# Nematode Resistant Wheat:
# Alternative to nematicides?

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# Root Knot Nematode Resistant ‘Patwin’ Wheat in Rotation with Tomato


| | Treatment |
|---|---|
| 1 | Fallow control |
| 2 | 'Patwin' wheat |
| 3 | Wheat 'Anza' |
| 4 | Triticale 'Trios' |
| 5 | Oats 'Montezuma' |

**Trial design:**

- Latin square (5 reps x 5 treatments)
- Three, 5-foot beds x 75’ per plot
- Trial area < 1 acre
- Nematode infested area in previous year
  Harvested with grower equipment

| Treatment | 7-Apr plant height (inch) | grass dry wt tons/acre | |
|---|---|---|---|
| 1 Fallow control | - | - | d |
| 2 Patwin(resistant) wheat | 32.3 | 2.32 | a |
| 3 Wheat 'Anza' | 30.6 | 2.07 | ab |
| 4 Trios' triticale | 29.3 | 1.62 | c |
| 5 Oats 'Montezuma' | 39.9 | 1.99 | b |
| LSD @ 5% | 2.1 | 0.32 | |
| % CV | 5 | 12 | |
| ^ non-additivity problem | ^ | | |


Matson
Matson


Watson

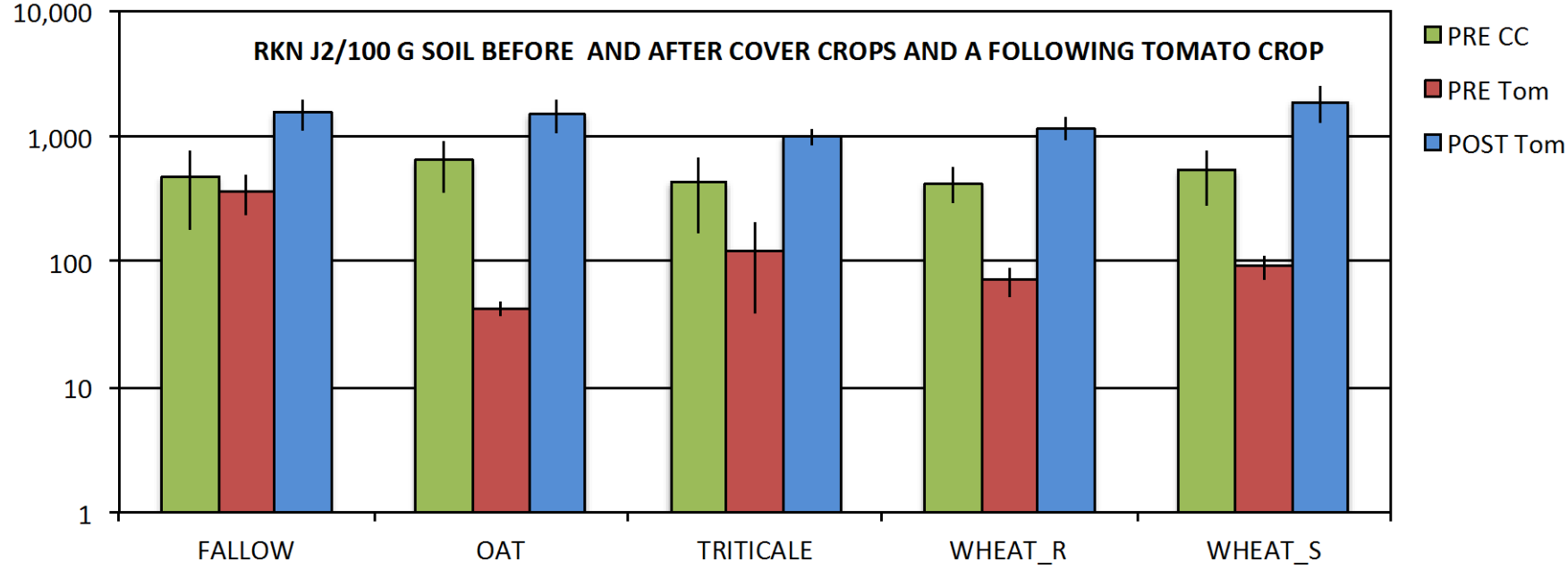
severity rating = 8
on scale of 1 to 10

# Neither resistant 'Patwin' wheat nor other grasses effectively reduced impact of root knot nematode

- ✓ high nematode level at end of 2013 tomato season
- ✓ grass 'cover crop' substantially reduced nematode level...
- ✓ ...but remained damagingly high
- ✓ by season's end nematodes tripled in a year & tomato roots were severely galled

| | Treatment | fall 25-Nov RKN J2 /100 g soil | spring 21-Apr RKN J2 /100 g soil | % of initial level | pre harvest 30-Sep RKN J2 /100 g soil | post harvest 6-Oct root galling index[1] |
|---|---|---|---|---|---|---|
| 1 | Fallow control | 472 | 364 | 77 | 1540 | 7.7 |
| 2 | Patwin wheat | 422 | 70 | 17 | 1170 | 8.3 |
| 3 | Wheat 'Anza' | 533 | 92 | 17 | 1905 | 7.9 |
| 4 | Triticale 'Trios' | 428 | 124 | 29 | 1005 | 8.5 |
| 5 | Oats 'Montezuma' | 640 | 42 | 7 | 1510 | 8.2 |
| | LSD @ 5% | NS | 202 | | NS | NS |
| | % CV | 102 | 109 | | 67 | 9 |
| | ^ non-additivity | | ^ | | | |
| | Class Comparisons | | | | | |
| | Control vs. | 472 | 364 | | 1540 | 7.7 |
| | any grass | 506 | 82 | | 1398 | 8.2 |
| | Probability | NS | 0.002 | | NS | 0.15 |

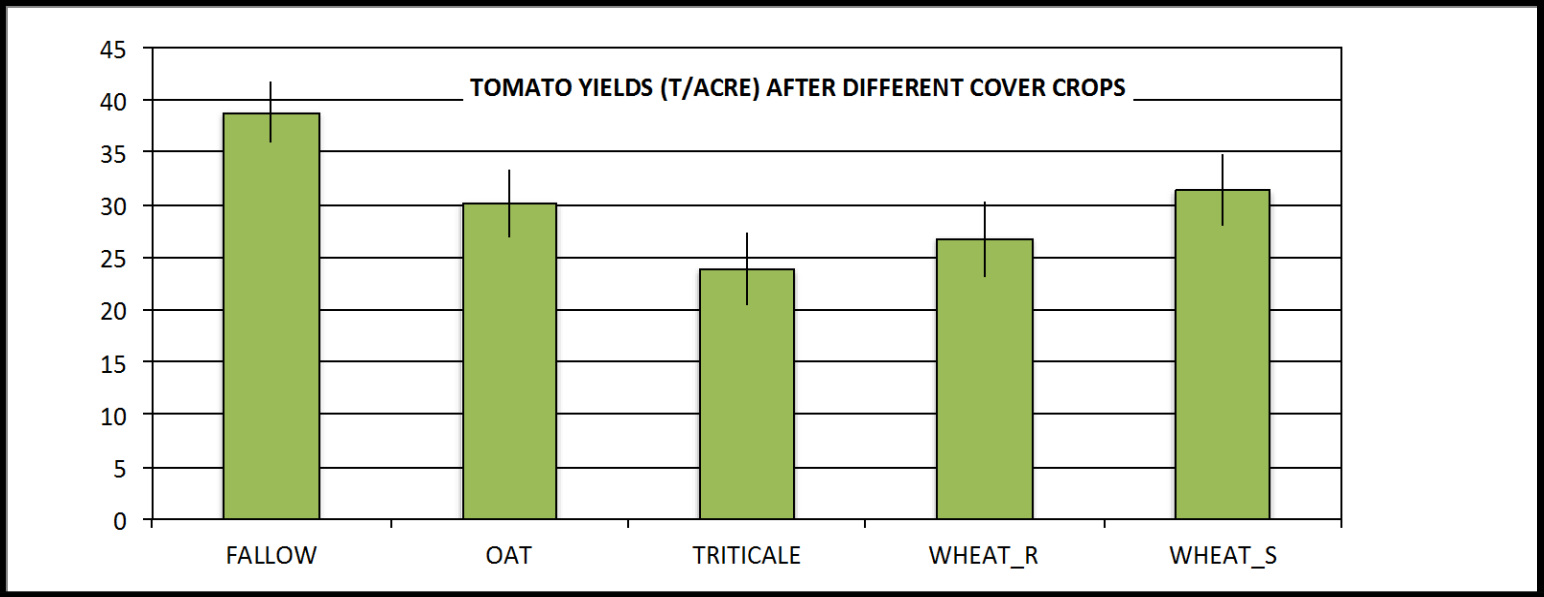
1= no galls 10= severe

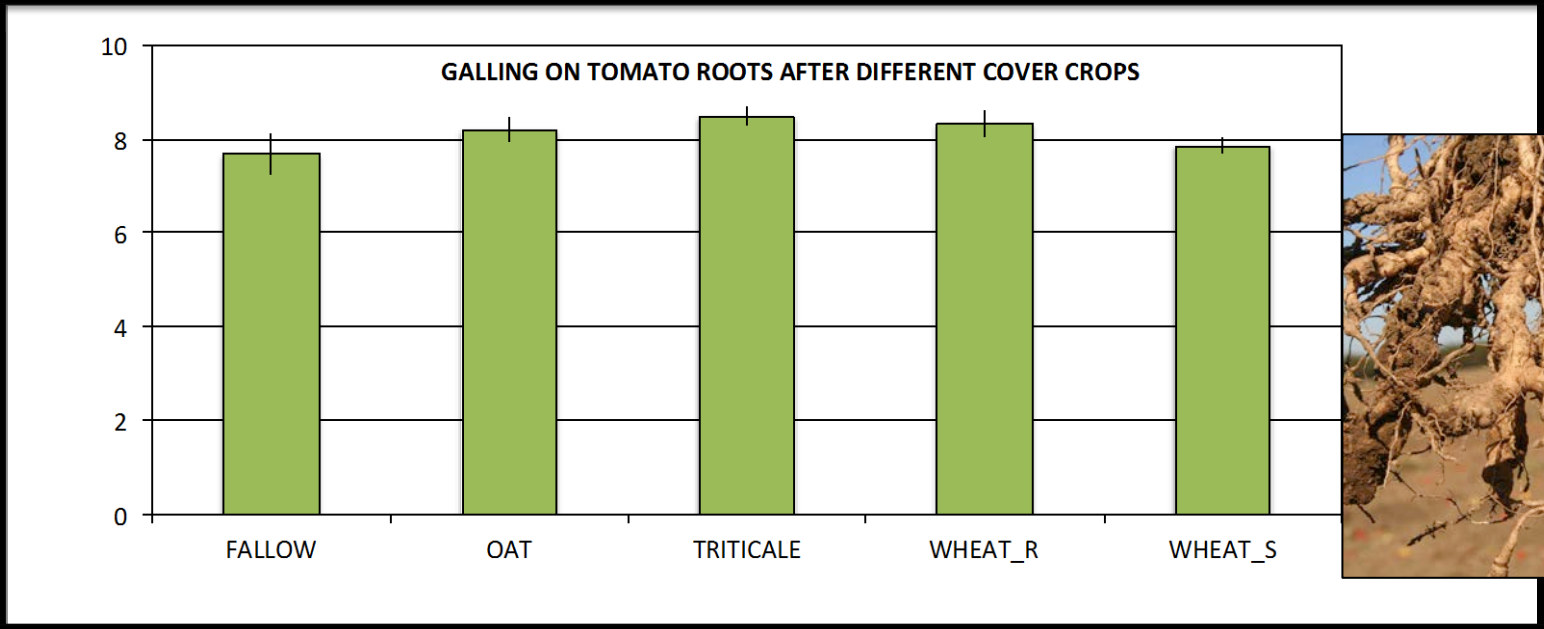



**Fall 2013: Nematode levels (green bars) were similar to each other at start of test**

**Spring 2014: compared to the fallow control, the grasses lowered nematode levels**

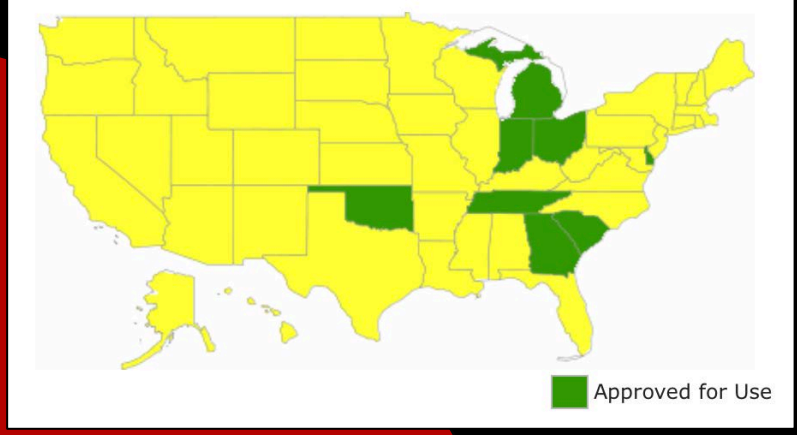
**Post tomato harvest: all levels high & similar to each other**


TOMATO YIELDS (T/ACRE) AFTER DIFFERENT COVER CROPS
45
40
35
30
25
20
15
10
5
0
FALLOW
OAT
TRITICALE
WHEAT_R
WHEAT_S


GALLING ON TOMATO ROOTS AFTER DIFFERENT COVER CROPS
10
8
6
4
2
0
FALLOW
OAT
TRITICALE
WHEAT_R
WHEAT_S

## Result:

- Patwin wheat cultivar did not improve tomato yield in presence of high root knot nematode population




# 2015 Research Plan:

- Nimitz® close to registration in California for tomatoes.
  Issues with plant back restrictions on label
  (12 months for most agronomic crops (grains & forage)

- Methods to Evaluate:
  1) surface-applied, preplant incorporated
  2) shank injected (with 3 starter fertilizer knives)
  3) chemigated through drip line

# Questions?