# Soybean Aphid and Potassium

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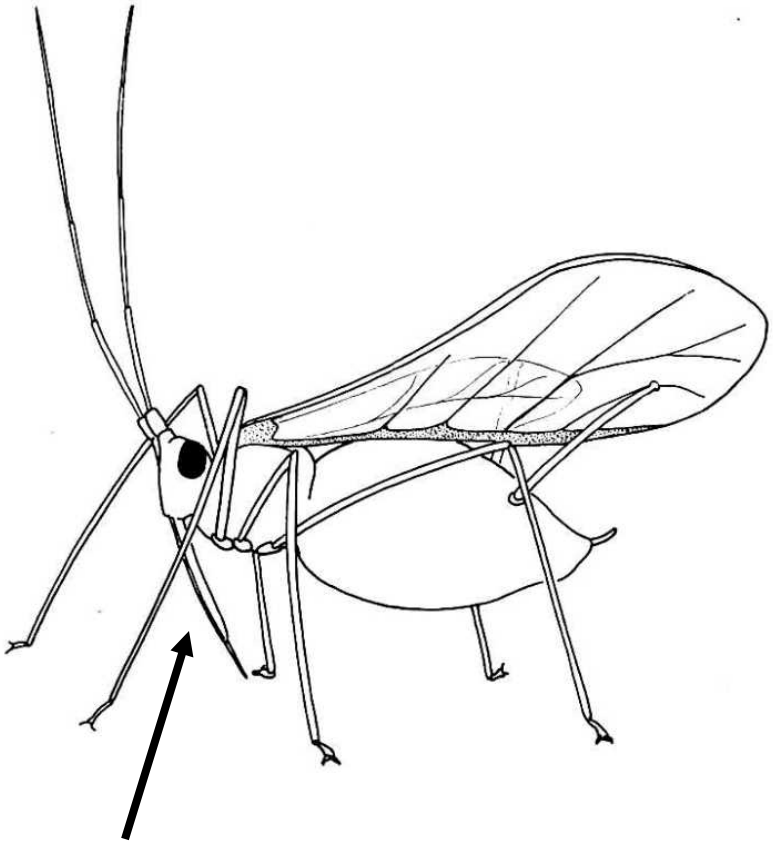
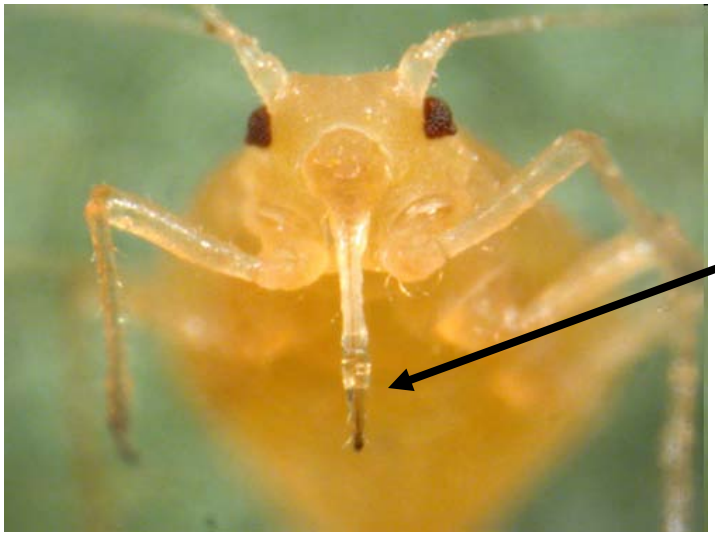
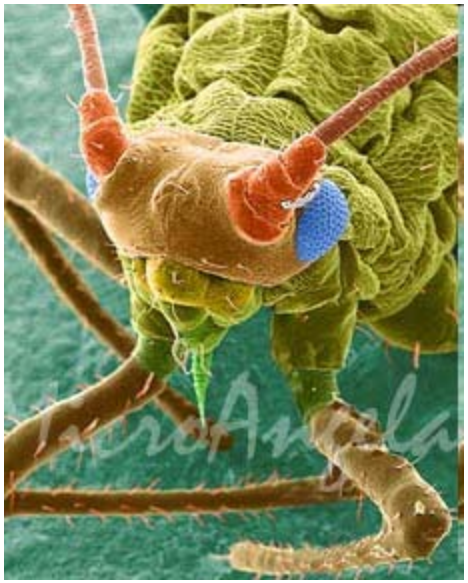
# Aphids Suck!

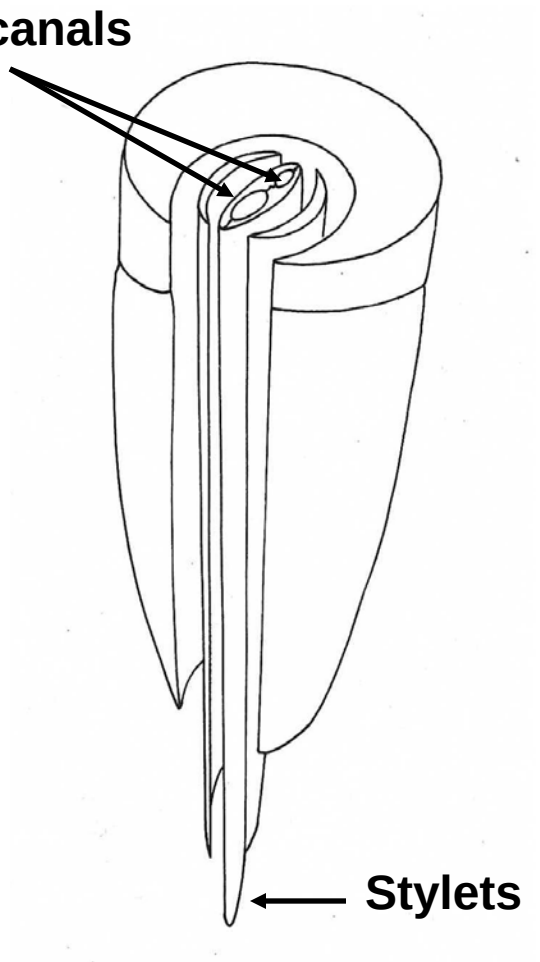


Proboscis (“beak”)

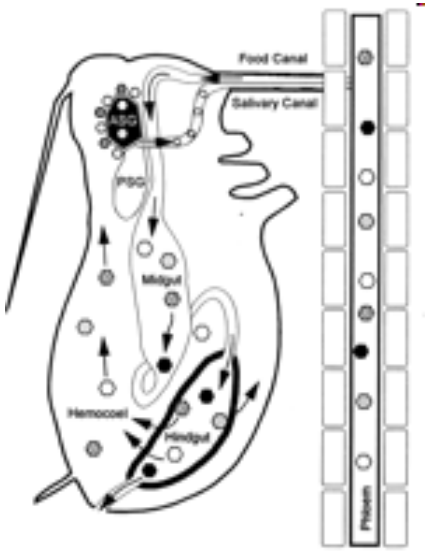


# Aphid Mouthparts

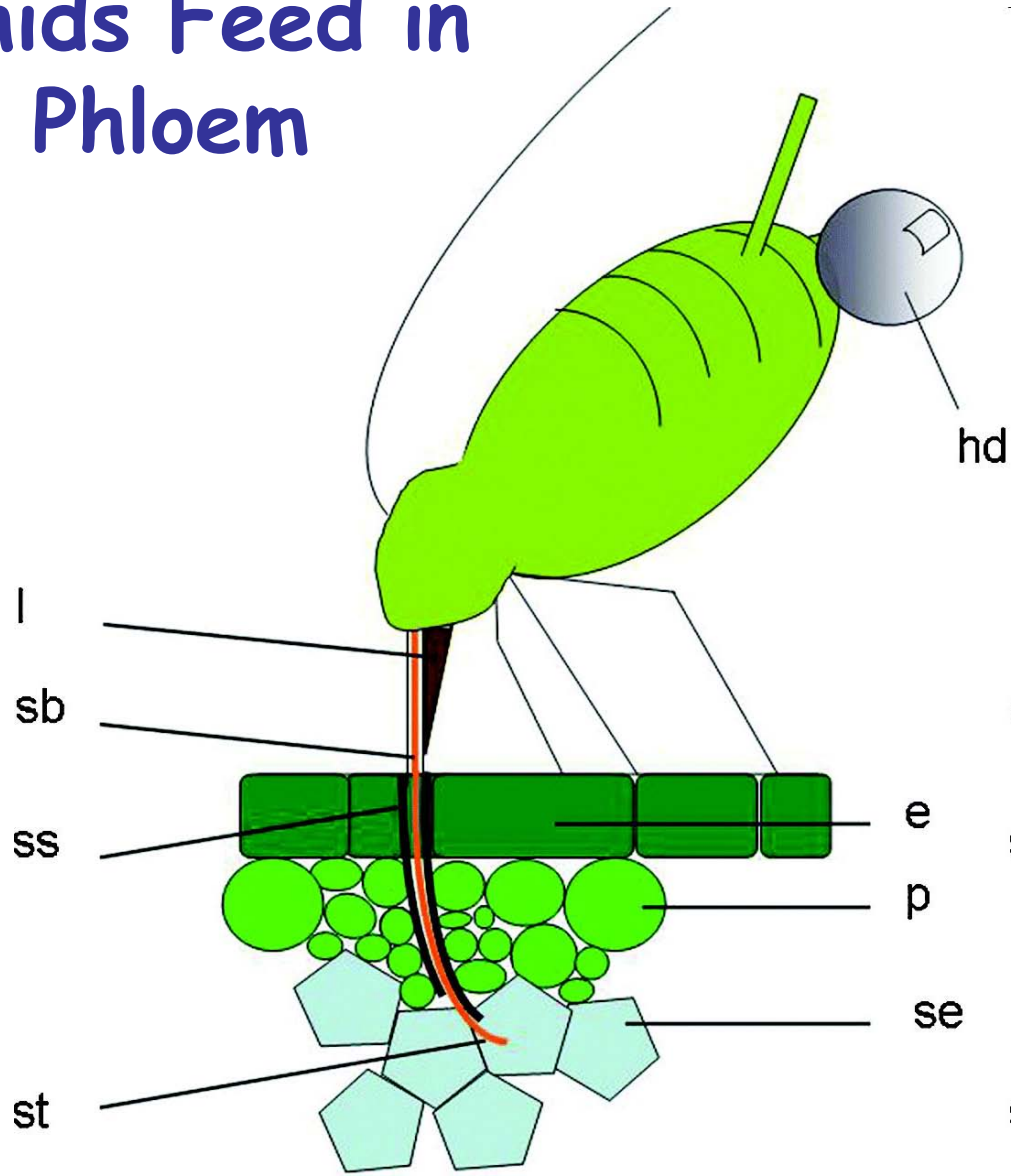




# Aphids Feed in the Phloem

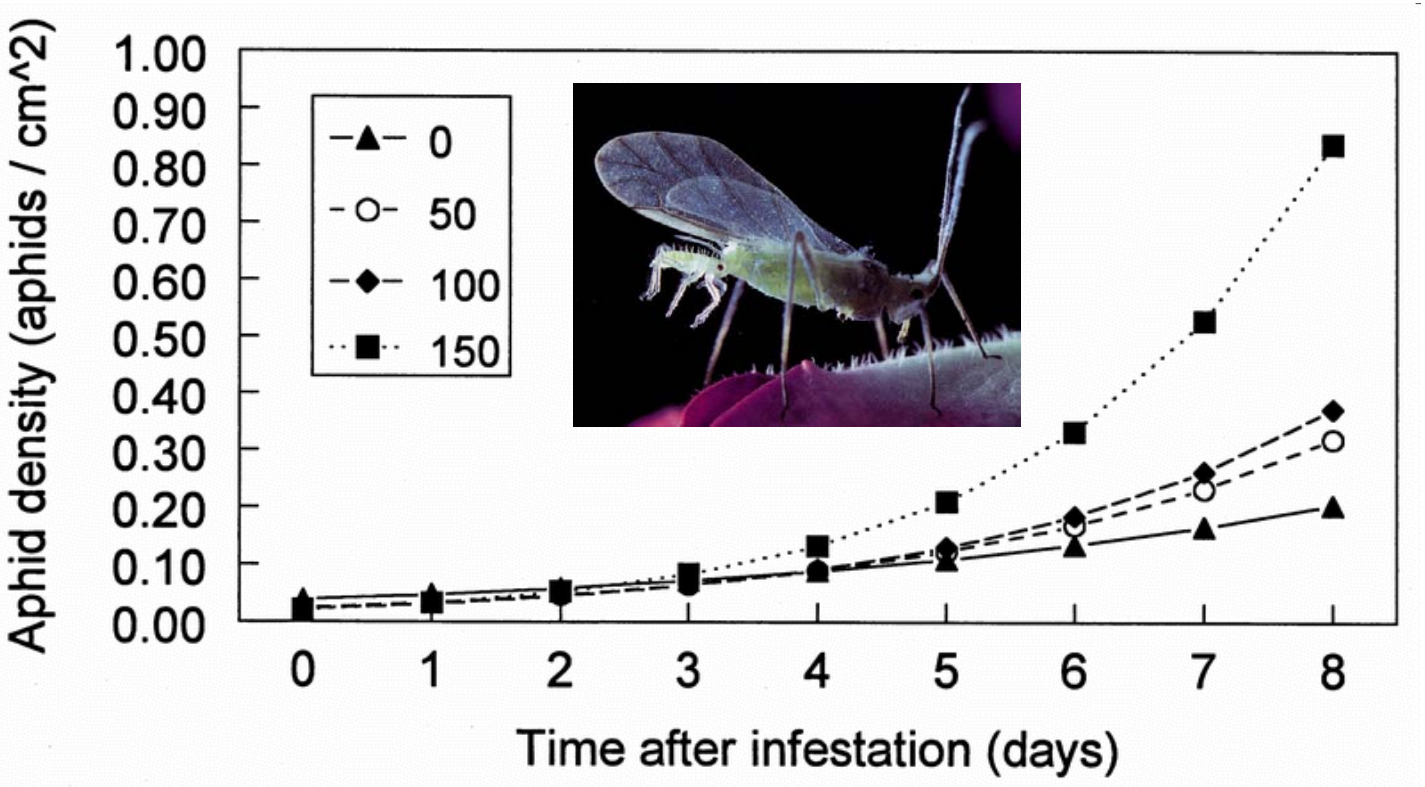






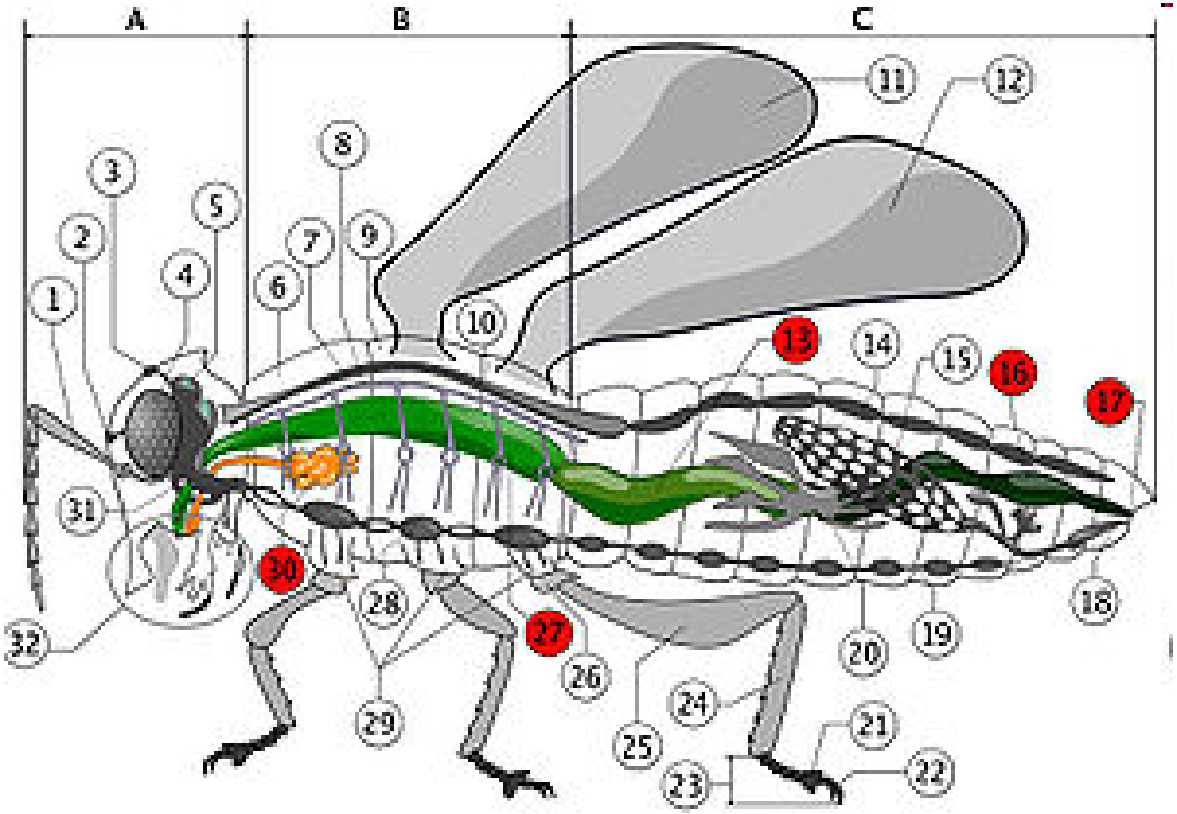
# Aphids are Nitrogen Limited!
## (Nevo & Coll 2001)

**Cotton aphid (*Aphis gossypii*) dynamics on cotton plants fertilized with different levels of N**

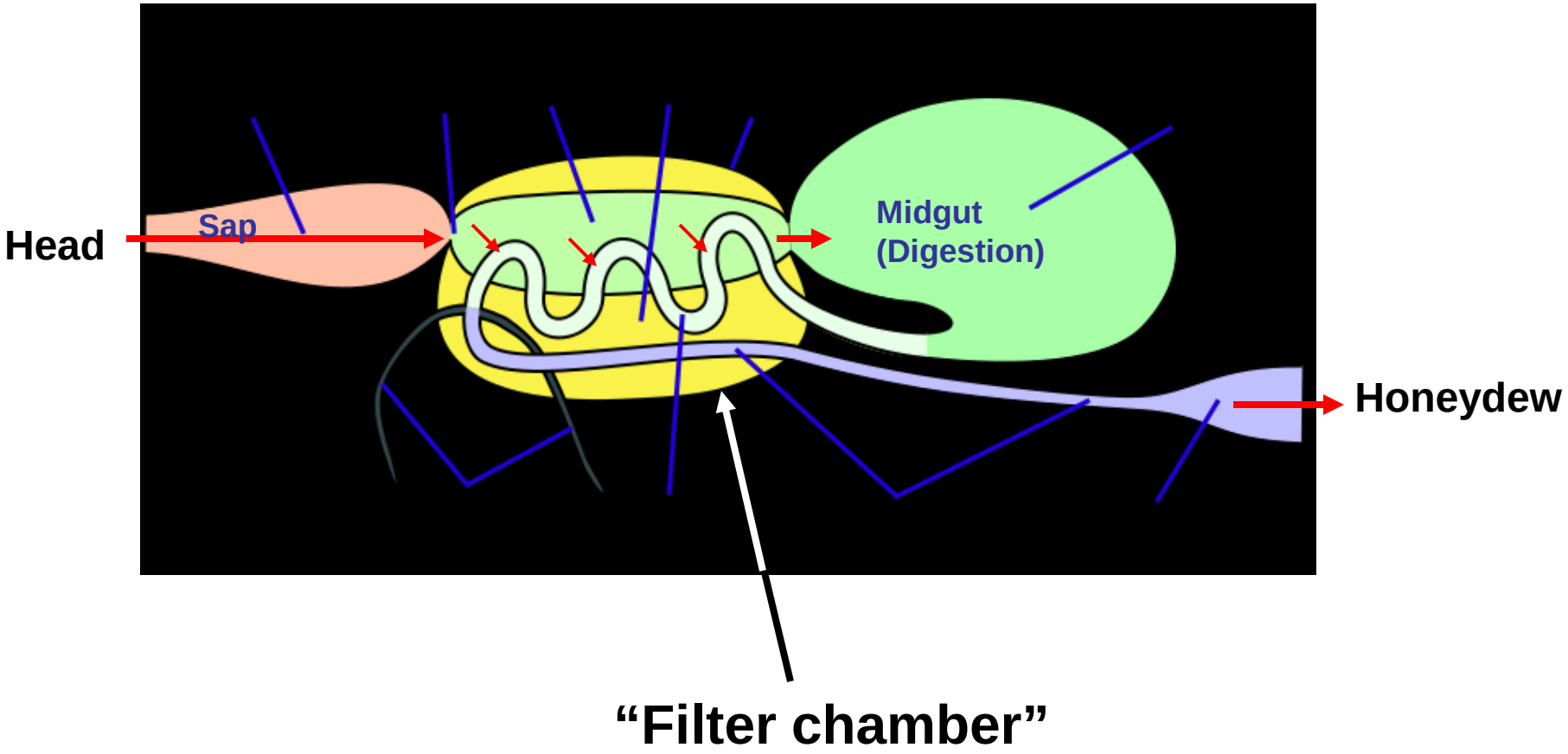


# Aphids are adapted to process lots of plant sap in search of Nitrogen

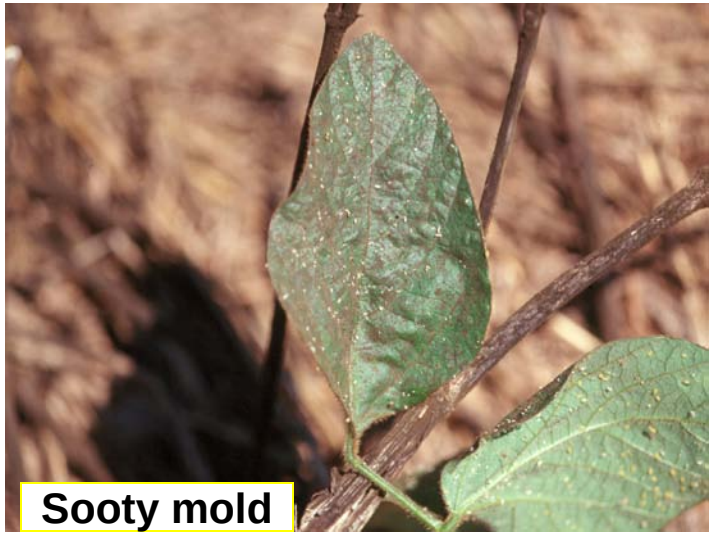
**Typical Insect Digestive System**



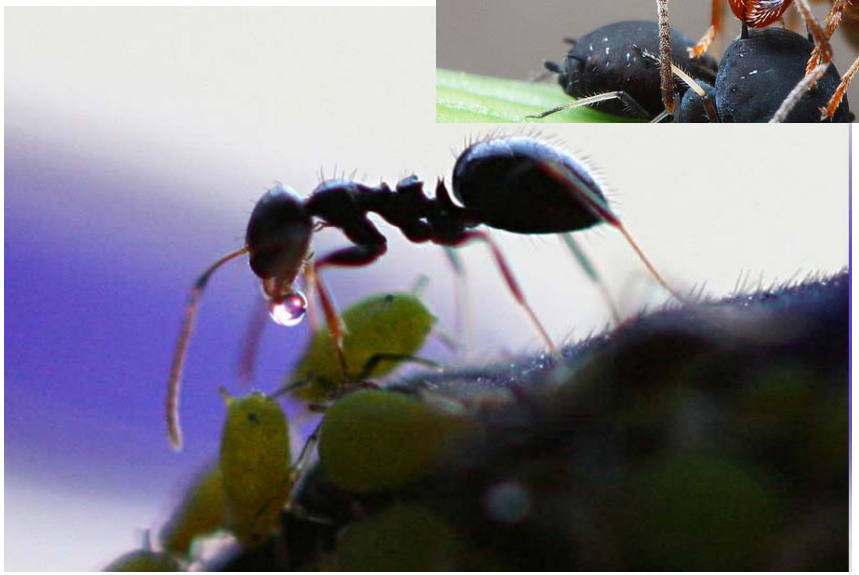
# Aphid Digestive System



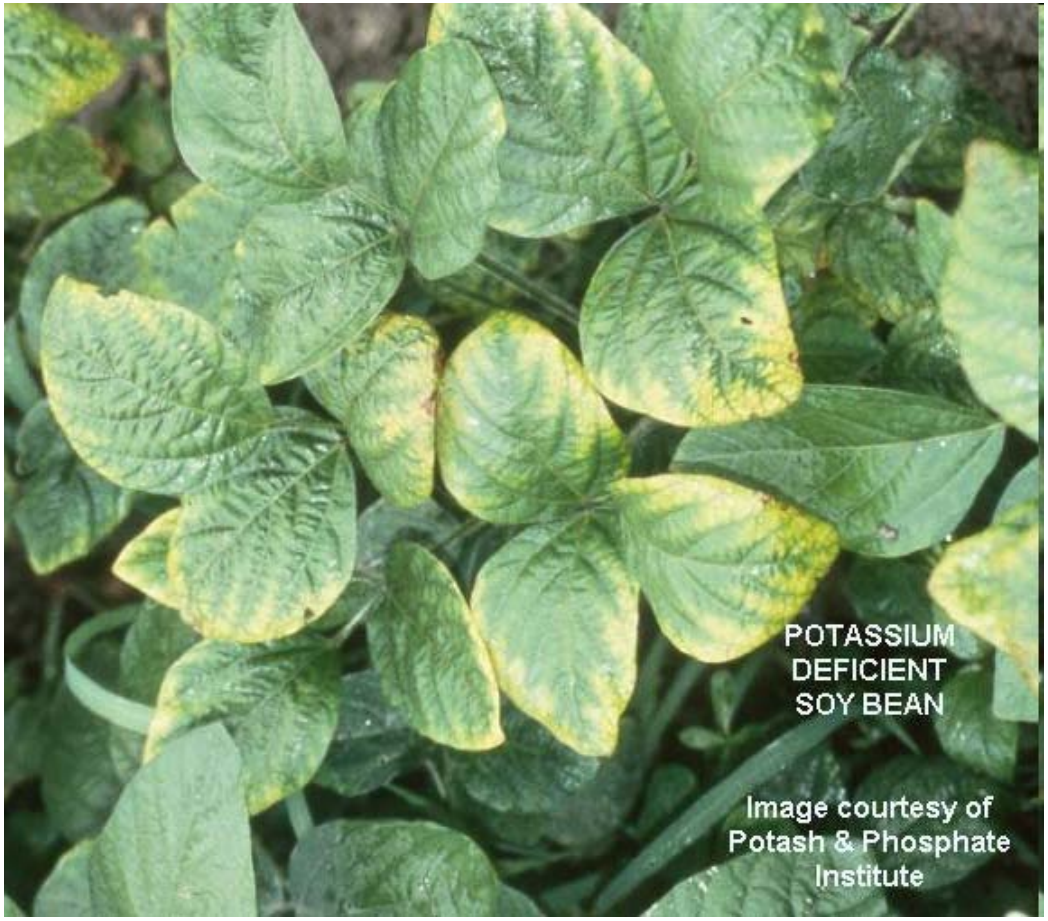
# Honeydew – a byproduct of aphid feeding







# What does any of this have to do with K deficiency in soybean?

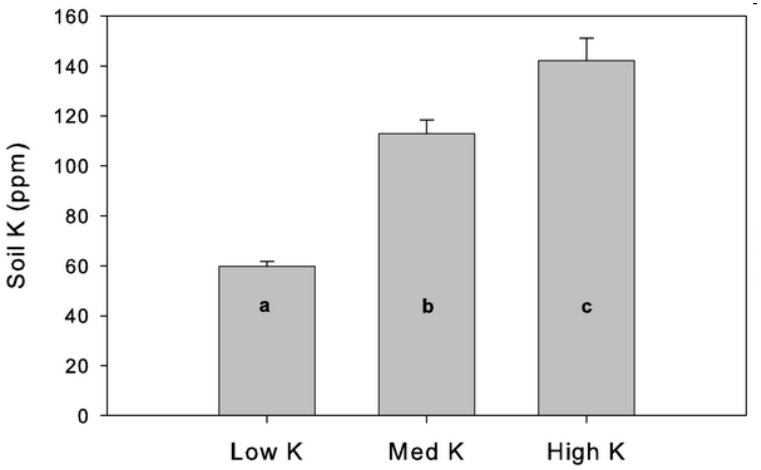


# Grant County – August, 2000

# Arlington, 2004

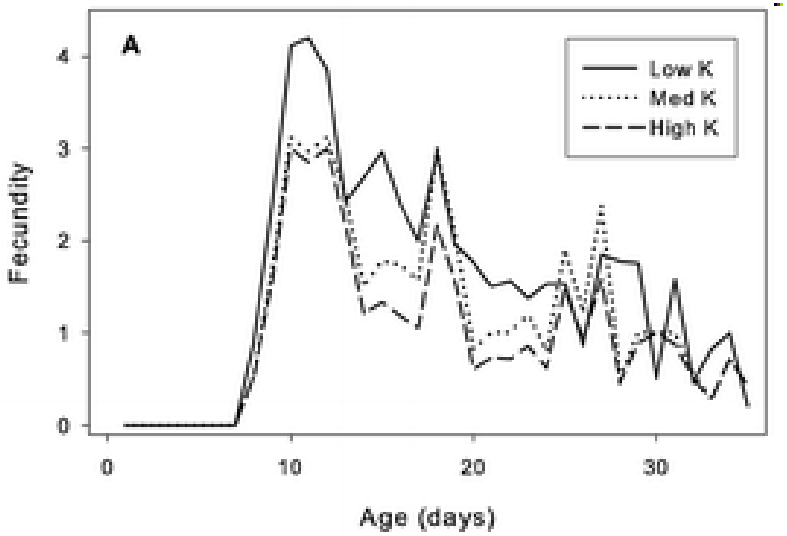
## (Myers & Gratton 2006)

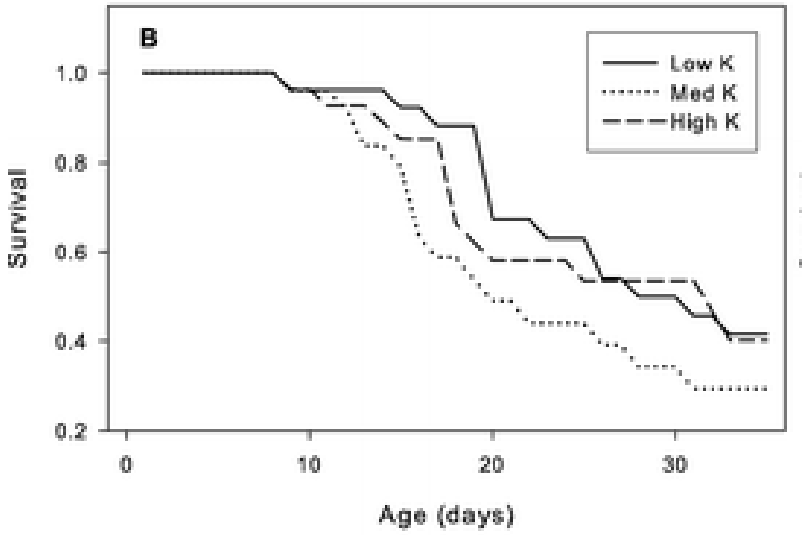
### Soil Potassium Treatments




clip cage

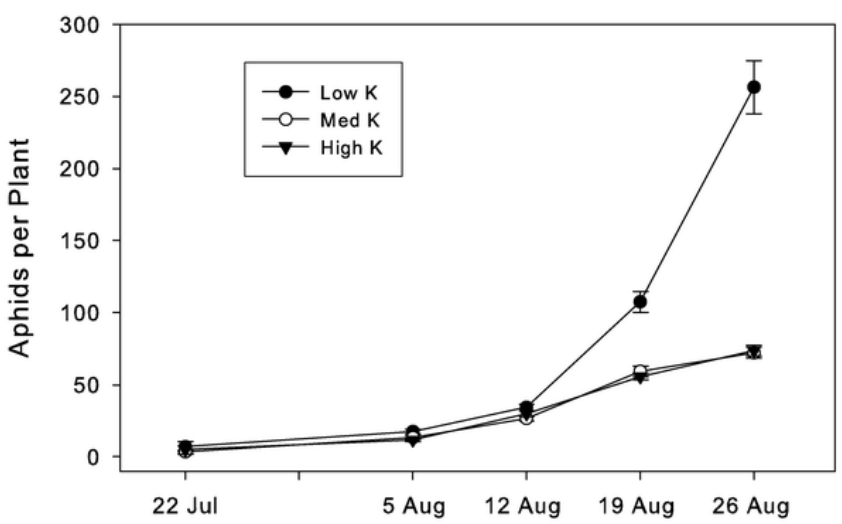
### Aphid Performance – clip cages



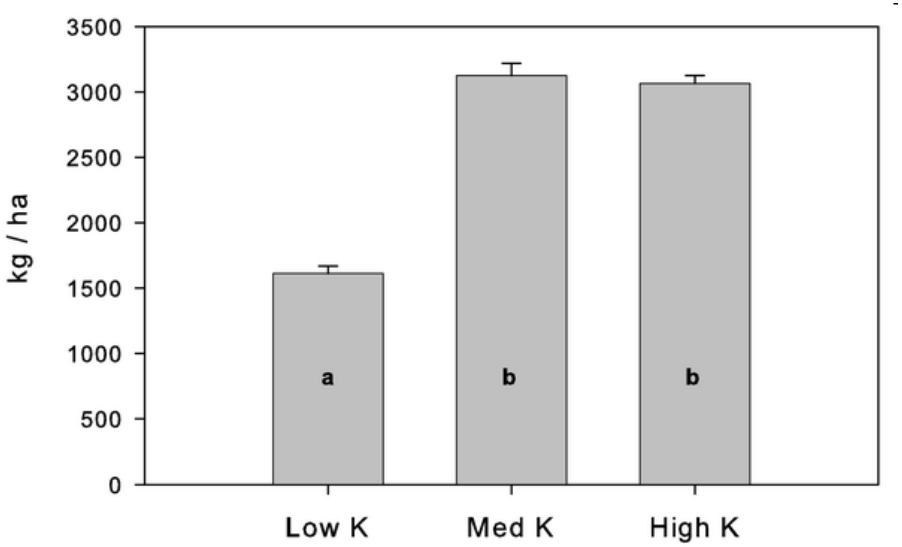



# Arlington 2004
## (Myers & Gratton 2006)

### Aphid Dynamics – open field



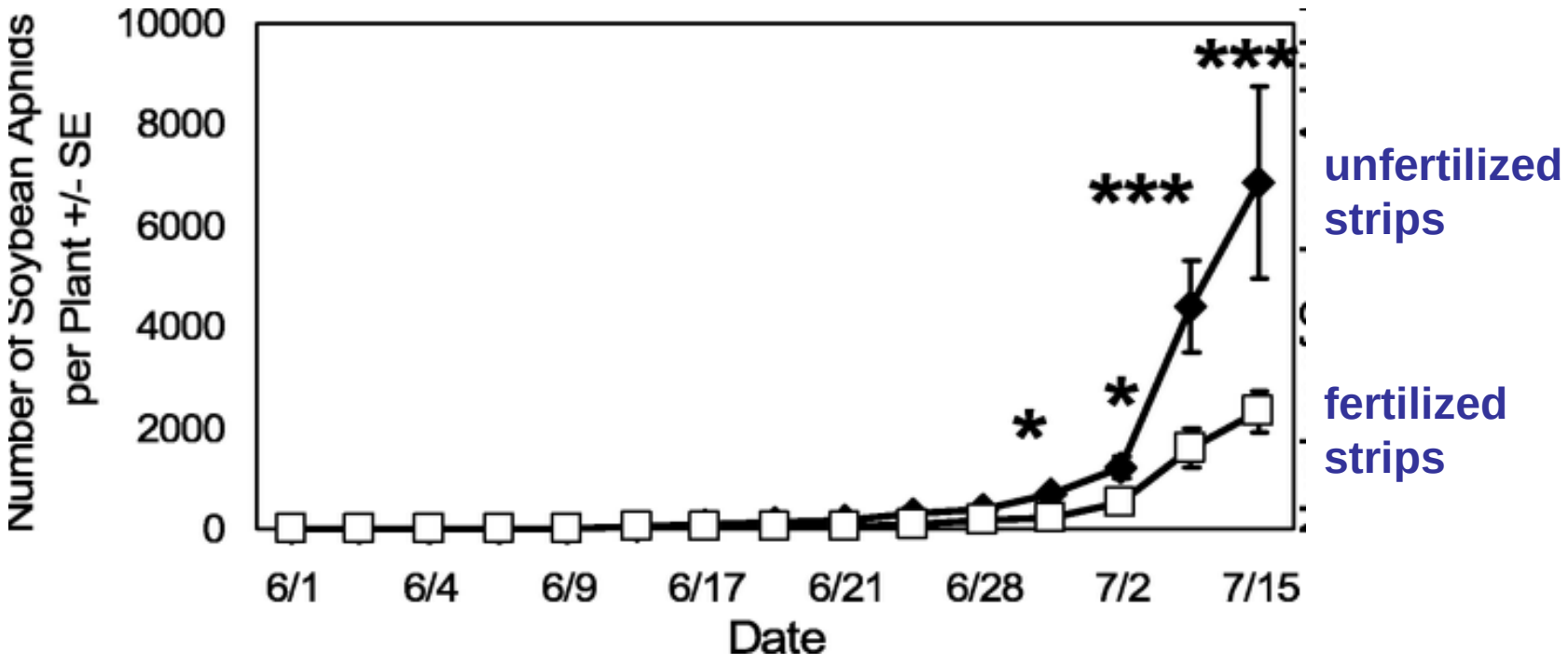

### Yields



# Soybean Aphid Dynamics in a Michigan Soybean Field

**(Walter & DiFonzo 2007)**

## Exclusion Cage Experiment

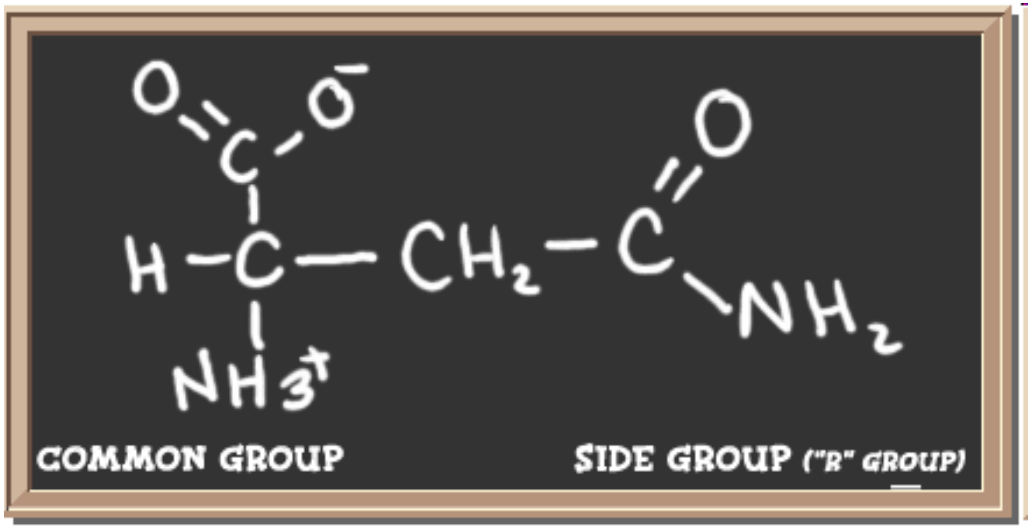


# Why are K-deficient soybeans "better" hosts for soybean aphids?

**(Walter & Difonzo 2007)**

## Asparagine

- **elevated levels of this amino acid were found in the phloem of K-stressed soybean plants**
- **asparagine is known to be important in the nutrition of many aphids**



# Are K-deficient soybeans more attractive to colonizing aphids as well as more nutritious?



Photo 9. Soybeans infested with soybean aphid.

# Importance of "top down" vs. "bottom up" factors on soybean aphid dynamics?

Asian Lady Beetle

Asian Lady Beetle larva

7 Spotted Lady Beetle

12 Spotted Lady Beetle

Minute Pirate Bug

Lacewings

Damsel Bug

Syrphid Flies