Glyphosate and Potatoes: What have we learned?

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What do we know so far?

- Sensitivity of potato growth stage
  - For grower
  - For seed producer
- Sensitivity of potato cultivar
  - Irrigated
  - Dry land
- Influence of environment
- ~~Influence of droplet concentration~~

Glyphosate drift & potato growth stage

Symptoms

Symptoms

Symptoms

Glyphosate effect on harvested tubers when applied to plants during TH and TI stages at 0.18 lb/A glyphosate compared to untreated

Symptoms

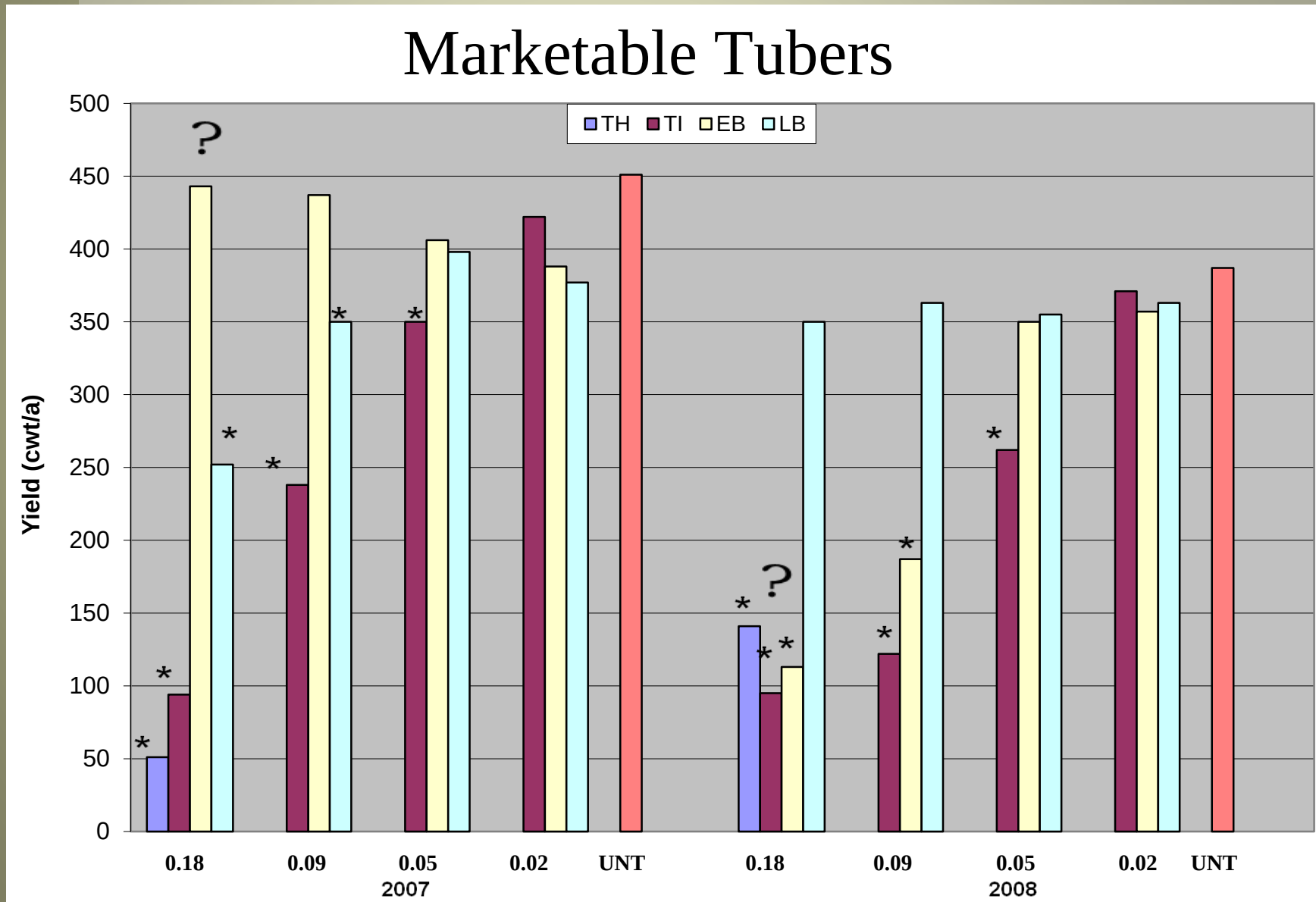
Seed tubers from the 0.18 lb/A glyphosate treatment at the LB stage.

Symptoms

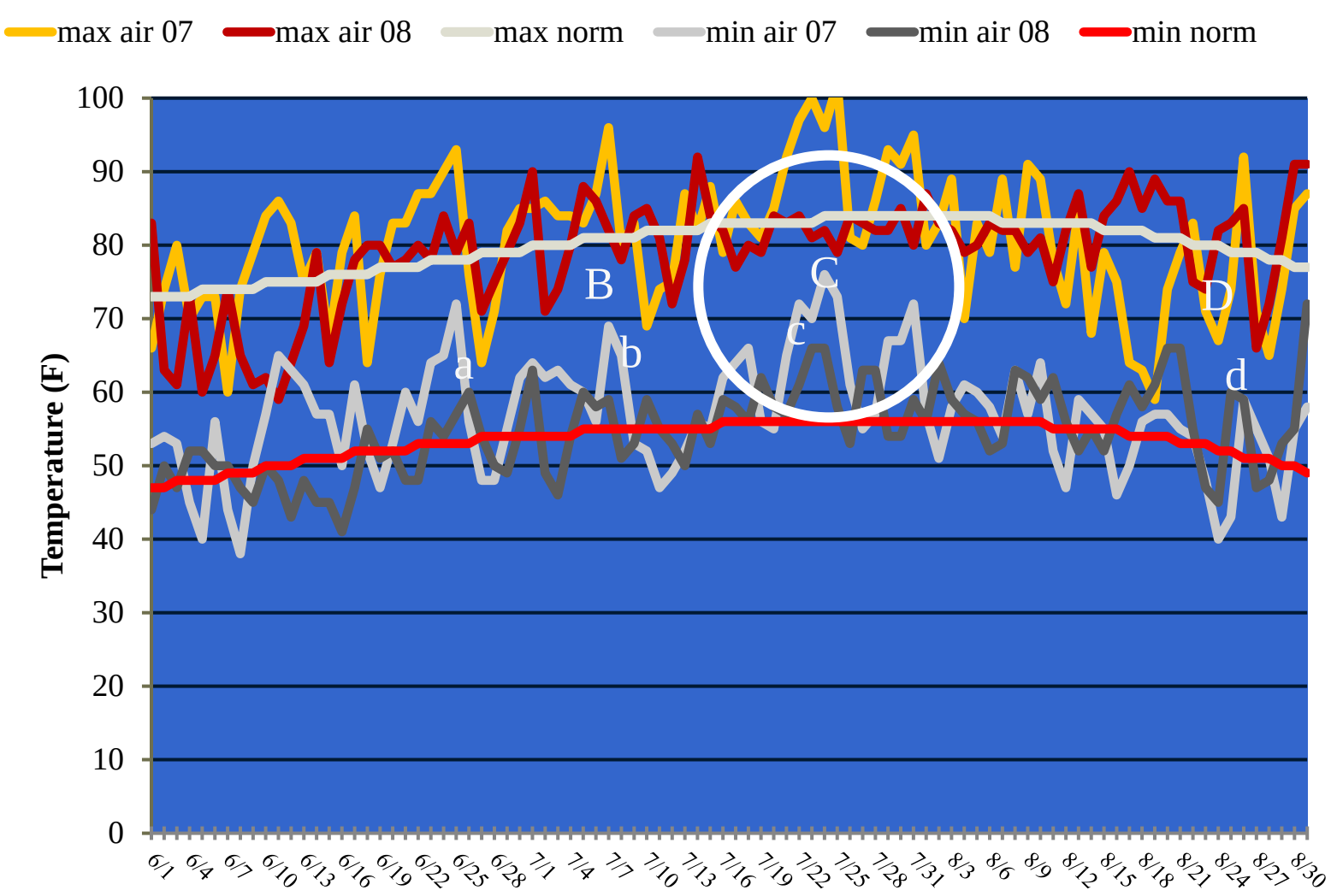
Symptoms

Symptoms

Direct effect on yield (RB)



Environmental influence



Indirect effect on yield (RB)

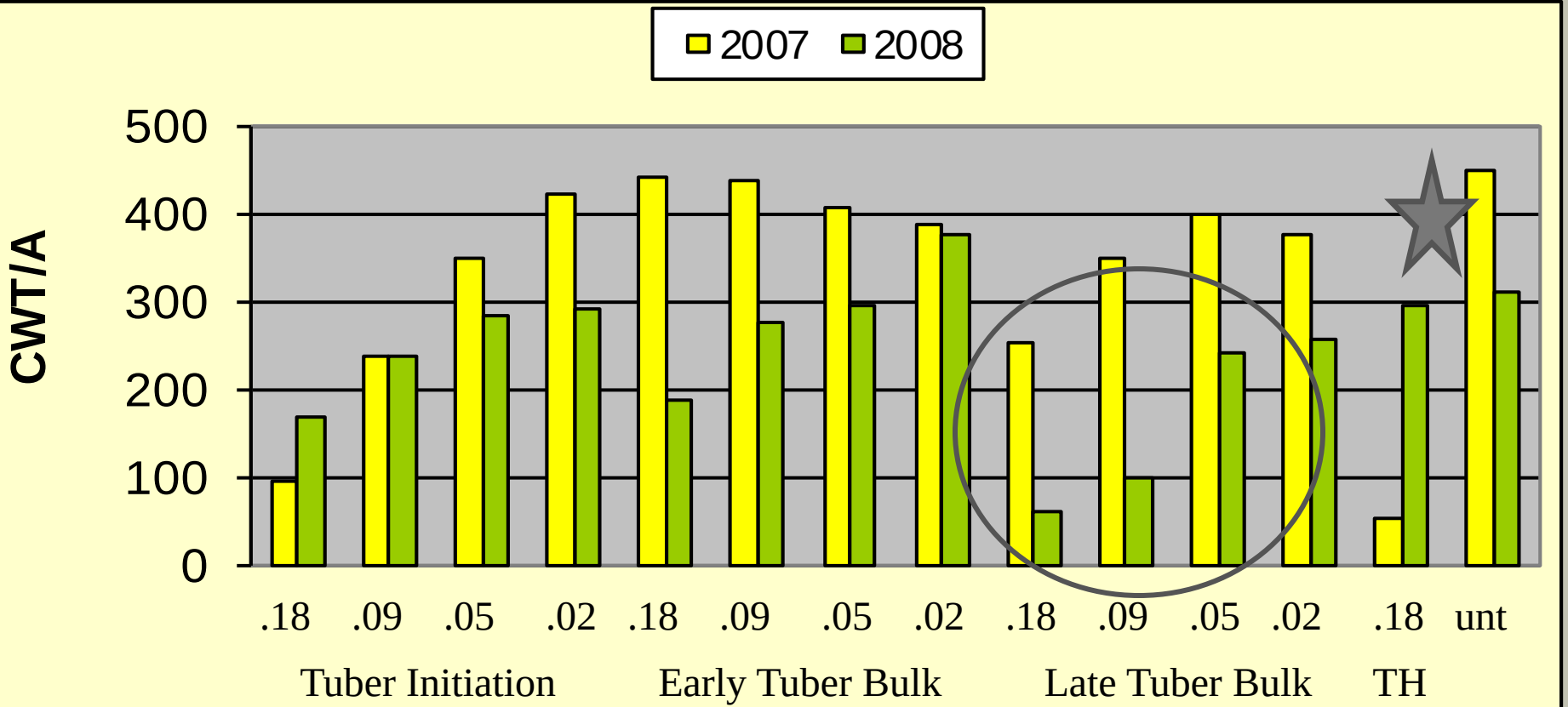
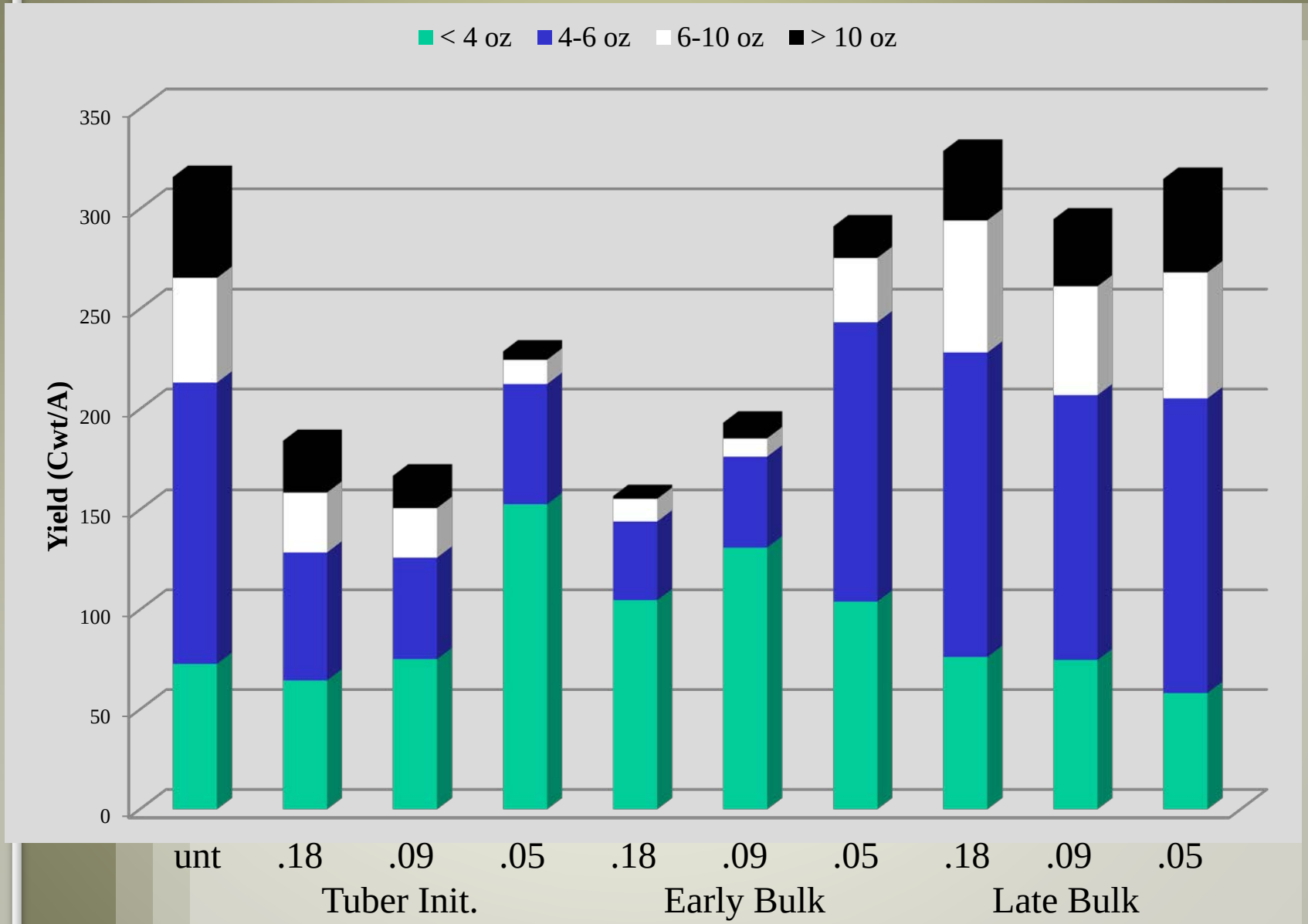


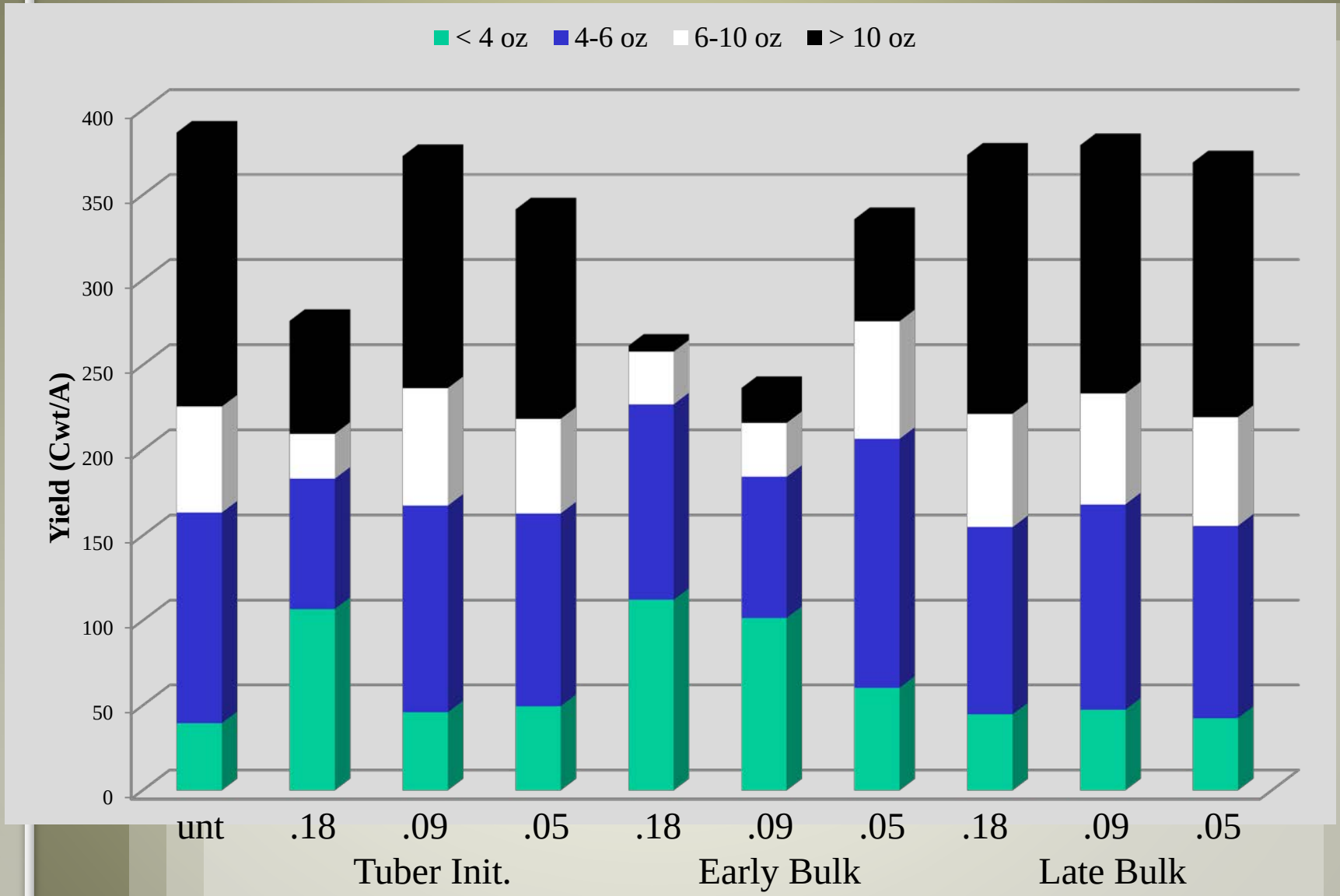
Figure 4. CWT/A of marketable tubers from 2007 and 2008.


Rn
307

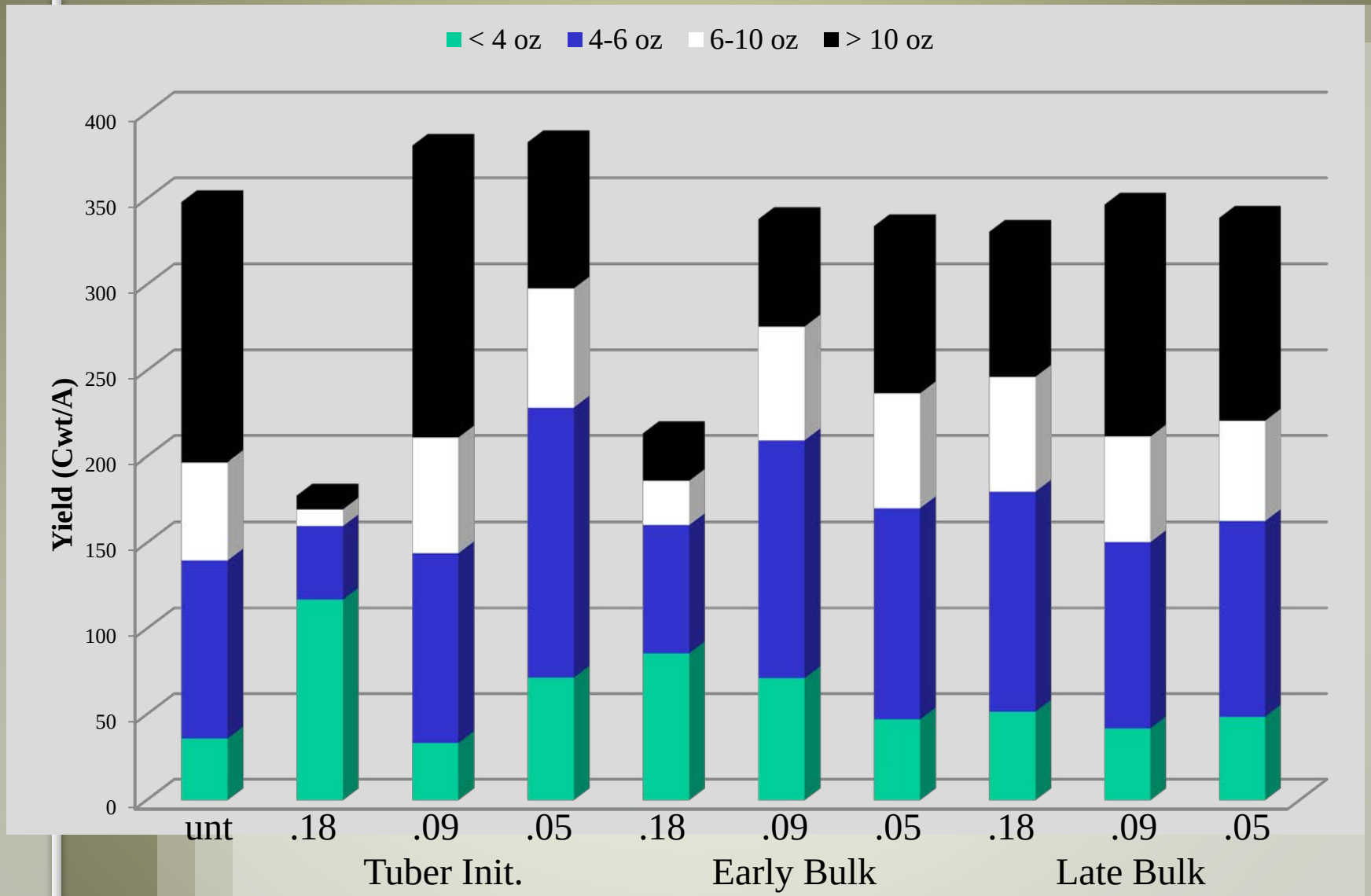
Red Norland Yield



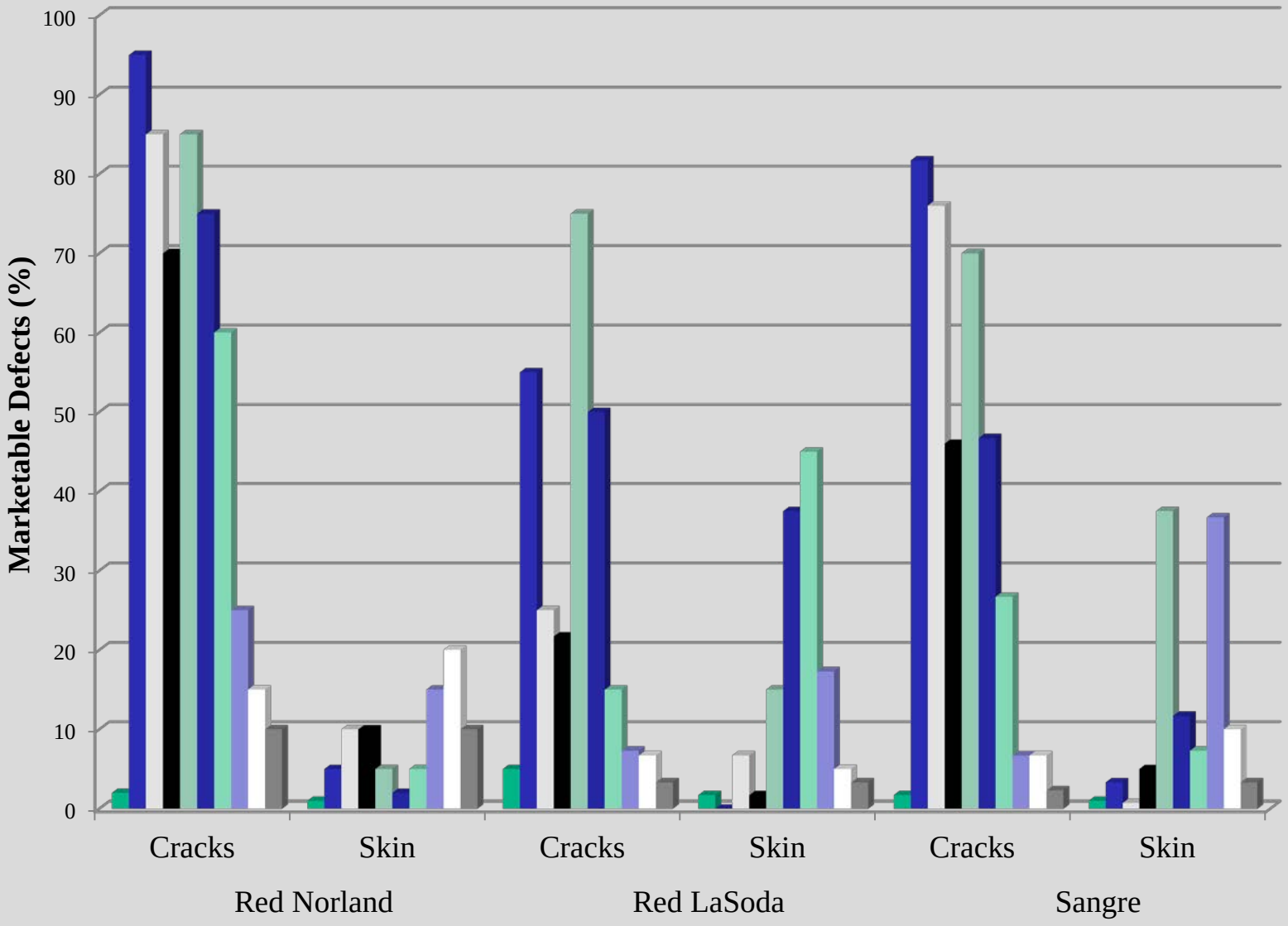
Red LaSoda Yield



Sangre Yield

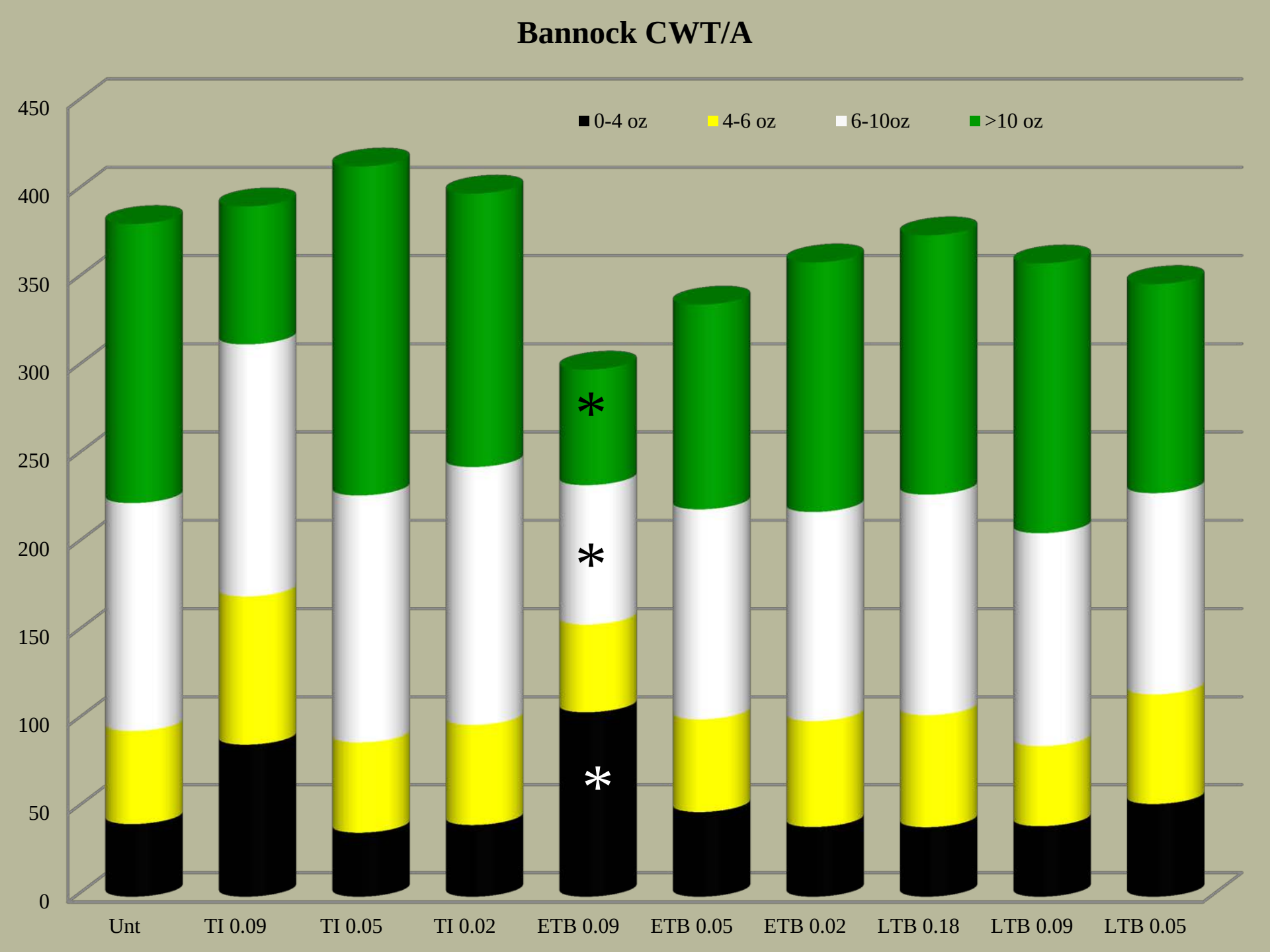


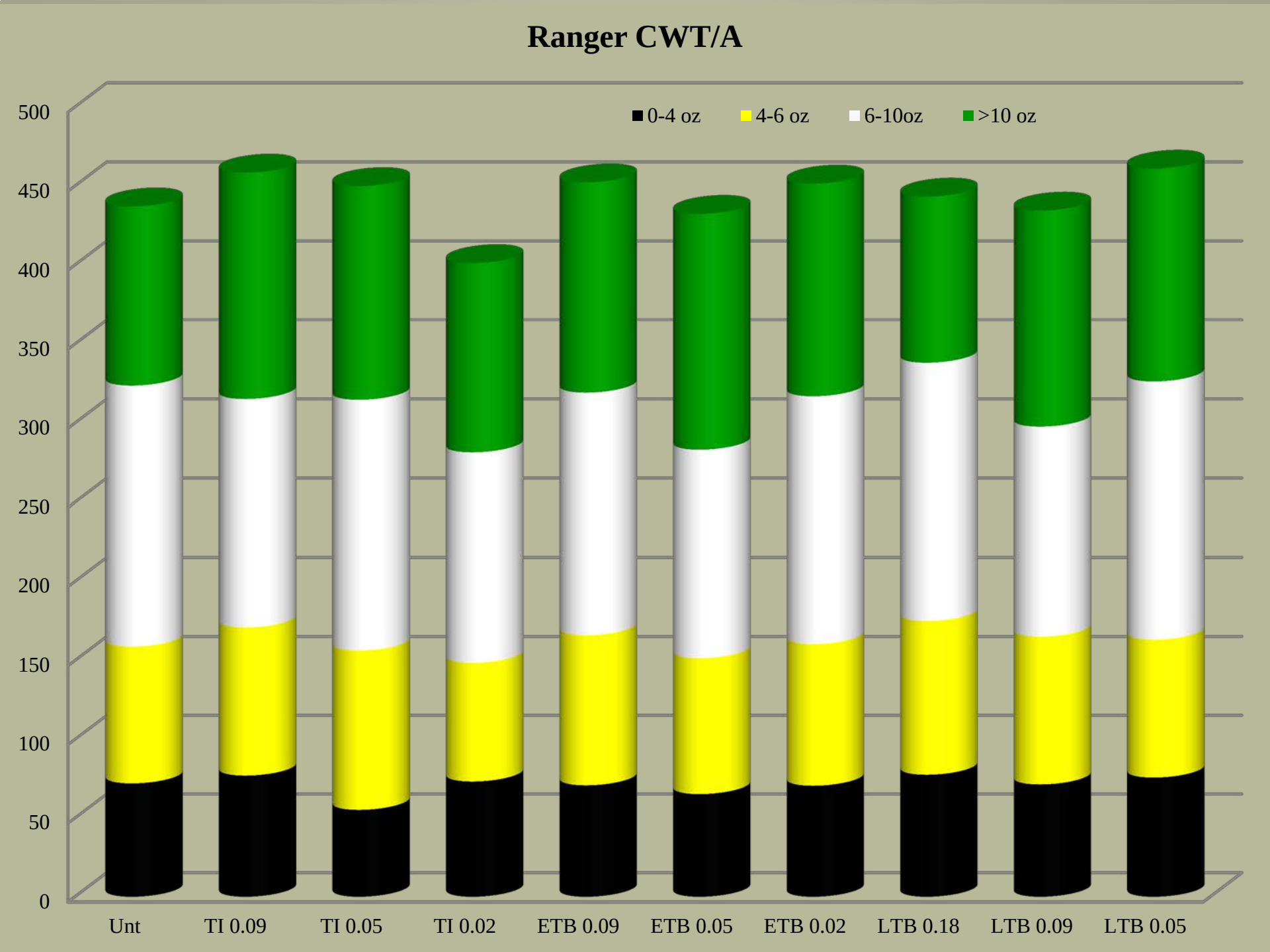
Marketable Tuber Defects

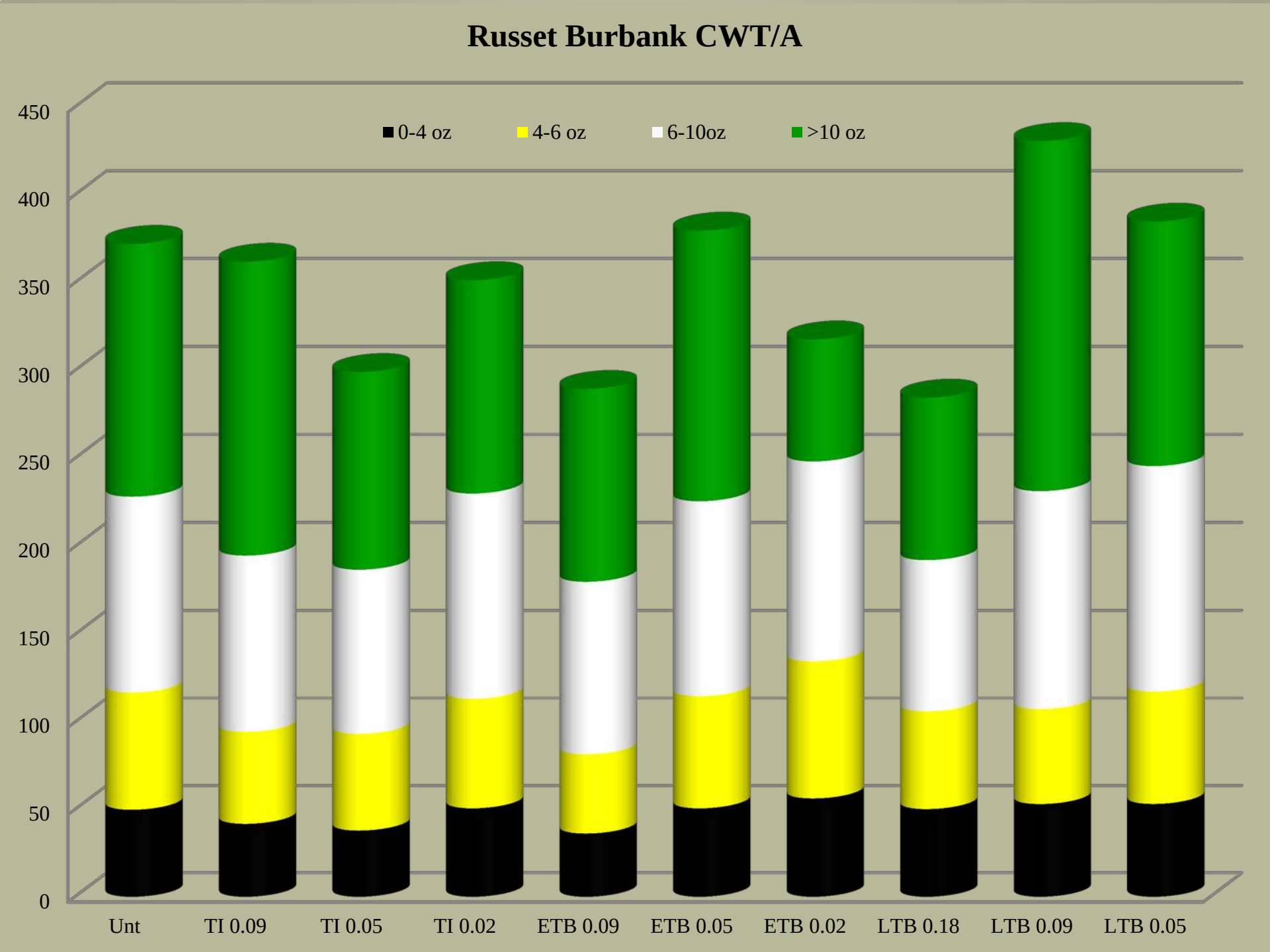


Processing Cultivars

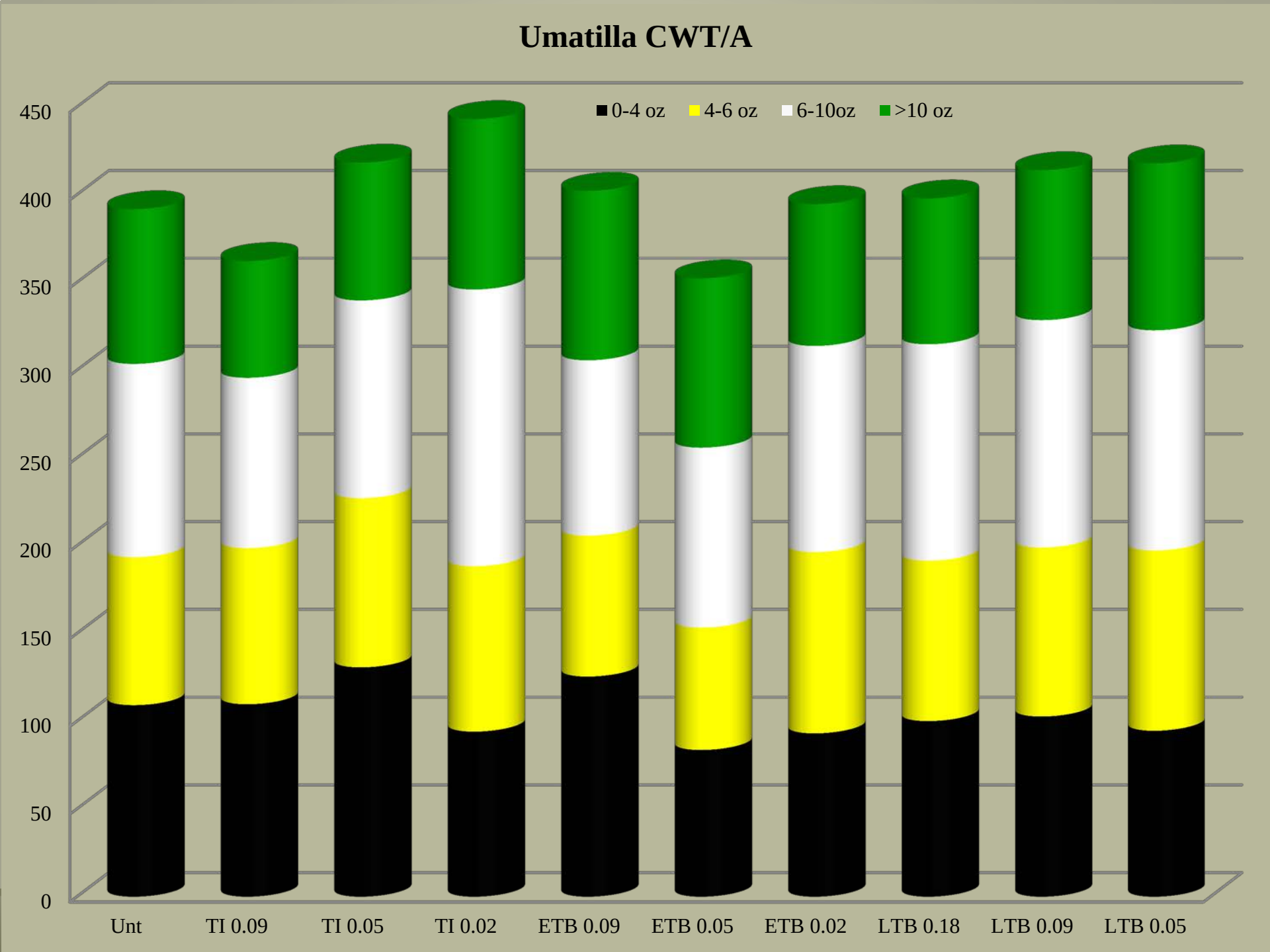
- Simulated glyphosate drift
  - 0.09, 0.05, 0.02, (0.18) lb ae/A
  - Added AMS
- Bannock, Ranger Russet, Russet Burbank, and Umatilla
- Herbicide applied 7/24, 8/9, 9/4 2012
- CO_2 sprayer
  - 8002 nozzles, 20 GPA and 40 PSI
- Harvested & storing tubers for planting following spring

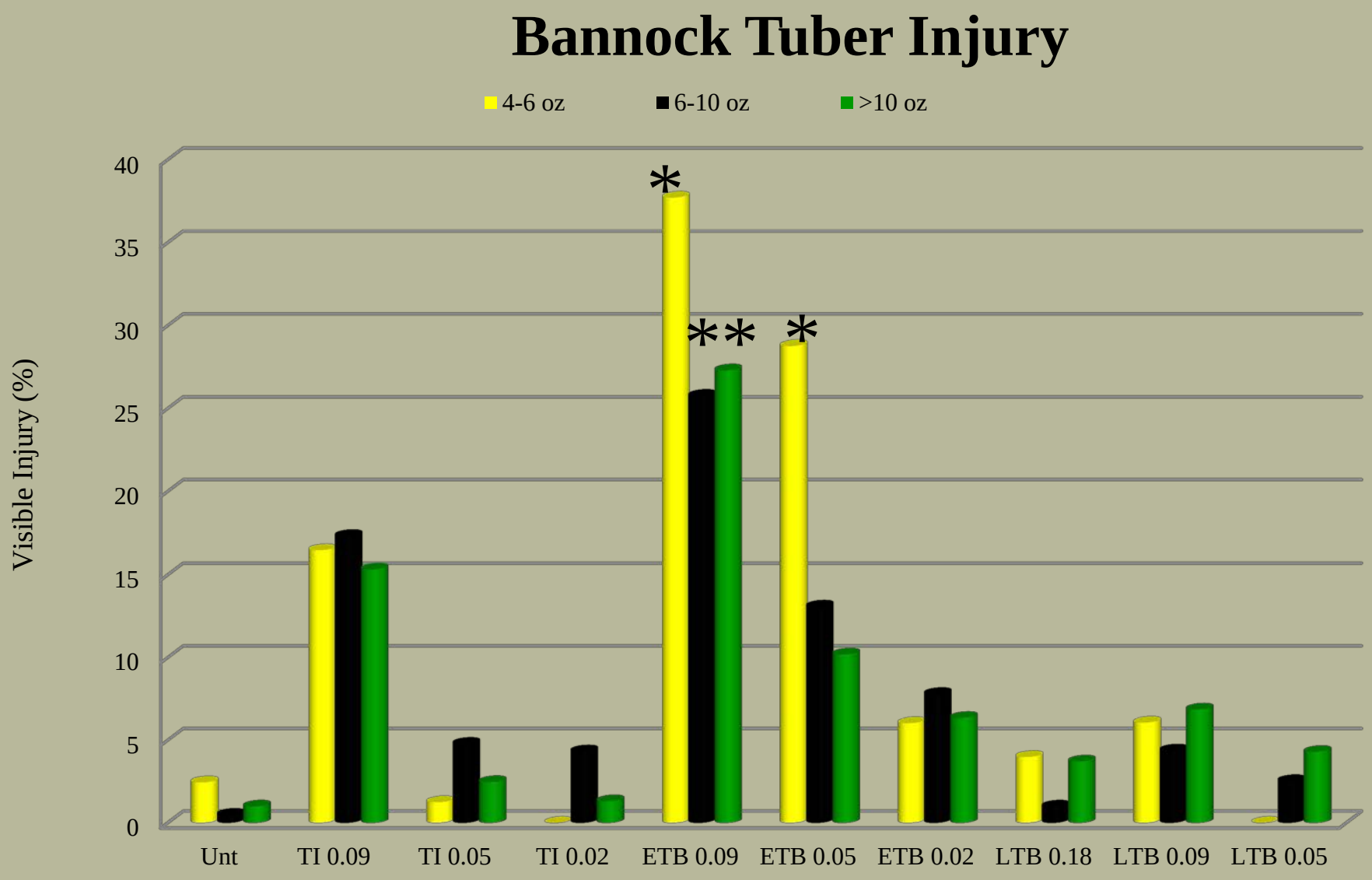

Bannock CWT/A
0-4 oz
4-6 oz
6-10oz
>10 oz
450
400
350
300
250
200
150
100
50
0
*
*
*
Unt
TI 0.09
TI 0.05
TI 0.02
ETB 0.09
ETB 0.05
ETB 0.02
LTB 0.18
LTB 0.09
LTB 0.05


Ranger CWT/A
0-4 oz
4-6 oz
6-10oz
>10 oz
500
450
400
350
300
250
200
150
100
50
0
Unt
TI 0.09
TI 0.05
TI 0.02
ETB 0.09
ETB 0.05
ETB 0.02
LTB 0.18
LTB 0.09
LTB 0.05

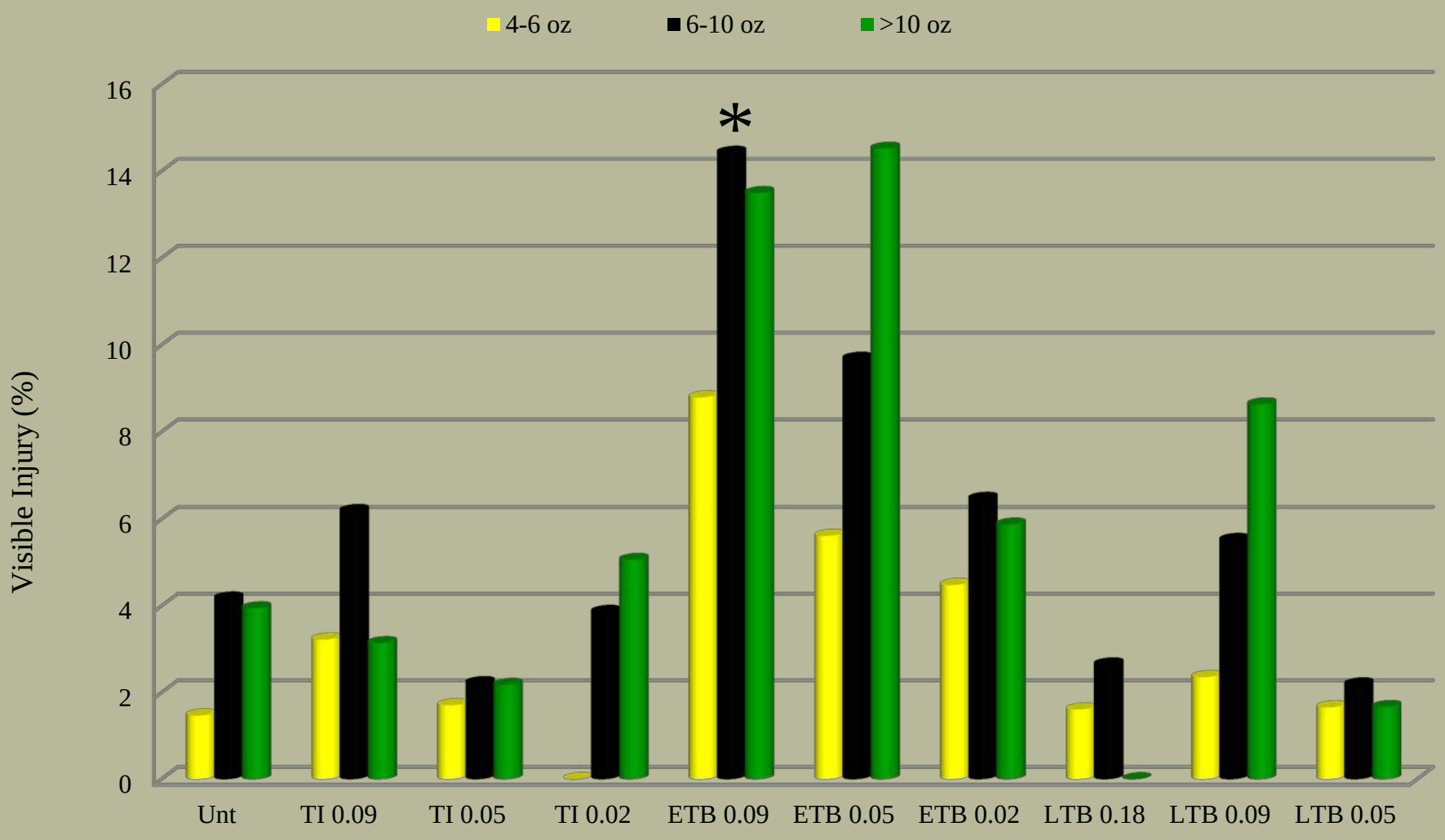

Russet Burbank CWT/A
0-4 oz
4-6 oz
6-10oz
>10 oz
450
400
350
300
250
200
150
100
50
0
Unt
TI 0.09
TI 0.05
TI 0.02
ETB 0.09
ETB 0.05
ETB 0.02
LTB 0.18
LTB 0.09
LTB 0.05

Umatilla CWT/A

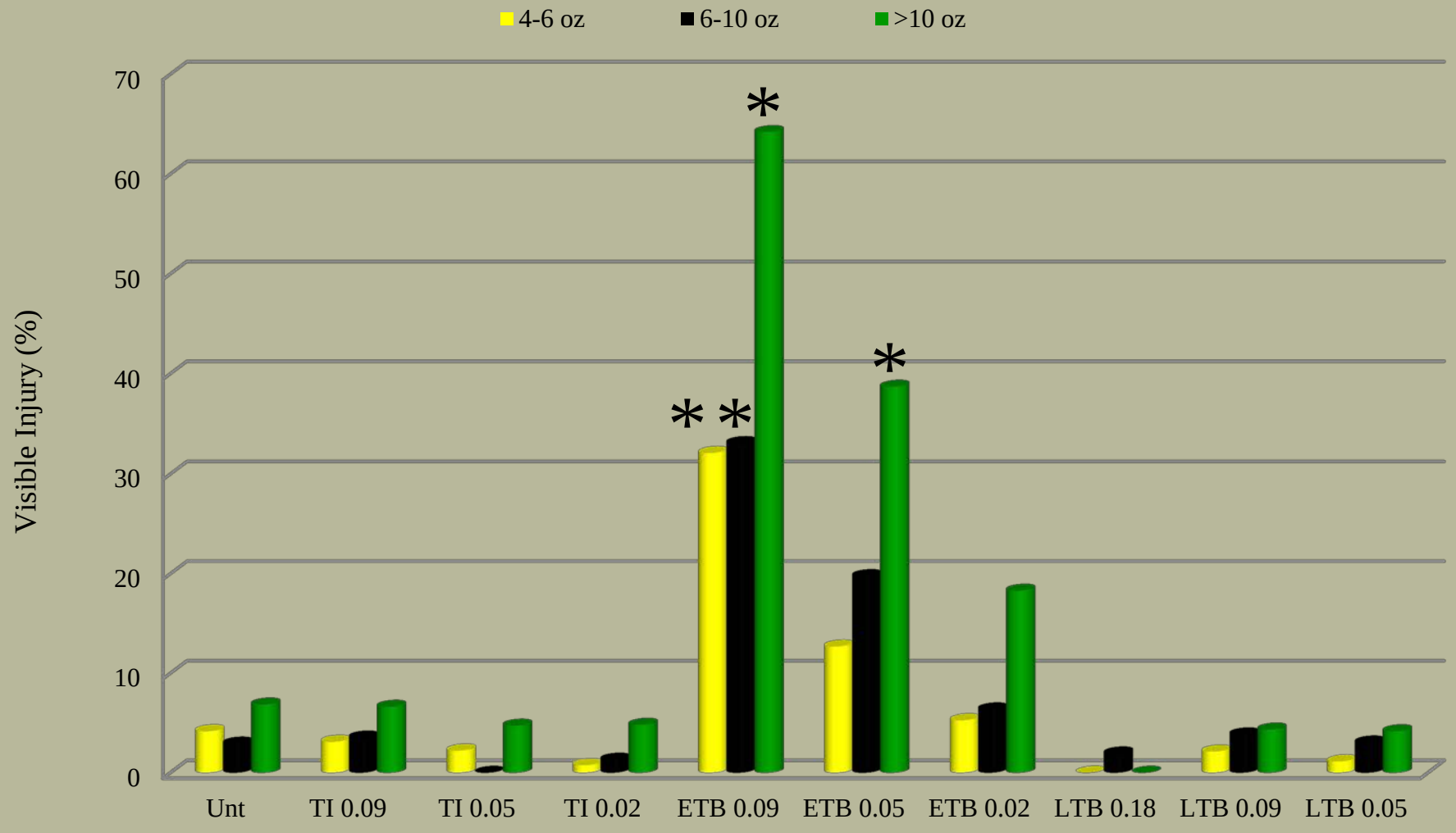



Bannock Tuber Injury
4-6 oz
6-10 oz
>10 oz
Visible Injury (%)
40
35
30
25
20
15
10
5
0
*
**
*
Unt
TI 0.09
TI 0.05
TI 0.02
ETB 0.09
ETB 0.05
ETB 0.02
LTB 0.18
LTB 0.09
LTB 0.05

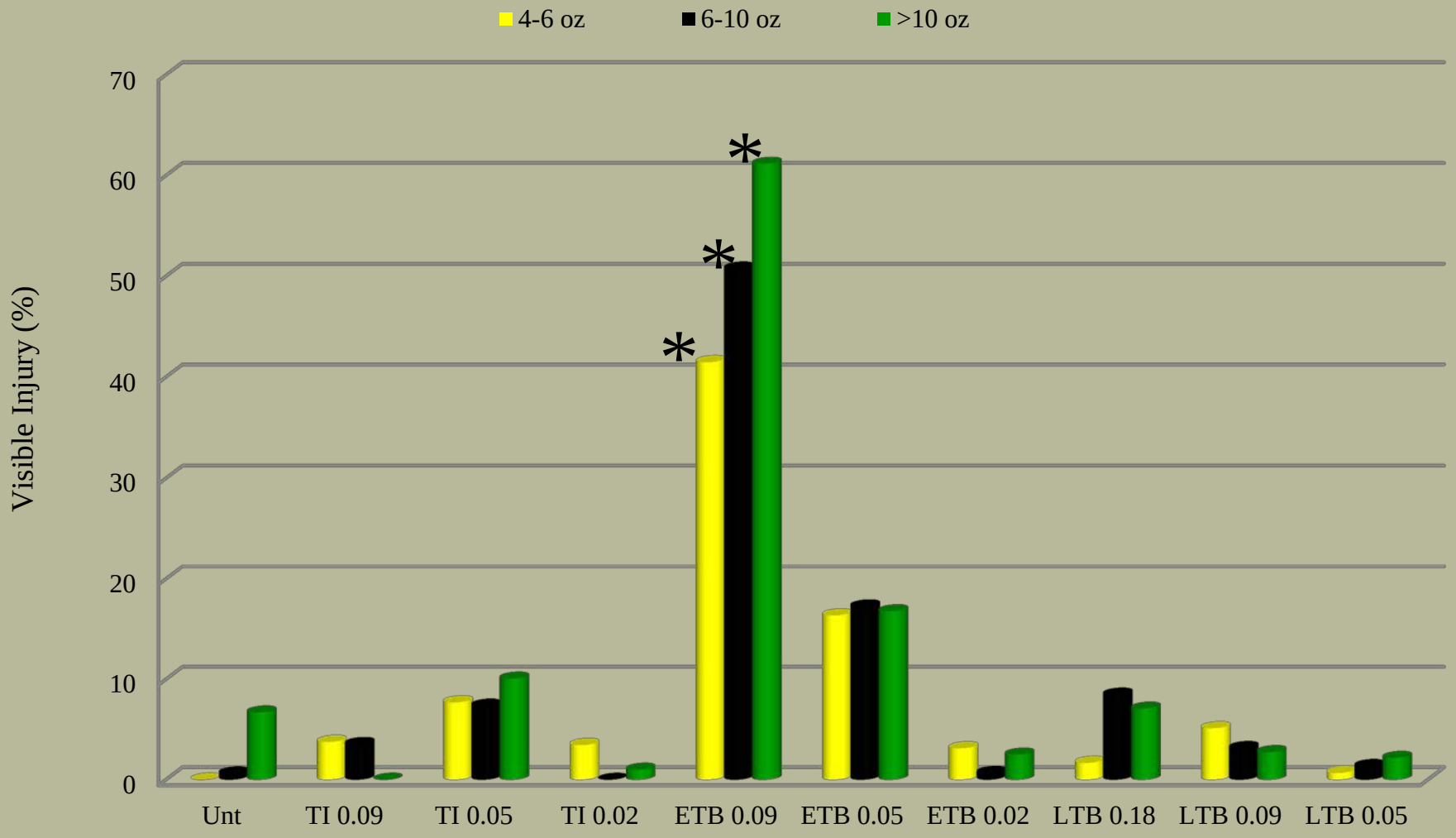
Ranger Tuber Injury



Russet Burbank Tuber Injury



Umatilla Tuber Injury

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301


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306

Conclusions

- Bannock – most sensitive

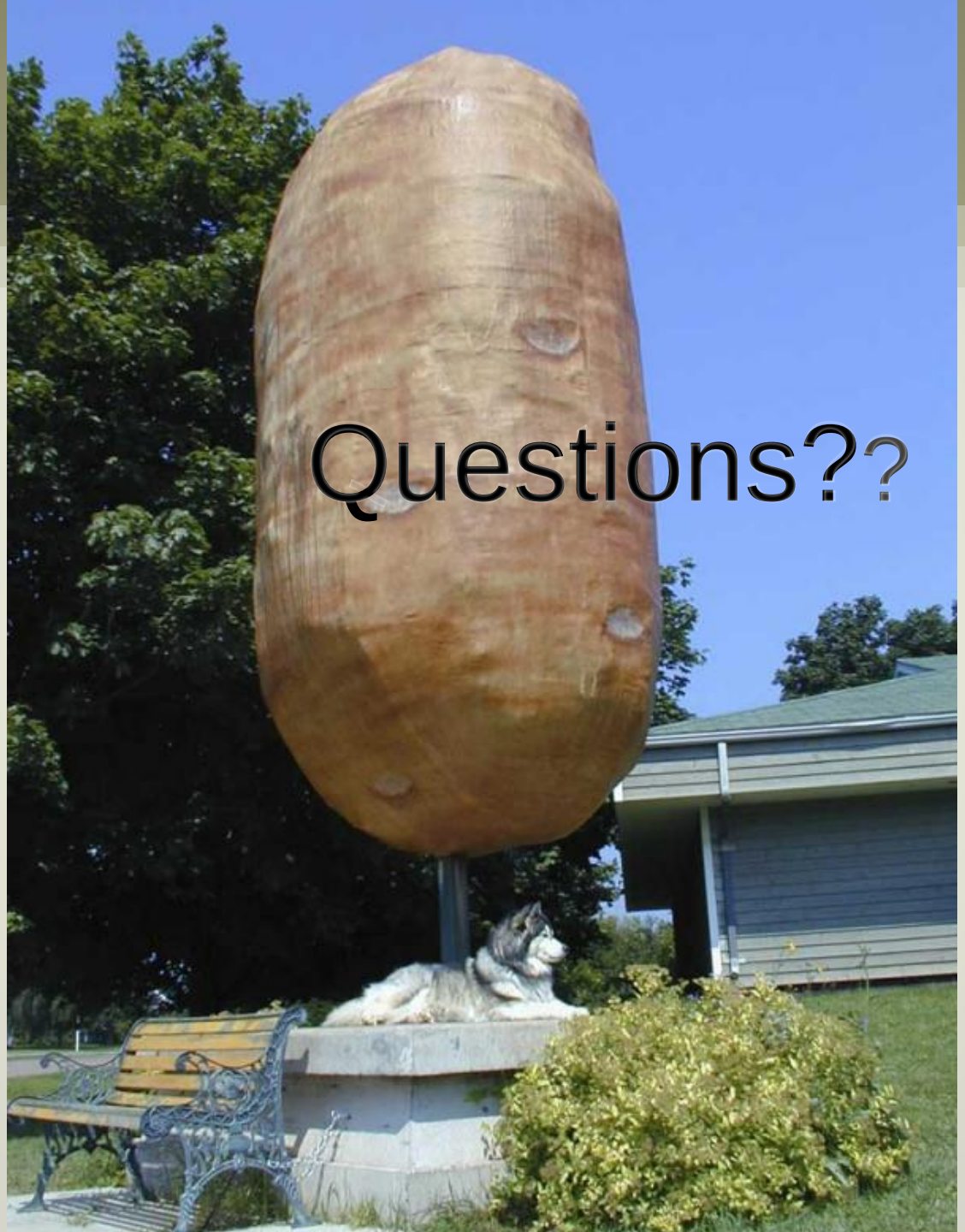
  - Glyphosate at 0.09 lb/A ETB caused reduced total yield compared to untreated
    - More < 4 oz tubers
    - Fewer 6-10 oz tubers
    - Fewer > 10 oz tubers
  - Glyphosate at 0.05 lb/A ETB or higher caused more imperfections in 4-6 oz tubers
  - Glyphosate at 0.09 lb/A ETB caused more imperfections in 6-10 & >10 oz tubers

Conclusions

- **Ranger Russet – least sensitive**
  - **Glyphosate did not reduce total or graded yields compared to untreated**
  - **Glyphosate at 0.09 lb/A ETB caused more imperfections in 4-6 & 6-10 oz tubers**

What's Next?

- Elisa assay to identify glyphosate residue
  - For seed producer
  - For grower
- Sensitivity of potato cultivars
  - Irrigated
  - Dry land
- Influence of environment


Questions??