FIGHTING BACK THE NEGATIVE IMPACT OF GOSS'S WILT

2011 What can we learn from it?

Is Goss's Wilt the biggest challenge we have in the field?

How many started with great Potential?

With each step you took we added just one more disease to the picture

How many of you got a good surprise and 200 bu./ac plus at harvest?

How many of you got much less then you expected?

Some of the challenges For me when we first figured out what we had was

1. How much yield could we lose?

2. How much yield will we lose?

3. Will the yield loss be enough to do something about or will this be a superficial disease?

I don’t know how many of you walk your fields.

- I Can Tell you a lot of lesions show up after
- Pollination.
  - ***What are they?***
  - ***Do they matter?***
  - ***Are they worth spraying for?***
  - ***Is it more economical to spray them or to ignore them?***

Why don't you come join me in the field and we will look together.

- Will a road side evaluation work?

How about this one? Can you tell what is happening?

Can you tell me from this distance what the problem is?

One Thing to note;

- In 1987 when I started scouting
  - **I had practice with Lesion Identification in the lab (we saw few in the field)**
  - **I actually saw the fewest in corn we had more in soybeans.**
    - **(Nutrient Deficiencies)**
  - **We however did see a lot of insects which had to be managed.**
  - **What has changed over the years?**
    - **Genetically Modified Crops have reduced the number of insect problems yet the most prevalent change I have seen is the increase of corn diseases**

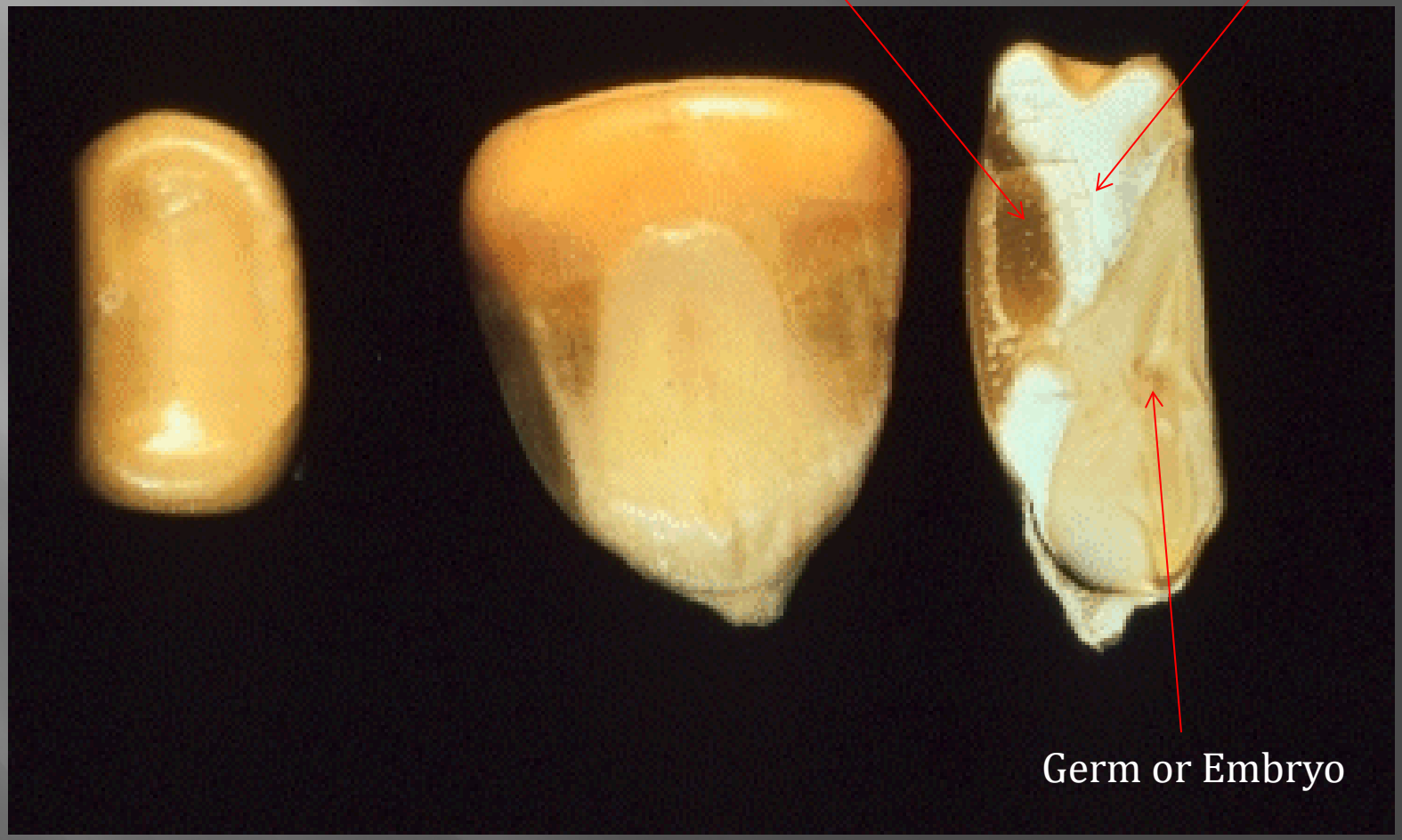
What do we Harvest?

- ***Your going to say corn, is she slow?***
- ***I will tell you it is yield!***
- ***BUSHELS, BUSHELS, BUSHELS!!!!***
- ***So what is yield????***
  - ***What creates bushels?***

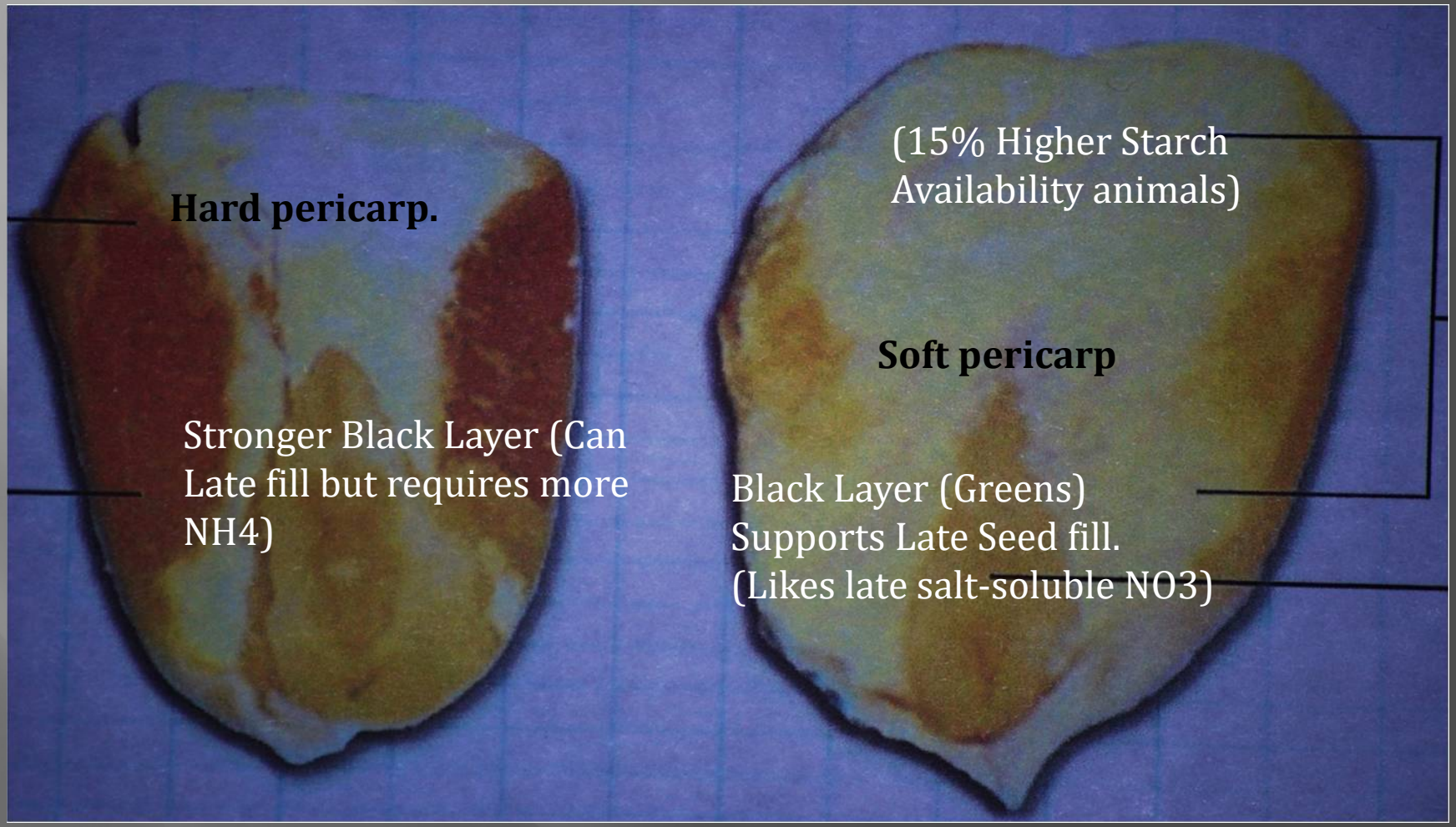
Yield equates to
Sugar + Nitrogen = Amino Acids

Can an ear shrink?????

Components of a Kernel of Corn



Two Different Seed Types
Vitreous vs. Floury (Hard vs. Soft)



Expands slowly

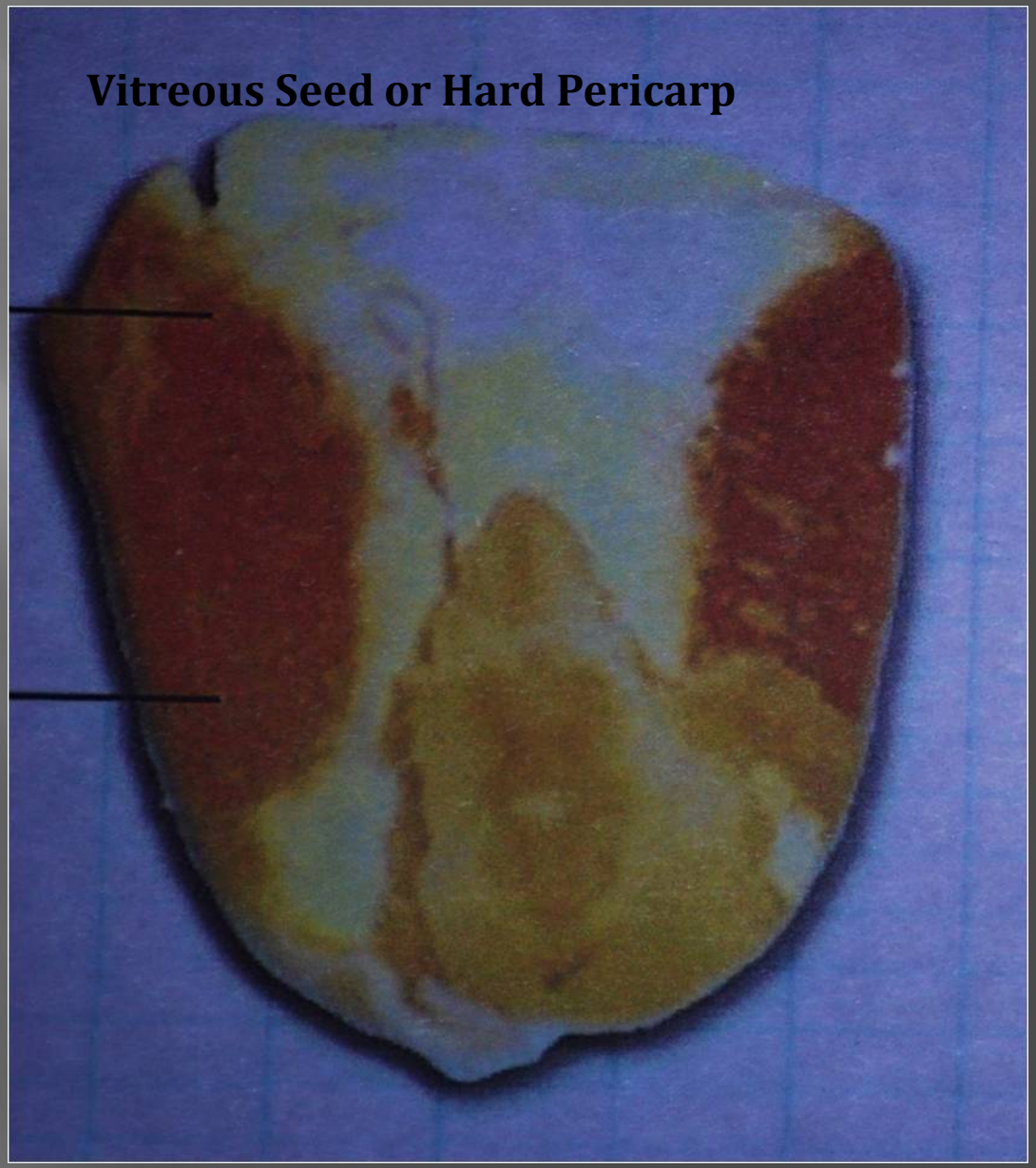
Creates a complex sugar chain.

More flint formation.

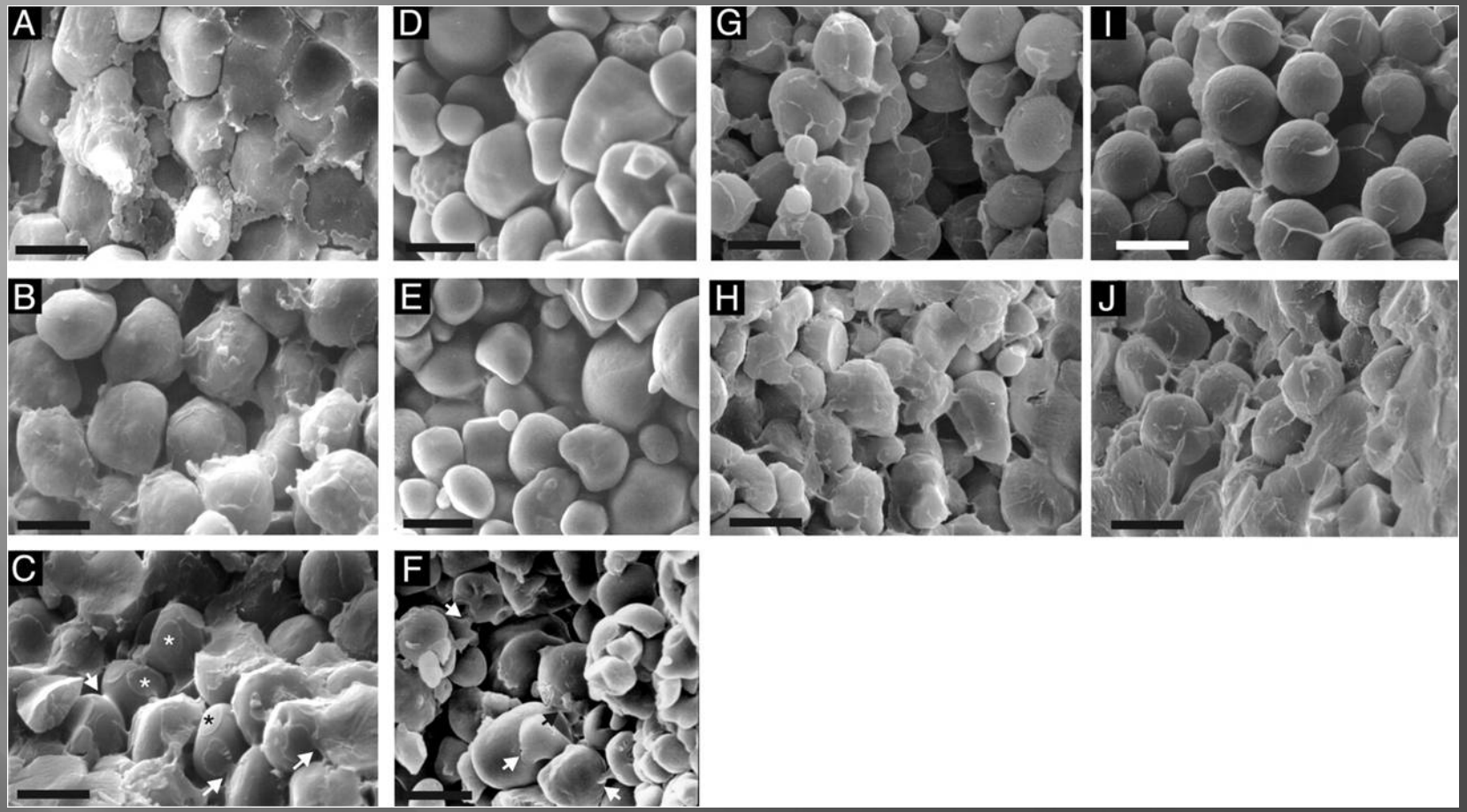
Lines with >78% zein content can be considered to having a vitreous endosperm.

Zein content in vitreous seed is twice as high as floury endosperm. (Paiva et al (1991)

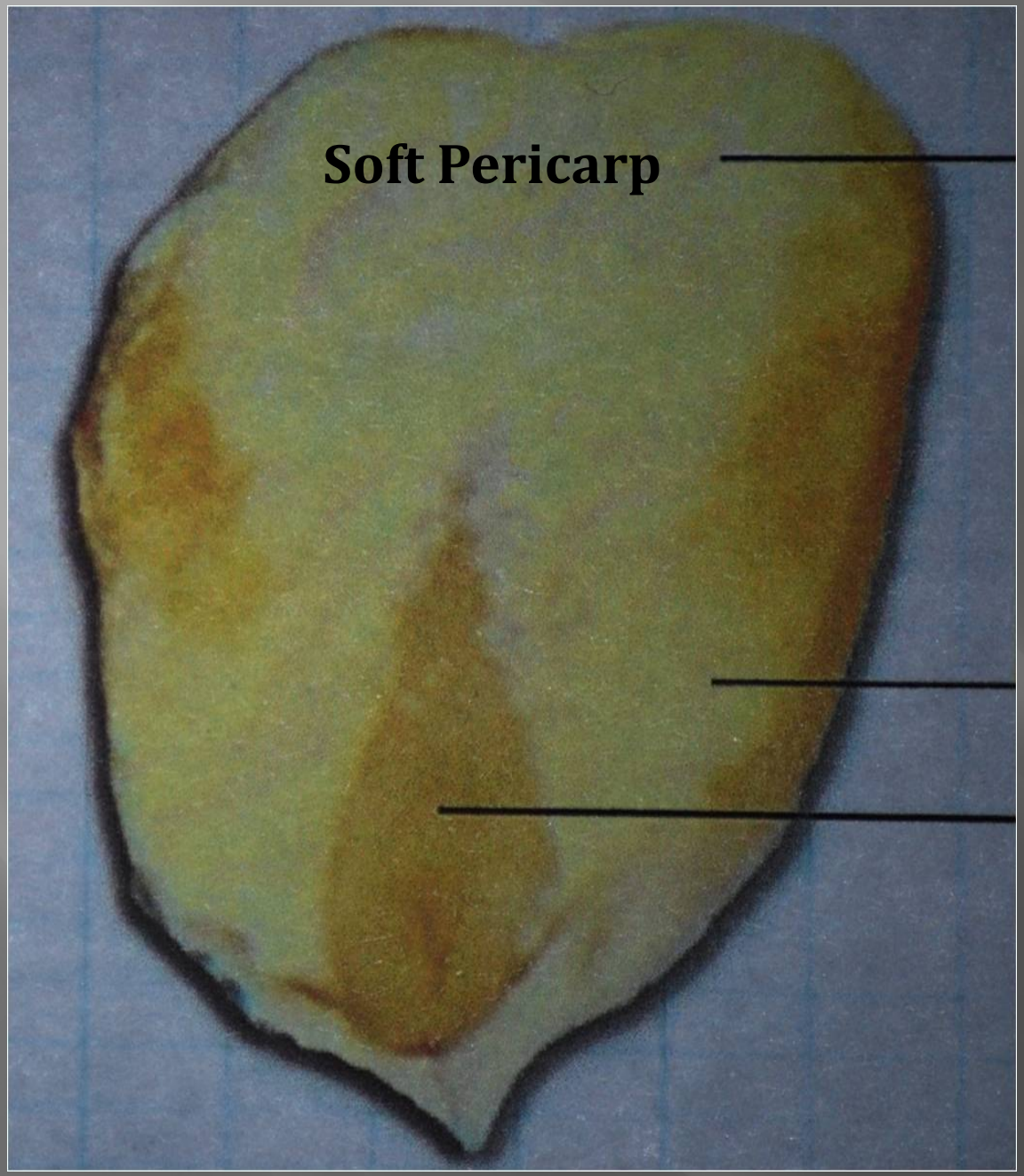
Typically maintains good test weight.



Scanning electron microscopy analysis of starch granules in mature endosperms and purified starch.



Reason why Vitreous corn is less digestible; The starch is encapsulated with the Prolamin or Zein Protein.



Last 10 Years has typically been the highest yielder.

Has a soft pericarp, expands easily, creating late yield increases.

As Salt-soluble Nitrogen increases, Zein decreases from 87 – 21% (Wessel-Beaver and Lambert 1982)

The more open structure makes it 15% more digestible for all animals;

Cattle, microbes, fungi and bacteria.

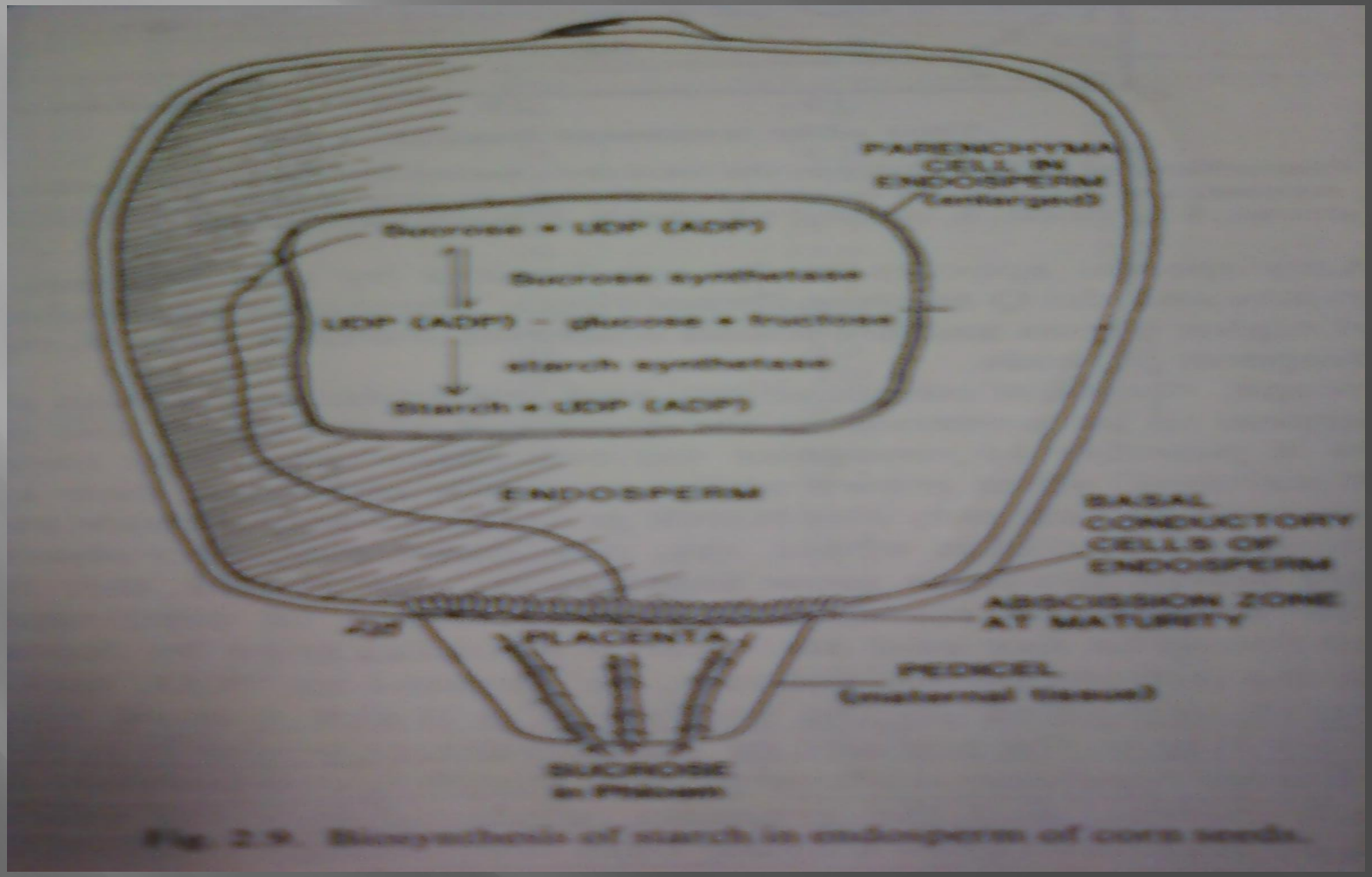
Floury endosperm contains “immature protein bodies” (Lending and Larkins (1989)

Can you tell which ear has the vitreous kernel and which has the soft kernel?

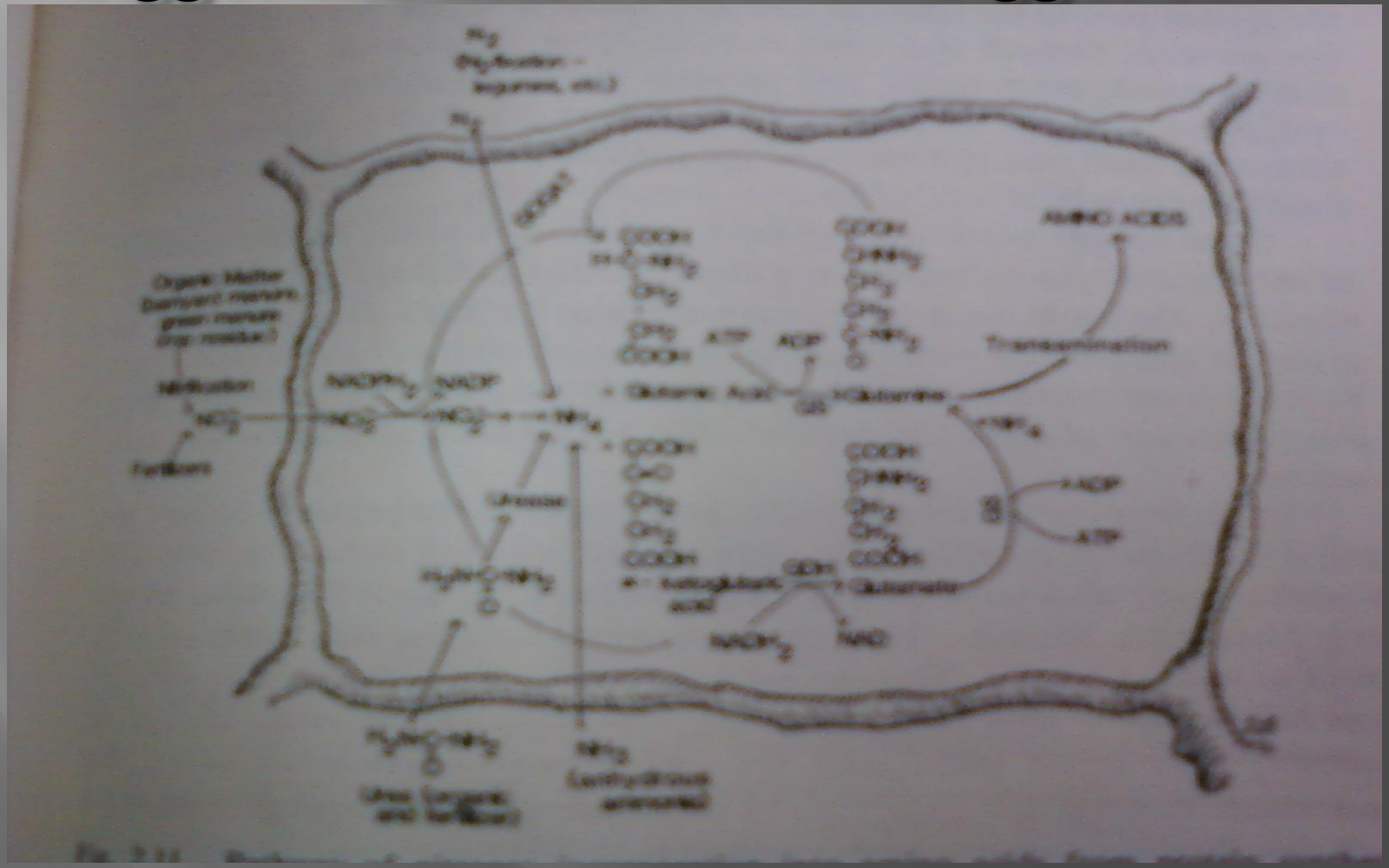
Once again can an ear shrink?

If an ear can shrink, how?

Corn Parenchyma Cell in Endosperm
This makes the internal cells bigger or smaller



Internal sugar structure in the Cell. The more carbon, sugar and Nitrogen (in). The bigger the internal cell = bigger seed.



Two Things to Note;

- **I look at each of the diseases we are about to see as "Alligators.**

  Yield equates to
  Sugar + Nitrogen = Amino Acids

- **What do these gators (Diseases) eat Amino Acids, Sugar and Nitrogen**
  - **= Your Yield.**

Now lets go look at some plants.

Which disease is this?

Anthracnose leaf lesions

- Colletotrichum grammicola
  - Typically starts at the base of the plant and feeds from the inside out
  - Fungus
  - Survives in plant residue
  - Present in warm, wet, humid conditions
  - May cause top dieback
  - Conditions that favor this disease include;
    - Weather, High Plant Populations, Insects, Loss of Nitrogen

What disease is this?

Northern Corn Leaf Blight.

- Large Tan lesions on leaves (typically top of the canopy)
- Favored by humid conditions.
- Fungus
- Survives on corn residue
- Spores are produced on residue
- Likes moderate temperatures at 65-89 degree F
- Fungicides are available if needed.

What is this disease?

Diplodia Ear Rot

- Stenocarpella maydis
- Produces a gray to black mold, often starting at the butt of the ear and progressing to the tip.
- Infected ears are lightweight
- Wet humid conditions in the 3 weeks after silking favor ear rots.
- Diplodia ear rots do not produce mycotoxins.

Is this a disease?

What disease is this?

Is this the same disease?

How many of these diseases will make this test positive?

Early seed born Goss's Wilt

Internal phloem of Goss's diseased plant Mn oxide that leaves browning.

Goss's Wilt what does it look like?

Second Identifier daily alting out of plants.

Weeping ooze that sits in ear shank.

Lesions that appear as the ear emerges.

This disease tends to destroy the second ear first.

Why? Any Ideas?

Goss's Wilt

- Leaves have light tan to gray lesions with dark flecks.
- Lesions appear shiny due to bacterial exudates on leaf surface.
- Plants will begin to have a line due to salting out which is a potassium dump.
- This is a BACTERIA
- Fungi are bigger.
- Bacteria over winter in infected residue on the soil surface.
- Goss's can also be seed born and seed transmitted

- Goss's will cross the Black Layer through the placenta.
- Goss's Wilt will continue to feed down to about 15% moisture. So it will continue to feed within your bins if you have wet corn.
- What Does Goss's wilt feed on?
  - It is a Lignin, Chitin and Sugar Digester

  Unlike fungi this bacteria will eat it all!!!!!

How do we stop it?

- The only thing I know for sure is that it appears to not like Ammonia in any form
- Ammonia tends to raise the PH of the plant.
- Bacteria's appear to not like Ammonia. It is used in packing plants to kill bacteria.
- The plant appears to utilize the Ammonia creating plant sugars longer than when using straight Nitrate Nitrogen.
- Early Anhydrous application tends to mask the disease longer

- Late Ammonial forms of Nitrogen continue to fuel the plant while building yield.
- The more Vitreous genetics or seed with the more pearly seed need the extra nitrogen input at the end of the season or after pollination.

- If you choose an ammonial application you will be feeding the plant while discouraging the disease.

Remember I told you how I looked at the combination of diseases?

- **I looked at each of the diseases we are about to see as "Alligators.**

  Yield equates to
  Sugar + Nitrogen = Amino Acids

- **What do these Gators (Diseases) eat Amino Acids, Sugar and Nitrogen**
  - **= Your Yield.**

I will tell you. These Gators get first dibs on your yield!

The question is who is going to win?

You or the Gators?