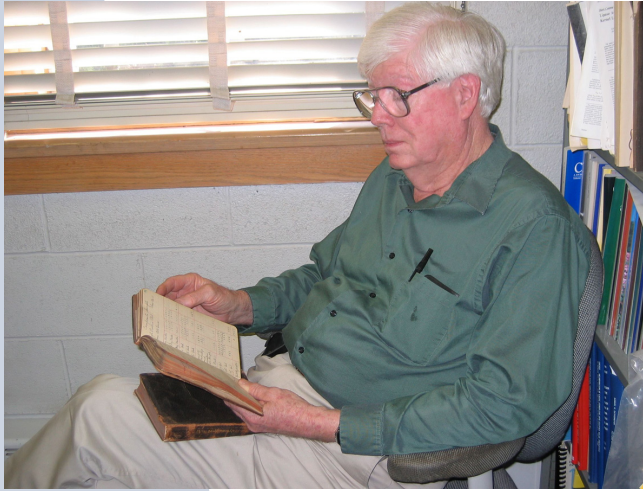


## Study Identifies 50 Genes Controlling One Trait



Corn with high oil content is in demand, particularly in corn sold for animal feed. And although it may seem simple to just cross-breed corn selecting for high oil as a characteristic, it's not. One reason is that there isn't just one gene that controls oil content in corn. A recent study identified 50 distinct genes that control oil.

"Some only have a small effect, but they contribute," said U of I plant geneticist John Dudley. "What we learned is that for the most part, it will be difficult to use biotechnology to shift oil content by changing any one gene. It's much more complicated than that."

Dudley explained that hybrid corn currently being grown and sold and considered to be high in oil content has only about 5 to 6 percent oil. "The U of I actually has corn lines with as much as 20 percent oil content. But they have other characteristics that make them undesirable, such as low yield, weak stalks, and a tendency to rot," he said.

The collection of corn lines is part of one of the longest running experiments ever. Since 1896, scientists at the U of I have been studying the characteristics of corn. One aspect of the study has been to look for ways to improve the oil content,

without losing traits like high yield. John Dudley came to the U of I in 1965 and has kept the study going ever since.

The process involved harvesting 60 ears from high-oil corn. The 12 with the highest oil content were planted in the field for a controlled crossing. "This isn't a biotech technique," said Dudley. "We physically go out in the field before the silks come out and cover the ears to protect them from foreign pollen. Then we collect the desired pollen in a bag on the tassels and place it on the silks."

In this most recent leg of the experiment, Dudley along with other U of I researchers teamed with Monsanto to identify the genes in corn that can be used to increase the oil concentration through traditional plant breeding or genetic engineering and create hybrids with strong characteristics.

Researchers at Monsanto obtained the marker data for 500 lines of corn. A marker is like a label on a chromosome that may be located close to a gene. With each generation of crossing, the length of pieces of chromosome which have the same genes as in the original parents is reduced. Thus scientists can follow the marker and get closer and closer to the individual genes.

"A similar study had been done once in the past, but on a much smaller scale, using only about 100 plants," said Dudley. "This study looked at 500 and used a technique called inter-mating in which two plants are crossed and then the resulting plants are crossed with each other for 10 additional generations."

Data were collected for two years, including starch, oil, and protein content as well as data on yield and other characteristics. The study was also replicated in Macomb and in Iowa and the findings were published in an issue of *Genetics*.



College of Agricultural,  
Consumer and  
Environmental Sciences

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Source: John Dudley (217-333-9640; [jdudley@uiuc.edu](mailto:jdudley@uiuc.edu))