# Management of Root-Knot Nematodes With Novel Nematicides

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Surface drip application

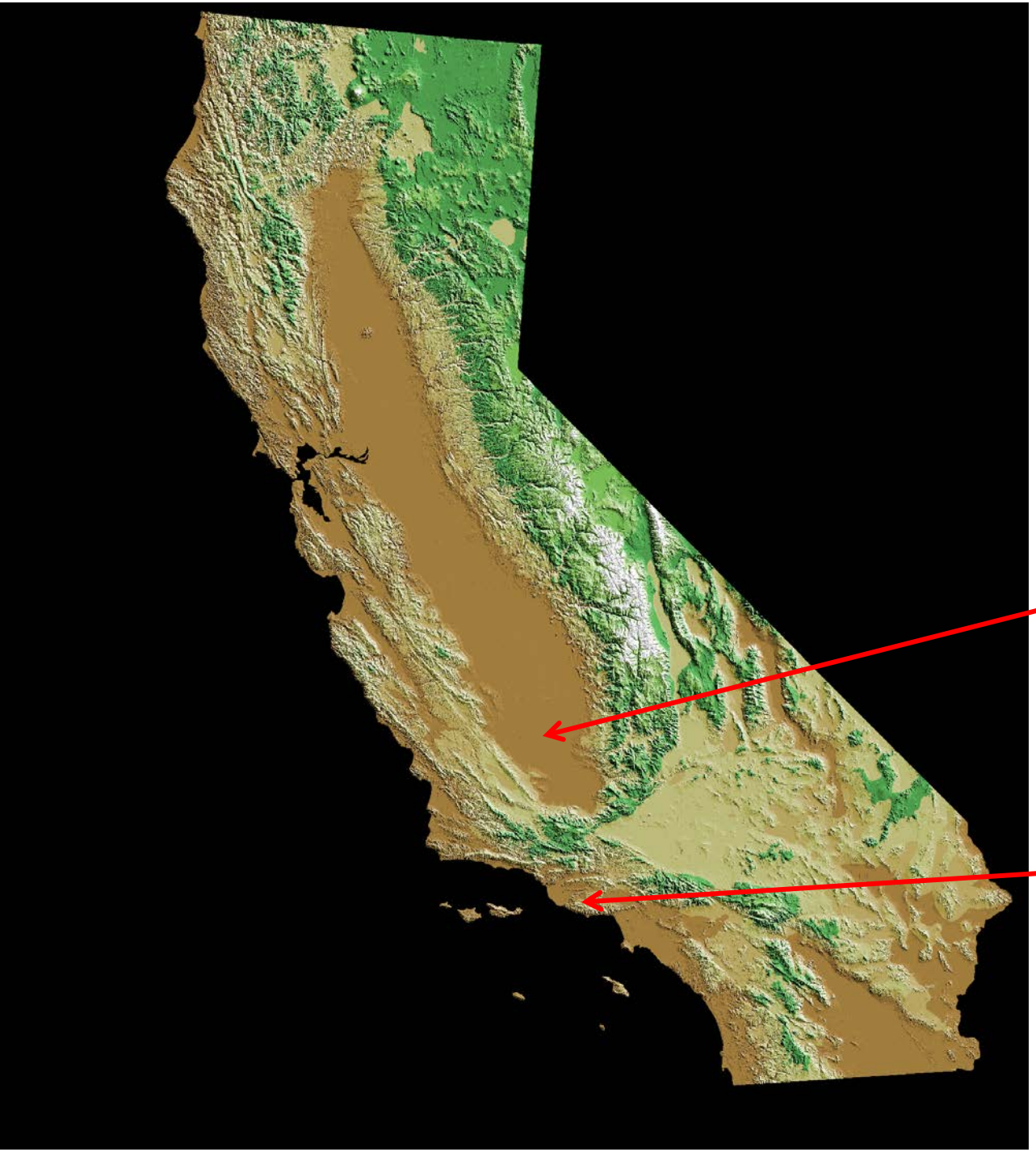
# SCREC

Sandy loam infested with
the Southern root-knot nematode,
*Meloidogyne incognita* (43J2/100 cc);
RCB, 5 replications

Vigorous growth 5 wks after planting

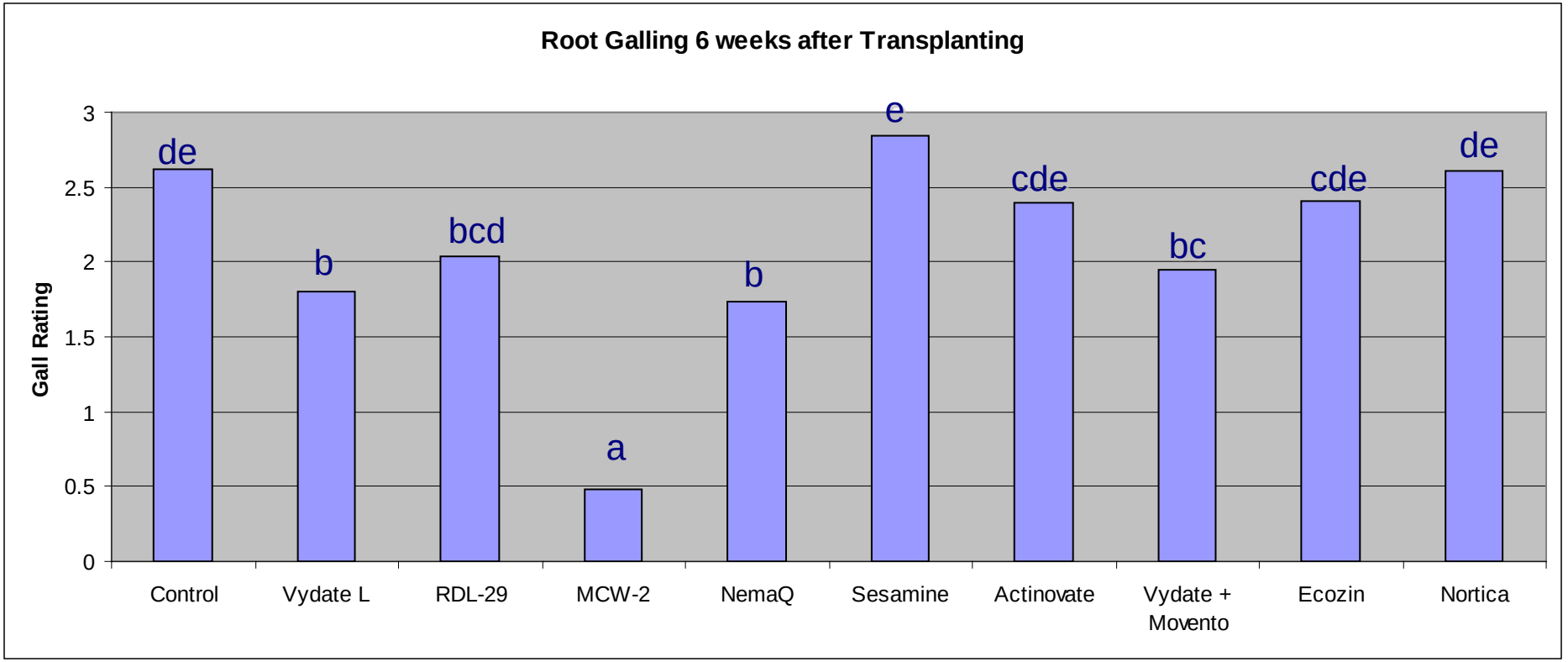
# Summer 2011 tomato trial at UC South Coast R&E Center

nematicide application before incorporation

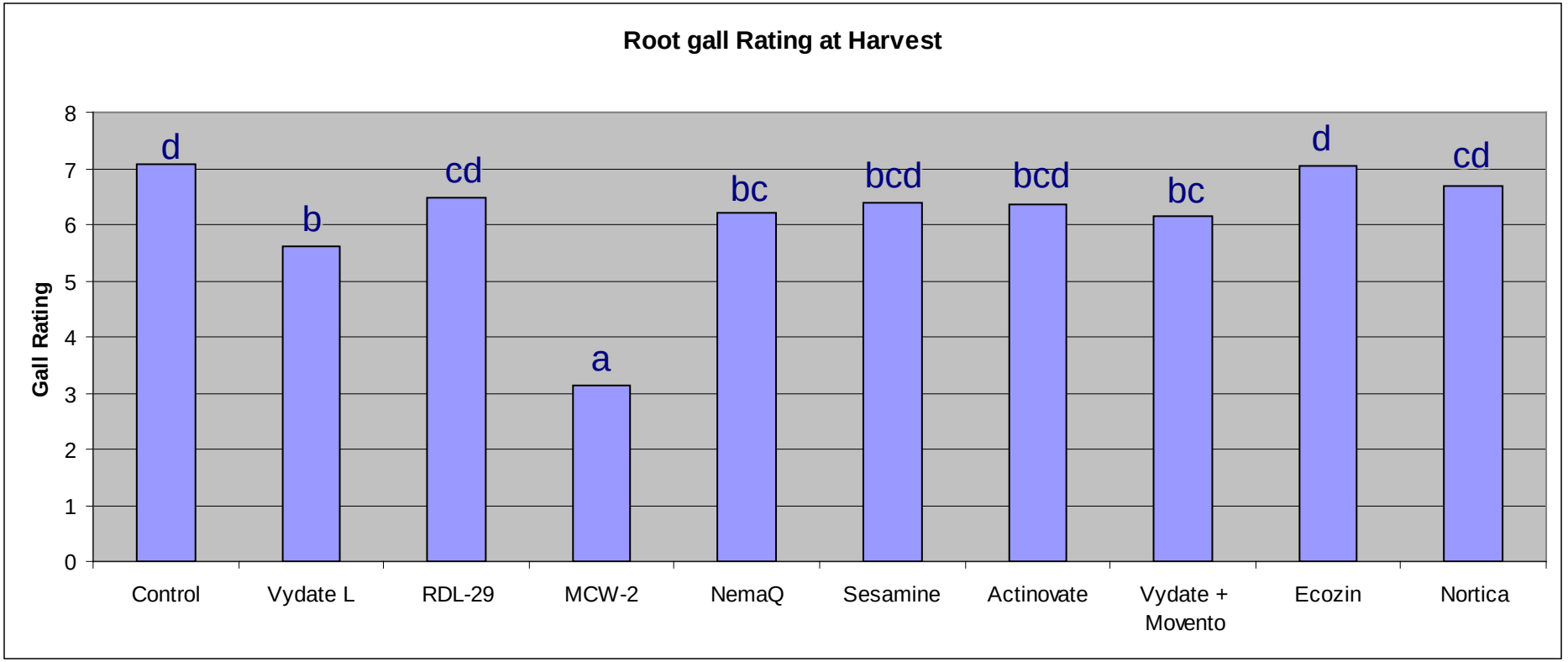

Shafter Research Station
South Coast REC

# 20011 Treatments

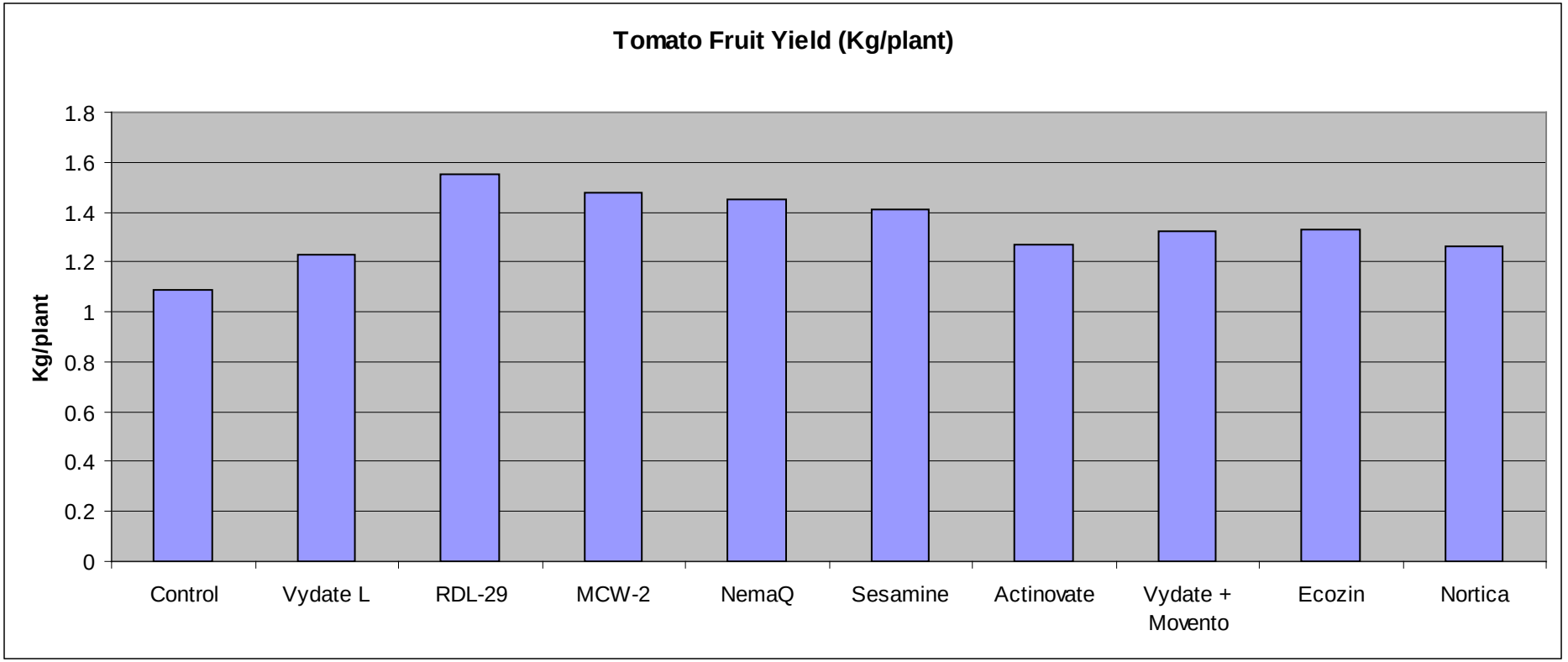
| Trmt# | Product | 5 days before transplant (incorporated) | 14 days after transplant (sprinkler can) | 21 days after transplant (sprinkler can) | 28 days after transplant (foliar) |
|---|---|---|---|---|---|
| 1 | Non-treated check | | | | |
| 2 | Vydate L | 3 pt/A | | 4 pt/A | |
| 3 | RDL-29 | 2.0 lb ai/A | | 1.0 lb ai/A | |
| 4 | MCW-2 | 3.56 lbs a.i./A | | | |
| 5 | NemaQ | 3 gal/A | 3 gal/A | | |
| 6 | Sesame | 1 gal/A | 1 gal/A | | |
| 7 | Actinovate | 12 oz/A | | | |
| 8 | Vydate + Movento | 3 pt/A | | | 2.5 oz/A |
| 9 | Ecozin Plus | 56 fl oz/A | 56 fl oz/A | | |
| 10 | Nortica | 75 lbs/A | | | |




Mean separation at $LSD_{0.05}$




Mean separation at $LSD_{0.05}$




Yields are not significant from each other

# Summer 2011 tomato trial at UC South Coast R&E Center

representative root systems (left to right): nt check, Vydate, MCW-2

# 2012 Trials

South Coast Research & Extension Center

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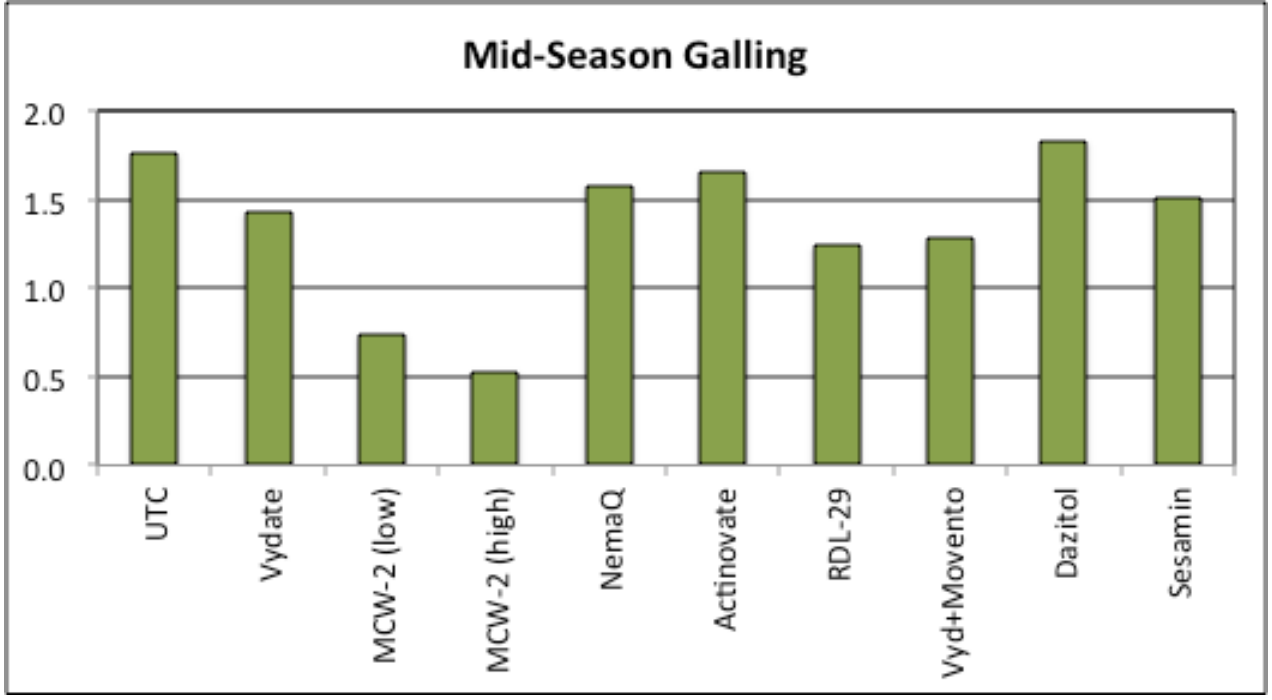
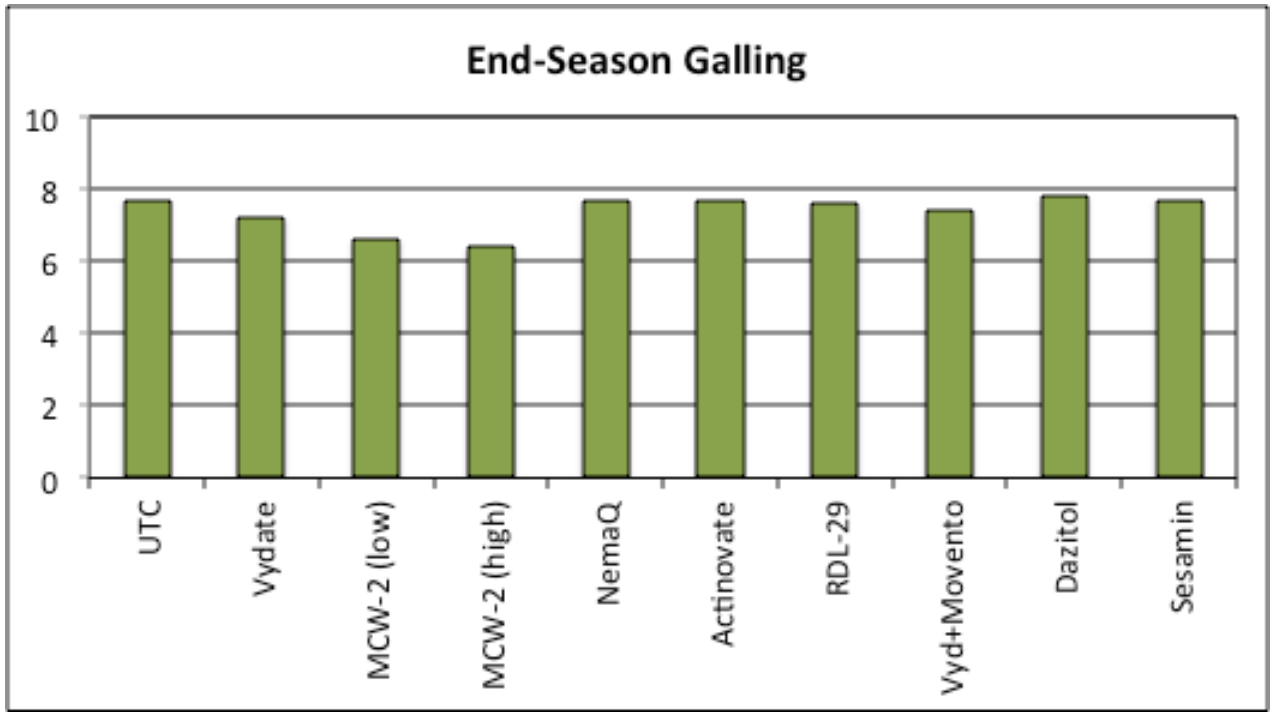
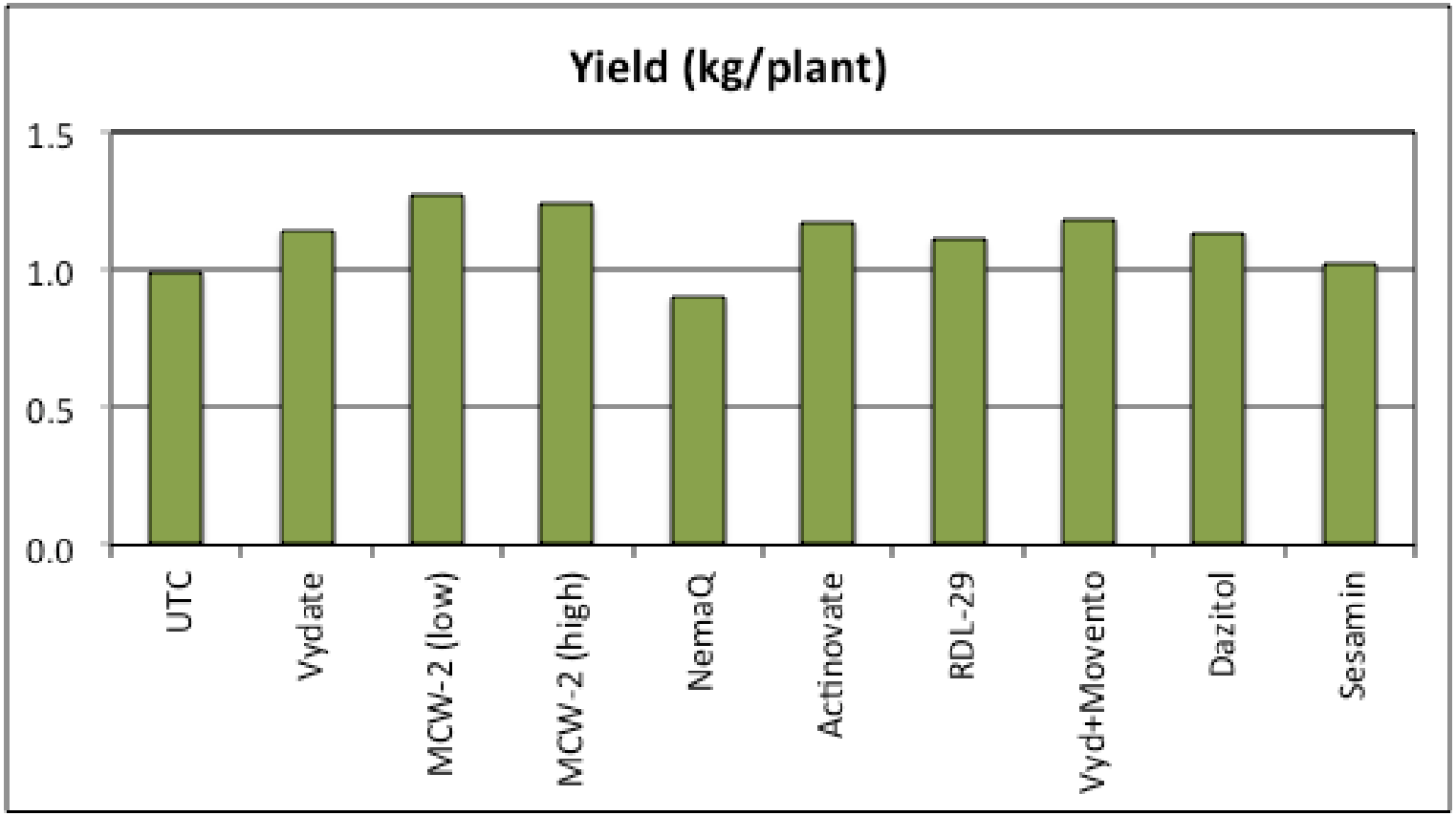
UCCE Shafter Research Farm

SCREC 2012


Mid-Season Galling
2.0
1.5
1.0
0.5
0.0
UTC
Vydate
MCW-2 (low)
MCW-2 (high)
NemaQ
Actinovate
RDL-29
Vyd+Movento
Dazitol
Sesamin


End-Season Galling
10
8
6
4
2
0
UTC
Vydate
MCW-2 (low)
MCW-2 (high)
NemaQ
Actinovate
RDL-29
Vyd+Movento
Dazitol
Sesamin

# SCREC 2012

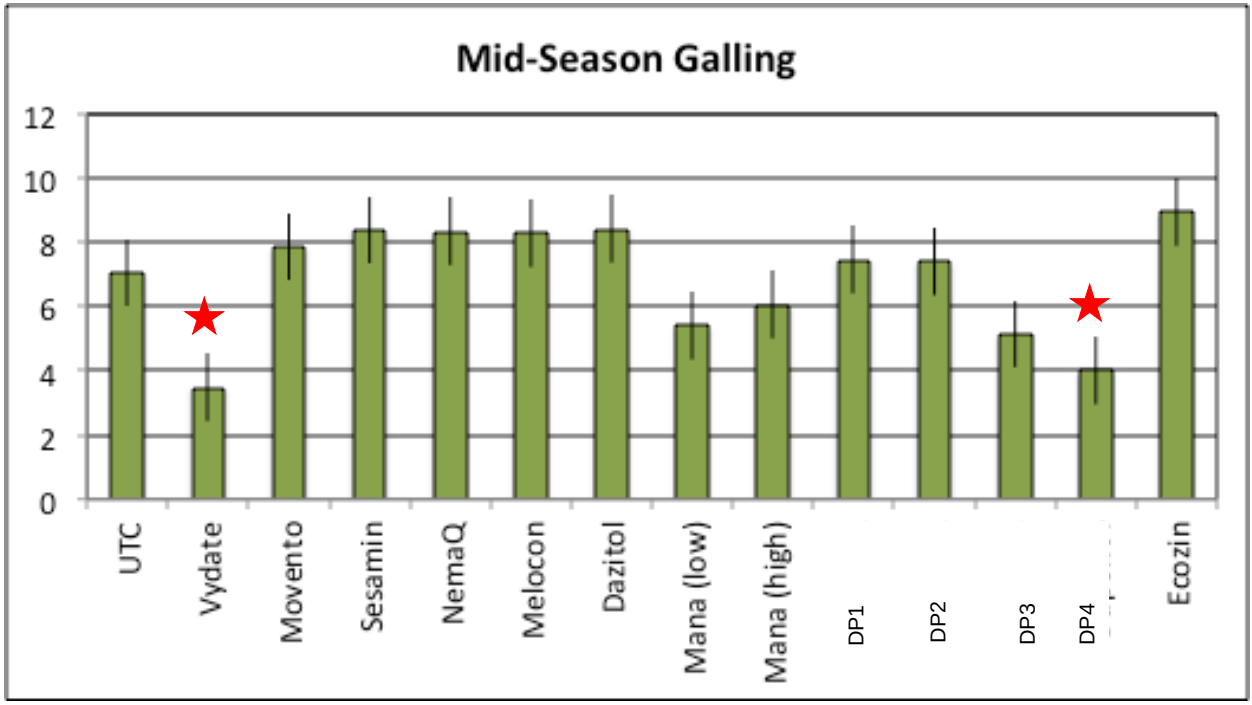

Yield (kg/plant)
1.5
1.0
0.5
0.0
UTC
Vydate
MCW-2 (low)
MCW-2 (high)
NemaQ
Actinovate
RDL-29
Vyd+Movento
Dazitol
Sesamin

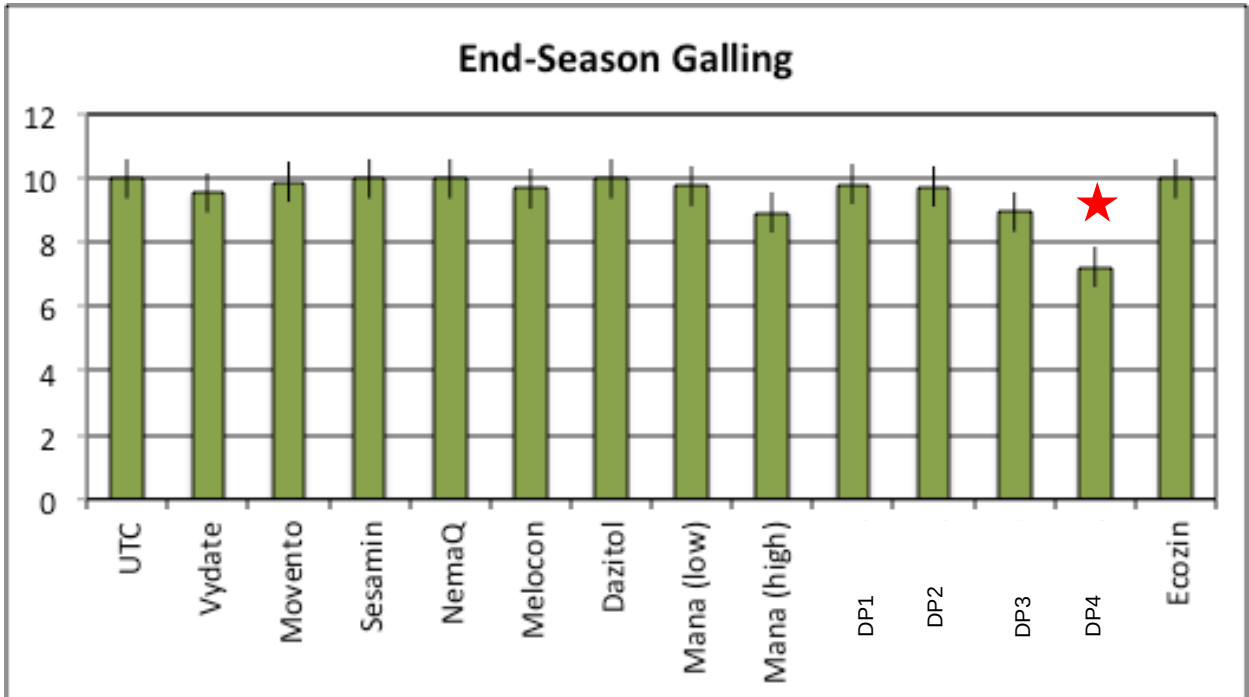
# Shafter Processing Tomato Nematode Trial 2012

| | | Mid-Season Root Gall Rating* (7/20/12) | End of Sesaon Root Gall Rating (8/21/12) |
|---|---|---|---|
| 1. Control | | 7.06 ABCD | 10.00 A |
| 2. Vydate | 3 pt/A | 3.48 F | 9.56 A |
| 3. Movento | 4 fl oz/A x 2 app | 7.86 AB | 9.88 A |
| 4. Sesamin EC | 1 gal/A | 8.38 A | 10.00 A |
| 5. Nema Q | 3 gal/A | 8.34 A | 10.00 A |
| 6. MeloCon | 4 lb/A | 8.28 A | 9.68 A |
| 7. Dazitol | 6.25 gal/A | 8.42 A | 10.00 A |
| 8. MCW-2 rate 1 | 6.25 liters/Ha | 5.40 CDEF | 9.76 A |
| 9. MCW-2 rate 2 | 8.33 liters/Ha | 6.06 BCDE | 8.92 A |
| 10. Dev Prod-1 | 1 pt/A | 7.46 ABC | 9.80 A |
| 11. Dev Prod-1 | 1 qt/A | 7.40 ABC | 9.72 A |
| 12. Dev Prod-1 | 1 pt & 0.5 pt post | 5.16 DEF | 8.96 A |
| 13. Dev Prod-1 | 1 pt & 2 X 0.5 pt post | 4.00 EF | 7.24 B |
| 14. Ecozin | 56 fl oz/A | 8.94 A | 10.00 A |
| Prob.= | | 0.0000 | 0.0032 |
| % CV= | | 23.95 | 10.35 |
| LSD $_{p=0.05}$ = | | 2.090 | 1.253 |

*Root Gall Rating: 1-10, where 1 equals no gall present and 10 is 100% of root system galled.

Shafter Research Farm
2012




CONTROL


VYDATE


MCW-2 Low Rate


MCW-2 High rate


DP 1 pre & 1 post application

# DP 1 pre & 2 post applications

# 2013 Trials

South Coast Research & Extension Center

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Table 1. SCREC treatment list with rates and application timing

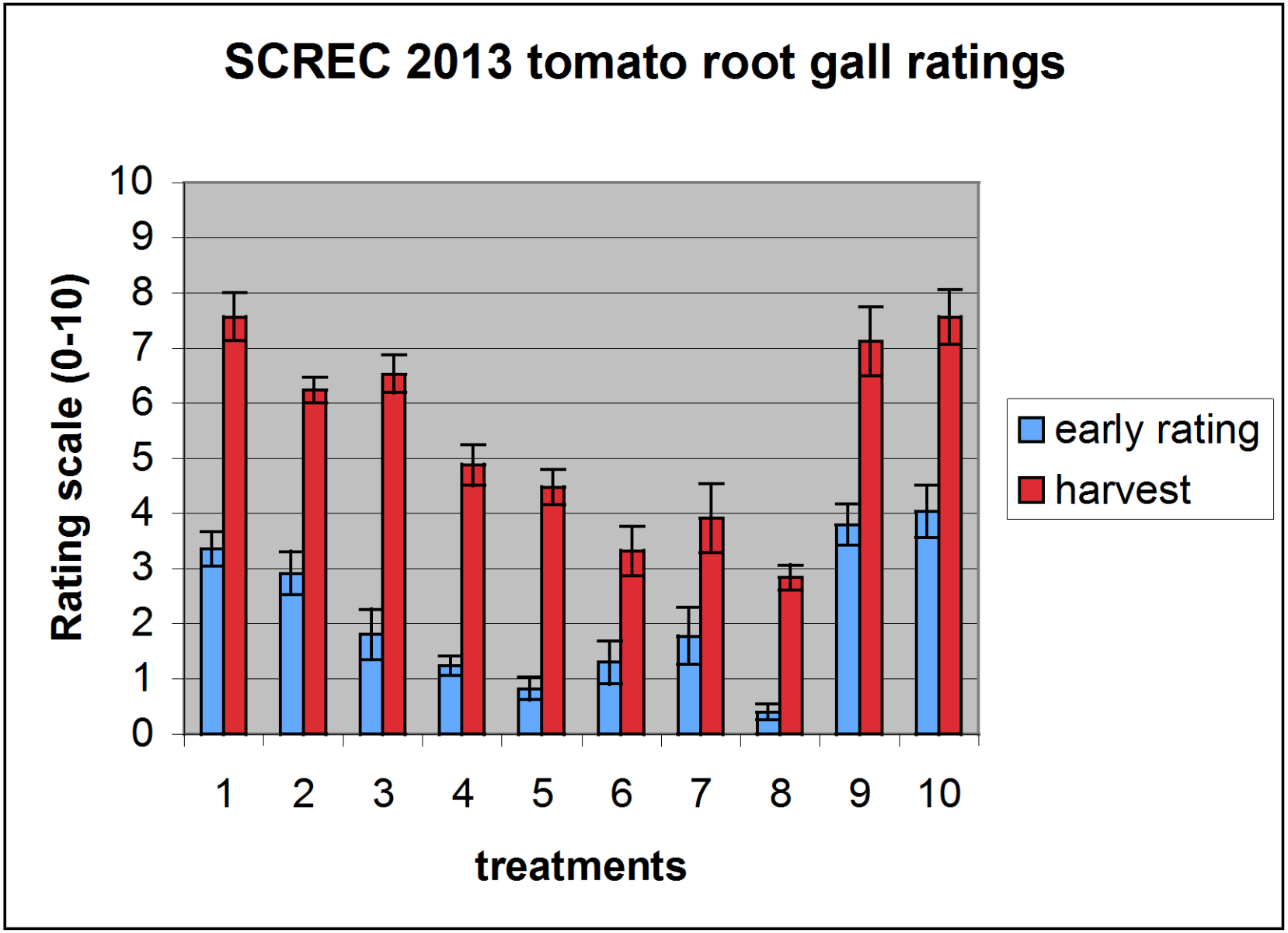
| Treatment nr. and name | Treatment rate(s) and timing of application |
|---|---|
| 1. non-treated check | n.a. |
| 2. Vydate L | 8.82 fl oz/1000 ft at planting + 15 dap[z] via drip |
| 3. MCW-2 low | 2.5 pt/acre, 7 dbp[z] |
| 4. MCW-2 medium | 3.5 pt/acre, 7 dbp |
| 5. MCW-2 high | 5.0 pt/acre, 7 dbp |
| 6. DP pre_only | 4.23 fl oz/1000 ft at planting |
| 7. DP pre+post_low | 2.1 fl oz/1000 ft at planting and 15 dap via drip |
| 8. DP pre+post_high | 4.23 fl oz/1000 ft at planting; 2.1 fl oz/1000 ft 15 dap via drip |
| 9. Nemaroot low | 2.23 g/plot at planting and 21, 42, 54 dap via drip |
| 10. Nemaroot high | 4.46 g/plot at planting and 21, 42, 54 dap via drip |

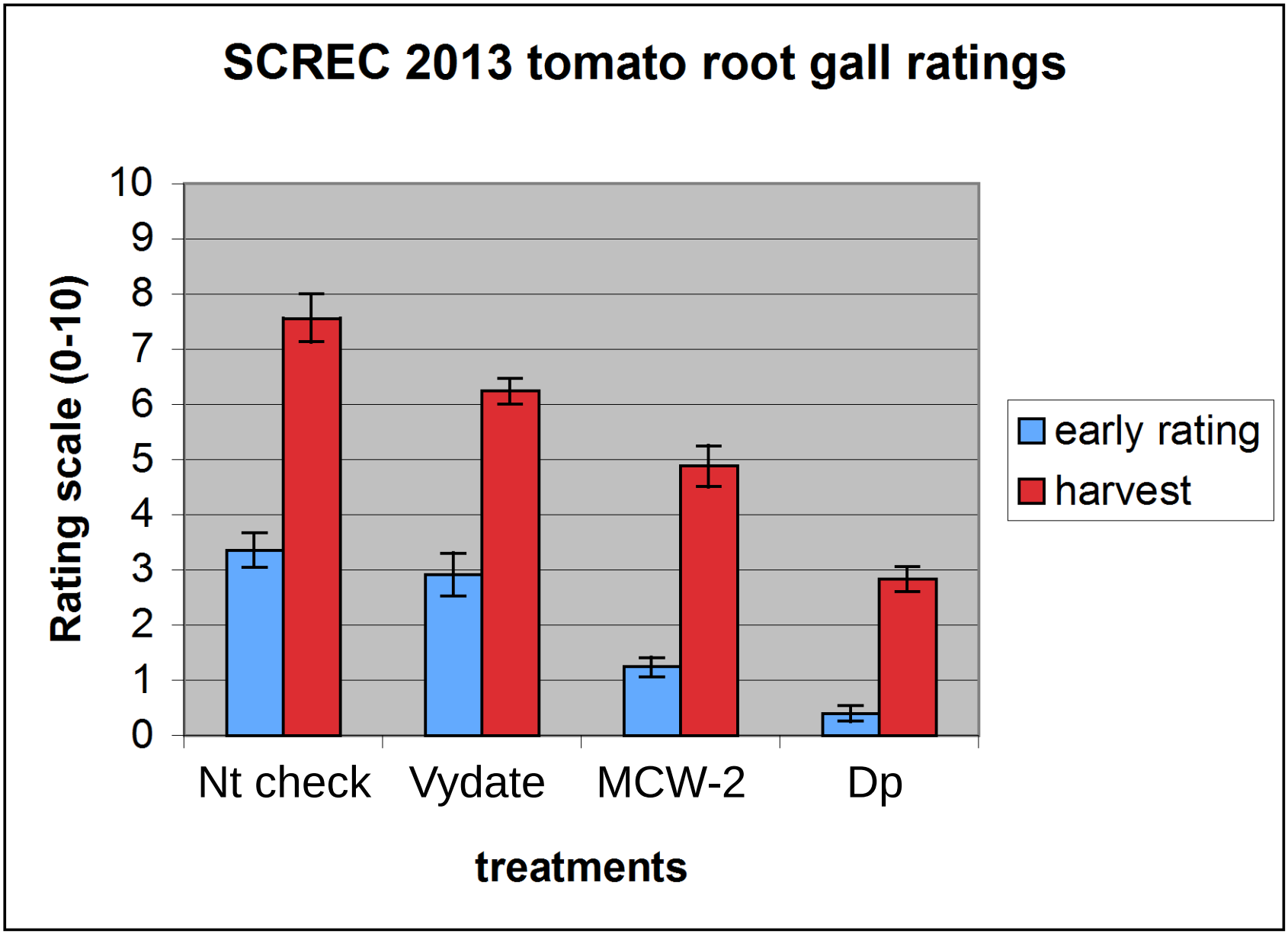
# 2013 SCREC Results

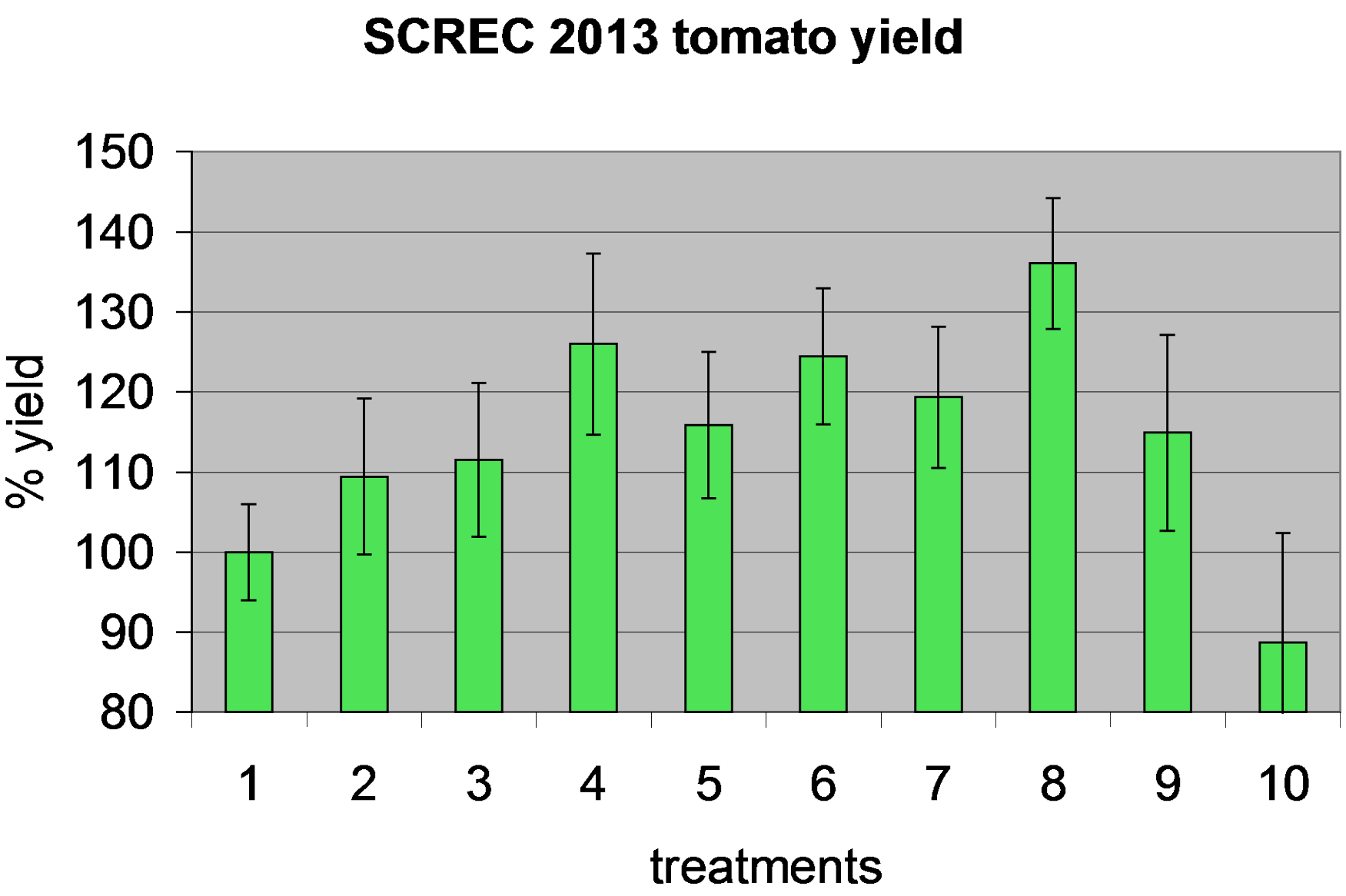
| Treatment | Mid-season Gall Rating | End-season Gall rating |
|---|---|---|
| 1. Non-Treated Check | 3.4 A | 7.6 A |
| 2. Vydate L | 2.9 AB | 6.2 BC |
| 3. MCW-2 low | 1.8 BC | 6.5 AB |
| 4. MCW-2 medium | 1.2 C | 4.9 CD |
| 5. MCW-2 high | 0.8 CD | 4.5 DE |
| 6. DP preplant | 1.3 C | 3.3 DEF |
| 7. DP pre+post low | 1.8 C | 3.9 DEF |
| 8. DP pre+post high | 0.4 D | 2.8 F |
| 9. Nemaroot low | 3.8 A | 7.1 AB |
| 10. Nemaroot high | 4.0 A | 7.6 A |

Table 4. Average vigor of tomato 4 weeks after planting and harvest fruit yield per plant (kg) at SCREC during the 2013-growing season (n=5).

| Treatment[z] | Vigor | | Yield per plant | | % diff. from non-treated check. |
|---|---|---|---|---|---|
| 1. Non-treated check | 6.4 | abc[y] | 1.18 | cd | 0 |
| 2. Vydate L | 6.2 | c | 1.29 | bcd | +9 |
| 3. MCW-2 low | 7.2 | abc | 1.32 | bc | +12 |
| 4. MCW-2 medium | 7.8 | a | 1.49 | ab | +26 |
| 5. MCW-2 high | 7.4 | abc | 1.37 | abc | +16 |
| 6. DP pre_only | 7.4 | abc | 1.47 | ab | +24 |
| 7. DP pre+post_low | 7.6 | ab | 1.41 | abc | +19 |
| 8. DP pre+post_high | 7.6 | abc | 1.61 | a | +36 |
| 9. Nemaroot low | 7.4 | a | 1.36 | abc | +15 |
| 10. Nemaroot high | 6.2 | bc | 1.05 | d | -11 |


SCREC 2013 tomato root gall ratings
Rating scale (0-10)
0
1
2
3
4
5
6
7
8
9
10
1
2
3
4
5
6
7
8
9
10
treatments
early rating
harvest


SCREC 2013 tomato root gall ratings
Rating scale (0-10)
10
9
8
7
6
5
4
3
2
1
0
Nt check
Vydate
MCW-2
Dp
treatments
early rating
harvest


SCREC 2013 tomato yield
150
140
130
120
110
100
90
80
% yield
1
2
3
4
5
6
7
8
9
10
treatments

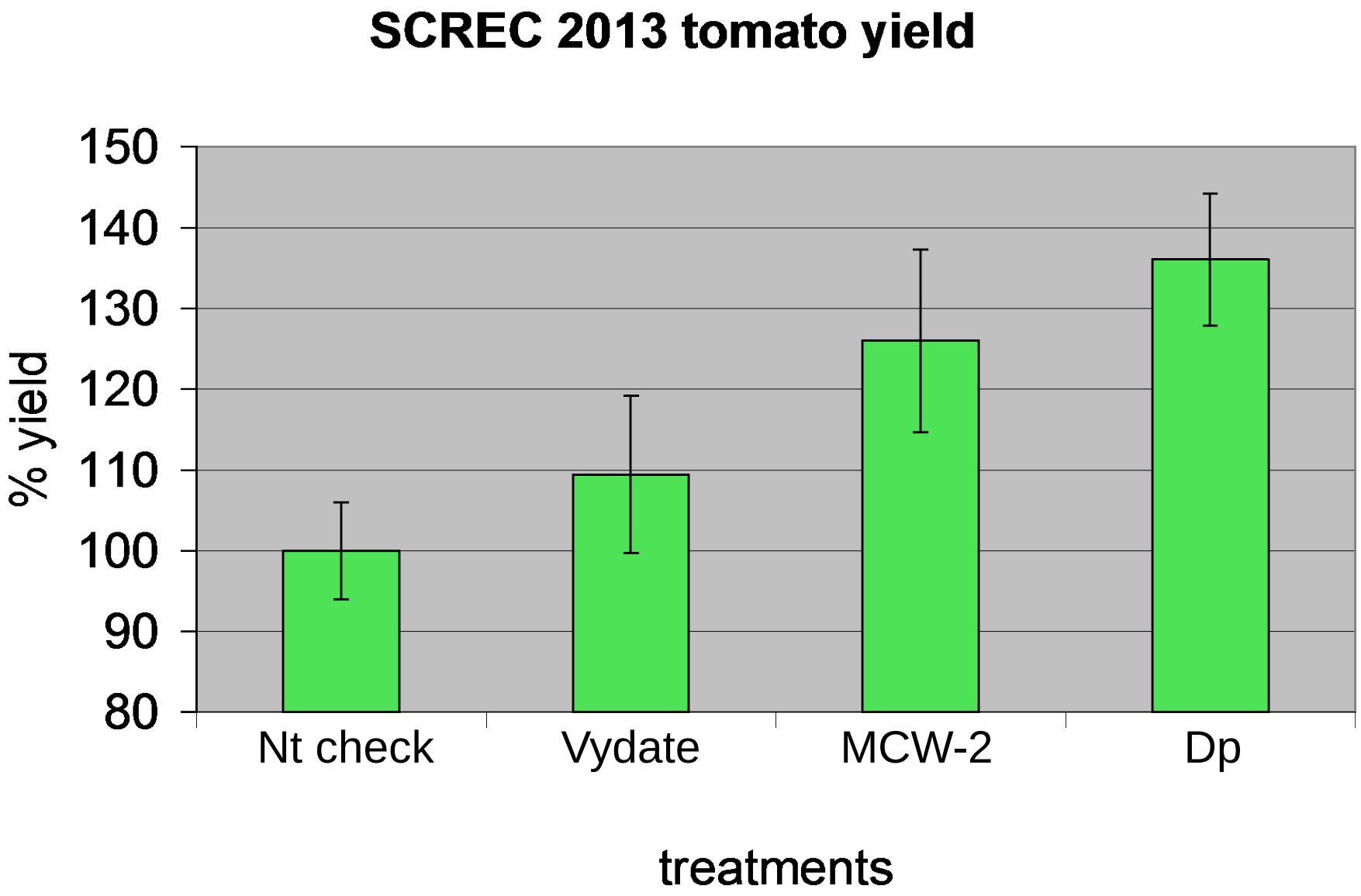

SCREC 2013 tomato yield
150
140
130
120
110
100
90
80
% yield
Nt check
Vydate
MCW-2
Dp
treatments

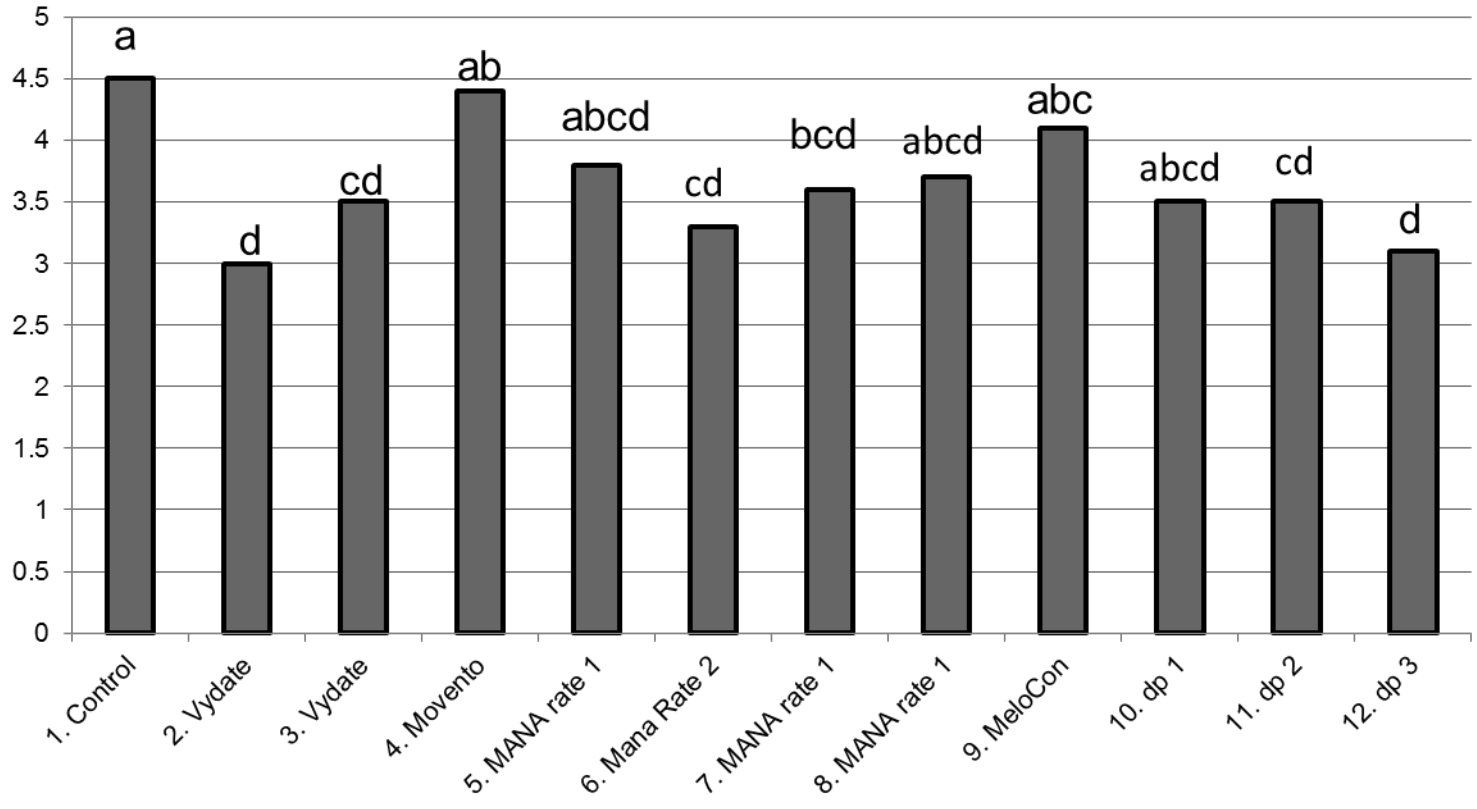
Table 2. Shafter treatment list with rates and application timing

| | |
|---|---|
| 1. Control | |
| 2. Vydate | 3 pt/A= 5 ml/plot pre-plant & 2 post plant applications |
| 3. Vydate | 2 post plant applications |
| 4. Movento | 5 fl oz/A = 0.5 ml/plot pre- & 2 post |
| 5. MCW-2 rate 1 | 668 ml/A = 2.3 ml/plot pre-plant |
| 6. MCW-2 rate 2 | 881 ml/A = 3 ml/plot pre-Plant |
| 7. MCW-2 ratc 1 | 668 ml/A & 1 post |
| 8. MCW-2 rate 1 | 668 ml/A & 2 post |
| 9. MeloCon | 6 lbs/A = 9.4 g/plot |
| 10. Dp 1 | 1.6 ml pre-plant |
| 11. Dp 2 | 1.6 + 0.8 ml post |
| 12. Dp 3 | 1.6 + 2 post at 0.8 ml |

Tab. 5 Nematicide evaluation 2013 at Shafter Station (*root gall rating (1-5))

| | | Average Nematode Rating* |
|---|---|---|
| 1. Control | | 4.5 A |
| 2. Vydate | 3 pt/A 1 pre & 2 post app | 3.0 D |
| 3. Vydate | 2 post app | 3.5 CD |
| 4. Movento | 5 fl oz/A | 4.4 AB |
| 5. MCW-2 rate 1 | 668 ml/A pre | 3.8 ABCD |
| 6. MCW-2 rate 2 | 881 ml/A pre | 3.3 CD |
| 7. MCW-2 rate 1 | 668 ml/A pre & 1 post app | 3.6 BCD |
| 8. MCW-2 rate 1 | 668 ml/A pre & 2 post app | 3.7 ABCD |
| 9. MeloCon | 6 lbs/A | 4.1 ABC |
| 10. Dp | 1 pt/A pre | 3.8 ABCD |
| 11. Dp | 1 pt pre & 1 post app @ ½ pt /A | 3.5 CD |
| 12. Dp | 1 pt pre & 2 post app @ ½ pt /A | 3.1 D |
| Prob. | | 0.1107 |
| %CV | | 24.48 |
| $LSD_{0.10}$ | | 0.8744 |

# Root Gall Rating Shafter 2013



# Control

# Vydate-pre & 2 post applications

# DP-pre & 2 post applications

# MCW-2-pre & 2 post applications

SCREC

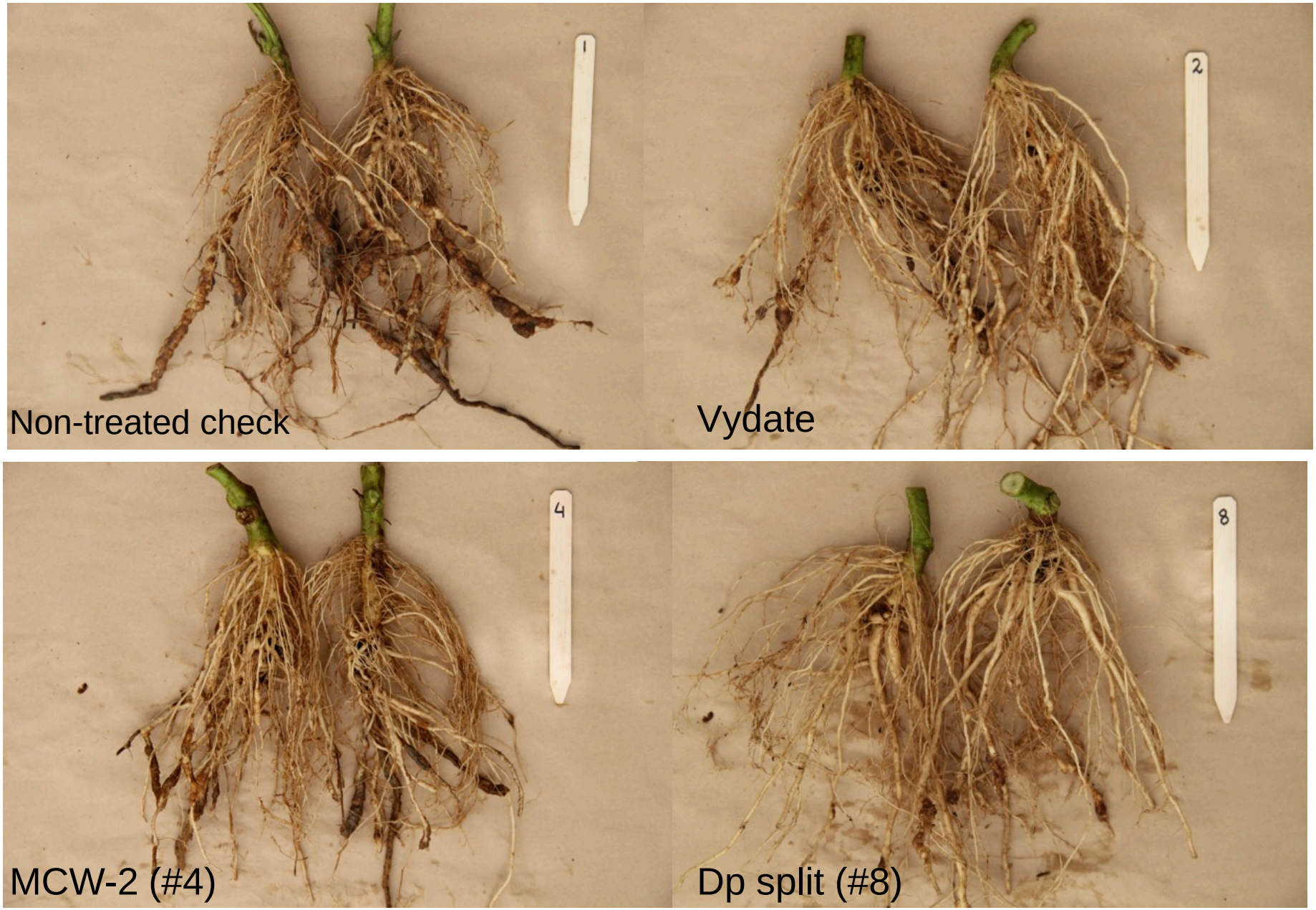
early root gall rating

7 weeks

after transplanting

Non-treated check vs MCW-2 (#5)

Non-treated check vs Dp split (#8)




representative roots at harvest

# Conclusions

- DP and Mana MCW-2 continue to show great promise as developing nematicide options

# Conclusions

- MANA's MCW-2 is an excellent non-fumigant nematicide with great potential.
  - Will be released in 2014 as "Nimitz"
  - Supply will be limited in 2014
  - Label will carry a "caution" as signal word

- "Development Product" nematicide also has great potential
  - No word when it could be available

- Vydate works best when applied pre-plant followed by post-plant applications

# Conclusions

- Biologicals
  - Performance is below chemicals and often times it's hit or miss with them
  - More work is needed to find how to best use them

- Other chemistries
  - There is renewed interest in developing non-fumigant nematicides. Other companies are in development stages of non-fumigant products.