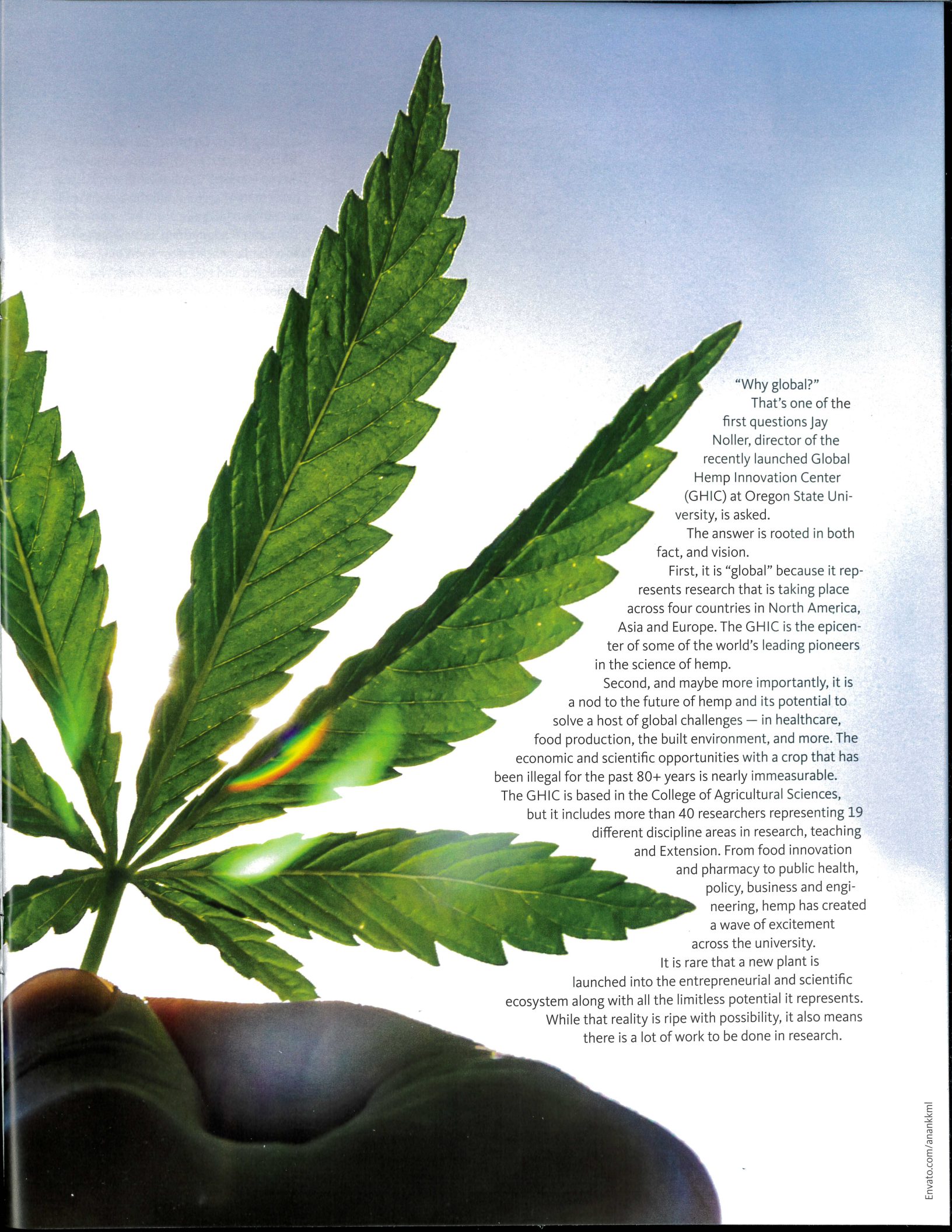
LAUNCHING A NEW FRONTIER:

THE GLOBAL HEMP INNOVATION CENT

By Heidi Happonen



"Why global?"

That's one of the first questions Jay Noller, director of the recently launched Global Hemp Innovation Center (GHIC) at Oregon State University, is asked.

The answer is rooted in both fact, and vision.

First, it is "global" because it represents research that is taking place across four countries in North America, Asia and Europe. The GHIC is the epicenter of some of the world's leading pioneers in the science of hemp.

Second, and maybe more importantly, it is a nod to the future of hemp and its potential to solve a host of global challenges — in healthcare, food production, the built environment, and more. The economic and scientific opportunities with a crop that has been illegal for the past 80+ years is nearly immeasurable.

The GHIC is based in the College of Agricultural Sciences, but it includes more than 40 researchers representing 19 different discipline areas in research, teaching and Extension. From food innovation and pharmacy to public health, policy, business and engineering, hemp has created a wave of excitement across the university.

It is rare that a new plant is launched into the entrepreneurial and scientific ecosystem along with all the limitless potential it represents. While that reality is ripe with possibility, it also means there is a lot of work to be done in research.

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Starting from Ground Zero

According to Noller, the great challenge of hemp is taking it out of what was largely a black market system into the scientific and commercial realm.

"As much as anything, our role is to lead a fundamental cultural shift in how we understand and talk about hemp," he said. "While legal, it's still not entirely comfortable for people who are unfamiliar with the plant and who may exclusively consider it in terms of its psychotropic properties, which are only a fraction of the application of hemp."

Another aspect of starting from the beginning in research includes the development of terminology and processes that we take for granted with other agricultural crops.

"We don't even have an agreed upon term for measuring hemp fiber," Noller added. "We may know what a bushel of wheat is, but there is no common word or standard measurement yet for hemp grain."

The exciting part of getting in on the ground floor with hemp for OSU and its partners is it provides the university an opportunity to bring together top-tier research, teaching and outreach that is integral to its land grant mission.

According to Alan Sams, Dean of the College of Agricultural Sciences, "The potential to be a part of defining the future of an entirely new agricultural commodity, in partnership with many disciplines and colleges across the university and partners around the world, is truly unique and exciting."

As the research begins, the 1,342 licensed growers from around the state are eager to see the university take this leadership role as well.

Justin Bordessa, from Hemp Ag Solutions, explained, "It's going to take years of research and development from a university to get the hemp industry on the same level of all the other industries."

Jay Noller inspects hemp plants in one of the Corvallis campus greenhouses.

Why Now

Oregon State's decision to launch the new hemp center follows Congress' adoption of the 2018 Farm Bill that removed hemp from the Controlled Substances Act and initiated the creation of a framework for hemp to become a fully legalized commodity in the future.

"Hemp has incredible potential across several industries and sectors, including in food and health products and as a fiber commodity," Sams said. "We believe that OSU is uniquely positioned to serve the global need for research-based understanding of hemp as a crop and for its use in new products."

According to the Brightfield Group, an analytics firm that tracks the cannabis industry, the hemp-derived cannabidiol market is expected to grow from $618 million in 2018 to $22 billion by 2022.

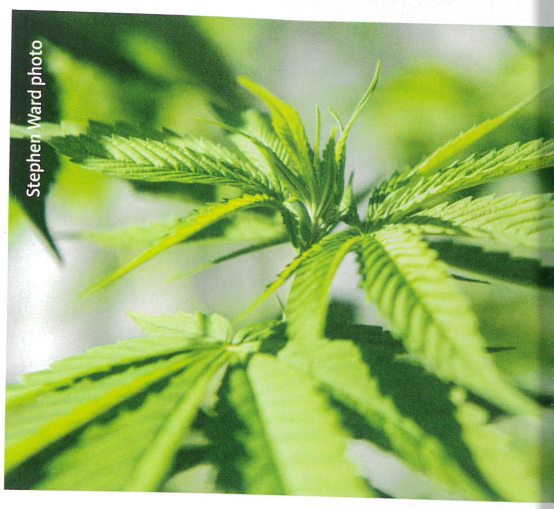
In addition to the research taking place, the GHIC is also serving as the state's only seed certification service for hemp, providing a valuable service to farmers. While it currently certifies seeds for as many as 48 agricultural commodities grown in Oregon, it is the only university in the nation to certify seed for hemp.

When asked what his immediate goals are for the research and outreach, Noller further explained that the center will initially be focused on how to efficiently and sustainably grow hemp for seeds, for hemp fiber materials that can be used in textiles and construction materials as well as hemp essential oils that have popular health and wellness uses, and hemp grain for use in foods and feed.

As a newly decriminilized crop, there remains much to learn still about the potential it offers. According to Noller, hemp is a unique agricultural commodity because the entire plant can be harvested and put to use.

"I like to imagine that one could sit in a house made of hemp, eating food made out of hemp, taking medicine made of extracts from hemp, wearing clothes made of hemp," Noller added with a smile.


Stephen Ward photo


Stephen Ward photo


Richard Roseberg photo

Four Years in the Making

While enthusiasm for new hemp research is creating buzz in Oregon, Noller and his team have been researching hemp across the globe for more than four years. He has specifically been targeting locations that share Oregon's 45th parallel — prime conditions for hemp production — in countries like Serbia and China that have fewer legal constraints on hemp cultivation and production.

Top left: Hemp planted at one of 10 research plots across the state at OSU's Agricultural Experiment Stations.

Top right: Hemp plants being grown and researched in campus greenhouses by Jay Noller.

Above: Field technician Jake Hoyman uses a plot seeder to plant hemp seed at OSU's Southern Oregon Research and Extension Center.

OSU's Global Hemp Innovation Center (GHIC) aims to lead the world in hemp research.

In Serbia, for example, Noller has been able to plant hundreds of acres of hemp. Within an acre, there are approximately 200,000 plants. With numbers like that, the margin of error in calculating the differences between different hemp trials is negligible.

"We have learned a lot already," Noller added. "Enough to make us keenly aware of the fact that we have much yet to learn."

Here in Oregon, the GHIC is conducting hemp trial research at 10 experiment stations across the state. The trials serve two key functions.

The first is to develop a foundation for future hemp research at these stations so that the plant breeders, agronomists and others already working there have the opportunity to gain familiarity with the plant. It's as much of a cultural learning curve as a scientific one, since hemp has until now been off-limits.

Second, with these trials underway, the university and its experiment stations will be better equipped to take their science to the farm — helping growers on their properties better understand challenges they face growing in different soils and climates much as is done with other types of crops.

"We can't just turn on a switch and have the infrastructure and experience to conduct hemp research like we do other plants," Noller said. "This first year is very much about culturally and structurally setting us up for success so that we can truly make a difference in this new field."

While the research is in its beginning stages, other areas of the college and university have also been looking into hemp. The Department of Food Science and Technology is working with hemp essential oils, the College of Engineering is starting to look at different delivery systems for those oils and the Food Innovation Center in Portland has already started working with food entrepreneurs on products that contain hemp seed.

I Just Have One Word for You

With all the potential and enthusiasm for hemp as a new crop with seemingly limitless potential for new products, I cannot help but be reminded of a famous scene in the 1967 classic The Graduate.

Benjamin Braddock, played by a young Dustin Hoffman, is trying desperately to escape the college graduation party his parents are hosting. Suffocated by the well-meaning but overbearing friends of his parents, pressured to answer the question looming over every graduate's mind — "What are you going to do with the rest of your life?" — he attempts to duck out when one of his parent's friends, Mr. McGuire, pulls him aside:

> ***Mr. McGuire:*** *"I just want to say one word to you. One word. Are you listening?"*
> ***Ben:*** *"Yes, Mr. McGuire."*
> ***Mr. McGuire:*** *"Plastics."*

Maybe hemp won't be as pervasive as plastics. Only time will tell. And certainly the pervasiveness of plastics came with some unforeseen consequences. However, the point is we stand at the dawn of a new crop that can produce materials that hold a great deal of promise across all facets of life. | **OAP**

Industrial hemp may only be grown in compliance with applicable state and federal law, including the 2014 and 2018 farm bills and the anticipated U.S. Department of Agriculture regulations. The following information is being provided for educational purposes only to inform licensed growers operating in compliance with applicable state and federal laws. Consult your local authorities, Department of Agriculture representatives, or personal attorney for questions regarding the legality of growing industrial hemp in your jurisdiction.

HEMP 101

MID-18th CENTURY

Industrial hemp is a major commodity crop in the U.S. until it is banned and considered illegal in the mid 1930s.

2014

The Farm Bill allows for the cultivation of industrial hemp within an authorized pilot program under strict guidelines.

2018

The Farm Bill decriminalizes the cultivation of industrial hemp and designates the U.S. Department of Agriculture's Agricultural Marketing Service to develop regulations regarding the propagation of hemp.

HEMP IS NOT MARIJUANA.

The plants may look the same, but marijuana contains more than 0.3 delta 9 tetrahydrocannabinol (THC), which is the component of the plant associated with causing euphoric, psychotropic highs when consumed.

CBD stands for **CANNABIDIOL** and is produced by the plant to ward off pathogens. It also nurtures seed production and is being researched for its potential biological and medical uses.

FIBER Hemp products include textiles, cordage and paper. With more consumer preference for natural, environmentally friendly products, the market for textiles that include fiber hemp is increasing significantly. It is also used in horticultural planting materials and shows promise as a bioenergy crop.

SEED OR GRAIN Hemp has been used as a food product since ancient times, providing for a number of essential nutrients and vitamins.

OIL There are three different oils from industrial hemp: cannabidiol (CBD) oil, essential oil and seed fixed (fatty) oil. CBD oil is legal in many states and is being included in a wide variety of products. A pharmaceutical-grade CBD extract was approved in 2018 by the FDA as a new medicine for the treatment of two rare forms of epilepsy in children.

HEMP BY THE NUMBERS

2 Main Current Uses: fiber and food

$22B Predicted value of the hemp-derived CBD market by 2022 (up from $618M in 2018)

8 Number of essential amino acids for humans in hemp seed or grain

30% Amount of edible (fixed) oil, protein, fiber and carbohydrates in hemp seed