Industrial Hemp @ K-State
Trying To Fill The Research Void

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K-STATE
Research and Extension
2019 Industrial Hemp Pilot Research Program

- Generated a rush of excitement in new & experienced farmers
- Need for unbiased, research based information
K-State’s Role in Industrial Hemp

- Research, Extension, & Teaching
- Production
- Improvement
- BMPs
- Education
- We have just completed 1st grow
K-State’s Role in Industrial Hemp
Botany of *Cannabis sativa* L.

- Wind-pollinated summer annual.
  - Grain & Fiber: Pollen = 😊
  - CBD Hemp: Pollen = 😞

- Can be dioecious (normally) or monoecious (occasionally).

- Strongly photo-period sensitive
  - Flowers when days begin to shorten, regardless of size
  - Fall or Winter = Lights
K-State’s Role in Industrial Hemp

- Grain & Fiber
- Variety Trials
- 17 varieties
- Strong Genotype x Environment
<table>
<thead>
<tr>
<th>Grain &amp; Fiber</th>
<th>vs.</th>
<th>CBD</th>
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<tbody>
<tr>
<td>• Seed</td>
<td></td>
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<tr>
<td>• Male &amp; female plants</td>
<td></td>
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<tr>
<td>• Pollen is necessary</td>
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<tr>
<td>• Rarely go ‘hot’</td>
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<tr>
<td>• Grain or Stem is harvest</td>
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<tr>
<td>• Agronomy Crop</td>
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<td></td>
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<td></td>
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<tr>
<td>• Clones (feminized seed)</td>
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<tr>
<td>• Female only</td>
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<td></td>
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<tr>
<td>• Pollen is mortal enemy</td>
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<tr>
<td>• Potential to be ‘hot’</td>
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<tr>
<td>• ♀ flowers harvested</td>
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<tr>
<td>• Horticulture Crop</td>
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</table>
Grain & Fiber

- Grain
- 30 #/A approx. ½” deep
- Harvest @ 75% mature
- Harvest w/ combine
- Dried to 8% for storage
Grain & Fiber

- Fiber
- 60#/A approx. ½” deep
- Harvest when male senesce
- Swather (or sickle) to cut & retting for 2-3 wks
- Bale @ 15% moisture
Grain – Plant #/m²
Grain Weight (g)/m²
Grain Weight (g)/plant

CFX1  CRS1  Fedora 17  Felina 32  Helena  Hlesia  Hluakuskii 51  Tygra  USO 31

A  BCD  B  D  D  BCD  D  B  CD
Fiber – Plant #/m²

- Eletta Campana
- Fibranova
- SS Beta
Fiber – Stem Dry Wt. (g)/m²

Eletta Campana  
Fibranova  
SS Beta
Fiber – Stem Caliper (mm)

Eletta Campana
Fibranova
SS Beta
Pests?

- Spotted Cucumber Beetle
- APHIDS
- APHIDS
- APHIDS
- Lepidoptera Larvae
- Eurasian Hemp Borer

- Army worm
- Russet Mites
- Botrytis
- Powdery Mildew
- APHIDS
- Stem Girdling Roots
K-State’s Role in Industrial Hemp

- **CBD**
- Variety Trials
- High Tunnel production
- Greenhouse production
- CBD vs THC content
- High CBD varieties and THC
Male vs. Female Plants
CBD Variety Trial

- 7 Varieties
- Container v. Fabric Bag
- High Tunnel v. Outdoors
Industrial Hemp

• CBD
  – Grown just like marijuana
  – Flower is processed for essential oils
  – Smokable CBD is popular in other states
  – Nearly everyone in KS is growing for CBD
Industrial Hemp

• Future Work
  – Plan to continue this line of work
    • Water utilization
    • Production practices
    • Variety evaluations
    • Human Health
    • Animal Nutrition
    • Helping KS farmers be more successful
  – Partnerships
    • Industry
    • K-State Vet School
    • USDA Multi-State working group