Colorado State University
Knowledge to Go Places

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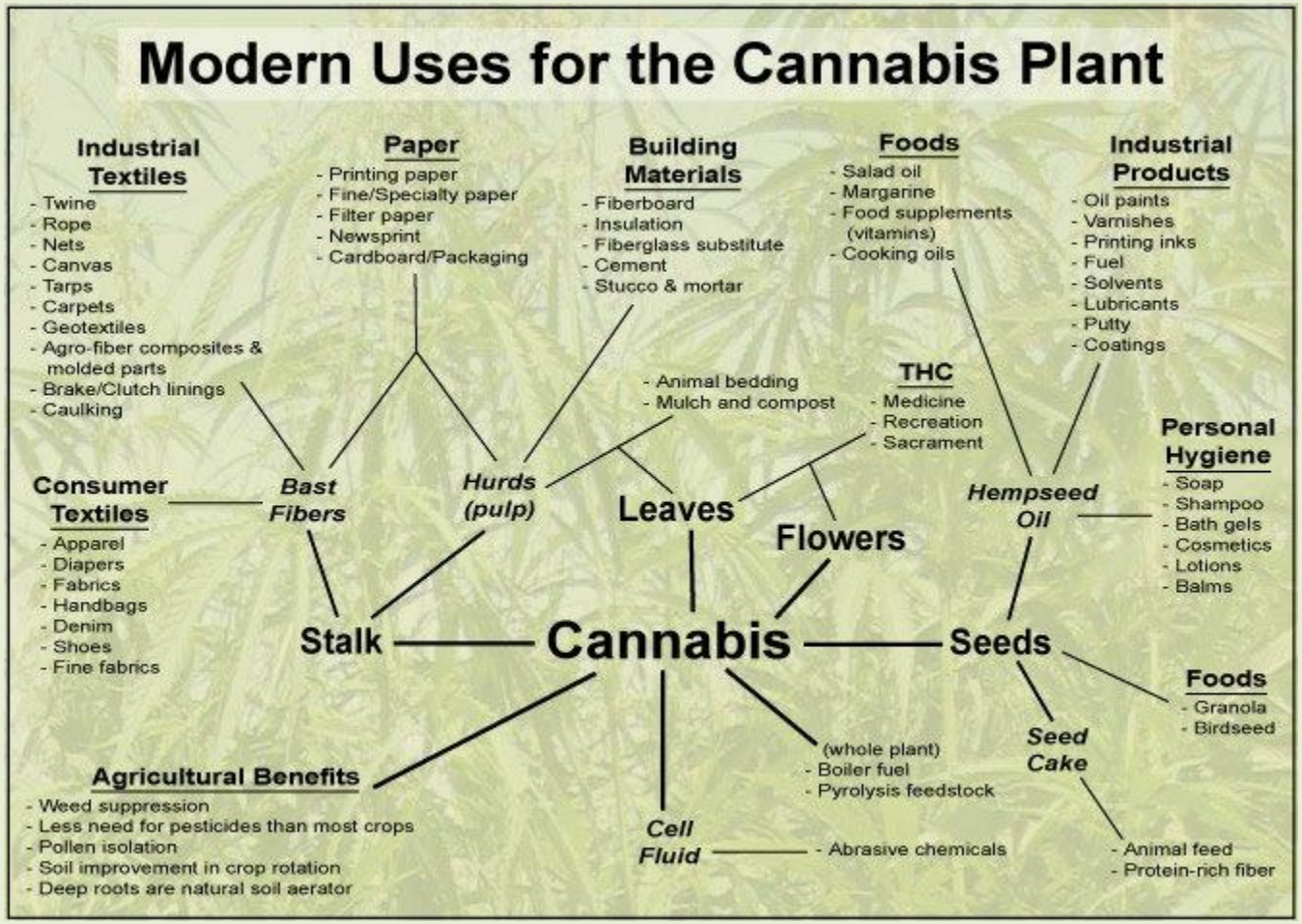
SEED GROWERS COLORADO ASSOCIATION

CDA CO COLORADO Department of Agriculture

# Industrial Hemp is a crop?

- Plant production is used for?
- Can you define this old/new crop we have?
- Why is seed certification important for hemp?
- What agronomy questions do I have?
- Should I plant Dioecious or Monecious types?
- Where do I market my production?
- What are the practical obstacles?

# Can Industrial Hemp be an alternative crop on my farm?



# What is Industrial Hemp?
# Canabis Sativa, L.

The *Cannabis* genus was first classified using the "modern" system of taxonomic nomenclature by Carl Linneaus in 1753, who devised the system still in use for the naming of species. He named *Cannabis sativa* L. (L. stands for Linnaeus, and indicates the authority who first named the species).

Linnaeus was very familiar with European hemp, which was widely cultivated at the time.

# *Industrial Hemp vs Marijuana*

## Industrial Hemp

- THC content less than 0.3%
- Anything with a THC concentration of 0.3% - 0.9% is considered to have “only a small drug potential” but is legally ***not*** *industrial hemp*

## Marijuana

- Tetrahydrocannabinol (THC)
- THC content between 5 – 10%
- THC may be as high as 25-30%
- THC at a level of 1% is considered the threshold for marijuana to have some intoxicating potential. However, any material with a THC above 0.3% ***is*** legally marijuana in CO, KS and federally

Sources:
Recommended methods for identification and analysis of cannabis and cannabis products. Manual for use by National Drug Analysis Laboratories. UNODC (United Nations Office on Drug and Crime) 2009

Small, E. and D. Marcus. 2002. Hemp: A new crop with new uses for North America. P. 284-326. In J. Janick and A. Whipkey (eds), Trends in new crops and new uses. ASHS Press, Alexandria, VA.

# *Are the two crops regulated the same? Absolutely Not.*

## Industrial Hemp

- Cultivation regulated by Dept. of Ag
- Nine pages of actual Rules
- Matter of statewide concern and counties cannot opt out
- Federally addressed in the Farm Bill giving states some room to adopt rules

## Marijuana

- All facets of the industry regulated by Dept. of Revenue
- Hundreds of pages of Rules
- Counties can opt out
- Remains federally illegal

# Hemp Seed Certification Process

- It begins with Variety Development (Breeder)
- Is it a unique variety for the crop?

# “Purpose of Seed Certification”

- **Seed Certification** is the means of maintaining a pedigreed seed of a specific variety. Certified seed varieties result from years of careful effort on the part of plant breeders and growers to develop superior varieties.
- “**Varietal purity**” is the first consideration in seed Certification, but other factors, such as weeds, diseases, viability and mechanical purity, are also very important.

# A Variety to be Eligible for Seed Certification, Specific Requirements Must be Met by the Owner. Industrial Hemp is not exempt!

- **A.** The name of the variety
- **B.** A statement concerning the variety's origin and the breeding procedure used in its development.
- **C.** A detailed description of the morphological, physiological and other characteristics of the plants and seed that distinguish it from other varieties.
- **D.** Evidence supporting the identity of the variety, such as comparative yield data, insect and disease resistance, or other factors supporting the identity of the variety.
- **E.** A statement delineating the geographic area or areas of adaptation of the variety.
- **F.** A statement on the plans and procedures for the maintenance of seed classes, including the number of generations through which the variety may be multiplied.
- **G.** A description of the manner in which the variety is constituted when a particular cycle of reproduction of multiplication is specified.
- **H.** Any additional restrictions on the variety, specified by the breeder, with respect to geographic area of seed production, age of stands or other factors affecting genetic purity.
- **I.** A sample of seed representative of the variety as marketed. The sample will be retained to provide appropriate control samples against which future releases of stock may be tested to establish varietal characteristics

# Classes of Seed Certification

- Breeder Seed- A class of seed under the control of the breeder and labeled by the breeder.
- Foundation Seed-  Class of seed is produced under the authority of the variety owner.
- Registered Seed- Class of seed that is the progeny of the Foundation production.
- Certified Seed- Class of seed that is the progeny of the Registered production.

- *We do not know <u>which classes of seed this industry will utilize the most</u>?*
- *The industry recognizes that Seed Certification will be a factor for their participation because of marketing and quality control.*

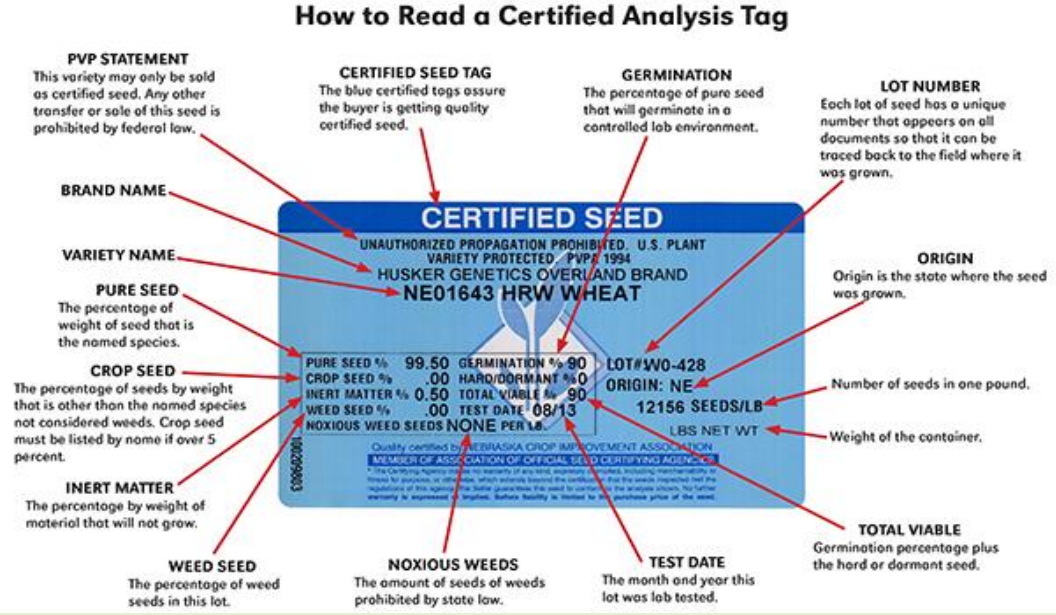
# Hemp Seed Certification Standards

- **Land requirements**----crop history, weed control, and crop rotation
- **Field standards**----crop inspection, roguing, variants and contaminants
- **Isolation**----to prevent cross-pollination; the distance will decrease with lower seed class. A range of 16,150 feet down to 3,230 feet.
- **Impurity standards**----based on plant counts of 10,000
- **Seed standards**----purity of 98%, germination of 80%

Colorado, Kentucky and Tennessee were the first states to have certified industrial hemp seed labeled in 2017.

*Is our seed certification tag different for this crop in Colorado?*

In Colorado all Industrial Hemp sold with Certified Seed tags will also be required to include an additional seed tag from the CDA that states this variety has been tested for Tetrahydrocannabinol (THC) within the state of Colorado and the THC levels have been determined to be acceptable.



# Agronomics

- Planting; firm-level, 46-50 degrees,
  seed .5-3/4 inch in depth
- Emergence; seed- germination 7-12 days, > 10%-30% mortality, plant establishment
- Seed density= variable 30,000 seed/ lb.
- Planting rate; fiber- 40 to 50 lbs. per acre (22-28 plants per square foot) (Canada)
- Planting rate; grain- 18 to 23 lbs. per acre (10-12 plants per square foot) (Canada)
- Planting rate; certified seed- 2 to 10 lbs. per acre

# Agronomics

- Dioecious varieties  (grain) (CBD)
- Monoecious varieties  (fiber) harvest is early!
- Day-length sensitive, What does that mean?
- Planting date; late May to early June hemp is (day-length sensitive)
- Flowering;  Initiated when daylight decreases, maintaining vegetative growth requires sunlight.

# Dioecious or Monoecious ?

- The difference between dioecious and monoecious plants is that dioecious plants have male and female flowers on different plants, while monoecious plants have male and female flowers on the same plant.

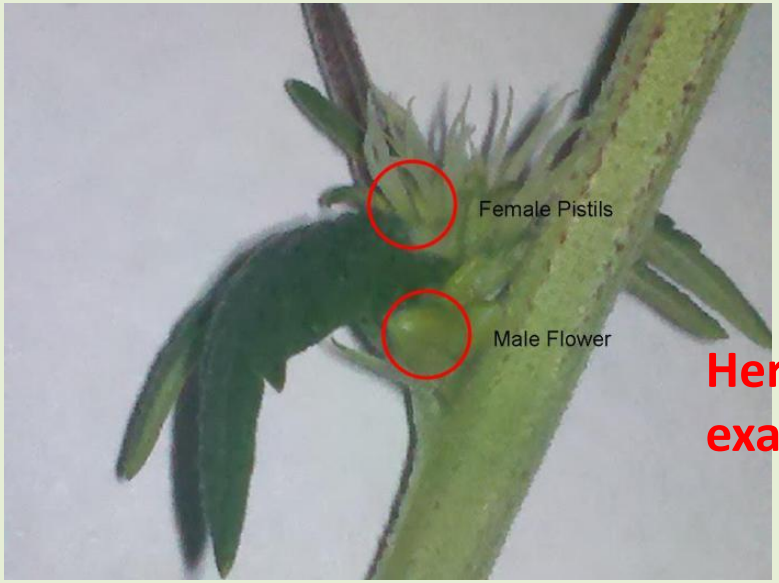
**MONOECIOUS**
**types are usually TALLER and produced for Fiber and / or Grain & Oil markets**

**DIOECIOUS**
**types are usually SHORTER and produced for Grain & Oil markets**

# DIOECIOUS

**Male plants are usually Taller and Thinner and produce yellow, dropping, pollen shedding flowers.**

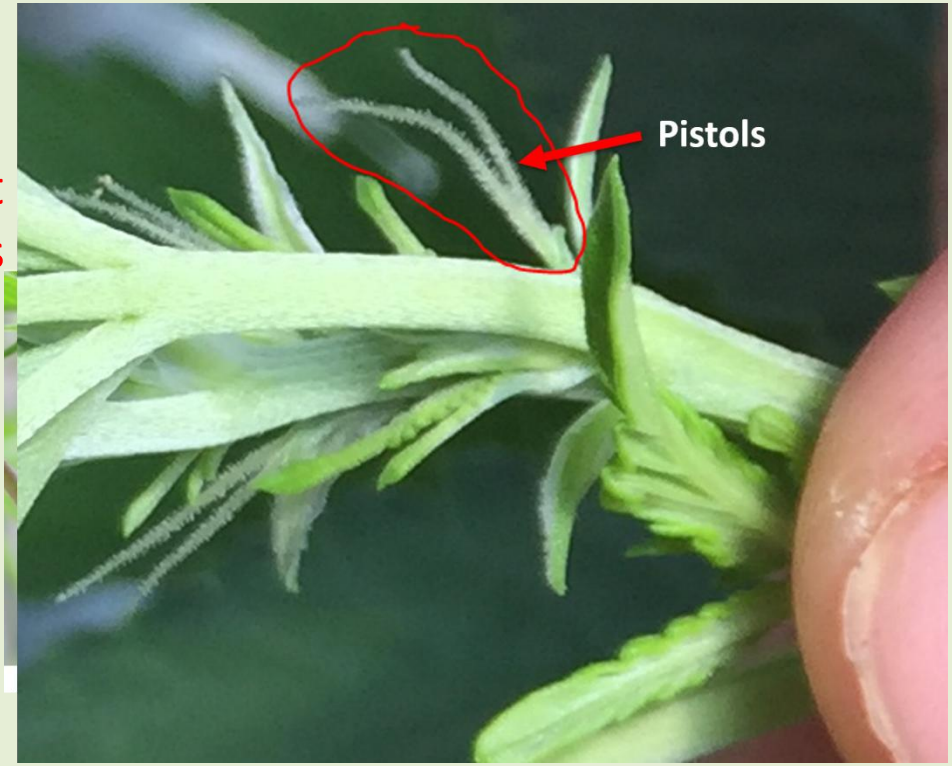
**Female plants produce thick, sticky, smelly buds, swollen with seeds.**




**Hermaphrodite examples**


Male hemp flowers

Normal plant sex examples



Here is a field example of transplanted seedlings in late August 2018

Ministry of Cannabis has found a solution for this problem. Using substances, such as gibberellic acid and colloidal silver, the breeders of Ministry of Cannabis have managed to ensure that their female plant will produce male pollen. In this way, given that both parents are indeed a female, only the X chromosomes are passed to the offspring. This is why the seeds that are produced in this way can only generate female plants (99,99%).  (Found in the Ministry of Cannabus article online)

# Hemp growing in early July

# Hemp growing in late July

# Agronomics

- Weed Control; no chemical options
- Disease & Pests; Bertha Armyworm, Cutworms, Grasshoppers, European Corn Borer, Sclerotinia stem rot (4 year rotation ?) also found in edible beans, canola and sunflower.
- Fusarium; from greenhouse transplants
- Seed may be difficult to find and costly????
- Roguing; Labor intensive, “you need resources”

# Agronomics

- Plants are day-length sensitive (June 21st )
- Harvest; for fiber varieties-during pollination
- Harvest; for grain varieties-70% seed is ripe ?
- Seed oil content- 30%
- Grain storage- 8-10% moisture
- Bushel weight- 44 pounds
- Baling residue moisture < 14%

# Hemp root can penetrate the soil in to six feet

# Agronomics

- Plants can root nearly 6 feet in the soils
- Soil PH; The optimum soil PH level is 6.3-6.8
- Nitrogen; 70-110 lbs. (similar to high protein HRSW)
- Phosphorus; up to 45 lbs.
- Water requirements?  25-30 inches


CASE IH

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# “Thank You”

Colorado Seed Growers Association