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# JESSE KREMER

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STATE REPRESENTATIVE • 59<sup>TH</sup> ASSEMBLY DISTRICT

*Testimony before the Assembly Committee on Agriculture  
State Representative Jesse Kremer  
November 7, 2017*

Good morning,

Thank you Chairman Nerison and committee members for holding a public hearing on the "Farm Freedom Act". I appreciate the opportunity to testify on Assembly Bill 183 and its sub-amendment, legislation that will benefit the agriculture sector and create new high tech, and likely rural, manufacturing opportunities for Wisconsin.

Although our state is referred to as America's Dairyland, our agricultural diversity is an incredible economic driver. With roughly 68,700 farms and 413,500 jobs, Wisconsin's agricultural sector contributes a significant \$88 billion to our overall economy each year. Wisconsin is the leading producer of cranberries, ginseng, snap peas, and until the 1970s, industrial hemp.

## The Historical Context

Industrial hemp, although a close cousin of, and commonly lumped in with discussions on marijuana, is a distinctly different plant and genus – *cannabis sativa*. Industrial hemp is extremely low in THC to the extent that it has no psychotropic effects, but thousands of potential benefits. Industrial hemp is a dry crop that requires little water and can grow in harsher climates.

Industrial hemp is a commodity that has a rich history in Wisconsin. In the past, industrial hemp fiber was used for rope, parachute webbing, shoes and clothing; in fact, Wisconsin took the lead in supplying the War Department with industrial hemp during the early 20<sup>th</sup> century. In addition to growing and processing hemp for the military, Wisconsin manufacturers designed and manufactured industrial hemp farm machinery, an ingenious move that allowed Wisconsin production to remain heads and shoulders above the production of neighboring states.

Although industrial hemp was a large part of our agricultural sector, it was labeled a narcotic in 1970 when it became associated with a very different plant that bears a similar resemblance – marijuana.

## The Current Landscape

Recently, a Republican Congress recognized the differences between industrial hemp and marijuana. The 2014 Farm Bill, signed by President Obama, prevented the Drug Enforcement Administration (DEA) from seizing and destroying industrial hemp in states that allow pilot research and growing programs for this crop. *The definition of industrial hemp as recognized by the federal government and referenced in AB 183 is one that contains no more than 0.3% THC by dry weight; and I will re-iterate again, that it is non-psychoactive.* Thirty one states have now defined industrial hemp as distinct and removed barriers to its production: Alabama, California, Colorado,



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Connecticut, Delaware, Florida, Hawaii, **Illinois, Indiana, Kentucky**, Maine, Maryland, **Michigan, Minnesota**, Montana, Nebraska, Nevada, New Hampshire, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Washington, West Virginia and Virginia. It should be noted that our neighboring states, and Kentucky in particular, have been leading the charge in this effort.

Currently, United States manufacturers import over half a billion dollars of industrial hemp annually. Re-introducing this crop to Wisconsin has the potential to expand our agricultural sector, give farmers hit hard by the recent Grassland milk crisis additional hope and options, create new manufacturing and tech opportunities, and ultimately produce new jobs and tax revenue. Industrial hemp fibers are stronger than carbon fiber and have already been used in protective fire gear, plastic panels in vehicles, brake pads, building insulation, super capacitors to replace graphene in high end batteries and to replace Kevlar in bulletproof vests.

From the human consumption and health aspect, the non-psychoactive CBD seed oils contain more Omega 3 than fish oils and can alleviate many more maladies than simple THC. CBD oil from industrial hemp, or the seeds themselves, are popular in shampoos, cosmetics, nutritional supplements, foods and beverages. It's very likely that many Wisconsinites have already consumed or used a hemp product or product that contains hemp.

Just this past December, Wisconsin's own Farm Bureau, a strong supporter of this bill, passed a policy urging the re-emergence of this commodity. Their official position states, "We support the production, processing, commercialization and utilization of industrial hemp and that it be regulated by USDA rather than the Drug Enforcement Agency (DEA)."

In addition, this bill has been reviewed and positively received by other stakeholders including the Wisconsin Department of Justice (DOJ), Department of Agriculture, Trade, and Consumer Protections (DATCP), and the UW-College of Agriculture and Life Sciences (UW-CALS).

Assembly Bill 183 provides the opportunity for Wisconsin farmers and manufactures to grow and process a crop that we already import. We can continue to bring jobs to our state and become a leader in yet another industry nationwide. On behalf of the 41 co-authors, co-sponsors, and myself, I thank you for this opportunity and urge your support for the creation of an industrial hemp pilot program under the "Farm Freedom Act".

## Rettinger, Nik

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**From:** Konopacki, Larry  
**Sent:** Thursday, November 02, 2017 5:48 PM  
**To:** Spencer, Matt; Rettinger, Nik  
**Cc:** Queensland, Michael; Pfothenauer, Mary  
**Subject:** RE: LRB 17s0143 Topic: Industrial hemp

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Senator Testin,

You asked for a general overview of LRBs0143/1, which is a substitute amendment to 2017 Senate Bill 119, relating to growing and processing industrial hemp. The Substitute Amendment does all of the following:

### State Industrial Hemp Program

- Creates a state "industrial hemp" program to be administered by the Department of Agriculture, Trade, and Consumer Protection (DATCP).
- Generally defines "industrial hemp" as Cannabis sativa having a delta-9-tetrahydrocannabinol (THC) concentration of 0.3 % or less, although this allowable percentage could be raised to a maximum of 1% THC under future federal action. "Industrial hemp" does not include any substance that is not a listed controlled substance under state or federal law.
- Requires DATCP to set up the framework for the industrial hemp program, and to do so in a manner that maximizes opportunity but that does not authorize violation of federal law. This framework is to be designed to ensure the quality of industrial hemp, ensure the security of activities related to industrial hemp, and ensure the safety of products produced from industrial hemp (including any necessary testing) to verify adherence to laws and rules governing activities related to industrial hemp, and to enforce violations of those laws and rules.
- Requires DATCP to assess an initial fee to be paid by anyone who will grow industrial hemp, and allows DATCP to assess an annual fee to be paid by anyone regulated under this program, in an amount sufficient to cover DATCP's costs of program administration.
- Provides other details of the program, such as requirements that DATCP keep certain information confidential that might be used to create security issues, requirements related to seed certification, required information sharing between agencies, and opportunity for DATCP to serve as an importer of industrial hemp seed.
- *NOTE that the only industrial hemp-related activity that would currently be allowed under this bill without a separate federal approval would be under the Industrial Hemp Pilot Program described below, because more opportunity is not available under current federal law.*

### Industrial Hemp Pilot Program

- Requires DATCP to create a pilot program to study the growth, cultivation, and marketing of industrial hemp. Under this pilot program, DATCP would issue licenses to industrial hemp growers and would register others who possess industrial hemp in the product chain, all of whom would have to pass background checks to determine that they have not been convicted of a drug-related crime.
- Provides that GPS coordinates of all industrial hemp fields planted by licensees will be provided to DATCP
- Requires documentation of the tested THC levels of any industrial hemp and the chain of its custody from field to eventual product.

### Penalties

- Specifies penalties for violations of the statutes or rules governing the industrial hemp program (\$200 to \$5,000 forfeiture for a first offense and \$400 to \$10,000 for second or subsequent offenses within 5 years).

- Creates safe harbor protections from criminal and municipal prosecution for people who engage in good faith in activities regulated under the state industrial hemp program.
- Allows criminal or municipal prosecution of violations if DATCP determines that such prosecution is appropriate and makes a prosecution referral.
- For purposes of the state Uniform Controlled Substances Act, modifies the definition of THC to clarify that parts of Cannabis plants that are specifically excluded from the definition of "marijuana" under current law are legal to possess.
- Creates a penalty enhancer for a person who attempts to conceal the commission of a drug-related crime while representing that he or she is engaging in regulated activities under the industrial hemp program (imprisonment of up to an extra 6 months for a misdemeanor and up to an additional 3 years for a felony).
- Requires the immediate seizure and destruction of an industrial hemp crop that exceeds the permissible THC concentration by more than 0.7%.

#### Rules

- Provides DATCP 90 days to promulgate emergency rules to implement the requirements of this bill.

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# PATRICK TESTIN

## STATE SENATOR

DATE: November 8, 2017  
RE: **Testimony on 2017 Assembly Bill 183**  
TO: The Assembly Committee on Agriculture  
FROM: Senator Patrick Testin

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Mr. Chairman and Committee Members, thank you for allowing me to testify on behalf of Assembly Bill 183, which would allow the growth, cultivation, and marketing of industrial hemp here in Wisconsin. If Wisconsin is given the ability to grow hemp, we can lessen our dependency on imports of yet another commodity.

Prior to its ban several decades ago, Wisconsin was a leading producer of hemp across the country, with nearly three-quarters of American hemp being grown in our state. Hemp grows well in Wisconsin, as it is a sturdy plant that can withstand Wisconsin's environment, and does not consume large quantities of water. Unfortunately, for nearly 60 years, farmers here have been prohibited from growing this safe, useful, and non-psychoactive crop because of its relation to marijuana.

Interestingly, you will still find hemp in many day-to-day products. When cultivating hemp, the crop's high fiber stalks can be used to make clothing, building materials, and fuel. Additionally, the seeds can be used to make food, produce Omega 3 oil, strengthen plastics, and create flame retardant protection for firefighters.

Although it is a close cousin of marijuana, industrial hemp, or *Cannabis sativa L.*, is a distinctly different genus from marijuana. However, due to its relation to marijuana, it has been mislabeled as a narcotic. Simply put, hemp is not marijuana and hemp does not offer the hallucinogenic high that is found in marijuana. In fact, our legislation states that should hemp contain even 1% of THC, the psychoactive drug found in marijuana, it must be destroyed by the proper authorities.

By allowing hemp to be safely grown on the farm down the road instead of the farm in a different state or country, Wisconsin businesses can capitalize on the reintroduction of hemp by offering new products to consumers across the country. While Wisconsin farmers sit on the sidelines, many states have begun to allow farmers to diversify their crop production with industrial hemp.

Due to the 2014 Farm Bill signed by President Obama, states have been given the ability to explore the use of industrial hemp. The Farm Bill included language that allows

universities and state departments of agriculture to begin cultivating industrial hemp for limited purposes. 31 states have begun removing barriers from hemp production, including our neighboring states of Illinois, Indiana, Michigan, and Minnesota.

After working with various stakeholders, legislators in both houses, and Legislative Council, Representative Kremer and I have introduced Substitute Amendment 1. This amendment addresses many issues that were brought up in the Senate Hearing.

The Substitute Amendment provides language for DATCP to create a hemp program that adheres to federal law. Moving forward, Wisconsinites who have not been convicted of a crime related to a controlled substance can plant, grow, cultivate, harvest, process, import, export, or sell industrial hemp to the maximum extent allowed under federal law. Additionally, to protect this crop from any mislabeling, the Substitute Amendment includes language that punishes those who intentionally try to hide illegal activity by using industrial hemp in any way.

Thank you for hearing AB 183 today. We ask that you support the growth, cultivation, and marketing of hemp moving forward. Wisconsin has led the nation in hemp production in the past and it is time for us to lead again.

# HEMP REINTRODUCTION INTO WISCONSIN AGRICULTURE AND INDUSTRY

by Prof. Emer. Paul G. Mahlberg

## A. TOPICS.

1. Distinguishing between industrial hemp and marijuana.
2. Hemp varieties.
3. Administration of hemp program.
4. Plant growth pattern.
5. Pollination of hemp and marijuana.
6. Cannabis secretory glands.
7. Glandular THC and plant sampling for THC analyses.
8. Industrial applications of hemp.
9. Cannabis publications of Paul G. Mahlberg.

## B. ABOUT THE AUTHOR.

Prof. Emer. Paul G. Mahlberg (B.S./M.S., U.W., Madison; Ph. D., Berkeley, 1958).  
Department of Biology, Indiana University, Bloomington, IN.

### MY BACKGROUND ON CANNABIS.

Studied Cannabis for over 30 years (retired from my laboratory in 2003).  
Had a DEA Schedule I research license to possess and grow Cannabis,  
Collected over 100 Cannabis varieties worldwide for this research.  
Grew and studied all varieties in greenhouses on the university campus.  
Identified and localized cannabinoids to be present/produced in glands.  
Published 39 research articles on Cannabis.

Served as consultant on Cannabis to the School of Pharmacy, Univ. Miss.  
Served as consultant to United Nations, Narcotics Division, Vienna.  
Visited with Prof. Ivan Bocsa, hemp breeder, at his laboratory in Hungary.  
Member of Board of Director, North American Industrial Hemp Council.  
Member of Hemp Industries Association.

## C. TOPICS CONTENT.

### 1. Distinguishing between industrial hemp and marijuana.

Industrial hemp and marijuana belong to the same genus, Cannabis. Both plants possess the genes to synthesize the drug, tetrahydrocannabinol, or THC, but in different

concentrations. These plants also synthesize other related cannabinoids, such as CBD (cannabidiol), that are not considered drugs.

Industrial hemp is accepted as a fiber-producing agricultural non-drug crop and is grown in over 30 countries throughout the world, including England and neighboring Canada. However, in the United States the Drug Enforcement Administration lists it in Schedule I as a drug plant and prohibits its cultivation. Industrial hemp has a very low THC content of 0.3% THC by weight, or less. It is generally recognized that this very low concentration of THC does not have a drug effect. Marijuana possesses a THC content of 5 to 20% THC (and reportedly as high as 28% THC) and elicits a drug effect.

## **2. Hemp varieties.**

Industrial hemp varieties have been bred and selected for over a hundred years. Russia has numerous varieties with desirable fiber features and grows them under the diverse agricultural conditions of that nation. Likewise, European countries have developed many varieties for growth under their differing ecological conditions between the Mediterranean and Baltic Seas. In Canada, where hemp became legal in 1998, growers initially used European varieties, but now have selected new varieties found to grow well under its different agricultural conditions. At present the Canadian government approves use of over 35 hemp varieties with a content of 0.3% THC or less by weight (**Fig. 1**).

Hemp varieties for cultivation in Wisconsin can be selected initially from those grown in Canada. Additional varieties can be developed in a breeding program to select those for production of enhanced fiber quantity, fiber quality, seed oil and protein production or other traits.

## **3. Administration of hemp program.**

The legislature has outlined a program for hemp cultivation indicating it will establish a rule-making program, perhaps with the Wisconsin Department of Agriculture and Tourism. Various aspects of the final program, perhaps, may be similar to those of other states now cultivating hemp or those formulated in Canada.

Canada has experienced no illicit marijuana planting, or co-mingling, on farms of hemp. Yet, to avoid any possibility of such an occurrence Canada, like European countries, takes precautionary surveillance steps. Farmers must grow certified hemp seed. A farmer must register the precise location of the farm area to be planted in hemp (hemp area of a farm will change yearly because of crop rotation), and the plot will be identified also by GPS. Thus, each farmed area can be surveyed by air or by ground, as desired by law enforcement. No fencing of any kind is necessary for hemp fields. Regulations in states in which hemp can now be grown, in accordance to the 2014 Farm Bill, also can serve as a model for developing a protocol for growing hemp in Wisconsin.



#### **4. Plant growth pattern.**

The hemp plant grows as a single stem 6 to 10 feet tall, and taller, with few or no branches before flower development so as to produce stems with long, straight fibers (Fig 2). There are approximately 200 plants per square yard; this density results in the lower leaves being shaded out and production of taller plants. Quality hemp results from rapid growth and minimal branch formation because branches result in irregularly shaped fibers of poor quality.

Marijuana is grown as shorter and robust plants, more Christmas tree-like in character, that produce numerous branches. Each of these branches will develop the desired numerous flower clusters that contain abundant glands in which THC is accumulated. Such plants require adequate ground space, 4-6 square feet, and sunlight necessary to develop flowers with abundant glands and enhanced THC content.

Each hemp variety has been genetically selected for uniformity of plant features including growth habit. Thus, plants in a hemp field appear very uniform in character and height when observed from the ground or from the air. This closeness produces quality hemp, and at the same time shades out any weeds in the field. All plants essentially come into flower at the same time.

If marijuana plants are grown in a field of hemp, they are readily recognizable from the ground and air because these plants are spaced widely apart for required sun to produce abundant flowers and glands. In a young field of hemp, the marijuana plants will appear clumpy from the air. Then, as the densely grown hemp plants increase in height and leaf canopy, the hemp will shade out the marijuana. Thus, marijuana plants in hemp fields of all ages in development can be recognized with surveillance on the ground and from the air. Law enforcement officials in Canada and Europe have no difficulty distinguishing between hemp and marijuana.

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#### **5. Pollination of hemp and marijuana.**

Hemp and marijuana are short-day plants and begin to flower in response to the duration of daylight, or photoperiod, during the growing season. Both plants produce male flowers (with pollen) and female flowers (with eggs--potential seeds). Flowering is induced when the day length begins to shorten late in June. Flowers are produced on specific branches, and new flowers continue to form on these branches for some period of time. Additional such branches with new flowers will form during the flowering period.

The adult parent plants of hemp (0.3% THC) and marijuana (15% THC) retain these same THC concentrations throughout their lifetime; these represent the genic traits for the variety. Cannabis is wind-pollinated. Therefore, the pollen can travel many miles.

Four typical natural crosses between hemp and marijuana varieties can occur in the field. These crosses will transfer the genes for THC production between the two

varieties of plants. The crossing process does not change the THC level in the parent plants. In these crosses only the **genes** for THC concentration are transferred to the embryo and subsequent seed; the mechanism to produce the THC chemical is 'turned on' when the seedling grows into a plant.

1. Pollen from hemp will pollinate female flowers (eggs>seeds) of hemp on farms.  
Cross:       hemp       **X**       hemp       (seeds from cross)
2. Pollen from marijuana in the field can pollinate hemp female flowers (eggs>seeds).  
Cross:       marijuana   **X**       hemp       (seeds from cross)
3. Pollen from hemp will pollinate female flowers (eggs>seeds) of marijuana in the field.  
Cross:       hemp       **X**       marijuana   (seeds from cross)
4. Pollen from marijuana will pollinate female flowers of marijuana in the field.  
Cross:       marijuana   **X**       marijuana   (seeds from cross)

Four broad groups of seeds result from these crosses:

1. The hemp **X** hemp cross. These are the seeds formed during cultivation of hemp. All these seeds possess the THC genes characterizing hemp.
2. The marijuana **X** hemp cross. Some such seeds could be produced in the vast fields of hemp. It would be almost impossible to identify such seeds. It would be necessary to grow every seed from a hemp field into an adult plant and analyze every such plant for the concentration of THC to identify this cross; not probable.
3. The hemp **X** marijuana cross. The vast dissemination of hemp pollen will pollinate marijuana out in the field. The genes for hemp-level THC will be transferred to embryo-seeds of this marijuana. Plants grown from these seeds during the next growing season will contain a lower THC content (0.3% THC **X** 15% THC) than in the parent marijuana plant. This is a desirable trait for controlling marijuana.
4. The marijuana **X** marijuana cross. Marijuana plants in the field will cross and the embryo-seed will contain the genes for marijuana level THC. Plants from these seeds in the next growing season will contain 15% THC.

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A marijuana grower could collect seed groups 3 and 4, but because so many of them could have been pollinated by hemp, all seeds are suspect. Some to many will contain the genes for low (0.3%) THC.

Conclusions from the above crosses include:

1. A marijuana grower would find it impossible to locate seeds of No. 2 in hemp fields. Farmers will harvest all hemp seeds (No. 1 and 2) for marketing. Since seeds contain only the gene to produce THC, not the THC chemical, all seeds can be marketed.
2. All the marijuana in the field will be included in No. 3 and 4. However, all the seeds collected by a marijuana grower from plants of No. 3 and 4 will be of unknown THC gene character. All these seeds look alike. The marijuana grower will have the impossible task of growing every seed to a plant so as to then analyze each one for its

THC concentration. The marijuana grower will be thwarted in any effort to cultivate marijuana in the field for high THC content when hemp is being grown as a farm crop.

Summary. The above discussion represents the results and impact of only one year's cultivation of hemp by Wisconsin farmers. It emphasizes the role that cultivation of hemp can contribute to the control of illegal marijuana. As described here, all new seeds of marijuana in the field become suspect because marijuana could/will be crossed with hemp, and a percentage of new plants resulting from such crosses could/will contain less THC than the parent marijuana.

We can project, therefore, that routine yearly planting of industrial hemp as an agricultural crop in Wisconsin will impact illicit marijuana throughout the countryside by progressively lowering its THC content and marginalize growing marijuana in Wisconsin as a drug plant.

## **6. Cannabis secretory glands.**

Numerous glands containing a large secretory cavity occur on the plant surfaces, including stem, leaves, bracts (small modified leaves) and floral parts of both hemp and marijuana (**Fig. 3**). Glands are just visible to the eye. They are most abundant, in fact very abundant, on the bracts associated with flowers. A group of cells at the base of the cavity synthesize the THC (and other cannabinoids) and also produce an abundance of sticky terpene compounds. These cells secrete the THC and terpenes into the large cavity where they accumulate--the cavity is densely filled with these substances along with other materials. The THC is dissolved in the sticky terpenes. Thus, the secretory glands are the sites of THC synthesis; similarly for other cannabinoids and for terpenes, they are formed in the secretory cells of the glands and accumulated in the cavity.

Other cells and parts of the plant do not contain THC. Thus, fiber cells, wood cells, seed coat, seed endosperm and embryo lack THC. However, the nucleus of all cells contains the genes for THC synthesis. In the seed those genes are 'turned on' only after the seed germinates, forms the seedling that develops into the growing plant (the embryo, for example, does not contain THC such as in the adult plant). The concentration of THC, say, 0.3% THC in hemp and 15% THC in marijuana, also is controlled genetically, and more study on this control mechanism is in progress. Thus, secretory glands are the sites of THC synthesis.

## **7. Glandular THC and plant sampling for THC analyses.**

Presence of THC in the terpenes of glands necessitates care when collecting plant tissue for THC analyses so as to avoid falsely detecting THC in samples. When a person collects (touches) any plant portion, glands with their THC in the resinous terpene content will be rubbed off onto fingers (gloves), instruments and collecting bags, and analyses of them will detect THC.

When plant parts, such as branches with mature seeds, are shaken to obtain seeds many glands will break off and mix with the seeds and coat the seed surface with THC in the sticky gland contents. Similarly, readily abscising glands with their THC content will contaminate other plant parts such as pollen, and falsely indicate the presence of THC in pollen grains. Thus, the analyses of gland-contaminated samples, or samples contaminated from THC on a collector's hands or equipment, will yield erroneous data for presence and concentration of THC in samples. Appropriate care must be exercised to avoid contamination of samples with glands that fall onto sample tissues; this may require microscopic examination of samples to determine if they are contaminated with glands or their resinous contents.

## **8. Industrial applications of hemp; hemp products are biodegradable.**

Older Wisconsin farmers are familiar with hemp cultivation prior to its prohibition in the post-World War II era, and with various products then manufactured from hemp. Hemp product development has been prolific in other countries, and we can utilize that information to initiate a hemp-based development program in Wisconsin. Fibers remain the major raw material source for cellulose, hurd or the wood is the raw material used to produce animal bedding products and insulation, and seeds are a source of oil, protein and flour for various uses.

In the auto industry (Europe at present, in particular) hemp fiber is used to manufacture lightweight compression molded parts such as dashboards, door and roof liners and similar items to replace those made from heavier fiberglass (**Fig. 4**). One USA company, Flexform Industries, Elkhart, IN is making the base fiber mats for similar parts for Ford, GM and campers in limited quantities, as well as shells for office equipment (**Fig. 5**). It also uses other fibers, such as sisal, flax, and kenaf, but considers hemp to be superior because of the strong and extra long fibers.

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Mercedes has a program dedicated to developing a bioplastic to replace the metal shell of their cars for use under production-line circumstances. Already new bioplastics of hemp or hemp-flax are used to form the shell of specialty cars. An all-hemp car--its shell and many parts--is manufactured and marketed in Canada (**Fig. 6**). The concept of an all-fiber (hemp and sisal) car shell was already demonstrated by Henry Ford in about 1938-1940 (**Fig. 7**).

Perhaps these are prototypes of future cars. In Europe hemp may become the plant of necessity because European companies are urged to manufacture eco-friendly biodegradable or recyclable products. Landfill space is at a premium in Europe. Other foreign auto manufacturers, such as Toyota and Subaru, among others, also have research programs directed to using bioplastics in their products. Compression molded parts using natural fibers and petro-based plasticizers may be recycled or incinerated, while parts made with fiberglass cannot.

We can visualize other new applications for hemp-based bioplastics, such as appliances, which is an important industry in Wisconsin. The kitchen appliance industry may well be able to design and manufacture bio-friendly major as well as small appliances that biodegrade upon disuse.

Hemp can have broad application to produce products for the construction industry in the building materials trade, such as particleboard (where I and two associates demonstrated the production of high quality particleboard from hemp).

Hemp seed oil is a major commodity on the world market. Millions of dollars of hemp oil are imported annually into USA for use in soaps and cosmetics, building materials, food materials, and other applications.

Bioplastics made from cellulosic hemp fibers, or similar cellulose sources, are now recognized as an environmental friendly substrate for producing many products. Coca Cola has developed a bioplastic Plant Bottle that will replace current bottles within a few years, and will be produced in South America. Why not here in the USA?

#### **9. Cannabis publications of Paul G. Mahlberg.**

(Next page)

## CANNABACEAE PUBLICATIONS OF PROF. PAUL G. MAHLBERG

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From over 125 journal articles, and books, films and edited books.

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Figure 1. List of approved hemp varieties for cultivation in Canada.

## List of Approved Cultivars for the 2012 Growing Season

### *Industrial Hemp Regulations* *Cannabis sativa L.*

Help on accessing alternative formats, such as Portable Document Format (PDF), Microsoft Word and PowerPoint (PPT) files, can be obtained in the [alternate format help section](#).

 (PDF Version - 94 K)

Pursuant to Subsection 39(1) of the *Industrial Hemp Regulations*, the following industrial hemp varieties are approved for commercial cultivation under licence for the year 2012. The list may contain variety names that are synonyms for the same variety.

### List of Approved Cultivars

Variety	Country where Maintained	Exempt from THC testing under subsection 16(1) of the <i>Industrial Hemp Regulations</i> *
<i>Alyssa</i>	Canada	Exempt in Manitoba only
<i>Anka</i>	Canada	Exempt in Ontario and Quebec only
<i>Canda</i>	Canada	No
<i>CanMa</i>	Canada	No
<i>Carmagnola</i>	Italy	No
<i>Carmen</i>	Canada	No
<i>CFX-1</i>	Canada	No
<i>CFX-2</i>	Canada	No
<i>Crag</i>	Canada	Yes
<i>CRS-1</i>	Canada	No
<i>C S</i>	Italy	No
<i>Delores</i>	Canada	No
<i>Deni</i>	Canada	No
<i>ESTA-1</i>	Canada	No
<i>Fasamo</i>	Germany	No

\* Samples will be taken by inspectors designated under the CDSA for routine variety monitoring.

\*\* Denotes variety under observation.

Variety	Country where Maintained	Exempt from THC testing under subsection 16(1) of the <i>Industrial Hemp Regulations</i> *
<i>Fedrina 74</i>	France	No
<i>Felina 34</i>	France	No
<i>Ferimon</i>	France	No
<i>Fibranova</i>	Italy	No
20 <i>Fibriko</i>	Hungary	No
<i>Fibrimon 24</i>	France	No
<i>Fibrimon 56</i>	France	No
<b><i>Finola</i></b> <del>51</del>	Canada (Finland)	No
<i>Joey</i>	Canada	No
<i>Jutta</i>	Canada	No
<i>Kompolti</i>	Hungary	No
<i>Kompolti Hibrid TC</i>	Hungary	No
<i>Kompolti Sargaszaru</i>	Hungary	No
<i>Lovrin 110</i>	Romania	No
30 <i>Petera</i>	Canada	No
<i>Silesia</i>	Canada	No
<i>UC-RGM</i>	Canada	No
<i>Uniko B</i>	Hungary	No
<i>USO 14</i>	Canada (Ukraine)	Yes
<i>USO 31</i>	Canada (Ukraine)	Yes
<i>X59(Hemp Nut)</i>	Canada	No
<i>Yvonne</i>	Canada	No
<i>Zolotonosha 11</i>	Canada (Ukraine)	Exempt in MB only
31 <i>Zolotonosha 15</i>	Canada (Ukraine)	No

Samples will be taken by inspectors designated under the CDSA for routine variety monitoring.

Denotes variety under observation.

**All cultivars may be grown in all regions, however requirements for THC testing under Subsection 16(1) of the IHR may vary from province to province, as indicated in the table above.**

#### Amendments to the List of Approved Cultivars for 2012

**Additions:** One variety, *Silesia* was added to the list this year.

**Deletions:** No varieties were removed from the list this year.

**Observation:** The variety *Finola*, remains under observation. Sampling and monitoring of production, as well as, a thorough verification of eligible parent seed planted will continue in

2012.

*Please Note*

Subsection 14(3) of the *Industrial Hemp Regulations* (IHR) requires that all seed planted for the production of industrial hemp in Canada must be of pedigreed status (Certified or better). This means that seed cannot be imported directly from countries that are not recognized by one of the Seed Certification Schemes of which Canada is a member. Canada is a member of two schemes, the Organization for Economic Cooperation and Development Seed Scheme (OECD) and that administered by the Association of Official Seed Certifying Agencies (AOSCA). Farmer-saved seed cannot be planted, unless it is Certified seed. Official seed tags will be requested by an inspector as evidence of compliance.

Under Subsection 16(1) of the IHR, a person who holds a licence to cultivate industrial hemp is required by law to have their crop sampled by an authorized Crop Sampler, unless the variety is specifically exempted from this testing. Sampling by a designated inspector does not exempt a licence holder from this testing. The sample taken by the authorized Crop Sampler must be tested by a competent laboratory, licensed for testing industrial hemp. A list of licensed laboratories is available on our website. Test results must be reported to the Office of Controlled Substances, at the address below. Varieties which are found to consistently exceed 0.3% THC may be removed from the *List of Approved Cultivars*.

Three varieties, USO 14, USO 31 and Crag are exempted from annual testing as required under paragraph 16(1) of the IHR for **all regions of Canada**. The varieties Alyssa, Anka, and Zolotonosha 11 are only exempt in the provinces indicated in the table above. All varieties have been evaluated against the *Policy on the Exemption of Industrial Hemp Varieties from THC Testing During the Growing Season*. A copy of this policy can be found on our [website](http://www.healthcanada.gc.ca/hemp) at [www.healthcanada.gc.ca/hemp](http://www.healthcanada.gc.ca/hemp).

The Office of Controlled Substances must be informed immediately in writing in the event of crop failure where samples cannot be drawn for testing.

Questions regarding the List of Approved Cultivars - 2012 may be submitted to:

Industrial Hemp Section  
Office of Controlled Substances  
Controlled Substances and Tobacco Directorate  
Healthy Environments and Consumer Safety Branch  
123 Slater Street A.L. 3502A  
Ottawa, ON K1A 1B9  
Phone: (613) 954-6524  
Fax: (613) 941-5360  
Email: [hemp@hc-sc.gc.ca](mailto:hemp@hc-sc.gc.ca)

Original signed by Johanne Beaulieu  
Director  
Office of Controlled Substances

2012-03-27  
Date

**Results of THC Testing for 2011: All Varieties**

Variety Name	Number of Samples	THC range (%)	Average	Number of samples over 0.3%
<i>Alyssa</i>	6	0.03-0.22	0.10	-
<i>Anka</i>	14	0.09-0.26	0.16	-
<i>Canda</i>	2	0.05-0.06	0.06	-
<i>CanMa</i>	6	0.06-0.15	0.09	1
<i>Crag</i>	1	0.08	0.08	-
<i>CFX-1</i>	59	0.02-0.45	0.11	2
<i>CFX-2</i>	14	0.03-0.19	0.09	-
<i>CRS-1</i>	66	0.03-0.26	0.09	-
<i>Delores</i>	16	0.02-0.12	0.06	-
10 <i>Finola</i>	53	0.06-0.47	0.17	5
<i>Jutta</i>	2	0.02-0.11	0.07	-
<i>USO 14</i>	3	0.02-0.07	0.04	-
<i>USO 31</i>	2	0.01	0.01	-
14 <i>X-59 (Hemp Nut)</i>	9	0.03-0.14	0.08	-

**Results as of January 28, 2012** as reported to the Office of Controlled Substances by both Health Canada and private laboratories.

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Date Modified: 2012-10-15

Figure 2. Hemp stem showing the long fibers of the bark and the woody core.

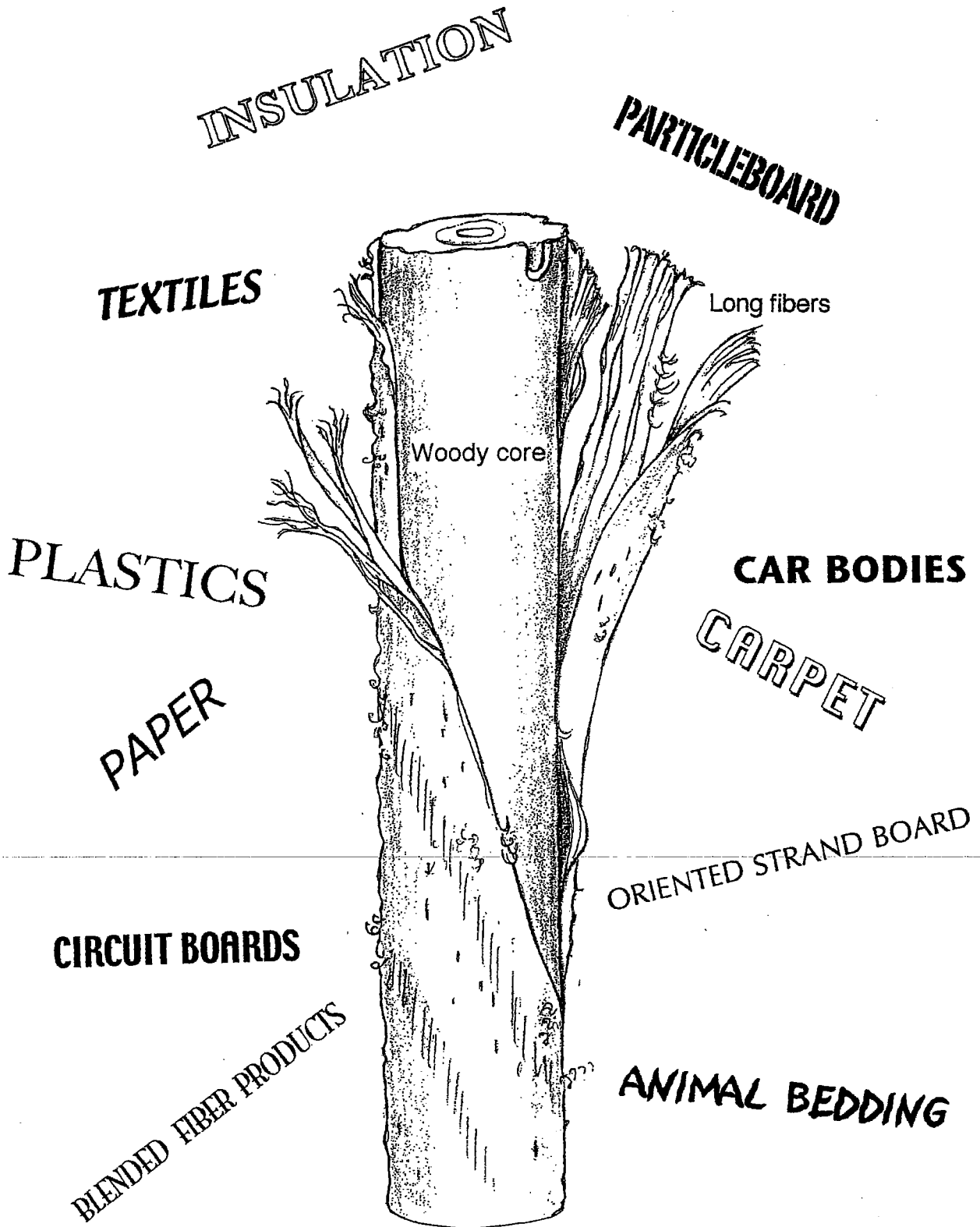


Figure 3. Glands and gland features of Cannabis (sub-figures 1 to 4).

FIGURES 1-4. Secretory glands. 1. Capitately-stalked and capitately-sessile glands on underside of bract. Hairs also are present on bract  $\times 35$ . 2. Capitately-stalked gland showing large head (star) and abscission zone at base of gland head (curved arrow)  $\times 300$ . 3. Section of gland head showing relationships of secretory cavity (S), disc cells (D), cuticle (E) and subcuticular wall (arrow). Vesicles (V) occur in secretory cavity and secretions occur in disc cell just below the wall (W, and at X). Bar =  $0.5 \mu\text{m}$ . 4. Portion of gland showing two disc cells, one at D, each with numerous lipoplasts (P) containing secretions (black). Portion of secretory cavity (S) is evident. Fibrillar matrix (arrow) has separated from wall. Bar =  $0.5 \mu\text{m}$ .

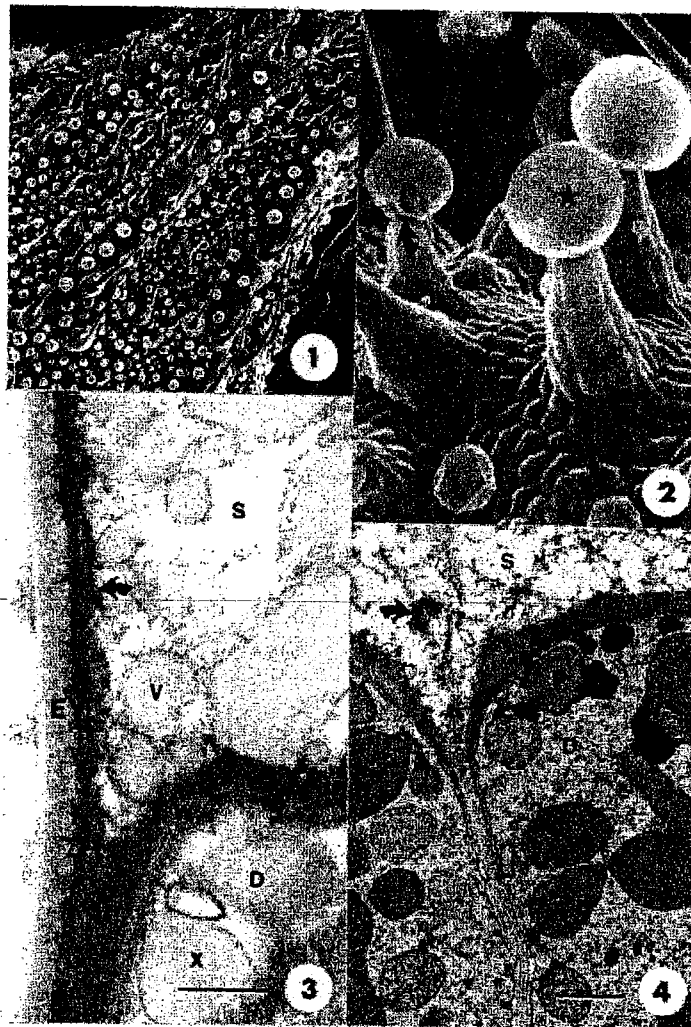
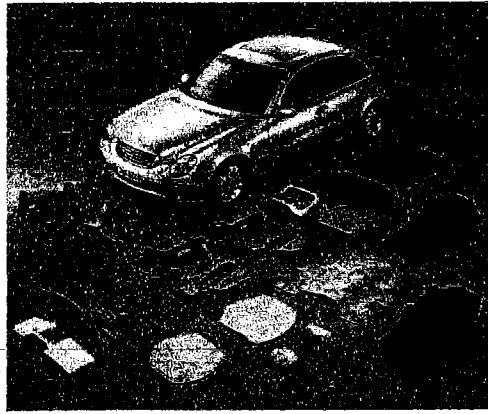


Figure 4. Automobile components made from hemp by European manufacturers.

# Eco-friendly cars need sustainable materials

Use European Hemp Fibres for bio-composites in light weight construction



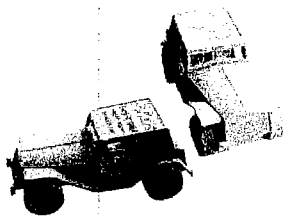
50 Natural fibre parts for Mercedes E-Class (Germany).  
Picture: Daimler AG



Sports car Lotus Eco Elise, in the main made from different natural fibre compounds, hand lay-up, vacuum bagging and RTM (UK). Pictures: Lotus Cars



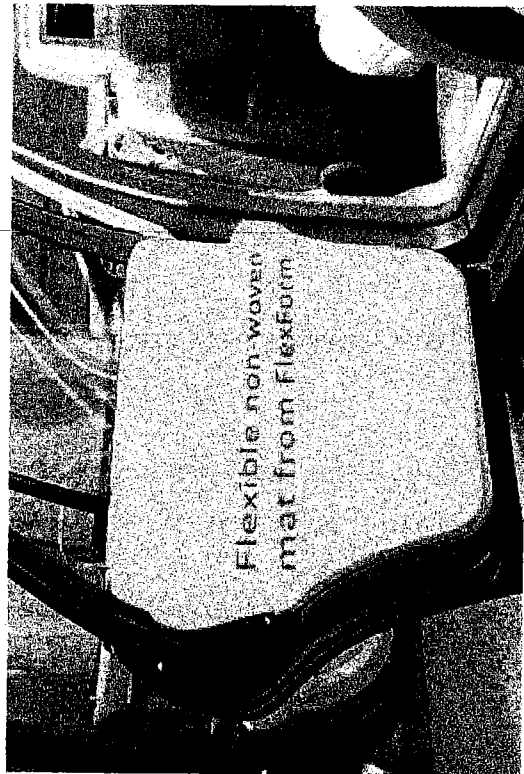
Natural fibre door panel for BMW 5 Series, compression moulded part (Germany). Pictures: BMW, nova-Institut



Toy cars, natural fibre and Polypropylen, injection moulding (The Netherlands).  
Picture: GreenGran







**FlexForm is the lightweight champion of the world.**

We have taken on the challenge of the world's auto manufacturers and engineered door, console, ceiling and other panels that are 1) lighter – increasing fuel efficiency and reducing shipping and handling and 2) recyclable – factory trim is recovered and sustainable parts can be recycled at end of use. Our one step 3-D molding platform is a perfect fit for Tier 1 suppliers.



and the light one is powered by FlexForm.

Figure 5. Fiber-based (including hemp) products manufactured by FlexForm for cars.

Figure 6. Car manufactured from hemp and other fibers by Motive Inc. in Canada.

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## An Electric Car Made from Hemp

Categories:

- [Energy](#)
- [Green Living](#)
- [Technology](#)

By [Michele Berger](#)  
02/23/2011



This car's made from hemp and other fibers. (Photo: Motive Inc.)

Soon, you'll be able to drive hemp. Literally. And guess what the car'll be called? Kestrel, after the raptor with the same moniker.

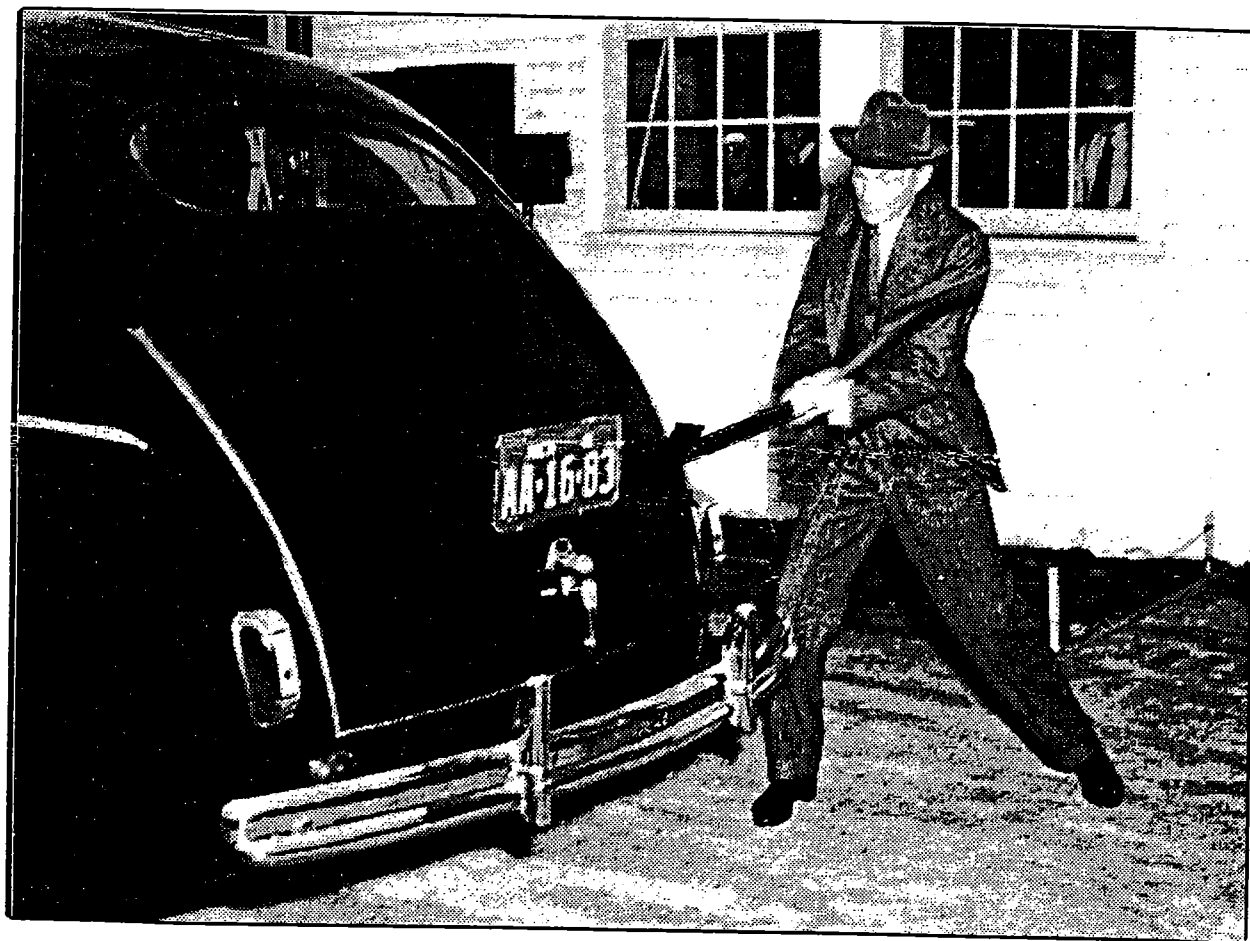
Right now, Canadian company [Motive Industries, Inc.](#), is testing the materials for a biocomposite hybrid electric car made from hemp and other natural and synthetic fibers. If all goes according to plan, Motive will finish its prototype mid-2011, and make the car available to the public in late-2012 or -2013, according to Nathan Armstrong, Motive's president.

The four-passenger, three-door electric vehicle—created, Armstrong says, to showcase new automotive technology coming out of Canada—can reach speeds of almost 85 mph. It's the result of [Project Eve](#), a for-profit collaboration aimed at combining “Canadian skills for the purpose of producing and supporting Canadian electric vehicles and components,” according to Project Eve's website.

The Kestrel's a solid step in that direction. “It won't have any smell. It should be quieter. It should be



(Photo: Motive Inc.)



**Figure 7.** Henry Ford shows the strength of a unique car body built from hemp and sisal cellulosic plastic, as he strikes it with an axe demonstrating his vision to "grow automobiles from the soil".

**Assembly Committee on Agriculture  
November 8, 2017  
Testimony on Assembly Bill 183  
Industrial Hemp**

Good morning Chairman Nerison and members of the committee –

My name is Rob Richard and I am Senior Director of Governmental Relations for the Wisconsin Farm Bureau Federation (WFBB). I am here to submit WFBB's support for Assembly Substitute Amendment 1 to Assembly Bill 183, relating to the growing and processing of industrial hemp.

In December of 2016, the voting delegates at our annual WFBB meeting took an official position on industrial hemp by passing a resolution stating "We support the production, processing, commercialization and utilization of industrial hemp and that it be regulated by USDA rather than the Drug Enforcement Administration (DEA)." This policy position mirrors what the American Farm Bureau Federation adopted in 2014.

Since that time, WFBB has been actively engaged in working with the bill authors to secure passage of Assembly Bill 183, and its companion Senate Bill 119, but we haven't stopped there.

Even though many states have legalized hemp cultivation, federal authorities have interpreted federal law so that the interstate commerce of hemp seed and potentially some hemp byproduct is illegal. What this means is that states that have passed hemp legislation are hemp islands that cannot transport/sell seed out of the state to be cultivated elsewhere. Introduced by Congressman James Comer of Kentucky, and cosponsored by Wisconsin Representatives Glenn Grothman, Mark Pocan, Ron Kind, Gwen Moore and Mike Gallagher, HR 3530 would classify industrial hemp as it should be - a crop.

As much as American farmers need HR 3530 to be signed into law, we still need a regulatory framework for industrial hemp in Wisconsin that allows farmers to plant and grow it, processors to manufacture it, and universities to research its possibilities. Since the passage of the 2014 Farm Bill, over thirty statehouses across the country have openly accepted industrial hemp's potential as a sustainable, eco-friendly and profitable crop. We need to join them.

Yesterday WFBB sent all committee members a 12-page feature article from the Wisconsin Historical Society that tells a great story about Wisconsin's dominance of the hemp industry in the mid-20<sup>th</sup> century. Assembly Substitute Amendment 1 to Assembly Bill 183 seeks to position ourselves at the national forefront of hemp cultivation, manufacturing and research. It's time that we once again embrace our hemp heritage and revitalize a dormant industry that has so much potential in the 21<sup>st</sup> century.

**WFBB respectfully asks that you support Assembly Substitute Amendment 1 to Assembly Bill 183.**