# Fumigation trial update

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Southern Forest Nursery Management Cooperative

# Coop tested alternatives

| Fumigant |
| --- |
| |
| Methyl Bromide |
| Chloropicrin (Pic) |
| Hot water (250°F) |
| Eptam 7EC + Chloropicrin (EPTC) |
| Iodomethane + Chloropicrin (Midas) |
| Methyl iodide |
| Metsulfuron methyl (Escort) |
| Metsulfuron methyl + Sulfometuron (Escort plus/ Verbena) |
| Rhizobacteria (PGPR) |
| MBA 401 (unlabeled) |

# Coop tested alternatives

| Fumigant |
| --- |
| |
| Methyl Bromide |
| Methyl Bromide + Chloropicrin |
| Chloropicrin (Pic) |
| Dimethyl Disulfide (DMDS) |
| Dimethyl Disulfide + Chloropicrin |
| 1,3 dichlropropene + Chloropicrin (Triform / Telone) |
| Dazomet (Basmid) |
| Metham-sodium |
| Metham- Sodium + Chloropicrin |
| Metham- Potassium + Chloropicrin (CMK) |

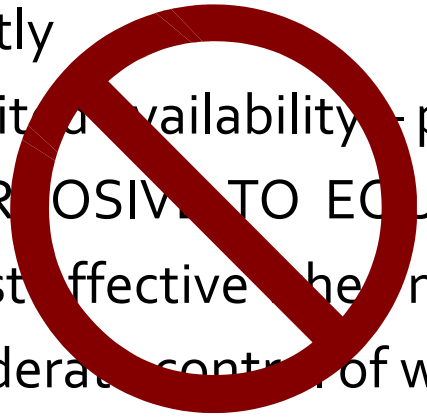
# The Good and Bad of Alternatives

- Chloropicrin
  - Lachrymator
  - Lack of weed control
  - Good disease control
- Telone – 1,3-D
  - Good nematode control
  - Lack of weed control

# The Good and Bad of Alternatives

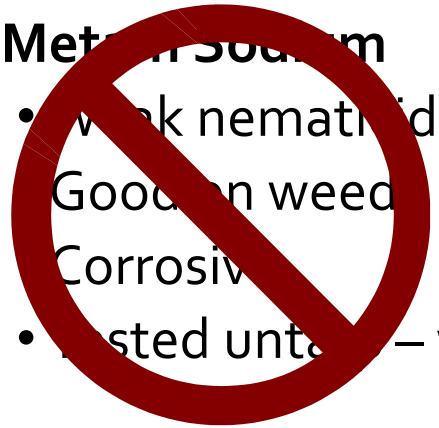
- DMDS
  - Odor
  - Good  possible alternative
  - EPA likes it

- Methyl Iodide
  - Costly
  - Limit[illegible]vailability – primarily in FL, GA, not MS LA and beyond
  - COR[illegible]OSIV[illegible]TO  EQ[illegible]UIPMENT
  - Most [illegible]ffective [illegible]he[illegible] mixed with Chloropicrin
  - Moderat[illegible]contr[illegible] of weeds

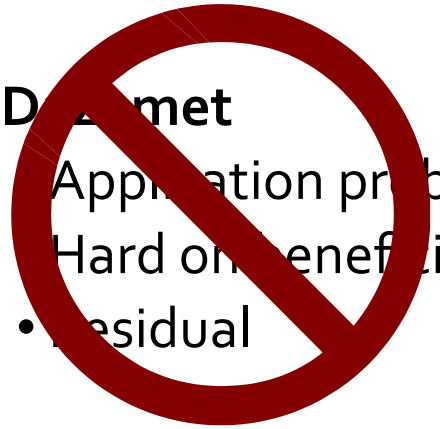


# The Good and Bad of Alternatives

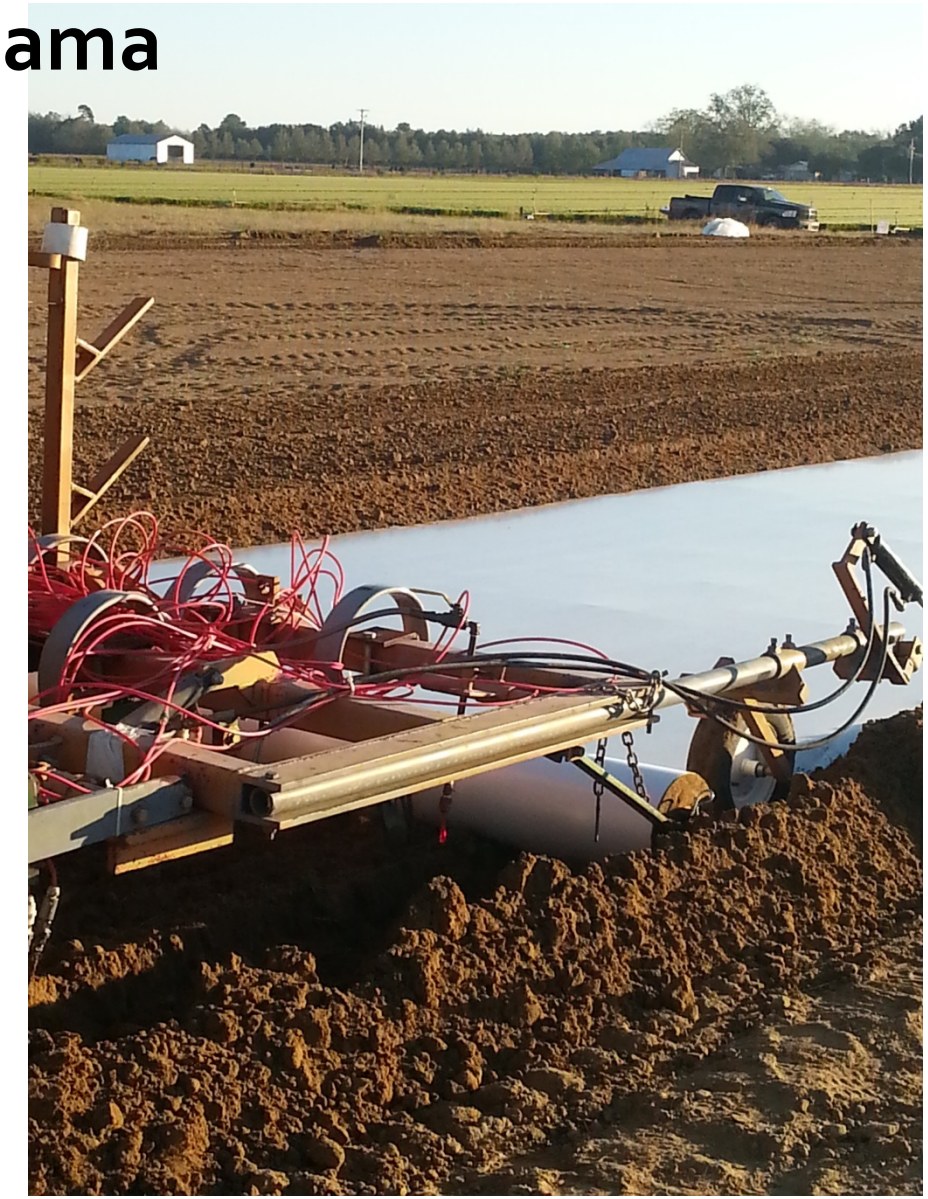
- **Met[illegible]m**
  - [illegible]k nemati[illegible]de
  - Good[illegible]n weed
  - Corrosiv[illegible]
  - [illegible]sted unta[illegible] – wrong decision.



- **D[illegible]met**
  - App[illegible]ation pr[illegible]blems
  - Hard on [illegible]enef[illegible]ial fungi
  - [illegible]esidual



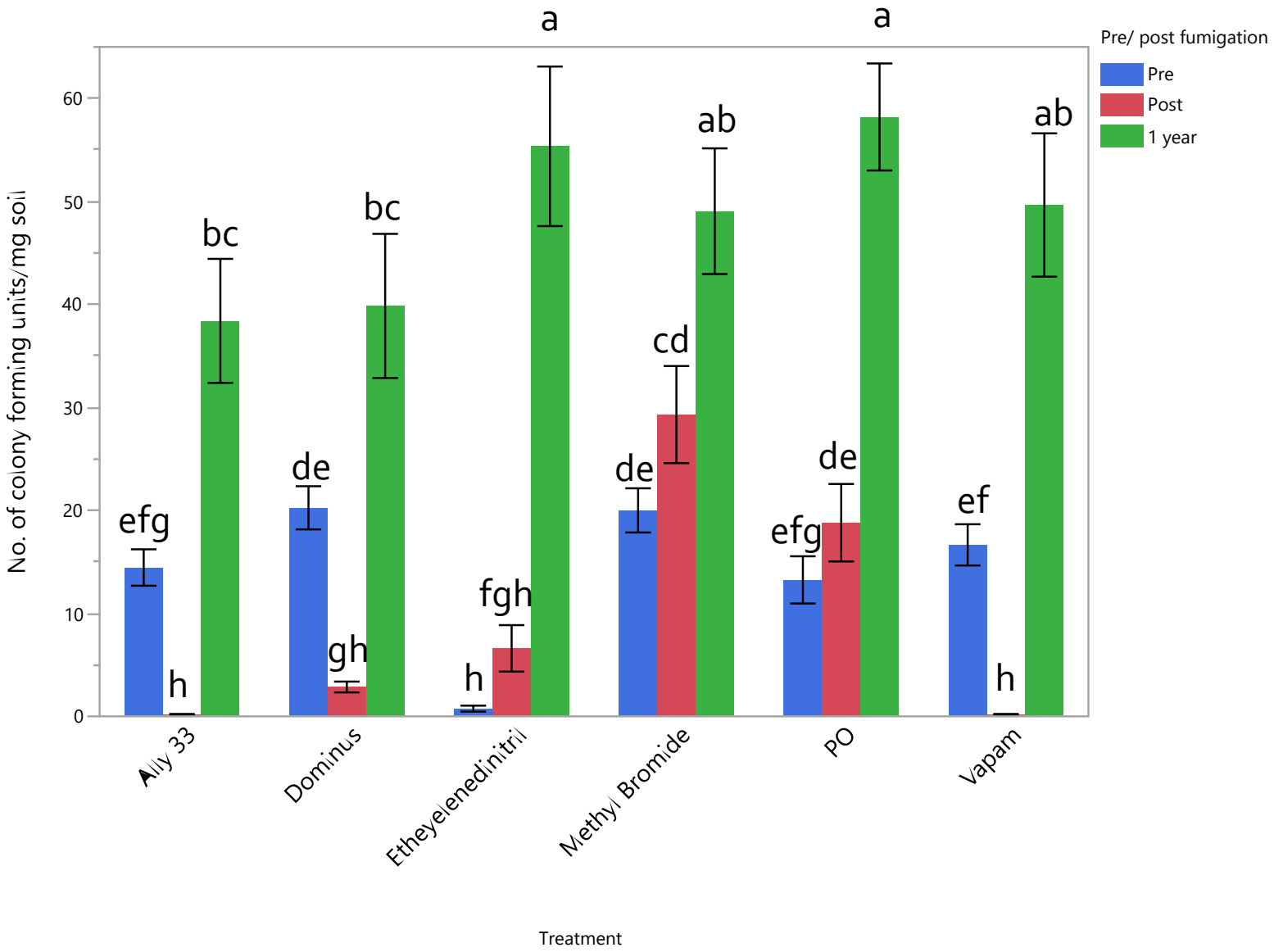
# Rayonier: Elberta, Alabama
# November 2016



# Fumigation trial

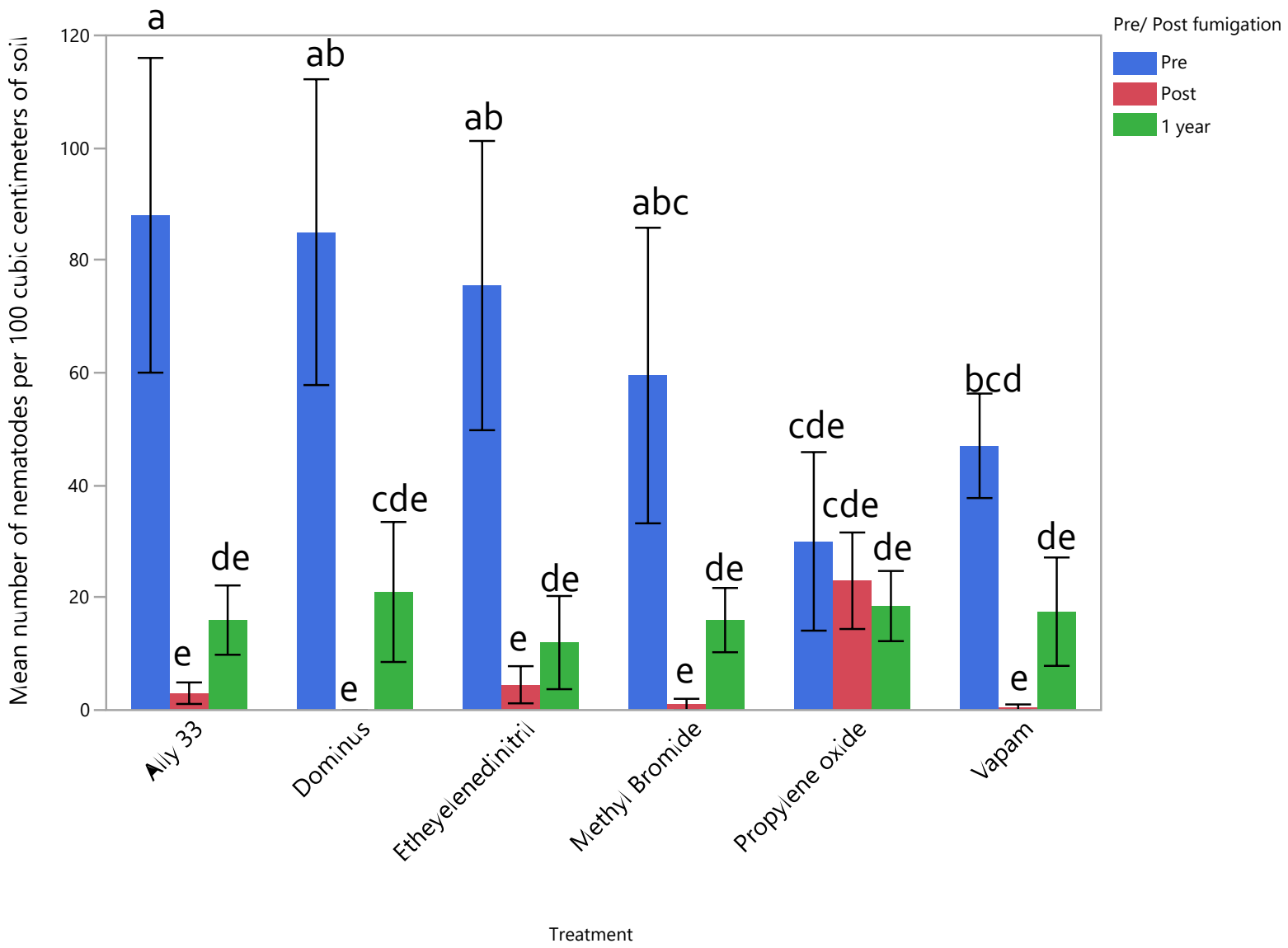
| Treatment | Rate |
|---|---|
| **Methyl Bromide (80/20)** | 350 lbs./ac |
| **Etheyelenedinitril (EDN)** | 500 lbs./ac |
| **Ally 33 (67% Dominus + 33% Pic)** | 500 lbs./ac |
| **Propylene Oxide** | 600 lbs./ac |
| **Dominus (AITC)** | 500 gal./ac |
| **Vapam (SMDC)** | 75 gal./ac |

# Trichoderma

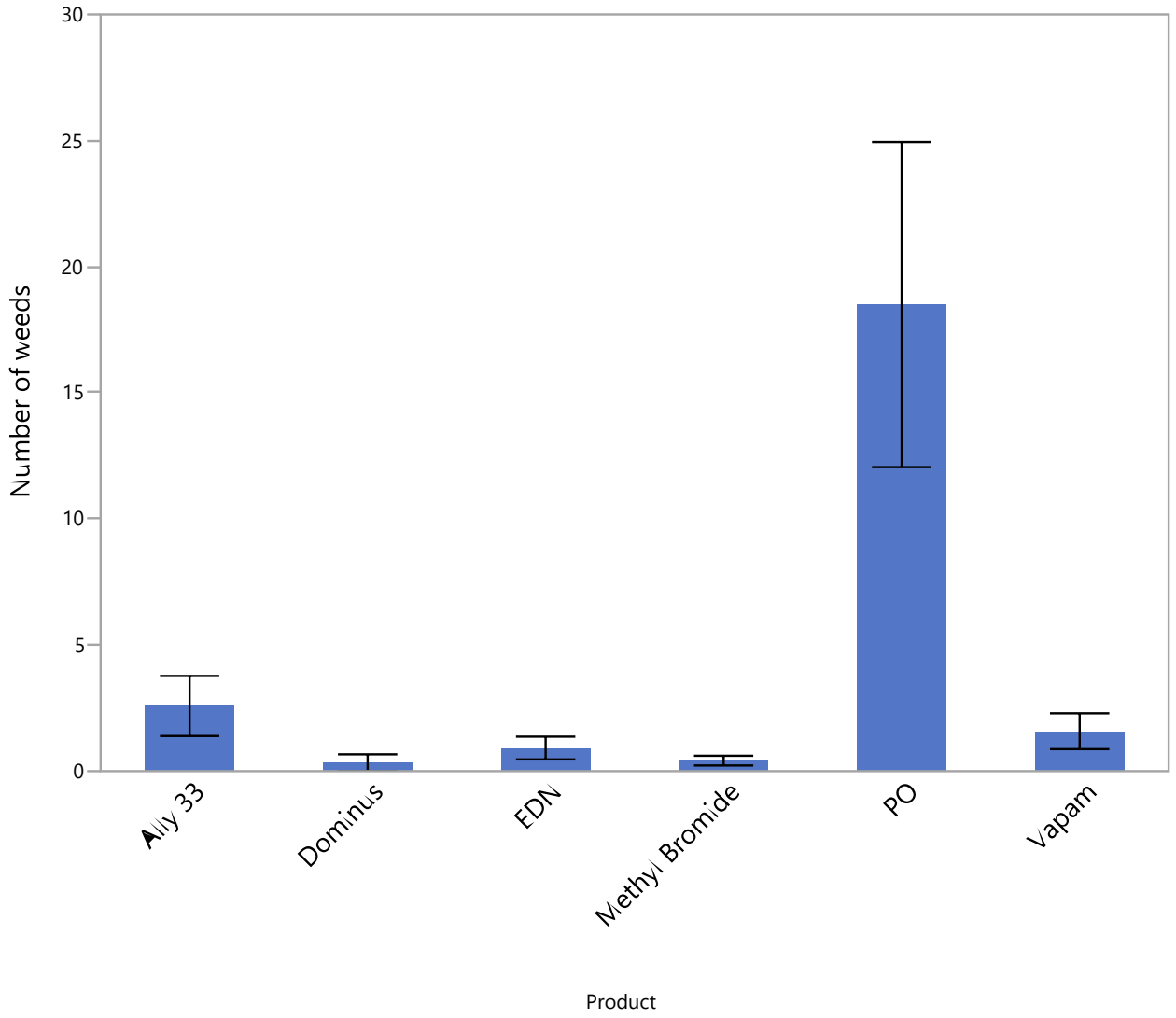


# Nematodes

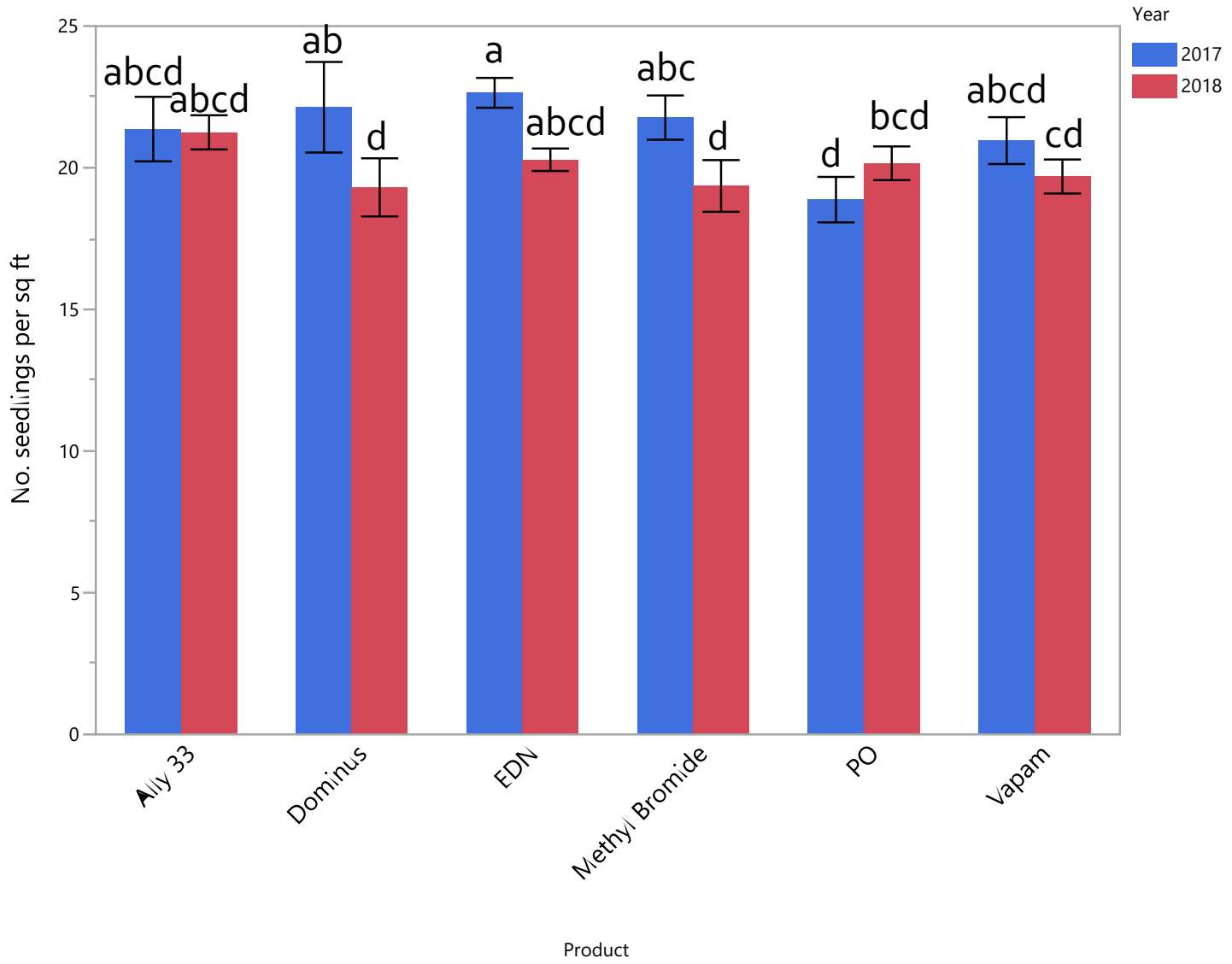

http://extension.uga.edu/publications/detail.html?number=C834&title=Guide%20for%20Interpreting%20Nematode%20Assay%20Results



# Loblolly weed counts




# Loblolly seedling densities



# Root weight ratio

| Treatment | Rate | Root Weight Ratio (% | |
|---|---|---|---|
| | | 2017 | 2018 |
| **Methyl Bromide (80/20)** | 350 lbs./ac | $15.83^{a}$ | $13.72^{bcd}$ |
| **Etheyelenedinitril (EDN)** | 500 lbs./ac | $15.63^{ab}$ | $13.43^{cd}$ |
| **Ally 33 (67% Dominus + 33% Pic)** | 500 lbs./ac | $15.05^{abc}$ | $12.57^{d}$ |
| **Propylene Oxide** | 600 lbs./ac | $13.73^{abcd}$ | $13.71^{bcd}$ |
| **Dominus (AITC)** | 500 gal./ac | $15.13^{abc}$ | $13.80^{abcd}$ |
| **Vapam (SMDC)** | 75 gal./ac | $13.65^{bcd*}$ | $13.45^{cd}$ |

# RCD

| Treatment | Rate | RCD (mm) | |
|---|---|---|---|
| | | 2017 | 2018 |
| **Methyl Bromide (80/20)** | 350 lbs./ac | 3.97$^{cde}$ | 4.42$^{a}$ |
| **Etheyelenedinitril (EDN)** | 500 lbs./ac | 3.86$^{e}$ | 4.06$^{bc*}$ |
| **Ally 33 (67% Dominus + 33% Pic)** | 500 lbs./ac | 3.66$^{f*}$ | 4.08$^{bc*}$ |
| **Propylene Oxide** | 600 lbs./ac | 3.90$^{de}$ | 4.00$^{cd*}$ |
| **Dominus (AITC)** | 500 gal./ac | 3.88$^{de}$ | 3.99$^{cde*}$ |
| **Vapam (SMDC)** | 75 gal./ac | 4.06$^{bc}$ | 4.15$^{b*}$ |

# Soil fumigation

- Objective is to identify possible alternatives to Methyl Bromide
- Consistently control insects, nematodes and fungi.
- Propylene oxide did not eradicate trichoderma nor nematode populations in the soil
- Weeds were a problem in Propylene Oxide treatments
- 2 seasons following fumigation Methyl Bromide produced seedling with the highest RCD

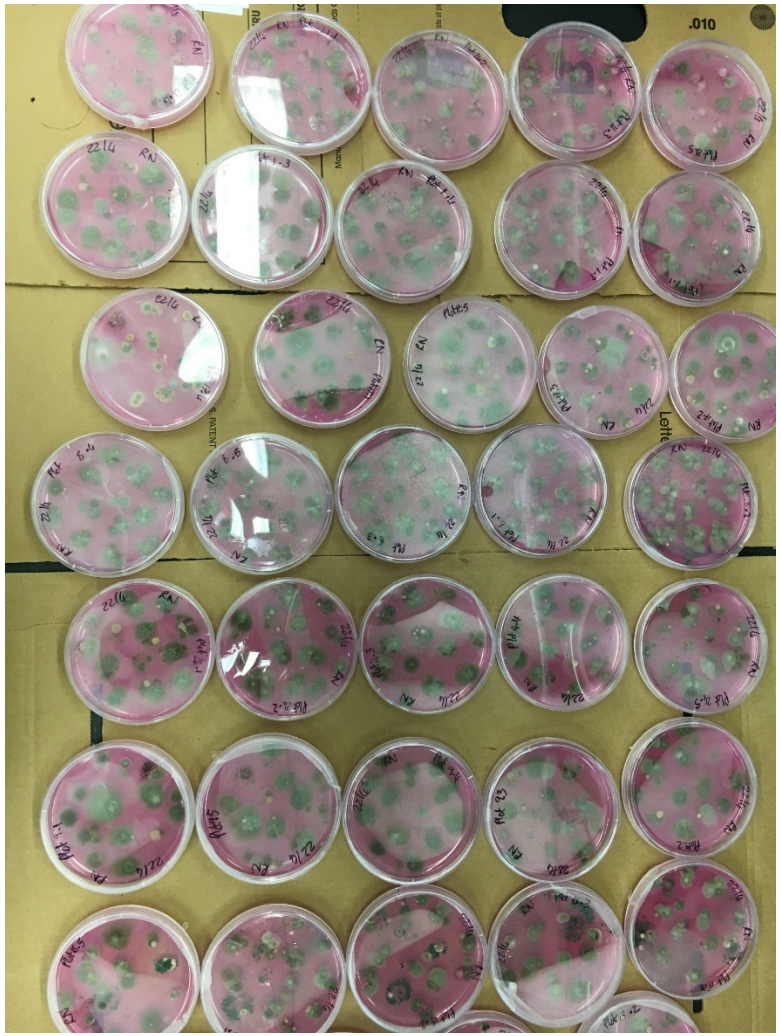
# Weyerhaeuser: Magnolia, Arkansas
# March 2019

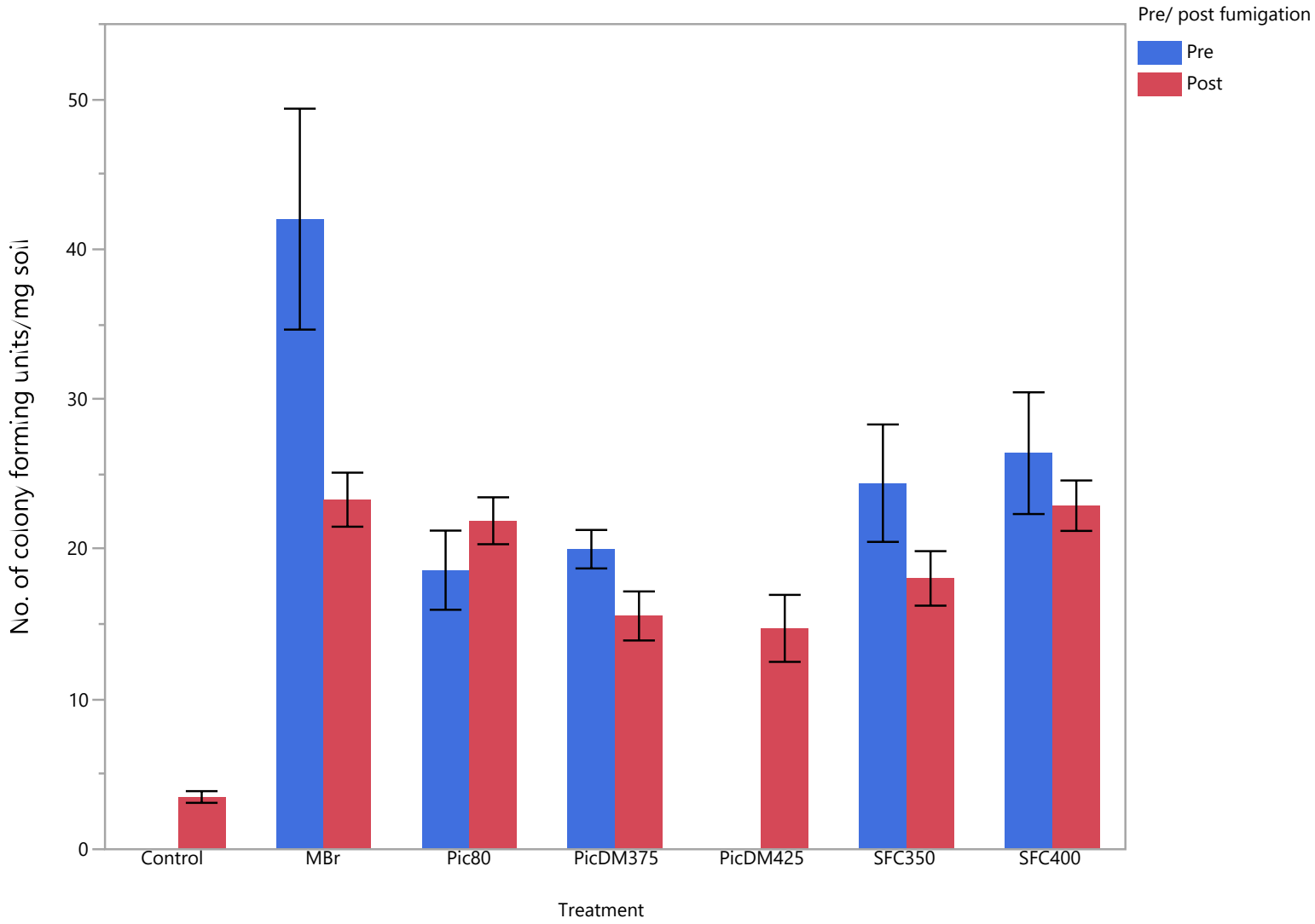
Photo: Bobby Catrett

# Fumigation trial

| Treatment | Rate |
|---|---|
| **Methyl Bromide (80/20)** | 300 lbs./ac |
| **Sulfuryl Fluoride + Chloropicrin** | 350 + 100 lbs./ac |
| **Sulfuryl Fluoride + Chloropicrin** | 400 +100 lbs./ac |
| **Dimethyl disulfide (DMDS) 60:40** | 375 lbs./ac |
| **DMDS 60:40** | 425 lbs./ac |
| **Chloropicrin (Pic) 80** | 350 lbs./ac |

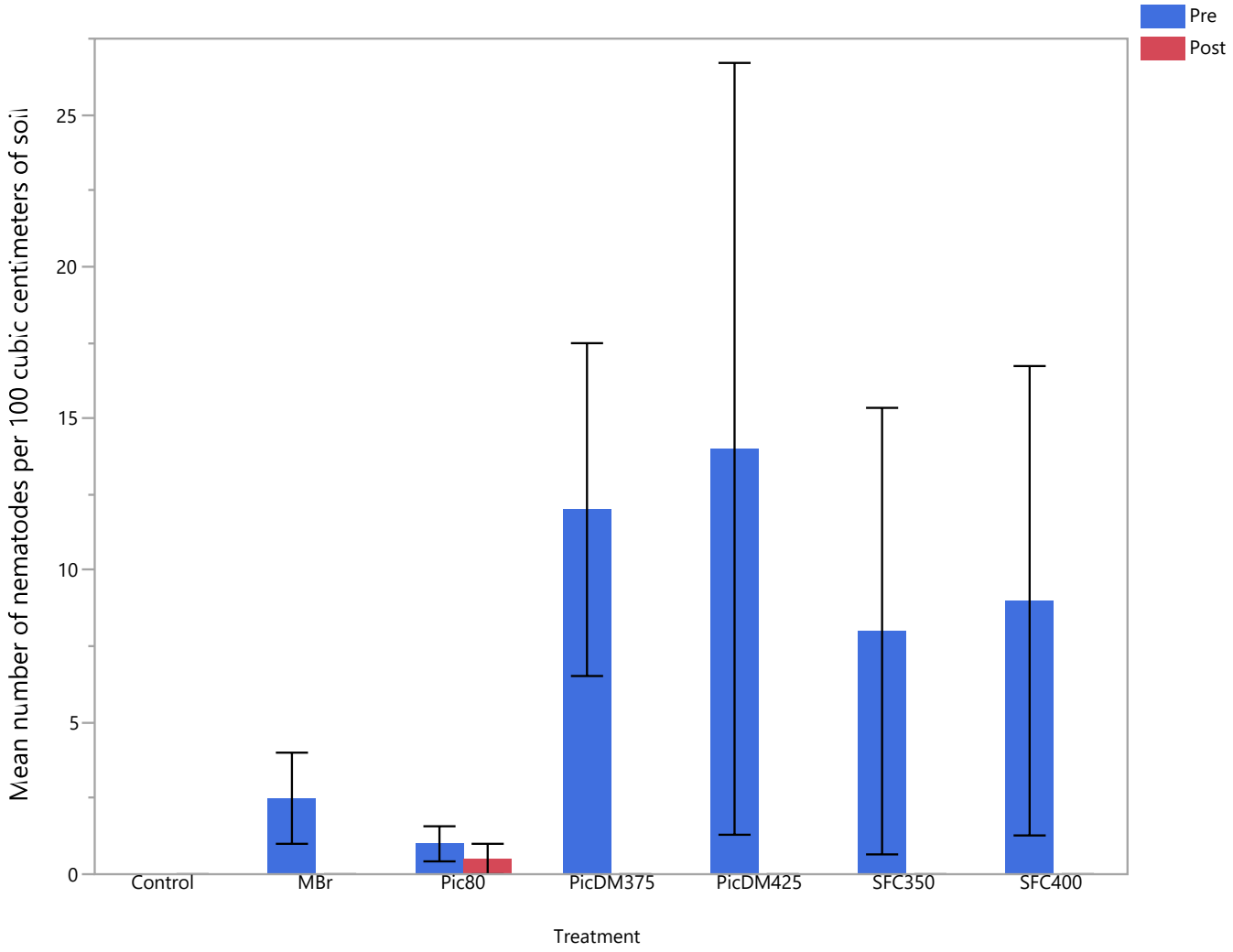
# Trichoderma – Pre Fumigation



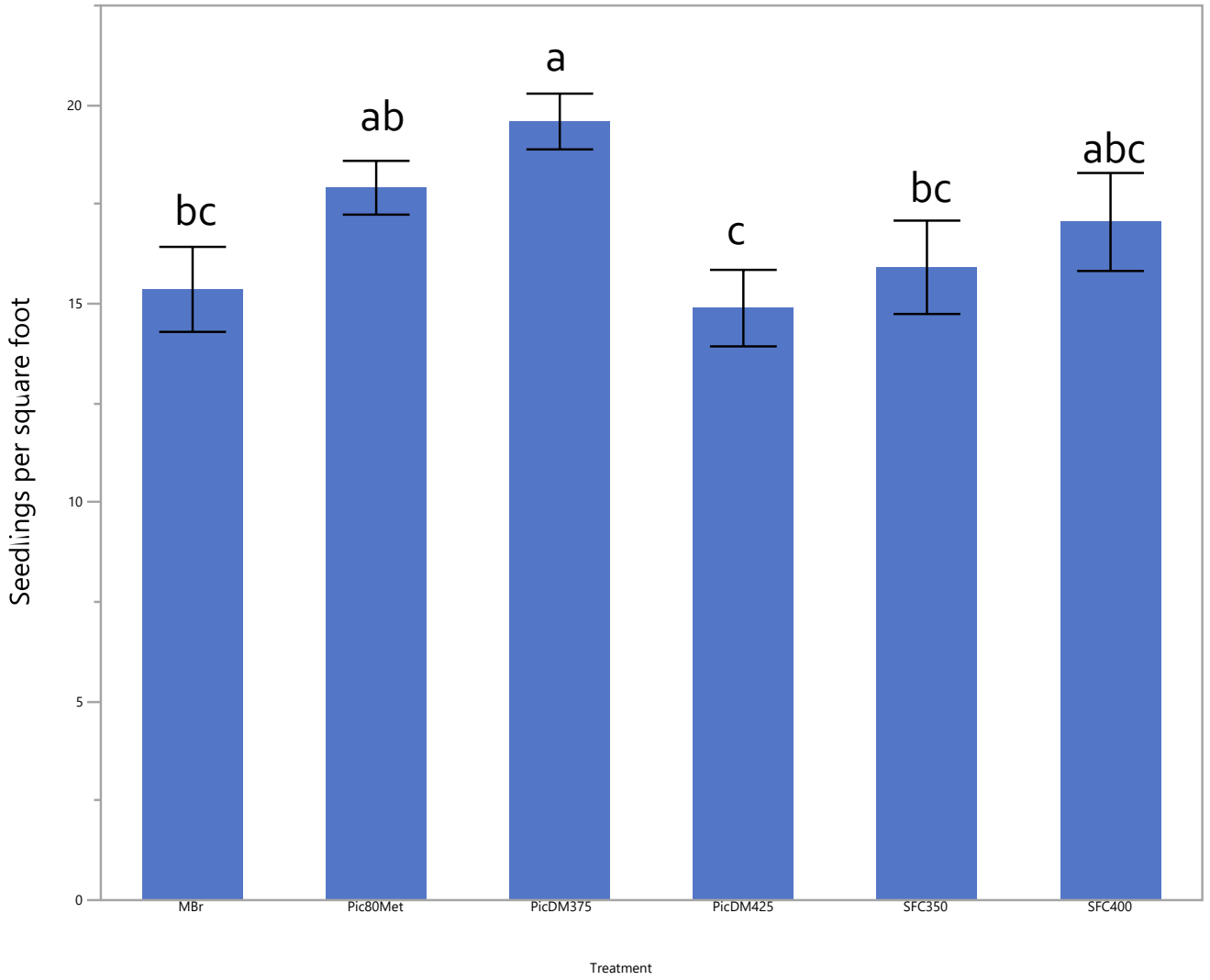


# Nematodes


http://extension.uga.edu/publications/detail.html?number=C834&title=Guide%20for%20Interpreting%20Nematode%20Assay%20Results



# Seedling densities



# RCD

| Treatment | Rate | RCD (mm) |
|---|---|---|
| **Methyl Bromide (80/20)** | 300 lbs./ac | 5.31[b] |
| **Sulfuryl Fluoride + Chloropicrin** | 350 + 100 lbs./ac | 5.33[b] |
| **Sulfuryl Fluoride + Chloropicrin** | 400 +100 lbs./ac | 5.28[b] |
| **Dimethyl disulfide (DMDS) 60:40** | 375 lbs./ac | 5.01[c] |
| **DMDS 60:40** | 425 lbs./ac | 5.54[a] |
| **Chloropicrin (Pic) 80** | 350 lbs./ac | 5.50[a] |

# RCD

| Treatment | Rate | RWR % |
|---|---|---|
| **Methyl Bromide (80/20)** | 300 lbs./ac | 17.30[bc] |
| **Sulfuryl Fluoride + Chloropicrin** | 350 + 100 lbs./ac | 17.84[b] |
| **Sulfuryl Fluoride + Chloropicrin** | 400 +100 lbs./ac | 18.88[a] |
| **Dimethyl disulfide (DMDS) 60:40** | 375 lbs./ac | 17.54[b] |
| **DMDS 60:40** | 425 lbs./ac | 18.03[ab] |
| **Chloropicrin (Pic) 80** | 350 lbs./ac | 16.50[c] |