

## 'Genetic modification key to feeding world'

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LINCOLN—Genetic modification of species has been a driving force of nature for thousands of years, and humans' ability to harness the science behind it is a critical, and safe, component of efforts to feed a growing global population, a leading plant scientist said Monday.

Sally Mackenzie, Ralph and Alice Raikes Chair for Plant Science in the Center for Plant Science Innovation at the University of Nebraska-Lincoln, was the first speaker in the Heuermann Lectures' 2013-14 series.

Mackenzie's lecture, titled "Beyond GMOs to a More Honest Dialogue About Our Food," put today's science into historical perspective.

"Recombinant DNA is the biological driving force of nature," she said. "It is a fact of life. It is why you have your mother's blue eyes and your father's dark hair."

Nature's genetic modification process helps ensure a diversity of life on the planet, and agricultural scientists long have been modifying plants too, through cross-breeding, she told a packed Hardin Hall auditorium at the lecture, sponsored by the Institute of Agriculture and Natural Resources at UNL.

Scientists first developed a genetically modified plant – an antibiotic-resistant tobacco – in 1982. Great progress has been made since, Mackenzie said.

"We've simply taken advantage of a very natural process that goes on in nature all the time," Mackenzie said.

Until 2000, that process was motivated by a goal to increase yields, and profits. In 2000, though, what Mackenzie called "the start of a golden era," golden rice was developed. That nutritionally enhanced rice can help feed starving and malnourished children in the developing world, in particular preventing blindness that now strikes up to 500,000 a year because of a lack of Vitamin A. The effort was funded not by corporations for profit but by leading philanthropic

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organizations such as the Rockefeller and Bill & Melinda Gates foundations.

"This is why scientists get into science, to make a difference in the world," Mackenzie said. "This just makes me proud to be a part of this community."

There are downsides to genetically modified crops, but mostly due to mismanagement, not the science itself, she said. So-called "super bugs" and "super weeds" have emerged because the crops have been overplanted.

However, Mackenzie said, there is no evidence genetically modified crops are unsafe to eat. She dismissed claims otherwise as bad science or politically motivated activism.

"We're not encountering any health effects yet," she said.

The continued debate over genetically modified crops is a "sociological and psychological discussion," not a scientific one, Mackenzie said, and it's a distraction from the reality: The world's population, now about 7 billion, is expected to top 9 billion by 2050. There's not enough water or arable land to feed those people using current agronomic practices.

"Those challenges are your challenges," Mackenzie said, directing her comments to the many UNL students at the lecture. "Genetic modification should be one of the tools in that toolbox, just one."

A related science that also shows great promise is epigenetics. Mackenzie, one of the world's leading scientists in exploring this technology, said this process focuses on changing how plants express their genes, rather than changing the genes themselves. Early findings indicate this technology could significantly increase yields.

"This is very new territory for the plant-breeding community. There's a lot of potential," she said.

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This technology might be more acceptable to the public since it doesn't involve genetic modification, Mackenzie added.