

Nutrient Management Issues in Tennessee



CAFOs in Tennessee

- ★ 2.1 million head of beef cattle = no CAFOs
- ★ Tennessee's dairy herd is about 90,000 head and diminishing rapidly
- ★ Swine industry in Tennessee also greatly diminished
- ★ Broilers are on the rise = 200 millions birds

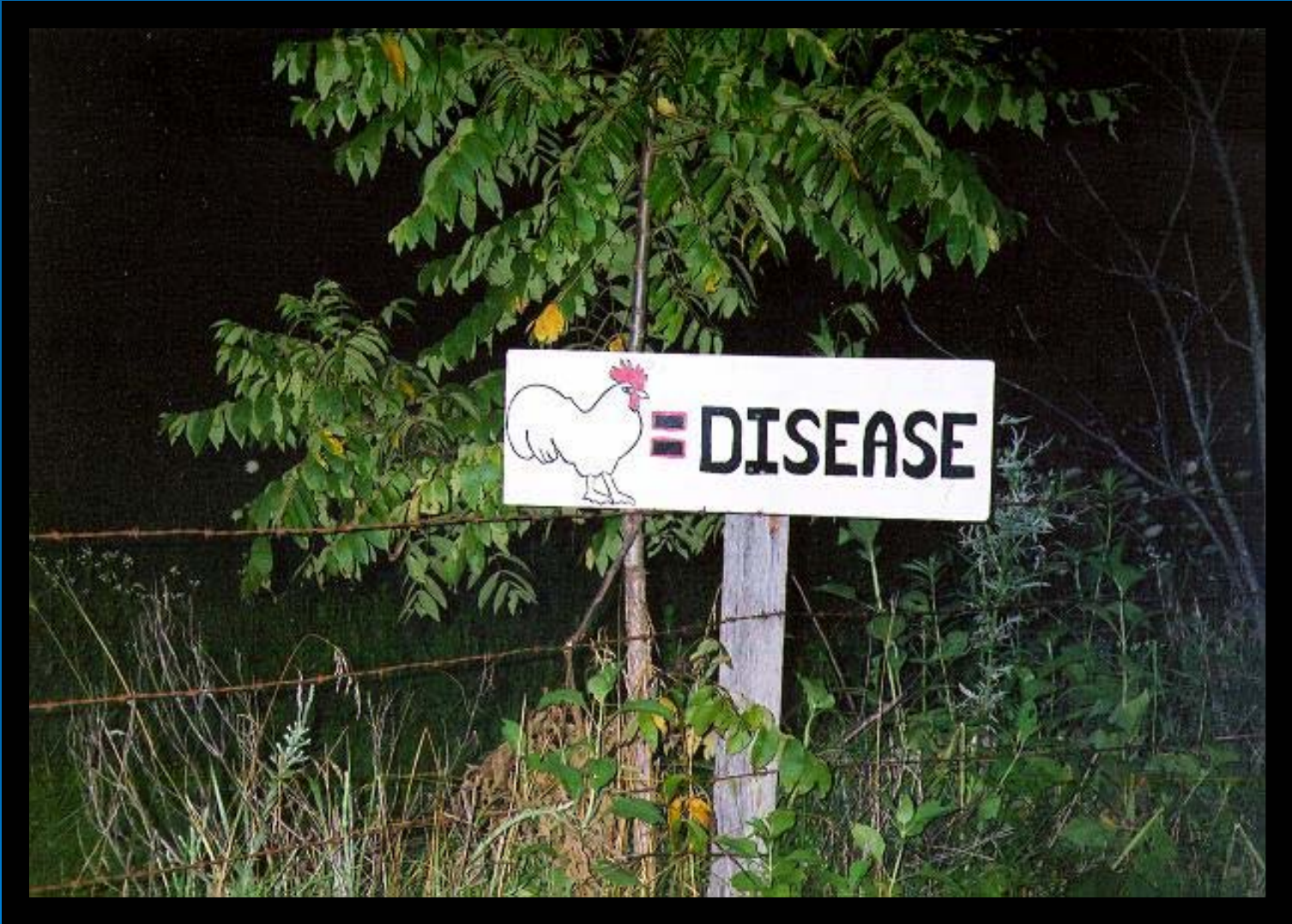
- ★ 9 large CAFOs permitted
 - ★ All swine
- ★ 136 medium CAFOs permitted
 - ★ Largely broilers

Stafford

Say YES to Fresh Air
Say YES to Clean Water

Say No to  Dairy
C.A.F.O.

Info Line: 727-6020





NPDES in Tennessee

- ★ Permits issued by Dept. of Environment and Conservation (TDEC)
 - ★ Responsible for permit issuance and enforcement
 - ★ www.state.tn.us/environment/permits/cafo.htm
- ★ Tennessee Dept. of Agriculture (TDA)
 - ★ Review all required plans
 - ★ Aid in compliance
 - ★ www.state.tn.us/agriculture/nps/afofaq.html

Tennessee's CAFO Rules

- ★ Written by TDEC in response to federal guidelines written by EPA
- ★ Series of public hearings - August 2003
- ★ Passed by Water Quality Control Board – November 2003
- ★ Become effective August 2004?

Key Definitions

★ Animal Feeding Operation

- ★ Confines animals for 45 days in 12 months
- ★ Sustains no vegetation in confinement area

★ Concentrated Animal Feeding Operation

★ Large

- ★ Only criteria is number of animals
- ★ Class I = individual permit

★ Medium

★ Based on animal number and other criteria:

- ★ Direct discharge
- ★ Confined animals in contact with water
- ★ **New and expanding operations**
- ★ **On impaired waterbody for nutrients or pathogens**

- ★ Class II = general permit

Nutrient Management Plan Options:

★ Large CAFOs with liquid manure:

- ★ Must have a “comprehensive nutrient management plan” (CNMP)
- ★ Prepared by a certified planner

★ Large, dry and Medium CAFOs:

- ★ Simply a nutrient management plan
- ★ Essentially a manure and nutrient budget
- ★ Can be prepared by anyone

Nutrient Management Plan Elements

- ★ Adequate storage
- ★ Mortality management
- ★ Divert clean water
- ★ Prevent direct contact
- ★ Proper chemical handling
- ★ Balanced nutrient budget
- ★ Site-specific conservation practices
- ★ Manure/soil testing
- ★ Land application rates
- ★ Records and documentation
- ★ Balanced manure budget

Non-application Buffers:

★ Land Application Buffers:

- ★ 100 feet to any down-gradient surface waters (may substitute 35 foot vegetated buffer)
- ★ Defers to NRCS standards for buffers around wells (standard 590)
- ★ 60 foot riparian buffer around “high quality” streams

★ Facility Location Buffers:

- ★ After April 13, 2006 must be sited in accordance with NRCS standard 313

Needs for CAFO Program

★ CAFO Census

- ★ How many do we have?
- ★ Where are they?

★ More staff for investigations and inspections

★ Third-part hauler accountability

★ Purposeful training for CAFO operators

★ Better “buy-in” and involvement of poultry companies in litter management

Comprehensive Nutrient Management Plans

- ★ Oversight of CNMP standards and writers comes from NRCS
- ★ Who is writing CNMPs in Tennessee?
 - ★ NRCS
 - ★ TSPs
- ★ Training for CNMP element writers:
 - ★ Has been provided by UT
 - ★ The land grant universities and NRCS from Idaho, Indiana, Iowa, Michigan and Tennessee will work cooperatively to develop a core CNMP educational curriculum

Biosolid Usage in Tennessee

- ★ **State only has regulatory authority where land-applied**
 - ★ TDEC must approve site
 - ★ Application rate based on N unless a non-nutrient limiting factor
 - ★ No NMP is written
- ★ **Lime stabilized biosolids are “burning up” many fields**
 - ★ Application rates are prescribed up to 10 tons per acre
 - ★ Most fields can only receive 2-3 applications due to the high pH (30% CaCO₃ equivalence)
- ★ **Innovative uses:**
 - ★ Composting and using to stabilize roadside slopes
 - ★ Using lime stabilized biosolids in reclamation of sites affected by acid mine drainage

NRCS Involvement:

- ★ **Prominent role in writing nutrient management plans**
- ★ **Will co-develop new CNMP element writer certification curriculum**
- ★ **Will revise Tennessee-specific 590 Practice Standard (Nutrient Management) to conform with national revision of 590 standard**
 - ★ **Must be completed by October 2004**

NRCS Involvement:

- ★ **NRCS in TN is in the process of developing standardized CNMP templates for use in AFOPro**
 - ★ automates manure and commercial fertilizer allocation decisions in compliance with the NRCS's 590 Standard
 - ★ All nutrient management plans for animal feeding operations will soon be automated using AFOPro

- ★ **NRCS has hired TSPs to assist with development and implementation of CNMPs**
 - ★ TSPs are paid by NRCS and they have to be registered on TechReg in CNMP category
 - ★ TSPs paid out of EQIP allocation

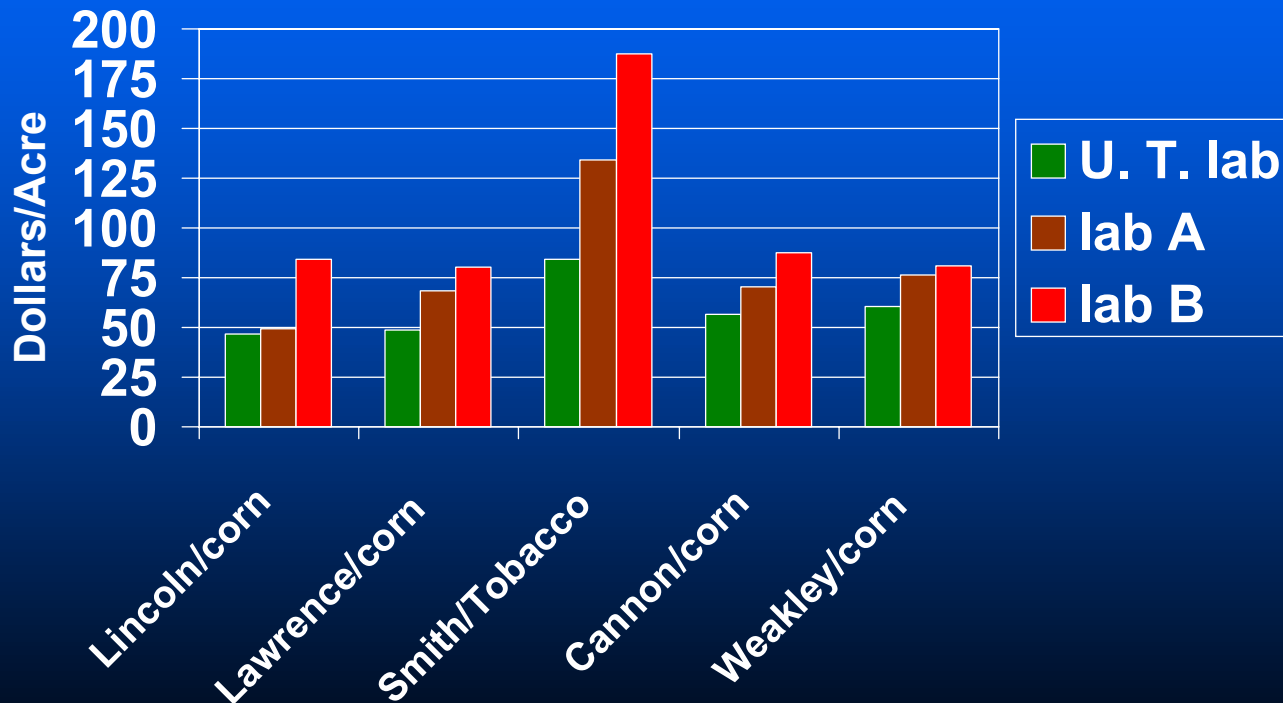
U.T. Involvement:

- ★ Assist in training NRCS staff
- ★ Primary CAFO focus has been informing producers of new CAFO rules
- ★ Need to address discrepancy between UT soil test lab results and those obtained from commercial labs
 - ★ Commercial labs tend to recommend more types and greater rates of fertilizer than do university labs
 - ★ Result is much higher per acre input costs to producer, more risk to the environment, and generally no increase in yield or profit

Fertilizer Recommendations by Three Different Labs Based Upon Analysis of the Same Soil Sample, 2002

<u>Lincoln Co./corn</u>	<u>Lawrence Co./corn</u>	<u>Smith Co./ Tobacco</u>
<u>U. T. Lab:</u> 180-35-0	<u>U. T. Lab:</u> 150-60-30	<u>U. T. Lab:</u> 200-0-120
<u>Lab A:</u> 180-30-0 +9S+0.8B	<u>Lab A:</u> 180-70-70 +13 S +1.0B+2.1Zn	<u>Lab A:</u> 300-0-120 +10S+0.5B
<u>Lab B:</u> 210-75-90 +35S +0.3B+5Zn+0.1Cu	<u>Lab B:</u> 190-105-80 +32S +5Zn+0.5 Cu	<u>Lab B:</u> 275-0-270 +24S +0.1B+1Zn +0.5Cu

Average Fertilizer Costs in Five Production Fields As Obtained From Three Different Laboratory Recommendations, 2002-03



Cost Comparisons

- Commercial lab corn fertilizer costs were as much as \$37.56 more per acre than those from U. T. lab
- Commercial lab tobacco fertilizer costs were as much as \$103.77 more per acre than those from U. T. lab

Pond Creek Project

- ★ Small 23,579 acre beef / dairy watershed
- ★ 35.6 miles of Mud Creek, Greasy Branch and Pond Creek listed on 2002 303 (d) list as impaired for:
 - ★ Pathogens
 - ★ Nutrients
 - ★ Sediments
- ★ Primary cause “Pasture Grazing”
- ★ What are the most cost-effective BMPs?



Pond Creek Project

- ★ **Project Goal:** Cost-effective reduction of major sources of sediment loads (nutrients and pathogens)
- ★ **Objective 1: Improving pasture management (beef and dairy)**
 - ★ Soil fertility, weed control, animal movement (more cost effective for farmer)
 - ★ Less emphasis on (more costly) “traditional” BMPs; fencing, vegetative buffers, alternative watering systems, heavy use areas, stream crossings
- ★ **Objective 2: Reduce impact from dairies**
 - ★ Nutrient management plans
 - ★ Improvements to manure handling and storage (with NRCS)

TDA Involvement:

- ★ **Review of NMPs for CAFOs**
- ★ **Funding for water quality improvement projects:**
 - ★ Agricultural Resources Conservation Fund
 - ★ On-farm projects only
 - ★ State money
 - ★ 319 Projects
 - ★ Agricultural and urban projects
 - ★ Federal money
- ★ **Hypoxia**
 - ★ Ohio River Sub-basin Committee
 - ★ Lower Mississippi Sub-basin Committee



Large CAFO Thresholds

INDUSTRY THRESHOLDS	
Animal Type	Animal Number
Dairy Cows	700+
Beef Cattle	1,000+
Swine	2,500+ (55 lb or more) 10,000+ (< 55 lb)
Horses	500+
Turkeys	55,000+
Chickens, liquid manure	30,000+
Chickens, other than a liquid manure system	125,000+ (broilers) 82,000+ (laying hens)

Medium CAFOs Thresholds

INDUSTRY THRESHOLDS	
Animal Type	Animal Number
Dairy Cows	200 - 699
Beef Cattle	300 - 999
Swine	750 - 2,499 (> 55 lb) 3,000 - 9,999 (< 55 lb)
Horses	150 - 499
Turkeys	16,500 - 54,999
Chickens, liquid manure	9,000 - 29,999
Chickens, dry manure system	37,500 - 124,999 (broilers) 25,000 - 81,999 (laying hens)

Pond Creek Project

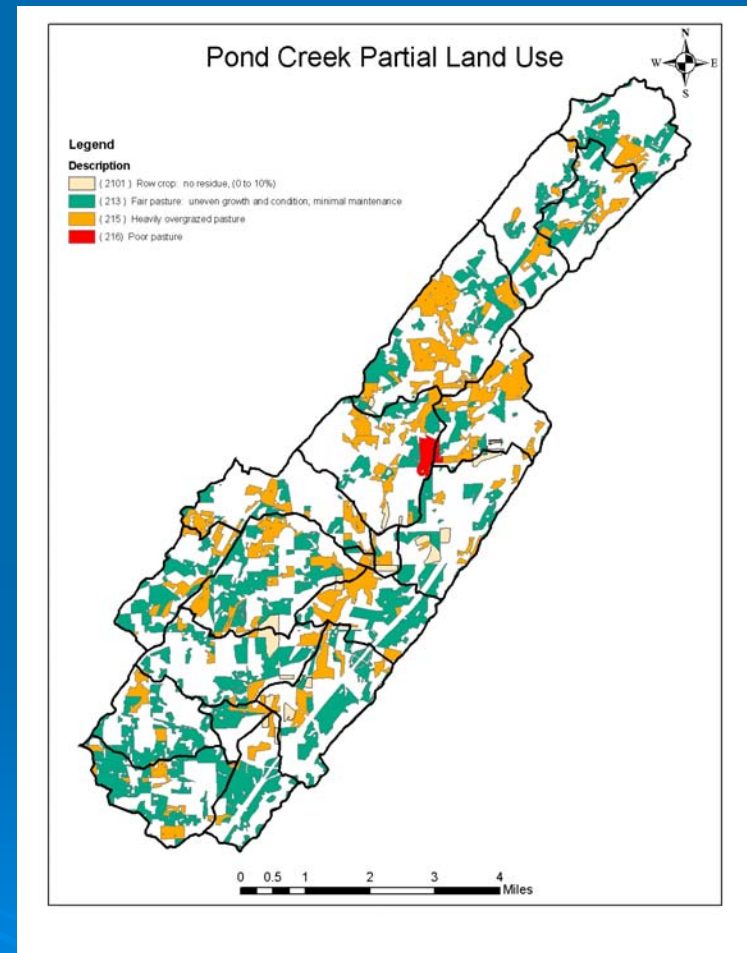
- ★ **Integrated Pollution Source Identification (IPSI)**

- ★ **TVA Model**

- ★ Land use from aerial photos
- ★ Estimate soil loss from RUSLE

- ★ **Major NP Pollution:**

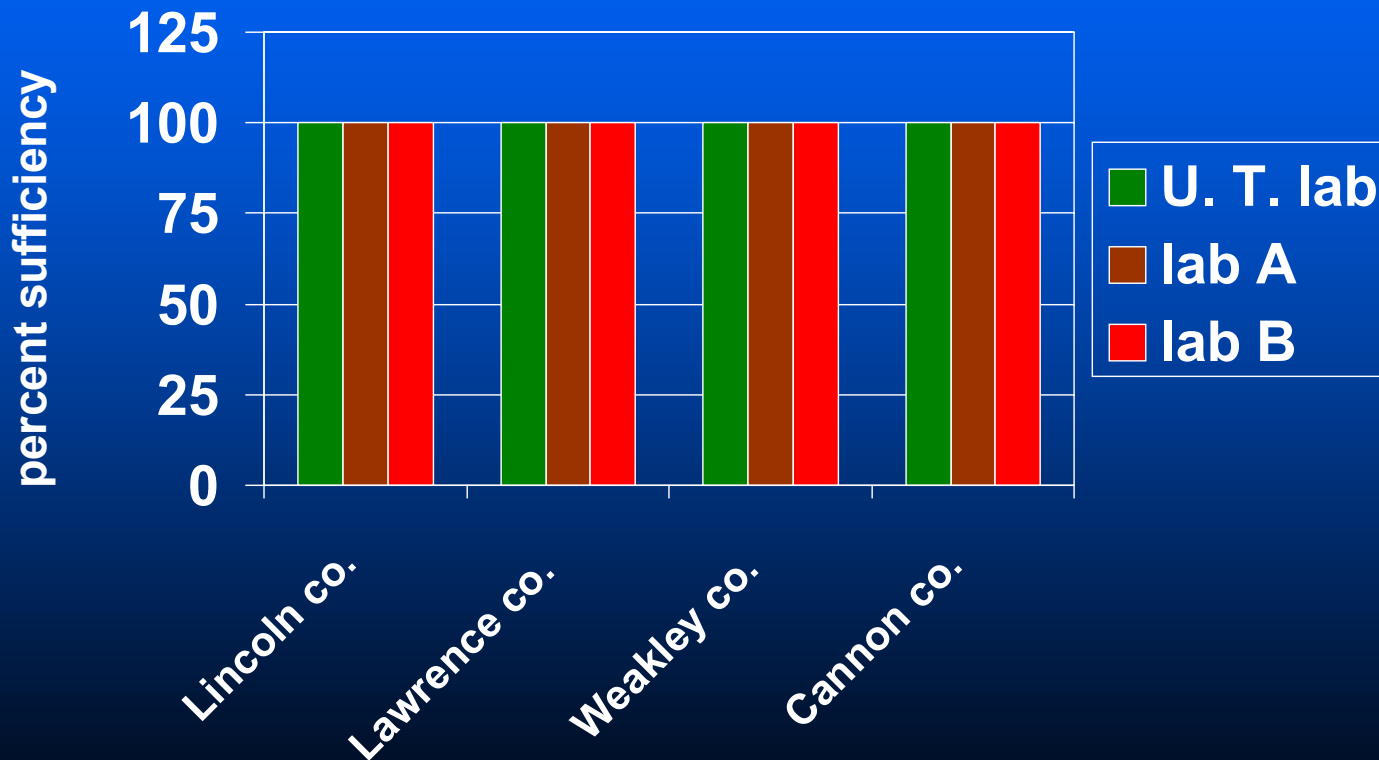
- ★ Fair, poor and over-grazed pasture = 9,600 acres (>40% of watershed)
- ★ Low residue row crops = 367 acres



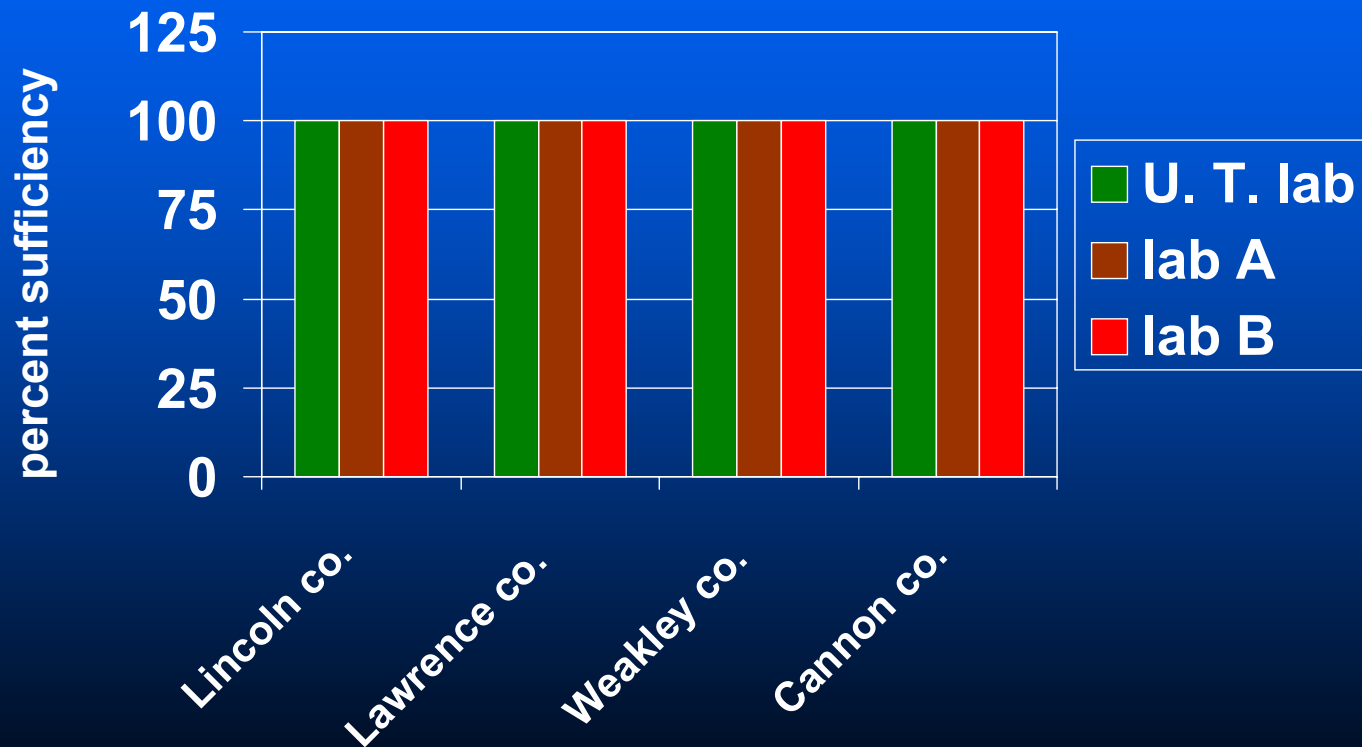
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<u>Lincoln Co./corn</u>	<u>Lawrence Co./corn</u>	<u>Smith Co./ Tobacco</u>
<u>U. T. Lab:</u> pH 5.3; P High; K Very High	<u>U. T. Lab:</u> pH 6.8 P Medium; K High	<u>U. T. Lab:</u> pH 6.3; P Very High; K High
<u>Lab A:</u> pH 5.2; P Very High; K Very High	<u>Lab A:</u> pH 6.4; P Medium; K Medium	<u>Lab A:</u> pH 6.0; P Very High; K Medium
<u>Lab B:</u> pH 5.3 P Medium; K Very High	<u>Lab B:</u> pH 6.7 P Low; K Adequate	<u>Lab B:</u> pH 6.1; P Very High; K Medium

Relative Corn Yields in Four Production Fields As Obtained From Three Different Laboratory Recommendations, 2002 and 2003



Relative Corn Yields in Four Production Fields As Obtained From Three Different Laboratory Recommendations, 2002 and 2003



Relative Tobacco Yield in A Production Field As Obtained From Three Different Laboratory Recommendations, 2002

