Land Ownership 101

Soils and Agronomy

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Dr. Maria Boerngen - Illinois State University Agriculture Department

Don Meyer – ISU Ag Department (Retired) / Lee Realty Group, Inc.

McLean County Farm Bureau

1

Objectives - An Improved Understanding of:

- Climate and Soil
- Central IL Crop Selection
- Principles of Corn Production
- Principles of Soybean Production
- Soil Testing

Maintenance Fertilizers / Fertilizer Materials

- Cover Crops
- Pest Management

2

Sources

- Illinois Agronomy Handbook
  - http://extension.cropsciences.illinois.edu/handbook/
- IL State Water Survey
- U.S. Department of Agriculture
- NASS Statistics
- Agridata-Surety Mapping Website
  - http://www.agridatainc.com/

3

Why Corn & Soybeans in McLean County?

- Annually ~ 325,000+ corn acres (314,500 - 2018)
- Annually ~ 300,000 soybean acres (312,000 - 2018)
- #1 corn and soybean county in the nation (usually)

4

Corn – Past 10 Years

Year	Acres Harvested	Ave. Yield	Production
2018	313,500	229.3	71,884,000
2017	305,000	223.9	68,276,000
2016	322,500	218.1	70,340,000
2015	317,000	199.2	63,148,000
2014	322,500	218.3	70,408,000
2013	334,000	188.6	63,008,000
2012	341,000	109.5	37,348,000
2011	364,000	159.6	58,104,000
2010	357,000	169.5	60,522,000
2009	368,500	186	68,541,000

5

Soybeans – Past 10 Years

Year	Acres Harvested	Ave. Yield	Production
2018	311,500	69.1	21,516,000
2017	310,000	66.8	20,699,000
2016	297,000	63.8	18,950,000
2015	299,500	64.6	19,341,000
2014	294,000	63.2	18,584,000
2013	285,000	56.5	16,115,000
2012	281,000	52.3	14,701,000
2011	260,500	56	14,581,000
2010	270,000	58.5	15,805,000
2009	241,500	54	13,041,000

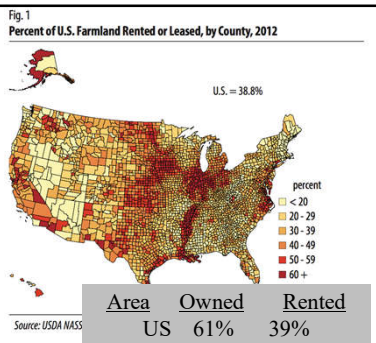
6

Can We Grow Other Crops?

- Yes, but is there a market?
- Is the yield sustainable?
- How does the crop fit leased land?
- Examples – hay, specialty corn/soybeans (including non-gmo), oats, barley, canola, buckwheat, sunflower, pennycress(?), many others

7

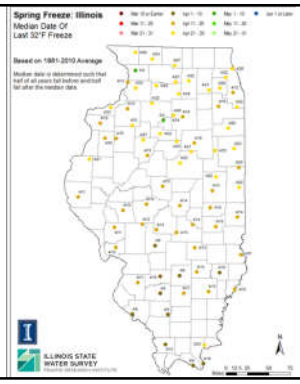
Land – Own vs. Rented



Area	Owned	Rented
US	61%	39%
IL	42%	58%

8

Median Spring Frost Date (32 degrees)



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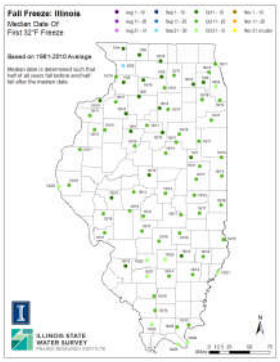
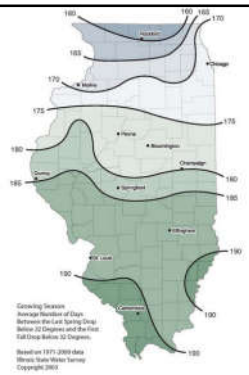
Median Fall Frost Date (32 degrees)



10

Climate

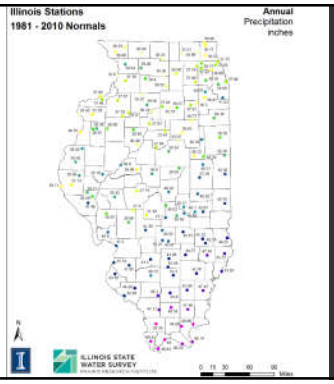
Frost-free Days in Illinois



11

Climate

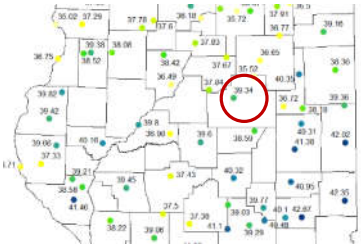
Average Precipitation in Illinois



12

Climate

Average Precipitation in Illinois



13

Growing Degree Days

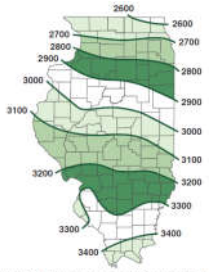


Figure 2.4. Average number of growing degree-days in Illinois, May 1 to September 30, based on 1971–2000 data. Map provided by the Illinois State Climatologist Office, Illinois State Water Survey.

((Temp Max+Temp Min)/2))-50
- Use temperature range 50-86

Example: 88 high, 62 Low
- ((86+62)/2)-50 = 24 GDD

Example: 60 high, 44 low
- ((60+50)/2)-50 = 5 GDD

14

CORN - Hybrid Selection

- Maturity
  - GDD rating (Growing Degree Days)
    - (50 F to 86 F)
  - Normally 3000-3100 GDD available to us here
    - (May 1 to Sept. 30)
- Hybrids generally used - 2500-2800 GDD rating
- Many still use RM (relative maturity) ratings
  - 100 day corn = 2400 GDD
  - 110 day corn = 2650 GDD
  - 115 day corn = 2800 GDD

15

CORN - Hybrid Selection

- Yield Range can be 50 bushels or more per acre
- Disease, insect, herbicide resistance factors
- Genetic Engineered (GMO) hybrids have:
  - grown yield
  - saved insecticide application
  - improved weed management
- Many hybrids now "stacked" with multiple traits
- Market - Biotech, Niche markets, Special traits

16

CORN - Planting Date

- Historically best yields when planted mid-late April
- Recent studies indicate 4/16 or 4/17 target date
- Decline of yield ½ bushel per day into early May
- 1 bu/day (1st 1/3 of May), 1.5 (2nd 1/3), 2 (final 1/3)
- Can still freeze April 22 (5/10 years)
- Growing plant stays low (less frost risk)
- Most farmers can plant corn crop in 7 days or less
- Soil temperatures 50 degrees or higher
- Need good soil tilth

17

CORN - Planting Depth

- Normal depth 1.5 to 1.75 inches
- Earlier planting, somewhat shallower (1.5)
- Later planting, somewhat deeper (2-2.5)
- Precise planting major focus today

CORN - Population

- Generally >32,000 kernels per acre
- Goal now >30,000 harvest population
- Some moving well into 30's
- Desire to "canopy" to prevent weeds/water loss
- Maximize sunlight
- Narrower rows fit the greater populations

18

CORN - Row Spacing

- Most common width = 30 inch row (>80%)
- Some interest in twin, 15 or 20-24 inch rows

CORN – Pest Pressure

- European Corn Borer (Bt used widely)
- Foliar disease –summer aerial applications common
- Stalk Rot
- Corn Rootworm (changing habits!)

19

SOYBEAN - Planting Date

- Yield best when planted in May
- Full season probably best in early May
- Photoperiod sensitive - flowering begins at nearly the same time, regardless of date
- Earlier than May might work, but only if soil tilth and temperature are favorable
- Greater risk of frost from exposed growing point

20

SOYBEAN - Planting Rate

- 30 inch rows = 110,000 -150,000 plants/acre (ppa)
- 100,000 ppa is adequate is planted at normal time
- Some years 50,000 ppa have yielded well
- Concern is for canopy cover
- Drilled rows = approach 200,000 plants/acre Focus now on seeds/acre rather than pounds/acre

21

SOYBEAN - Planting Depth

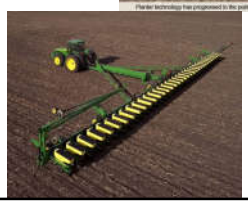
- 1.25 – 1.75 inches preferred

SOYBEAN - Row Width

- Generally a yield advantage to 20 inches, but not necessarily less than that
- Many using “split-row” planters for 15” spacing

22

Planter Technology



23

Planter Technology

24

SOYBEAN - Seed Source

- Bin Run - need to germinate test, assess seeds per pound – not as common (tech agreement issues)
- Certified Seed - more of a guarantee of weed free, disease free, fewer cracks, higher germination test, licensed and signed tech fee – mostly private company seed today

25

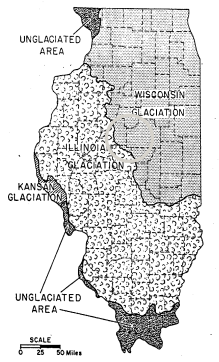
Crop Rotation

- Improved disease management
- Fewer insect pressures
- Less need for insecticide
- More options for weed management
- Problems today with weed resistance
- We STILL need a 3rd or 4th crop!!!

26

Soil - History

Extent of Glaciation in Illinois



27

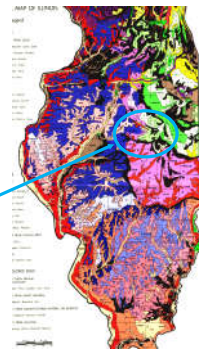
Soil - History

Native Vegetation in Illinois

28

Soil - Characteristics

General Soil Series Map of Illinois

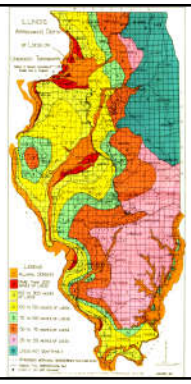


29

Soil - Characteristics

Average Loess Thickness in Illinois

It takes about 300 to 500 years to form 1 inch of topsoil!

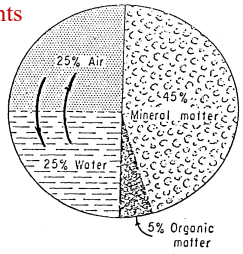


30

Soil - Characteristics

Soil Components

-45 % M.M.
- 5% O.M.
-25% Air
-25% Water

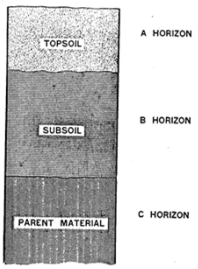


31

Soil - Characteristics

Horizons

Layers in a Soil Profile



32

Soil - Characteristics

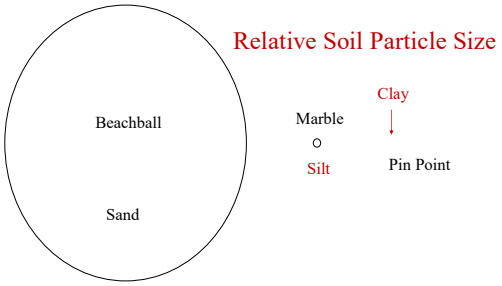
Texture

The percentage of sand, silt , and clay within a soil

sand	.050 - 2.00 mm	gritty
silt	.002 - 0.05 mm	smooth
clay	<.002 mm	sticky

33

Soil - Texture



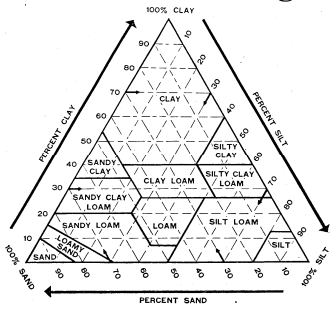
34

Soil Texture

- influences the chemical properties of a soil
  - amount of nutrients held – clay most significant
  - availability of nutrients
- influences the physical properties of a soil
  - compaction
  - drainage
  - aeration
  - root penetration

35

Soil Texture Triangle



36

Soil Structure

How sand, silt, and clay particles are arranged into stable structural units called aggregates or “peds”

37

Soil - Structure

Common Types of Soil Structure

Granular

Crumb

Platy

Prismatic

Columnar

Blocky

Single Grain

Massive

38

Soil -

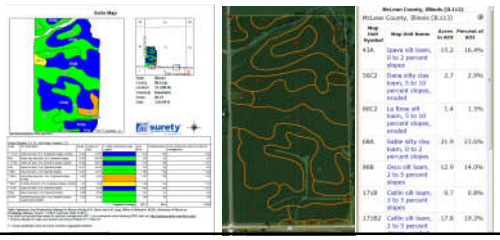
Organic Matter

- the remains of plants and animals
- helps develop good air/water relationships
- supplies some of all nutrients need by plants

39

Soil Type – How to find

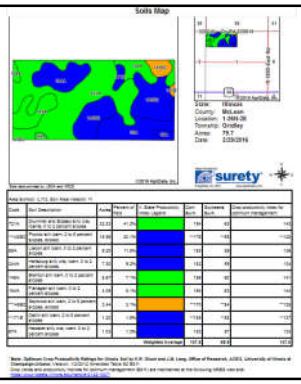
- AgriData - https://www.agridatainc.com/
- USDA Web Soil Survey - https://websoilsurvey.sc.egov.usda.gov/



40

Soil Types & Productivity Indices (PI) used for:

- taxes
- land value
- cash rent



41

42