

**Using Honey Bees to Disseminate
Trichoderma harzianum to
Strawberries for *Botrytis* Control**

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**Tests conducted from 1994-1997 at the
NYSAES and on 10 NY grower farms
showed that bees could successfully
deliver *T. harzianum* spores to strawberry
flowers for Botrytis control.**

Objective

To determine if bee delivery of *T. harzianum* could be successfully used on strawberries grown under California conditions.

Methods

Location: UC South Coast Res & Ext Center
Irvine, CA (Feb. - April 1997, 1998)

Weather:	<u>Rainfall (in.)</u>		
	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>
1997	0.1	0.0	0.0
1998	11.5	3.6	0.7

Treatments

(4 reps)

1997

1. (C) Com.
- Rovral or Benlate (2x)
2. (C) Trich. Spray - (2x)
3. (C) Check - untreated
4. (UnC) Bee/Trich.

1998

1. (C) Com. 3 Rovrals
2. (C) Trich. Sp. (3x)
3. (C). Check
4. (UnC) Com. 3 Rovral
5. (UnC) Trich. Sp. (3x)
6. (UnC) Bee/Trich.

NY Rowcover/Cage Effect

(Seneca, Glooscap, Allstar, Kent)

	<u>n</u>	<u>% Botrytis</u>
With Rowcover	8	11.7 a
Without Rowcover	8	8.2 a

Means followed by the same letter are significantly different ($p > 0.05$).

NY Trichoderma levels Pretreatment

<u>Grower</u>	<u>% flowers w/trich</u>	<u>rating (cfu's)</u>
Sodus	4	0.08
Lansing	8	0.20
Bergen	8	0.24
Penn Yan	25	1.37
Castile	33	5.83

CA Trichoderma levels

12 Mar 1997

<u>Treatment</u>	<u>% flower</u>	<u>Rating</u>
Pre. (2/27)	0	0
Th spray	100	52
COM	80	56
B&T	65	52
Check	85	73
GS (60 m)	10	0.5

CA Trichoderma levels 1998

<u>Treatment</u>	<u>Pre (2/22)</u>	<u>% flower with</u>		
		<u>3/11</u>	<u>4/2</u>	<u>4/10</u>
1. (C) COM	0	15	50	0
2. (C) Th Sp.	0	60	90	15
3. (C). Check	0	0	50	20
4. (UnC) COM	0	50	80	20
5. (UnC) Th Sp.	0	85	65	40
6. (UnC) B&T	0	40	65	15

CA Harvest (Chandler)

2 April 1997

	<u>Treatment</u>	<u>% culls</u>
caged	Check	20.7 a
	COM	25.7 a
	Th spray	23.9 a
	<u>B&T</u>	<u>11.2 b</u>

means followed by the same letter are not significantly different (Fishers PLSD $p > 0.05$)

CA Harvest (Chandler)

Total April 1997

<u>Treatment</u>	<u>% culls</u>
Check cage	25.1 a
COM cage	24.6 a
Th sp cage	27.7 a
GStd. (no cage, many fung.)	25.9 a
B&T nocage	15.0 b

means followed by the same letter are not significantly different (Fishers PLSD $p > 0.05$)

CA Harvest (Camarosa)

31 Mar & 7 Apr 1998

<u>Treatment</u>	<u>% culls</u>
↑ COM uncaged	55.8 a
↑ B&T uncaged	64.8 a b
B&T Th sp. uncaged	67.8 a b
COM caged	76.8 b c
Th sp. caged	88.7 c
<u>Check caged</u>	<u>89.4 c</u>

means followed by the same letter are not significantly different (Fishers PLSD $p > 0.05$). Transformed $\log(x+1)$

Summary

- Honey bees can successfully deliver *Trichoderma harzianum* to strawberry flowers under Southern CA conditions.
- In a dry year, bee delivered *Trichoderma* alone gave as good Botrytis control as conventional programs.
- In a wet year, bee delivered *Trichoderma* can provide an additional 20% Botrytis control, when mixed with conventional fungicides.