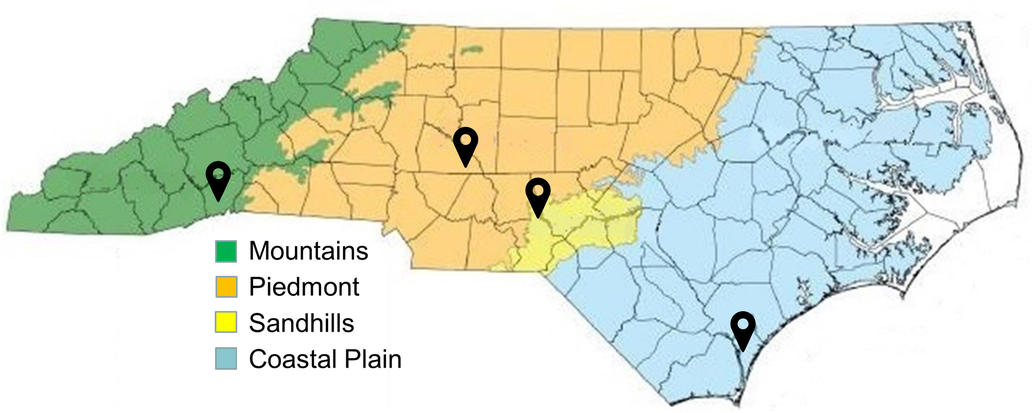
- Deploy sentinel traps monthly
  - Bait with infested fruit to attract Gb
  - Incubate berries and check for presence of Gb
- Deploy liquid traps for ongoing SWD monitoring
  - Wasps have also been recovered in liquid traps
- Sample field fruit monthly
  - Include both cultivated and wild fruit
  - Continue sampling until fruiting has ended



SWD on blackberry at research station

Vial of Gb for release on blueberries

Gb just after release on blackberries



Results to Date: Gb Released

Site	# Released 2022	# Released 2023	# Released to Date
Sandhills RS	483	1010	1493
Piedmont RS	486	2155	2641
Mt Hort RS	451	2150	2601
Totals	**1420**	**5315**	**6735**

Post-release sentinel traps

Post-release liquid trap

Gb searching pokeweed for SWD

Preliminary Results

- 2022: Parasitoid wasps found at all sites
  - No *Ganaspis brasiliensis* recovered
  - Unidentified native parasitoids recovered
  - Adventive non-native *Leptopilina* spp. recovered at all sites
- 2023: Parasitoid wasps found at all sites
  - IDs not yet confirmed, but *Ganaspis brasiliensis* suspected

Future Directions

- Continue releases at all sites in 2024, with the addition of 4th site in Coastal Plain
- Add sleeved releases to test recovery without the possibility of dispersal
- Analyze data from ongoing rearing studies to determine optimal rearing conditions
- Add rearing study to more closely replicate in situ temperature, humidity and lighting conditions
- Expectations: Ability to more clearly address the potential for *Ganaspis brasiliensis* as a biocontrol agent in NC, and its inclusion within a developing management strategy

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