

COMMENTS ON BEE-VECTORED Cr-7 COMPARED TO FUNGICIDES AGAINST BOTRYTIS AND ANTHRACNOSE IN USA TRIALS (FOR PERIOD OF DECEMBER 2015 TO FEBRUARY 2016)

Dr. John Sutton

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#1 Cal Lewis, NC, North Farm. Hoop houses with open ends.

House 6 = Fungicides

- Fungicide sprays applied weekly. Cr- 7 found only once (stray bees?).

House 7 (east side and west side) = Cr-7 bees

- Frequency and abundance of Cr-7 found on the flowers was generally **high** 10 - 18 Dec, 29-31 December, and 19 February, and **low / zero** 21 December and 22 January to 15 February.
- Low frequencies were related to cold weather and covers used over the strawberries.

Comparison of Botrytis incidence and severity on the flowers:

- No Botrytis found on flowers fungicide-treated or Cr-7 treated flowers until late December.
- In the period of 22 January to 15 February Botrytis was more frequent (*average 44%*) and more severe (*40%*) in the fungicide treated strawberries than in Cr-7 treated (*31%* and *15%*, respectively). These data indicate that Bee vectored Cr-7 was substantially more effective than the fungicides.
- On 9 and 15 February Botrytis persisted on the fungicide treated flowers but was totally suppressed on the Cr-7 treated flowers (even though levels of vectoring were fairly low). **EFFECTS OF CR-7 IN SUPPRESSING BOTRYTIS EPIDEMICS ARE OFTEN PERSISTENT OVER SEVERAL WEEKS EVEN IN THE ABSENCE OF VECTORING BECAUSE IT PERSISTS INSIDE THE LEAVES UNTIL THE LEAVES SENESCE (AND IS NOT WASHED OFF OR INACTIVATED BY RAIN ETC). BY PERSISTING ENDOPHYTICALLY IT CAN BLOCK SPORE PRODUCTION OF BOTRYTIS MANY WEEKS LATER.** My latest data obtained 5 March show that leaves from bee-vectoring areas have substantial *Clonostachys* present. This probably **also triggers ISR** in the sepals and other flower parts.
- Ratings by A. Bassi reflect the overall greater vigour in the Cr-7 treated compared to fungicide treated. This is consistent with observations in many kinds of crops.

While we do not have an “untreated control” the evidence shows that Cr-7 is superior to the fungicide program. This should be corroborated with yield data.

#2 Cal Lewis NC, South farm “open hoop houses”, side by side

Fungicide treated: Some incidence of Cr-7 on flowers in December, presumably from vagrant bees from the “bee house”. Not in January and February (flowers more abundant near the bee hives so less likely to go further afield; periods of cold weather etc).

Cr-7 bees: Fairly consistent recovery of Cr-7 from flowers in December. Highly erratic thereafter (weather; but what other factors?).

Comparison of Botrytis incidence and severity on the flowers:

In the period of 25 January to 19 February Botrytis incidence and severity on the flowers were about twice as high in the fungicide treated compared to the bee Cr-7 treated i.e. fungicide treated averaged 53% and 38% compared to 26% and 21% with bees Cr-7 .

This indicated that bees-Cr- 7 was hugely superior to the fungicides in suppressing Botrytis.

#3 McLeod, SC. Plants suspended above the ground. Hydroponics.

There are three substantially separated zones (houses) in one large plastic house. The middle zone (house 2) has the bees-Cr-7. House 1 and house 3 = fungicides.

Substantial incidences of Cr-7 in houses 1 and 3 (fungicides) in December but none on January and February (seems like the bees foraged mainly in their own house [or zone] when the flowers were more abundant).

Let's **average** the Botrytis values on the flowers for the epidemic period of 29 December to 23 February:

House 1. Fungicides.	Average Incidence 45%	Average severity 34%
House 2. Bees-Cr- 7	15%	5%
House 3 Fungicides	33%	19%

#4 JayMar FL Bees/Cr-7 in approx... 5 acre field surrounded by trees. Fungicides in a nearby field of about 50 acres.

There was never a buildup of Botrytis on the flowers from the fungicide or bee treatments. Botrytis is however present at low levels in the strawberries as indicated by the flower data and plated disks (data were obtained 5 March) leaf. Considerable Cr-7 was encountered in leaves picked 22 February (data to come). Unfortunately an untreated control was not possible. **Nonetheless yields of bees- Cr-7 treated strawberries were >30% higher than in the fungicide treated controls.** This was despite the finding that vectoring was spasmodic. Again, the results are consistent that Cr-7 has LONG TERM EFFECTS on Botrytis spore production and probably ISR resistance in the plants. Fungicides on the other hand were apparently stressing the plants (e.g. calyces much smaller; visibly stressed whole plants in the field) and would inactivate many other kinds of naturally occurring micro-fungi that compete with Botrytis.

#5 Driscolls FL Approx. 100 acre field with 10 rows on one side next to bee hives “north and south” groups of rows are adjacent to each other.

I will comment only on Anthracnose for 25 January and 1 and 8 February

Anthracnose incidence and severity averaged **53%** and **47%** respectively in the fungicide area and **13%** and **22%** for bees / Cr-7 (“north rows”).

A fully replicated trial in NC will include effects on Anthracnose. Taken together the data of a past trial in Ontario and the present Driscoll trial indicate that bee-vectored Cr-7 can very strongly reduce incidence and severity of anthracnose on the flowers (fruits as well in Ontario).