

# Weed Management in Strawberry with Dominus, Temozad, & Herbicides

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UCCE Santa Barbara Nov. 12, 2014

# Collaborators

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- ❖ Cheryl Wilen
- ❖ Nathan Dorn, Reiter Affiliated Cos.
- ❖ Ian Greene, Ramco Norcal
- ❖ Jenny Broome, DSA
- ❖ Mike Stangellini, TriCal
- ❖ Husein Ajwa →



# Financial support

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- ❖ **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**

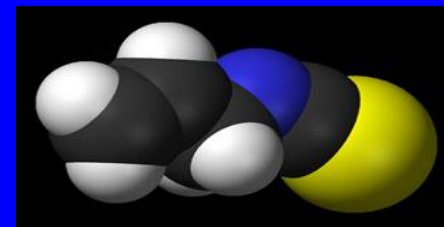
# Introduction

- ❖ Dominus – product description & trial results
- ❖ Temozad - trial results
- ❖ Herbicides
- ❖ Summary

# Dominus = IRF135 = AITC

## Product Overview (from Isagro)

- u Allyl Isothiocyanate (AITC) is a synthetically produced biopesticide with its origins in a naturally occurring plant defense chemical from the plant family, brassicaceae
- u Testing since 2009 – University, USDA, Contract, and Grower Demo's
- u 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

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## ***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)

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



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

- ❖ Salinas October 2013
- ❖ Salinas October 2014 (2 trials)
- ❖ Watsonville October 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

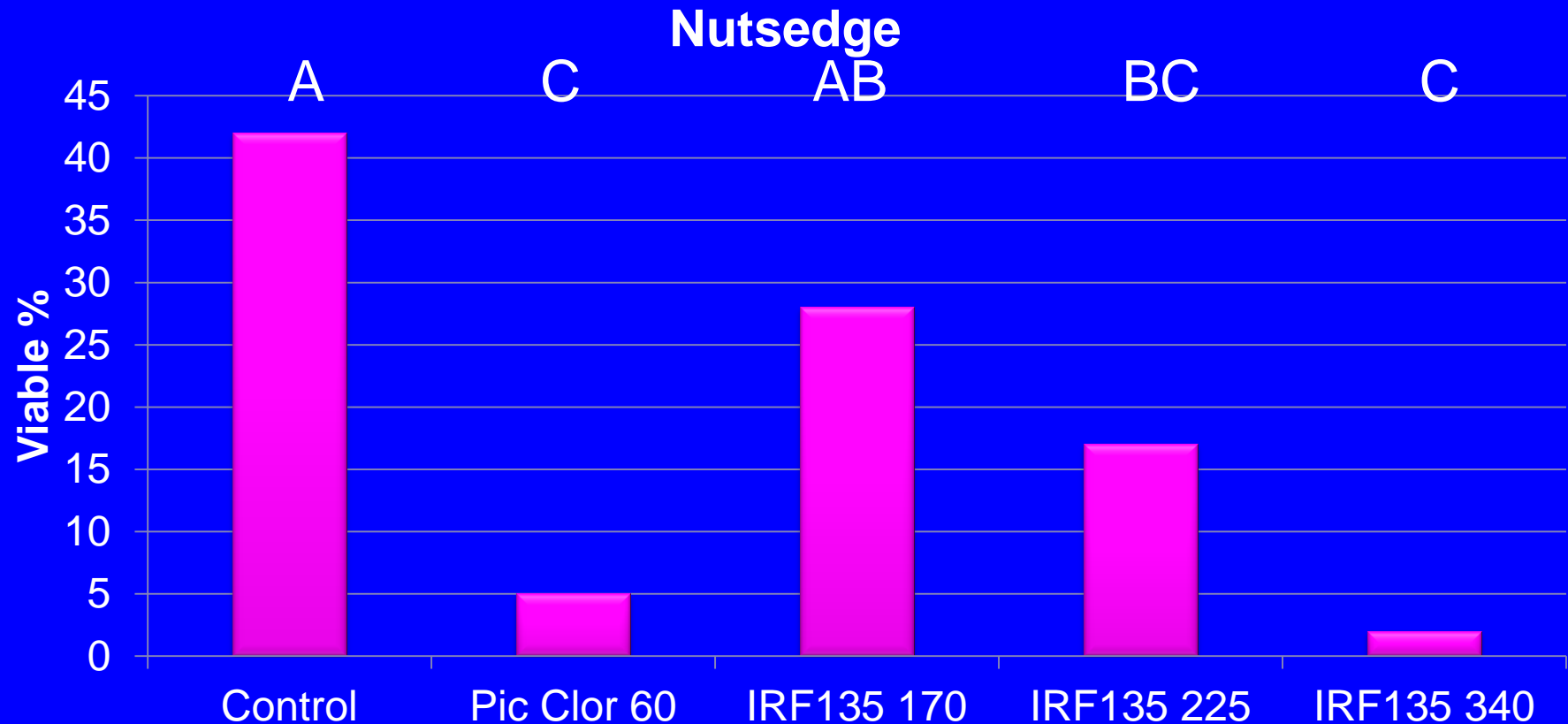
- ❖ Dominus dose response study LD<sub>90s</sub>
  - ❖ Annual bluegrass - 19 PPM – 12 lb/A
  - ❖ Sweet clover - 1120 PPM – 698 lb/A
  - ❖ Pigweed - 635 PPM – 396 lb/A
  - ❖ Sowthistle - 21 PPM – 13 lb/A
  - ❖ Yellow nutsedge – 147 PPM – 92 lb/A

# **Dominus (IRF135) evaluation in strawberry**

## **❖ Treatments 2012-13**

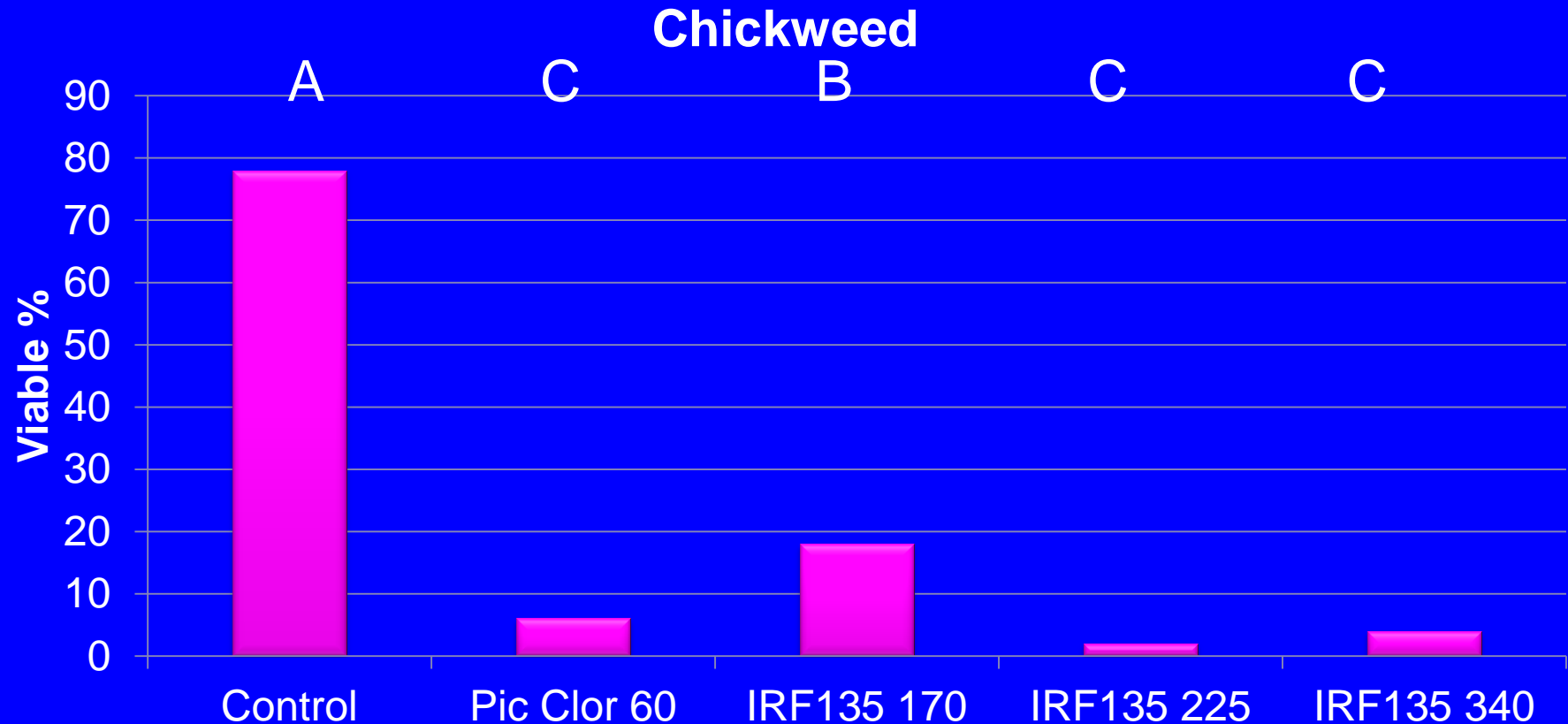
- ❖ Control**
- ❖ Pic Clor 60 350 lb/A**
- ❖ IRF135 170 lb/A**
- ❖ IRF135 225 lbs/A**
- ❖ IRF135 340 lbs/A**
- ❖ 4 replicates per treatment, Oct. 25, 2012**
- ❖ Weed seed bioassay, local field weeds**

# Nutsedge viability – IRF135



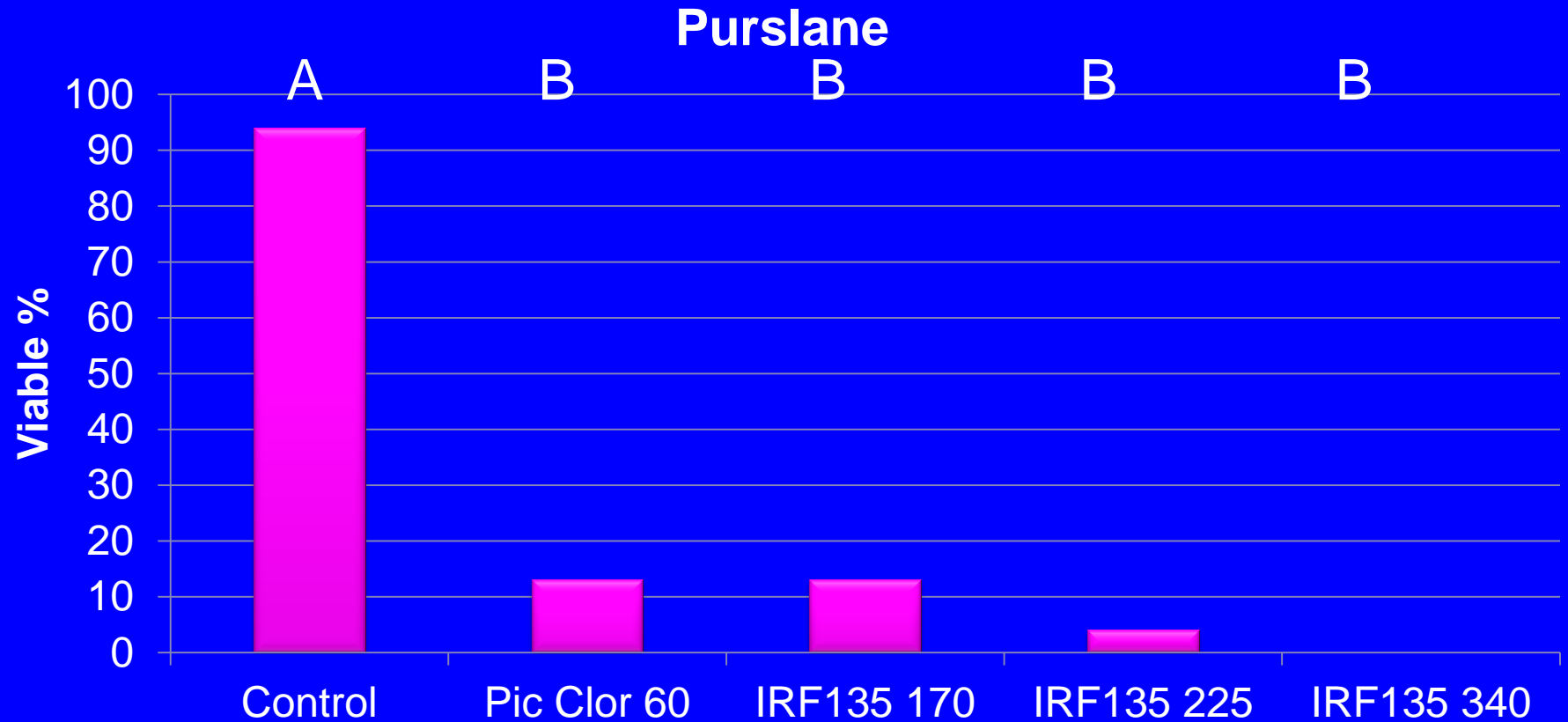
Ramos 2012-13

# Chickweed viability – IRF135



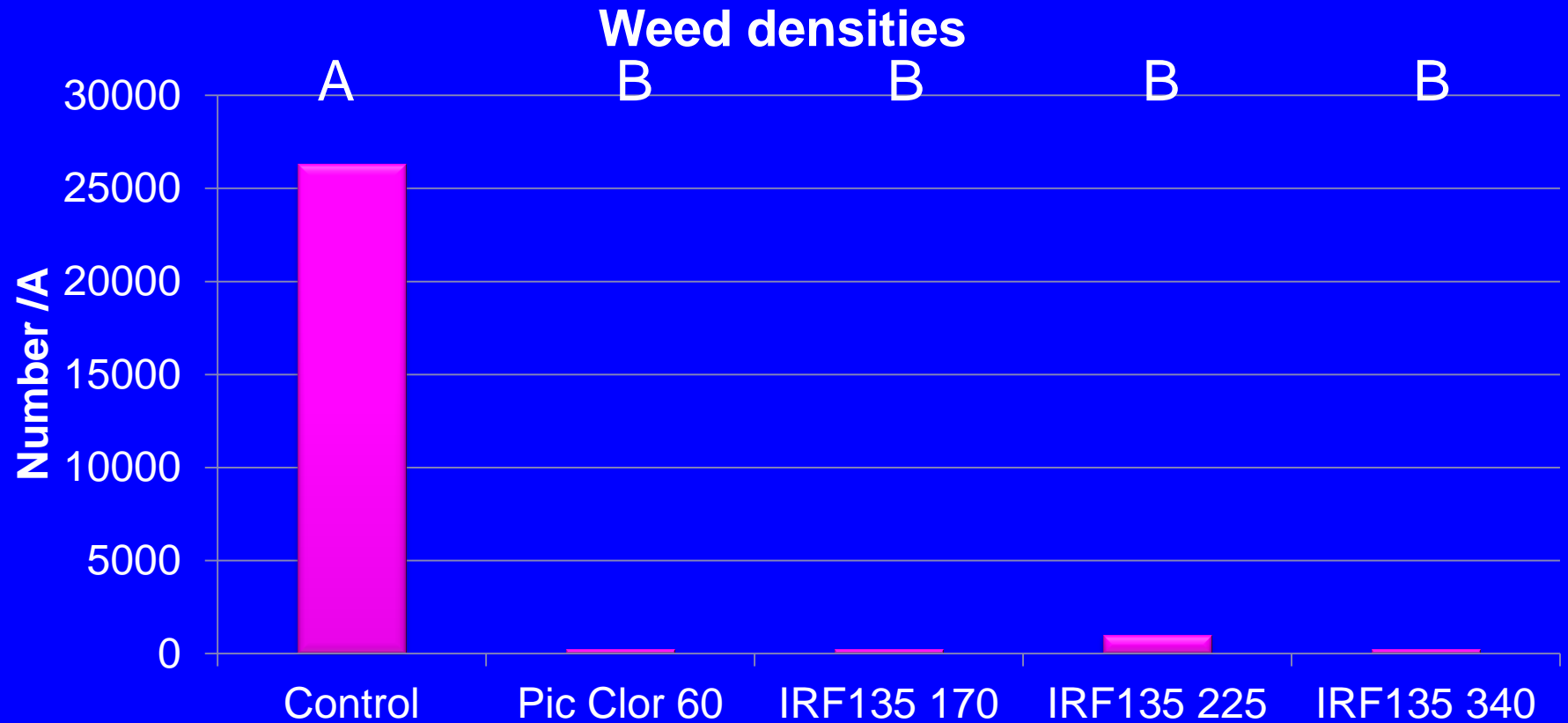
Ramos 2012-13

# Purslane viability – IRF135



Ramos 2012-13

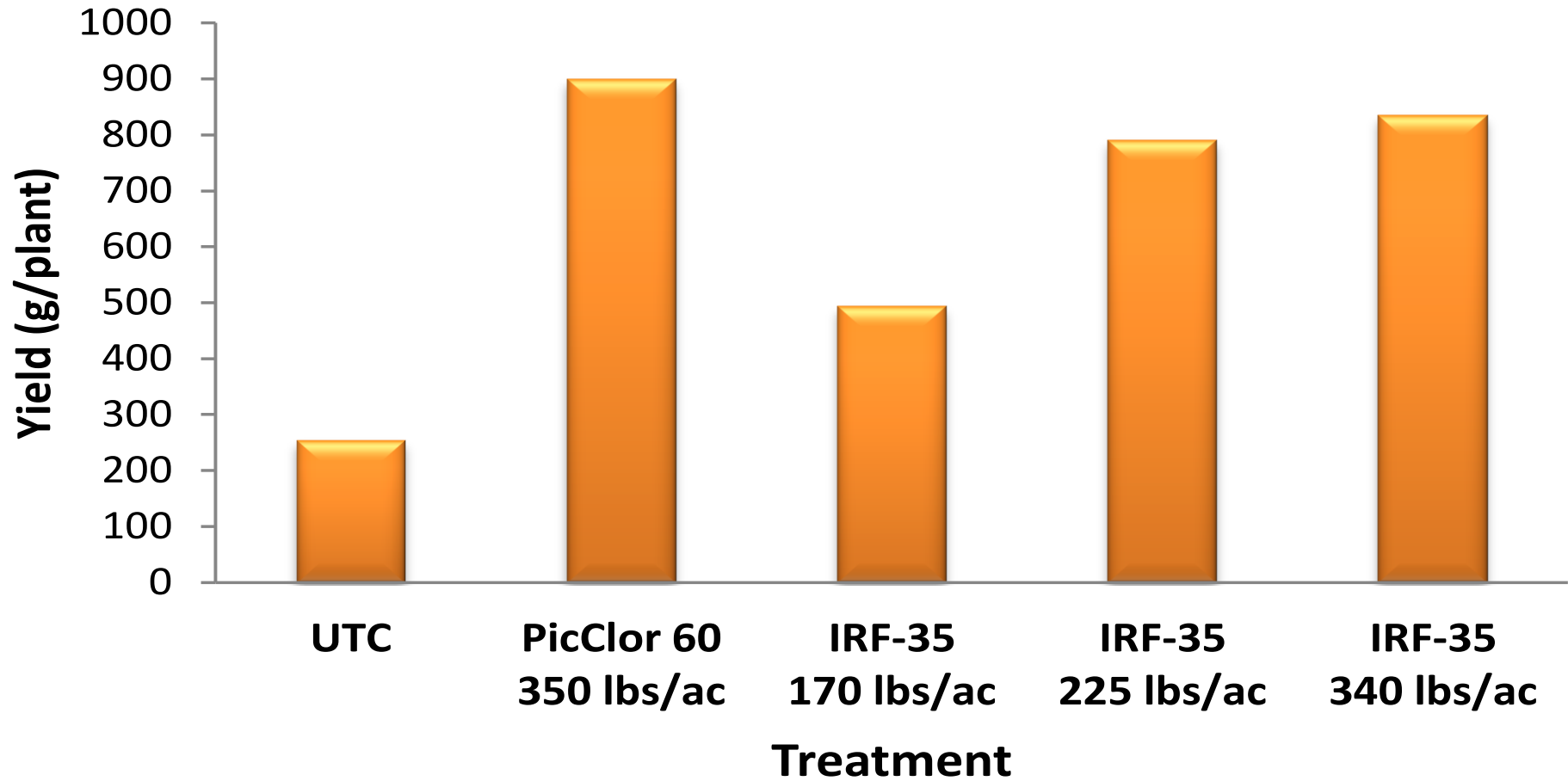
# Field Weed Control – IRF135



Ramos 2012-13



## Early Season Yield from Clear Plastic at Watsonville, CA \*



\* Standard PE Film

# Late season collapse, Watsonville, CA - 2013



**PicClor-60**  
**350 lbs/ac**

**Dominus**  
**360 lbs/ac**

**Dominus**  
**225 lbs/ac**

**UTC**

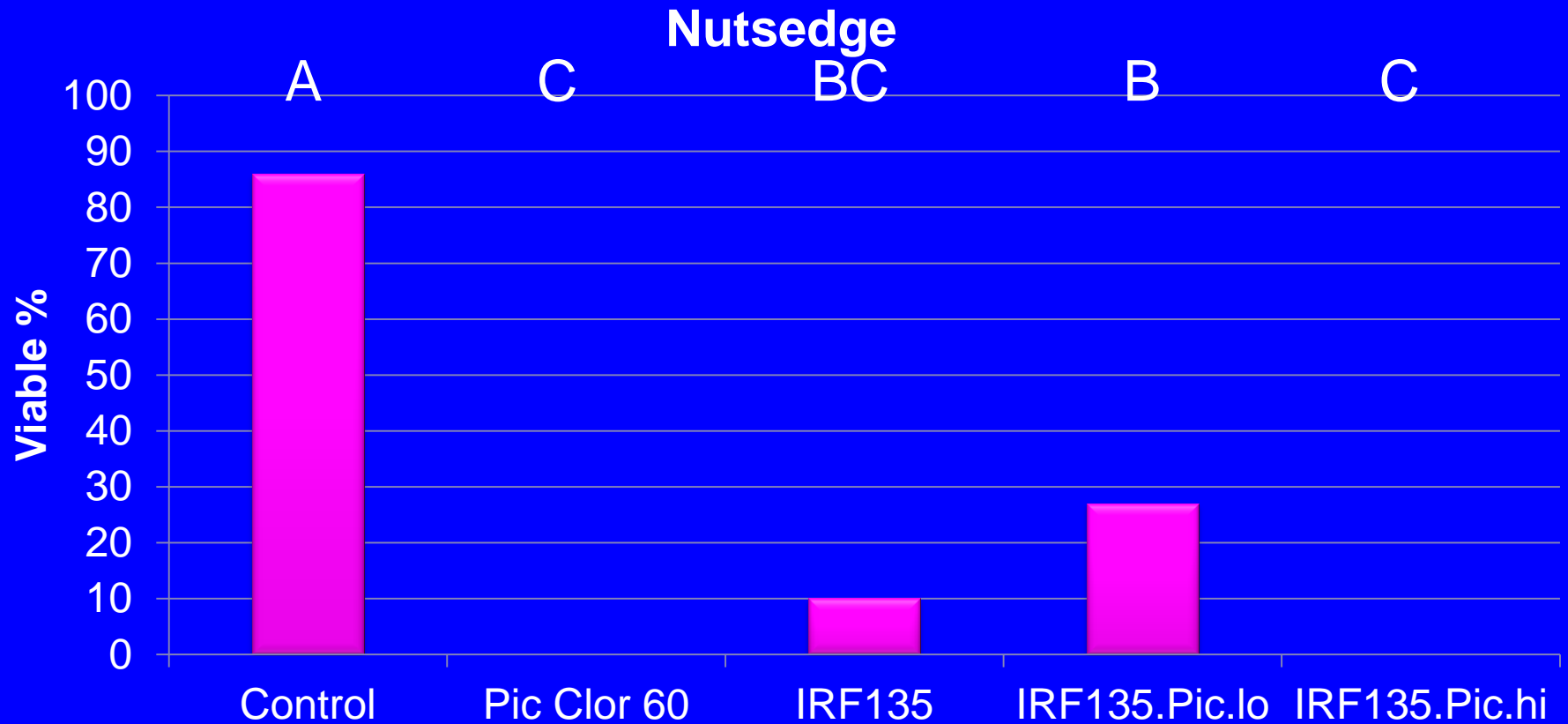


# **Dominus (IRF135) evaluation in strawberry**

## **❖ Treatments 2013-14**

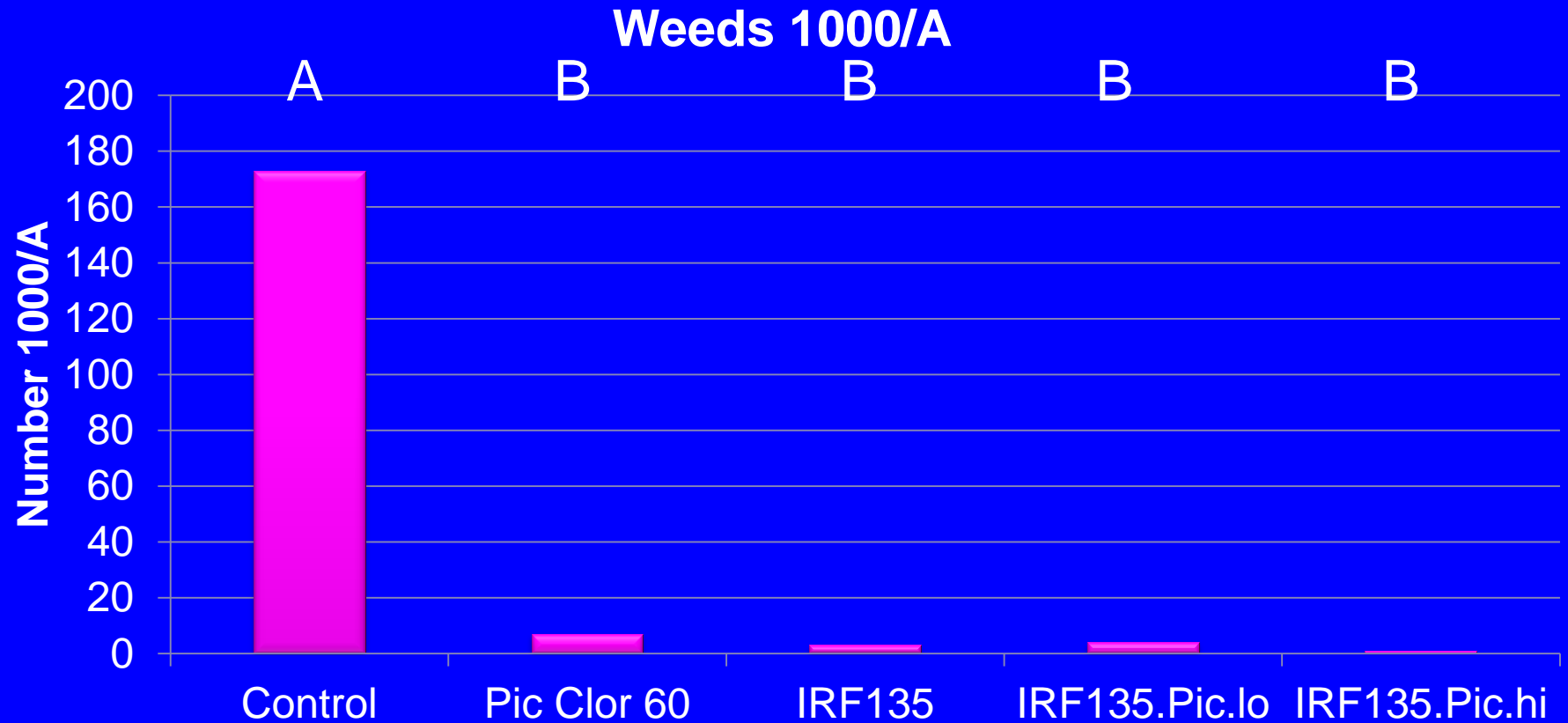
- ❖ Control**
- ❖ Pic Clor 60 350 lb/A**
- ❖ IRF135 340 lb/A**
- ❖ IRF + Pic 180 + 90 lbs/A (67:33)**
- ❖ IRF + Pic 240 + 120 lbs/A (67:33)**
- ❖ 4 replicates per treatment, Nov 11, 2013**
- ❖ Weed seed bioassay, local weeds**

# Nutsedge viability – IRF135



Ramos 2013-14

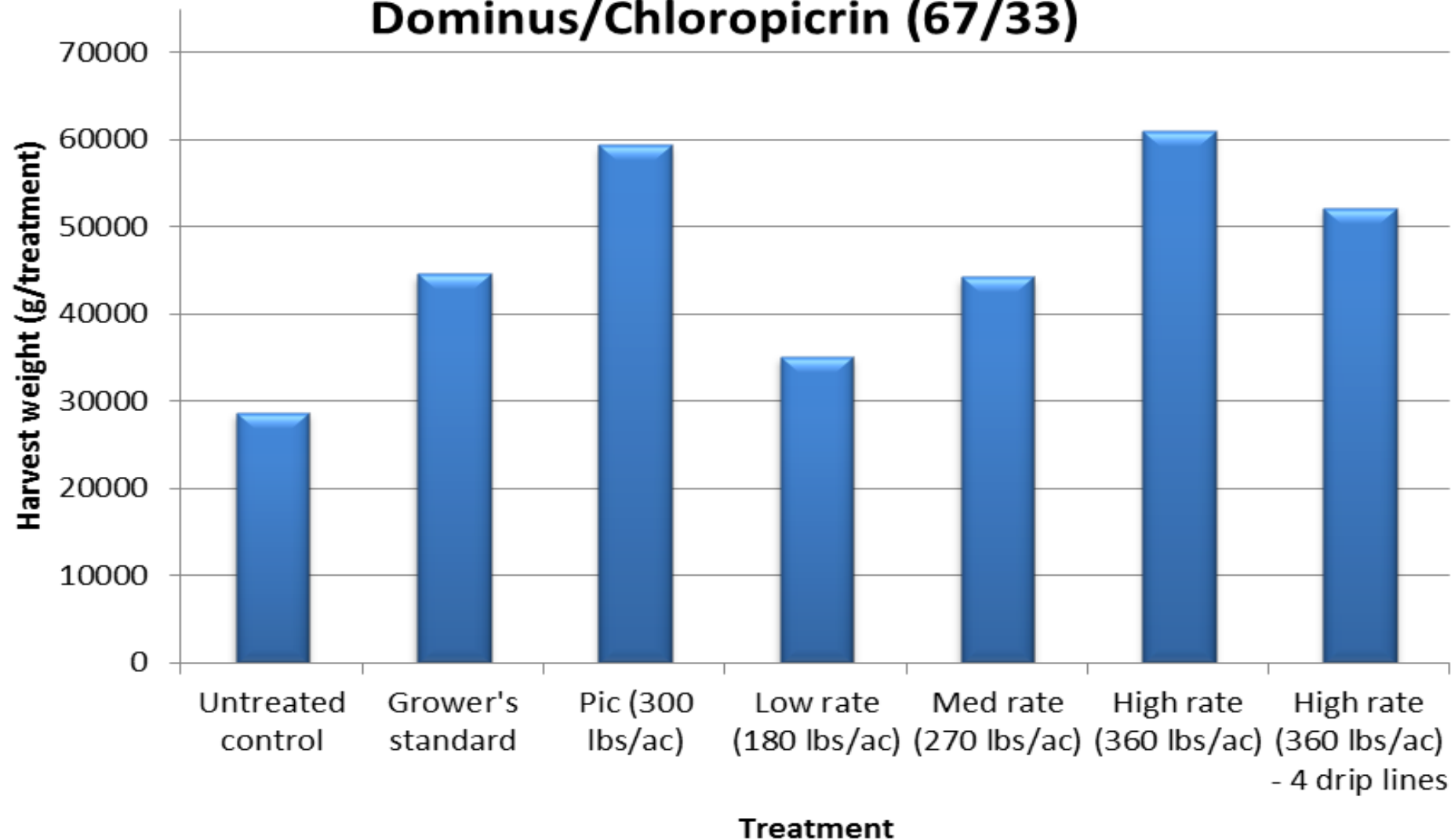
# Weed densities– IRF135



Ramos 2013-14

## Strawberry Yield, Watsonville, 2014

### Dominus/Chloropicrin (67/33)



**Watsonville, 2014**

**240 lbs Dominus  
+  
120 lbs chloropicrin**

**160 lbs Dominus  
+  
80 lbs chloropicrin**

**Untreated  
control**





## ***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

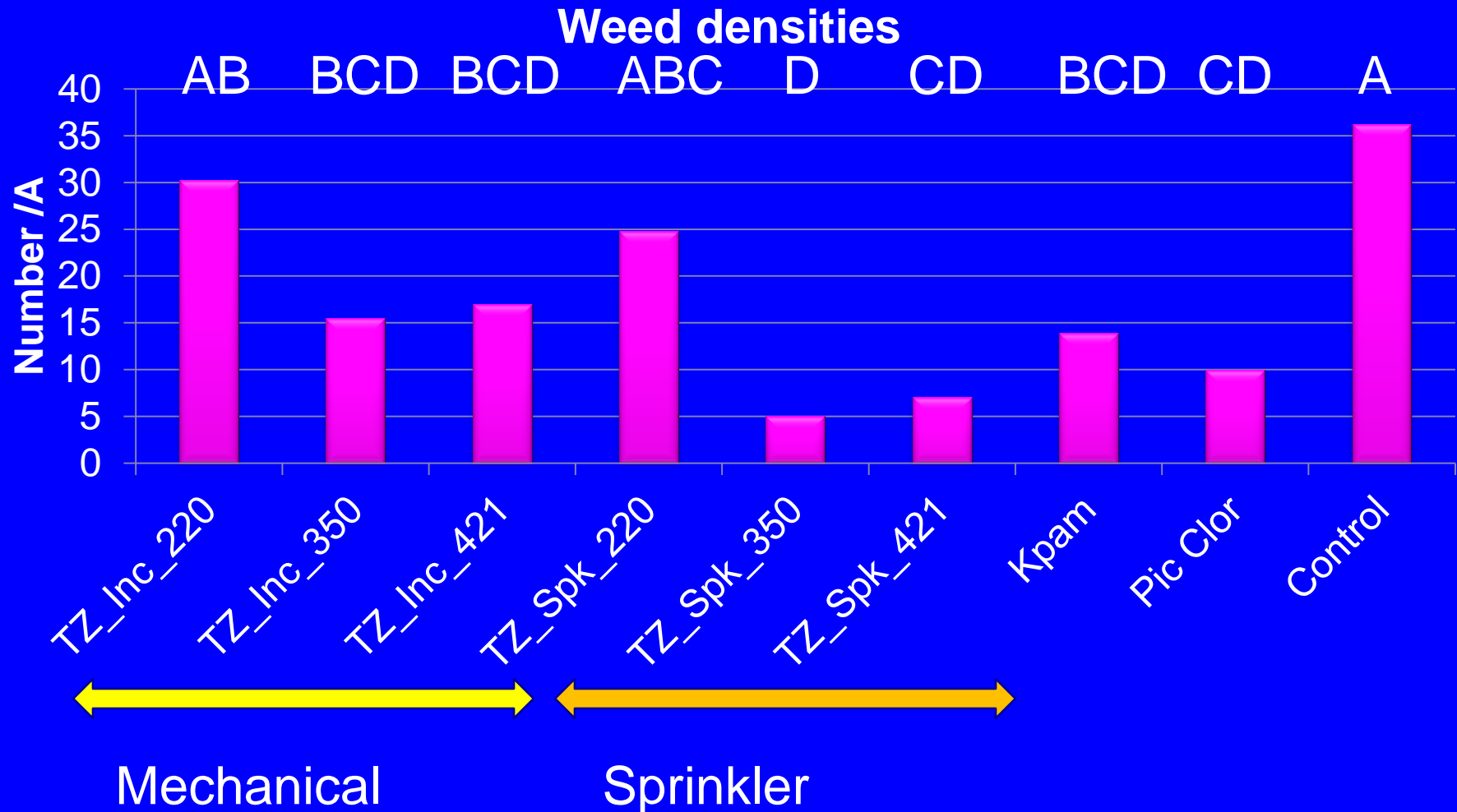


# **Dazomet (Temozad) evaluation in strawberry**

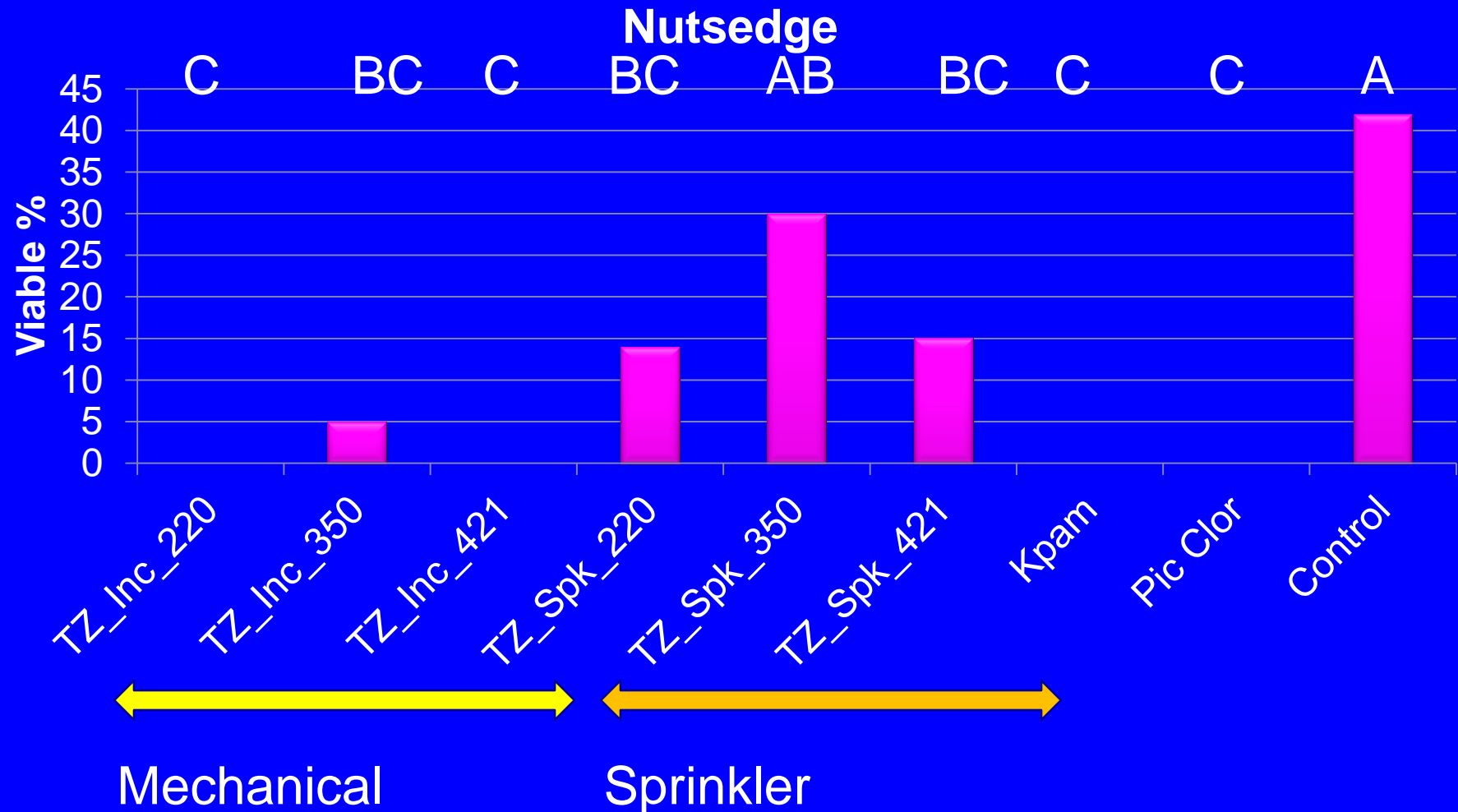
## **❖ Treatments**

- ❖ Temozad 220, 350, 421 lb/A incorporated**
- ❖ Temozad 220, 350, 421 lb/A surface & sprinkled**
- ❖ K-Pam 50 GPA**
- ❖ Pic Clor 60 29 GPA**
- ❖ Control**
- ❖ 4 replicates per treatment, Sept. 23, 2013**
- ❖ Weed seed bioassay, local weeds, fruit yield**

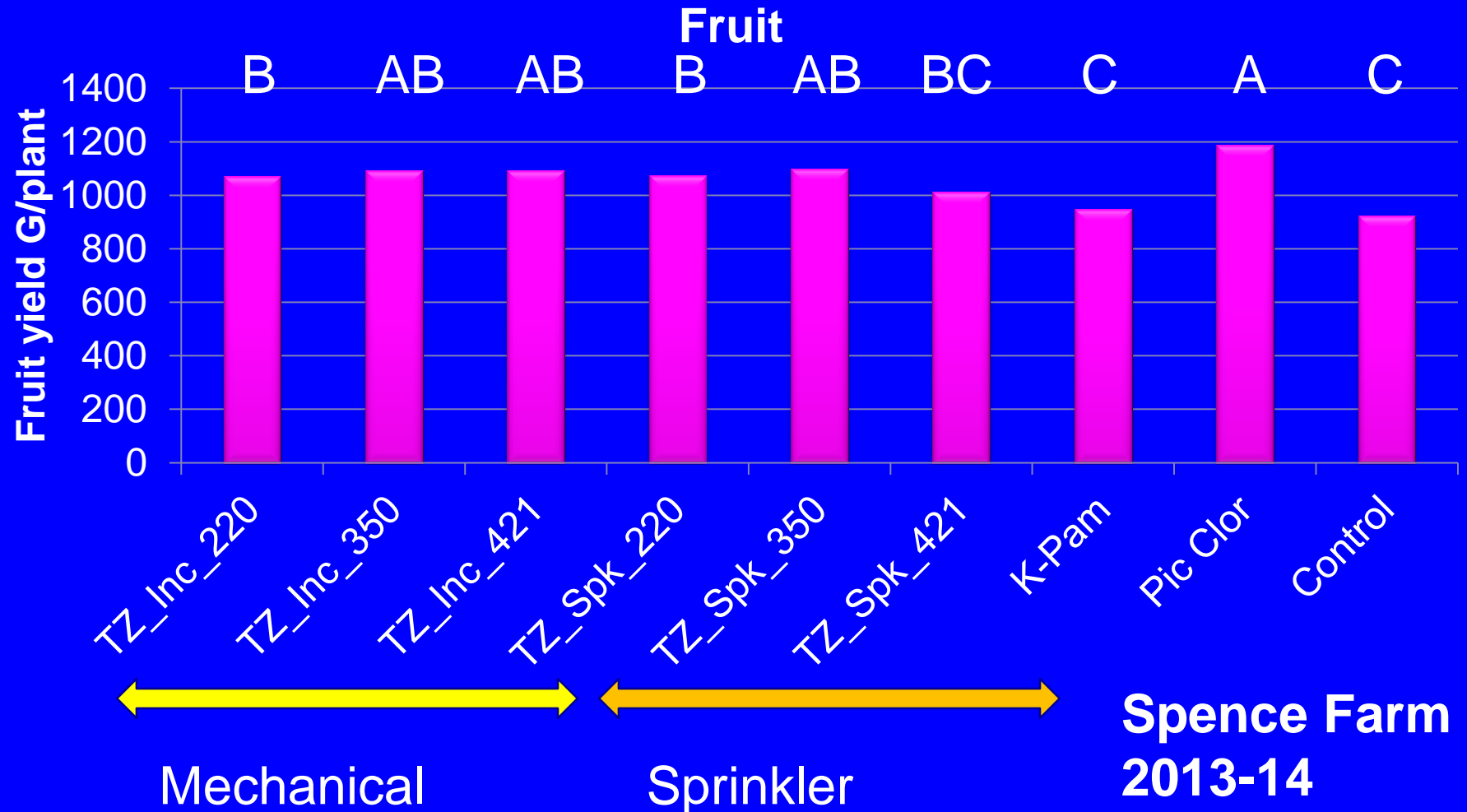
# Weed Control- Temozad



# Nutsedge Viability - Temozad



# Fruit Yield- Temozad



# **Dazomet (Temozad) summary**

- ❖ **Nutsedge control was better where incorporated**
- ❖ **Control of other weeds was better where surface applied**
- ❖ **Strawberry yields were similar under both application methods**

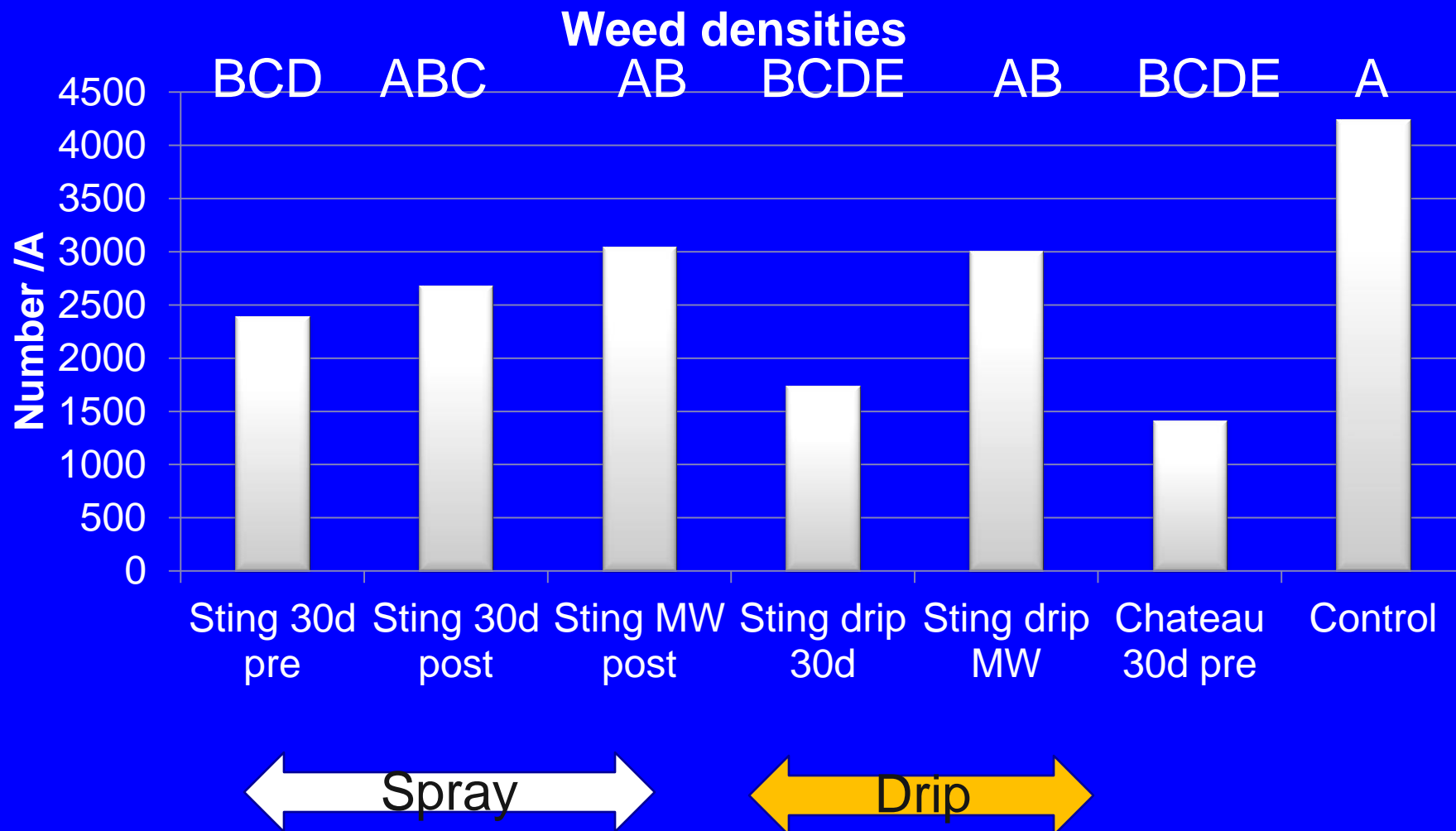
# Stinger (clopyralid) I

- ❖ Stinger herbicide is already registered on strawberry in several other states
- ❖ Can it be applied in-season through the drip tape to selectively kill weeds under plastic?
- ❖ Stinger was applied 30 days before and after strawberry transplanting
- ❖ Stinger was also evaluated as a mid-winter application by spray and drip chemigation

# Stinger (clopyralid) II

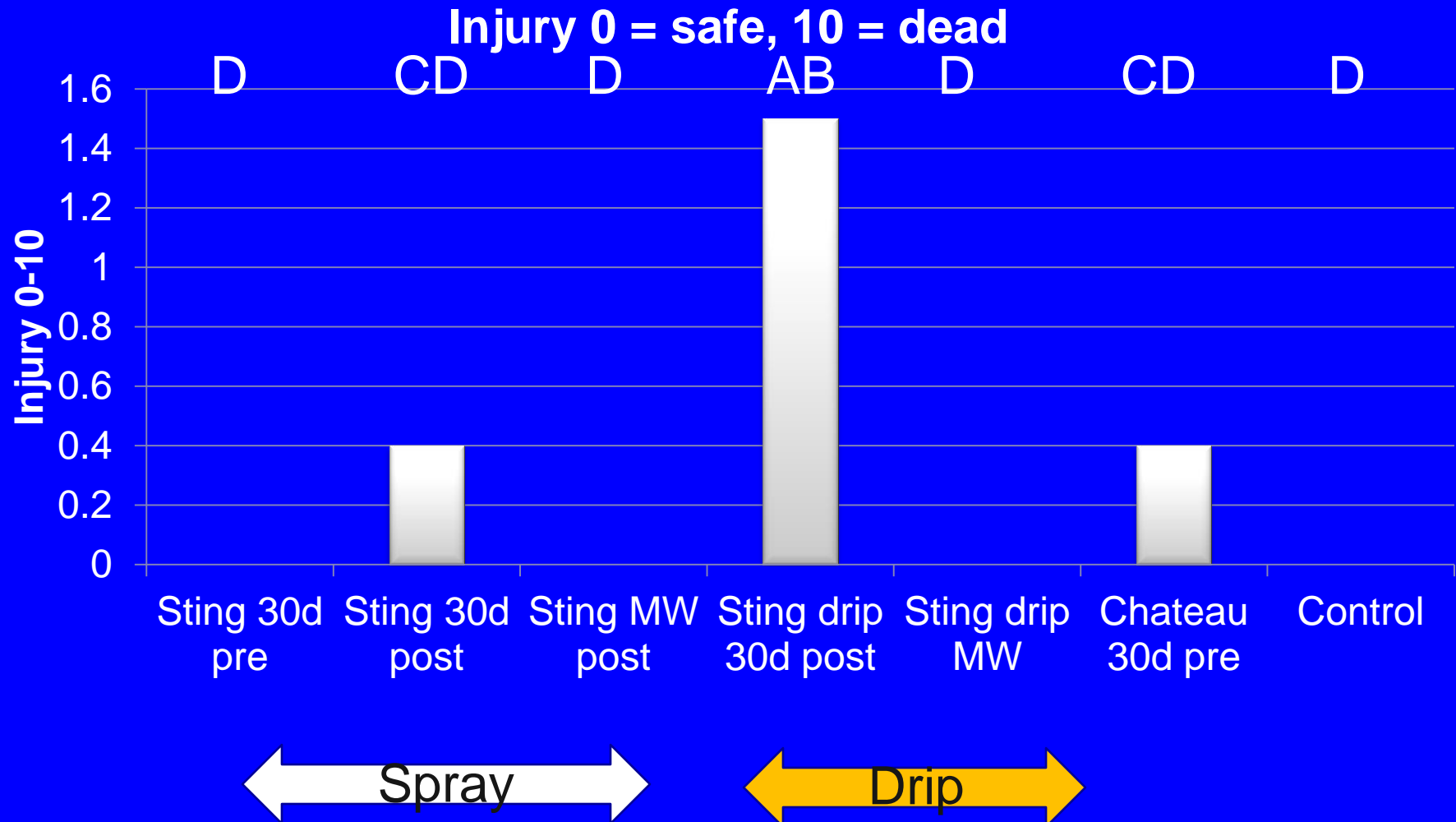
- ❖ Stinger rates were
  - ❖ Low - 0.17 pints/A
  - ❖ High – 0.33 pints/A
- ❖ Applied by spray
  - ❖ 30 d pre transplant
  - ❖ 30 d post transplant
  - ❖ Mid winter
- ❖ Applied by drip
  - ❖ 30 d post
  - ❖ Mid-winter

# Field Weed Control- Stinger

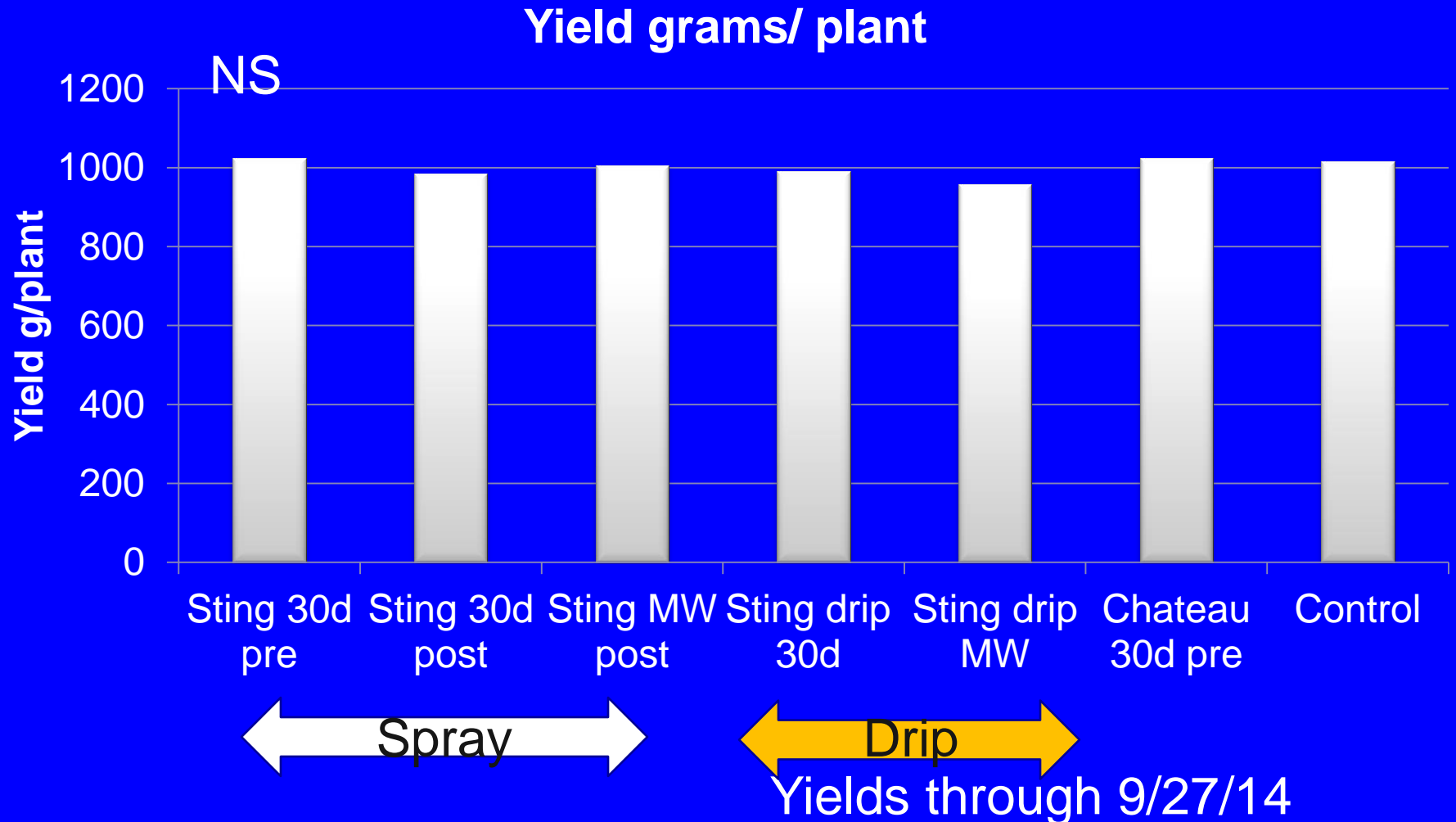




# Strawberry Injury-Stinger



# Strawberry Yield-Stinger



# Summary - Stinger

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- ❖ Stinger is effective on weeds applied under the plastic
- ❖ Stinger may be more injurious to strawberry applied under plastic
- ❖ No advantage seen for Stinger vs. Chateau

# Future directions

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- ❖ Evaluate lower rates of Stinger under the plastic
- ❖ Evaluate Trellis a potential new herbicide for strawberry