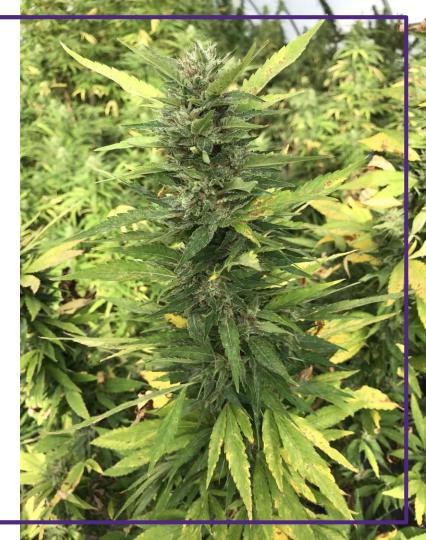
Industrial Hemp @ K-State Trying To Fill The Research Void

Dr. Jason J. Griffin John C. Pair Horticultural Center





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

Cheyenne	Rawlin	15	Decatur	Norton	Phillips	Smith	Jewell	Republic	Washington	Marsha	ll Nemah	a Brown	Doniph	<u>ک</u>
Sherman	Thor		Sheridan	Graham	Rooks	Osborne	Mitchell	Cloud	-			- 10°		
Sherman	Thor		Shendan	Granam	NOOKS	Osborne	Mitchell		Clay	Riley of F	ottawatomie ,	lackson Je	fferson 🗧	5
			_				Lincoln	Ottawa	1 6	X	ent	-	Leavenworth	UTyaniset
Wallace	Logan		Gove	Trego	Ellis	Russell			Dickinson	Geary	Wabaunsee	Shawnee	Douglas	n.
							Ellsworth	Saline	ן ך	Morris	4	Osage	Douglas	\varkappa
Greeley	Wichita	Scott	Lane	Ness	Rush	Barton	1				Lyon	1	Franklin	Miami
							Rice	McPherson	Marion	Chase	-			
Hamilton	Kearny	Finney		Hodgeman	Pawnee	-ل				ł		Coffey	Anderson	Linn
	Reality	runey		nougeman		Stafford	Reno	Harvey	/ Butler	_	Greenwood			
	L	l	Gray	Ford	Edwards	T'			0015000		Greenwood	Woodson	Allen	Bourbon
Stanton	Grant	Haskell	-		1	Pratt	-	Sedgw	9CK			Wilson	Neosho	L
					Kiowa		Kingman		5		Elk		Neosilo	Crawford
Morton	Stevens	Seward	Meade	Clark	Comanche	Barber	Harper	Sumner	Cowle	ry	1	Montgomery	Labette	-
		4-5-51-62-921			comanche		macper				Chautauqua		1.00008080808	Cherokee

Botany of Cannabis sativa L.

- Wind-pollinated summer annual.
 - Grain & Fiber: Pollen =
 - CBD Hemp: Pollen = 📢
- The second se



- 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





Grain & Fiber vs. CBD

- Seed
- Male & female plants
- Pollen is necessary
- Rarely go 'hot'
- Grain or Stem is harvest
- Agronomy Crop

- Clones (feminized seed)
- Female only
- Pollen is mortal enemy
- Potential to be 'hot'
- 9 flowers harvested
- Horticulture Crop



Grain & Fiber

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





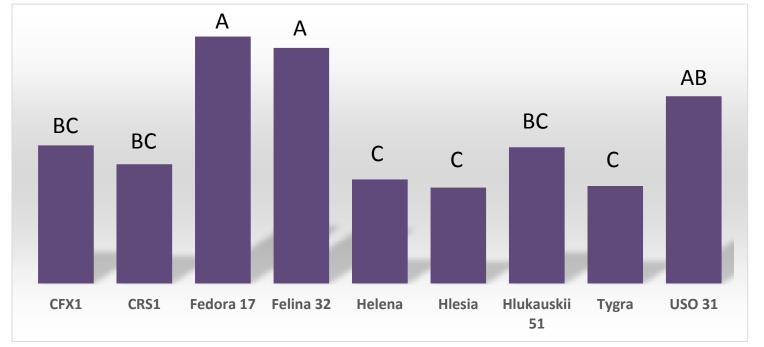
Grain & Fiber

- Fiber
- 60 #/A approx. ½" deep
- Harvest when male senesce
- Swather (or sickle) to cut & retting for 2-3 wks
- Bale @ 15% moisture

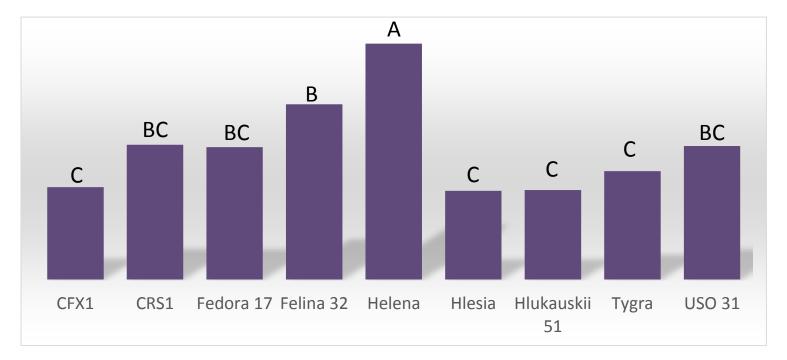




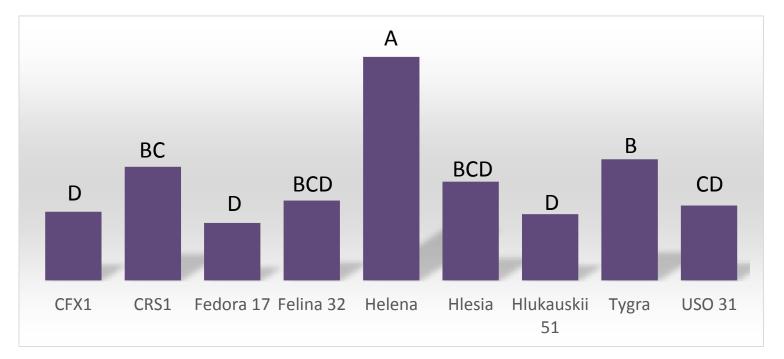
Grain – Plant #/m²



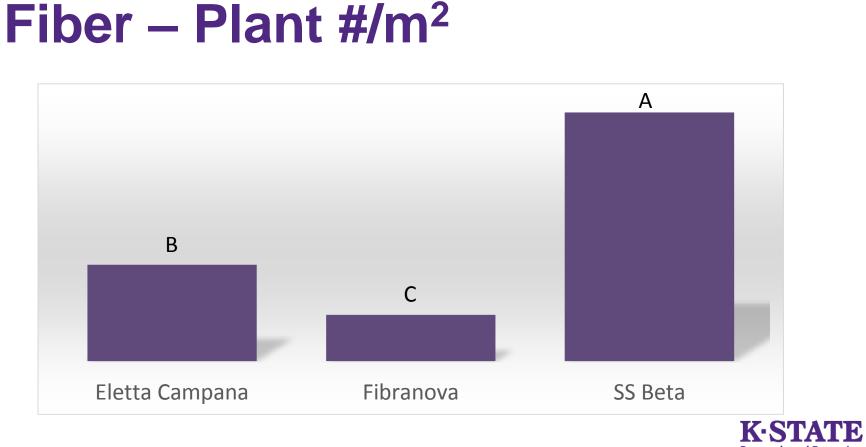
Grain Weight (g)/m²



Grain Weight (g)/plant







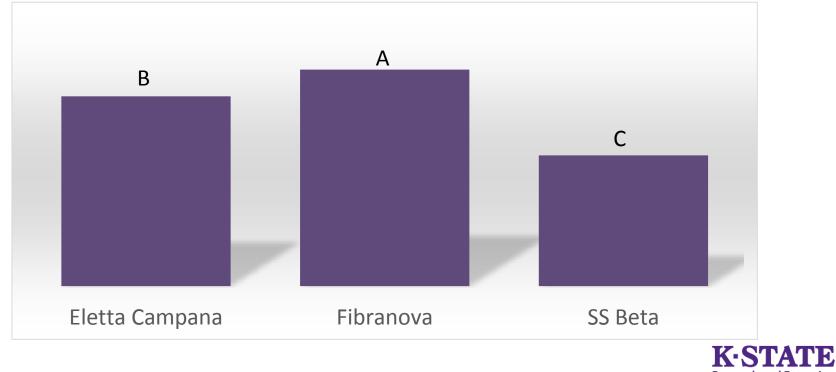
Research and Extension

Fiber – Stem Dry Wt. (g)/m²



Research and Extension

Fiber – Stem Caliper (mm)



Research and Extension

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

- <u>CBD</u>
- 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
- Organic v. Conven. Fert.
- 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
- Varieties: AC/DC, Cherry, Otto II Endurance, Otto II Franklin, Otto II Stout, Super CBD, and The Wife
- 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





