Effect of Potassium Fertility on Soybean Aphid Populations

Scott Myers
Department of Entomology
UW - Madison

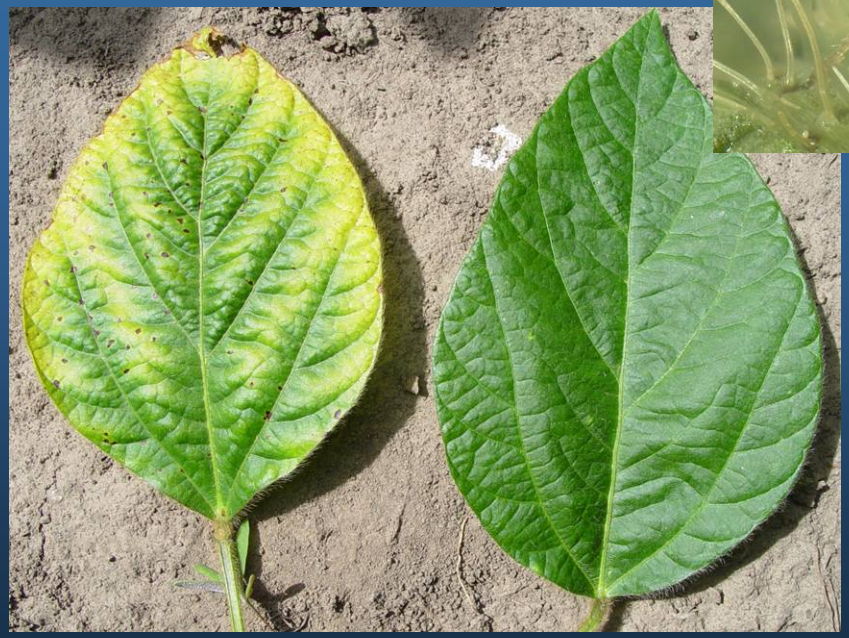
Background:

Numerous reports of heavy soybean aphid infestations on K deficient fields in WI and neighboring states.

Data from laboratory experiments in 2003 showed that soybean aphids reared on K deficient soybean leaves reproduced at a greater rate than those reared on non-K deficient leaves.

Objectives:

Examine the effect of three K treatments on soybean aphid performance under field conditions.



Potassium Study: 2004

Arlington Research Station

Pre-plant soil K: 67 ppm

Small Plots: 10’ x 25’

Three K treatments (14 replications)

- Low: 0 lbs K/A added
- Med: 50 lbs K/A added
- High: 100 lbs K/A added

P applied @ 100 lbs/A at planting

Life Table

Provides useful information on population growth and mortality.

Neonate (newly born) aphids were caged on soybean plants in each treatment.

One aphid was placed in each cage, two cages per plot for a total of 84 cages (aphids)

Aphids were monitored daily for 35 days.

Data Collected:

- Growth stage (nymph *Vs*. adult)
- Number of offspring produced
- Mortality

Soil and Leaf Tissue Analysis

Treatment	Leaf Tissue K (%)	Soil K (ppm)
Low K	1.6 b*	59.8 b (low)
Med K	2.4 a	112.9 a (high)
High K	2.4 a	149.2 a (very high)

* Means followed by the same letter do not differ significantly

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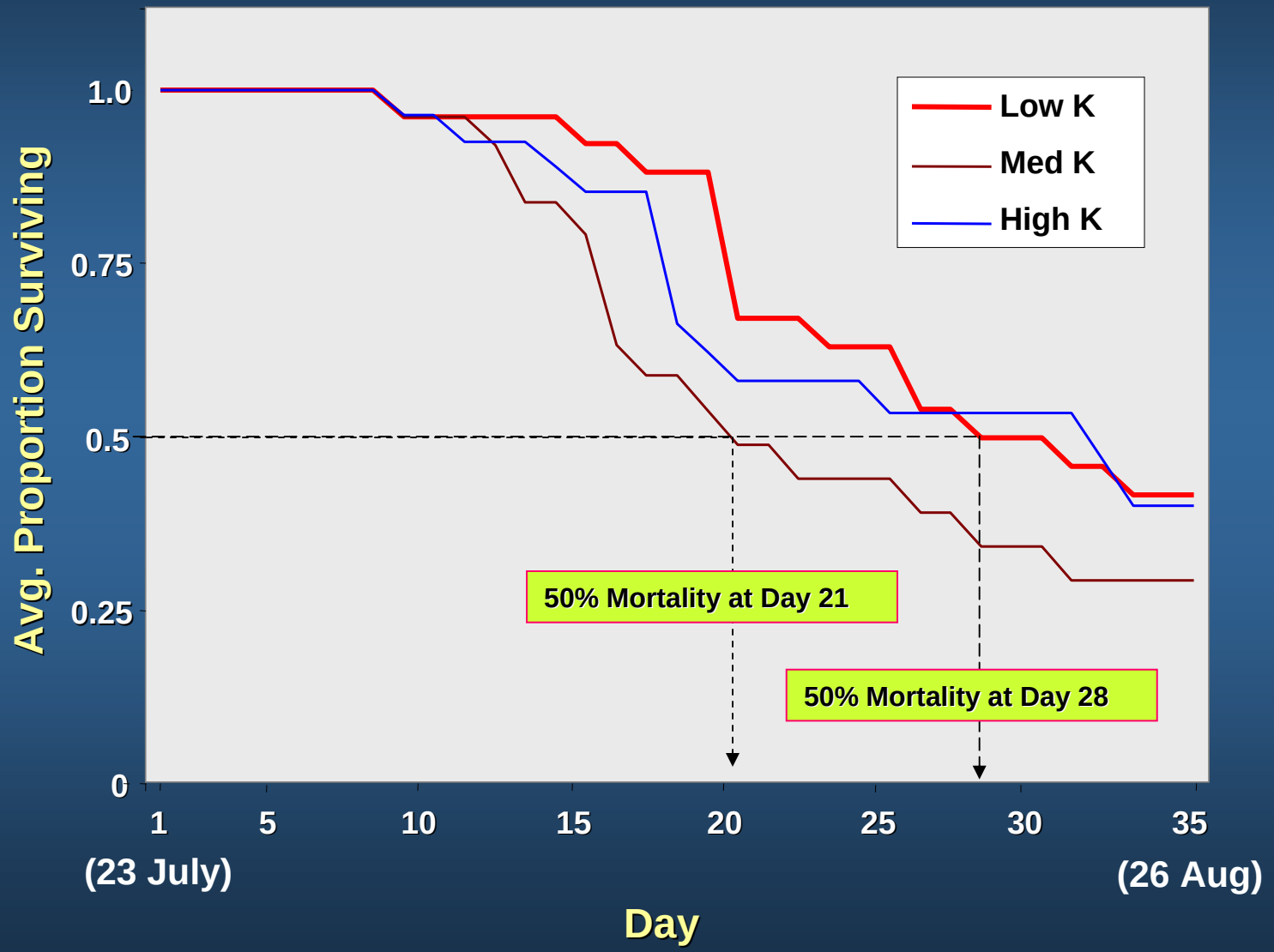
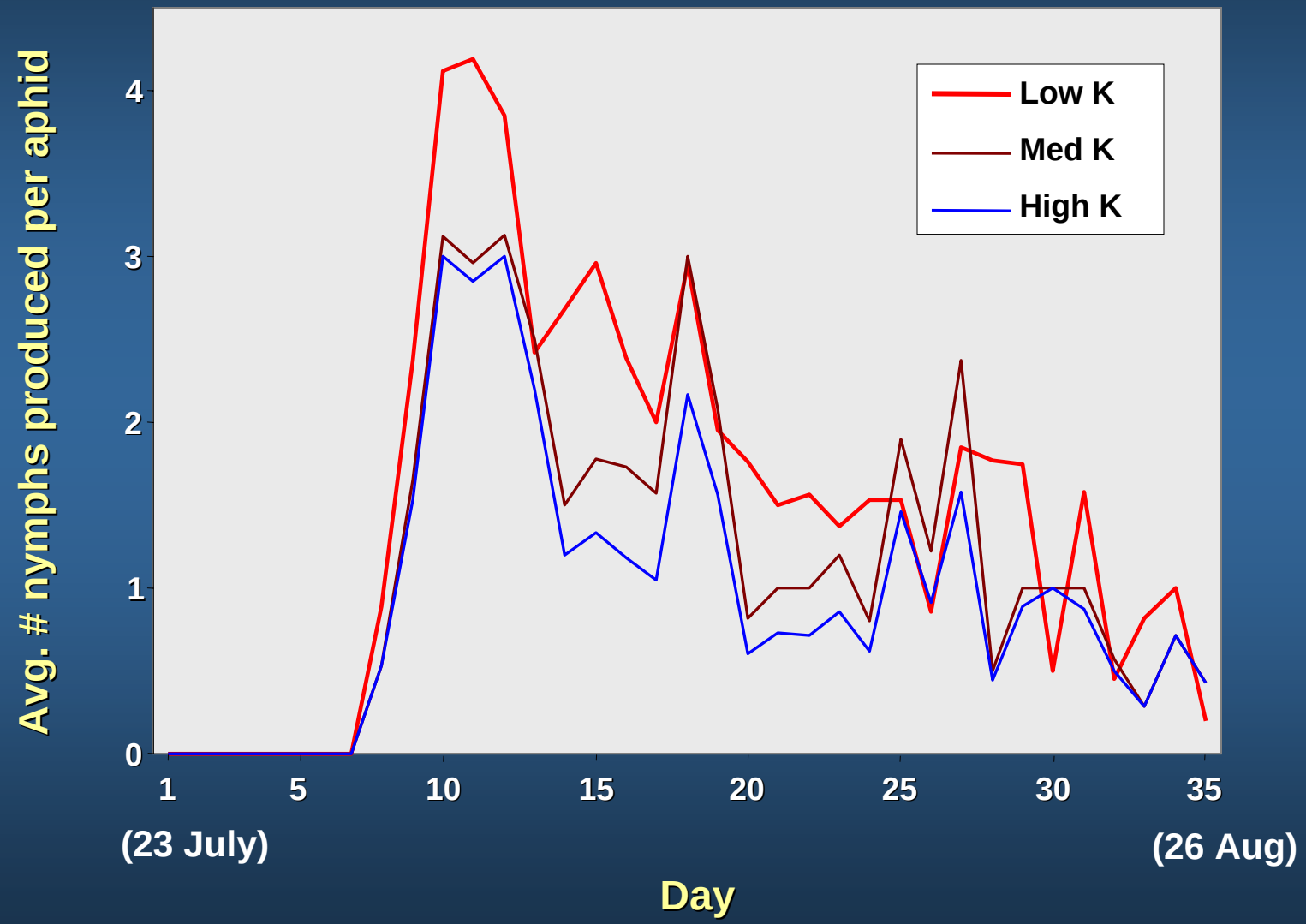
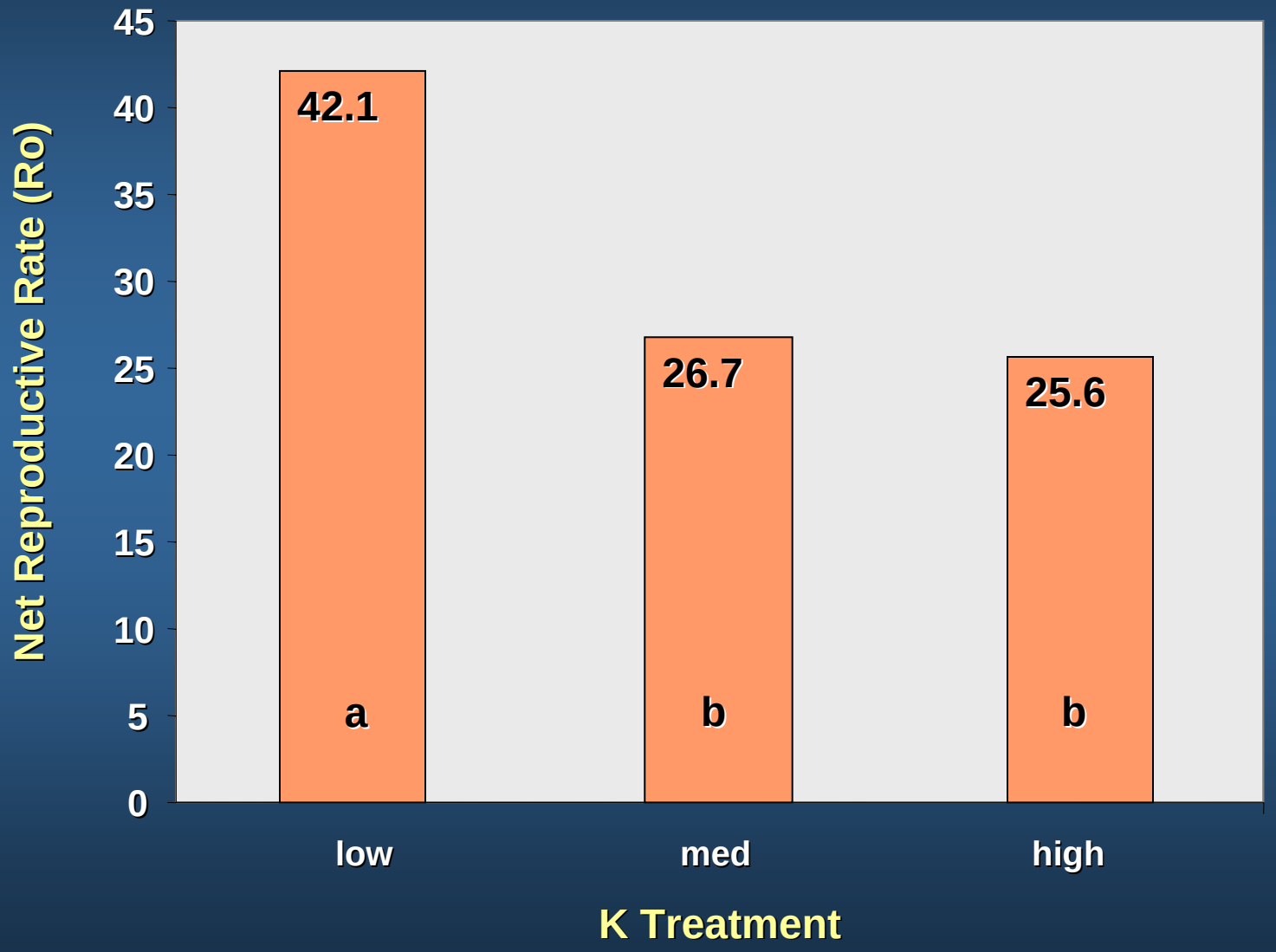
Soybean Aphid Survivorship on Three K Treatments



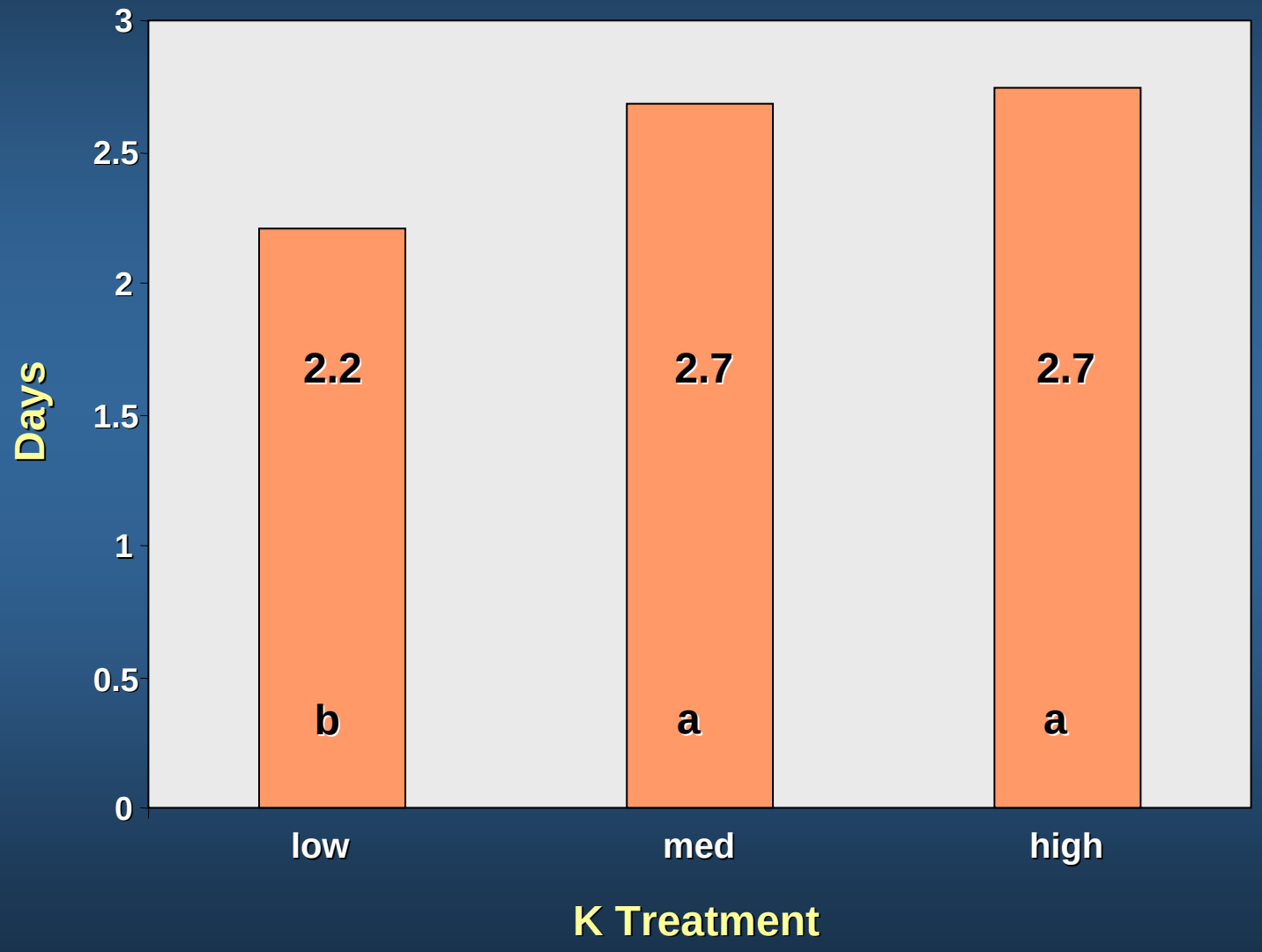
Soybean Aphid Fecundity on Three K Treatments



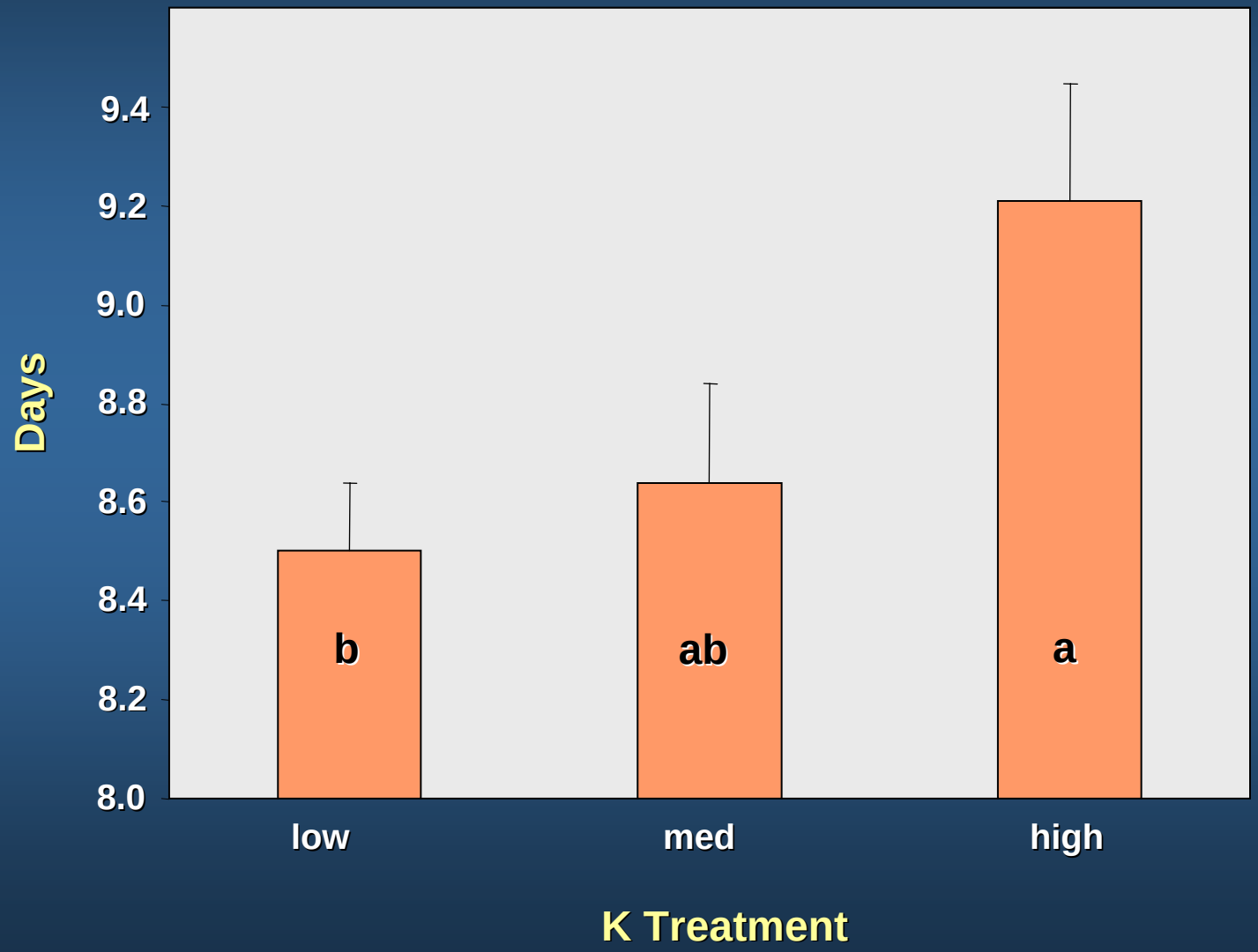
Soybean Aphid Reproduction on Three K Treatments



Population Doubling Time on Three K Treatments



Soybean Aphid Time to Adulthood on Three K Treatments



Aphid Sampling

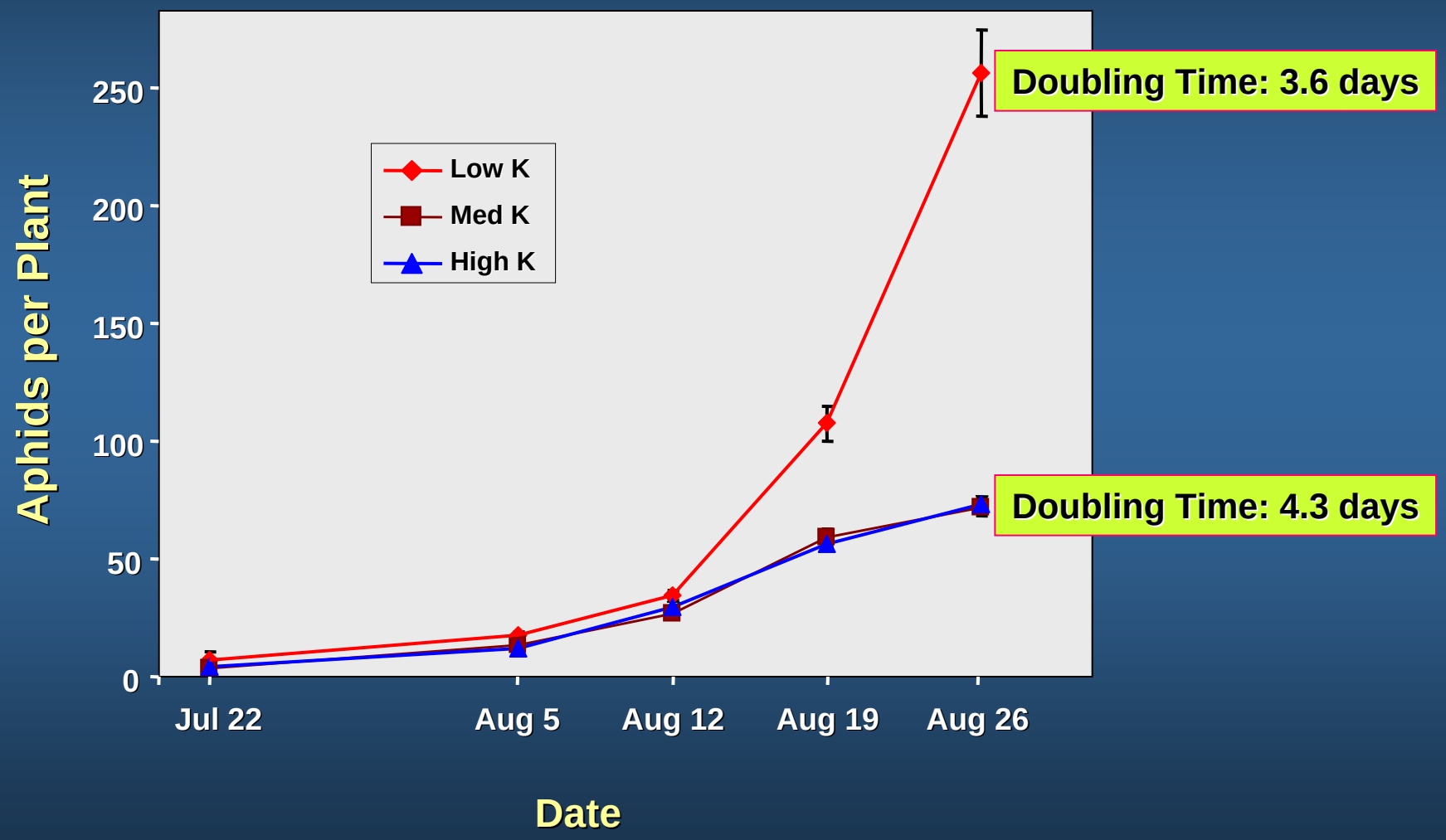
Naturally occurring aphid populations were sampled throughout the growing season.

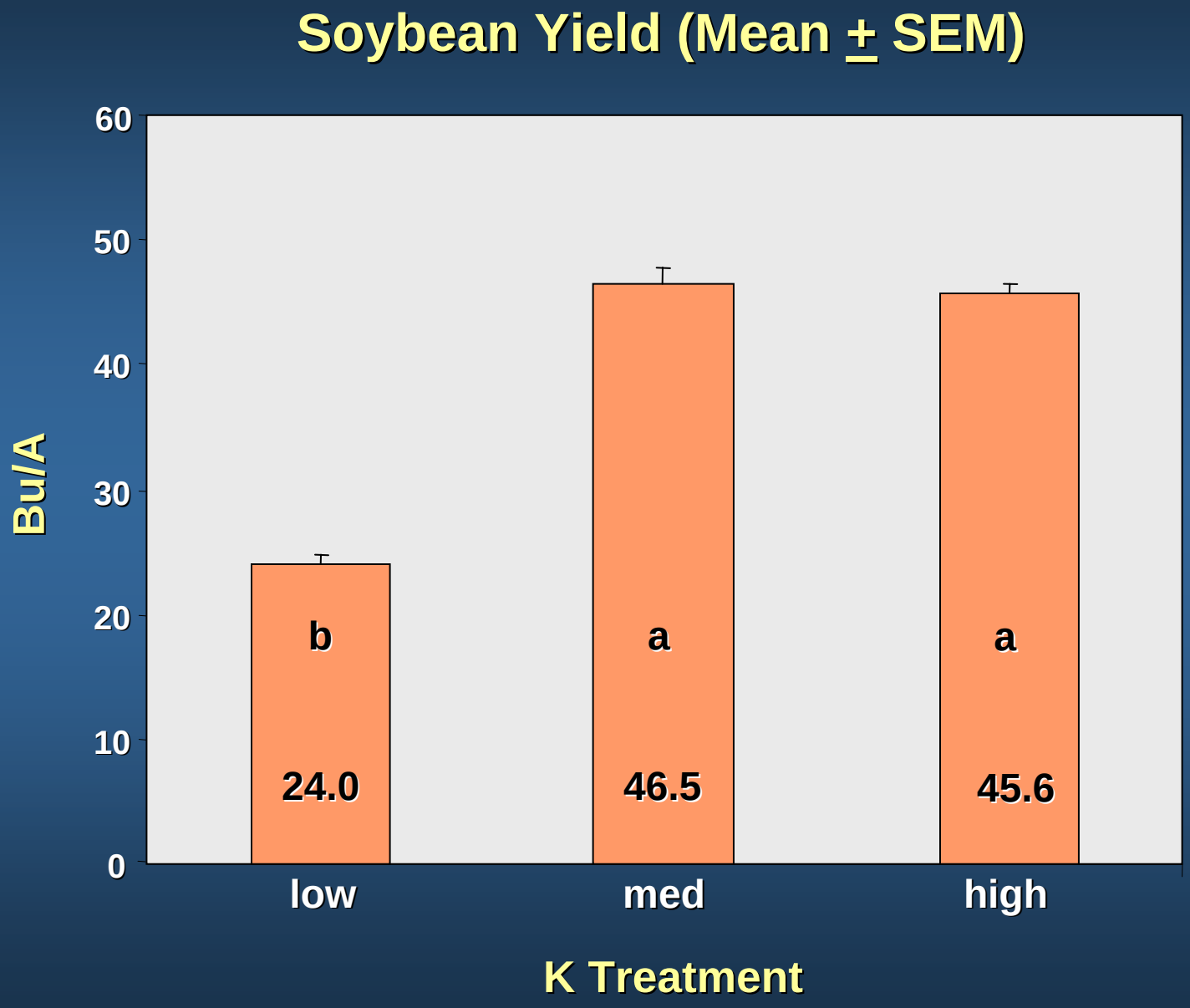
Aphid Sampling

Number of aphids per plant were counted on 10 plants in each plot.

5 sampling dates (23 July – 26 August)

Soybean Aphid Densities on Three K Treatments




Soybean Yield (Mean ± SEM)
Bu/A
60
50
40
30
20
10
0
b
a
a
24.0
46.5
45.6
low
med
high
K Treatment

Summary

- Potassium appears to play a significant role in soybean aphid population buildup.

- Aphid reproduction increased, time to adulthood and doubling time decreased on K deficient plants.

- Natural infestations resulted in greater aphid numbers on the low K treatment *Vs.* Med and High K treatments.

Acknowledgements

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