

'Sunbean', a breakthrough in moving genes

WASHINGTON, D.C. — Secretary of Agriculture John R. Block recently announced development of a technology for moving genes from one kind of plant to another.

"This breakthrough achievement opens a whole new era in plant genetics," Block said. "It is the first step toward the day when scientists will be able to increase the nutritive value of plants, to make plants resistant to disease and environmental stresses, and to make them capable of fixing nitrogen from the air."

Block said scientists of the U.S. Department of Agriculture and University of Wisconsin have opened the way to a new medium for the genetic engineering of plants—creating variations not now available because of sterility barriers between species and genera.

What the scientists have done is to transfer a gene that directs the production of major protein from its native location in the French bean seed into the foreign environment of a sunflower cell. They call the new plant tissue "sunbean."

The gene is stable in its new environment and is producing messenger RNA. Messenger RNA is the cellular vehicle that carries genetic information from the genes to the protein-synthesizing machinery of the cell.

The scientists now are looking for—and hope soon to see—the production of the bean protein in the "sunbean."

To achieve the genetic transfer, research teams led by biochemists John D. Kemp of USDA's Agricultural Research Service and Timothy C. Hall of the University of Wisconsin-Madison used a

bacterium, *Agrobacterium tumefaciens*.

This bacterium, which causes crown gall disease in certain species of plants, has been called "Nature's genetic engineer" because it transfers a small piece of its genetic material into a host plant's cells.

This genetic material then is incorporated into the plant cells and causes fundamental changes in their genetic makeup.

Kemp said, "What we did was to turn the bacteria's exploitation of plant cells into a tool for the transfer of genes useful to us."

To do this, scientists employed a form of piggy-backing. The strategy used involved the splicing of the bean protein gene into a location of the bacterium the scientists know is responsible for transmitting crown gall disease.

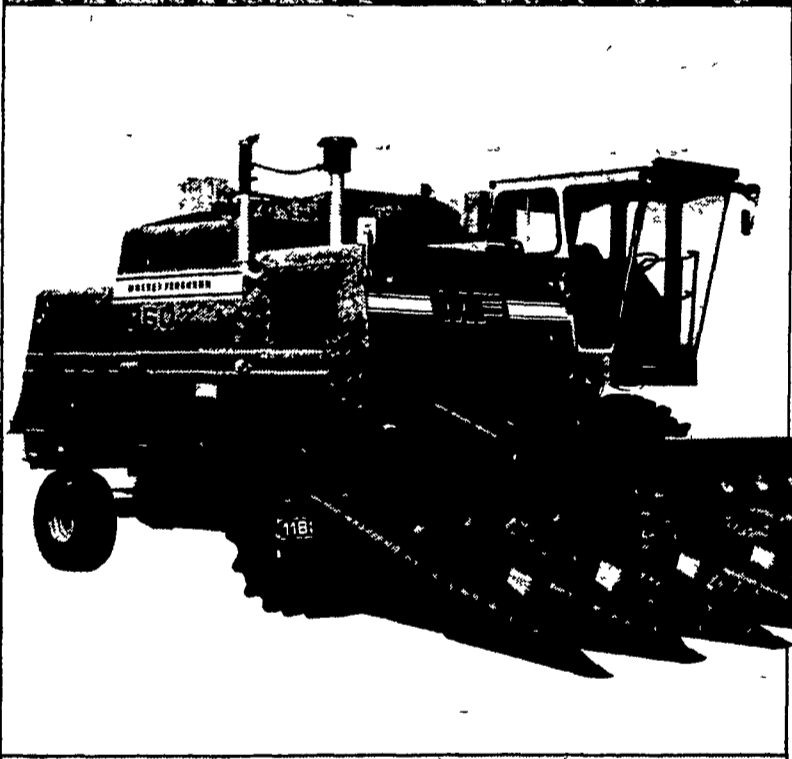
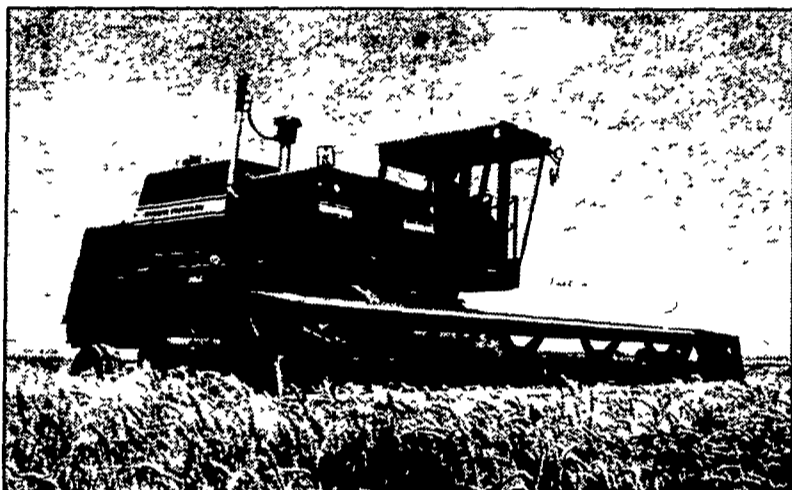
Kemp said although the bean protein is not yet being produced in the new "sunbean" plant tissues, the scientists plan to modify their new methods until they attain high levels of protein production.

The next step is to regenerate a sunflower plant from the cells in the tissue cultures. The technology to do this is not yet available, nor do the scientists know exactly the effect the bean gene will have on regenerated sunflower plants.

These developments are yet to come. They may not come quickly or easily, Kemp said. However, he said, he and his colleagues will continue their pioneering work, which they characterize as "laying the ground work for 21st century agriculture."

This announcement closely follows one made by Block June 18 on using genetic engineering to produce a vaccine effective against the virus of food-and-mouth disease.

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