Pest Control in Strawberry with IRF135, Pic and Metham K

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Collaborators

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Financial support

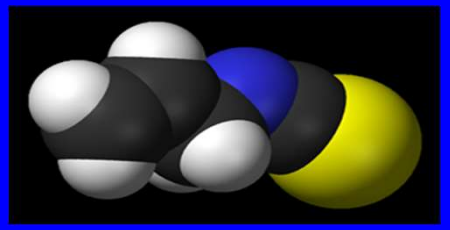
- USDA NIFA Methyl Bromide Transitions
  - 2013 -51102-21524
- California Strawberry Commission
- Support from Reiter Affiliated Companies, Driscoll's, NorCal Ramco, AMVAC, Isagro
- A special thanks to TriCal Inc. & Ajwa Inc. for fumigant application
- Thanks to growers Jose Garcia & Miguel Ramos

Introduction

- Dominus– product description
- Dominus alone and tank mixes – product description & trial results
- Metam K (K-Pam) tank mixes - trial results
- Summary

Dominus = IRF135 = AITC
Product Overview (from Isagro)

- Allyl Isothiocyanate (AITC) is a synthetically produced biopesticide with its origins in a naturally occurring plant defense chemical from the plant family, brassicaceae
- Testing since 2009 – University, USDA, Contract, and Grower Demo's
- Broad-spectrum activity
  - Efficacy against
    - Weeds, nematodes, soil fungi and insects
  - Classified by US EPA and CA DPR as a Fumigant
    - Vapor pressure + Bp + Henry's Constant = "*Passive Fumigant*"
    - AITC is a naturally occurring plant defense compound provided by ISAGRO USA in a consistent synthetic formulation



Dominus

Physical/Chemical Characteristics of AITC

- Flashpoint is 117°F (47°C)
- Boiling point is 304°F (151°C)
- Vapors are 3.4 times heavier than air
- Does not make its own pressure (The only pressure in the cylinders is nitrogen pressure)

Dominus Details – (from Isagro)

- All crops labelled (not yet in California)
- Entry restricted period = 5 days
- Acres allowed per day = unlimited
- Tarp cutting / puncture = 5 days
- Aeration = 2 – 24 hrs
- Planting interval = 10 days after application
- Buffer zone distance 0-25’ all rates, application methods and acres applied
- FMP’s = not required
- Biopesticide status
- Not yet registered in California

DOMINUS™

BIOPESTICIDE FOR AGRICULTURAL SOIL TREATMENT USE

A Broad Spectrum Pre-Plant Soil Biofumigant For The Control Of Certain Soil Borne Fungi, Nematodes, Weeds And Insects

Product	All Crop	Buffer Zone	Applic. Uses	Restricted Use Pesticide	Restricted Entry Interval	Film Type	Acres per Day	Applic Per year	FMP
DOMINUS	YES	0 –25’	FF, RBS, RBD	NO	5 DAYS	ALL	NO LIMIT	> 1	NO
Standard-CP, MB, 1,3-D	NO	25 – 300+’	FF, RBS, RBD	YES	5 DAYS	VIF, TIF	40	1	YES

FF = Flat Fume/Broadcast; RBS = Raised Bed Shank
RBD = Raised Bed Drip

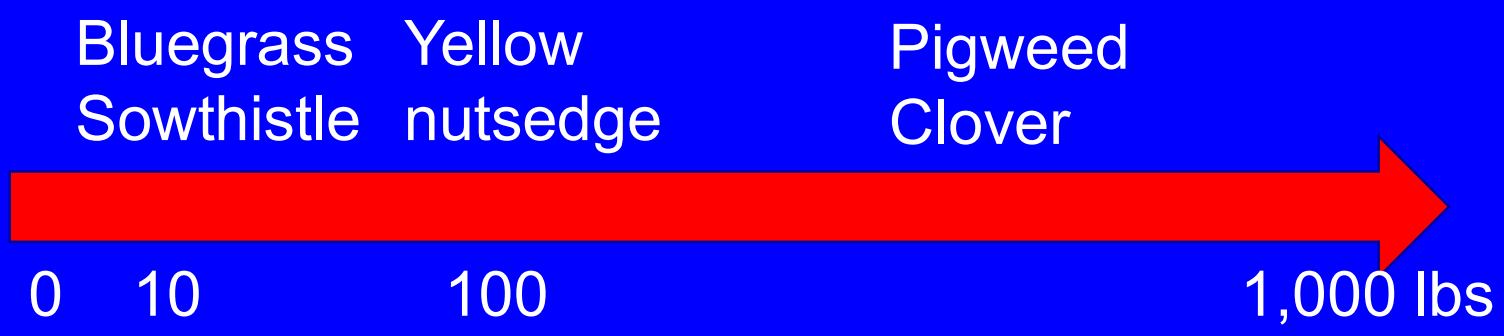
Strawberry Trial Schedule

- Lab
  - Lab weed dose response Jan. 2014
- Strawberry field
  - Salinas October 2013
  - Salinas October 2014 (2 trials)
  - Watsonville October 2012, 2013, 2014

Weed Viability - Lab

- Dominus dose response study
  - Annual bluegrass
  - Sweet clover
  - Pigweed
  - Sowthistle
  - Yellow nutsedge
- Dominus (IRF135) doses of 0, 10, 25, 50, 100, 150, 250, 500, 750, 1000, 1250, 2500 PPM
- Propagules were exposed 24 h, 50 seed per replicate, 4 replicates per treatment, January 21, 2014

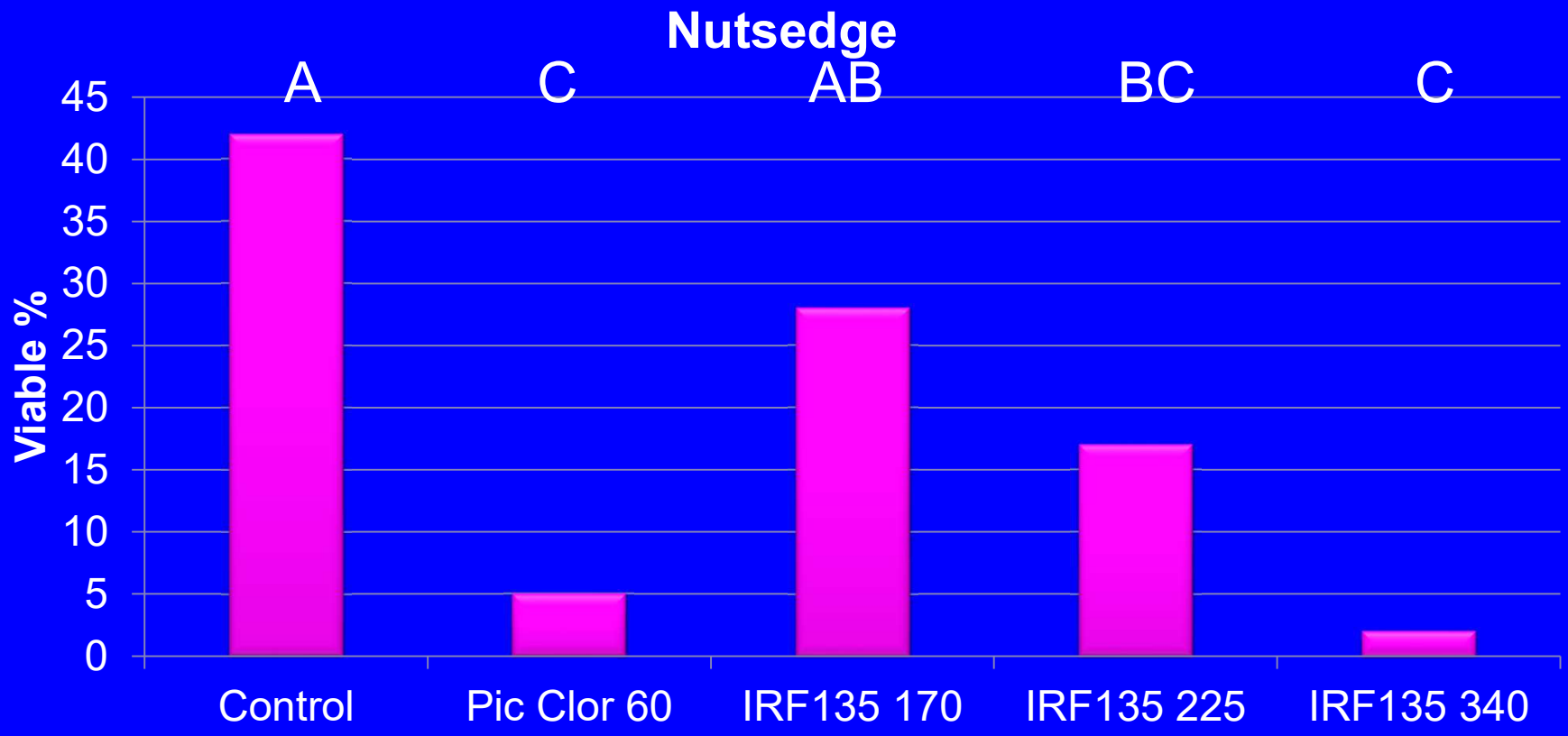
Weed Viability - Lab



Dominus (IRF135) evaluation in strawberry

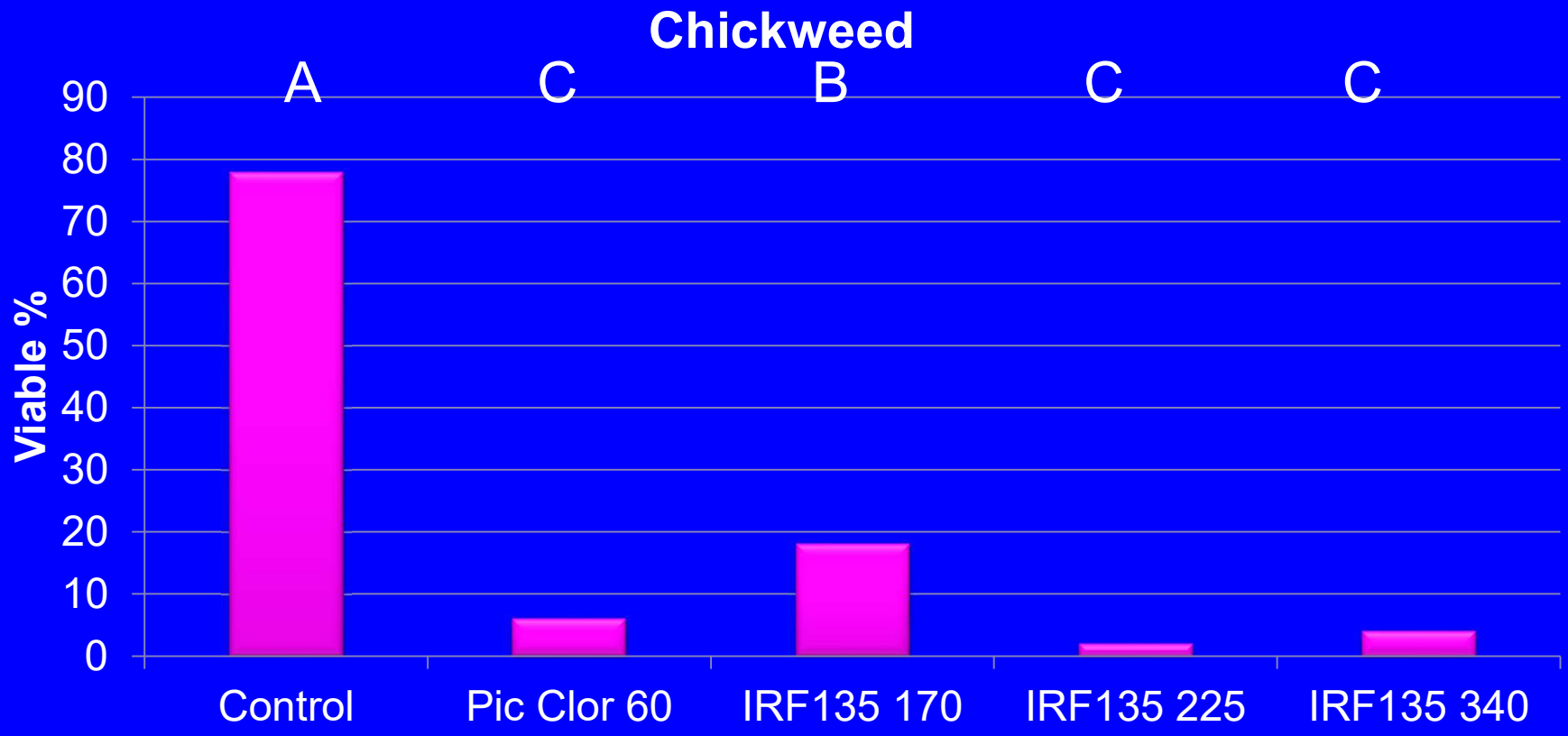
- Treatments 2012-13
  - Control
  - Pic Clor 60 350 lb/A
  - IRF135 170 lb/A
  - IRF135 225 lbs/A
  - IRF135 340 lbs/A
- 4 replicates per treatment, Oct. 25, 2012
- Weed seed bioassay, local field weeds

Nutsedge viability – IRF135



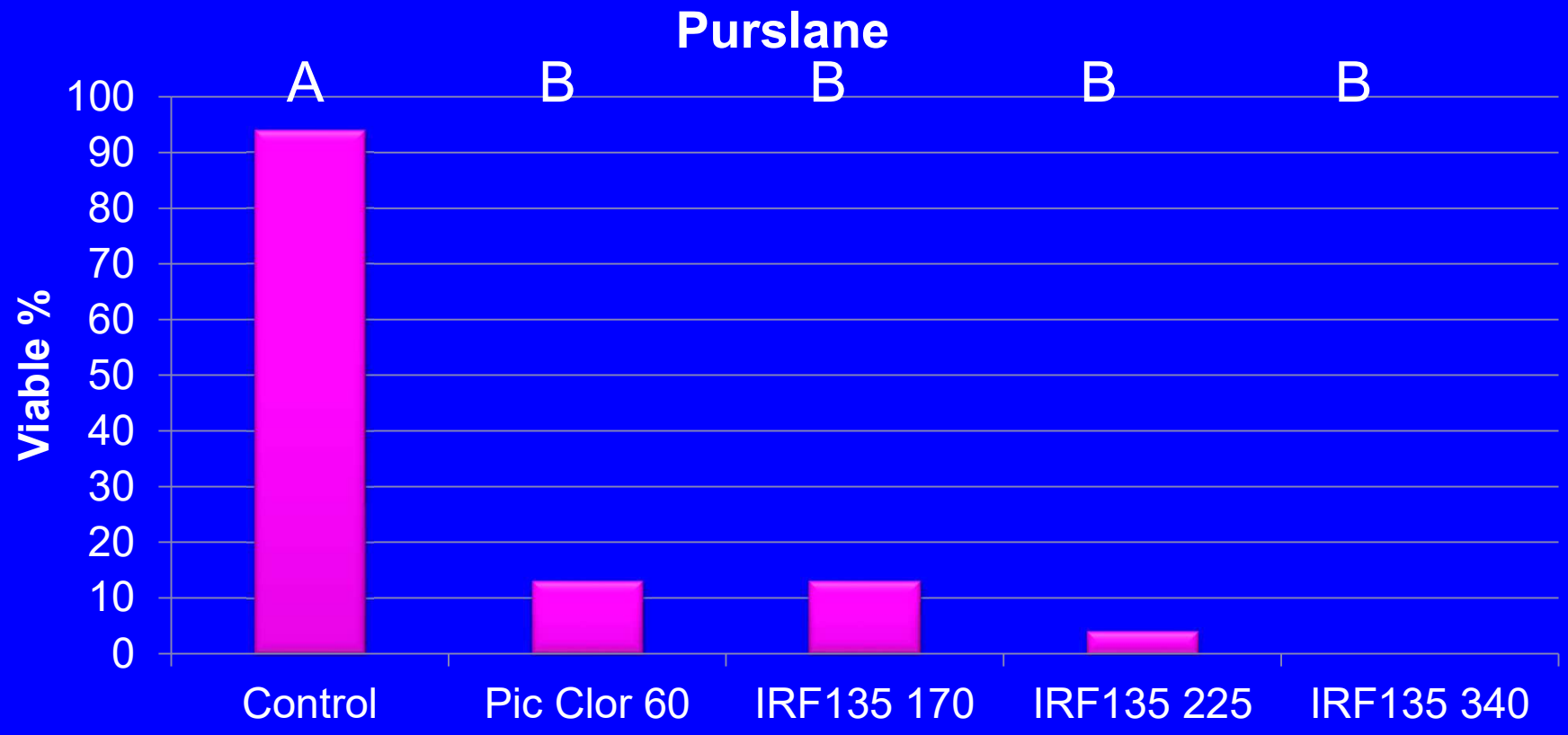
Ramos 2012-13

Chickweed viability – IRF135



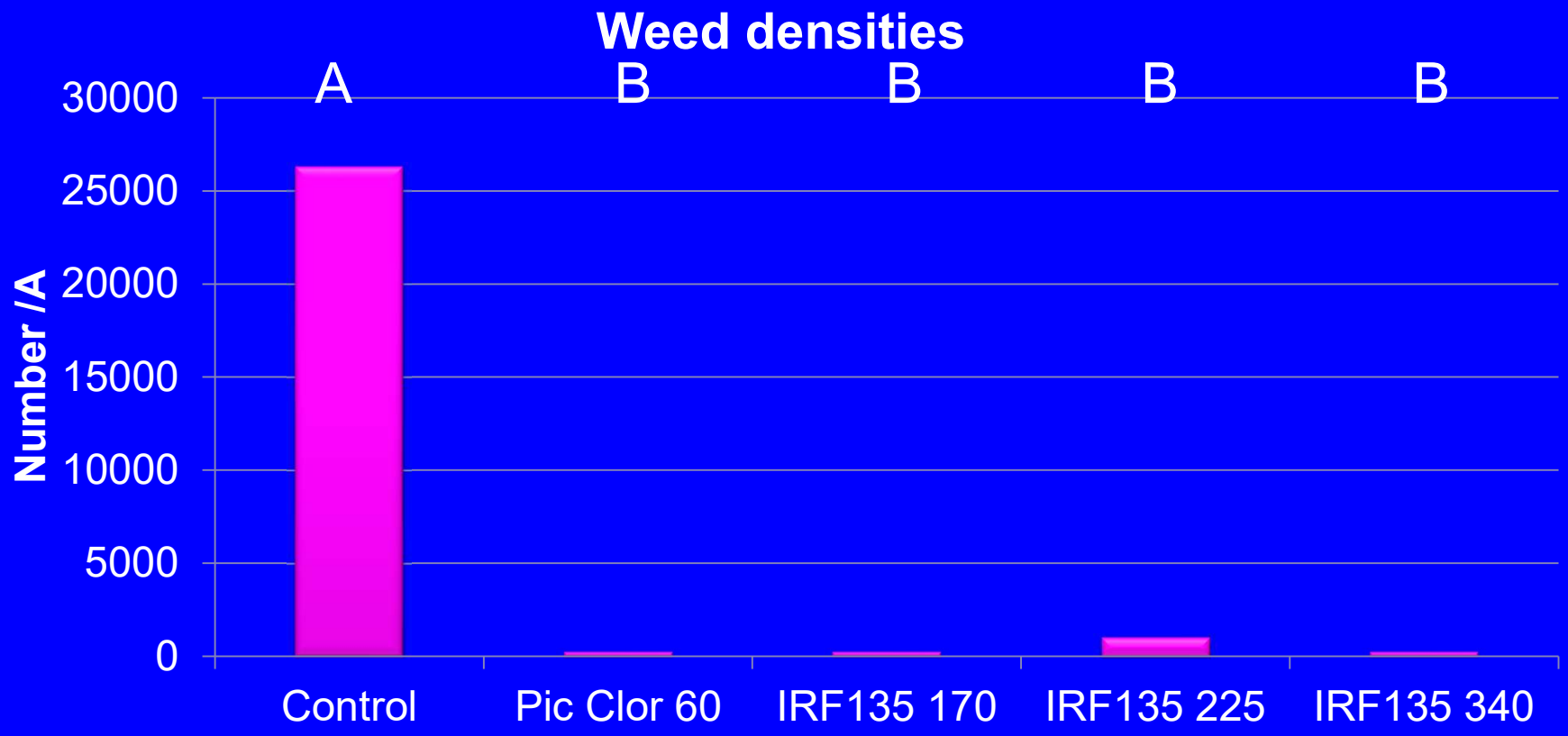
Ramos 2012-13

Purslane viability – IRF135



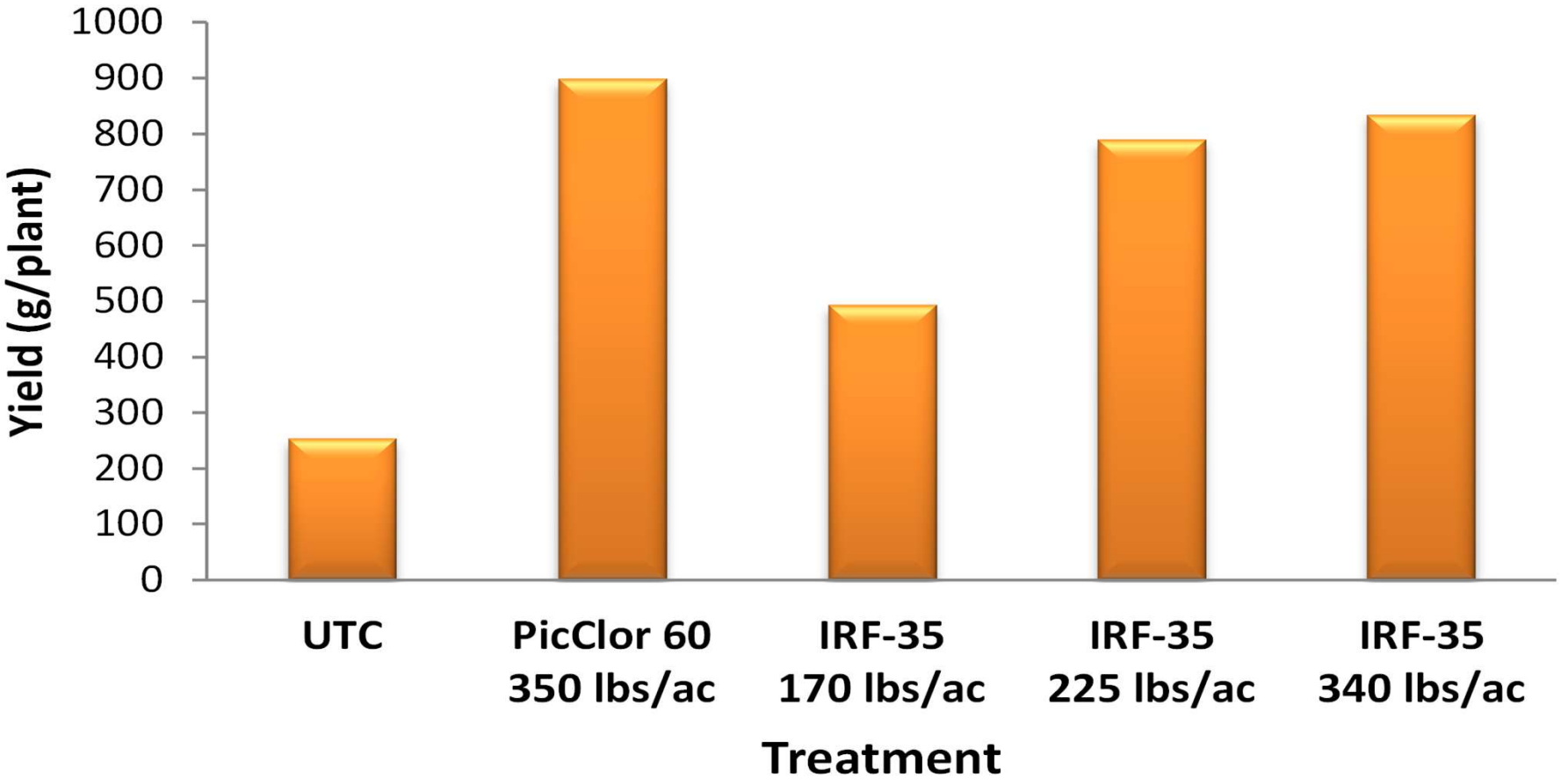
Ramos 2012-13

Field Weed Control – IRF135



Ramos 2012-13

Early Season Yield from Clear Plastic at Watsonville, CA *



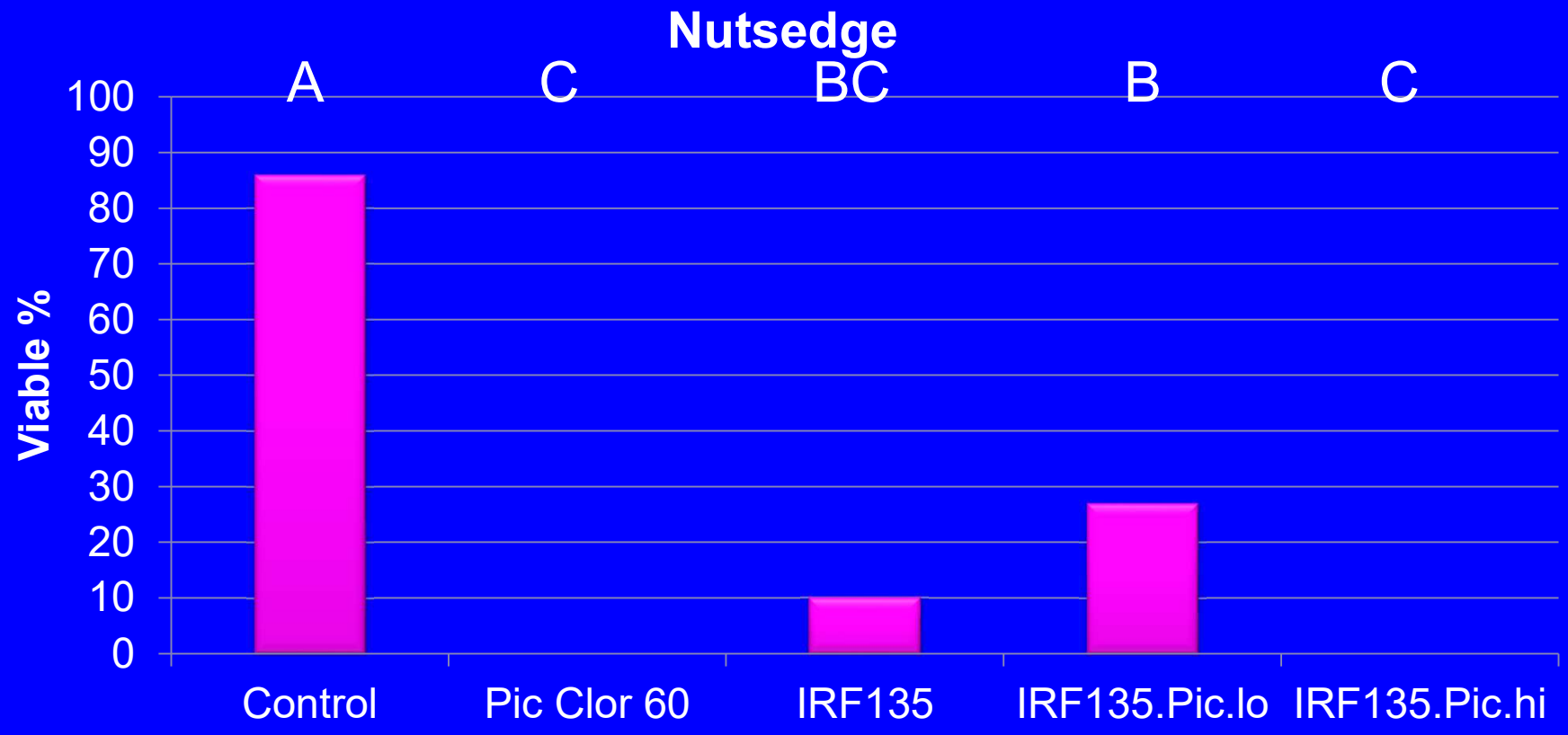
* Standard PE Film

Late season collapse, Watsonville, CA - 2013

Dominus (IRF135) evaluation in strawberry

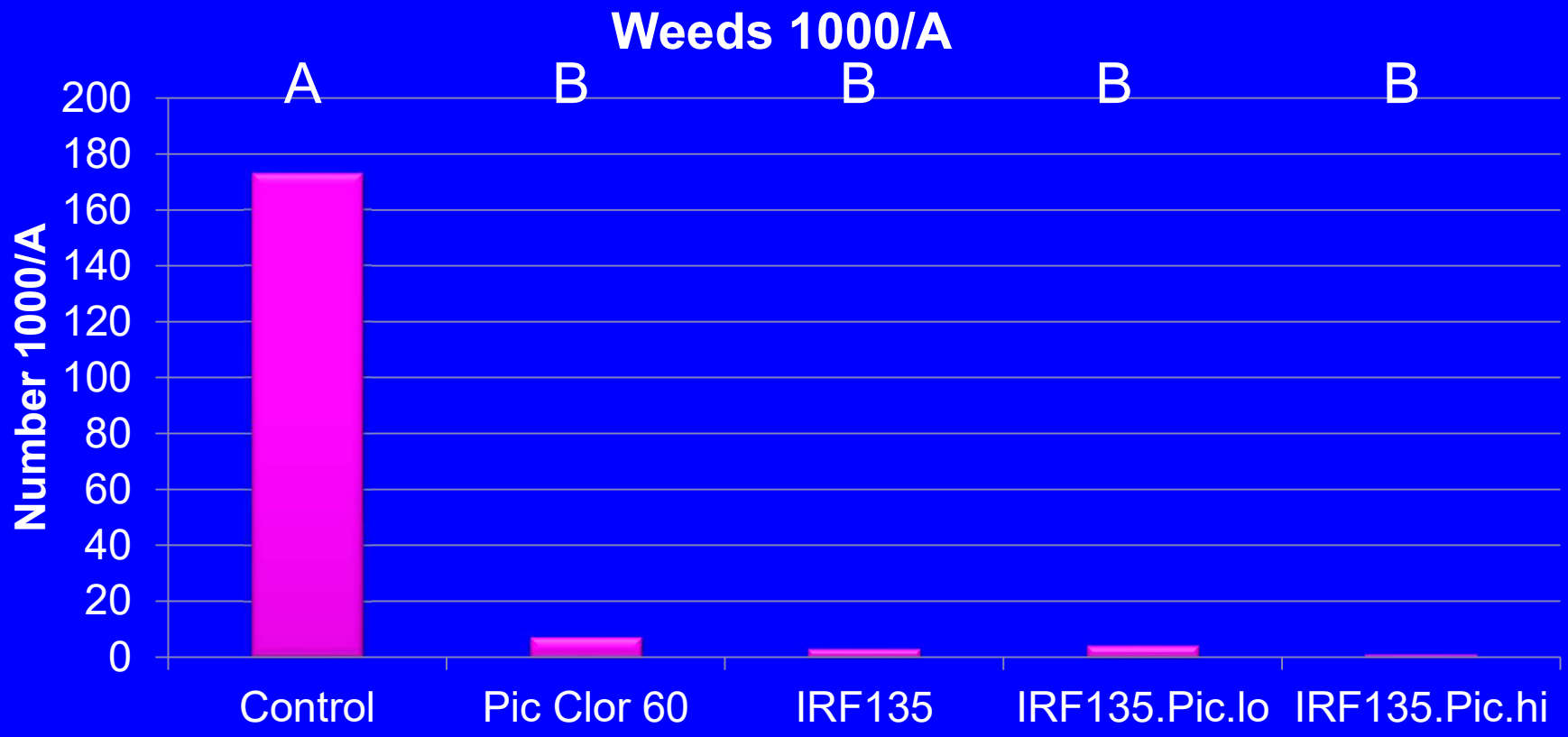
- Treatments 2013-14
  - Control
  - Pic Clor 60 350 lb/A
  - IRF135 340 lb/A
  - IRF + Pic 180 + 90 lbs/A (67:33)
  - IRF + Pic 240 + 120 lbs/A (67:33)
- 4 replicates per treatment, Nov 11, 2013
- Weed seed bioassay, local weeds

Nutsedge viability – IRF135

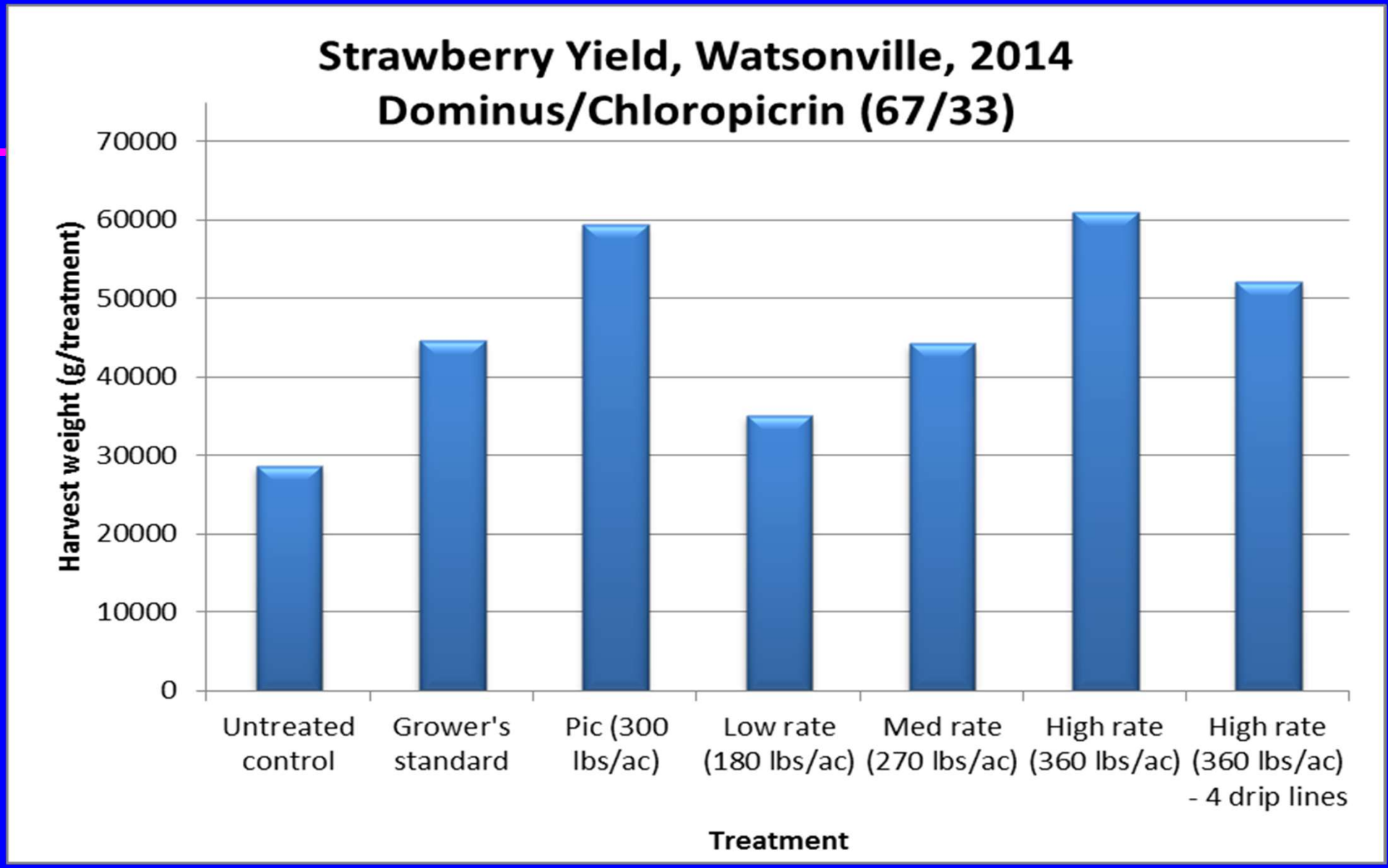


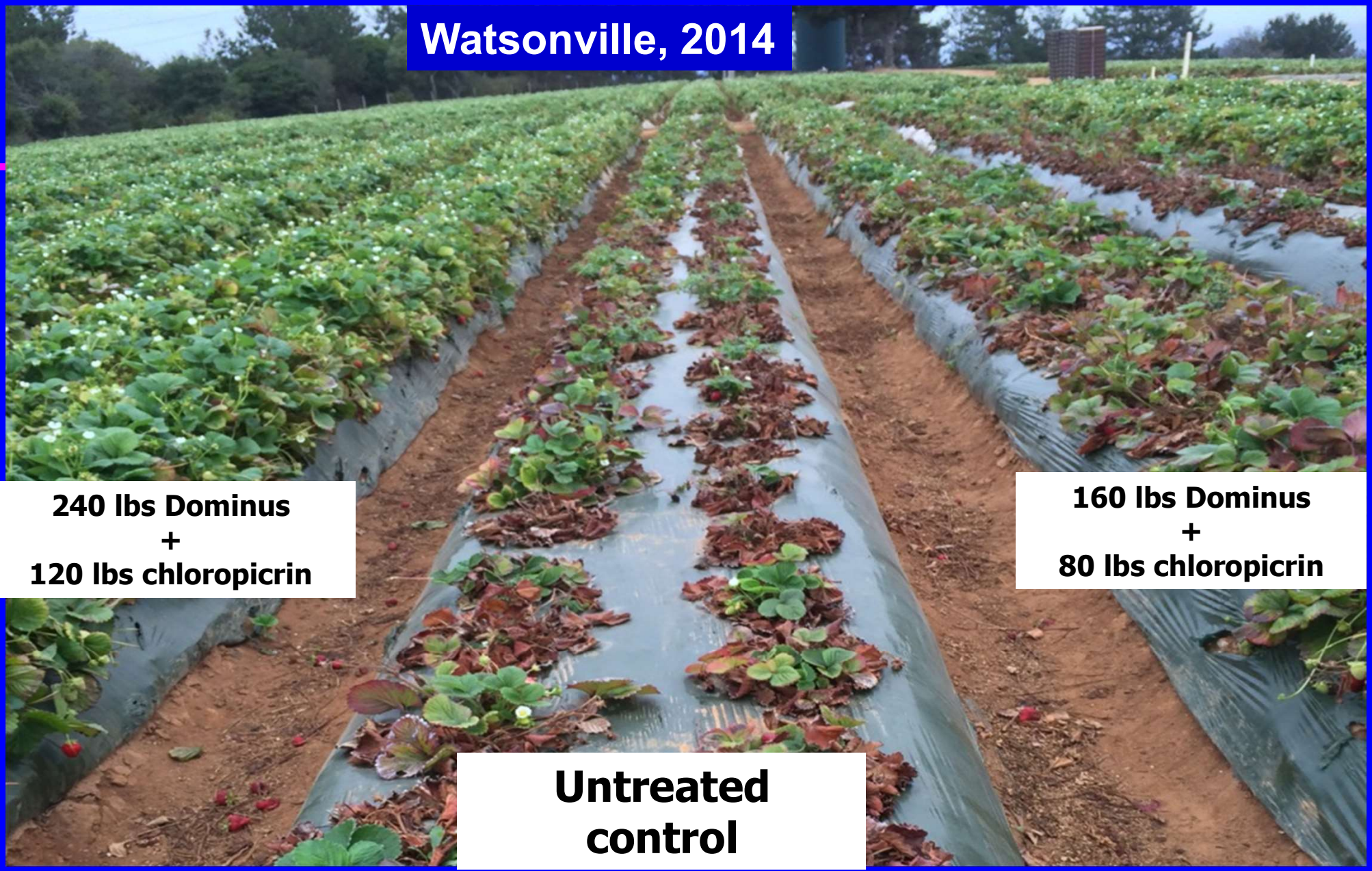
Ramos 2013-14

Weed densities– IRF135



Ramos 2013-14

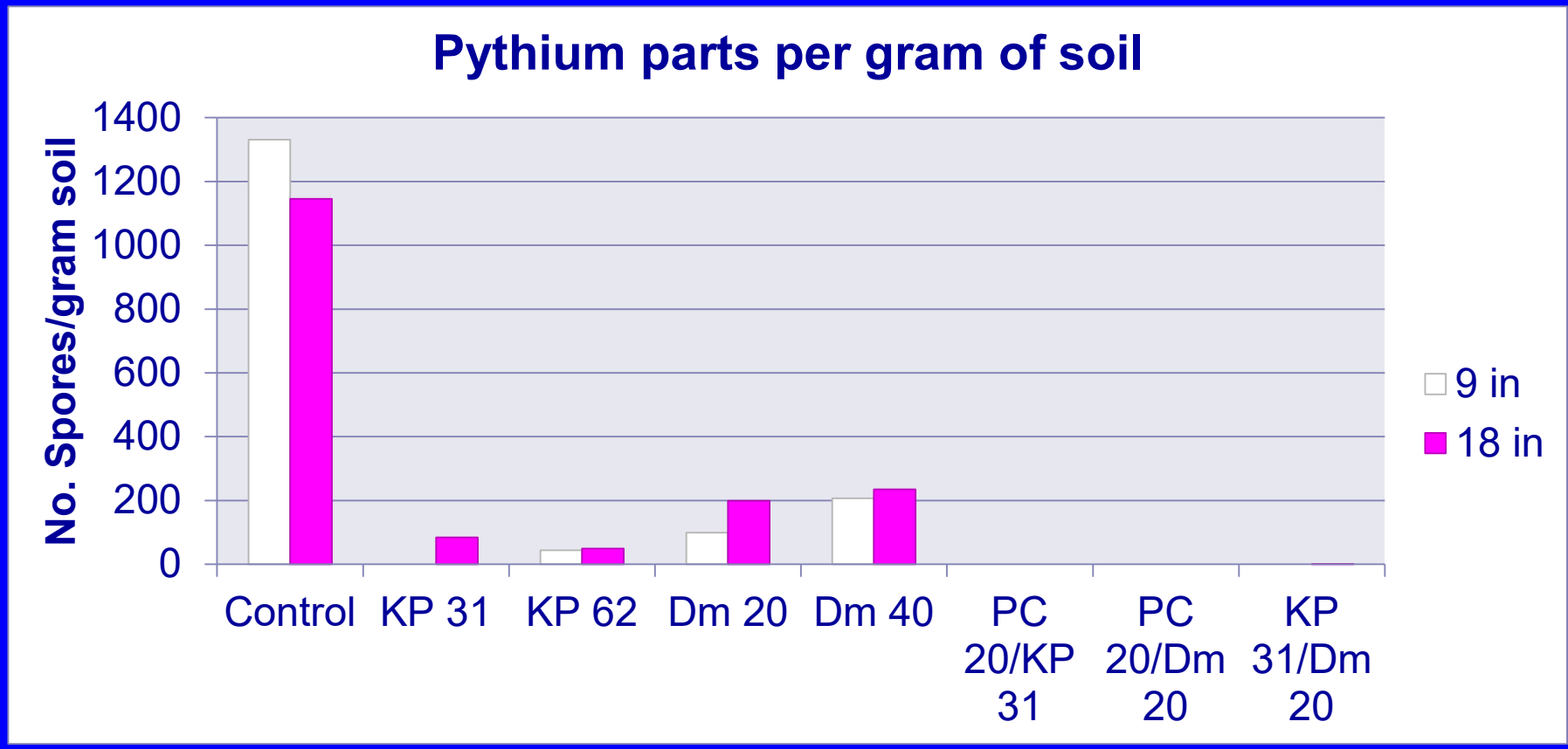

Strawberry Yield, Watsonville, 2014
Dominus/Chloropicrin (67/33)
Harvest weight (g/treatment)
70000
60000
50000
40000
30000
20000
10000
0
Untreated control
Grower's standard
Pic (300 lbs/ac)
Low rate (180 lbs/ac)
Med rate (270 lbs/ac)
High rate (360 lbs/ac)
High rate (360 lbs/ac) - 4 drip lines
Treatment


Watsonville, 2014
240 lbs Dominus
+
120 lbs chloropicrin
160 lbs Dominus
+
80 lbs chloropicrin
Untreated
control

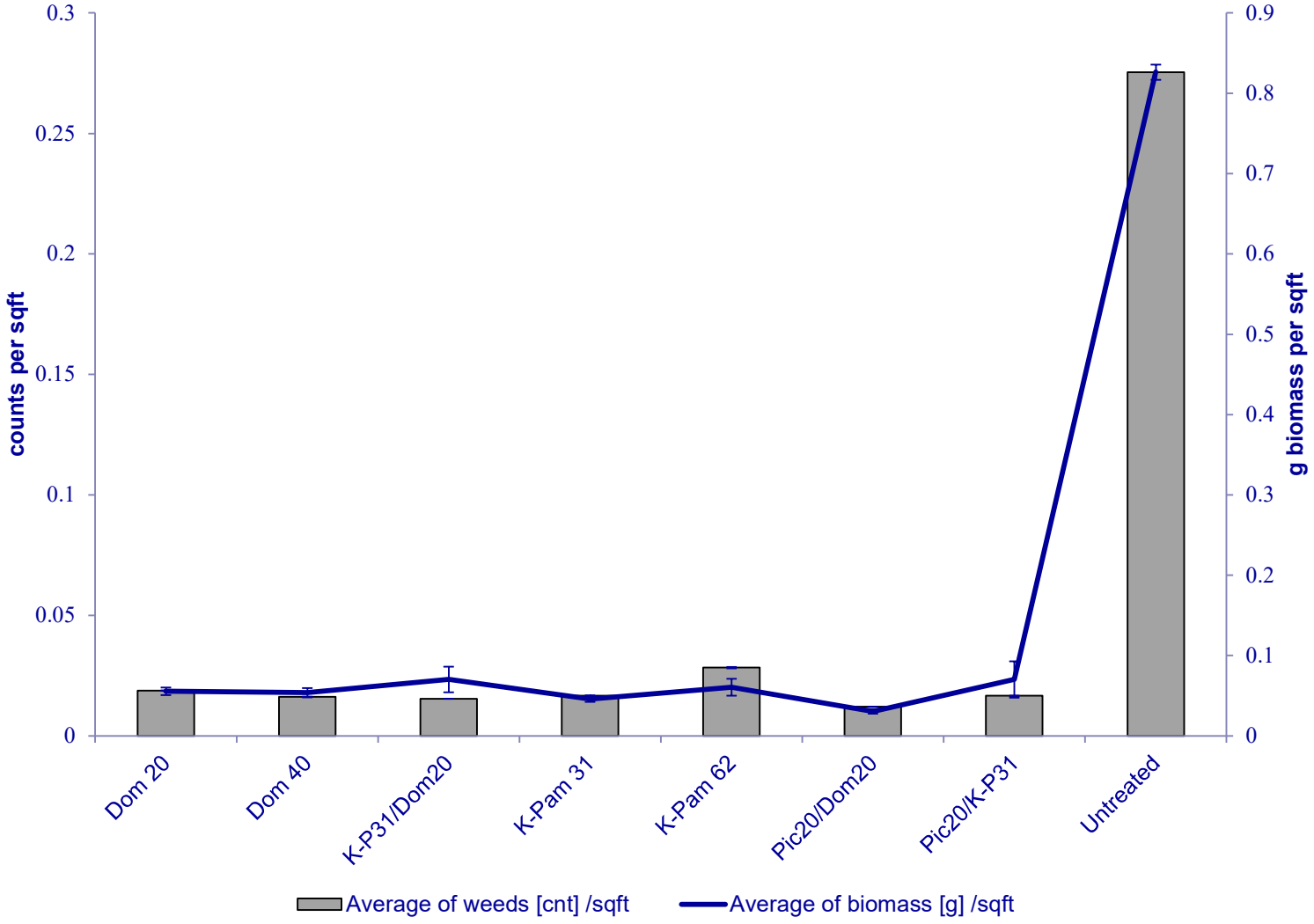
Dominus (IRF135) K-Pam evaluation in strawberry

- Treatments 2014-15 – Drip applied
  - Control
  - K-Pam 31 & 62 GPA
  - Dominus 20 & 40 GPA
  - Pic Clor 60 20 GPA
  - Pic Clor 60 fb K-Pam 20 fb 31 GPA
  - Pic Clor 60 fb Dominus 20 fb 20 GPA
  - K-Pam fb Dominus 31 fb 20 GPA
- 4 replicates per treatment, Oct 11 & 15, 2014
- Weed seed bioassay, local weeds, nematodes, pythium, verticillium

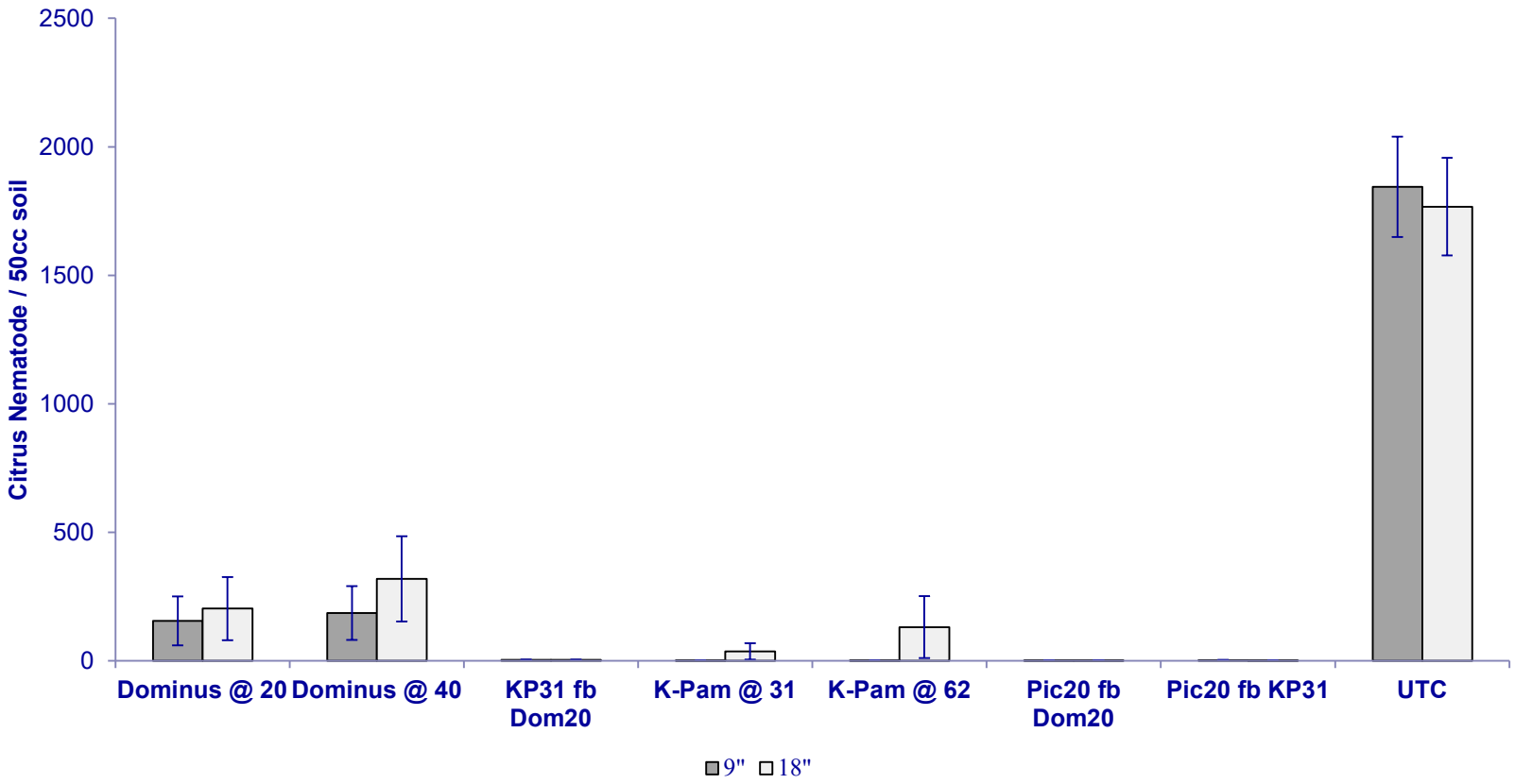
Pythium Control - bioassays



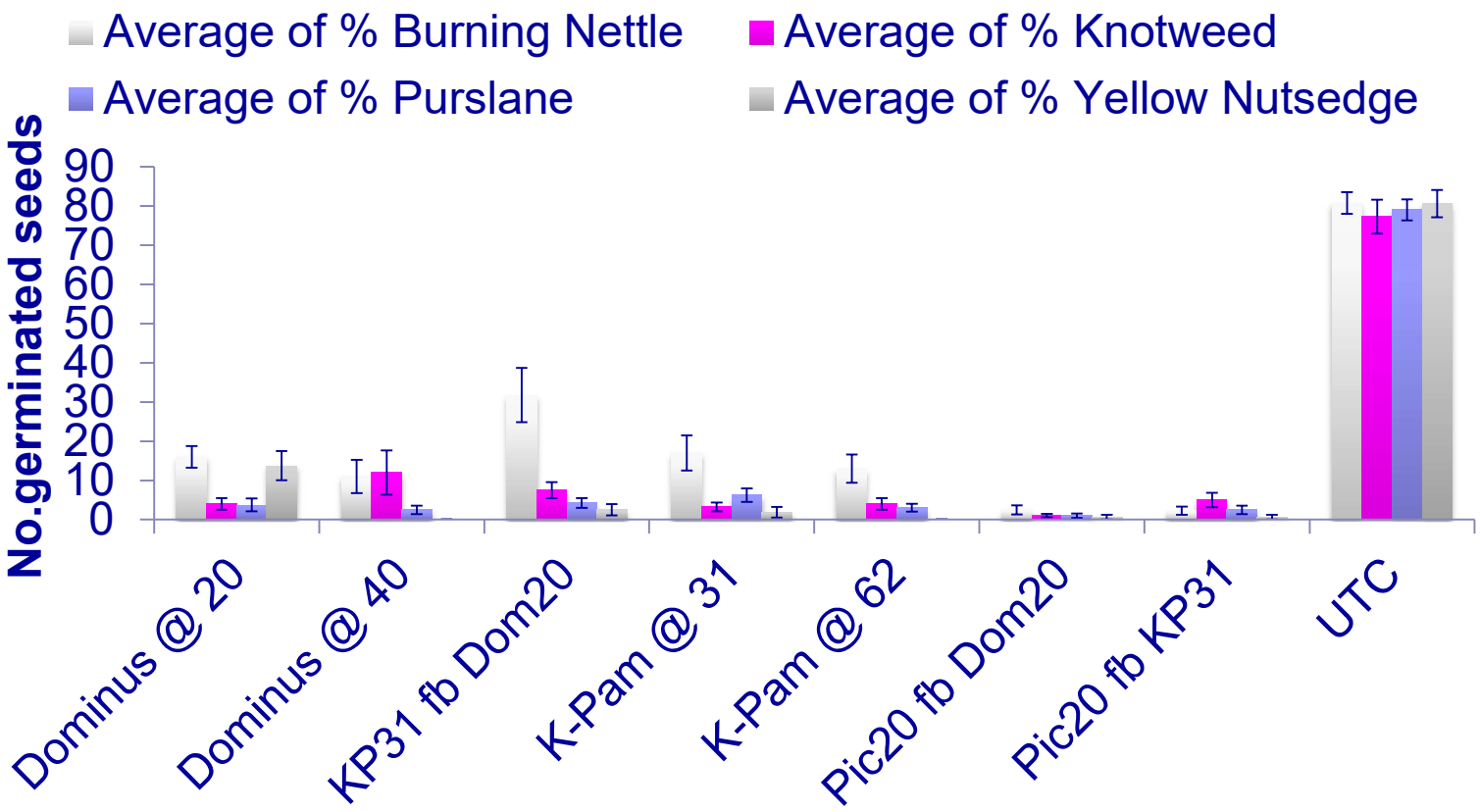
Frank Martin 2015



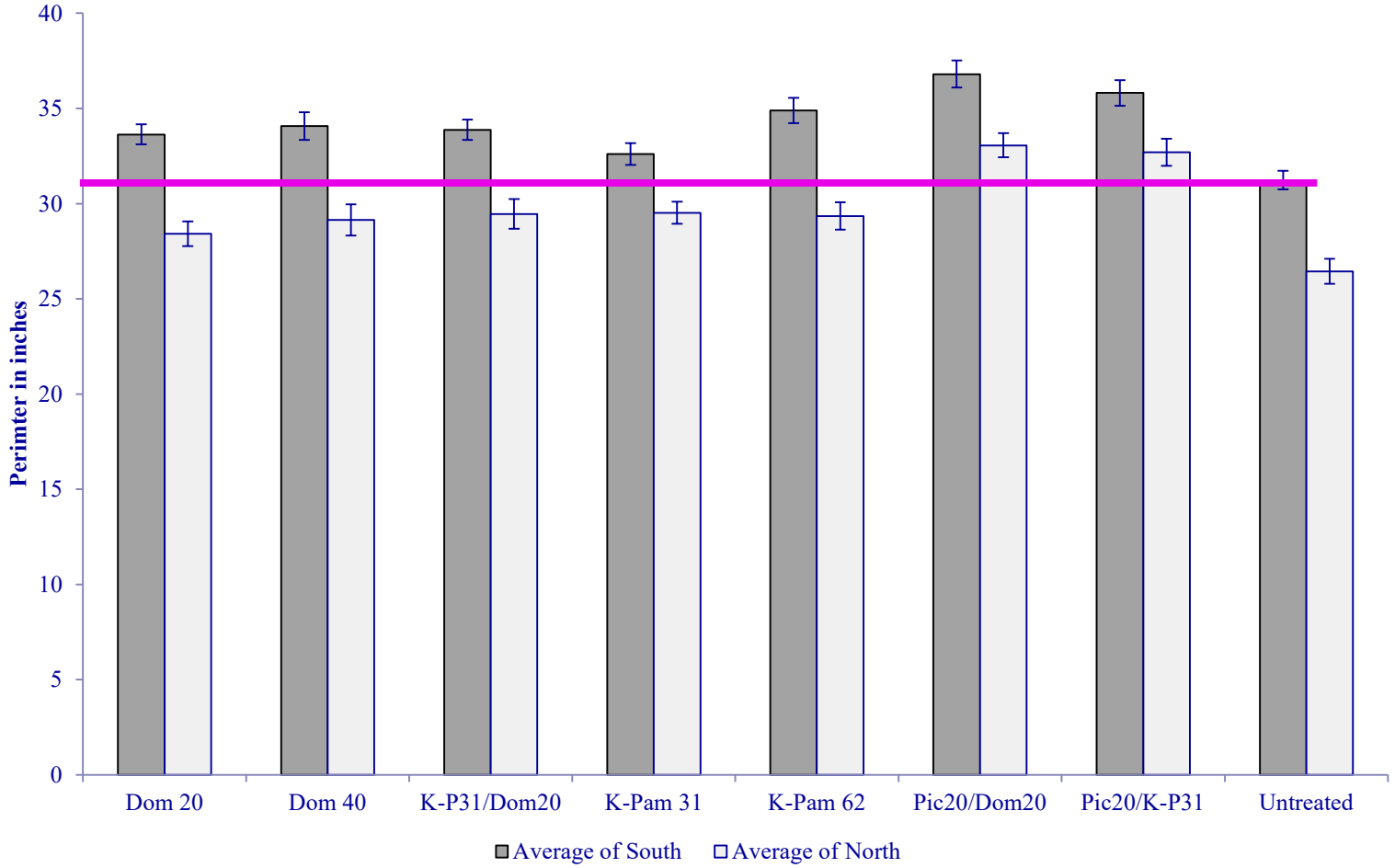
Weeds per sqft and biomass per sqft



Survival of Citrus Nematodes in 9” and 18”



Germination of selected weed seed samples



Plant Perimeters (March 2015)

Summary
Dominus (IRF-135)

- **No phytotoxicity or plant injury was observed when planting 10 days after fumigation.**
- **360 lbs/ac of Dominus/Chloropicrin (67/33) is required to produce the highest strawberry yields in heavily-infested soils.**
- **Weed control with Dominus, Dominus+Pic good if rate >350 lbs/A**

Summary
Dominus (IRF-135) part 2

- **Dominus controls citrus nematode**
- **Dominus missed some Pythium**
- **Dominus does appear to have good nutsedge activity at high rates**