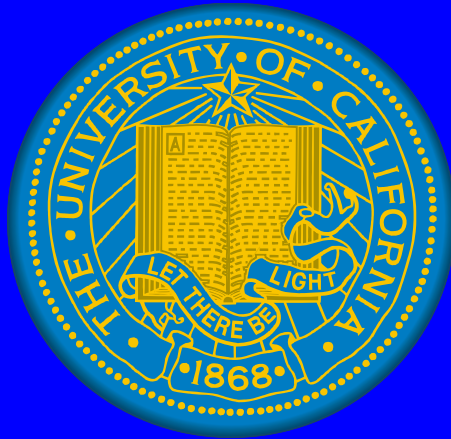


Evaluation of Potential Carryover of Zeus Herbicide to Rotational Vegetables

Steve Fennimore & John Rachuy

University of California-Davis, Salinas, CA



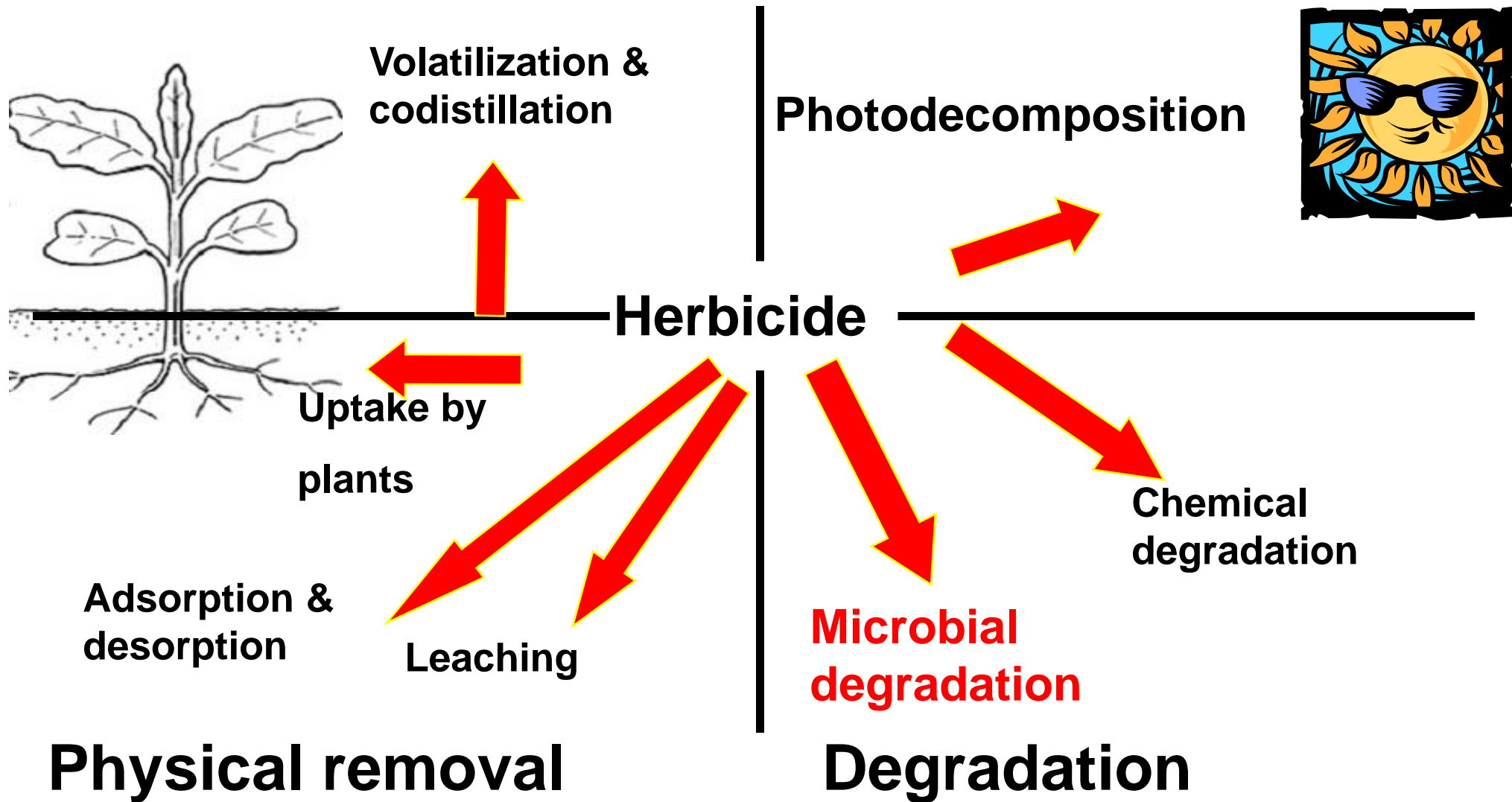


Green Onion	Carrot
Treatment #4	
V-10142 3.3FL	
0.4 lb a/Ac	
4 Mos. B4 Seeding	

Herbicide carryover

- ❖ Ideally we want herbicide activity on weeds for the duration of the crop season, then at harvest we want herbicide activity to end.
- ❖ Potential for carryover injury to rotational crops from herbicides is much greater than for fungicides and insecticides due to the spectrum of activity of herbicides.

Fate of herbicides applied to soil



Acknowledgments

- ❖ Thanks to FMC for support of this project
- ❖ Tom Lanini
- ❖ Barry Tickes
- ❖ Alana Miller
- ❖ Julio Corona

Objective

- ❖ Determine the potential for Zeus (sulfentrazone) to carryover to vegetables in the Salinas Valley.

Key dates (planting)

- ❖ July 21, 2010 – 365 days
- ❖ October 22, 2010 – 270 days
- ❖ January 18, 2011 – 180 days
- ❖ April 20, 2011 – 90 days
- ❖ July 22, 2011 – 0 days

Trial design

- ❖ A split plot with treatments replicated 4 times.
- ❖ The factors were:
 - ❖ a) Zeus rate 0.1 & 0.2 lbs ai/A (3.2 & 6.4 oz/A) – applied with a tractor mounted plot sprayer
 - ❖ b) time – 365, 270, 180, 90 & 0 days before final planting
 - ❖ c) tillage – minimum tillage, conventional tillage
- ❖ Analyzed using SAS GLM – interactions tested Rate * days, Rate * tillage, Days * tillage and rate * days * tillage.

Tillage July 2011

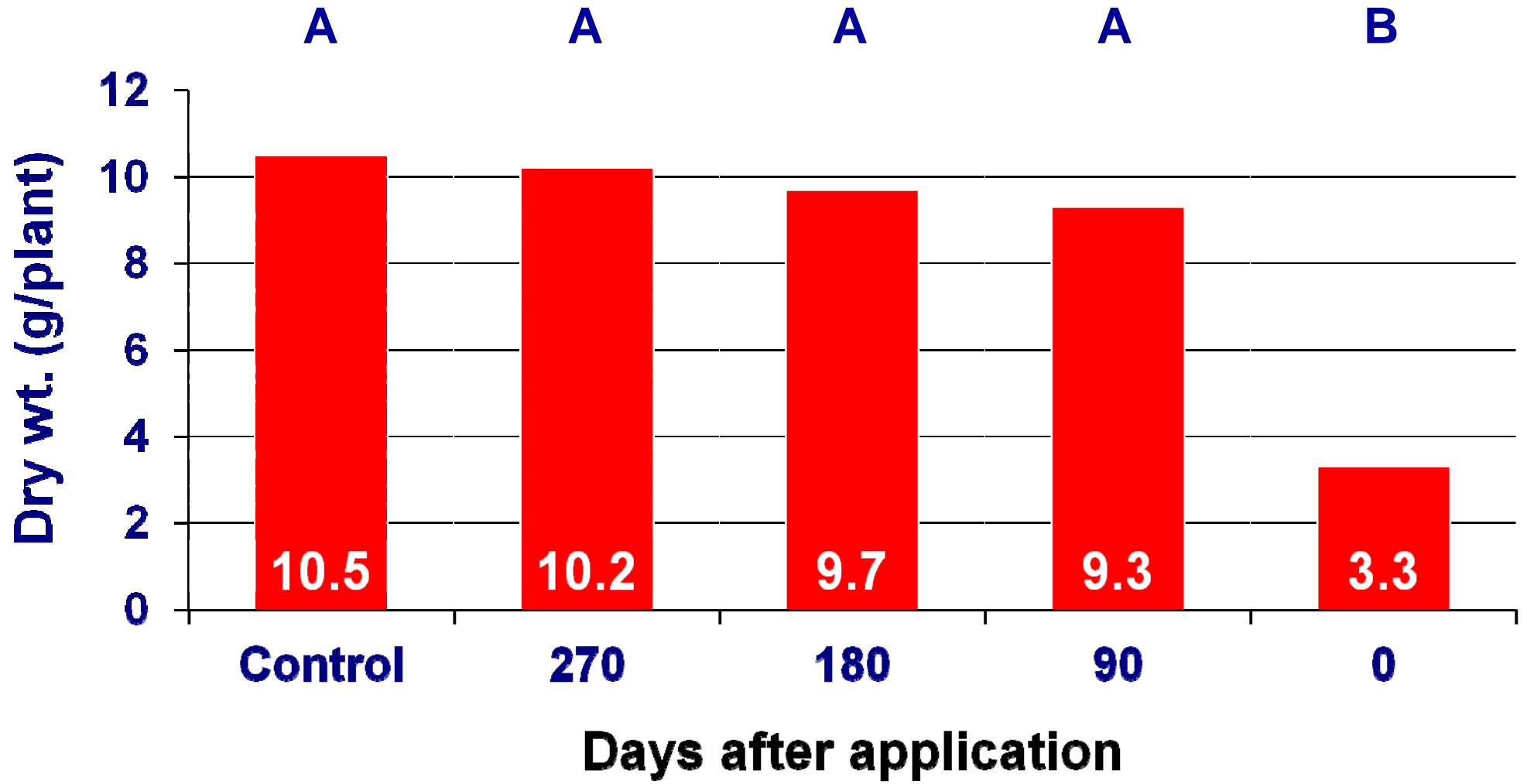
- ❖ **Minimum tillage:** the beds were left intact and lightly tilled 2-inches deep with a bed disk followed by a bedshaper. We deliberately kept the herbicide close to the surface.
- ❖ **Conventional tillage:** the beds were completely disked down and then reformed. The herbicide layer was deliberately blended (diluted) into the top 8- inches of soil by disking.

Harvest

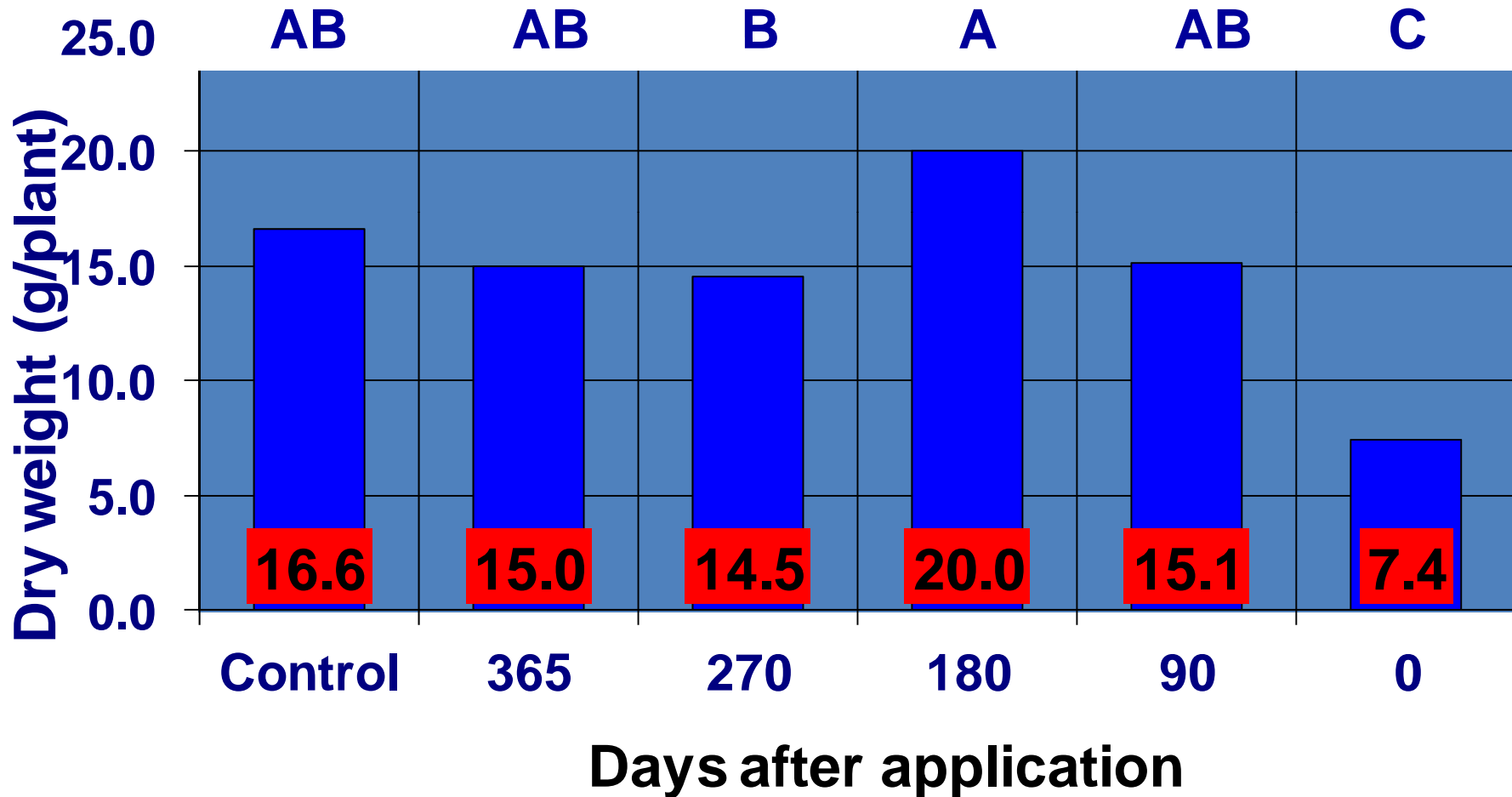
- ❖ Harvest was at or near commercial maturity for carrot, spinach, and bunching onion.
- ❖ Harvest was before commercial maturity for broccoli, lettuce and tomato.
- ❖ Biomass was harvested from 5 ft sample areas and the plant material was placed in a drying oven until dry.

HEAD LETTUCE

Head lett. dry weight (g/plant) April 2011 main effect of time ($P < 0.0001$)

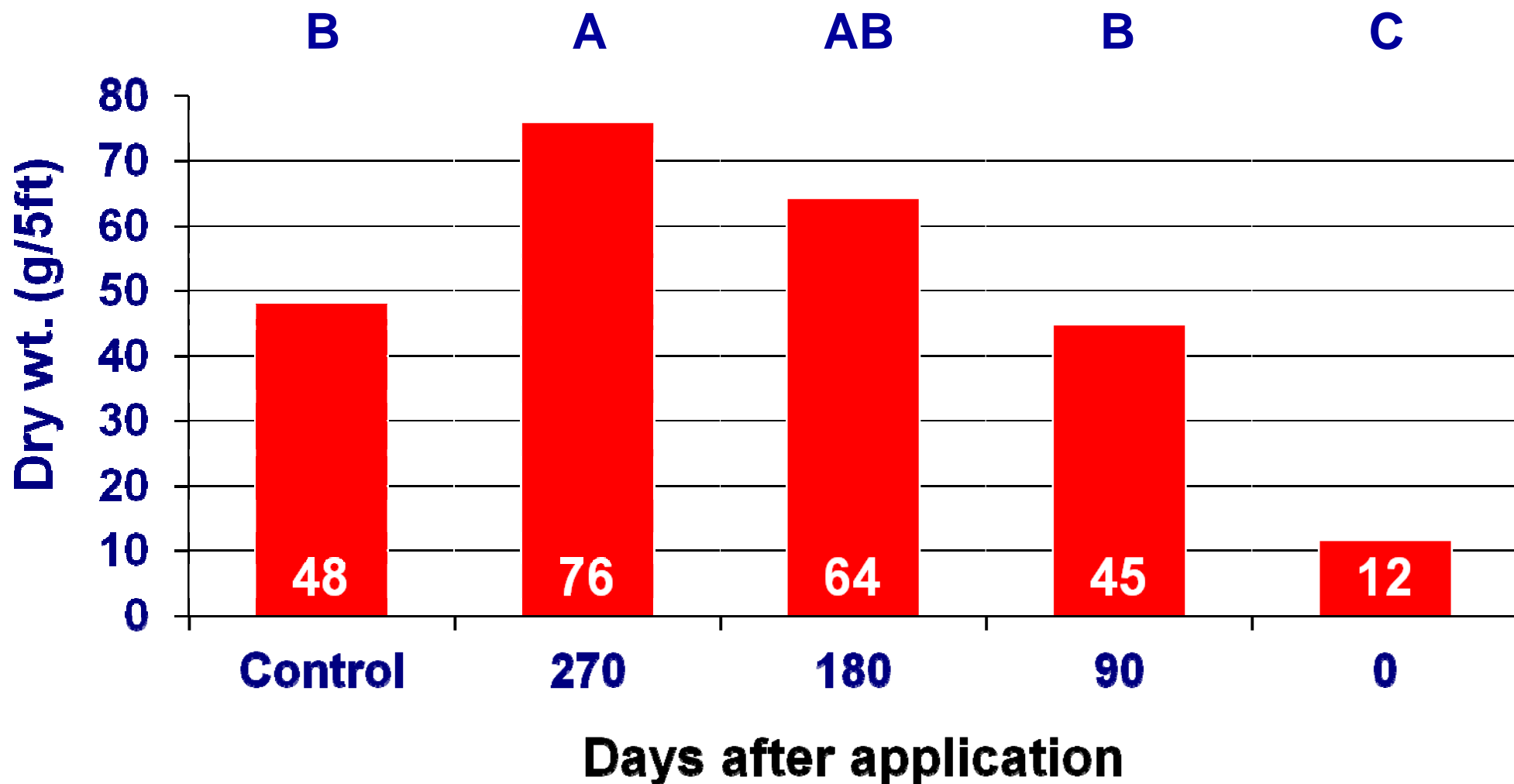


**Head lett. dry weight (g/plant) July
2011 main effect of time
($P < 0.0001$)**

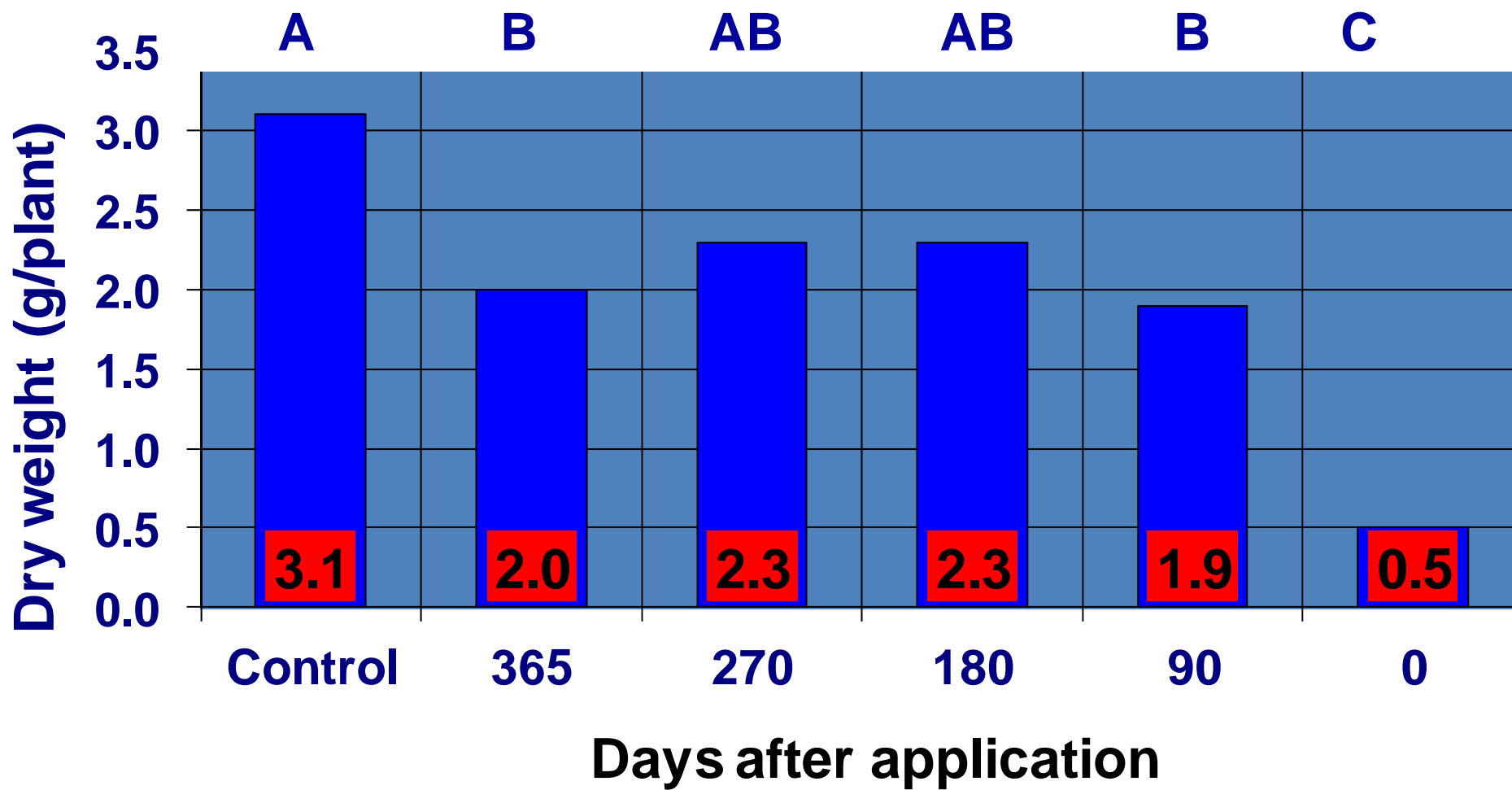


GREEN ONION

Onion dry weight (g/5ft) April 2011 main effect of time (P<0.0001)

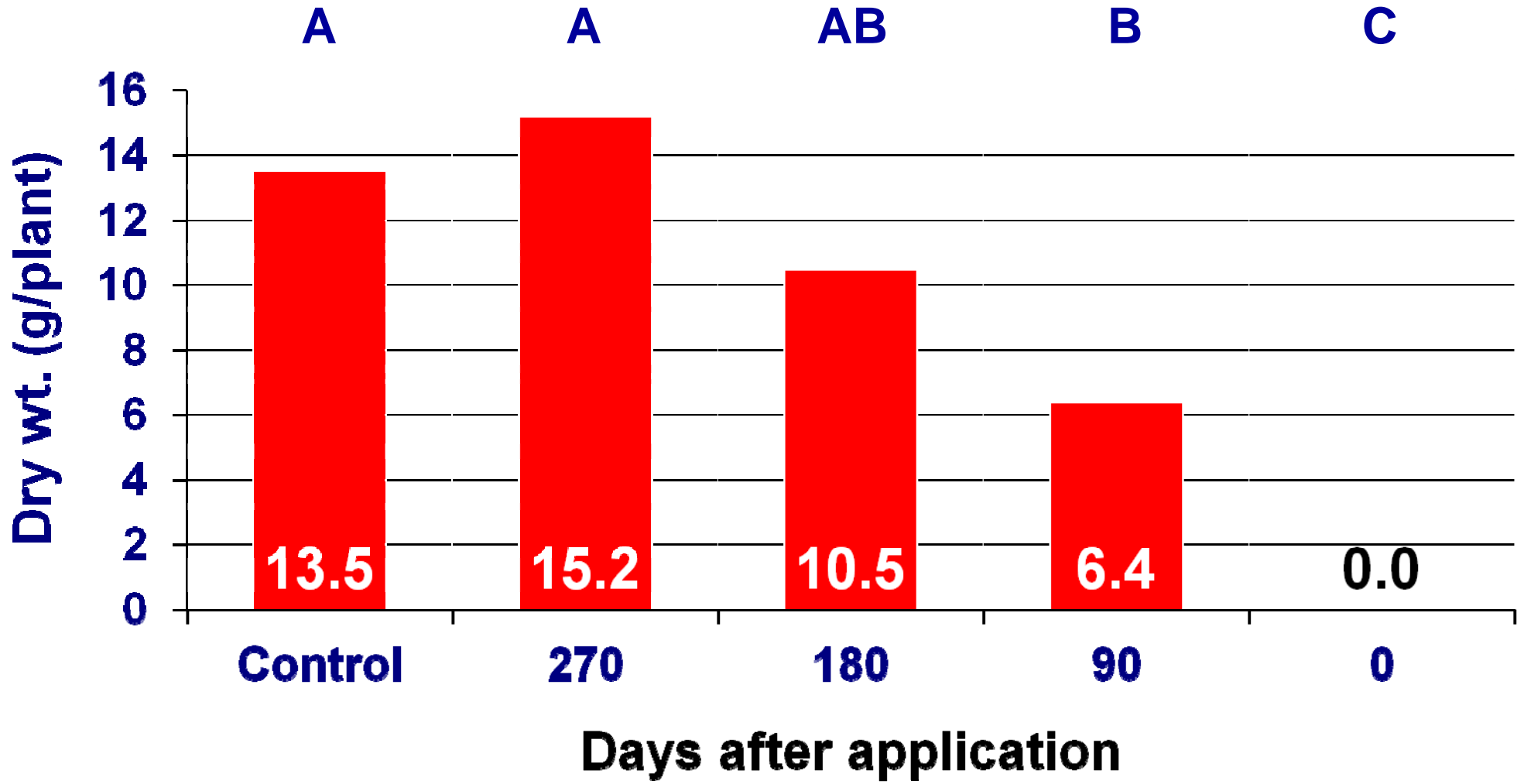


Green onion dry weight (g/plant) July 2011 main effect of time ($P < 0.0001$)

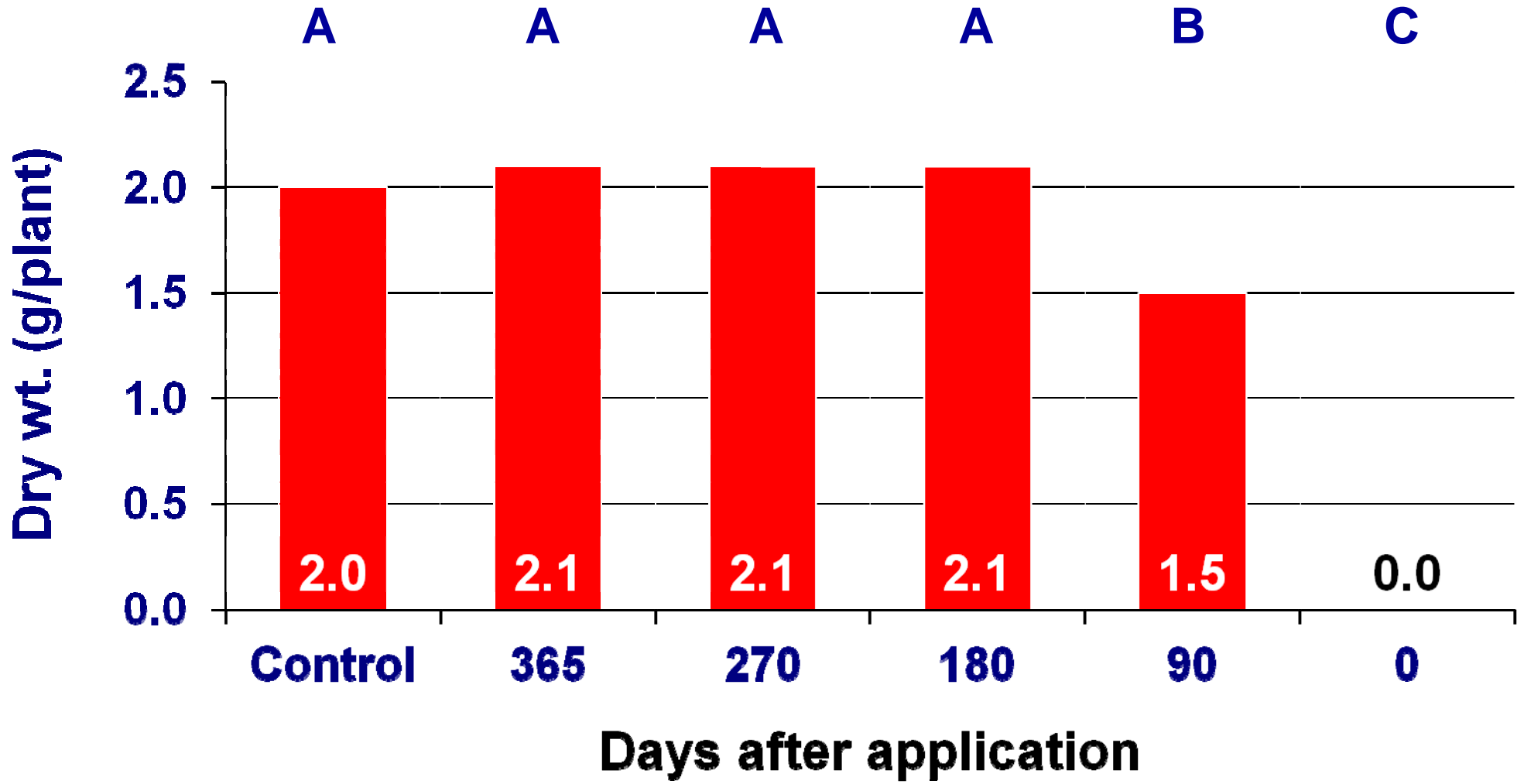


SPINACH

Spinach dry weight (g/plant) April 2011 main effect of time ($P=<0.0001$)



Spinach dry weight (g/plant) July 2011 main effect of time ($P < 0.0001$)



July 2011 Planting – lettuce, onion, spinach



Min Till

365 day

270 Day

180 Day

90 Day

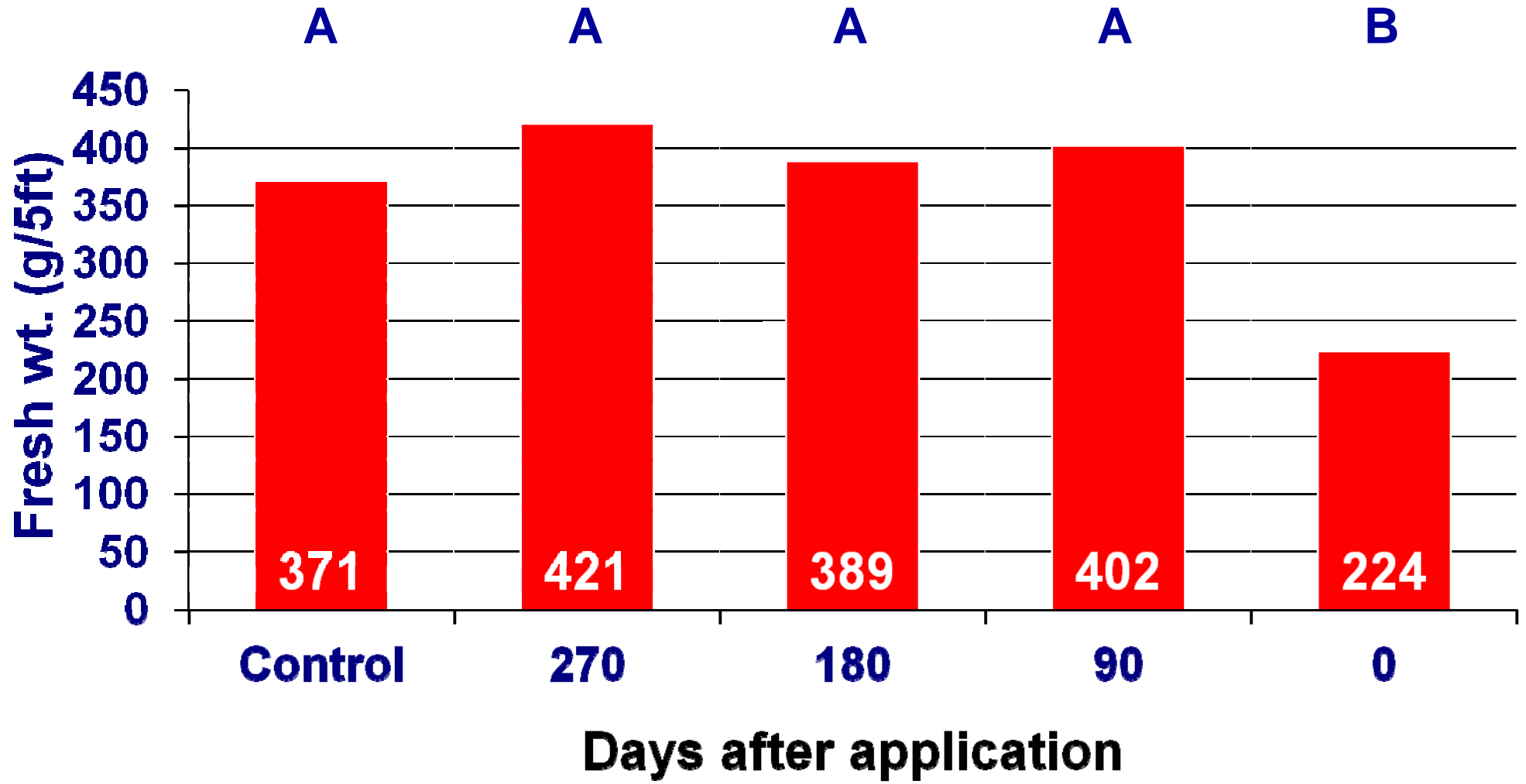
0 Day



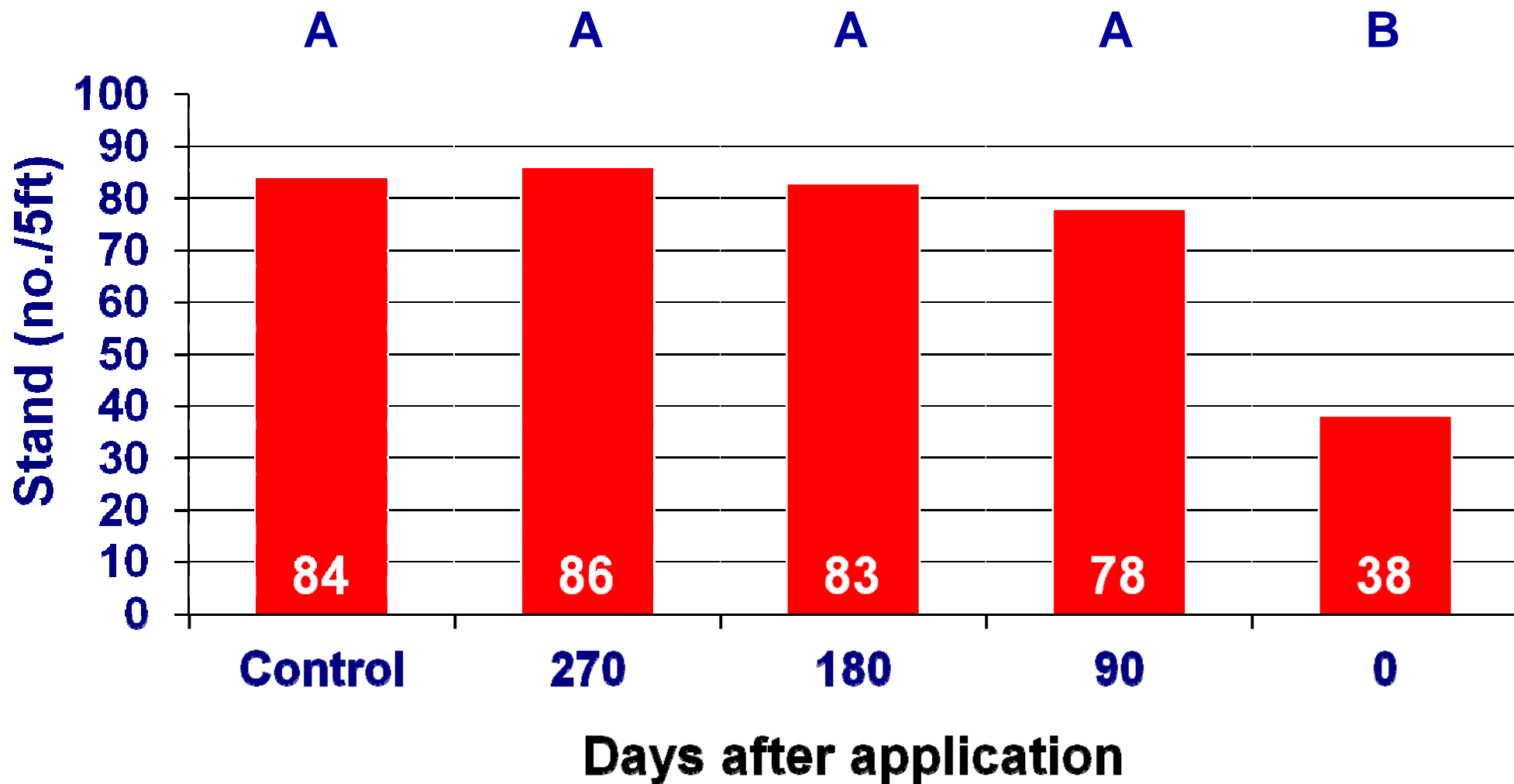
Conv Till

CARROT

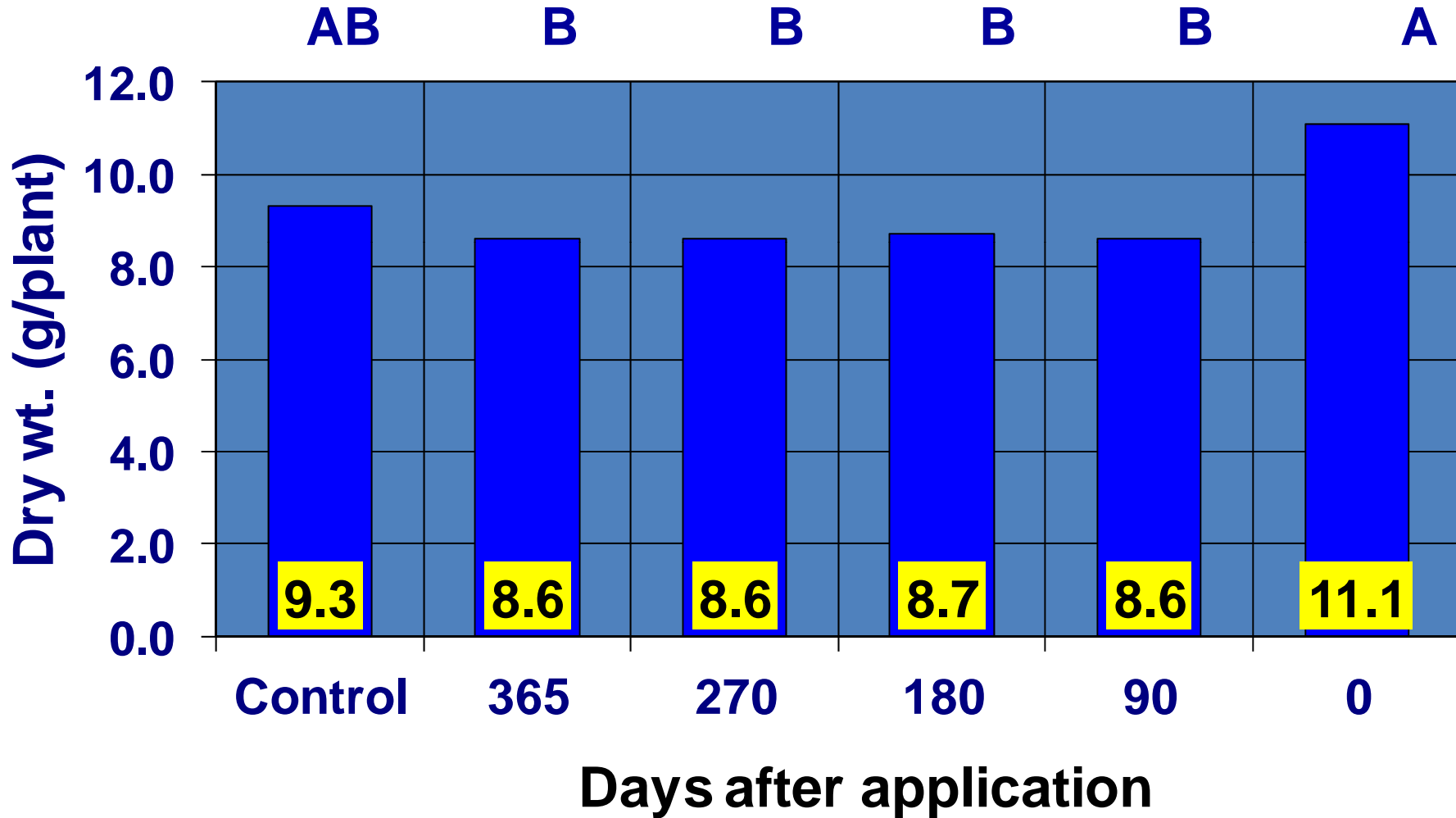
Carrot dry weight (g/5ft) April 2011 main effect of time (P=<0.0001)



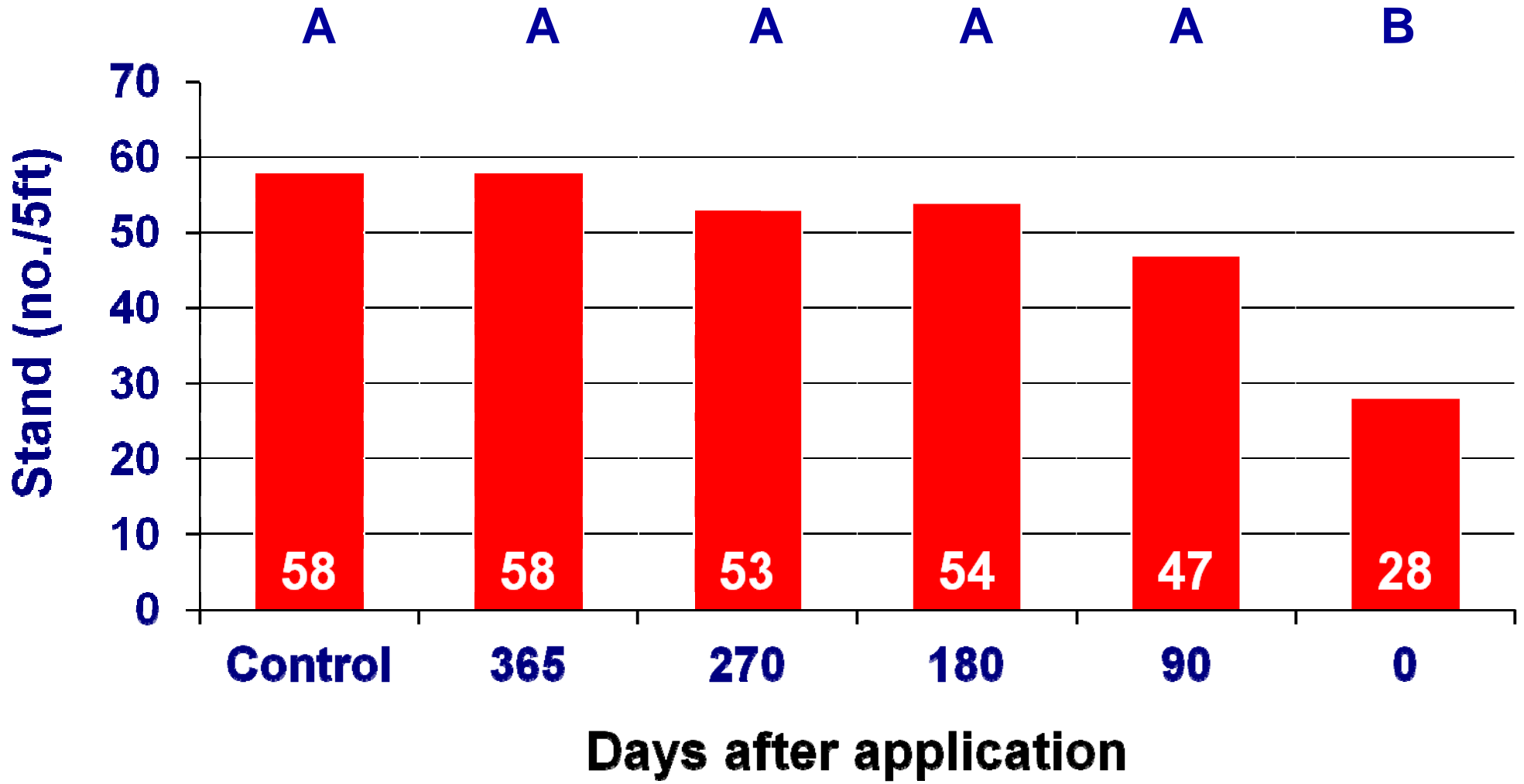
Carrot plant stand (no./5ft) April 2011 main effect of time (P=<0.0001)



Carrot dry weight (g/plant) July 2011 main effect of time

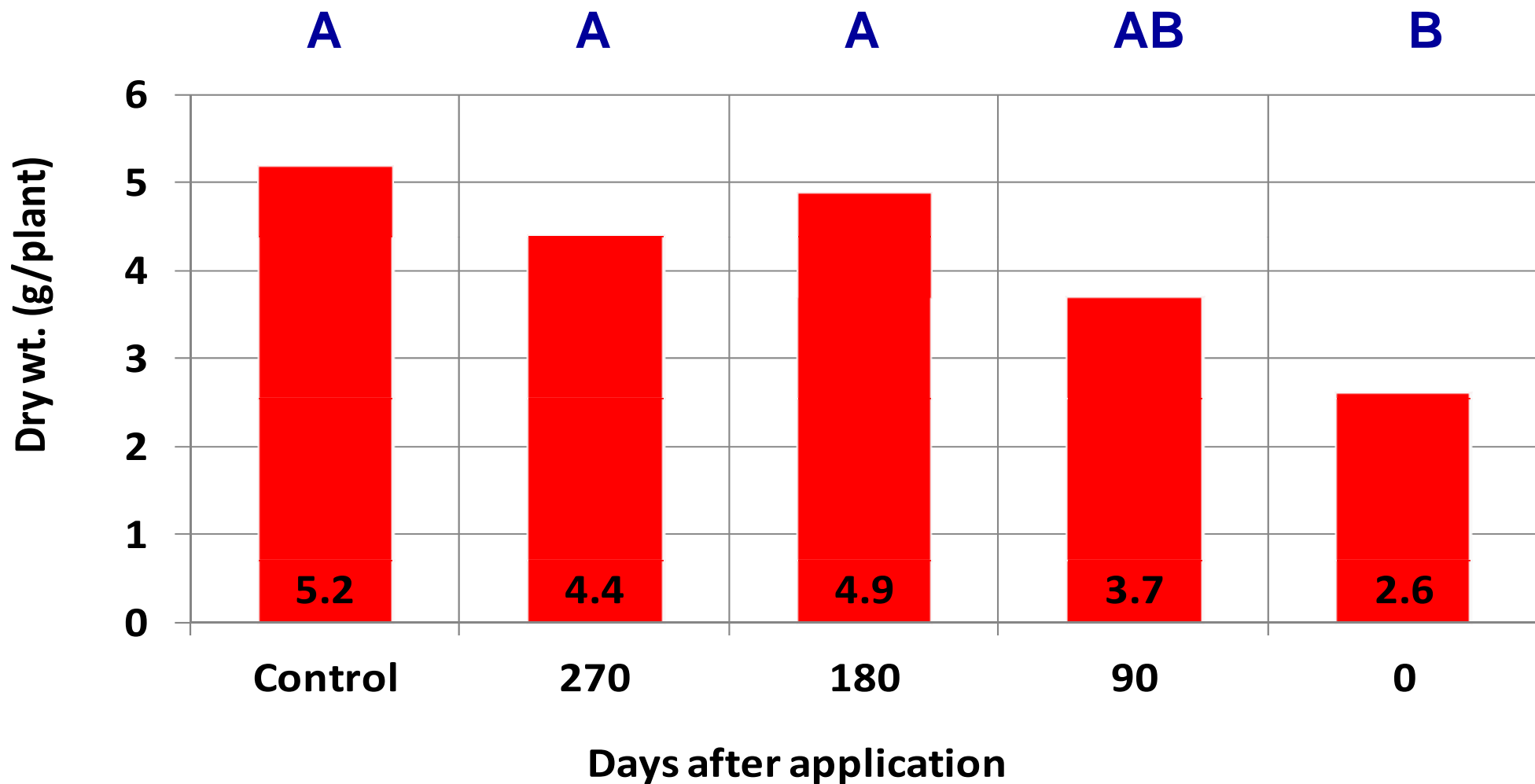


Carrot plant stand (no./5ft) July 2011 main effect of time ($P < 0.0001$)

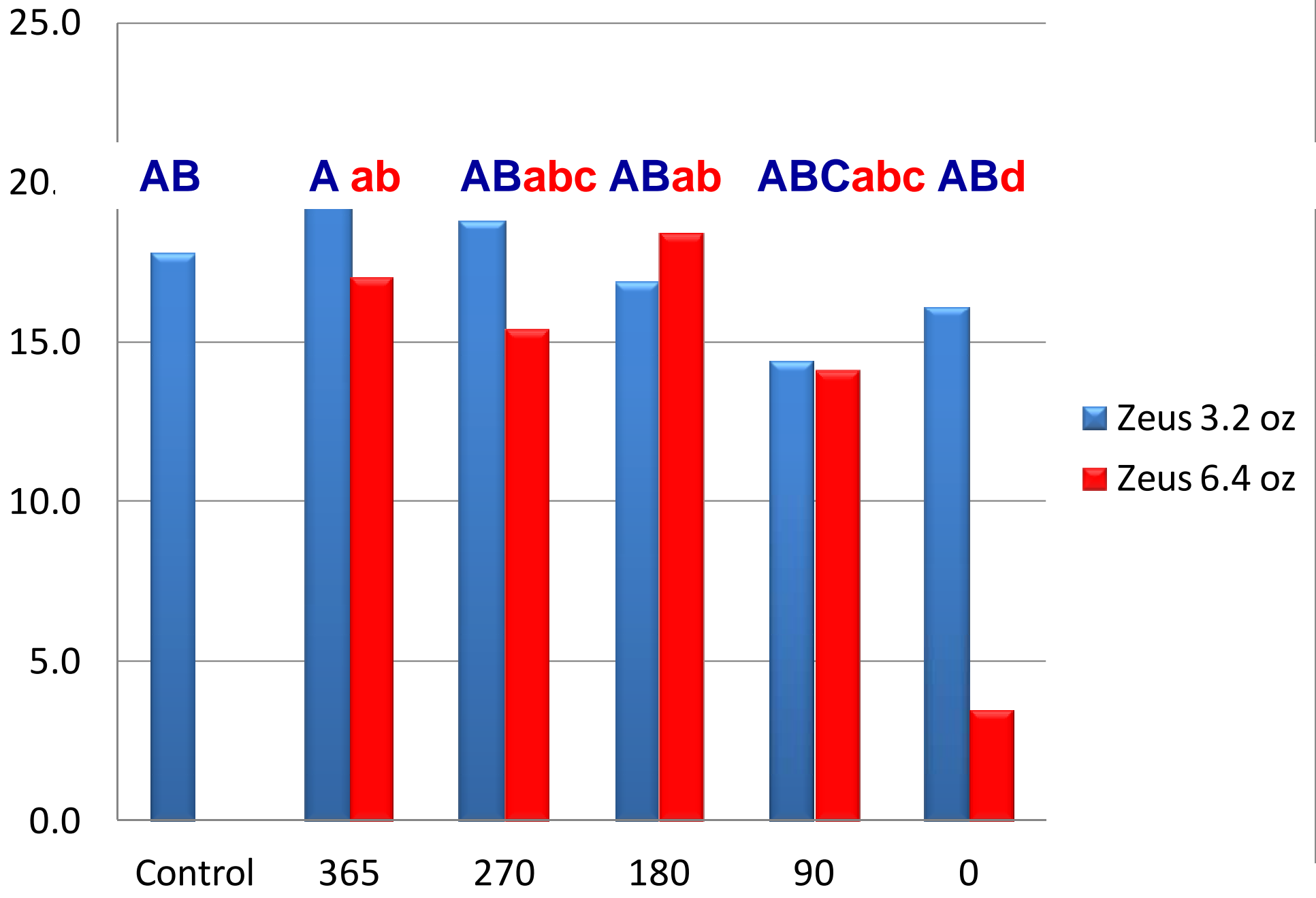


TOMATO

Tomato dry weight (g/plant) April 2011 main effect of time (P=0.0138)

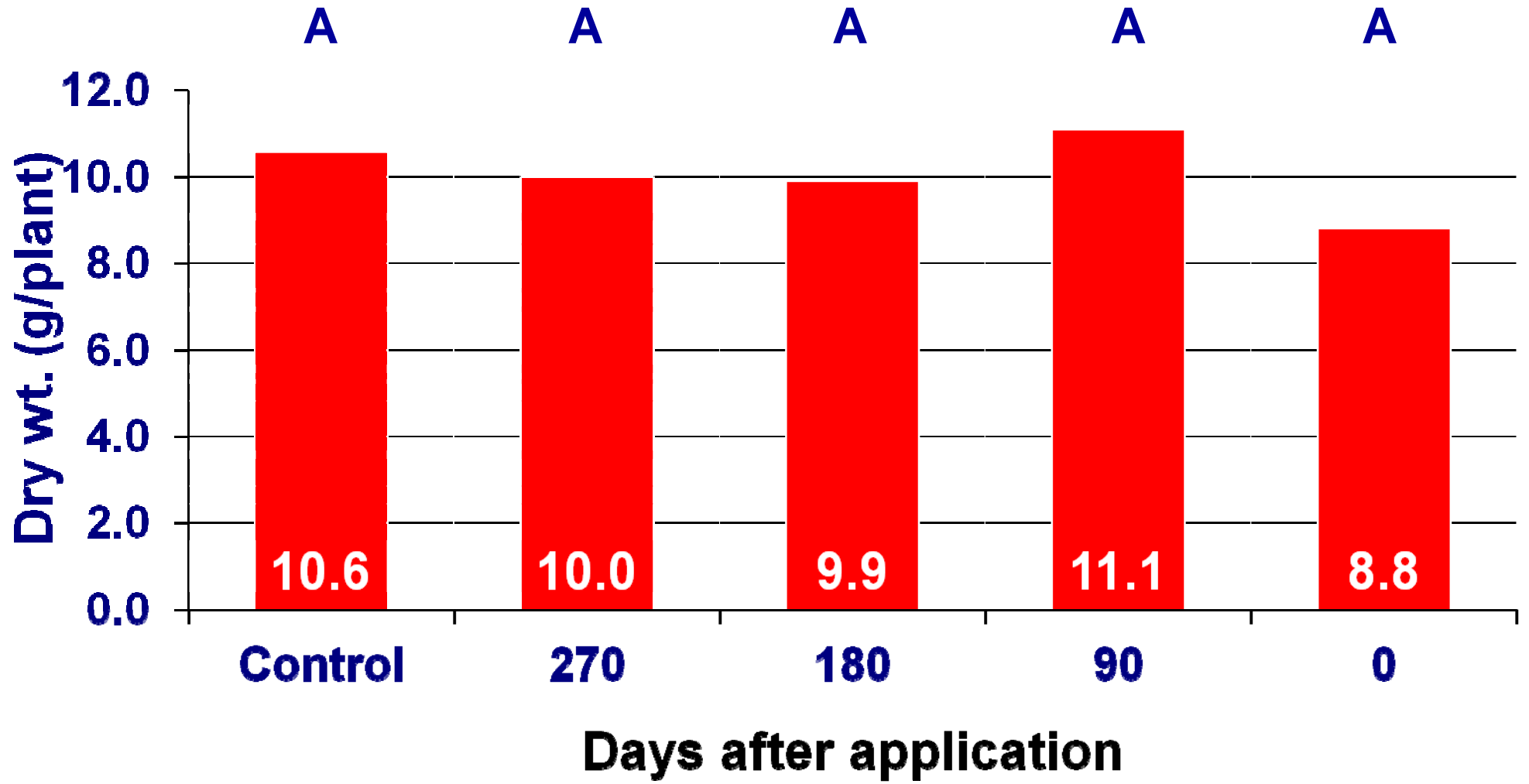


Tomato dry weight (g/plant) July 2011 min till (rate*daysP=<0.0196)

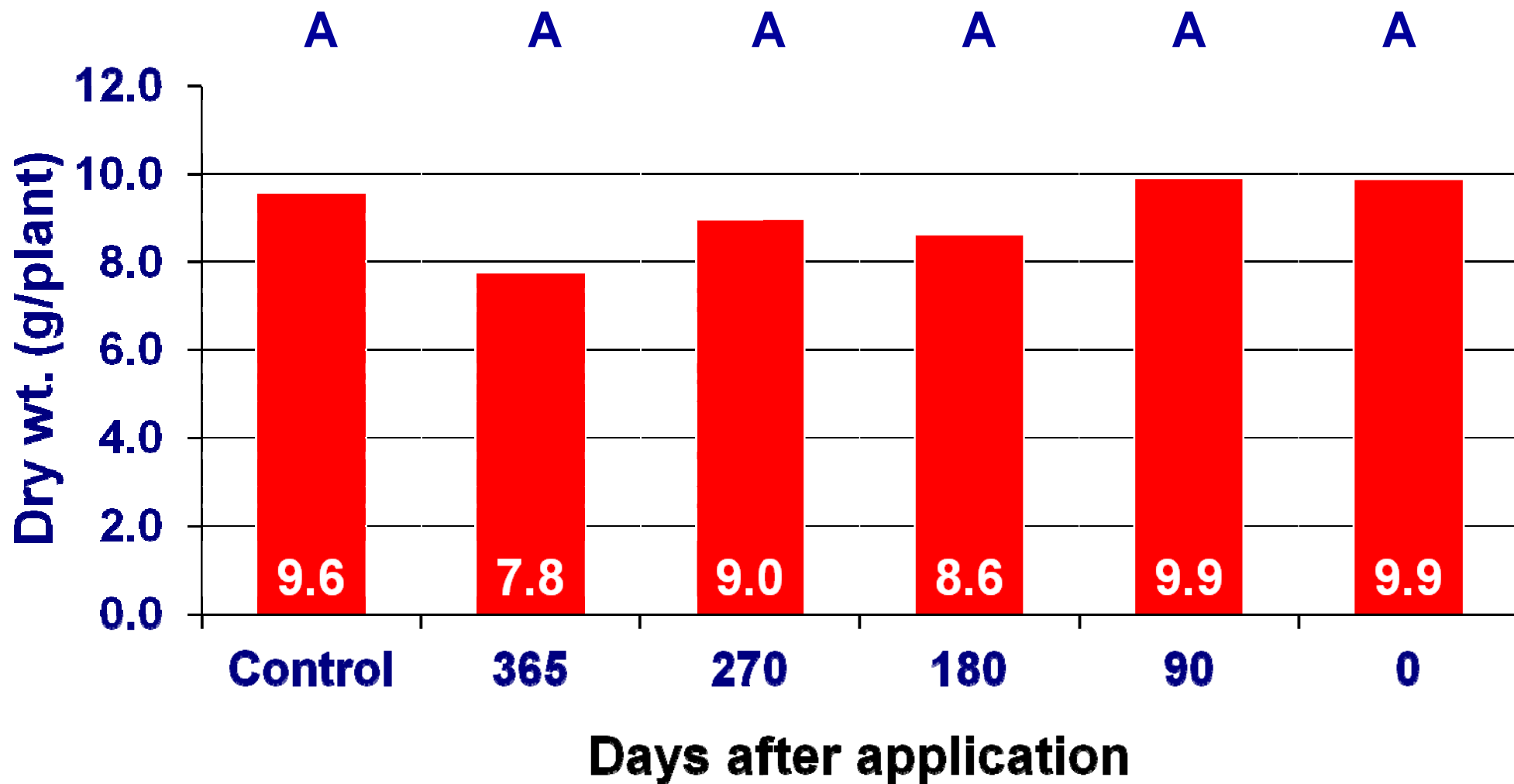


BROCCOLI

Broccoli dry weight (g/plant) April 2011 main effect of time (P=0.7685)



Broccoli dry weight (g/plant) July 2011 main effect of time (P=0.4224)



July 2011 Planting – broccoli, tomato, carrot



365 day



270 Day



180 Day

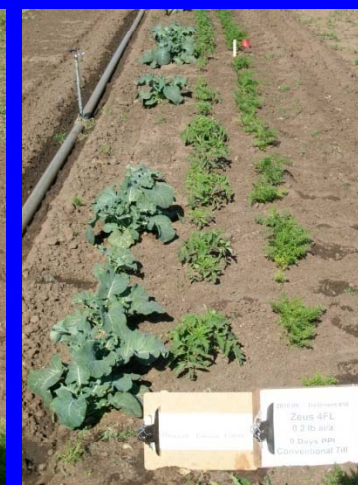


90 Day



0 Day

Min Till



Conv Till

Zeus summary

- ❖ **A 90 day plantback would be safe for lettuce, and broccoli.**
- ❖ **A 180 day plantback would be safe for carrot, onion and tomato.**
- ❖ **A 270 day plantback should be safe for spinach.**
- ❖ **These same studies are being conducted in Yuma, AZ (Barry Tickles) and in Davis, CA (Tom Lanini). Final summary will be based on all three studies.**