

## EVLAUATION OF METHYL BROMIDE ALTERNATVIES ON COMERCIAL VEGETAGLE FARMS

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Alternatives to methyl bromide were evaluated in large-scale plots on commercial tomato and pepper production farms in southeastern Florida. Several fumigant application methods were evaluated including broadcast and underbed applications of a mixture of 1,3-dichloropropene and chloropicrin. Results from three of six trials are presented.

### Farm H

#### Treatments (chemical application rates expressed per broadcast acre):

1. Methyl bromide: chloropicrin (67: 33) @ 400 lb/acre
2. Alternative:  
Telone C-35 (22 gal/acre) broadcast applied using Yetter Avenger  
Devrinol (4 qts/acre) + Treflan (1 pt/acre) broadcast applied in 30 gal/acre  
Chloropicrin 150 (lbs/acre) applied in the bed

**Experimental Design:** 21 contiguous blocks ( 25 acres under plastic) west of 441 treated with the alternative package. The remainder of the farm was treated with methyl bromide:chloropicrin (67:33).

**Field Cropping History:** This farm has been in continuous pepper production since the 1970's. Field are disked fallowed during the summer off season. On occasion a double (second) crop of cucumber has been planted into the existing beds. This farm has a history of epidemics of Phytophthora blight.

#### Application Details:

- September, 2003– production blocks were laser leveled
- October 2 and 3 – Telone C-35 broadcast applied at 22 gal/acre using the Yetter Avenger with 30” coulters.
- October 8 – Devrinol and Treflan broadcast applied. Nozzles spaced 18 inches apart on a 13 ft spray boom. Herbicides were applied in 30 gal/acre of water at 22 psi and immediately incorporated into soil to a 6 inch depth using a field cultivator. Following incorporation, soil was compacted with a roller to seal in herbicides.
- October 10 – beds were prepared and covered with plastic mulch  
Chloropicrin applied in-row at the time of bedding at 150 lbs/acre (broadcast rate) in Telone C-35 treated blocks.  
Methyl bromide:chloropicrin (67:33) applied in-row at 400 lbs/acre broadcast rate in the methyl bromide treated areas.
- November 10 – Trial planted. Used the cultivar “Aristotle”.
- Disease and weed ratings taken at weekly intervals.
- February 4– first harvest
- February 24-second harvest

**RESULTS:**

Disease incidence: The incidence of Phytophthora blight was less than 1% in all treated areas (Telone C-35 and methyl bromide:chloropicrin).

Weed counts: Weed counts including nightshade were less than 1 per 50 ft. of row in areas treated with methyl bromide and areas treated with the alternative..

**YIELD:**

Combined harvests

Treatment	Yield (28 lb boxes per acre)
Methyl bromide	1696
Alternative package	1501 ( <b>11.5% reduction</b> )

**Farm K**

**Treatments (chemical application rates expressed per broadcast acre):**

1. Methyl bromide: chloropicrin (67: 33) @ 400 lb/acre
2. Alternative:  
 Telone C-35 (22 gal/acre) broadcast applied using Yetter Avenger  
 Devrinol (4 qts/acre) + Treflan (1 pt/acre) broadcast applied in 30 gal/acre  
 Chloropicrin 150 (lbs/acre) applied in the bed  
 Goal (1 pt/acre) surface applied to the bed

**Experimental Design:** eight contiguous blocks (26 acres under plastic, 32.7 acres total) southeast of Lyons road treated with the alternative package. **This is the 4<sup>th</sup> consecutive year this section of the farm has been treated with methyl bromide alternatives.** The remainder of the farm was treated with methyl bromide:chloropicrin (67:33).

**Field Cropping History:** This farm has been in continuous tomato production since the 1970’s. Fields are disked fallowed during the summer off-season. This farm has a history of epidemics of Fusarium wilt and Fusarium crown rot of tomato and a severe infestation of black nightshade.

**Application Details:**

- September, 2003– production blocks were laser leveled
- October 2 and 3 – Telone C-35 broadcast applied at 22 gal/acre using the Yetter Avenger with 30” coulters.
- October 8 – Devrinol and Treflan broadcast applied. Nozzles spaced 18 inches apart on a 13 ft spray boom. Herbicides were applied in 30 gal/acre of water at 22 psi and immediately incorporated into soil to a 6 inch depth using a field cultivator. Following incorporation, soil was compacted with a roller to seal in herbicides.
- October 10 – beds were prepared and covered with plastic mulch  
 Chloropicrin applied in-row at the time of bedding at 150 lbs/acre (broadcast rate) in Telone C-35 treated blocks.  
 Goal surface applied to beds prior to covering with plastic in blocks previously treated with Devrinol/Treflan . Used application rate of 1 pt/acre. Herbicide applied using nozzles spaced 20 inches apart 17 inches from the top of the bed in 30 gal/acre of water at 25 psi.  
 Methyl bromide:chloropicrin (67:33) applied in-row at 400 lbs/acre broadcast rate in the methyl bromide treated areas.
- November 12 – Trial planted. Used the cultivar “Florida 47”.

Disease and weed ratings were taken at weekly intervals.  
 February 21– 1<sup>st</sup> harvest  
 March 3 – 2<sup>nd</sup> harvest

**PEST CONTROL:**

Fusarium Crown Rot – April 6 (115 days after transplanting)  
 Methyl bromide:chloropicrin **10.2%**  
 Alternative package **7.3%**

Weed counts: Weed counts were less than 1 per 50 ft. of row in all treated areas.

**YIELD:**

Combined 1<sup>st</sup> and 2<sup>nd</sup> harvest

Treatment	Yield (Number of 25 lb boxes per acre)
Methyl bromide	1,117
Alternative package	1,313, <b>(15% increase)</b>

**Farm B**

**Treatments (chemical application rates expressed per broadcast acre):**

1. Methyl bromide: chloropicrin (67: 33) @ 400 lbs/acre  
 Applied with pre-bedder immediately prior to laying plastic
2. Alternative A:  
 Telone C-35 (26 gal/acre) broadcast applied using Yetter Avenger  
 Devrinol (4 lbs/acre) + Treflan (1 pt/acre) broadcast applied in 30 gal/acre  
 Chloropicrin 150 (lbs/acre) applied under beds after plastic was laid using  
 the ‘Under Bed Fumigator’
3. Alternative B:  
 Telone C-35 (35 gal/acre)  
 Applied with pre-bedder immediately prior to laying plastic  
 Devrinol (4 lbs/acre) + Treflan (1 pt/acre) broadcast applied in 30 gal/acre
3. Alternative C  
 Telone C-35 (35 gal/acre) applied under VIF (Klerks, Htyibar Flex) after  
 plastic was laid using the ‘Under Bed Fumigator’.

**Experimental Design:** Two blocks (2.6 acres) treated with Alternative A. Five blocks (6.5 acres) treated with Alternative B. Methyl bromide treated blocks located on either side. Alternative C located on a different section of the farm and consisted on 2 rows 550 ft in length (0.15 acre) within a methyl bromide fumigated block.

**Field Cropping History:** This farm has been in continuous pepper production since the 1970’s. It has a history of severe epidemics of Phytophthora blight and also has a high population of annual weeds including black nightshade, smooth and spiny pigweed, ragweed, and portulaca.

**Application Details:**

- October 10 – Telone C-35 broadcast applied (26 gal/acre) in the Alternative A treatment using a Yetter Avenger with 30” coulters.
- October 22 – Devrinol and Treflan broadcast applied to Alternative A and B treatments in 30 gal/acre of water at 22 psi. Herbicides immediately incorporated into soil to a 6-inch depth using a field cultivator and then sealed with a roller..
- October 22 – beds were prepared and covered with plastic mulch

Telone C-35 applied with a pre-bedder (35 gal/acre) immediately before laying plastic in Alternative B treatment.

Methyl bromide:chloropicrin (67:33) applied with a pre-bedder (400 lbs/acre) immediately before laying plastic.

October 24 – Chloropicrin applied under plastic mulched beds in Alternative A treatment (150 lbs/A) using the ‘Under Bed Fumigator’. Telone C-35 applied under the VIF mulched beds in Alternative C treatment C (35 gal/acre) using the ‘Under Bed Fumigator’.

Disease and weed ratings taken at weekly intervals.

February 13– 1<sup>st</sup> harvest

February 24 – 2<sup>nd</sup> harvest

March 3 - 3<sup>rd</sup> harvest

**YIELD:**

Small plot data (average of 4 separate plots with 24 contiguous plants each)

**COMBINED HARVESTS**

Treatment	Yield ( 28 lb boxes per acre)
Methyl bromide	723
Alternative A (broadcast Telone C-35 + chloropicrin in the bed)	838 ( <b>14% increase</b> )
Alternative B (Telone C-35 with prebedder)	487 ( <b>23% decrease</b> )

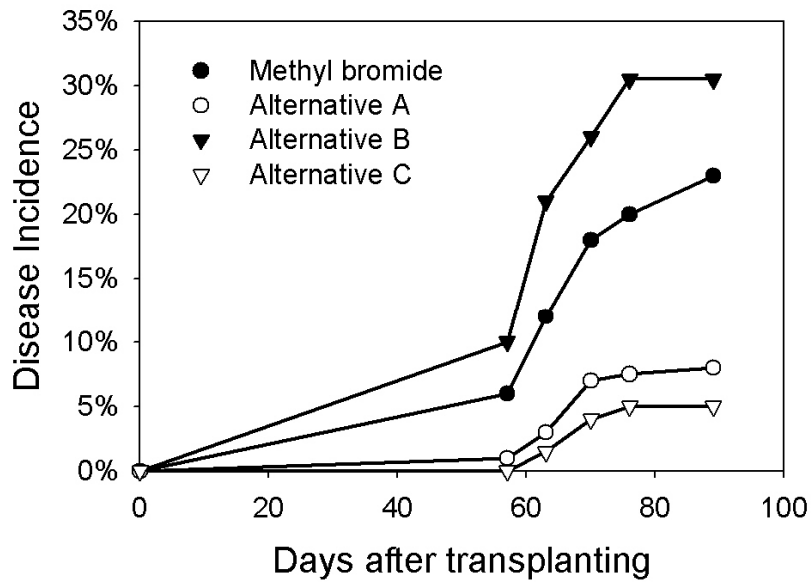
Methyl bromide	536
Alternative C (Telone C-35 applied under VIF film using the Under Bed Fumigator)	551 ( <b>3% increase</b> )

**WEED CONTROL**

Treatment	Weeds emerging from the bed
Methyl bromide	< 1 per 100 linear ft of row
Alternative A (broadcast Telone C-35 + chloropicrin in the bed)	< 1 per 100 linear ft of row
Alternative B (Telone C-35 with prebedder)	< 1 per 100 linear ft of row
Alternative C (Telone C-35 applied under VIF film using the Under Bed Fumigator)	1 per <b>4.4</b> linear ft of row

\*weeds identified in order of prevalence: pigweed, nightshade, portulaca, Carolina geranium, assorted grasses.

## Incidence of Phytophthora blight



Methyl bromide = 67:33 methyl bromide:chloropicrin applied with pre-bedder.

Alternative A = Telone C-35 and herbicides broadcast applied, chloropicrin applied under plastic using the 'Under Bed Fumigator'.

Alternative B = Telone C-35 applied using pre-bedder, herbicides broadcast.

Alternative C = Telone C-35 applied under VIF using the 'Under Bed Fumigator'.