



Hemp Panel Webinar

May 13, 2020

John Fike, PhD Associate Professor
and Extension Specialist Virginia Tech

Kelli Scott Manager of Production
and Marketing at TruHarvest Farms

Adam Taylor, Mag Hemp Small
Farmer at Singing Spring Farm; Farm
Manager at the Virginia Tech
Catawba Sustainability Center



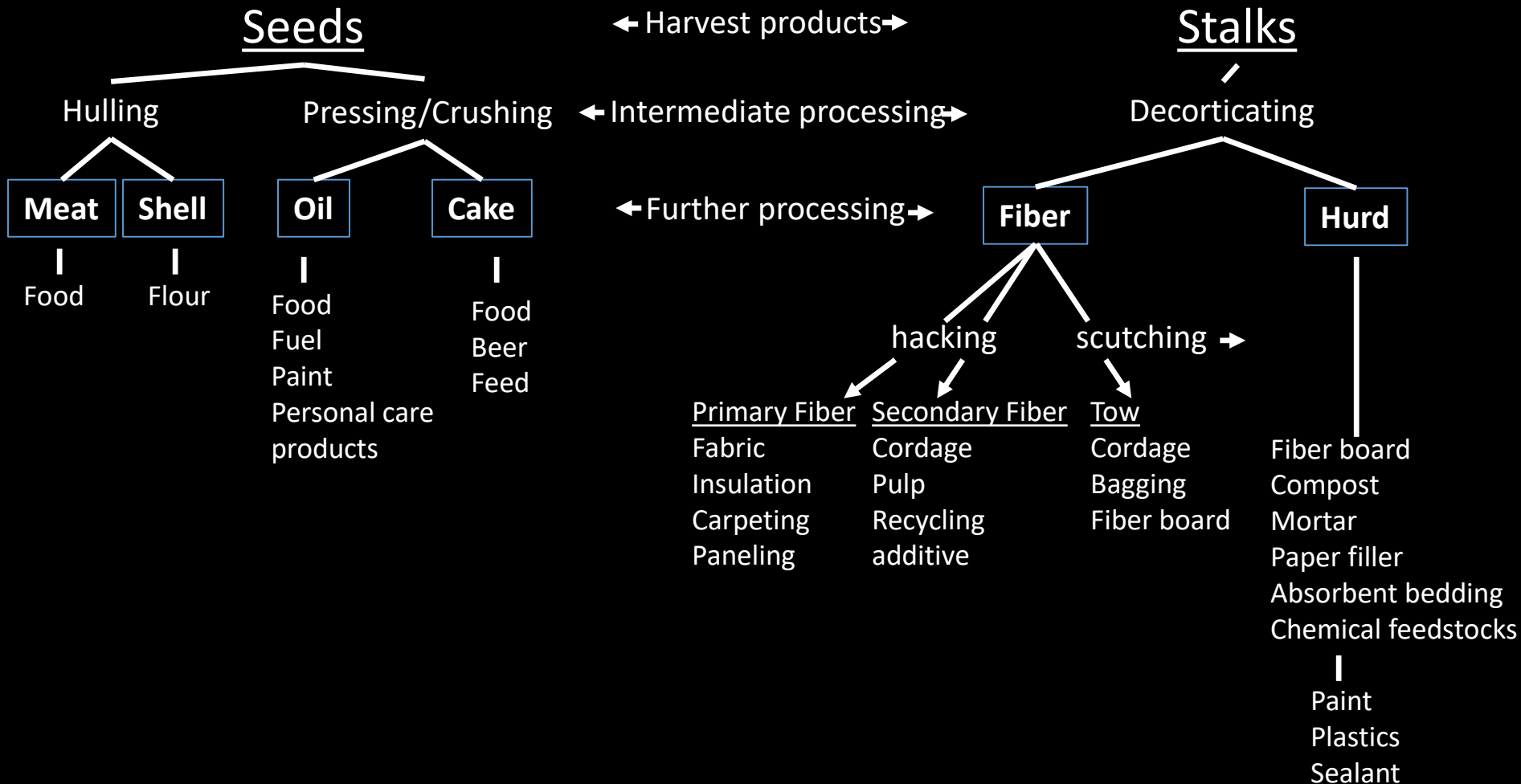
VIRGINIA
Beginning Farmer & Rancher
COALITION PROGRAM



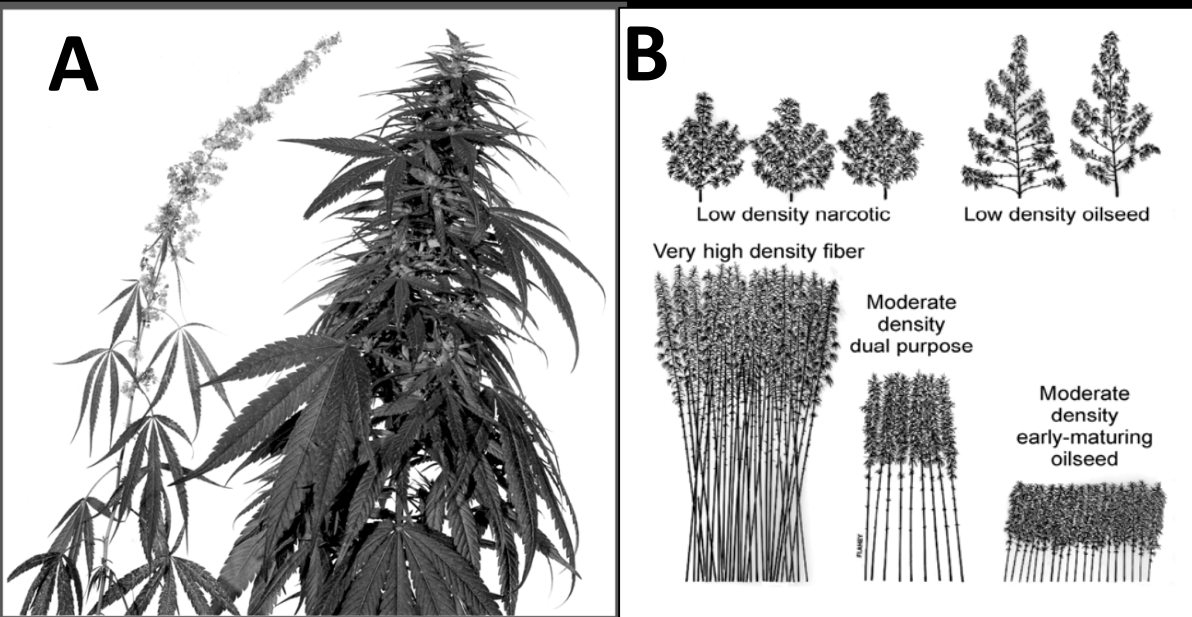
To join our listserv email
ketrozzo@vt.edu with the
subject “Join VBFRC Listserv”)

Claim: 25,000 Uses

Industrial Hemp Processing and Products



Distinct differences by management, type



Staminate (“male”) and pistillate (“female”) cannabis plants (A, left and right) and the typical architecture of hemp grown for narcotics, oil seeds, and fibers under different densities (B). Adapted from (Small and Marcus, 2002).



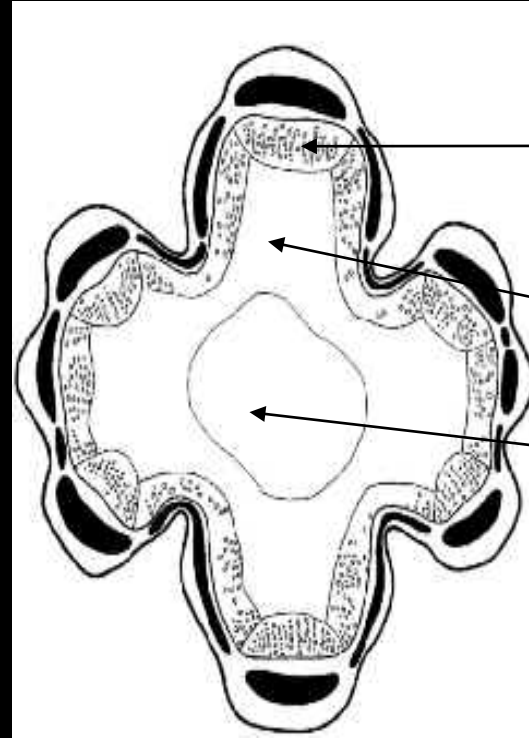
Stem cross sections of hemp fiber (top) and narcotic (bottom) plants. From Small and Marcus (2002).

Hemp fibers



A hemp stem showing the bast fibers which grow under the “bark” layer.

<http://www.sk8rjay.com/wp-content/uploads/2010/10/Hemp-fiber.jpg>



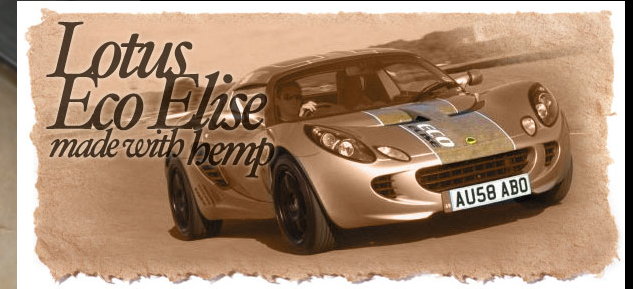
Fiber bundles
Woody core (hurd)
Hollow space

Hemp stem cross section adapted from McPartland, 1996

Fiber insulation



Natural fibers embedded in polymer resins



Natural fibre for lean injected design (NafiLean) has been developed to introduce green content into high-performance material for injected instrument panels, door panels and centre consoles on such components as trim parts, top covers, and defroster and closure ducts. (photos: Faurecia)

<http://www.plastics.gl/automotive/car-interiors-go-green/>

Hempcrete



Hempcrete

Hempcrete Walls require less lumber which reduces framing costs 30-40%
It also serves as the sheetrock, insulation, & tyvek all rolled into one!



CannabisNationRadio.com

it's time for an honest conversation about hemp
facebook.com/reformwarrior

Hemp House

Walls made with Hempcrete

Solar Windows made with Hemp Plastic

Hempcrete is more energy efficient than concrete

Hempcrete every savings = up to 70%



Hempcrete is mildew resistant, termite resistant, an excellent sound isolator, and breathable insulator

WHY is it ILLEGAL to grow HEMP in the U.S.?



HEMPCRETE

Hempcrete

- Breathable, flexible for timber frame buildings (Bedliva and Isaacs, 2014)
- LCA: negative GHG balance due to CO₂ uptake (Arrigone et al., 2017) dependent on binder
- Perfect 0 rating for fire safety in recent US tests

Hempcrete home, Va Beach



Hemp grain

- 27-38% oil
- +fatty acid profile
 - Alpha linolenic acid
 - Only natural gamma linolenic acid source
- Omega3:Omega6 = 3:1
- Human health literature is limited
- Finding use in cosmetics
- Economic potential undefined



Hemp as forage?

- KY research on ensiling hemp

Perhaps suitable in “single use” systems.

Likely better in “two use” systems.

- Some empirical grazing evidence

Erosion control



<https://www.biocompositesgroup.com/erosion.html>



Remediation

High tolerance to

- Polyaromatic hydrocarbons
- Metals – As, Cd, Cu, Ni, Pb...
 - Typically higher in leaves

Fibers can sorb/desorb Zn from H₂O many cycles

Hemp as a medicinal crop

- Growing for cannabinoids in bracts, leaves



Fike

Hemp “colas” (flower clusters)



<https://www.leafly.com/news/growing/increasing-trichome-production-on-cannabis>

Hemp flower with white pistils



<https://www.drugtimes.org/marijuana-horticulture/general-overview-and-considerations-when-making-seeds.html>

Hemp bract full of trichomes (source of CBD). Seed are undesirable for CBD.

FDA Deschedules Hemp



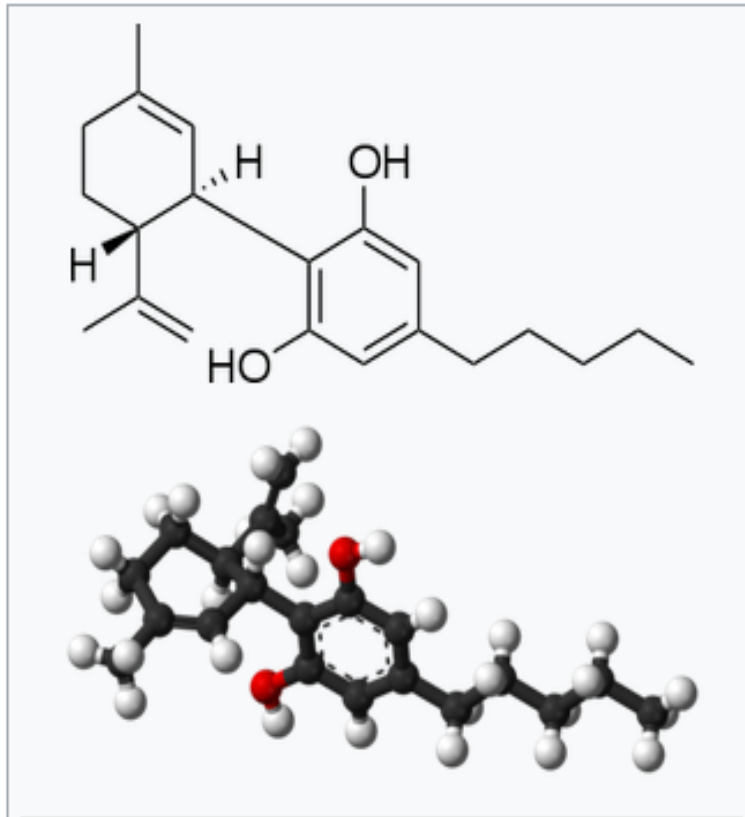
https://fm.cnn.com/applications/cnn.com/resources/img/editorial/2018/09/27/105475258-1538066795425epidiolex_bottleandsyringe_v17.1910x1000.png

Over 100 cannabinoids in

Cannabis

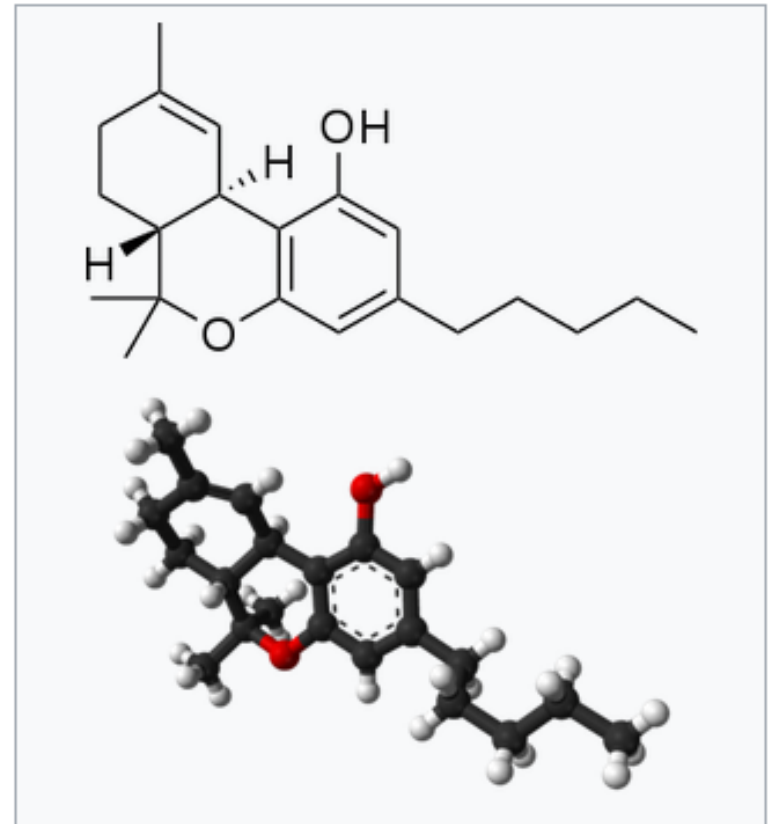
- Primary interest / effort (currently):

Cannabidiol



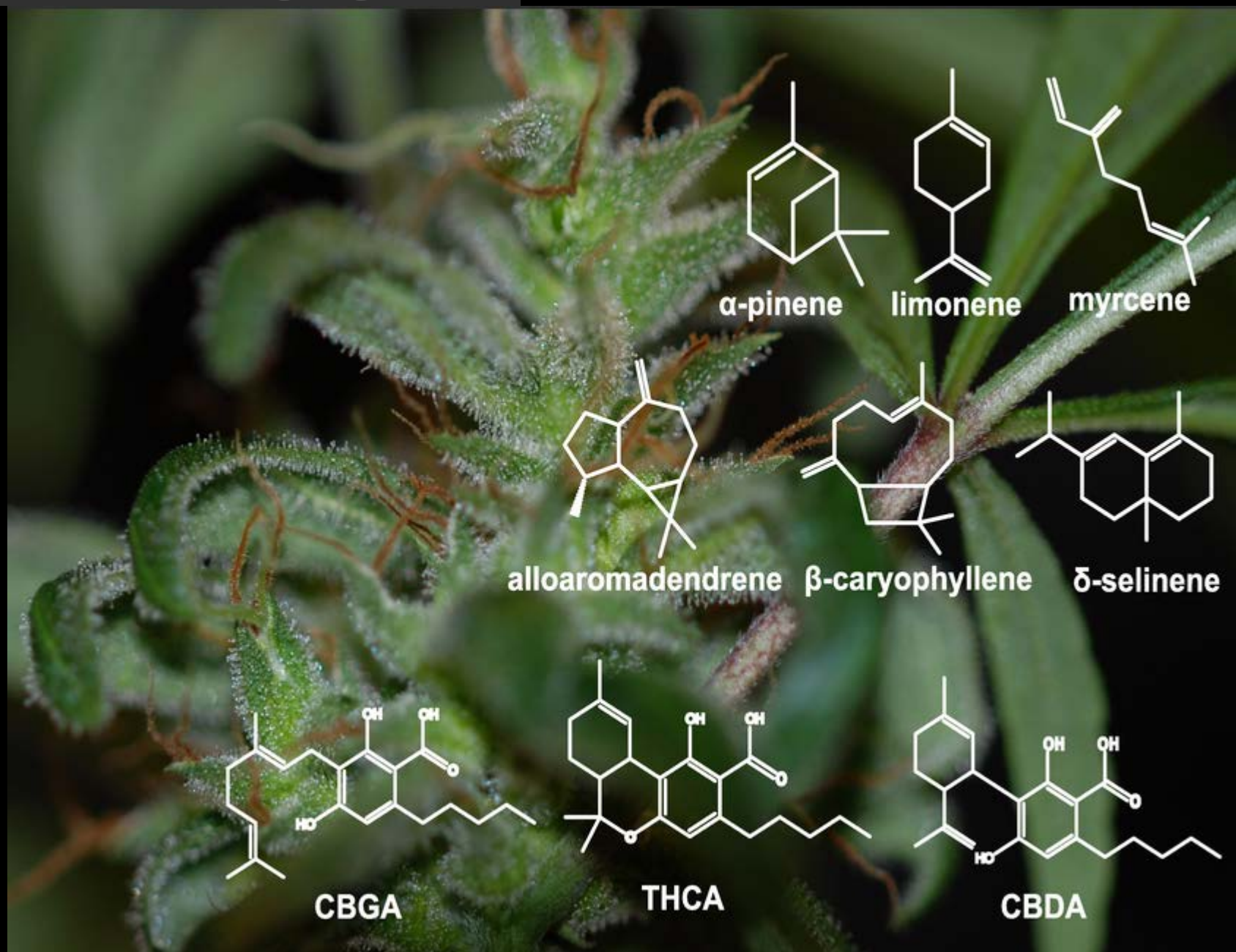
Tetrahydrocannabinol

INN: dronabinol

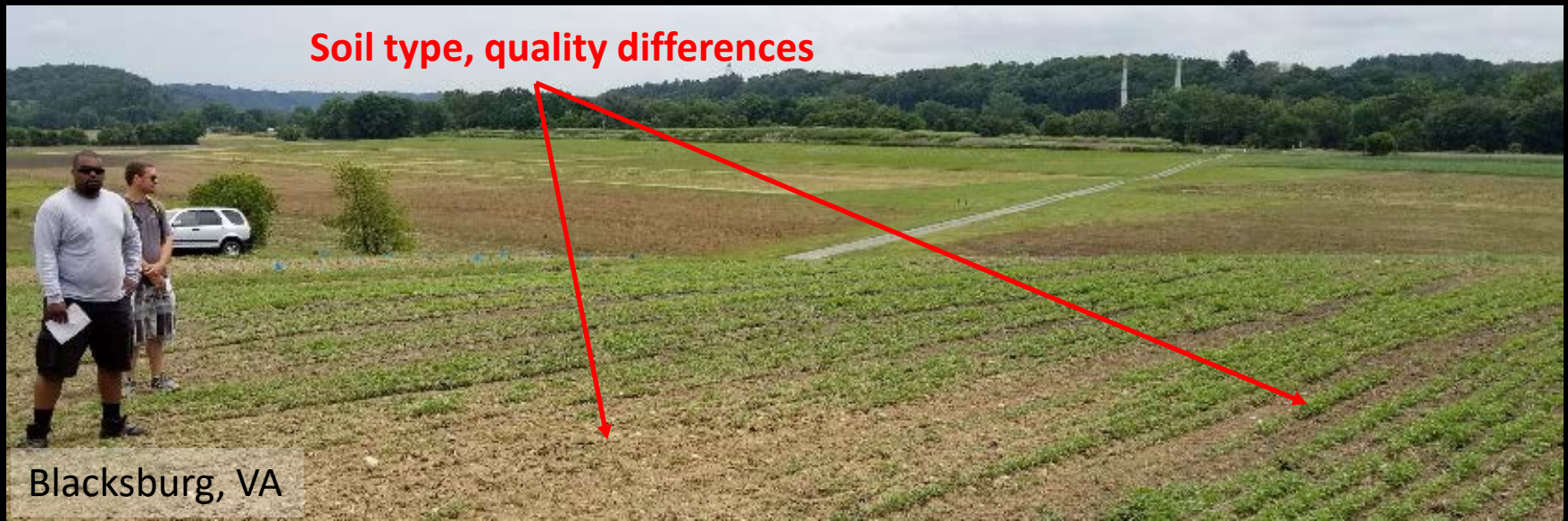


Terpene synthases from *Cannabis sativa*

Judith K. Booth, Jonathan E. Page, Jörg Bohlmann



Site suitability – avoid heavy clay, wet spots



Where can you get soils information?

- Web Soil Survey
- <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>
- Local Cooperative Extension offices
- Local Natural Resource Conservation Service offices



United States Department of Agriculture
Natural Resources Conservation Service

Web Soil Survey

[Home](#)[About Soils](#)[Help](#)[Contact Us](#)

You are here: Web Soil Survey Home

Search



Browse by Subject

- ▶ [Soils Home](#)
- ▶ [National Cooperative Soil Survey \(NCSS\)](#)
- ▶ [Archived Soil Surveys](#)
- ▶ [Status Maps](#)
- ▶ [Official Soil Series Descriptions \(OSD\)](#)
- ▶ [Soil Series Extent Mapping Tool](#)
- ▶ [Geospatial Data Gateway](#)
- ▶ [eFOTG](#)
- ▶ [National Soil Characterization Data](#)
- ▶ [Soil Quality](#)
- ▶ [Soil Geography](#)

The simple yet powerful way
to access and use soil data.

START
WSS

Welcome to Web Soil Survey (WSS)



Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Soil surveys can be used for general farm, local, and wider area planning. Onsite investigation is needed in some cases, such as soil quality assessments and certain conservation and engineering applications. For more detailed information, contact your local [USDA Service Center](#) or your [NRCS State Soil Scientist](#).

Four Basic Steps

1

Define.

I Want To...

- [Start Web Soil Survey \(WSS\)](#)
- [Know the requirements for running Web Soil Survey — will Web Soil Survey work in my web browser?](#)
- [Know the Web Soil Survey hours of operation](#)
- [Find what areas of the U.S. have soil data](#)
- [Find information by topic](#)
- [Know how to hyperlink from other documents to Web Soil Survey](#)
- [Know the SSURGO data structure](#)

Announcements/Events

- [Web Soil Survey 3.1 has been released! View description of new features and fixes.](#)

Map — Yields of Non-Irrigated C

Tables — Yields of Non-Irrigated Crops (Component): Grass-legume hay (Tons) — Summary By Map Unit

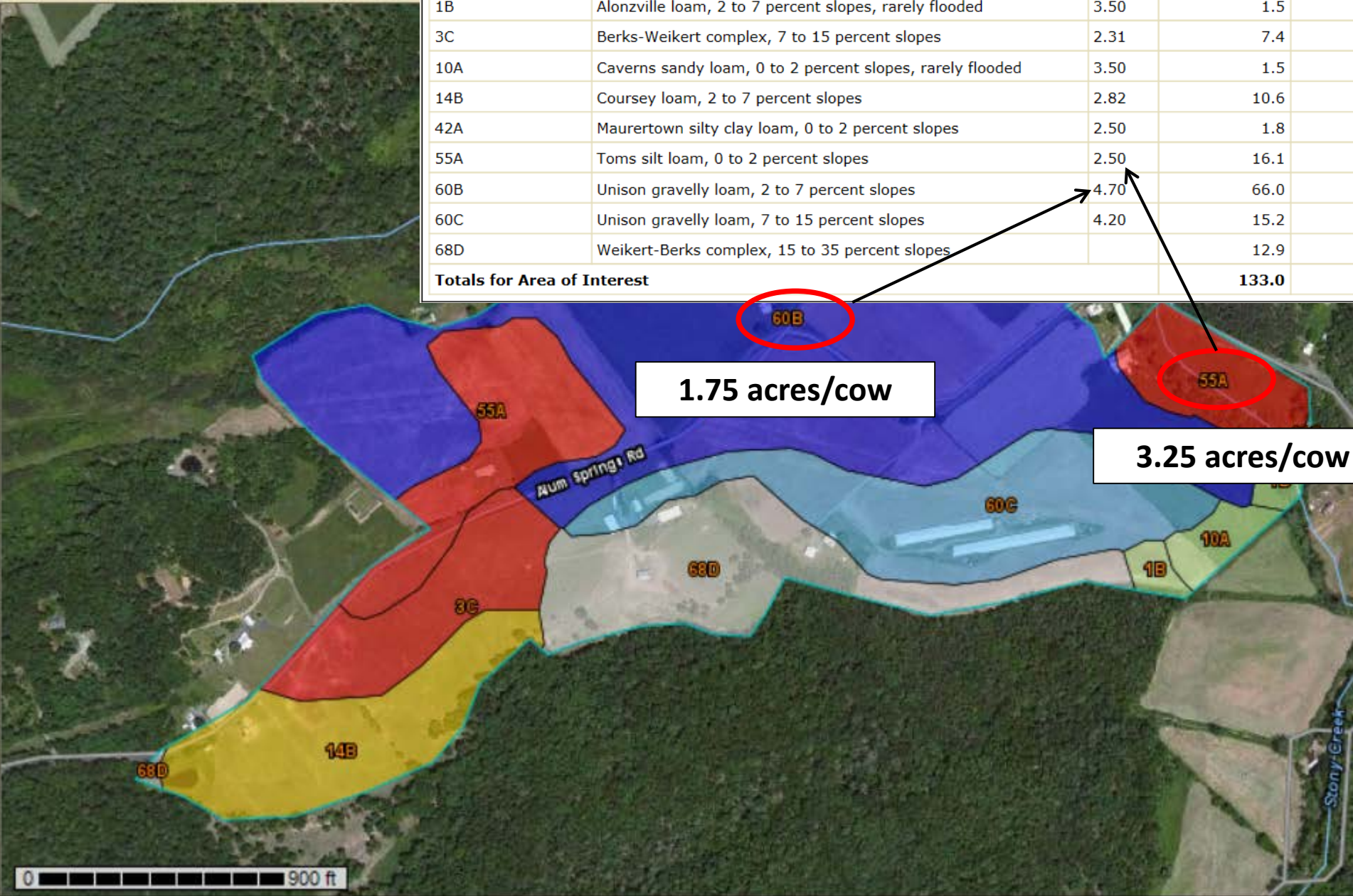


Summary by Map Unit — Shenandoah County, Virginia (VA171)

Map unit symbol	Map unit name	Rating	Acres in AOI	Perce
1B	Alonzoville loam, 2 to 7 percent slopes, rarely flooded	3.50	1.5	
3C	Berks-Weikert complex, 7 to 15 percent slopes	2.31	7.4	
10A	Caverns sandy loam, 0 to 2 percent slopes, rarely flooded	3.50	1.5	
14B	Coursey loam, 2 to 7 percent slopes	2.82	10.6	
42A	Maurertown silty clay loam, 0 to 2 percent slopes	2.50	1.8	
55A	Toms silt loam, 0 to 2 percent slopes	2.50	16.1	
60B	Unison gravelly loam, 2 to 7 percent slopes	4.70	66.0	
60C	Unison gravelly loam, 7 to 15 percent slopes	4.20	15.2	
68D	Weikert-Berks complex, 15 to 35 percent slopes		12.9	

Totals for Area of Interest

133.0



Developing a fertility plan

- Take a representative soil sample
 - Avoid sampling from atypical areas or sample those separately
- Follow the recommendations

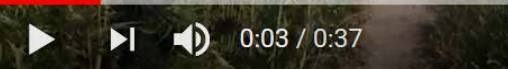
Hemp biomass yields by site, N

Variety	Orange	Blacksburg		Blackstone	
	TPA	TPA		N rate	TPA
C. Eletta	--	2.99		0	2.11
Canda	0.46	1.87		40	2.45
Carmagnola	0.80	2.64		80	2.53
Felina 32	0.71	2.57		160	2.89
Fibranova	0.79	2.65			
Glesisa	--	1.89			
Gliana	--	2.18			
Zolotonosha	--	2.22			

Soil pH and fertility

- Slightly acidic ($\text{pH} \geq 6$) sites are fine
- Maintain high P and K
 - Current P and K reccs are based on soils test for corn
- Nitrogen varies by end use
 - Fiber: 50-100 lb/acre common
 - Grain: 100-200, depending on soil productivity
 - Flowers: ??? – using tobacco and tomato rates to soil test has worked

<https://www.youtube.com/watch?v=G5RumvEk6pc>



Transplant management

Look at the roots!



EPA-registered pesticides

- 9 biocides, 1 conventional pesticide
- <https://www.epa.gov/pesticide-registration/pesticide-products-registered-use-hemp>



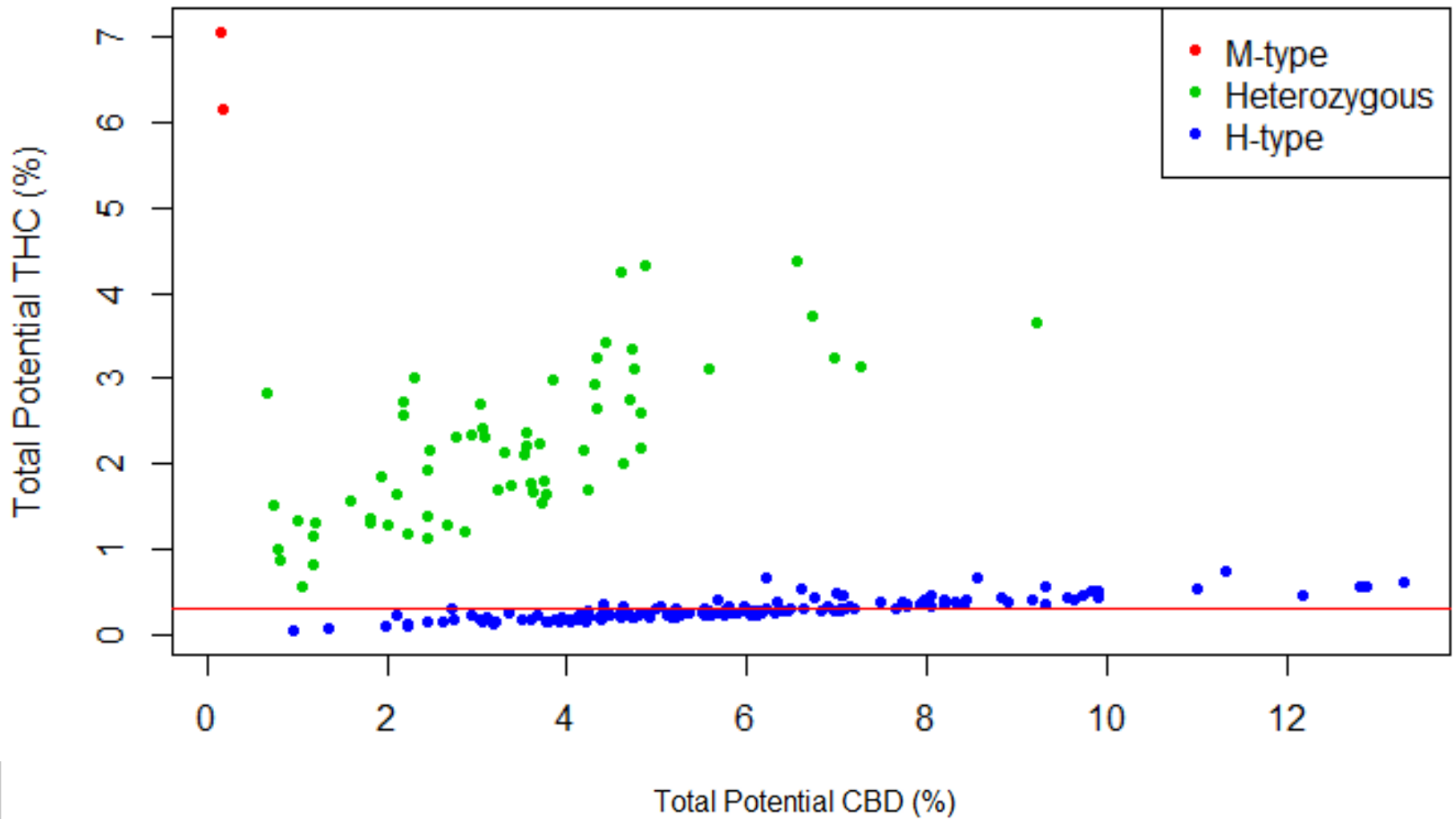
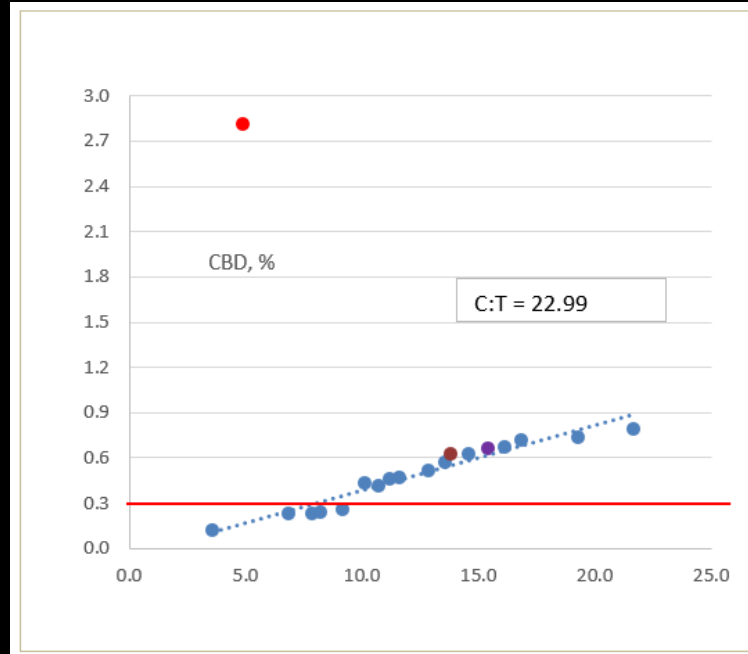
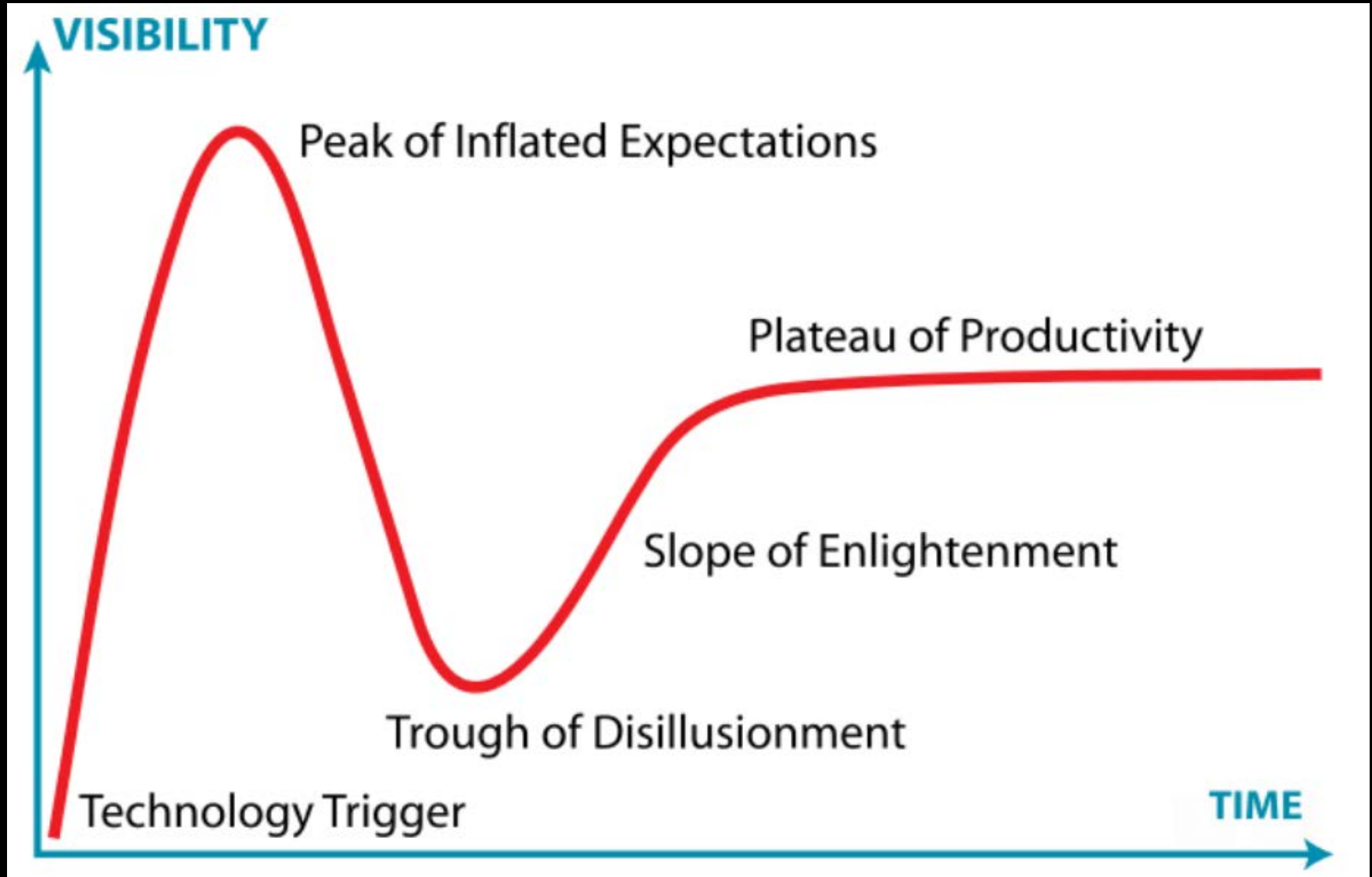


Table 1. CBD, THC and their ratio by flower hemp variety

Variety	CBD	THC	Ratio
88	7.84	0.23	34.1
<u>Baox</u>	10.68	0.42	25.5
Carolina	14.59	0.63	23.2
Cherry Blossom	13.57	0.57	23.8
Cherry H2	6.55	2.79	2.3
Cherry Wine	12.85	0.52	24.7
Electra	19.27	0.74	26.2
Endurance	3.58	0.12	29.8
Franklin	6.83	0.23	29.7
Hawaiian Haze - Top	15.43	0.66	23.4
Hawaiian Haze - Bottom	13.81	0.62	22.1
Painted Lady	8.22	0.24	33.8
<u>Phylos</u>	--	--	--
<u>Sisikyou</u> Gold Early	11.17	0.46	24.4
Skipper	9.39	0.29	32.7
Special Sauce	16.86	0.72	23.4
Stout	9.18	0.26	35.1
<u>Suver</u> (Clone)	21.67	0.80	27.2
<u>Suver</u> (Seed)	16.11	0.68	23.8
Sweetened	11.59	0.47	24.7
T1	10.08	0.44	23.2



Gartner Hype Cycle



Flower budget considerations

Inputs	Range	Typical	Other considerations	Comment
Clones, \$/plant	\$3-\$12 (\$150)	\$8/plant	\$2+\$2	Charge?
\$/ac	\$3.6K-\$14.4K	\$9600/ac		
Seed	\$0.15 - \$4	\$1/seed	\$0.15 M+F	Weed out?
		\$1200/ac	Minimum purchase?	
Bedding + drip		\$ 500/ac(?)		
Fertility (\$/ac)	\$0-\$200	\$ 100/ac		
Fungicides/Pesticides		??		
Labor (\$/ac)	\$2K-\$10K	??\$6000??		
Hand harvest?			Expensive but higher quality	
Machine harvest?			Sufficient quality?	
Storage, 0.25-0.5/ac				
Hand processing?		8 plants/hr	(12-15 h/acre)	

Contracts are important

Current payment for flowers based on CBD % ($\leq 5\%$ no value; $>0.3\%$ THC a problem)

Will current pricing (\$3.00-\$4.00/percentage point) hold in 2019?

Flower budget considerations

Inputs	Range	Typical	Other considerations	Comment
Clones, \$/plant	\$3-\$12 (\$150)	\$8/plant	\$2+\$2	
\$/ac	\$3.6K-\$14.4K	\$9600/ac		
Seed	\$0.15 - \$4	\$1/sc		
Bedding + drip				
Fertility (\$/ac)				
Harvest?				
Storage, 0.25-0.5/ac				
Hand processing?		8 plants/hr	(12-15 h/acre)	

**Try a small plot for fun
First get a contract if growing for profit!**

Contracts are important

Current payment for flowers based on CBD % ($\leq 5\%$ no value; $> 0.3\%$ THC a problem)

Will current pricing (\$3.00-\$4.00/percentage point) hold in 2019?

Thanks!

Hemp information

<https://ext.vt.edu/agriculture/hemp.html>

jfike@vt.edu



Hemp Panel Webinar

May 13, 2020

John Fike, PhD Associate Professor
and Extension Specialist Virginia Tech

Adam Taylor, Mag Hemp Small
Farmer at Singing Spring Farm; Farm
Manager at the Virginia Tech
Catawba Sustainability Center

Kelli Scott Manager of Production
and Marketing at TruHarvest Farms



Kelli Scott

Manager of Production and Marketing at TruHarvest Farms

<http://truharvestfarms.com/>



EMAIL

info@truharvestfarms.com



ADDRESS

1771 Flanagan Dr., Christiansburg, VA 24073

TruHarvest

History

FAQ

News

Shop

Contact



PLANT TO PURE PRODUCTS

VIRGINIA'S PREMIER HEMP FARM

Producing a local, high-quality hemp crop for CBD
production

Adam Taylor, M.Ag

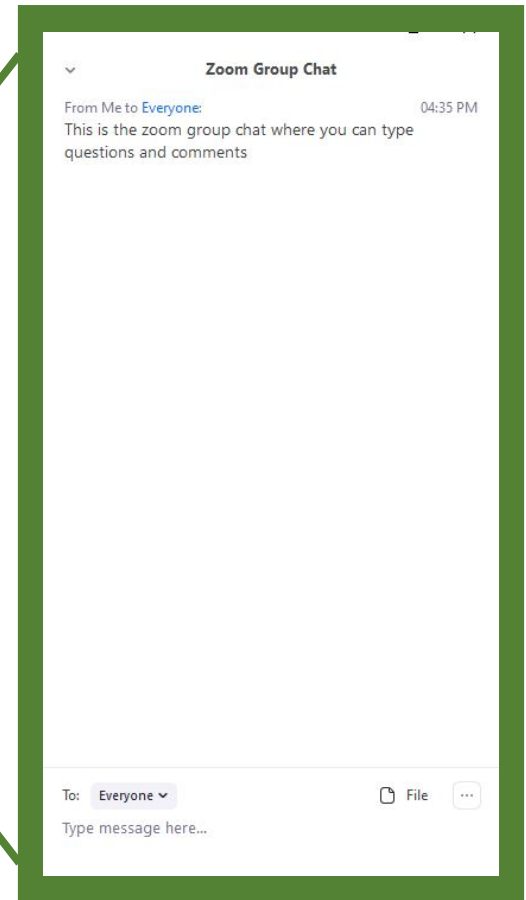
Hemp Small Farmer at Singing Spring Farm; Farm Manager at the
Virginia Tech Catawba Sustainability Center



Q & A Session

Directions

Please type your question in the chat feature making sure to indicate who you are asking (John, Adam, Kelli, All, Any)





Upcoming VBFRC Webinars

June 25 Farm Financing Options for Historically Underserved and Beginning Farmers Through the USDA Farm Service Agency

Webinar Evaluation Link

https://virginiatech.qualtrics.com/jfe/form/SV_5aw6uNInev5lwDH