HEMP NOTES

Specific for farm

From Virginia Industrial Hemp Research Program presentation (https://youtu.be/VV6fgbeT2cI)

- Industrial Hemp and Marijuana are all *Cannabis sativa*
- Industrial Hemp has a THC less than 0.3% (2014 Farm Bill)
    - Growing conditions can affect the THC levels in the plants
- Hemp can grow on marginal soils (but low yields)
- Sunlight sensitive; less light signal, plant will grow taller but take longer to produce flowers
- High density planting for fiber, low for grain, very low density for flowers
- See video at 13:41 for chart on Industrial Hemp processing and products
- Fibers used for:
    - Insulation for homes
    - Hempcrete
    - Cars – door panels, trim, etc.
    - Batteries
- Grain used for: (not really a seed, but a grain)
    - Omega 3
    - Cosmetics
    - If plant is growing a seed, energy is going into seed production. Without seed, plant produces more resin
- Flowers used for:
    - Medicinal purposes
    - Other facts:
        - 3' between rows for flowers is too close
        - White plastic-culture to avoid roots from getting too hot
        - Not bad to have groundcover between rows can reduce air flow and compete for nutrients; can make hemp plants susceptible to mold (keep plants low)
- Forage? Unknown as this time
- Weed pressure – more of an issue for grain
    - Herbicides can make the product unusable (hemp does not have low shatter, so when harvesting it shatters. For seed, if harvested at high moisture to prevent the shatter loss, get it out of the field as soon as possible.)
    - Too wet, seeds will start to germinate
- Harvesting
    - Fiber –simple bar mower
        - Sunstrand: https://www.sunstrands.com/
        - Cut with a single bar
        - Let it sit in the field and ret (retting = 'rotting;' microbial activity will break down the tectins so the long fibers break away from the short fibers)
        - Ted it a couple of times so it rets evenly
        - After a couple of passes with the tedder, rake and bail
    - Flower
        - Hang to dry

        - Need a good sized barn area to dry it
        - Land prep. – beds and white plastic mulch + irrigation
        - Direct planting with tobacco equipment
        - If hand processing, need lots of labor
- Find brokers – get a contract and look at what they are offering
- Deer are not a fan of hemp (may nibble on it, but then realize it's not tasty)
- www.vdacs.virginia.gov for more information

Other Notes (from https://legacyhemp.com/farming-hemp-101)

- Reproduces through pollination; pollen shed lasts 1-3 weeks
    - Males die after they are out of pollen
    - Gender can be determined 4-6 weeks after planting
- It will not flower until the days start to get shorter
- Flowers
    - Planted as seeds or transplants
    - similar to tobacco
    - planting and harvesting are typically done by hand (planting can be done with a transplanter)
    - only female plants; male plants can ruin an entire crop
- Fiber
    - Similar to growing hay
    - Planting: grain drill or broadcast
    - Harvest: mower, baler
    - Bales are stored at 15% moisture until shipped to processor
    - It is laid out in the field to dry like hay
        - "field ready"
        - Longer process than with hay
        - 7-21 days to dry (has to go through the redding process to break down the stalk material to loosen the fibers and make it easier to transport and for the processers to handle)
        - Once the crop is dry, bail it (large square bales makes it easier to transport
        - smaller stem diameter
        - reduces the size of the inside woody core to a small pencil like stalk
        - little herd, more bass fiber
- Grain
    - Similar to growing wheat or other small grains
    - Planted by seed
    - Planted with grain drill or broadcast
    - 25-35 lbs/acre
    - Harvest – combine (has 4-6 hours before it starts to spoil)
    - Post-harvest: grain should be dried in aeration bins immediately after harvest
- Well drained soils are the best (sandy-loam)
- Avoid heavy clay soils (too much water)
- Avoid excess moisture
    - Increases mortality
    - Reduces vigor and competitiveness with weeds
    - Significantly reduces yields
- Fields
    - Pick fields that are most productive
    - Choose fields with low weed pressure
    - Well-drained
    - Little to no compaction
    - Plant will show you where you have issues in your field

    - Avoid rotating after corn or Hemp's N needs will increase
- Organic
    - Watch for weeds
    - Rotate after legume (best weed control and provides residual nitrogen; alfalfa is a good choice, if soils are suitable)
    - Avoid rotation after corn or soybeans
        - High weed potential
        - Increase disease potential
    - Increase planting rates
- Nutrients (this is for Wisconsin. Virginia rates are lower; follow recommendations in your nutrient management plan)
    - Nitrogen 100-125 lbs/acre
        - Majority is stored in the stalk
        - Excess N can cause lodging (possibility)
    - Phosphorus: 40-70 lbs./acre
    - Potassium: 60-100 lbs./acre
    - Sulfur: 15-25 lbs./acre
- Planting depth – ¼ - ¾ inches
    - Target is ½ inch
- Plant AFTER a rain, not before
- Germination: 24-48 hours
- Emergent 3-5 days
- First 30 days is when weeds need to be controlled (most important time to watch)
- Pests
    - Mold's preferred conditions:
        - High humidity
        - Cool-moderate temperatures (overnight)
    - Insects – not as problematic
        - Japanese beetles like the pollen from male plants
- Rapid growth is typically between Day 30-60
- Reproductive phase
    - When days get shorter
    - Reproductive stage is usually day 60-90 after planting

<u>Harvest (grain)</u>

- Maturity is usually day 100-110
    - Seeds reach mature stage between 90-100 days after planting
    - Some seeds will remain grain and immature at harvest
- Harvest moisture: 12-18%
- Harvest at 110-130 days
- Clean all equipment before harvest (especially if harvesting after a wheat crop)
- Straight cutting recommended; swathing NOT recommended
- Cut grain heads only – reduces the amount of fiber though the combine

Harvest (fiber)

- Mowing will occur first, 1-2 weeks of pollination
- Leave 4-6 inches of stubble to reduce ash content
- Rake when stalks turn from green to pale yellow
- Retting period is 2-6 weeks (depending on the environment)
- When bailing, bale moisture should be <12%

Other facts:

- Not recommended planting hemp in the same field 2 years in a row (not enough knowledge on potential diseases at this time)
    - If the same crop is planted year after year, it is more likely pest problems will start to appear

Shatter = seed starts to lose its shell

Questions (All based on cultivars):

- **pH**
  - Fiber, Grain, and Flowers: between 6-7
- **P & K**
  - Fiber: similar to corn, but needs ~1/3 N
  - Grain: similar to corn
  - Flowers: similar to corn
- **Soils**
  - Fiber, Grain, and Flowers: well drained, low clay
- **Cultivars**
  - Fiber: Chinese/S. European dioecious lines
  - Grain: French monoecious verities
  - Flowers: ??? (feminized seed or clones?)
- **When to plant**
  - Fiber: May or earlier
  - Grain: May
  - Flowers: May to early July
- **Seed rates**
  - Fiber: 18-20 germinable seed/linear foot
  - Grain: 9-10 germinable seeds/linear foot
  - Flowers: 1,200/acre
- **When to harvest**
  - Fiber: At flowering, with a sickle bar mower
  - Grain: When first seeds are fully ripe, ~20% moisture
  - Flowers: Scout for THC and hand harvest at 0.3%; after harvest, "bucking"/"shucking" stems; grinding
- **Storage (after harvest)**
  - Fiber: leave in field for 2-6 weeks (when moisture level is >12%)
  - Grain: dry immediately
  - Flowers: low temperature with air movement to dry plants
- **Spacing between rows**
  - Fiber: ~7.5" spacing (lower seeding rate)
  - Grain: ~7.5" spacing (lower seeding rate); can try 15-30" spacing which may work if planted early enough, but might have weed pressure issues
  - Flowers: 6' apart within a row and 6' apart between rows (depends on plant material and when you get in the ground; if you're planting late, might plant at a higher density due to shorter growing season)
- When to **apply N**
  - Fiber, Grain, and Flowers: Half N should be applied at planting and the remaining half 30 days afterword. N is not needed if it is following a winter legume cover crop
- **Till vs No-Till**
  - Fiber: No-till (higher % stand for tillage, but not much)
  - Grain: Tillage (still working on studies; based on studies so far, not good results for no-till)
  - Flowers: