

Contact: Alice Coram, 919.293.0243, ext. 201

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NEW CROP HAS POTENTIAL TO DISPLACE CASTOR OIL IMPORTS AND MORE **Technology Crops International escorts Cinderella of new crops, lesquerella, to market**

Phoenix, Ariz., September 14, 2006 – It is planting time and excitement is high for a new specialty oilseed crop called lesquerella (les-kuh-REL-uh), which--perhaps fortuitously--rhymes with Cinderella and has been dubbed the “princess of new crops.” A breakthrough, lesquerella has the potential to displace castor oil imports, thus benefiting multiple industries, reducing the U.S. trade deficit and offering a profitable alternative crop to American farmers. Further, with different functionality, lesquerella is a potential improvement over castor that brings with it new opportunities. Technology Crops International is leading the commercialization of the new crop, adding lesquerella to its portfolio of new crops on the heels of the successful commercialization of cuphea last year.

Lesquerella has potential to displace castor oil imports

In development for over 20 years, lesquerella has the potential to displace castor oil imports and with its improved functionality, may find significant uses beyond that of castor. Indeed, experts believe lesquerella has greater commercial potential than any new U.S. crop developed in recent years. “Lesquerella has huge potential and a large number of companies are interested,” says Dr. Terry Isbell, research leader in the New Crops and Processing Technology Research Unit of the U.S. Department of Agriculture’s Agricultural Research Service (USDA-ARS) at Peoria, Illinois.

Castor oil is used as a lubricant and in cosmetics, toiletries, inks, plastics and paints, but all castor oil used in the U.S. is imported, primarily from India, and is subject to fluctuations in both price and supply.

Significant benefits to growers

“This crop offers a significant opportunity for growers,” says Andrew Hebard, president and chief executive officer at Technology Crops International, who is currently seeking qualified farmers to help with the initial production of lesquerella that will be planted this fall. “Lesquerella will be priced on contract and will provide growers with higher returns than are traditionally earned on commodity crops,” he adds.

A member of the mustard family, lesquerella is known to scientists as *Lesquerella fendleri*, a hardy winter oilseed crop with excellent salt tolerance that grows well in arid soils of the American southwest, including Arizona, New Mexico, and Texas. The crop blooms bright yellow and produces a small seed that provides a high oil yield of 30 to 40%. Lesquerella produces approximately 1500-1800 pounds of seed per acre, which translates to 450 to 540 pounds of oil, or about a drum per acre. Yields in excess of 2000 pounds of seed per acre are possible.

Unlike other oilseed crops, lesquerella is valued for both its oil and gum. The gum has the potential to be used as a thickener in various industrial and food products, much like xanthan gum. “An unusual and valuable trait of lesquerella is the water-soluble gum on the seed, which may become a major selling point,” says Dr. David Dierig, a USDA-ARS research geneticist in Maricopa, Arizona who has been working on lesquerella his entire career.

Even the hulls left over after the lesquerella oil and gum have been removed have value. According to Dierig, the hulls contain higher-than-average protein levels of 30-35%, and meal from the hulls can be used as a protein supplement in livestock feed.

"The seeds don't shatter and the crop is harvested using normal combining methods and equipment," says Hebard. "Lesquerella is also attractive to growers because it is a winter crop that can be grown in rotation with food crops," he adds.

Lesquerella superior to castor

Research has shown that in some areas, lesquerella is superior to castor. According to a study in *Industrial Crops and Products* [23, 2006, p. 54], due to the lack of solvents and catalysts needed in its processing, lesquerella may offer a more cost-effective base stock for lubricants and functional fluids than current commercial products.

Lesquerella is not just a replacement for castor, but has different functionality, offering superior performance and opening the door for broader applications. "This oil is better than castor," says Spencer Awbrey, an industrial chemist who currently works as a senior research fellow with PSP Science and Technology in Texas and has done troubleshooting for almost every chemical company in the industry over his 35-year career. "It's like castor on steroids," he says with a laugh. "Lesquerella has great lubrication capacity. It makes excellent greases, it is biodegradable, and it has good oxidation stability."

Lesquerella oil contains fatty acids that are 20 carbons long (C20), versus 18 carbons (C18) for castor oil fatty acids. The longer the carbon chain length, the better the oil's value for industrial purposes.

"Lesquerella is an excellent chemical feedstock," says Awbrey. He has developed products using lesquerella oil and thinks industrial chemicals are a key area to utilize plant alternatives to petroleum products. He explains, "If you make biodiesel you replace only about one-fourth of a barrel of petroleum, but if you make chemicals, you will replace eight times that--approximately two barrels. The difference is in the processing. Petroleum burns well, but it has to go through so much processing that it is quite expensive and inefficient for manufacturing chemicals. Lesquerella offers huge savings in energy and increase in yield without unwanted byproducts. This oil allows us to do chemical reactions at a fraction of the temperature and pressure required for petroleum."

Most promising uses perhaps yet to be discovered

"In my opinion, the best uses for lesquerella oil may have yet to be investigated," says Professor Keith Coupland, the director of the Centre for Lipid Research at the University of Hull in the U.K. "For example, dyestuffs, specialty chemicals, nutritional and medicinal uses are yet to be explored," he explains.

Coupland is a synthetic organic chemist who once worked for Exxon in the U.S. where he helped develop Uniflo motor oil. Before joining the university, Coupland was involved in the development of a medicinal oil used to treat ALD (adrenoleukodystrophy), a rare degenerative nerve disorder. The oil is called Lorenzo's oil and inspired the movie by the same name.

Economic impact

According to a March 2004 report in the *Chemical Market Reporter* (CMR), total castor oil exports from India were estimated from 165,000 to 170,000 tons, and castor oil derivatives at 30,000 to 35,000 tons. In mid-August 2006, the publication listed the price for castor oil at \$0.43/lb and derivatives ranged from \$0.65 to \$1.05/lb. According to Awbrey, the U.S. uses about 60 million pounds of castor oil per year, which represents an approximate value of \$25.8 million.

A fairytale future?

“The only problem now is that not enough of this crop is being grown,” notes Awbrey.

According to Hebard, “Companies that need lesquerella oil can simply contract with us for acreage. At Technology Crops International, we manage the entire supply chain for specialty oil users, providing them with oil products grown, harvested, transported and processed under our close supervision, thus ensuring our clients a cost-competitive, assured, sustainable supply of raw material.”

“This first year’s commercial crop production is just the tip of the iceberg,” predicts Isbell.

For more information, visit www.techcrops.com or call 877.780.5882.

About Technology Crops International

Technology Crops International is a global leader in the evaluation, development, commercialization and delivery (supply chain management) of new and high-value strategic oilseed crops, such as high erucic acid rapeseed oil, high oleic sunflower oil, meadowfoam, cuphea, lesquerella, camelina and echium. The company offers a full spectrum of expert services in specialty crop contracting and serves the biotechnology, pharmaceutical, industrial chemical, specialty nutrition and medical foods industries. With offices in the U.S. and the U.K., Technology Crops International supplies clients around the world with safe, sustainable, traceable and cost-competitive crop-derived products.

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