



Statewide Needs Assessment for the Hemp Industry in Oregon

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Background

In Oregon, hemp (*Cannabis sativa* L.) has the potential to be an economically important agricultural commodity due to favorable climatic conditions and potentially high market value. This crop was relegalized as an agricultural commodity in the U.S. through the 2018 U.S. Farm Bill. Hemp, by legal definition, is a plant within the species *C. sativa* and contains 0.3% or less of delta-9 tetrahydrocannabinol (THC) on a dry weight basis.

Hemp can be grown for grain, seed oil, fiber, smokable flower, cannabinoid production or a combination of these uses. The Oregon hemp industry is in the early stages of development, making it challenging to identify the hemp production community's needs. Since Oregon State University Extension is committed to supporting agriculture research and outreach across the state, OSU personnel involved with hemp research



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and outreach assessed the research and educational needs and priorities of the Oregon hemp industry.

This needs assessment identifies what is known about hemp cultivation and knowledge gaps recognized by industry members, including growers, processors and allied stakeholders. This information will help establish priorities for future research and outreach efforts that target programs and services for the hemp industry across the state. To our knowledge, there have been no prior efforts to comprehensively gather statewide information on Oregon hemp production needs. Gathering these data will inform future OSU hemp research and outreach programming activities.

The goal of this study was to identify and prioritize the research and educational needs of Oregon hemp growers and other industry members. The specific objectives were to:

1. Document the market and production concerns and challenges of current hemp producers.
2. Identify barriers to including or increasing hemp production in Oregon cropping systems or participating in the hemp product supply chains.
3. Prioritize research and educational needs that would facilitate market and production growth of the hemp industry in Oregon.

Approach to determining Oregon hemp industry needs

The Oregon Hemp Industry Needs Assessment used information gathered through a statewide workshop conducted in a hybrid format and a follow-up questionnaire that allowed participating stakeholders to rank, prioritize and add to the needs identified in the statewide workshop.

1. Oregon hemp industry needs assessment workshop

To conduct the workshop, we compiled a list of email addresses that included Oregon hemp growers from 2018–22; academic, federal and state employees; and crop consultant stakeholders interested in the Oregon hemp industry. OSU hemp researchers and Extension faculty developed the agenda for this hybrid workshop (Table 1) and

Table 1. Agenda items for the Oregon hemp industry needs assessment workshop

Session #	Time allotted	Topic
1	20 minutes	What is your current focus of hemp production? What kind of hemp research and information would be valuable for your current production?
2	20 minutes	What do you see as the greatest challenges for you and for the hemp industry in Oregon?
3	20 minutes	Are you interested in producing other types of hemp? What hemp research would be valuable for you to expand into other types of hemp production?
4	20 minutes	If you aren't currently producing hemp, what do you need in terms of information or research in order to become a producer?

created an online registration form via a Qualtrics survey to gather information about each participant's location and affiliation with the Oregon hemp industry. The workshop flyer and the online registration link were shared via email with 674 hemp industry stakeholders. To increase workshop participation, the announcement was shared multiple times through various organizations and agencies, including OSU's Extension Service and the Global Hemp Innovation Center, the Oregon Department of Agriculture and the Oregon Industrial Hemp Farmers Association.

The workshop was held on Oct. 20, 2022, online and at five OSU-affiliated locations representing five hemp-growing regions around the state:

- Willamette Valley (Linn County Extension Office, Linn County)
- Southwestern Oregon (Southern Oregon Research and Extension Center, Jackson County)
- Central Oregon (Central Oregon Agricultural Research and Extension Center, Jefferson County)
- Columbia Basin (Columbia Basin Agricultural Research Center, Umatilla County)
- Eastern Oregon (Malheur Experiment Station, Malheur County)

Eighty people participated in the workshop via Zoom or in person at the various locations.

OSU faculty from each region facilitated the workshop. In addition to the facilitators, a note-taker at each location recorded the discussion in an electronic document developed before the workshop. Facilitators were provided with a seven-page instruction document to help them prepare for the workshop. Facilitators used a PowerPoint presentation for prompts to address topics to be covered in the discussion. The workshop consisted of a 15-minute welcome for all locations and participants. This was followed by four breakout sessions that focused on different topics (Table 1). The workshop concluded with each region summarizing its research needs to the statewide group. A social event with light refreshments followed the workshop.

General workshop outcomes

Participants created a list of high-priority challenges categorized as requiring short-, medium- and long-term or ongoing research efforts. The participants' interests and concerns regarding hemp production varied by regions. For example, participants in southwestern Oregon and the Willamette Valley were primarily interested in smokable flower and extracted cannabidiol (CBD) production, while Central Oregon, Columbia Basin and eastern Oregon participants were mainly interested in CBD production. Also, participants in the Willamette Valley, Central Oregon and eastern Oregon expressed interest in the evaluation of hemp for medicinal application. There was also interest in dual-purpose hemp varieties (that is, grown for both flower and fiber), particularly by Columbia Basin and eastern Oregon participants. Regardless of the region, participants had a nominal interest in grain and fiber hemp production, which may be explained by the current lack of markets and processing infrastructure and the mandate that hemp pollen not be produced near feminized plants grown for flowers used in CBD production.

The first and second breakout sessions focused on individual hemp producers. In the first pair of breakout sessions, many agronomic challenges were unique to particular regions (Appendix A). Pollen drift and planting into black plastic were common challenges mentioned among all regions. Participants also brought up the lack of information about optimal planting density and harvesting techniques and technology.

All regions identified a need for breeding to improve hemp genetics. Other commonly mentioned needs included:

- The development of varieties adapted for specific climatic zones in the state.

- Varietal standardization along with decreased heterogeneity.
- Better genetic stability within varieties.
- The development and availability of dual-purpose varieties.

Most regions identified insect pests, plant diseases and weeds as challenges, although the specific pest problems varied among regions (Appendix A). Lack of water was identified as an issue in Central Oregon and would likely be acknowledged by producers in other regions of Oregon. Across most regions, participants were concerned about regulatory issues associated with THC restriction levels for hemp and the need for more and quicker registration of pesticides labeled for use in hemp. Southwestern Oregon and the Willamette Valley also expressed concern about a lack of information about the current market for smokable and CBD products. In breakout sessions, individuals brought up issues related to finding CBD extractors for small batches, easier access to hemp production, economic data and product statistics, and public education about products such as hempcrete.

An array of specific market and economic challenges were identified by individual regions. This included market instability, banking support, hurdles to marketing online and exploring new products. Infrastructure needs for various types of hemp production (such as cordage, hempcrete and grain) were identified by eastern Oregon and Willamette Valley participants. Breakout session attendees expressed interest in general science information, commodity grading and co-op establishments.

Session 3 focused on expanding the types of hemp production and associated hurdles. The problems identified were unique for each region, except for the need for information about fiber processing (Appendix A). There was interest in most areas, except for southwestern Oregon, in expanding the types of hemp produced, depending on markets and infrastructure (Appendix A).

Session 4 examined roadblocks for novice hemp growers. Information on agronomy and pest management was identified for Southwestern Oregon and the Willamette Valley. Regulatory aspects were also highlighted as barriers for new hemp growers in several regions. Insufficient time was allotted in the workshop to discuss unique findings from individual regions to more fully assess their commonality to other regions in the state. Therefore, a Qualtrics survey was developed after the workshop to better assess the relative importance of the issues and ideas that were identified in the breakout sessions of the hybrid workshop.

2. Post-meeting Qualtrics survey

The post-workshop survey provided Oregon hemp industry stakeholders the opportunity to see the breadth of production challenges identified from the workshop activities and to rank the importance of identified issues for their farm or business. There were 20 questions in the survey. The first four questions asked for background information about the survey respondents, including their affiliation with the hemp industry in Oregon, how many years they have been producing hemp and which regions they represent. The remaining questions addressed the industry challenges identified in each topic area of the in-person workshop. Survey participants could rank specific challenges and identify other challenges or considerations. The survey was open to all workshop participants and hemp growers, processors, seed producers, seed company representatives, pesticide stakeholders, researchers and educators, and any other stakeholders unable to join the meeting. Fifty-seven participants responded to the online survey.

3. Survey outcomes

Agronomy and production issues. Respondents noted nutrient management (61%) as an important issue, followed by optimization of the harvesting system (54%), pollen

management (53%) and current cropping system (50%) (Table 2). The topics considered less important included irrigation management and THC remediation.

Table 2. Priorities for hemp agronomy and production in Oregon, ranked by percentage of responses by respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Optimization of the current cropping systems (floral and cannabinoid hemp) in relation to yield (plant density/spacing, planting method, hemp product types); n=50	50	32	18
Optimization of harvesting systems (flower/grain maturity, harvest time in relation to THC, harvesting techniques); n=51	54	29	17
Pollen management (pollen drift); n=48	53	37	10
Nutrient management for specific regions in Oregon; n=48	61	29	10
Irrigation management (timing, drip tape depth, cutoff time before harvest); n=48	46	48	6
THC remediation as an alternative for hemp crops > 0.3% delta-9 THC on a dry weight basis; n=50	48	40	12

Genetics, varieties and phytochemistry issues. The majority of respondents reported that the development of varieties adapted for fiber harvest, increased availability of hemp varieties with stable genetics, development of varieties adapted to specific climatic conditions and research on other hemp component phytochemicals beyond CBD and CBG (cannabigerol) as important industry needs (Table 3). Topics considered less important included varietal standardization and decreased heterogeneity within varieties, development of dual-purpose hemp varieties, drought-resistant varieties and varieties where preharvest THC levels are not elevated after drying and stripping.

Table 3. Priorities for hemp genetics and varieties as well as phytochemistry of current lines in Oregon, ranked by percentage of responses by respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Increased availability of hemp varieties with stable genetics; n=48	50	38	12
Varietal standardization and decreased heterogeneity within varieties; n=49	43	43	14
Development of varieties adapted for specific climatic zones within Oregon; n=47	51	34	15
Development of varieties adapted for fiber harvest; n=45	56	18	26
Development of dual-purpose varieties (examples: good cannabinoid profiles as well as fiber production); n=47	43	23	34
Development of drought-resistant varieties; n=51	49	31	20
Development of varieties where preharvest THC level is not elevated after drying and stripping levels; n=49	45	39	16
Research on other hemp component phytochemicals beyond CBD and CBG; n=50	50	39	11

Insects, mites and rodent issues. In regard to pest issues, respondents noted there was a lack of information about safe-use patterns for insecticide applications in and around hemp. This was considered the most important need, followed by damage caused by corn earworm (*Helicoverpa zea*) or other bud-feeding caterpillars and faster or more insecticide registrations for use in hemp in Oregon (Table 4). Rodent chewing damage, aphids, seed corn maggots, grasshoppers and early insect control for direct seeding were considered.

Table 4. Priorities for insect, mites and rodent pests in Oregon, ranked by percentage of responses of respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Aphids (Hemiptera); n=35	29	57	14
Caterpillars (Lepidoptera); n=35	49	34	17
Seed corn maggots (<i>Delia platura</i>); n=32	28	34	38
Grasshoppers (Orthoptera); n=32	25	34	41
Thrips (Thysanoptera); n=33	34	41	25
Beet leafhoppers (<i>Circulifer tenellus</i>); n=32	38	38	24
Two-spotted spider mites (<i>Tetranychus urticae</i>); n=35	37	43	20
Early insect control for direct seeding; n=35	34	40	26
Safe-use patterns for insecticide applications in hemp and around hemp; n=43	70	16	14
Faster and/or more registrations of insecticides for hemp; n=39	46	36	18
Rodent chewing damage; n=36	25	33	42

Plant disease issues. Most respondents identified safe-use patterns for fungicide application in and around hemp and faster or more fungicide registrations for hemp as important industry needs. Respondents perceived diseases caused by gray mold and bud rot (*Botrytis*) and powdery mildew as most important (Table 5). *Sclerotinia* white mold, *Fusarium* diseases, beet curly top virus and hop latent viroid were perceived as less important. *Verticillium* wilt and leaf spot diseases were the lowest-ranked disease problems.

Weed issues. Most respondents identified safe-use patterns for herbicide applications in hemp and around hemp as their primary need, and weed suppression with cover or row cropping as their primary challenge (Table 6). Respondents would like faster or more registrations of herbicides for hemp. A few specific weed species (kochia, tumbleweed, etc.) were identified as problems but were ranked lower among their concerns.

Issues surrounding knowledge and information availability. Some issues stood out as important, including access to production and marketing data, information on extractors and processors, background information on hemp varieties, pest management information and ease of navigation of current Oregon hemp production rules and regulations (Table 7). The majority of respondents considered guidelines on hemp production as important and information on phytochemistry components as less important.

Table 5. Priorities for hemp disease in Oregon, ranked by percentage of responses of respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Powdery mildew (<i>Golovinomyces ambrosiae</i> and <i>Podosphaera macularis</i>); n=39	56	33	11
Curly top (Beet curly top virus); n=35	46	40	14
Hop latent viroid; n=37	46	43	11
Gray mold (Botrytis bud blight and stem canker) (<i>Botrytis</i> spp.); n=39	62	28	10
Fusarium diseases (<i>Fusarium</i> spp.); n=35	49	34	17
Verticillium wilt (<i>Verticillium</i> spp.); n=33	33	45	22
Sclerotinia white mold (<i>Sclerotinia sclerotiorum</i>); n=34	47	35	18
Leaf spot diseases (<i>Alternaria</i> spp.); n=31	29	42	29
Safe-use patterns for fungicide applications in hemp and around hemp; n=40	68	20	12
Faster and/or more registrations of fungicides for hemp; n=38	53	34	15

Table 6. Priorities for weed issues in Oregon, ranked by percentage of responses by respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Lambsquarters (<i>Chenopodium album</i>); n=31	48	36	14
Pigweed (<i>Amaranthus</i> spp.); n=32	47	40	13
Tumbleweed (<i>Salsola tragus</i>); n=31	36	32	32
Kochia (<i>Kochia scoparia</i>); n=27	41	33	26
Weed suppression with cover/row cropping; n=42	57	33	10
Safe-use patterns for herbicide applications in hemp and around hemp; n=41	59	34	7
Faster or more registrations of herbicides for hemp; n=38	47	42	11

Table 7. Priorities for knowledge and information available to hemp producers in Oregon, ranked by percentage of responses by respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Access to production and marketing data; n=49	69	27	4
Hemp production guidelines; n=48	56	33	11
Hemp varietal information; n=50	60	34	6
Pest (insects, plant pathogens, animal pests, weeds) management information; n=48	63	29	8
Information on extractors/processors in Oregon; n=47	62	34	4
Information on phytochemistry components for growers; n=44	43	41	16
Easy-to-navigate current information on Oregon hemp production rules and regulations; n=47	62	30	8

Oregon infrastructure issue. Respondents identified a need for general scientific information on growing hemp and infrastructure for fiber production (Table 8). The majority of respondents thought that infrastructure for grain and CBD production was also important. The lowest-ranked topics included infrastructure for floral production, product classification criteria and finding extractors willing to process small amounts of hemp.

Table 8. Priorities for infrastructure to hemp producers in Oregon, ranked by percentage of responses by respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Production classification criteria (commodity grading); n=43	47	44	9
Finding extractors willing to process small amounts of hemp; n=40	45	37	18
Infrastructure for grain production in Oregon; n=44	50	25	25
Infrastructure for fiber production in Oregon; n=43	63	16	21
Infrastructure for floral production in Oregon; n=46	48	41	11
Infrastructure for CBD production in Oregon; n=45	51	36	13
General science on growing hemp that is supported by scientific data; n=47	75	19	6

Market and economic issues. Participants identified several key topics, including insurance and banking support, which is not currently available for hemp growers; market research for hemp paper, cordage and hempcrete; and research on factors that influence market stability (such as marketing rules, infrastructure, channels, options, supply and demand) (Table 9). Most respondents considered the potential for and level of economic return of different types of hemp crops to be important. Topics considered less important included developing a co-op for the sale of hemp products, research on

marketing for hemp residuals such as stem and leaf materials from smokable/CBD-type hemp and dynamic enterprise budgets to look at multiyear rotations.

Issues surrounding federal rules and regulation. The most important issues were current federal or state rules regulating THC levels and current protocols used by the Oregon Department of Agriculture to test THC levels (Table 10). Most participants also ranked as important research and federal approval of hemp for animal feed, creation

Table 9. Priorities for hemp marketing and economic aspects in Oregon, ranked by percentage of responses of respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Marketing research on factors that influence market stability (marketing rules, marketing infrastructure, marketing channels, marketing options, supply and demand); n=44	61	32	7
Insurance and banking support for hemp growers that are currently not established; n=45	62	22	16
Developing a co-op for sales of hemp products; n=42	45	33	22
Research on markets for potential hemp products such as paper, cordage and hempcrete; n=45	62	25	13
Research on marketing for hemp residuals such as stem and leaf materials from smokable/CBD-type hemp; n=45	47	40	13
Dynamic enterprise budgets to look at multiyear rotations; n=43	44	37	19
Potential for and level of economic return for different types of hemp crops; n=43	58	28	14

Table 10. Priorities for regulation in Oregon, ranked by percentage of responses by respondents (n)

Description of issues	Percentage of respondents		
	Very important	Somewhat important	Not important
Current federal or state rules and regulations for THC levels; allow THC levels to be increased; n=51	73	18	9
Sampling/testing protocols conducted by the Oregon Department of Agriculture; n=44	73	20	7
The 30-day harvesting window after the preharvest test needs to be extended further; n=41	41	37	22
Remediation of illegal cannabis production and wild plants; n=43	60	26	14
Establishment of flower zones; n=41	50	35	15
Creation of a pinning map for the protection of hemp fields from unwanted pollen; n=44	61	25	14
Barriers to advertising and brand promotion; n=41	49	44	7
Research and federal approval of hemp for animal feed; n=46	63	30	7

of a pinning map for protection of hemp fields from unwanted pollen dispersal and remediation of illegal cannabis production and/or wild plants. Significant but less important issues were the establishment of flower zones, barriers to advertising and brand promotion, and the 30-day harvesting window requirement after preharvest testing.

4. Conclusions

Oregon hemp growers and industry members are experiencing numerous and varied challenges associated with hemp agronomy and production, variety development, pest management, information availability, infrastructure, marketing and regulation. These growers and industry members identified as top issues the need for general science information on growing hemp that is supported by scientific data, increasing the THC levels allowed in hemp above the current threshold of 0.3% and sampling/testing protocols conducted by the Oregon Department of Agriculture. Specific needs that were deemed as most important included:

Agronomy and production

- Nutrient management for specific regions.
- Optimization of harvesting and cropping systems.
- Pollen management.

Variety development

- Varieties with stable genetics.
- Varieties adapted for fiber harvest.
- Varieties adapted for specific climatic conditions.

Pest management

- Safe-use patterns for fungicide, insecticide and herbicide application in and around hemp.
- Faster and more registrations of fungicide, insecticide and herbicide products.

Information availability

- Access to production and marketing data.
- Information on extractors/processors, hemp varieties and best pest management practices.
- Production rules and regulations presented in an understandable format.

Infrastructure, marketing and regulatory

- Scientific information on growing hemp.
- Infrastructures for grain and CBD production.
- Insurance and banking support.
- Market research for hemp paper, cordage and hempcrete.
- Research on factors that influence market stability.
- Federal or state rules and regulations for THC levels, including sampling and testing protocols used by the Oregon Department of Agriculture.

In conclusion, the workshop and follow-up survey identified top hemp industry needs for research and Extension. Through the participatory discussions and activities that

were conducted, a framework of needs has been developed. This framework will serve as a guide for research and outreach by Oregon State University and others affiliated with the Oregon hemp industry.

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Appendix A. Summary of findings from 2022 Oregon statewide hemp industry research needs workshop

Breakout Sessions 1 through 4

Session 1

Topic	item/issues for current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Agronomy	Pollen drift				x	x
	Flower density				x	
	Plant density				x	
	Planting densities (increase densities to improve plant structure for harvesting both flower and fiber production)		x			
	Optimum densities for different varieties		x			
	Can a fiber crop be direct seeded, dense enough under pivot without weeds		x		x	
	Plastic use on soil; can field preparation help bare bed fields perform similarly to plastic mulch beds		x			
	Harvesting and drying techniques				x	
	Mechanized harvest, best way to harvest without losing cannabinoids		x			
	Fertilizer needs should be done on one standard variety		x			
	Research related to harvest or yield needs to occur when growers are very busy and have other priorities		x			
	Seed production, seed, fiber and residue (allelopathic effects for soils)	x				
	At what point can you just let male plants go	x				
	Specifically, how much seed can you have in the crop without messing up oil production	x				
	Residue and allelopathic effects for soils within the wheat dryland system	x				
	Potential cover crop or rotation crop	x				
	Compatibility of farming equipment with current production; equipment crop management to promote drying to reduce wear on equipment	x				

Topic	item/issues for current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Hemp genetics	Lack of genetic stability				x	
	Development of appropriate varieties adapted for specific climatic zones (early-maturing)			x		
	Availability of lines with stable genetics			x		
	Variety shape, form and density optimized for fiber harvest		x			
	Efficient mechanized harvests via plant architecture (more upright growth with terminal flowers vs the “Christmas tree”)			x		
	Dual-purpose hybrids with good cannabinoid and stalk yields	x	x			
	Information on varieties is lacking — they list cannabidiol (CBD) (provide a range, was it derived in the greenhouse), size, maturity, disease resistance beet curly top virus (BCTV), standardization of traits and varieties		x			
Pests	Insect pests				x	
	Aphids (flowering season)		x			
	Thrips (flowering season)		x			
	Seed corn maggot	x				
	Corn earworm					x
	Early insect control for direct seeding	x				
	Lambsquarter		x			
	Pigweed		x			
	Tumbleweed		x			
	Kochia		x			
	Weed suppression with cover/row cropping		x			
	Using the hemp crop to help with weed control within cropping system (example with onions)	x				
	Early detection of viruses		x			
	Beet curly top virus	x				
	Need more research on viruses of cannabis					x

Topic	item/issues for current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Water	Water retention		x			
	Deeper drip tape (currently 4–6 inches) is challenging for unestablished plants and transplants		x			
	Water consumption, timing and needs by different varieties currently use moisture sensors to keep fields at 75–90% field capacity, when can irrigation be turned off prior to harvest?		x			
Regulatory: State and federal rules and regulations	Tetrahydrocannabinol (THC) level	x			x	x
	Legality of advertising and brand promotion				x	
	Remediation of the black market for wild plants				x	
	Establishing Jackson and Josephine County as a flower zones similar to non-genetically modified organism zones				x	
	What happens if federal authorities remove cannabis from schedule 1, and what is the right direction from regulators to growers, processors, retailer and consumers?				x	
	Getting hemp approved for animal feed (biomass and CBD)			x		
	Restrictions in saving back seed (goal is not to produce seed)	x				
Knowledge	Will OSU do research for both Oregon Liquor and Cannabis Commission and Oregon Department of Agriculture?				x	
	Information readily available to growers				x	
	Access to data				x	
	Statistics on production including type of hemp product					x

Topic	item/issues for current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Market and economic aspects	Market instability				x	
	Insurance				x	
	Marketing rules				x	
	Banking and business structure barriers				x	
	Missing cordage as an industry					x
	Developing a co-op for sales of hemp products					x
	Finding markets					x
	Explore production of hemp paper					x
	Investigate hempcrete production					x
Infrastructure needs	Production classification criteria				x	
	Commodity grading				x	
	Co-op establishment				x	
	Communication among growers					x

Session 2

Topic	item/issues for current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Agronomy	Feral male plants				x	
	Illegal hemp/cannabis grows				x	
	Pinning map strategy similar to specialty seed crops					x
Hemp genetics	Genetic stability				x	
	Development of appropriate varieties adapted for specific climatic zones (early-maturing) or market sectors	x		x		
	Varietal standardization and decreased heterogeneity within varieties	x	x			
	THC levels pre-harvest are OK, after drying and stripping levels are elevated					x
	Seed certification program	x				
	Develop drought-resistant hemp					x
Pests	Corn earworm				x	x
	Powdery mildew					x
	Gray mold bud rot					x
	Rodents and groundhogs/gophers (strip bark off bottom and kill plant)					x
	Safe-use patterns for pesticides in hemp and around hemp		x			
State and federal rules and regulations	Federal and state rules for THC level or legality			x	x	x
	Illegal market				x	
	Licensing and inspection fees penalize small growers			x		
	Legislation/regulation seems to be designed for small scale growers		x			
	Stricter OR standards for THC content compared with other states			x		
	Herbicides/pesticides registered for hemp and faster registrations (24C's and IR-4 program)	x	x			
	Allowing hemp for animal feed		x			
	Sampling/testing protocols issues		x			

Topic	item/issues for current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
State and federal rules and regulations	Having to complete harvest 30 days after pre-harvest test; would take pressure off if THC level cutoff was higher, or the time requirement was more than 30 days					X
Knowledge	Knowledge of current markets	X				X
	Finding extractors who are willing to process small amounts					X
	Some extractors/processors can get out more of the THC					X
	Educating public and marketing products like hempcrete					X
Market and economic aspects	Market instability				X	
	Banking support				X	
	Development of markets	X				
	Marketing hemp-based CBD products is almost impossible online, can't place drug-adjacent ads on big platforms					X
	Dynamic enterprise budgets to look at multi-year rotations	X				
	The potential depth and level of economic return for different types of hemp crops	X				
	THC remediation: a need for alternatives to just destroying the crop; defining a path for what to do with a crop that goes over the limit					X
Infrastructure needs	Infrastructure needed for grain production (e.g., storages, elevators, etc.), small seed company that has excess capacity (USDA Rural Development funding)	X				
	Lack of infrastructure for hempcrete and cordage production in Oregon					X
	General science of growing hemp, backed up with data, particularly for Western OR					X
	Need for some kind of redundancy in seed/plant production	X				

Session 3

item/issues that are roadblocks for expanding beyond current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Can residuals (stem and leaf materials) be marketed?				X	
Smokable herb blend				X	
Need information about how fiber would be processed for new products				X	X
As a battery charge				X	
Hempcrete				X	
Grain, depends on the market		X			
More research on other hemp component phytochemicals beyond CBD and CBG			X		
Research on interactions of hemp phytochemicals			X		
Hemp hearts and the Food and Drug Administration		X			
Land rental to expand is hampered by attitudes about cannabis, outreach for public awareness about hemp as a legal/valid crop could help with this; perhaps a template for rental agreements that would protect landowners renting to rogue hemp operation					X
Crop rotation with a view to integrated pest management approach					X
Chemical/biocontrol products that would be used for fiber hemp as opposed to CBD hemp					X
No corn earworm entry in PNW insect handbook, recommendations for hemp pests instead of referral to a table in handbook					X
Future of hemp as a medicinal product: understanding the biology of different chemistries and what that means for future products and marketing; outreach to educate on chemistries for growers; build interface between customers wanting certain chemistries and growers to understand demand; agronomy to influence production of different chemistries					X

Session 4

Topic	item/issues that are roadblocks for expanding beyond current production	Columbia Basin	Central Oregon	Eastern Oregon	Southwest Oregon	Willamette Valley
Information	Access to production and marketing data				x	
	Supply and demand data				x	
	Agronomy and pest management information				x	x
	Master Gardener Program has been unable to talk about hemp or offer any information					x
Regulatory	FDA needs to resolve the food/ medical use issues			x		
	Current roadblocks on pesticide use			x		
	Took a long time to figure out the pre-harvest and post-harvest testing requirements, also the requirements change every year; some resource for new growers could be very helpful; one of the long-term goals of hemp commission has been to produce an info center that would accomplish this					x
	Rules and regulation information that are easily accessible to public				x	
Germplasm	Finding a source of feminized hemp seeds is challenging; some growers sell only in big lots; connecting growers with the right source would be helpful; info center could be a clearing house for this type of information, along with other types of information					x