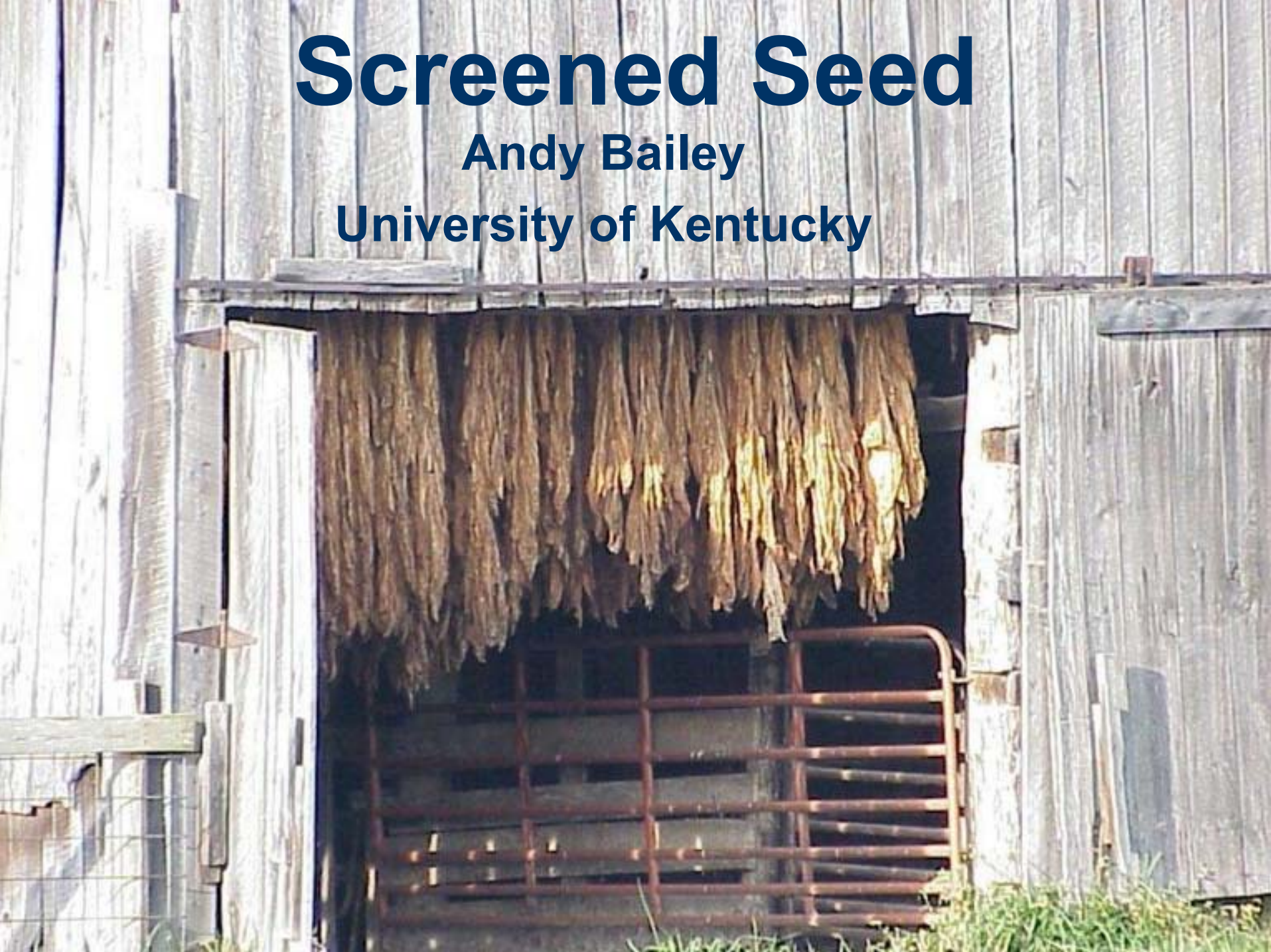


# Screened Seed

Andy Bailey

University of Kentucky



# Industry Issues

- **Big issues in tobacco industry**
  - anti-smoking lobby
  - buyout
  - TSNAs
  - **nornicotine**

# What are TSNAs?

- Tobacco Specific Nitrosamines
- Nitrogen containing compounds known to be potentially carcinogenic
- Formed during curing
- Increase during storage of cured leaf

# Major Factors Influencing TSNA Accumulation

- Curing conditions
- Storage conditions
- Nitrogen fertilization
- Varietal differences – **nornicotine**
  - high nornicotine increases chance of high TSNA

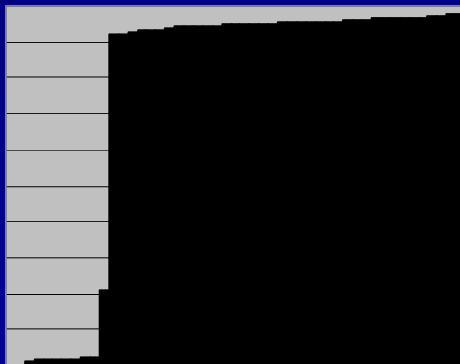
# Nicotine Conversion

- One gene responsible for conversion of nicotine to **nornicotine**
  - these plants are known as **converters**
  - plants which do not have this mutation are known as **non-converters**
- **Conversion**
  - varies with variety and seedlot
  - can vary with site and season
    - occurs during curing, senescence

# Variation in Seedlots

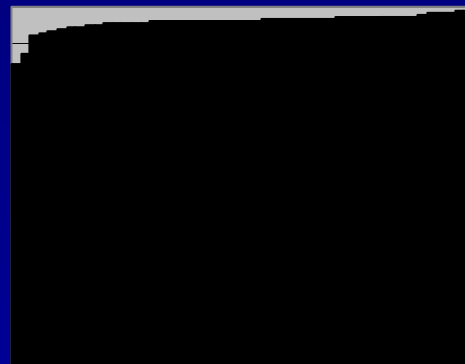
## Unselected KY 9

KY lot 1



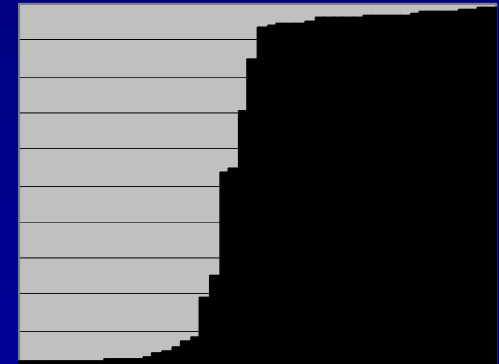
72

KY lot 2



96

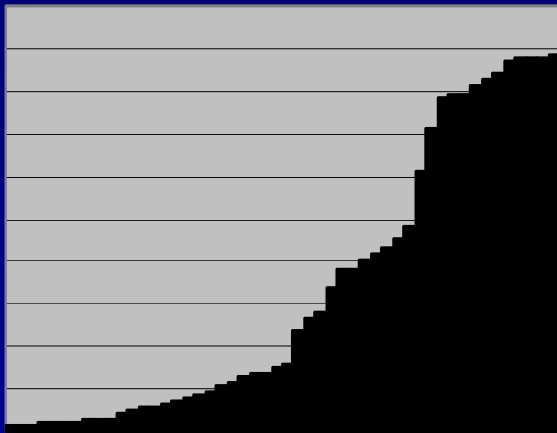
Other Source



51

# Variation in Varieties

KY 16



33

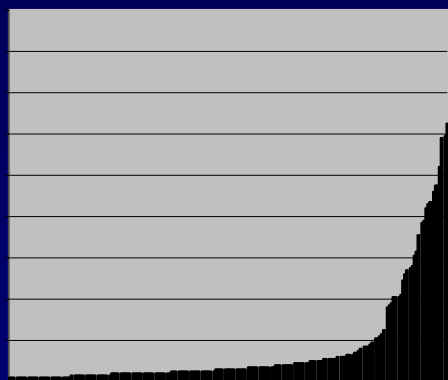
L8



2

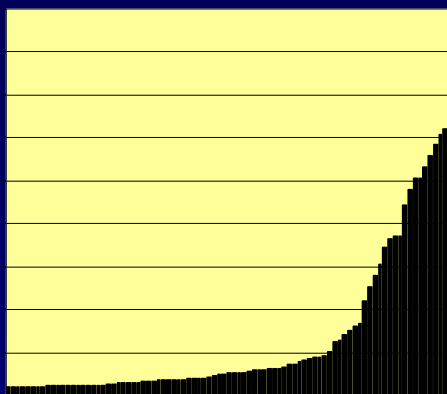
# Variation in Site – VA 509

KY 1



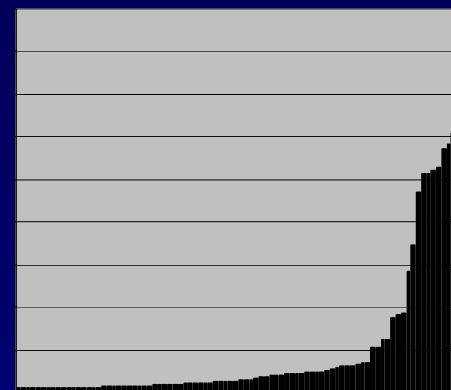
8

KY 2



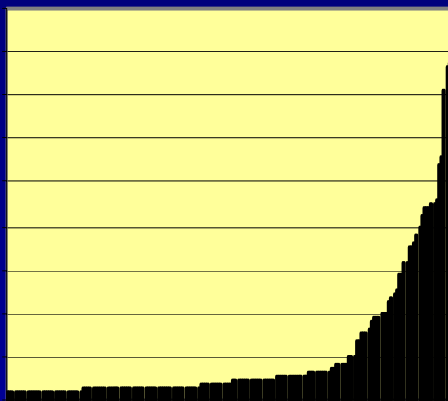
13

KY 3



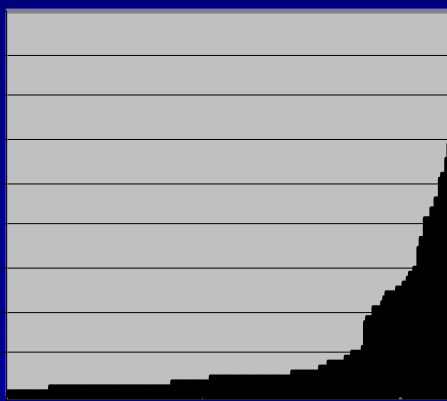
9

TN 1



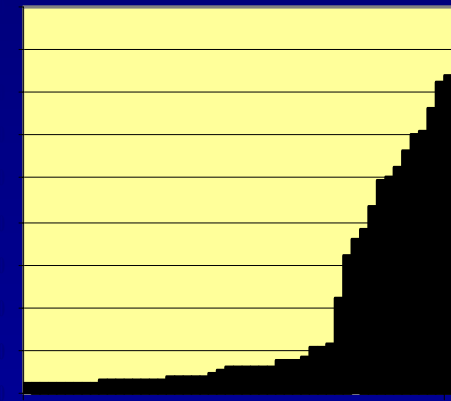
10

TN 2



9

NC



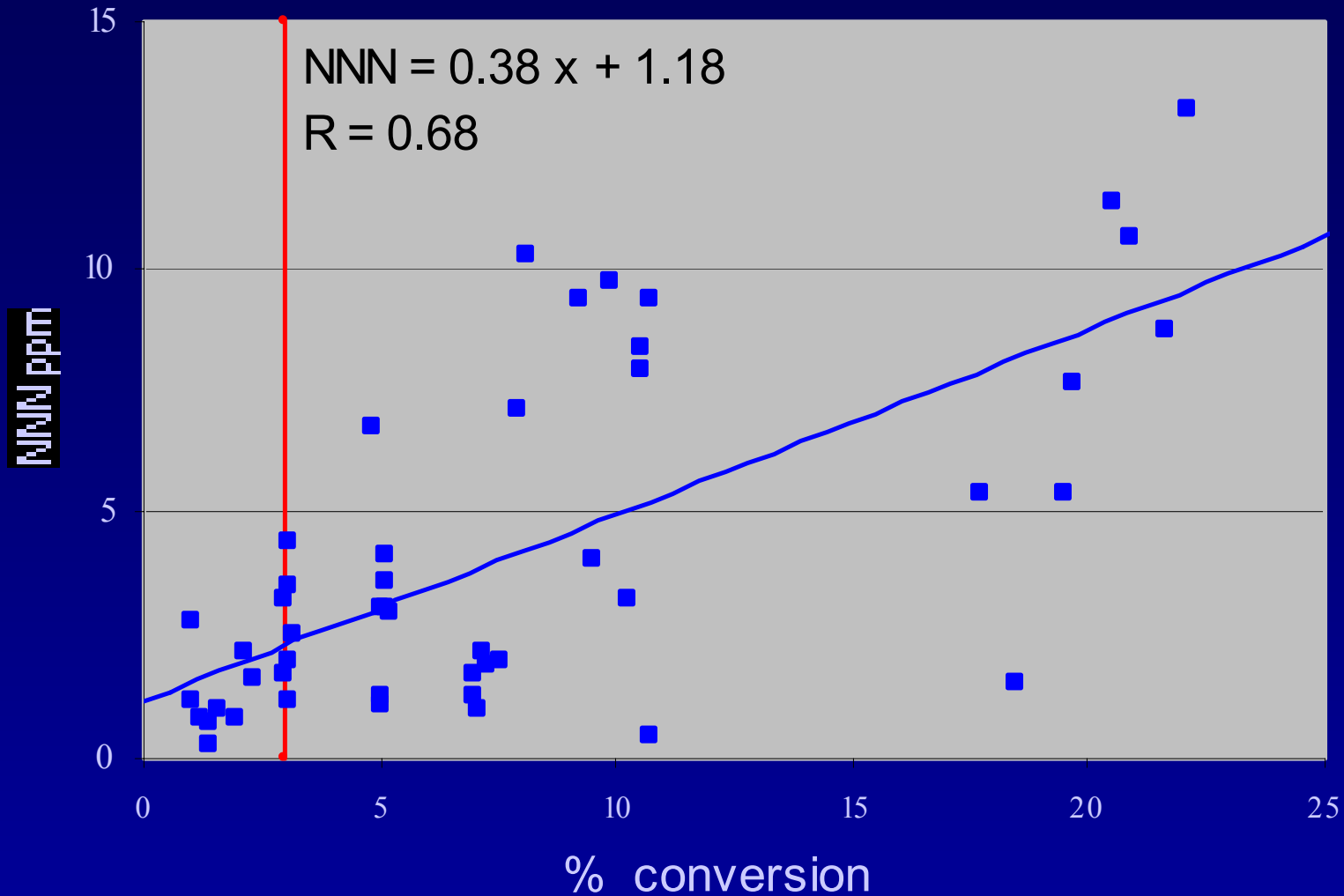
19



# Nornicotine – why the fuss?

- **Detrimental effect on smoke**
  - considered undesirable long before current interest in TSNAs
- **Detrimental health effects**
- **Effect on TSNAs**
  - ALL THINGS BEING EQUAL, lower nornicotine = lower TSNAs
  - low nornicotine no guarantee of low TSNA
  - curing environment over-riding effect

# NNN ppm vs % conversion



# Why focus on nornicotine?

- **So many variables affect TSNAs**
  - **few can be controlled**
    - **weather**
    - **microbial populations**
- **Nornicotine is the one variable which can be controlled**

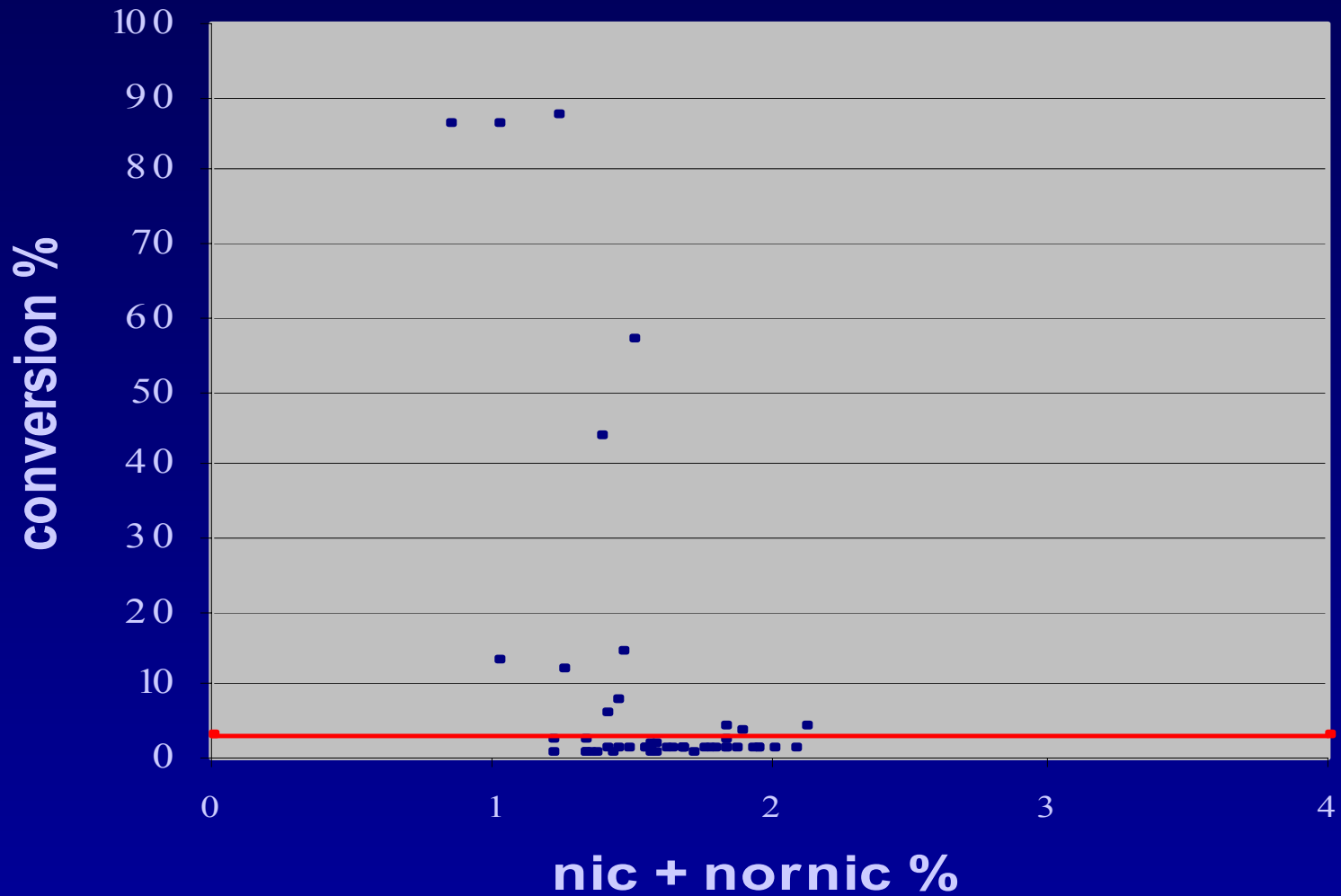
# What can the industry do?

- **Screen seed to reduce conversion**
  - need to identify screened seed
    - by renaming screened varieties
  - screened cultivars re-released as “LC” cultivars
    - LC = “low converter”
    - eg TN 90 LC

# What is Screening?

- Roguing converter plants out of seed crop (breeder & foundation seed)
  - number & test plants individually
  - cut out all plants above limit (3%)
- Use ethephon to drive plants to full potential

# Screening (3%)





p  
p

17/02/2004

# Ethephon Treatment



17/02/2004



# Ethephon Treatment

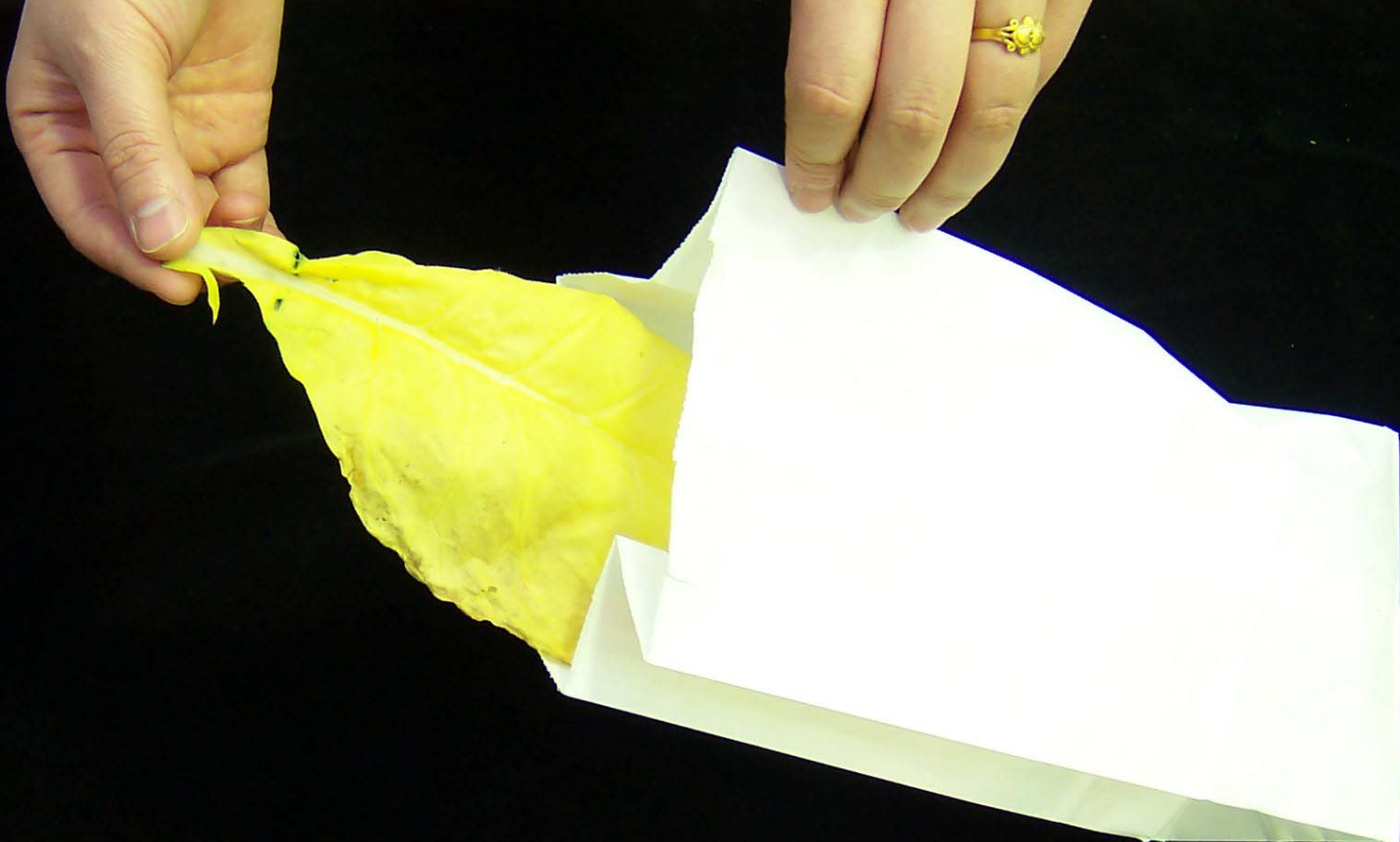




13/06/2004



19/02/2004



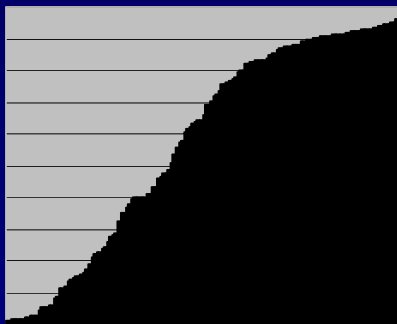
**Day 6**

20/02/2004

# Effect of screening

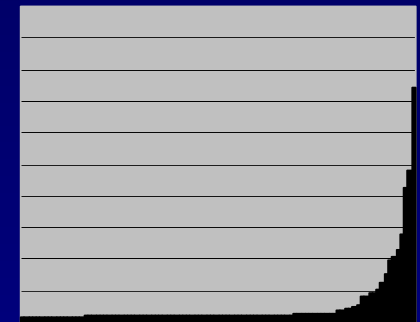
Unscreened

Screened

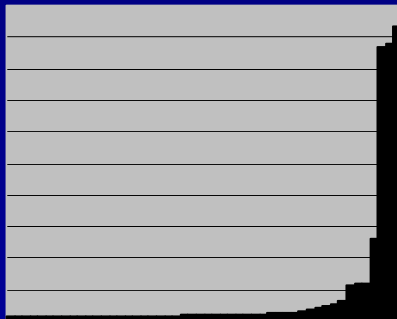


57

VA 509

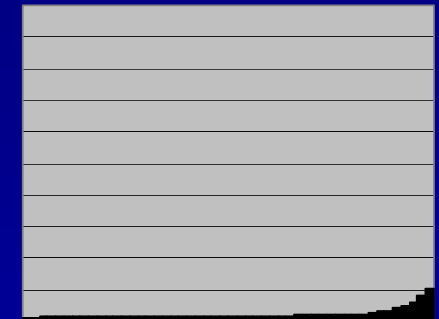


5



8

TN 90



2

# Effect of Screening

- **Lowers mean conversion**
  - does not necessarily eliminate all converter plants
  - most dramatic with high converters
  - reduced effect with low converters

# Bottom Line

- **Screened seed**
  - **lower nornicotine**
    - **will HELP reduce TSNAs – no guarantee**
- **Industry demand**
  - **manufacturers want screened seed**
    - **enable growers to meet requirements**
  - **need to identify screened seedlots**
    - **can only do this by renaming screened varieties**

# “LC” Varieties

- **Screened varieties**
  - **Re-released as “LC” varieties**
    - “LC” varieties available to growers in 2005
    - TN 90 LC, TN 86 LC, TN 97 LC, KT 200 LC, KY 907 LC
- **NO difference** except for conversion
  - same for yield, quality, disease resistance
    - TN 90 “LC” is still TN 90



**Thank you**