



## **NEWS RELEASE**

### **Contact:**

**Ginny Orndorff**  
**President and CEO**  
**Evolutionary Genomics, LLC**  
**1376 Miners Drive, Suite 101**  
**Lafayette, CO 80026**  
**(303) 862-3222 ext. 301 [ginny.orndorff@evolgen.com](mailto:ginny.orndorff@evolgen.com)**

### **EVOLUTIONARY GENOMICS AWARDED BIOFUELS RESEARCH GRANT**

Lafayette, Colo. (July 1, 2008) – The National Science Foundation (NSF) has awarded a Phase I Small Business Innovative Research grant for \$100,000 to Evolutionary Genomics (EG) entitled “Bioenergy from genomics: genes that increase corn kernel starch and oil content”. The grant will support work to determine if corn genes that the company had previously shown to control corn grain yield have an impact on the amount of starch and oil in corn kernels.

Having genes in hand that control starch and oil levels could be used to breed or genetically engineer corn with significantly higher starch or oil content per kernel. Two major objections to the use of corn to make ethanol are the environmental impact of fertilizing and irrigating great amounts of land for growing corn and diverting corn from food to fuel when people in the world are starving. Increasing the yield of fermentable starch for ethanol production from each acre of corn grown would provide more corn for ethanol and food from the same acreage.

“To truly become energy independent, we will need a mix of energy sources, particularly renewable biological sources. Corn ethanol is available today and promising technologies are coming. Our approach to more efficiently make corn ethanol addresses the conflict between feed and fuel.” said Walter Messier, Ph.D., the study’s Principal Investigator and Chief Technology Officer of Evolutionary Genomics.

Modern corn is the largest production cereal crop in the world. Fermentation of corn starch yields ethanol. Current research in corn focuses on ways to improve crop production, including increasing overall yield, starch content, and oil content of corn kernels, as well as enzymatic and methods for increasing the cellulosic content of corn that is available for ethanol production. New approaches to increasing corn kernel starch are urgently needed in order to improve the economics of corn ethanol production and decrease negative impacts on land use and food cost/availability. Moreover, the co-product, corn oil, can be used in the production of biodiesel.

Evolutionary Genomics (EG) has identified six novel gene groups that appear to be responsible for changes in corn during domestication. We have shown that certain of

these genes are associated with changes in total corn yield. In the NSF-funded project, Evolutionary Genomics (EG) will determine if these genes control the amount of the yield components corn starch and corn oil in corn kernels. These genes could be used either as markers for improved breeding as well as in transgenic (GM) approaches to increase starch and oil content.

One bushel of corn yields about 2.8 gallons of ethanol plus about 16 pounds of distillers dried grains and 1.5 pounds of corn oil. If the proposed project is successful and demonstrates the feasibility of using certain alleles of the genes described above as markers to breed corn with higher starch content and/or oil content, then corn breeders could breed corn producing more starch for conversion to ethanol as well as more corn oil for conversion to biodiesel per bushel of corn processed. For example, if the starch content per bushel of corn could be increased by 20% using the alleles as markers, this would be expected to generate about one-half gallon of additional ethanol per bushel of corn processed. Starch content increased many-fold during domestication, and we know these are domestication genes, so if the proposed project indicates that these domestication genes control starch, a 20% increase in starch content should be quite feasible. In 2006 in the U.S., approximately 1.8 billion bushels of corn were processed to yield approximately 4.8 billion gallons of ethanol. If one-half gallon additional ethanol could be produced per bushel of corn, it would result in about 1 billion more gallons of ethanol. At today's U.S. ethanol price of about \$2.90/gallon, that extra billion gallons of ethanol would have a value of about \$2.9 billion. Clearly, genes that control starch content could have great value.

EG is located in Lafayette, outside of Denver, CO. The company's "Adapted Traits Platform" was developed by Dr. Walter Messier, a molecular evolutionist, and is a patented method of comparing genes of closely related species and identifying rare sequence patterns indicating adapted genes. EG applies the method in both human healthcare and agriculture. To tackle intractable human diseases for which there are solutions in chimpanzees or other closely related non-human primates, such as AIDS, hepatitis C, hormone-sensitive cancers, and sepsis, EG scientists analyze equivalent genes of humans and disease-resistant primates. To discover natural control points for yield in key agricultural crops, EG scientists analyze equivalent genes of domesticated crops and their wild ancestors.

The National Science Foundation Small Business Innovative Research program is a congressionally mandated grant program that selects proposals demonstrating "unique, ingenious" approaches to problems with important commercial applicability. Successful completion of Phase I grants (which provide up to \$100,000) makes a small business eligible to apply for a Phase II grant of up to \$500,000. Evolutionary Genomics successfully completed Phase I and II grants from the NSF regarding novel targets for treating AIDS.