Soil fumigation updates

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Nursery Soil Fumigant Usage - 2016

Time of Fumigation	2016 Data	2015 Data
Fall	14 nurseries	25 nurseries
Spring	9 nurseries	14 nurseries
Average Acreage	26 acres / fumigation	18 acres / fumigation
Total Acreage	508 acres Southern US	528 acres Southern US

Fumigant MBr/Chl	2016	2015	Rates
98/2	1	2	300 - 400 lbs / acre
80/20	16	19	240 – 450 lbs / acre
67/33	3	5	350 - 400 lbs / acre
TriFecta / Telone / Pic +	3	13	275 – 350 lbs / acre

Plastic	2016 Percent	2015 Percent
TIF	82%	98%
HDPE	17%	1%
LDPE	1%	1%

Current Nursery Usage: 2013-2016

	Active Ingredient lbs/acre Southwide US				
	MBr	Chlor	DMDS	Telone	Other
2013	214	69	170	77	0
2014	234	72	162	79	340
2015	239	85	220	107	353
2016	246	89	0	15	0

	Total Soil Fumigant Used lbs/Year				
	MBr	Chlor	DMDS	Telone	Other
2013	118,532	36,553	1595	3180	0
2014	130,101	40,043	3363	4459	1020
2015	109,660	37,776	2200	6003	3585
2016	124,716	44,952	0	7620	0

EPA / USDA / MeBTOC: Tea Leaves

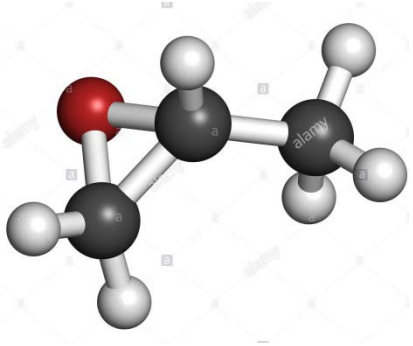
- **International meeting to be held in July is limited in nature and not the decision making meeting. Decisions will be made at the meeting in November.**
- **Information regarding pre-shipment and quarantine (QPS)**
  - **Continues to be an exemption to the Montreal protocol.**
  - **Amount of Methyl Bromide being used under this exemption is significant. Commodity and Soil.**
  - **Alternatives are being used and new fumigants continually being assessed.**
  - **Skeptical of any policy changes (actions) regarding QPS at this upcoming meeting in November shouldn't be a problem in the future.**
  - **QPS put in place to stop invasive species and agree that QPS is extremely important to agriculture.**

Game Plan

- MBIP – Methyl Bromide Industry Panel
- CMTF – Chloropicrin Manufactures Task Force
- SFNMC
  - Collect soil fumigant usage and soil fumigant concerns annually – Fall 2017 and Spring 2018.
  - Compile and respond to requests from EPA as they appear on Federal Register.
  - Keep Advisory group informed.

Propylene oxide as an alternative to Methyl Bromide

Propylene oxide



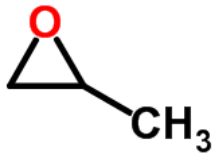
Has been used as a post-harvest fumigant for over 35 years with no reported incidences of adverse effects to fumigators or others.

Has shown good potential when applied to the soil for control of soil borne diseases, nematodes, and weeds

Its chemical and physical characteristics buffer zones should be minimal if needed at all.

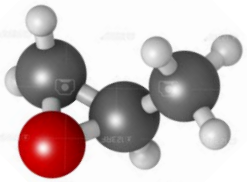
Can be used in current shank / tarp injection systems.

Propylene oxide



Treatment / Rate	Strawberries lb/acre
PPO 30 gal/acre	40,900 ab
PPO 20 gal/acre	37,665 b
MBr/Chlorp 350 lbs/acre	37,415 b
Untreated Control	33,625 bc

Propylene oxide

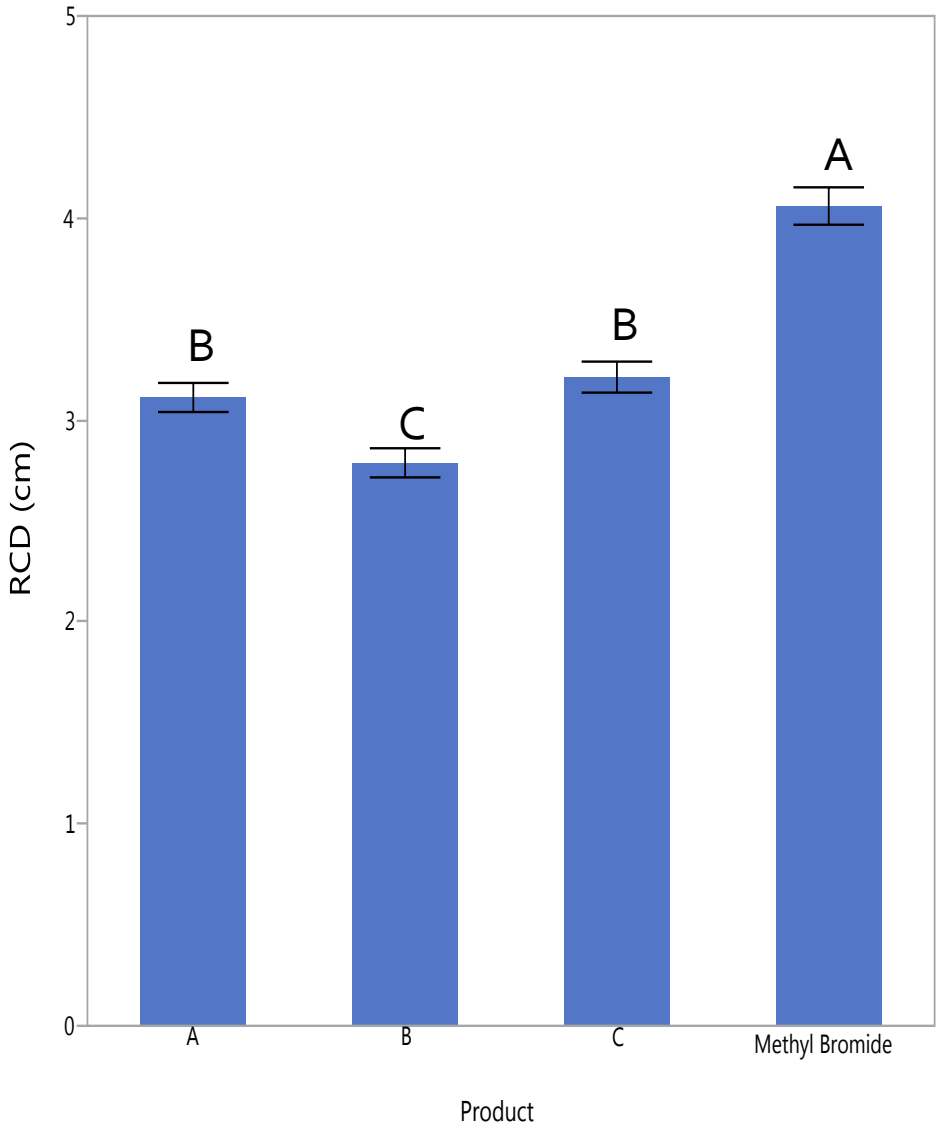


	Fusarium Wilt Disease			Ralstonia Wilt %		
	Wks Post Trmt			Wks Post Trmt		
	14	17	19	14	17	19
MBr 350 lbs/acre	0 b	2.5 b	3.8 b	0 b	0 b	0 b
PPO 45 gal/acre	0 b	8.8 b	8.8 b	0 b	0 b	0 b
Control	16.3 b	35 .0 a	35.0 a	3.8 a	8.8 a	8.8 a

Propylene oxide trial

Treatment	Rate
Methyl Bromide (80:20)	300 lbs/ac
Propylene oxide (100%)	500 lbs/ac
Propylene oxide (67%) and Telone (33%)	500 lbs/ac
Propylene oxide (67%) and Chloropicrin (33%)	500 lbs/ac

Treatment impact on seedling diameter

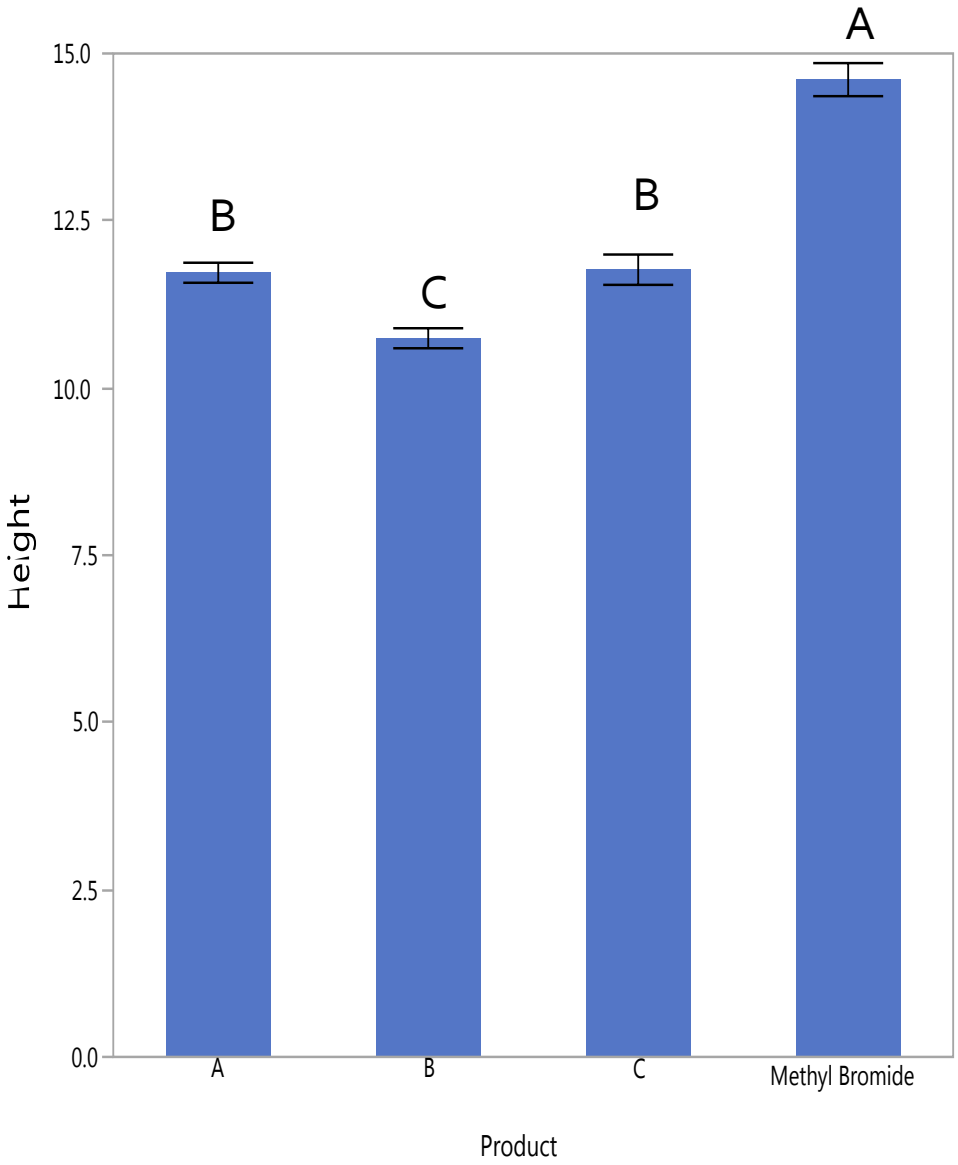


A = Propylene oxide (67%) and Telone (33%) - 500 lbs./ac

B = Propylene oxide (100%) – 500 lbs./ac

C = Propylene oxide (67%) and Chloropicrin (33%) - 500 lbs./ac

Treatment impact on seedling height



A = Propylene oxide (67%) and Telone (33%) - 500 lbs./ac

B = Propylene oxide (100%) – 500 lbs./ac

C = Propylene oxide (67%) and Chloropicrin (33%) - 500 lbs./ac

First Seasons' Conclusion

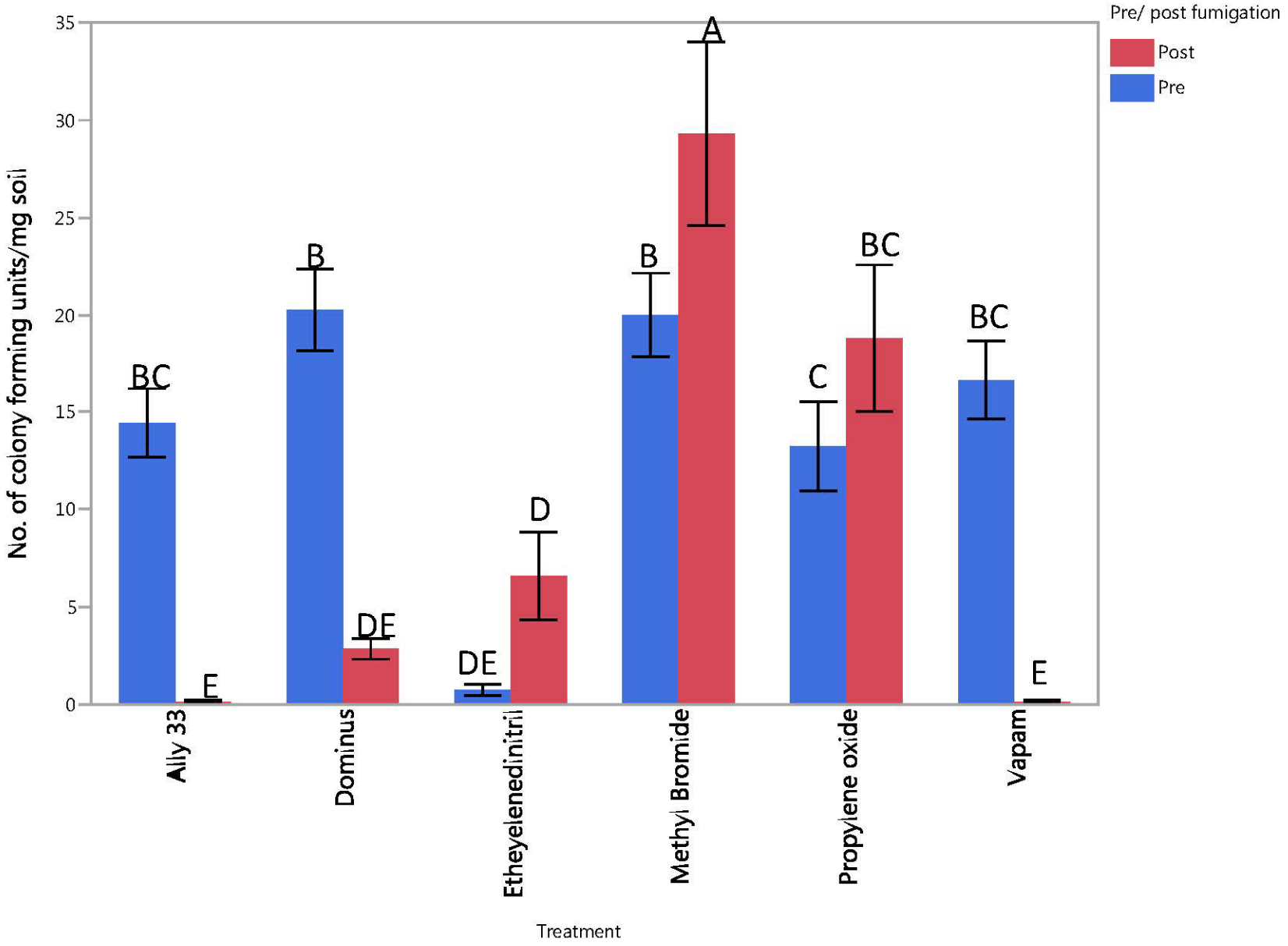
- Propylene oxide as a stand alone treatment resulted in a reduction in seedling height and diameter compared to other treatments.
- There was no significant difference in seedling height and diameter for the Propylene oxide (67%) and Telone (33%) treatment compared to the Propylene oxide (67%) and Chloropicrin (33%) treatment.

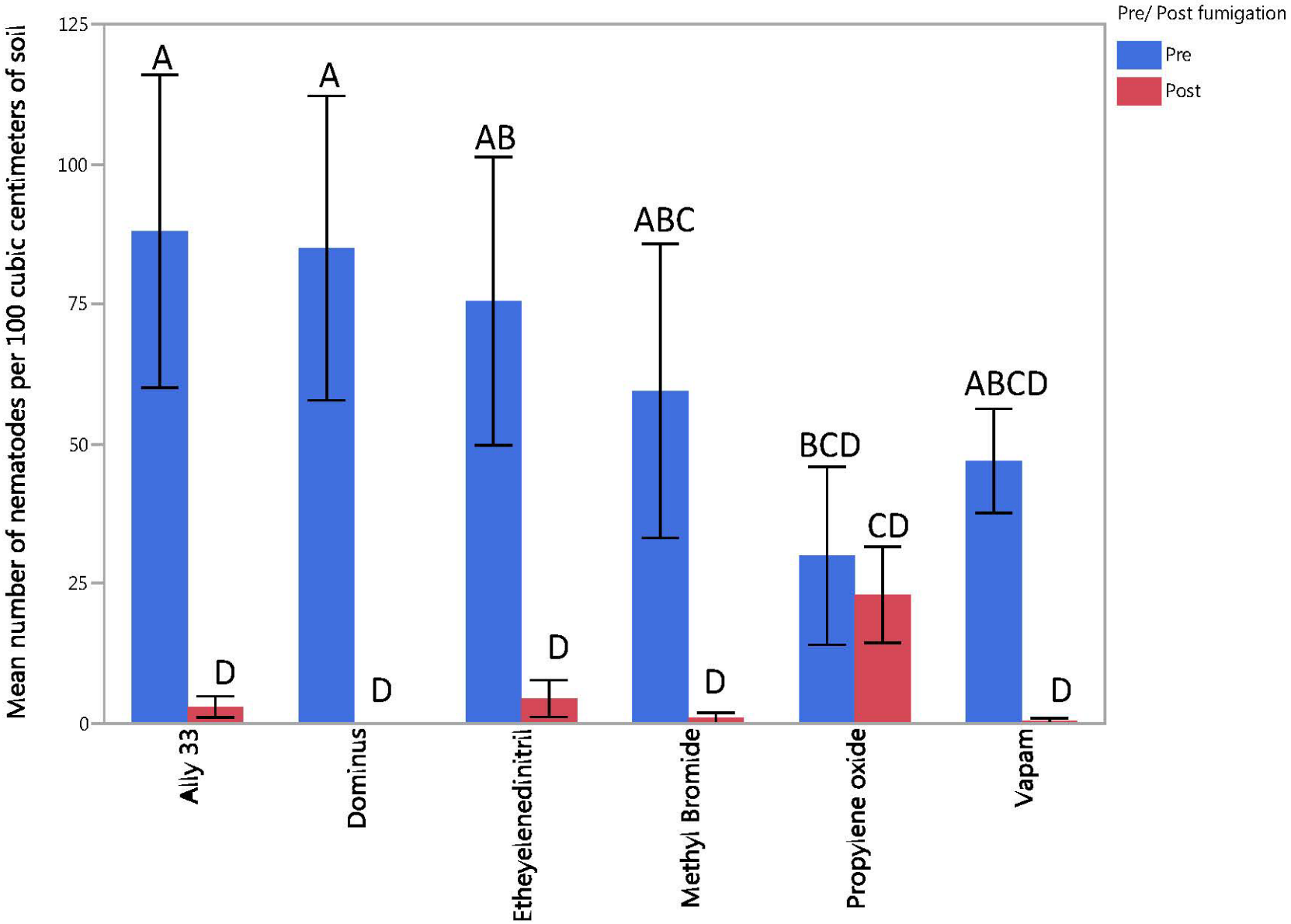
Other Soil Fumigants – 1st Season

- Etheyelenedinitril (EDN) – 500 lb/ac
- Methyl Bromide (80/20) – 400 lb/ac
- Dominus (AITC) – 500 gal/ac
- Vapam (SMDC) - 75 gal/ac
- Ally 33 (67% Dominus + 33% Pic) – 500 lb / ac

- Propylene Oxide - 6ool bs/ac

Rayonier: Elberta, Alabama
November 2016


Pre/ post fumigation
Post
Pre
No. of colony forming units/mg soil
35
30
25
20
15
10
5
0
BC
E
B
DE
DE
D
B
A
C
BC
BC
E
Ally 33
Dominus
Etheyelenedinitril
Methyl Bromide
Propylene oxide
Vapam
Treatment


Mean number of nematodes per 100 cubic centimeters of soil
125
100
75
50
25
0
A
D
A
D
AB
D
ABC
D
BCD
CD
ABCD
D
Ally 33
Dominus
Etheyelenedinitril
Methyl Bromide
Propylene oxide
Vapam
Pre/ Post fumigation
Pre
Post

Other Soil Fumigants – 1st Season

- Continue to monitor for seedling characteristics / end of season.
- Weed populations and species.
- Sown again next spring.
- Part of Southern Forest Nursery Association's Biennial Meeting in July 2018.

- 2018 Trials / Dominus
  - IR-4 Project
  - Nationally Funded Project for minor-use (high value) crops.