Weed & Crop Emergence & Management in Strip Tillage

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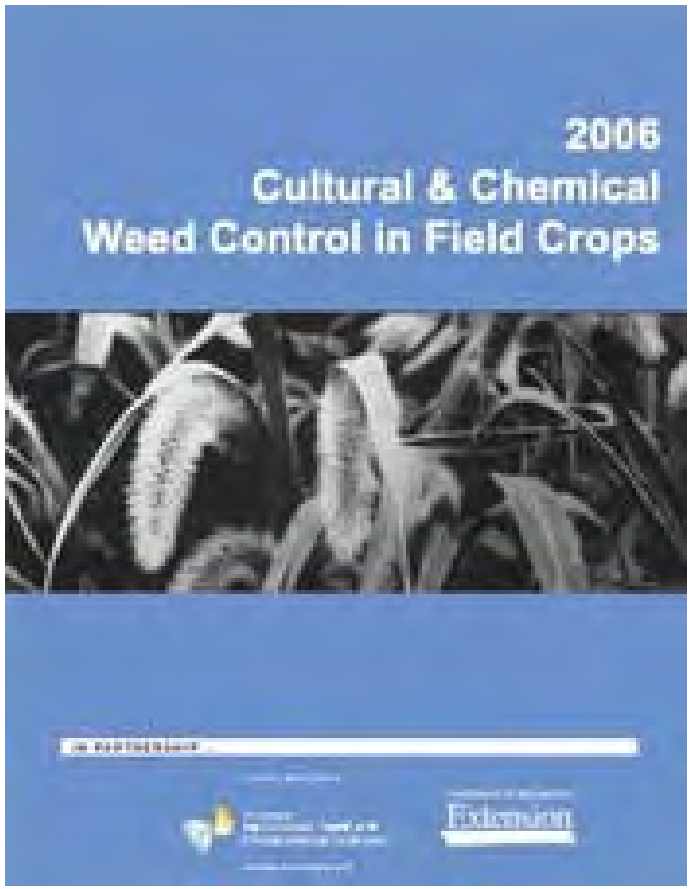
Two-year study near Morris

- Comparison of 5 tillage systems
  - NT, no-till
  - SS, strip-till shallow
  - SD, strip-till deep
  - CP, chisel plow
  - MP, moldboard plow
- Crop stand & emergence rates
- Weed density & emergence rates
  - Row, wheel track, and interrow sites
- Implications for management

Herbicide recommendations

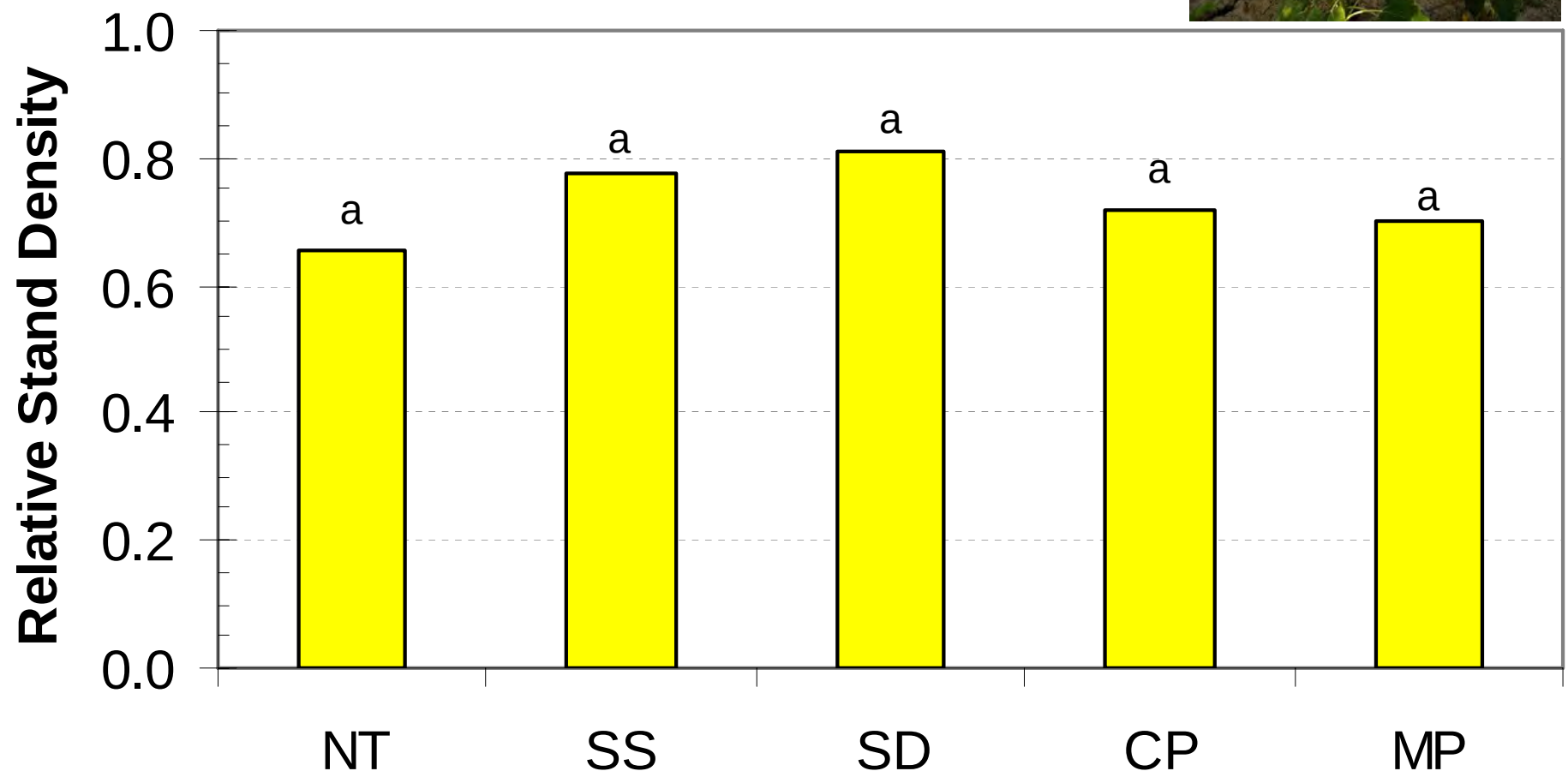


http://appliedweeds.coafes.umn.edu/pubsweedbull.html

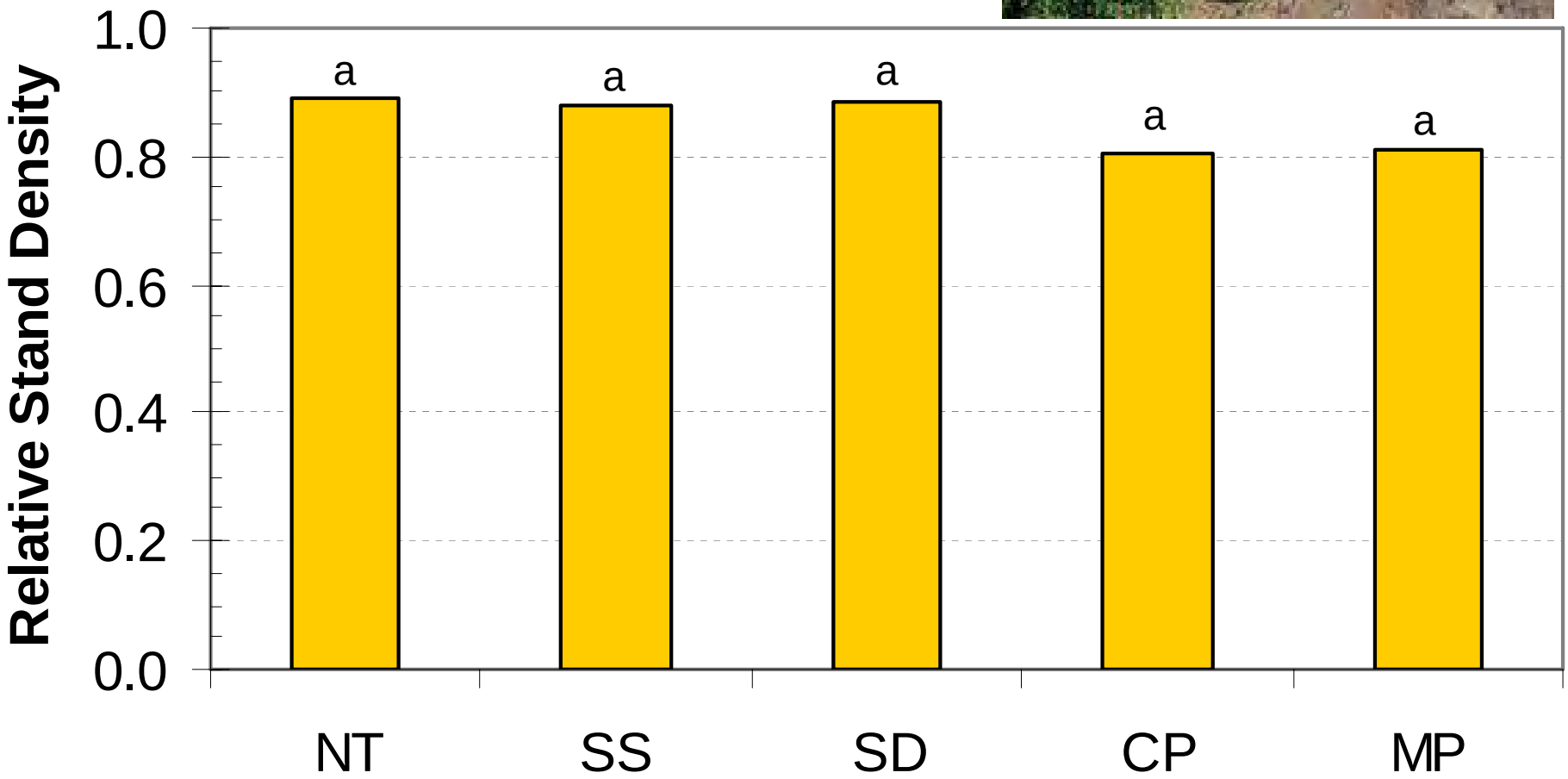
Average Crop Stands

- Sunflower 30,000 / A
- Soybean 98,000 / A
- Corn 25,000 / A

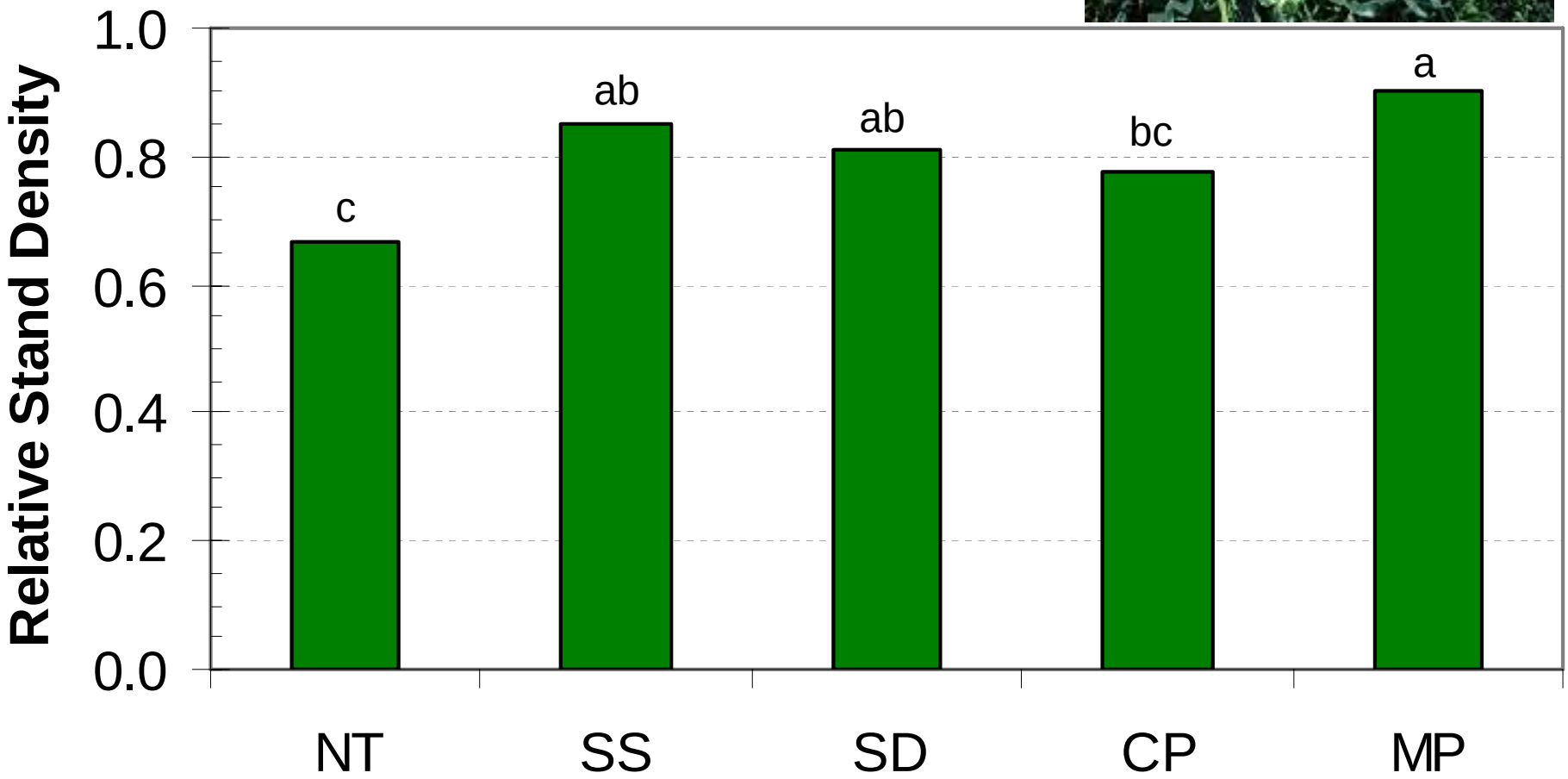
Sunflower



Soybean



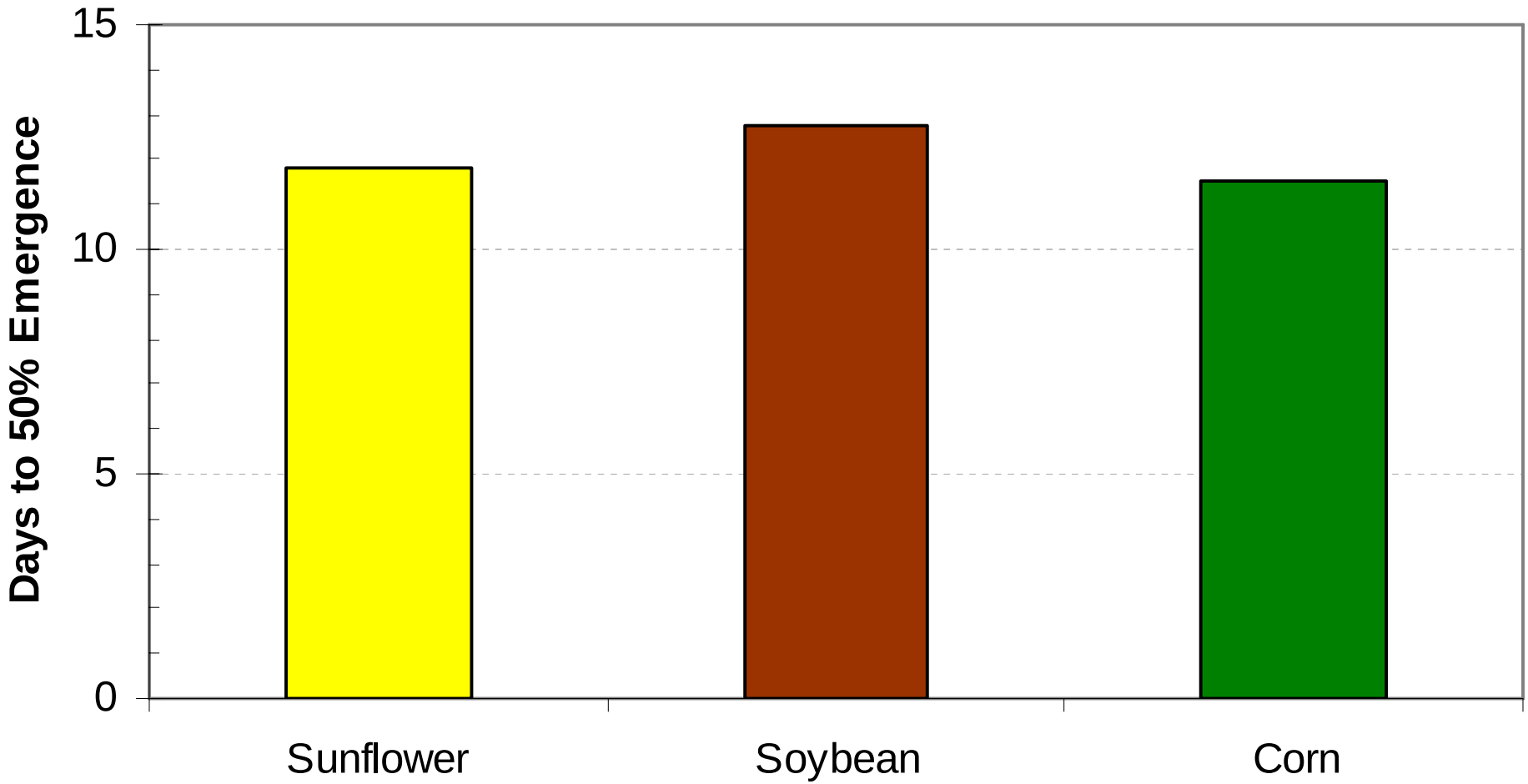
Corn


Relative Stand Density
1.0
0.8
0.6
0.4
0.2
0.0
c
ab
ab
bc
a
NT
SS
SD
CP
MP

Summary of crop stands

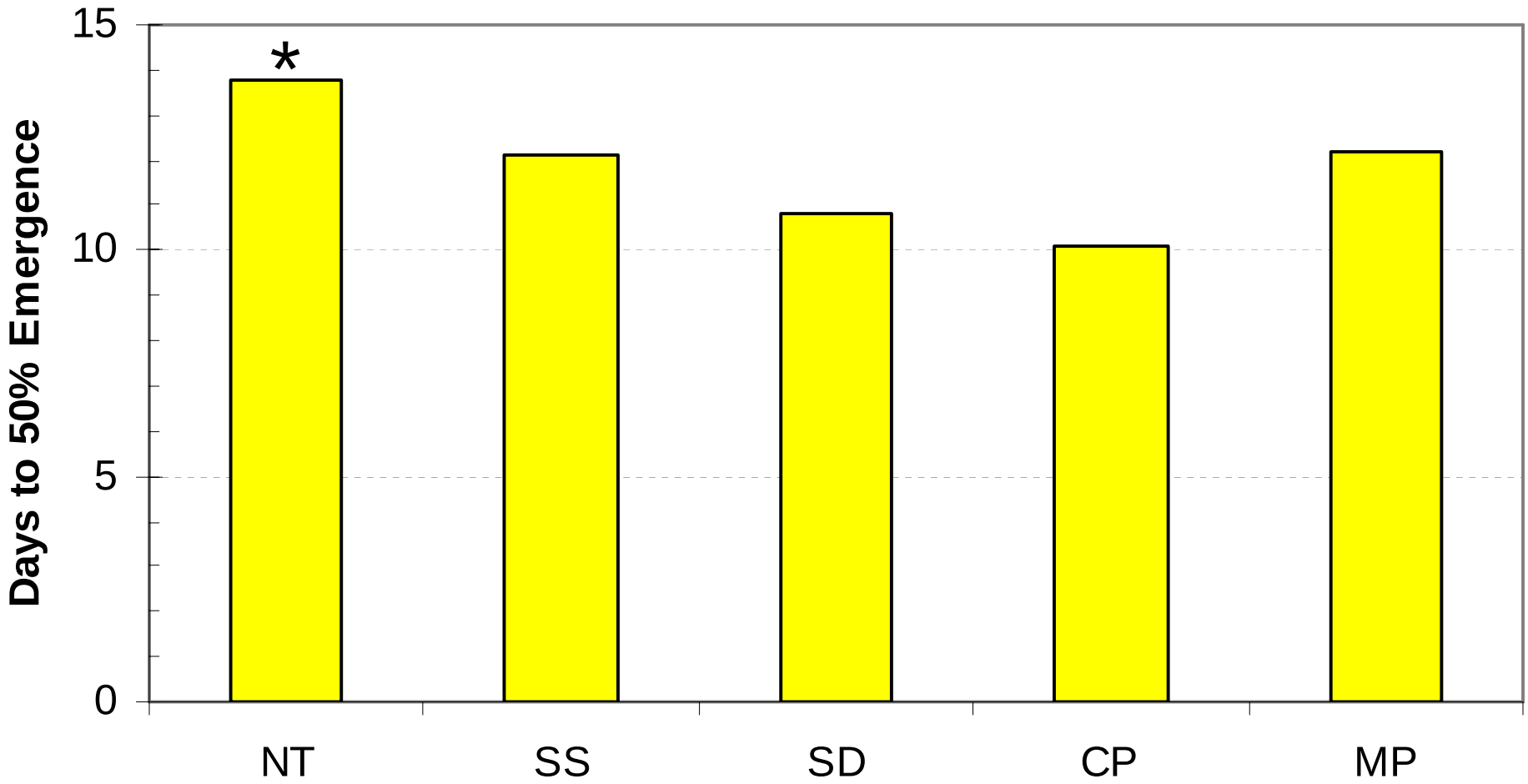
- Basically, good crop varieties don’t care much about tillage.
- The exception is corn. It’s stands can be reduced in no-till.
- Possible solution: Plant 10 to 20% more seeds in no-till.

Crop Emergence Rates



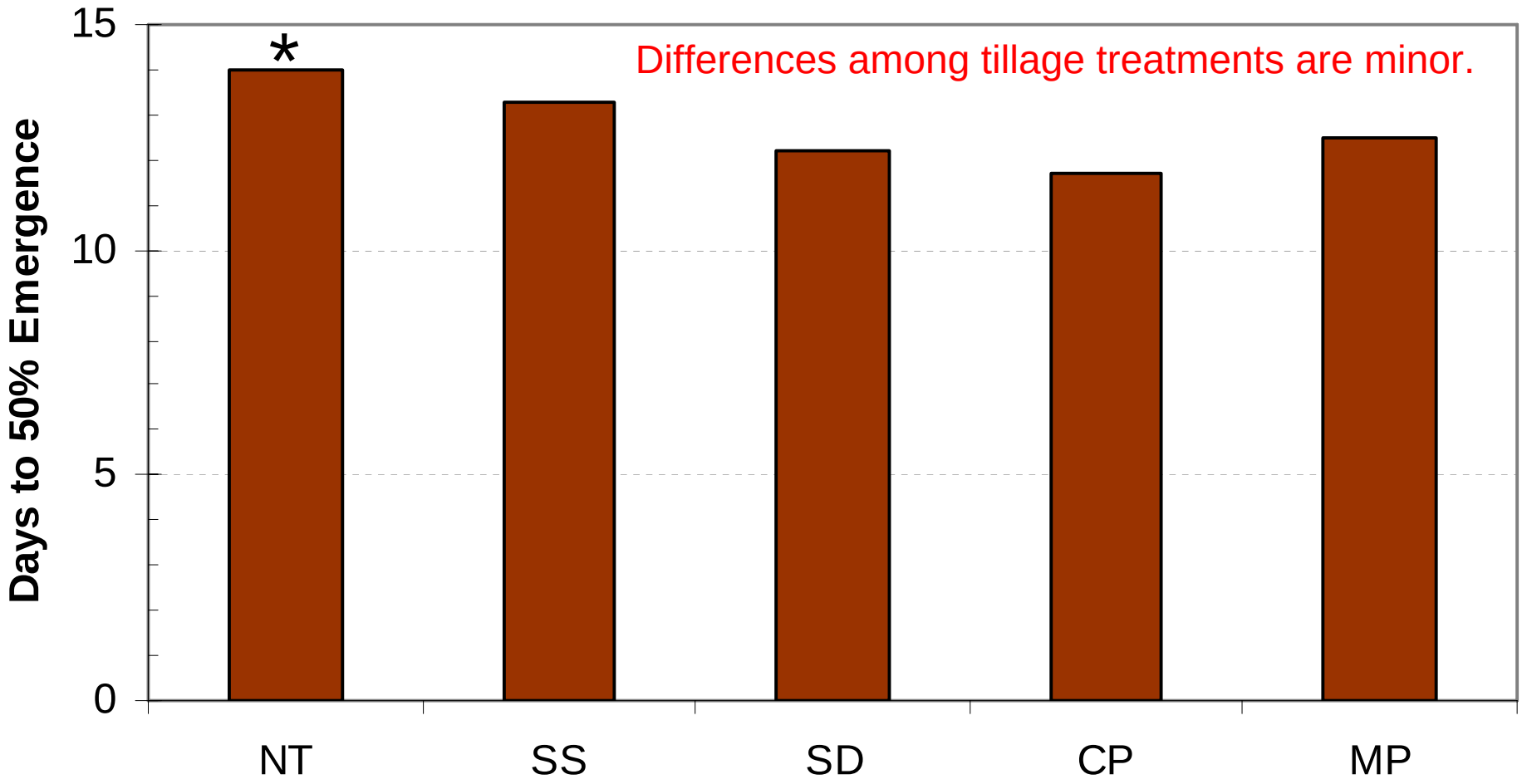
Sunflower Emergence

(Less is better; * = consistently worse than best)



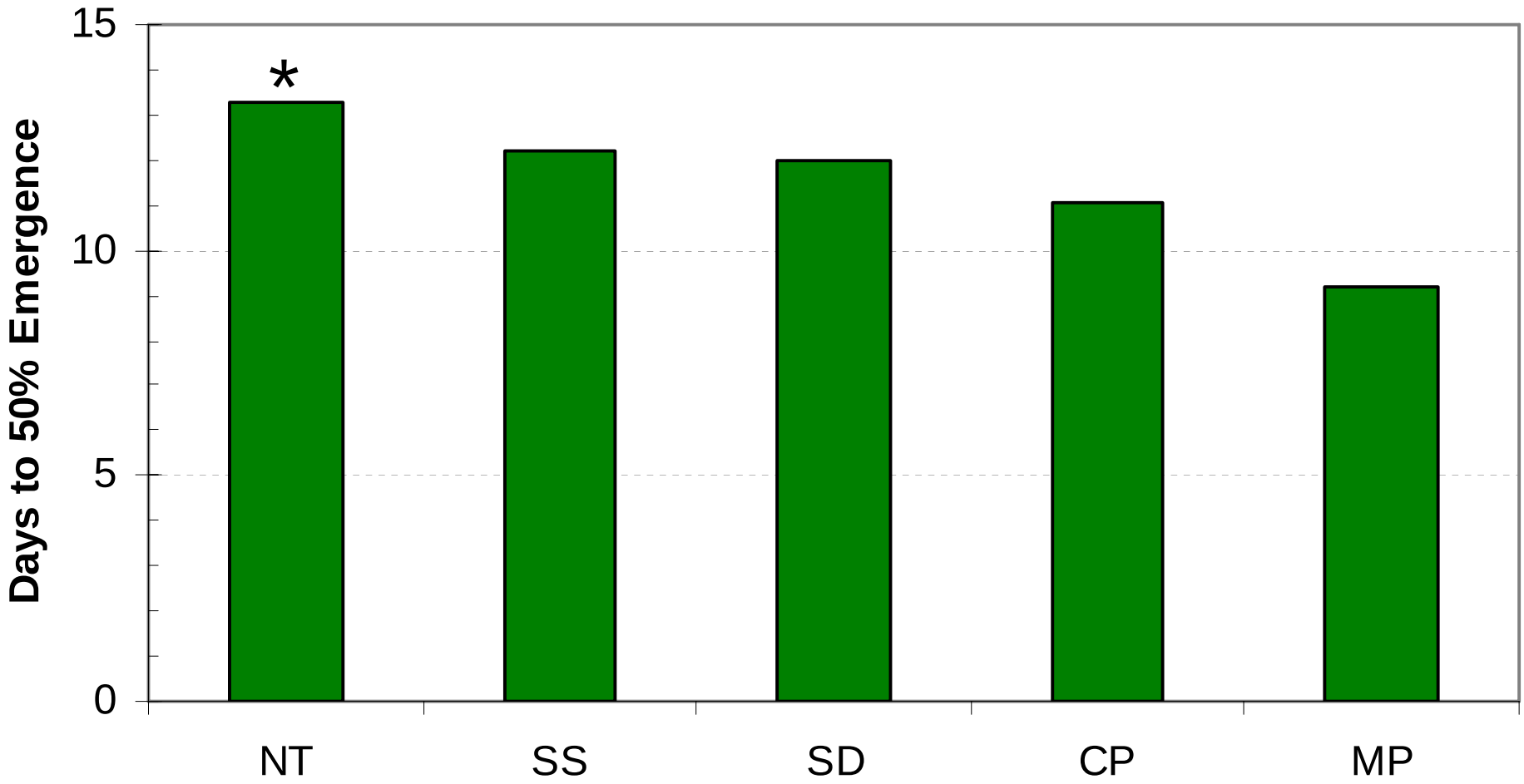
Soybean Emergence

(Less is better; * = consistently worse than best)



Corn Emergence

(Less is better; * = consistently worse than best)



Summary of crop emergence rates

- No-till causes delays in emergence of all crops.
- Strip-till, especially deep strip-till, never differs from best treatment.
- Differences for soybean probably are not important, but may be so for other crops.

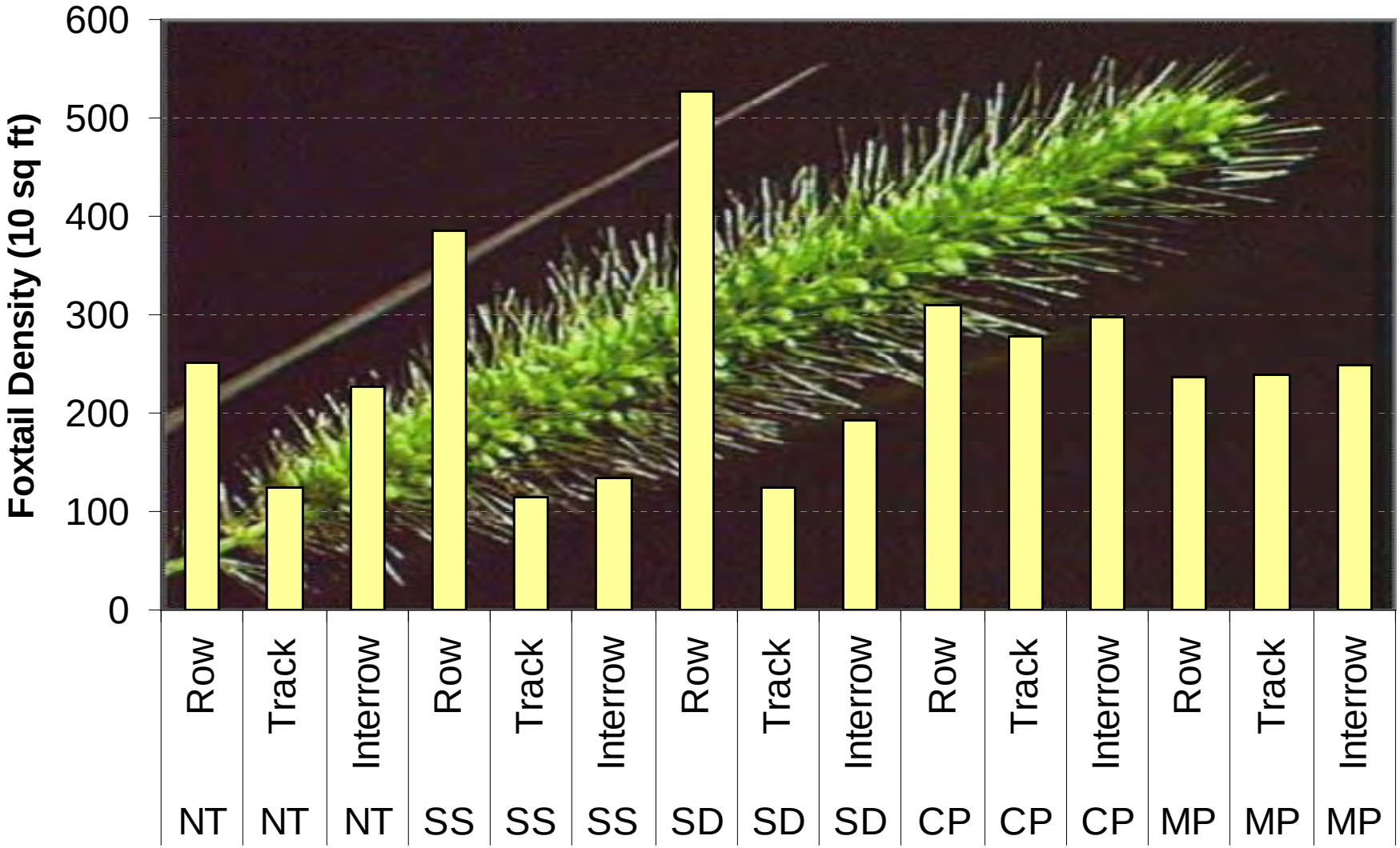
Weed Densities

Foxtail
(Pigeon grass)

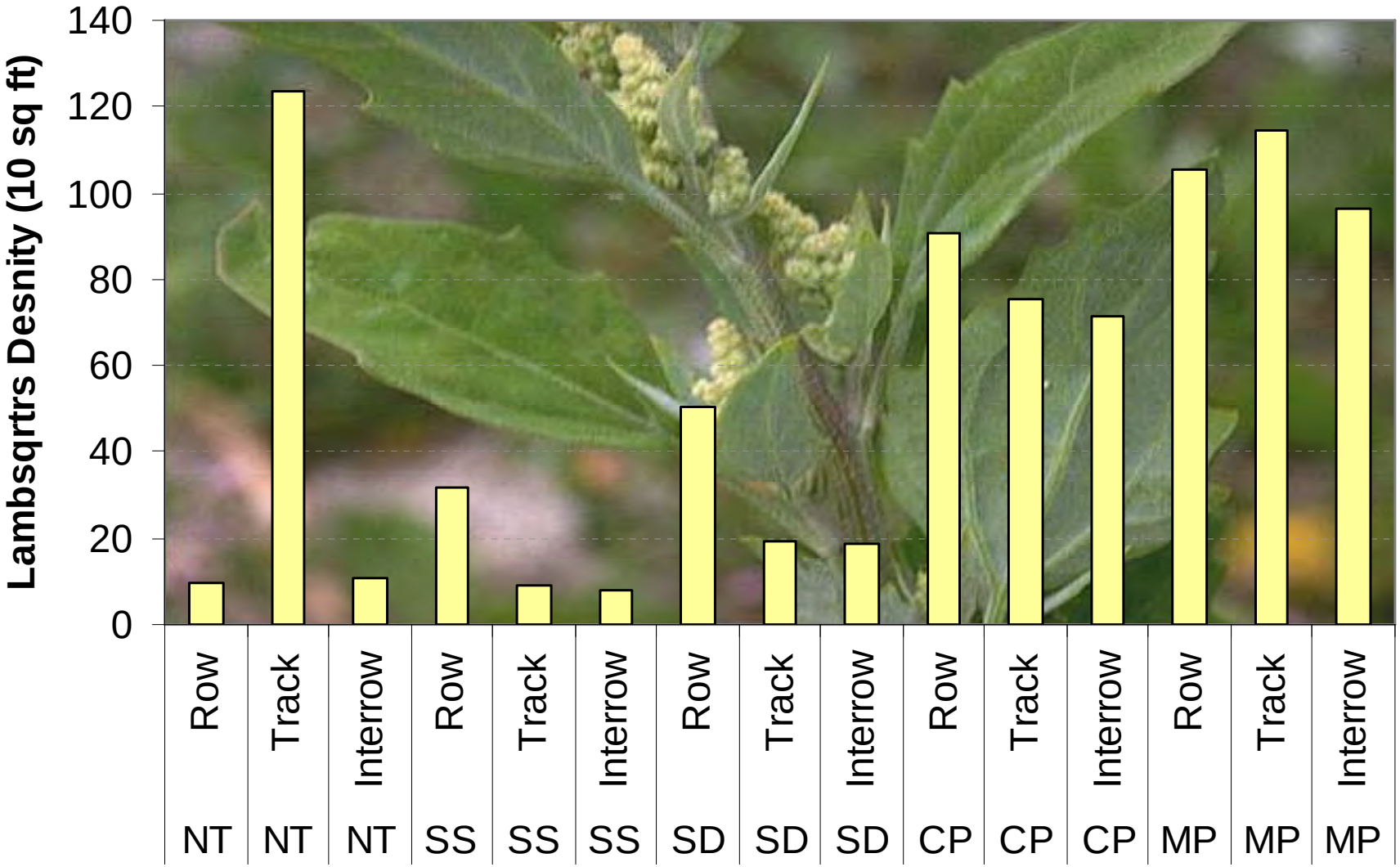
Common
lambsquarters

Wild mustard

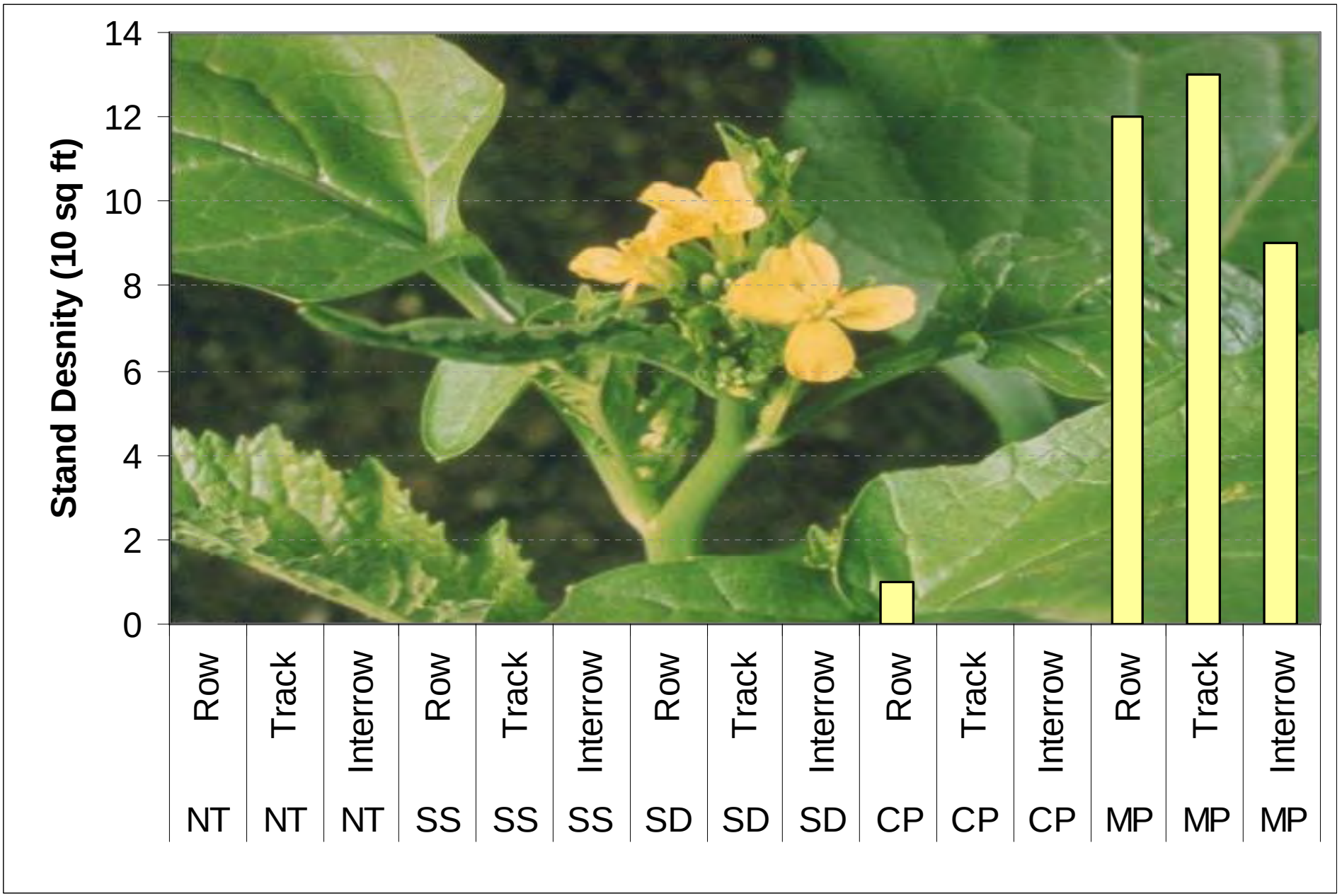
Foxtail Densities



Lambsquarters Densities



Wild Mustard Densities



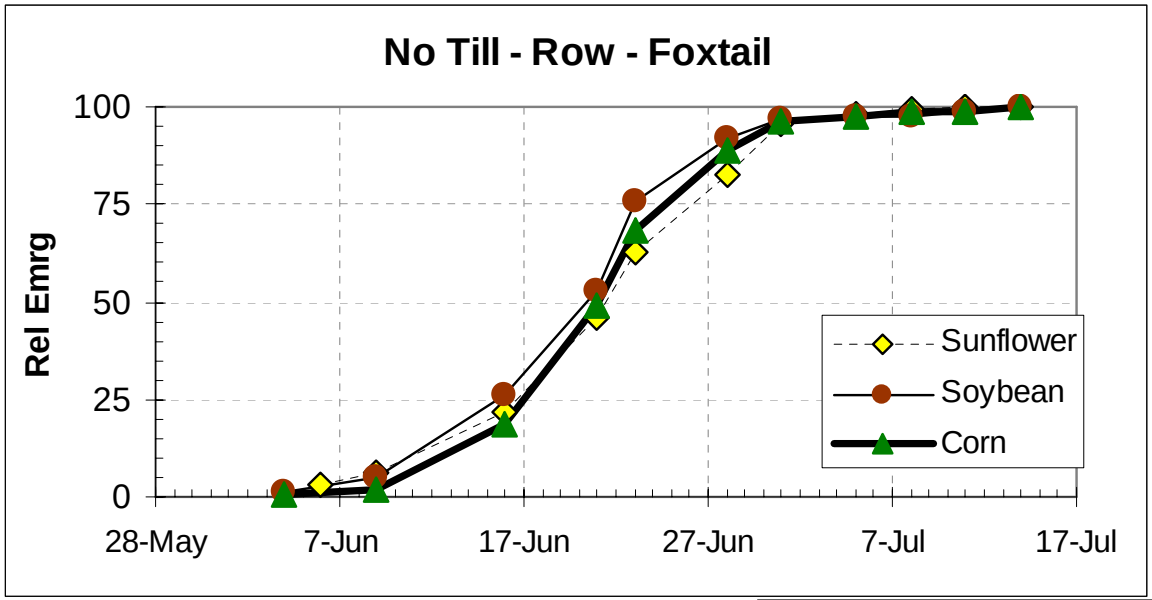
Summary of weed densities

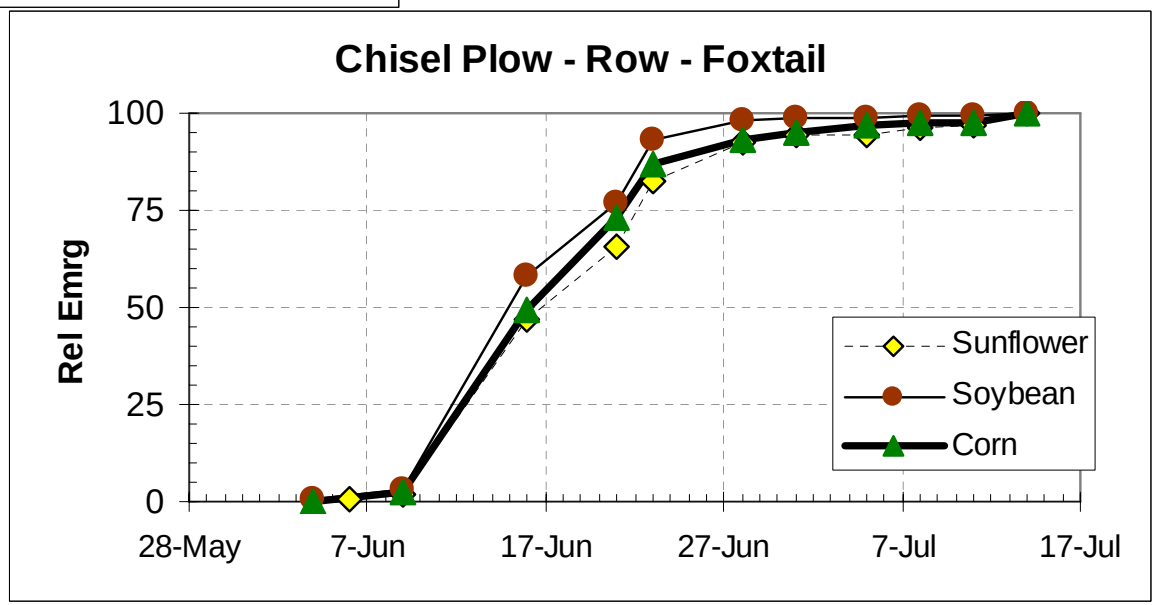
- Foxtail is an all-purpose weed. It handles all tillage systems well. Prefers rows in reduced tillage system.

- Lambsquarters clearly prefers plowed soils, but also can be abundant in reduced tillage.

- Wild mustard is restricted to plowed soils.

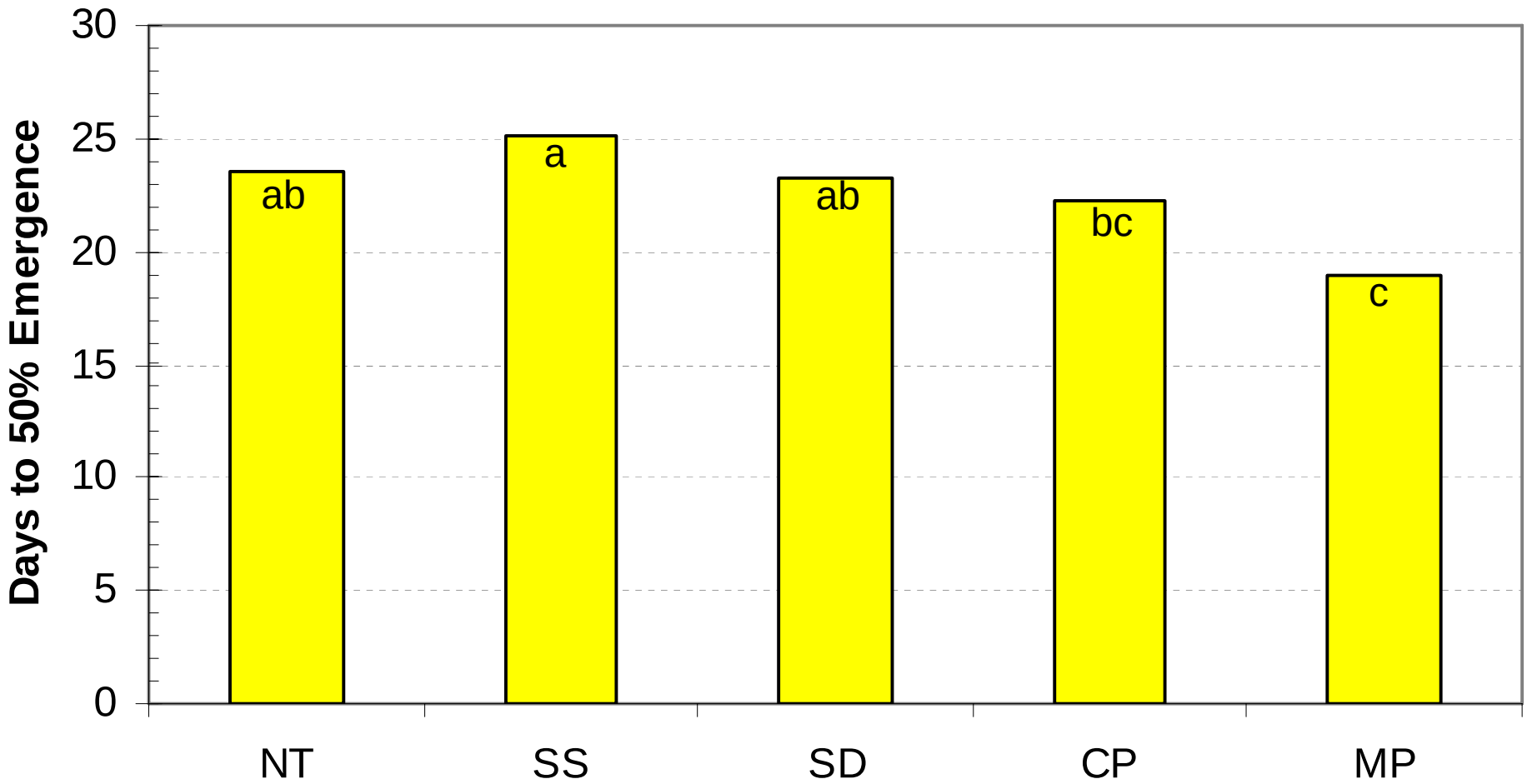
Comparing weed emergence





Foxtail Emergence

(Unlike in crops, high is better. Weeds that emerge slowly compete poorly with crops.)



Lambsquarters Emergence

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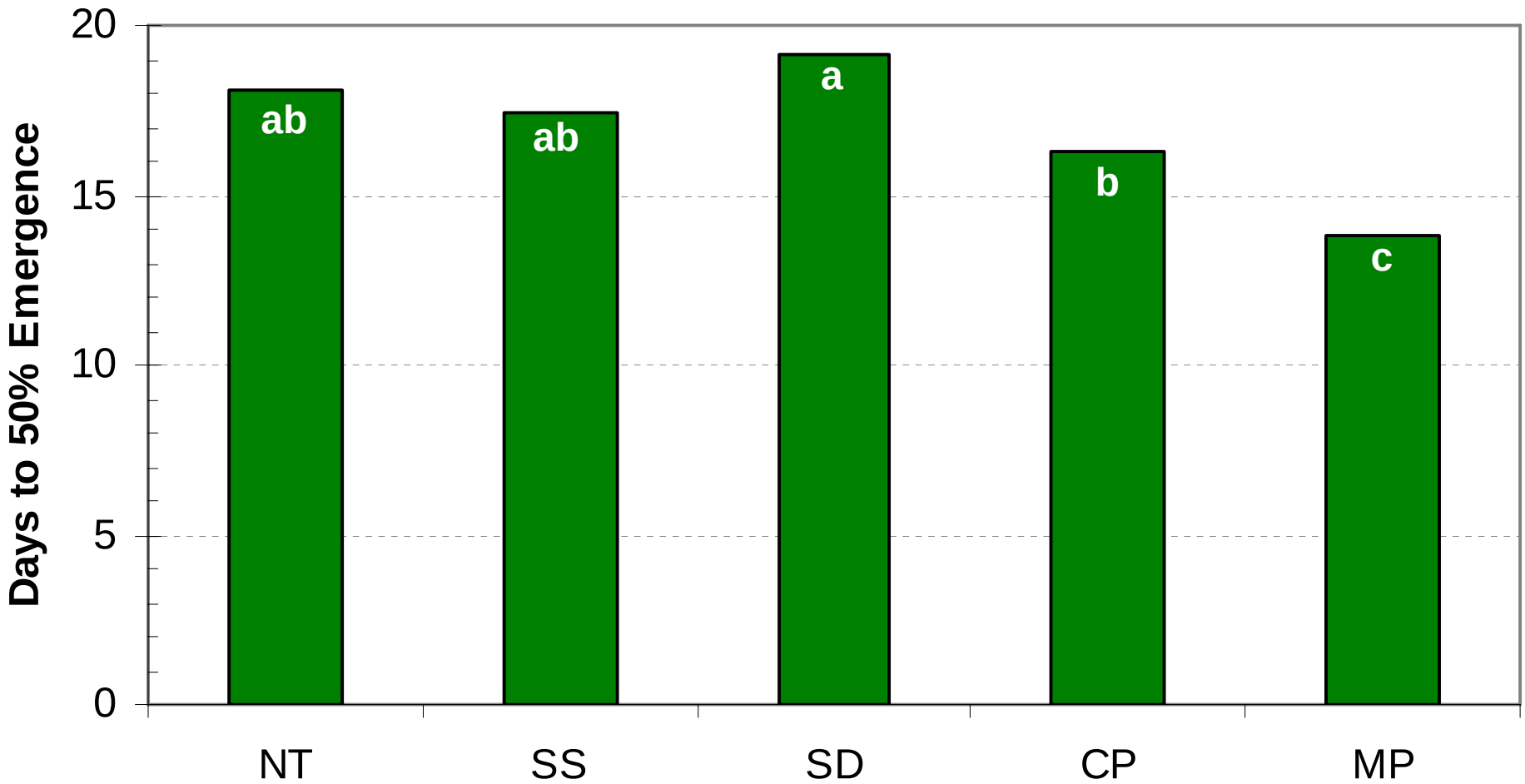

Weed Emergence

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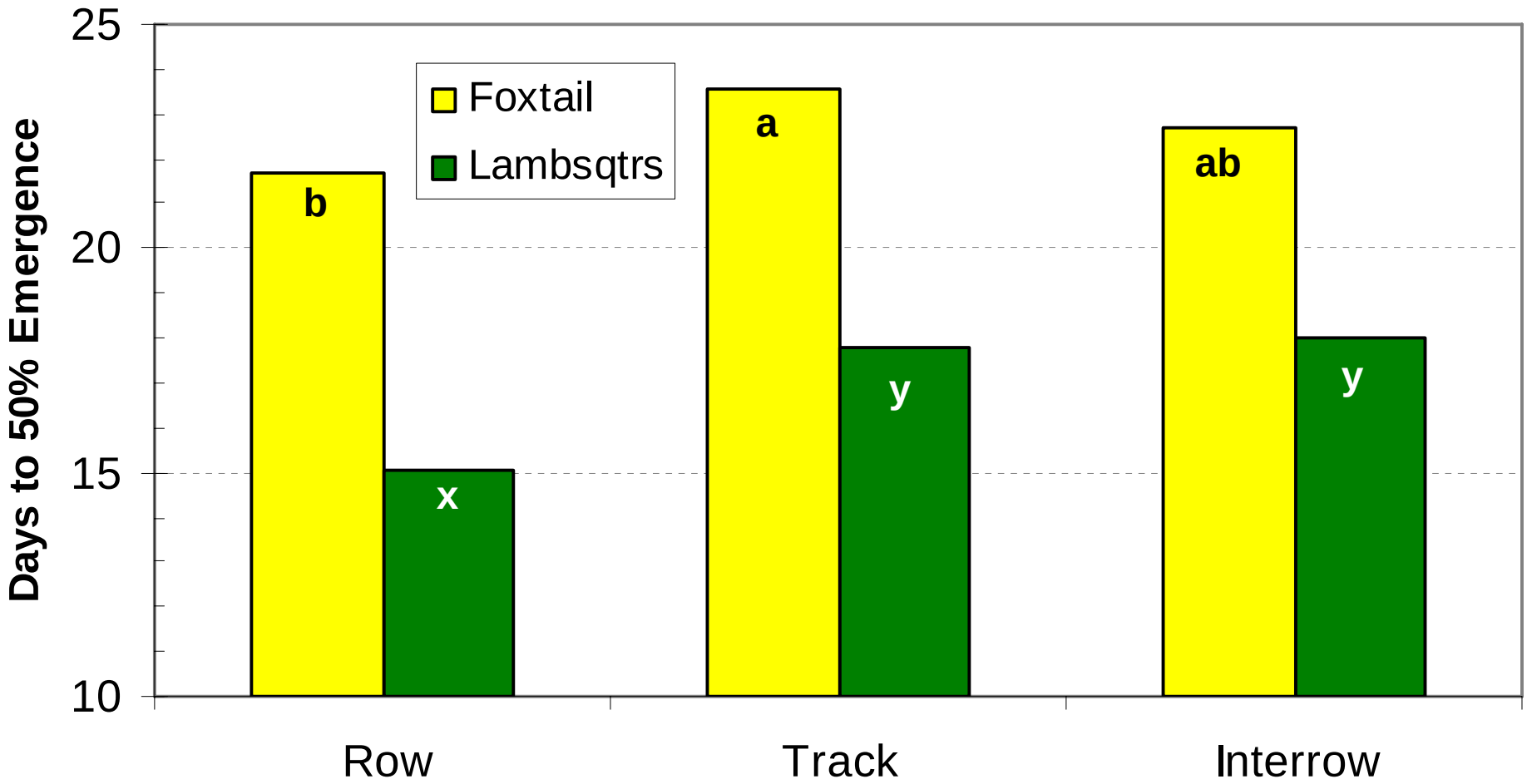
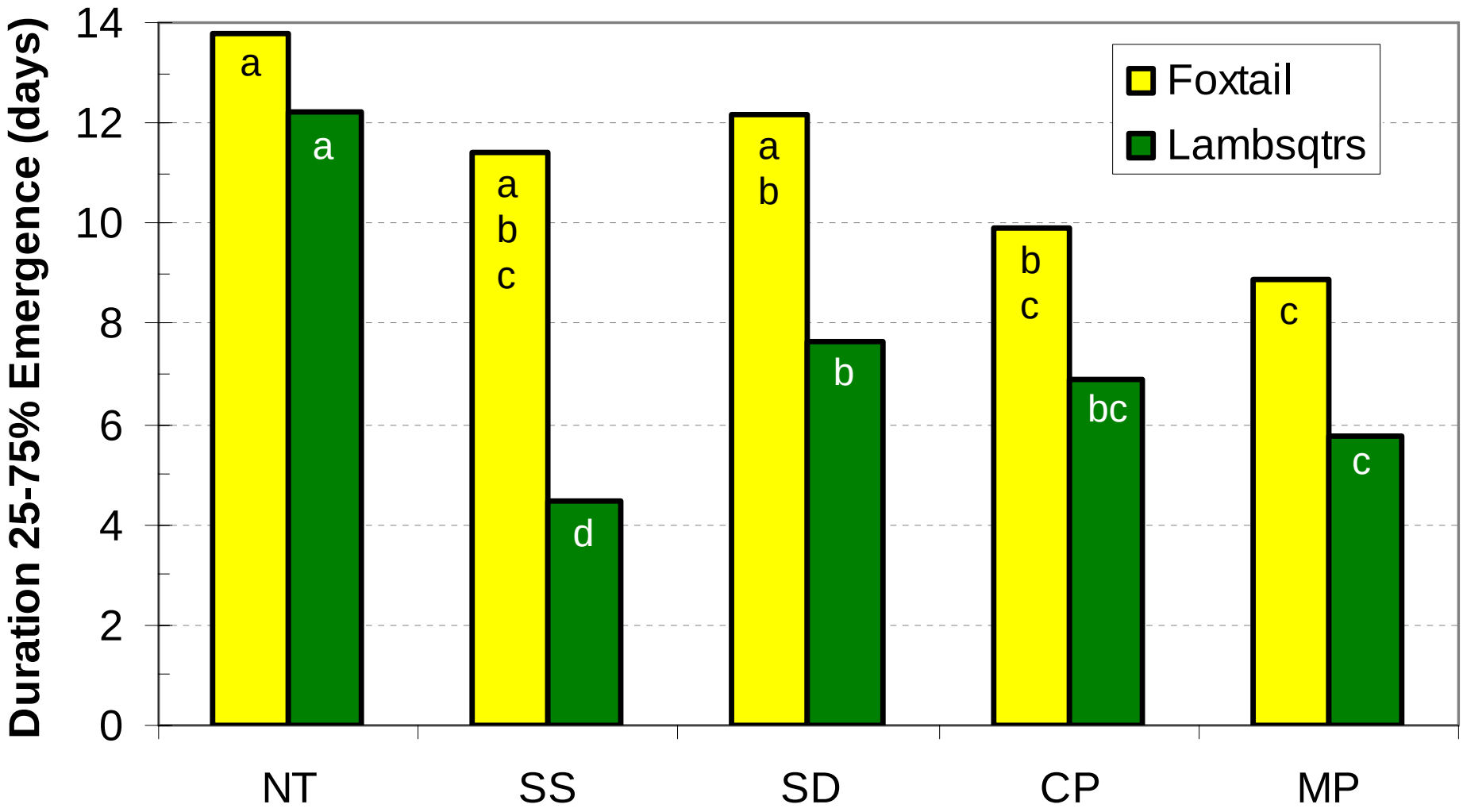


Weed emergence duration

(Time between 25% & 75% emergence)



Summary of weed emergence rates

- Reduced tillage causes delays in weed emergence.
- Delays also seen in wheel-track and interrow areas.
- Delayed weed emergence reduces crop-weed competition.
- Short-duration of weed emergence makes weed control easier, but harder if it is prolonged (foxtail in strip-till).

Overall Summary for Strip Till

- Strip-till effects on crop densities & emergence rates are not unique.
- Strip-till impacts foxtail little, limits lambsquarters, & eliminates mustard.
- Strip-till delays & prolongs emergence of foxtail.
- Strip-till delays & shortens emergence of lambsquarters.
- PRE grass herbicides are advisable (e.g., Dual, Harness/Surpass) fb POST herbicides, even in RR crops. ($10-$15 / A)