Profitable Soybean Production

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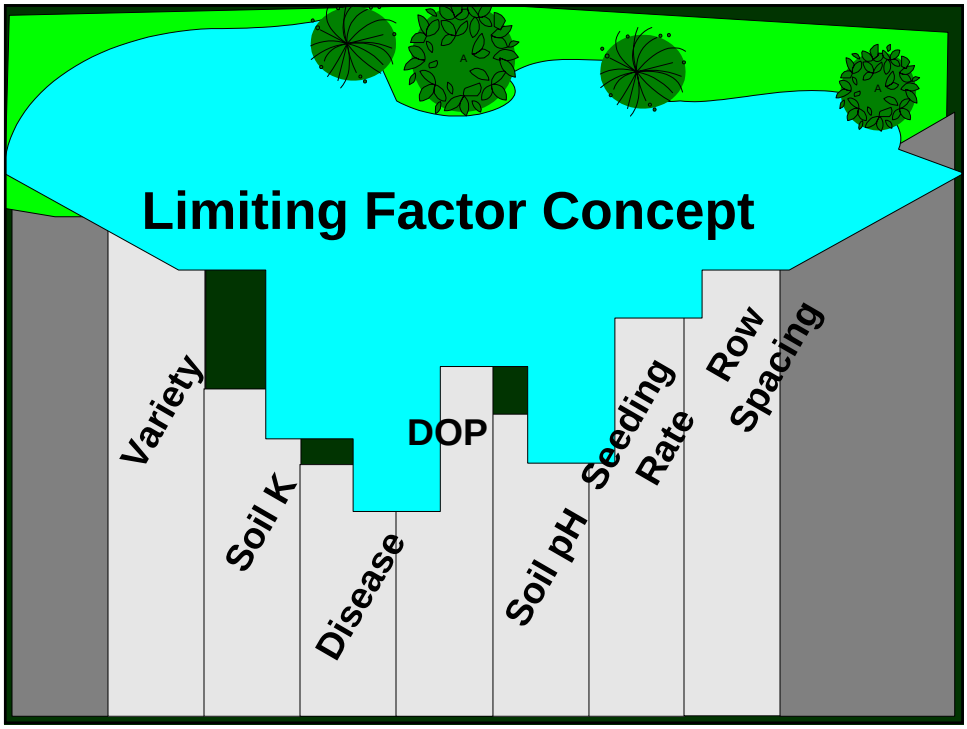
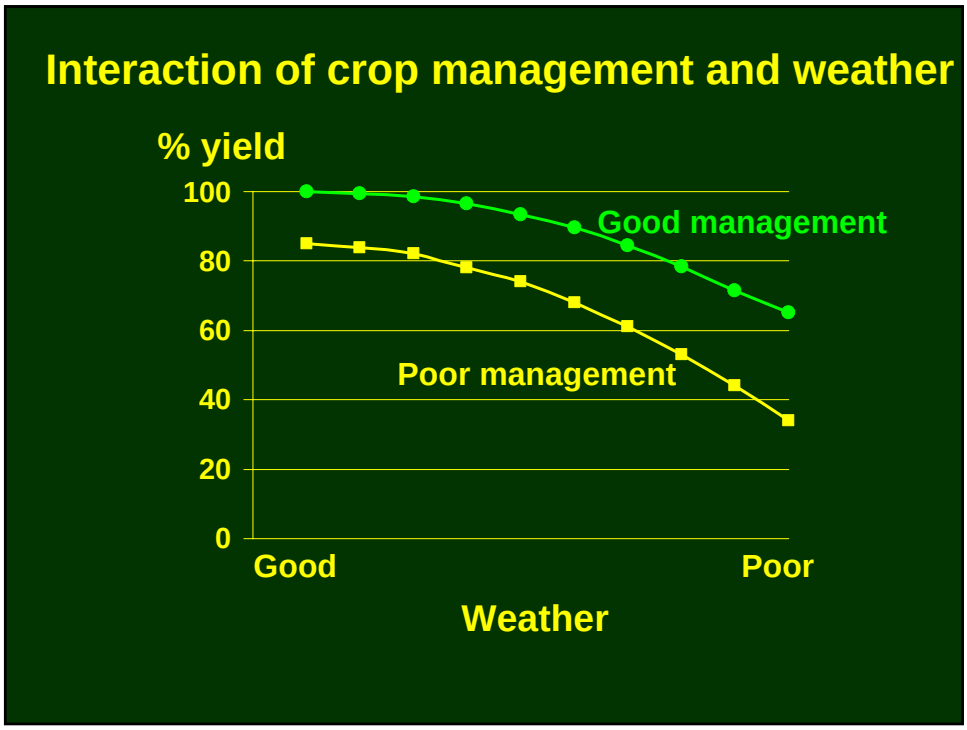
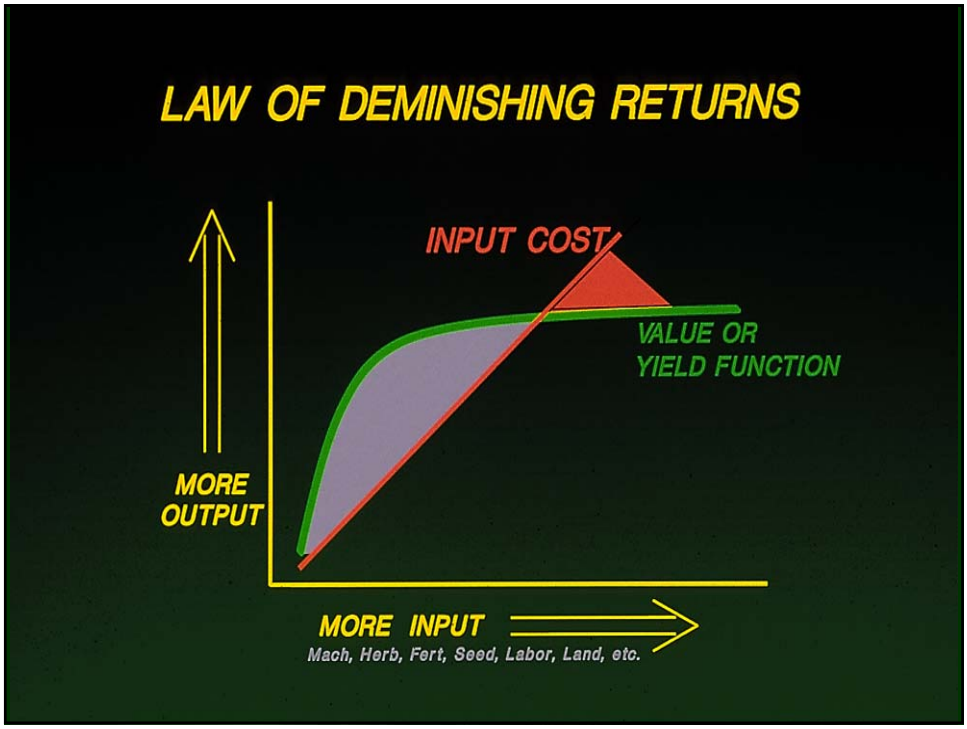
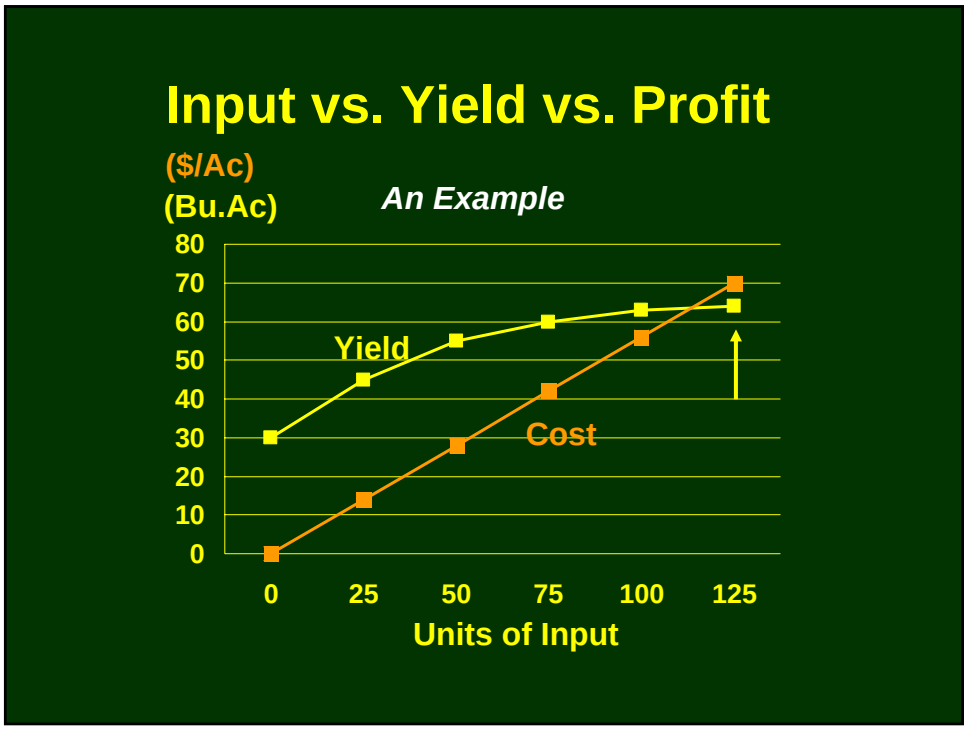
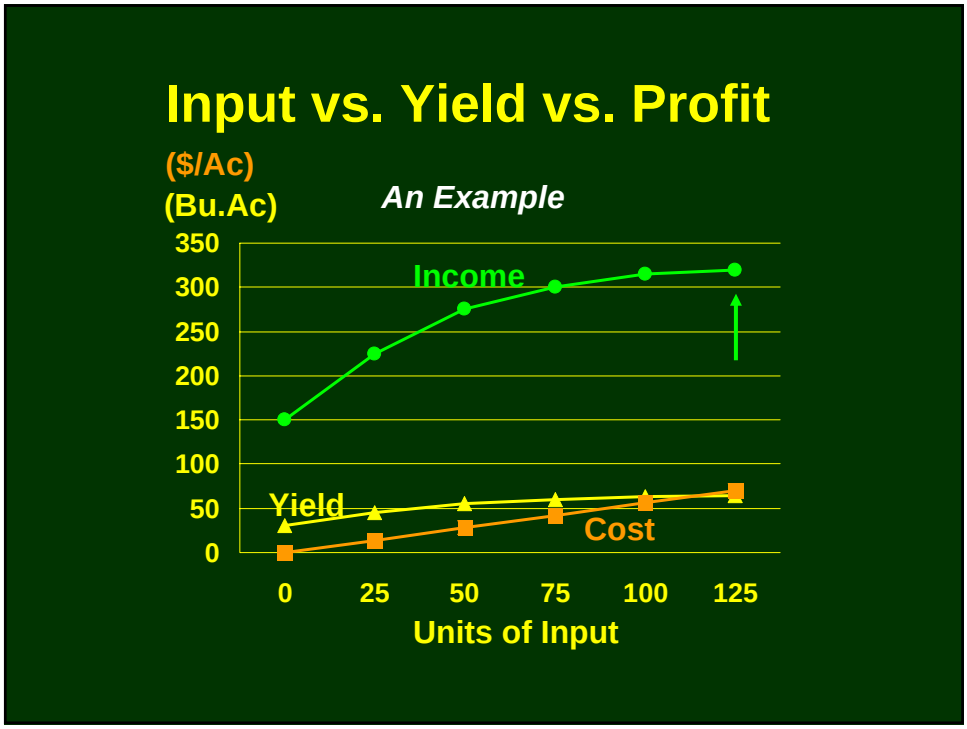
Useful Economic Principles and the Basics of plant growth

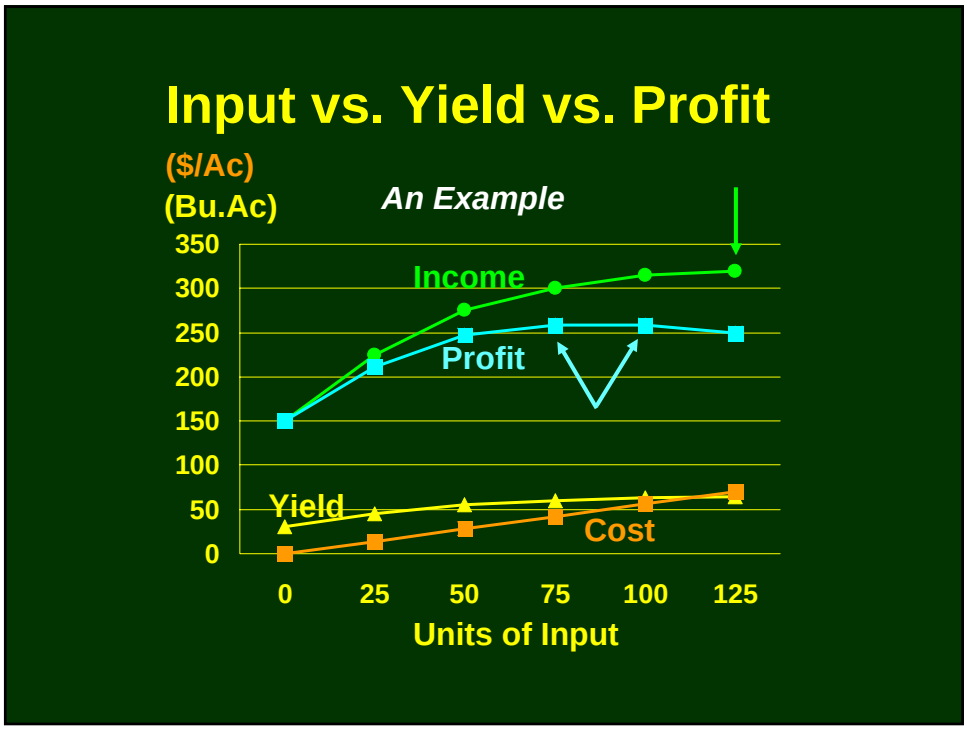






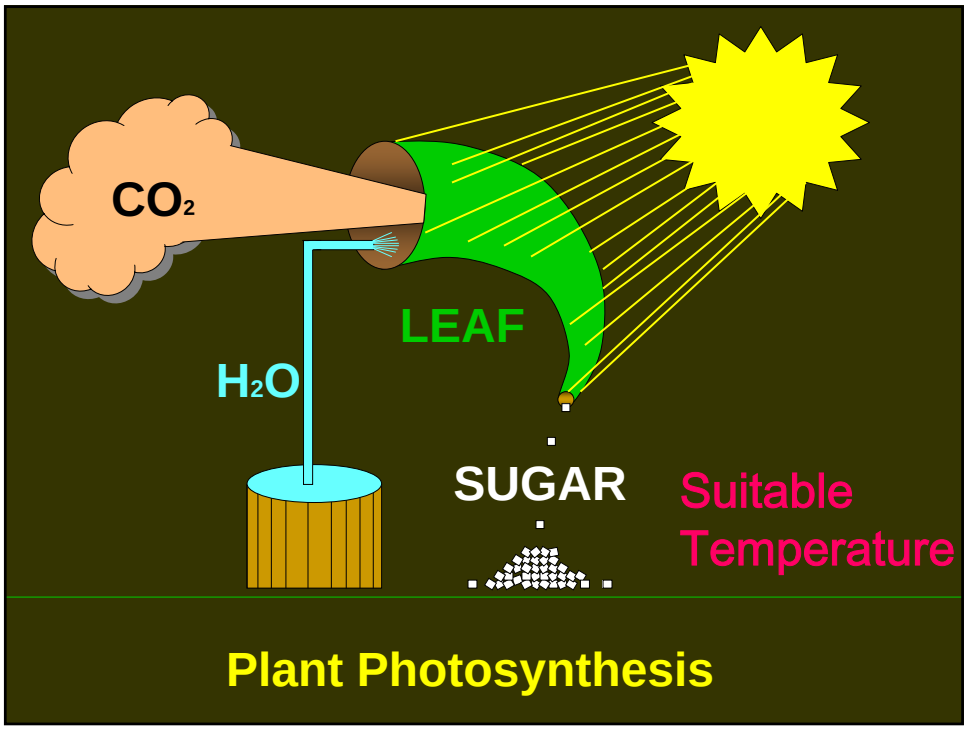


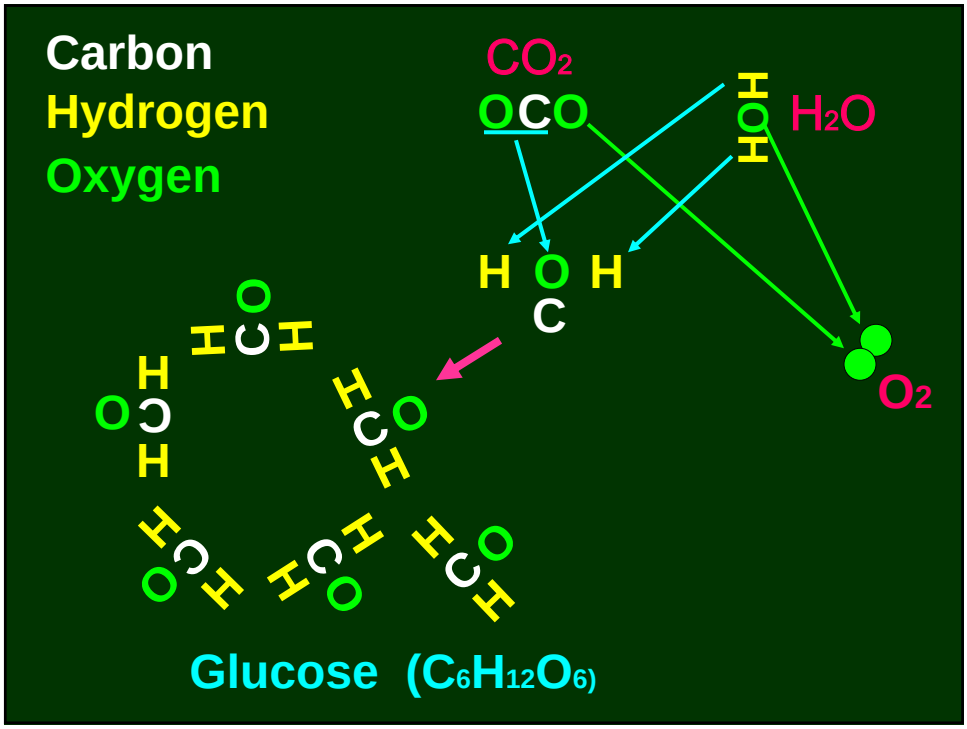


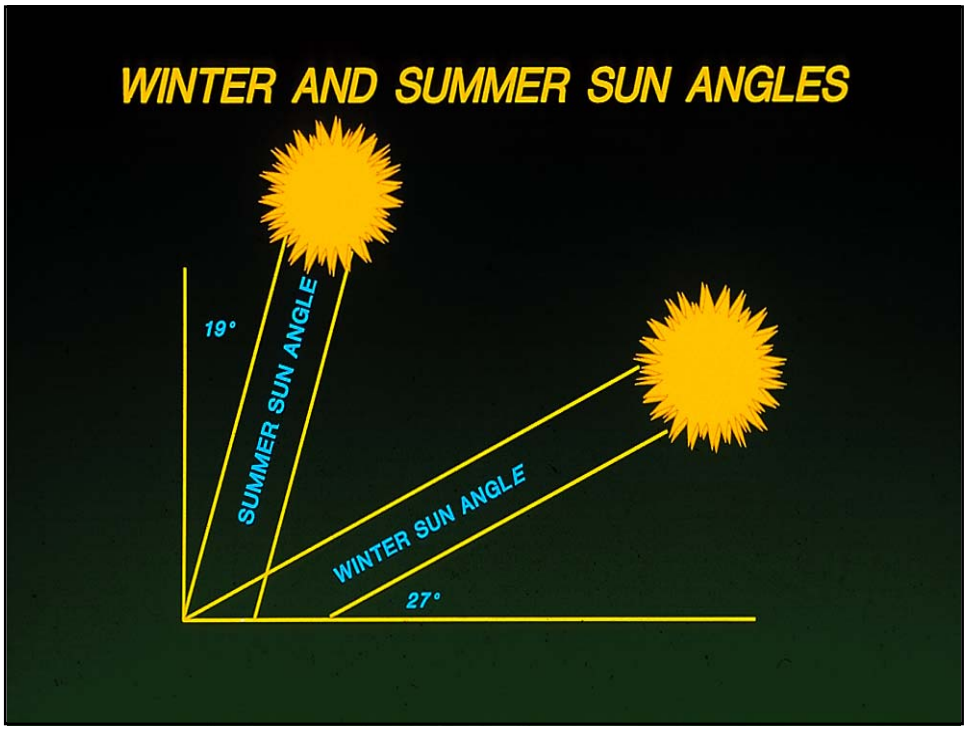


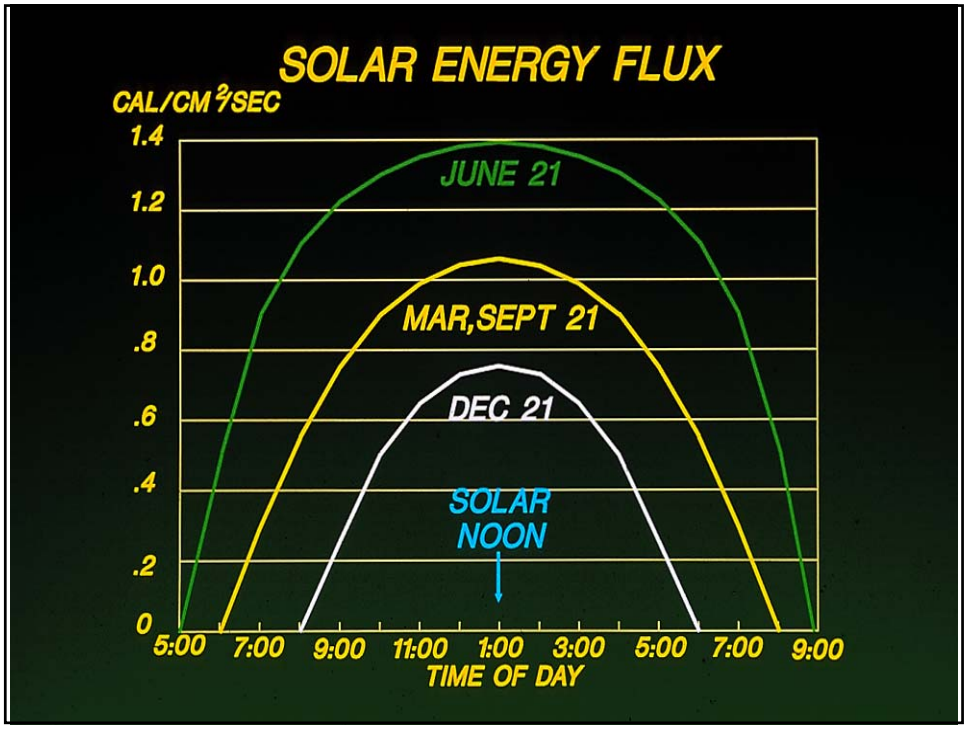
A 50 bushel soybean crop is made of:

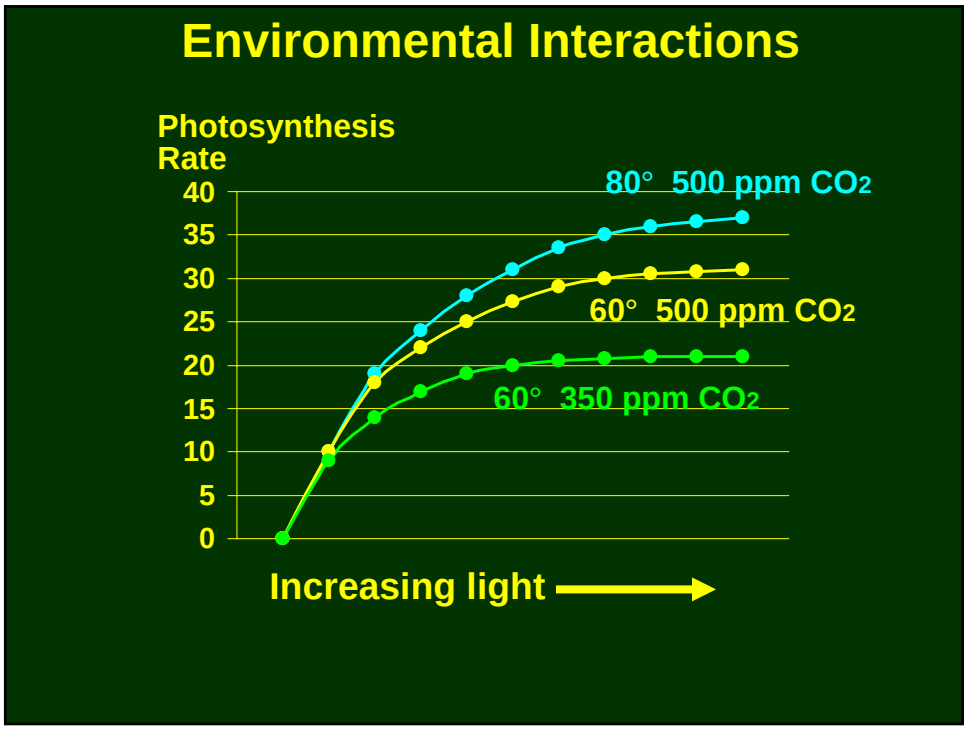
3770 # of Carbon	from CO_2 in air
1450 # of Oxygen	from CO_2 in air
300 # of Hydrogen	from water
300 # of Nitrogen	from soil and bacterial fixation
180 # nutrients	from soil
6000 # (grain + straw)	



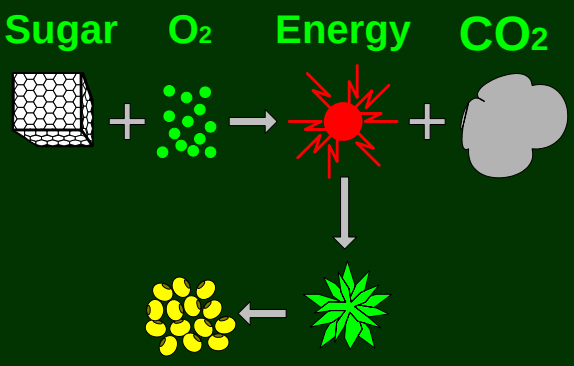








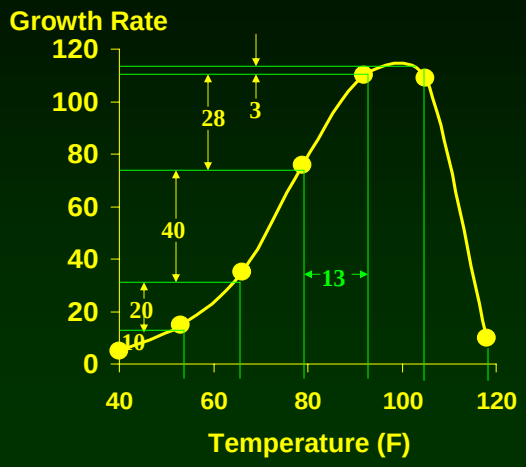
Respiration



Crop Temperature Ranges

Ranges	Soybean	Wheat
Optimum	70 - 85	55 - 75
Growth	40 - 95	35 - 80
Survival	28 - 110	(15) - 90

Effect of Temperature on Soybean Growth and Chemical Reactions



The Bottom Line - Perfection

If we had perfectly clear days with full sunlight and 85° F. and then cool nights with 60° F., no weeds, insects or disease, and planted good varieties early, in narrow rows, and provided adequate soil nutrients, then yields could be 150-200 Bu/Ac.

Current yields indicate the level of perfection we have reached.

Important Soybean Production Practices

Or Stress Management

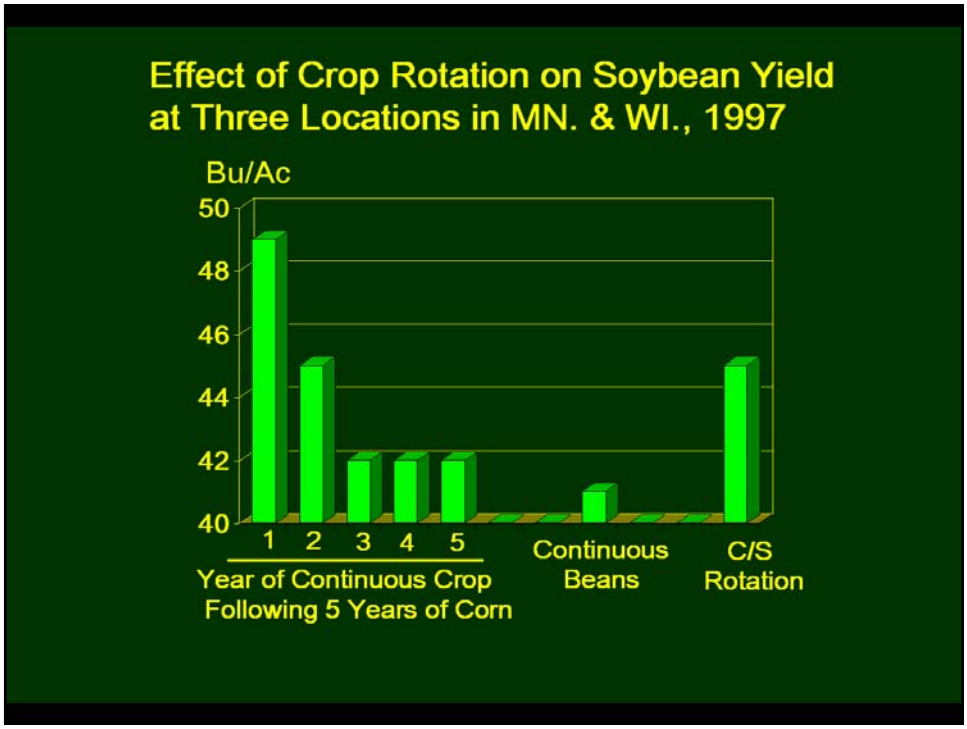
- Crop Rotation (pest control)
- Variety Selection
- Crop Establishment
- Canopy Design
- Crop Nutrition
- Pest Management
  - Disease, Weeds, Insects

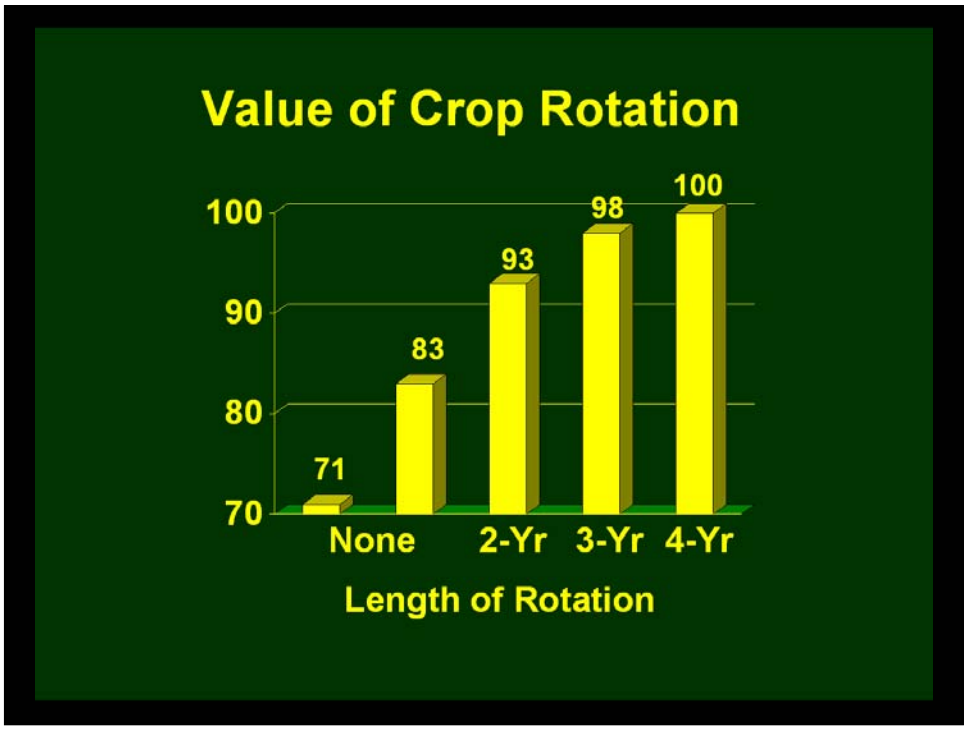
Crop Rotation Research Results

Minnesota, 29 Yr-Loc. Study. Corn and Soybean yields increased 13% and 11% in rotation compared to no rotation.

Cornell, 12 Yr-Loc. On-Farm Study. Corn yields were 10% higher from a corn-soy rotation than no rotation.

Kansas, 20 Yr-Loc. Study. Soy yields were 20 % higher when rotated with corn or grain sorghum than with soy.





Crop Rotation Problem

You farm 1500 acres with half in corn and half in soys. Average corn and soy yields have been 150 and 50 bu/ac. You cut your corn & soy acreage by adding 500 acres of wheat which causes both your corn and soybean yields to increase 5%. How much would your profit from corn & beans together go up if corn and beans are worth $2.50 and $7.50 per bushel, respectively?

Crop Rotation

Soy: 50 Bu X .05 X $7.50 = $18.75

Corn: 150 Bu X .05 X $2.50 = $18.75

1000 ac X $18.75 = $18,750 / yr
OR $37.50 / ac. of wheat

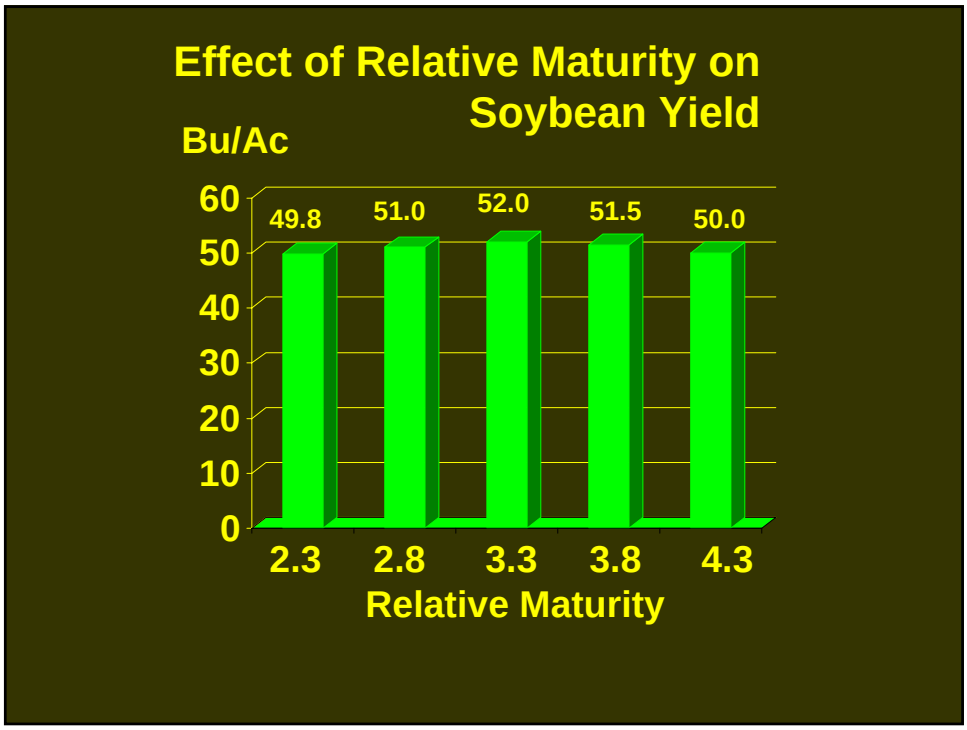
The value of wheat in a crop rotation that most people don't consider.

Variety Selection:

Grow several different maturities

Use varieties with disease tolerance

Select varieties with a good yield history



Proper crop establishment is:

Planting seeds at the:

Proper time in the
Proper row spacing at the
Proper rate and at the
Proper depth and with
Uniform spacing in the row.

Adjusting Cultural Practices For NO - TILL

Reasons for No – Till Soy Prod.

1. Saves Time
2. Saves Labor
3. Saves Fuel
4. Less Machinery Cost
5. 90% Reduction in Erosion

Adjusting Cultural Practices for NO-TILL

When Switching to NO –TILL, Soybean Cultural Practices Must be Adjusted Before Profits Will Increase.

Adjusting Cultural Practices For NO - TILL

Problems caused by No-Till

1. Cold soil slows germination, emergence and early growth.
2. More Root Rot Disease.
3. Heavy Crop Residue and difficult planter operation.

Adjusting Cultural Practices For NO - TILL

Solutions for cold soil:

1. Plant shallow (1”).
2. Slow planter speed (5mph).
3. Get good seed-to-soil contact.
4. Use high quality seed with good vigor.

Adjusting Cultural Practices For NO - TILL

Solutions for Root Rot:

1. Don’t plant when soil is wet.
2. Use resistant and tolerant varieties.
3. Treat seed with Apron or Allegiance.

Adjusting Cultural Practices For NO - TILL

Proper planter / drill operation:

1. 225# down pressure on disk openers.
2. Use a residue cutting coulter.
3. Constant & accurate depth control.
4. Adequate space for residue flow.
5. Top inch of soil should be dry enough to crumble.

Adjusting Cultural Practices For NO - TILL

Solutions for Crop Residue:

1. Spread evenly when harvesting.
2. Remove or incorporate wheat straw.
3. Don't plant on old corn rows.

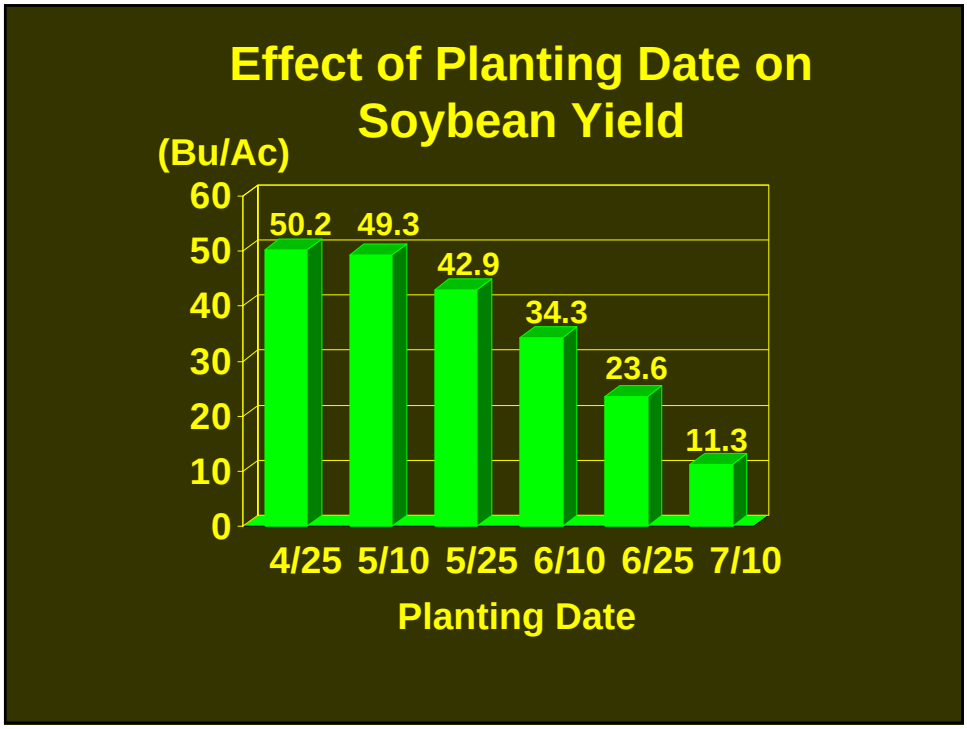
Solve a Problem

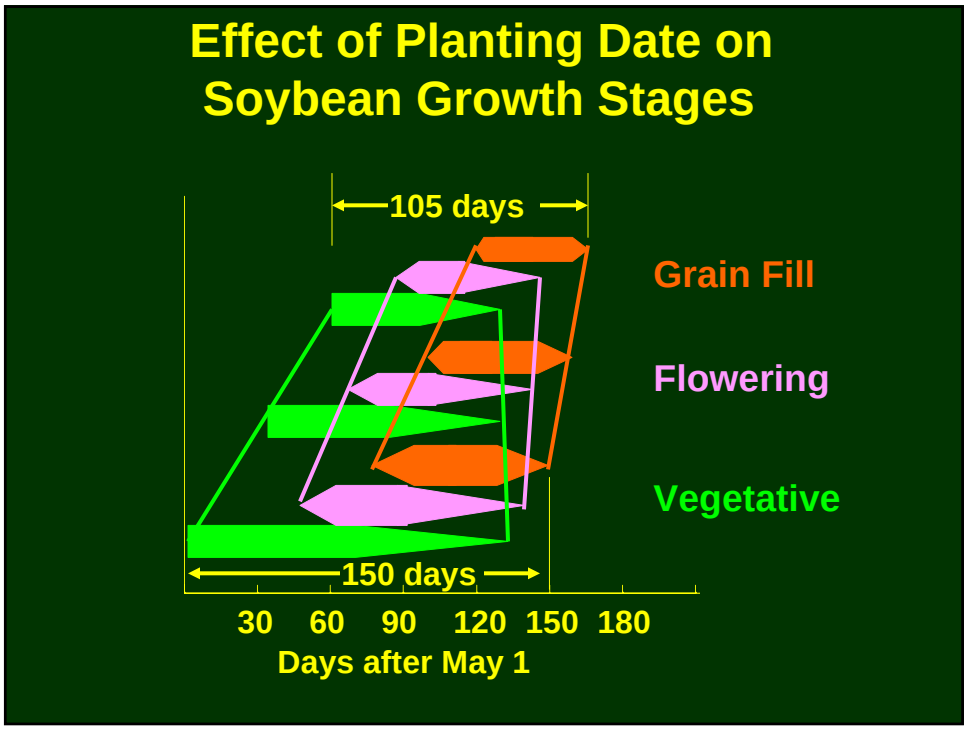
The cost to chisel and disk your land before planting is $23 per acre. If corn and soys are $2.50 and $7.50 per bushel, how many bushels of each could you loose per acre and still maintain the same net income per acre using No-Till and assuming yield does not change?

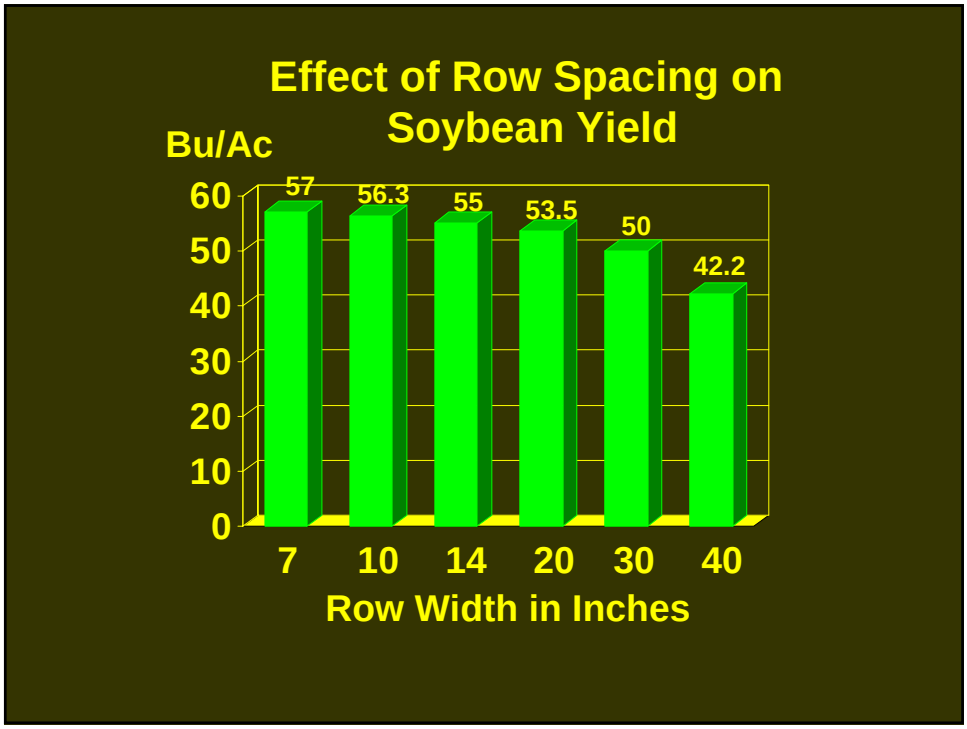
Solve a Tillage Problem

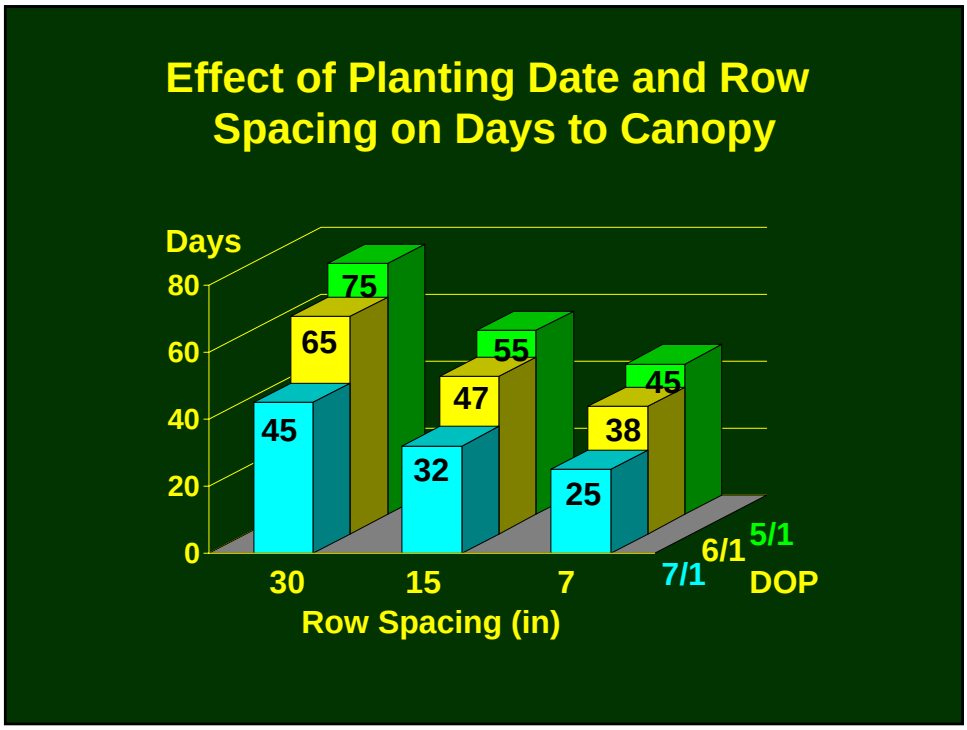
Corn: $23.00 / $2.50 = 9.2 bu/ac

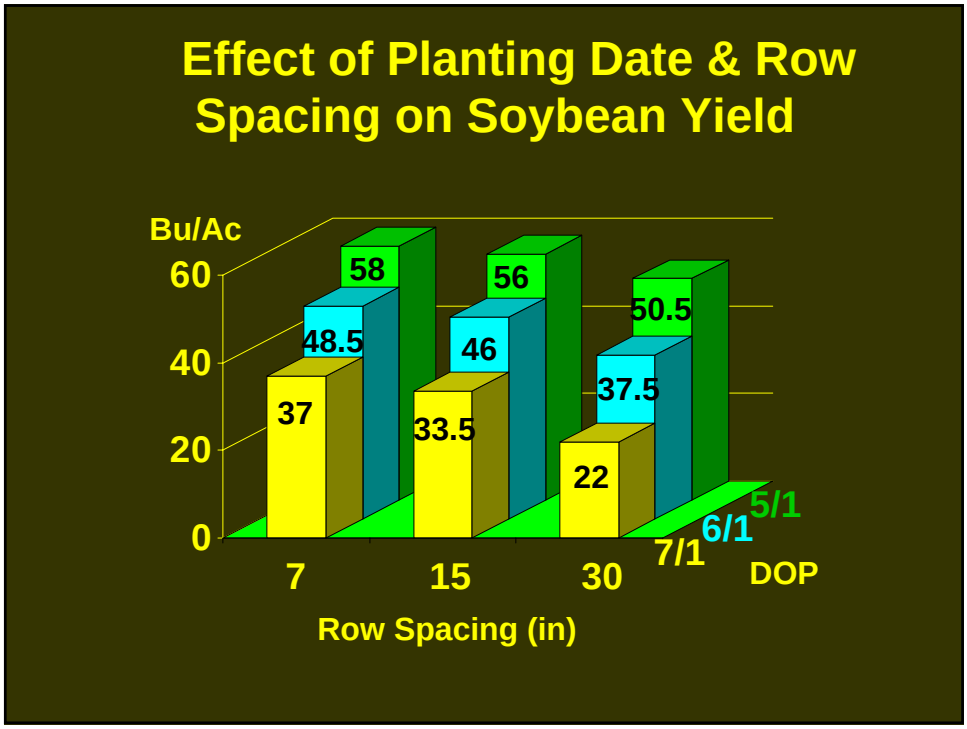
Soys: $23.00 / $7.50 = 3.1 bu/ac

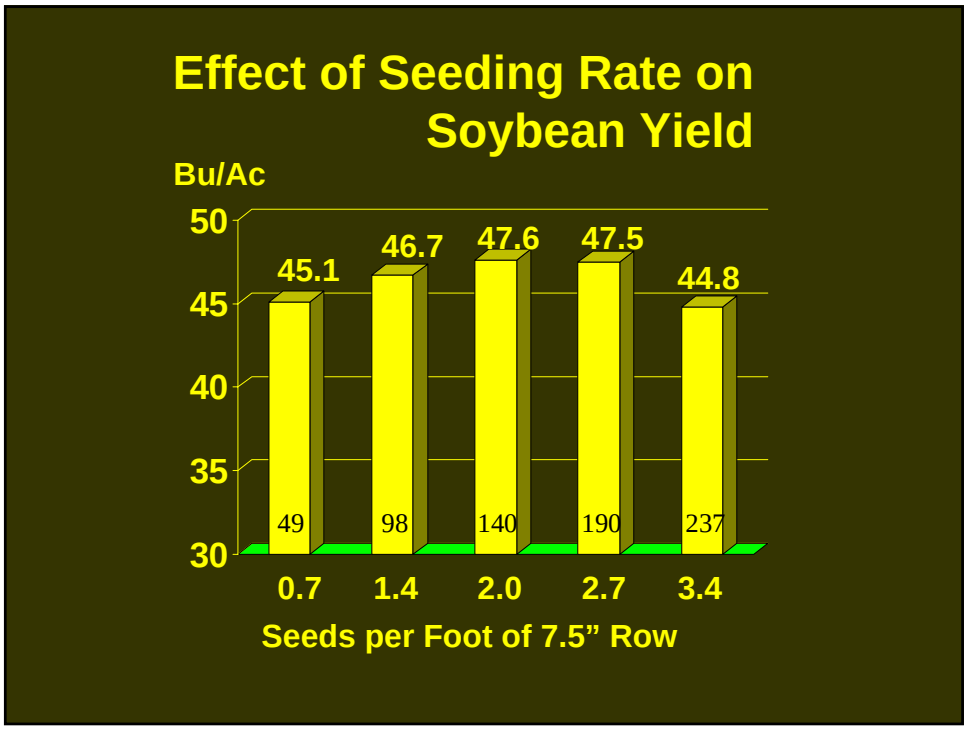


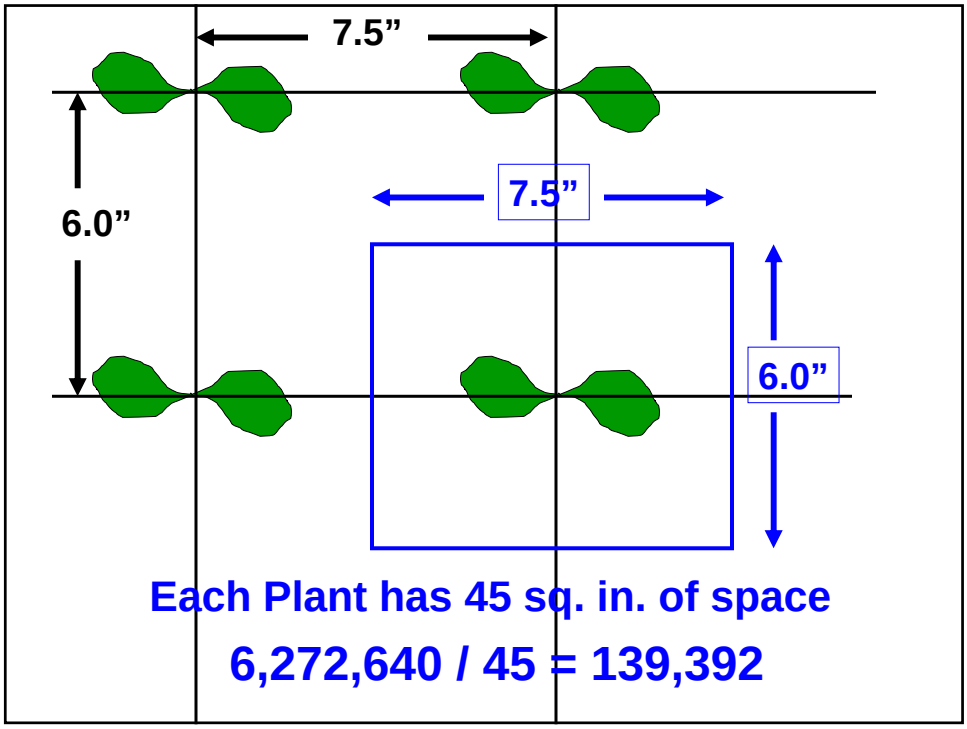












Soy Seeding Rate Problem

How many seeds per acre will you drop if you seed at the rate of 2.7 seeds per foot of row when rows are 7.5” apart?

There are 6,272,640 sq. inches acre.

Soy Seed Rate Problem

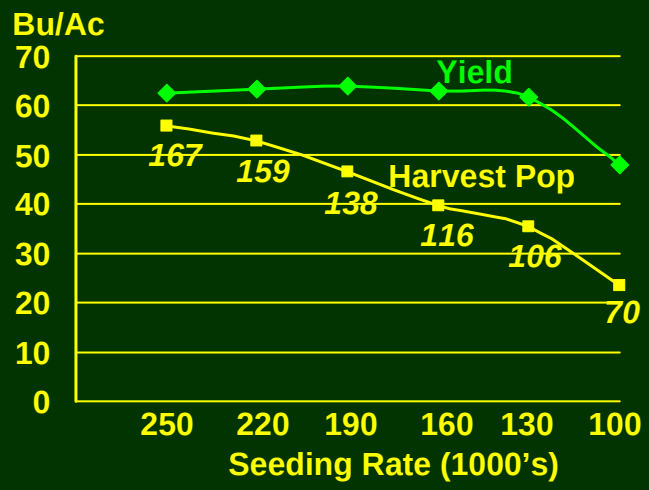
Seed spacing in the row is 12” / 2.7 = 4.45

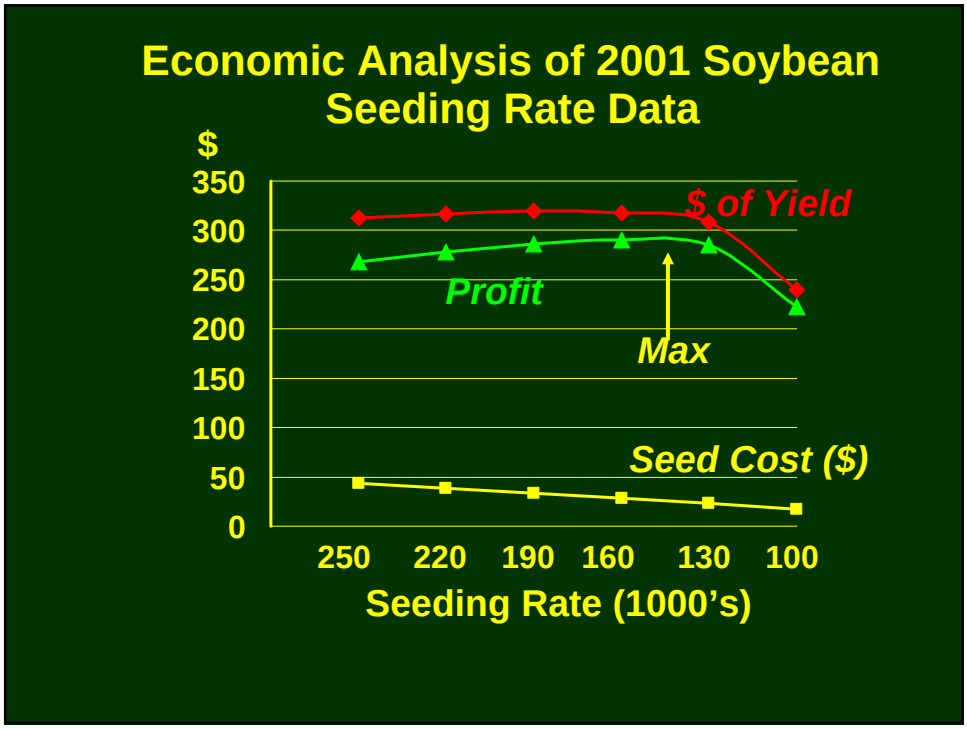
4.54” X 7.5” = 33.375 Sq inches per seed

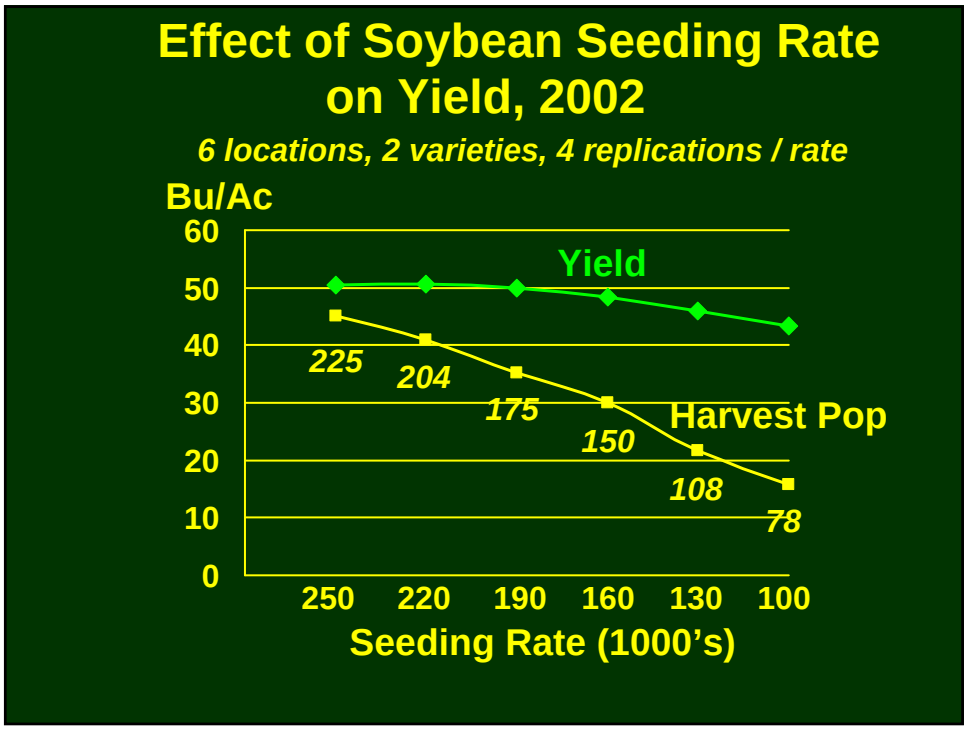
6,272,640 / 33.375 = 187,944 seeds / acre

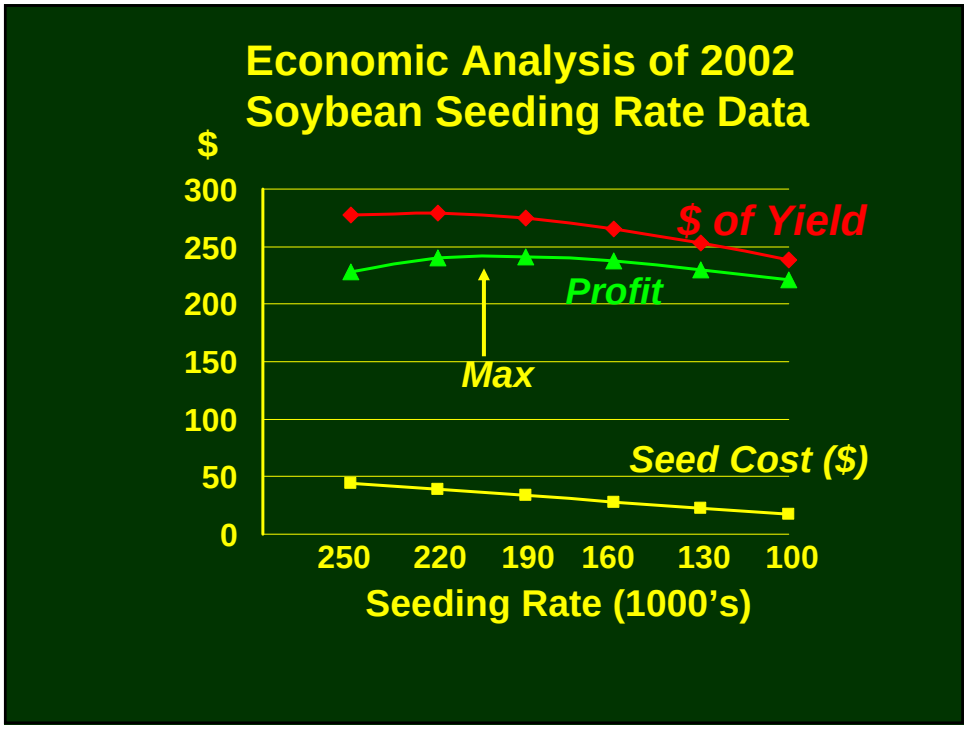
Effect of Soybean Seeding Rate on Yield, 2001

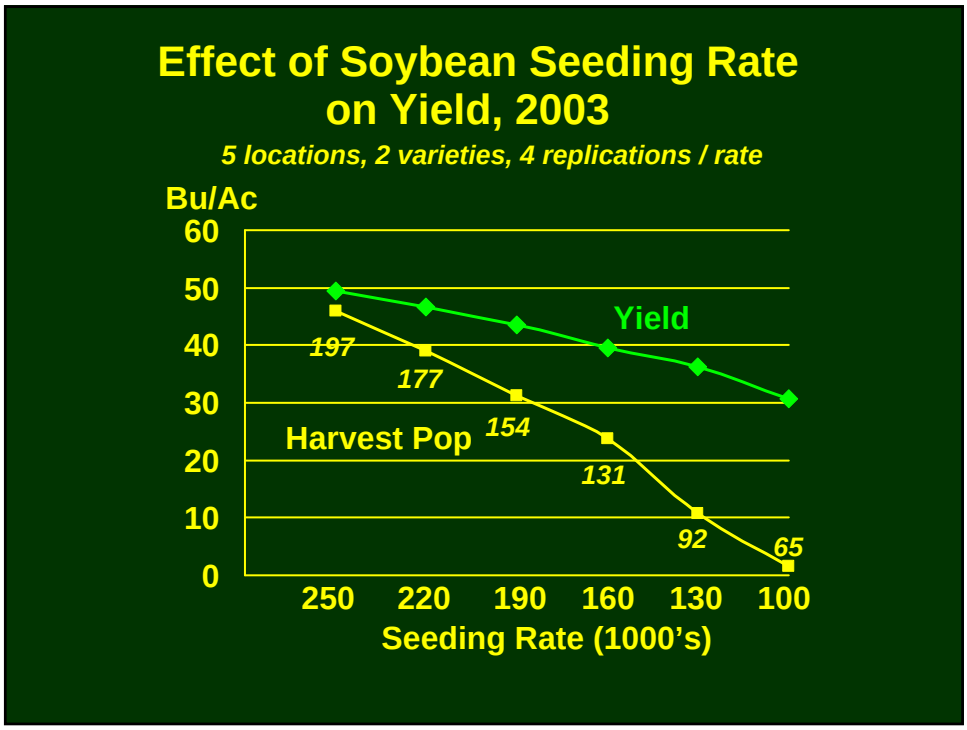
6 locations, 2 varieties, 4 replications / rate

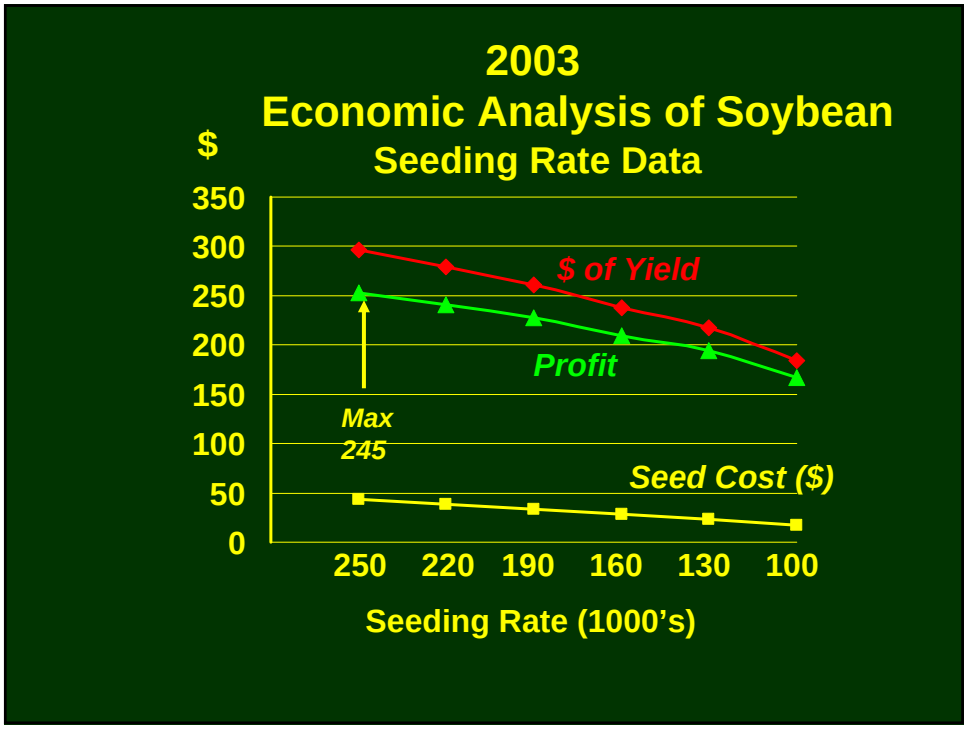


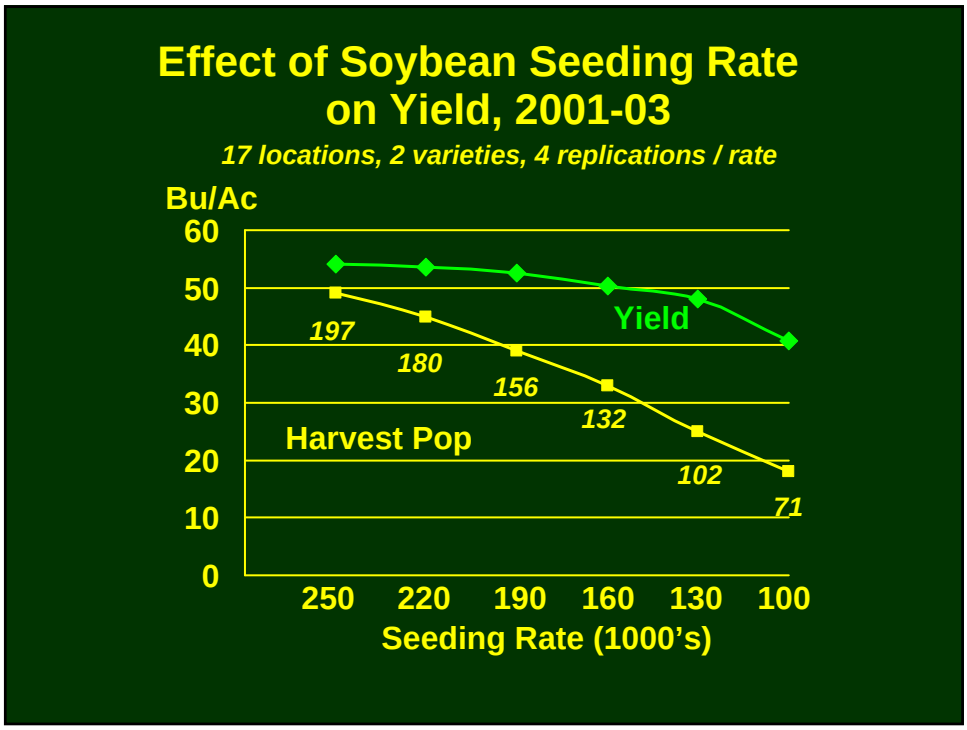


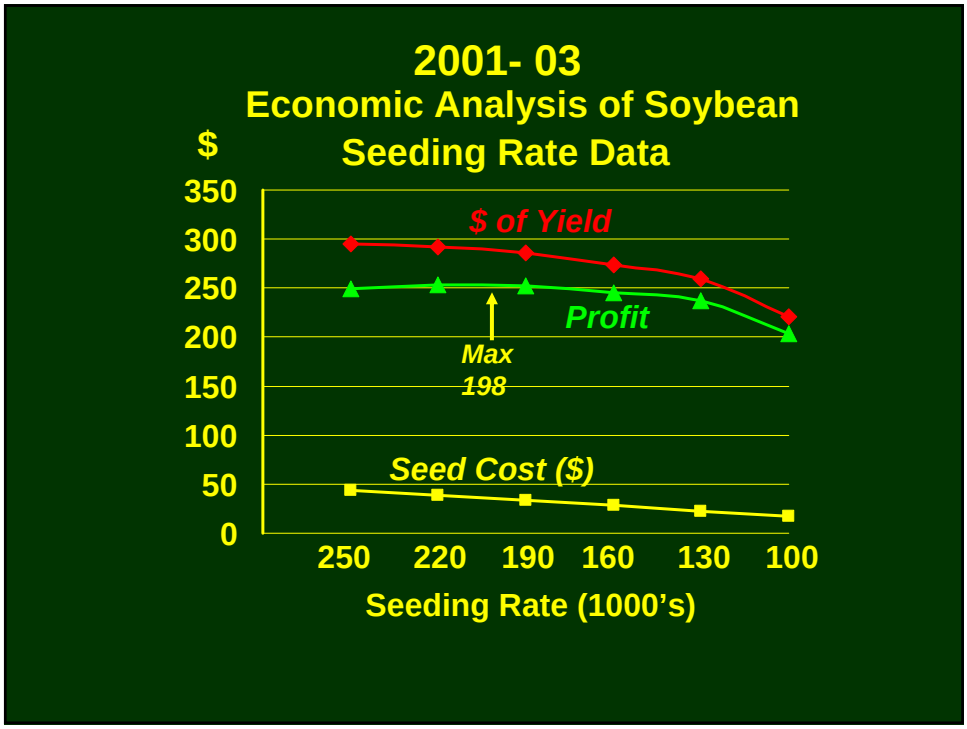












Problem to Solve

Using this yield curve and seed cost (data in table), what is the most profitable seeding rate, if grain is worth $7.50 per bushel?

# seed	$ of seed		Yield (bu)	
49	18.60	2.70	53.3	$24
56	21.30	2.70	56.5	$15
63	24.00	2.70	58.5	$7.5
70	26.70	2.70	59.5	$3.75
77	29.40	2.70	60.0	$1.50
84	32.10		60.2	

Last Problem to Solve

You planted a field of soys on April 25 and are unhappy with the stand. You walked the field and counted the number of plants in 10 feet of 7” row at 10 different places in the field. The distribution of plants in the field was uniform for all 10 counts but averaged only 19 plants per 10 feet of row. What is the population per acre?

Soybean Stand Problem

There were 1.9 plants / ft. of row

12” / 1.9 = 6.32” between plants in the row

6.32” X 7” = 44.24 sq in / plant

6,272,640 / 44.24 = 141,787 plants / acre

Fungicide Seed Treatments

Three years and six sites per year.

Test fields have had a corn/soybean rotation, good surface and subsurface drainage, proper fertility and few impediments to high yields.

Over time, fungicide seed treatments produce $3 for each $ spent.

Inoculation

10 years and over 50 field trials

Test fields have had a corn/soybean rotation, Good surface and subsurface drainage, proper Fertility and few impediments to high yields.

Over time, seed inoculation produces $4 for each $ spent