Genetically Modified Corn & Wheat

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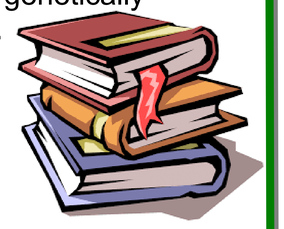
Introduction:

- Genetically modified crops are currently being tested to replace the regular crops.
- The process includes taking genes from the original crops and altering their rDNA, so that they grow to be stronger and last longer in their environments. .
- Although these genetically modified crops are still being tested for production, there is controversy about the economic concerns and safety consumption of the crops.

Method:

- Data on genetically modified corn and wheat plants was compiled from various sources. The majority of the scholarly articles include data from individual experiments that are open for public knowledge. These articles were used to generalize and cover many aspects of the genetically modified corn and wheat scientific studies.



Process/Procedure:

1. Isolation of gene of interest: find location of the desired chromosome. EX drought tolerance or interest resistance.
2. Insert the gene into a transfer vector. This can be done using a circular DNA molecule (the plasmid) using recombinant rDNA techniques.
3. Beginning the plant transformation. Modified cells are mixed with regular plant cells to form the transgenic cells. This can also be done through the process of bombardment.
4. Select the modified plants: test the desired traits in the new plant cells to see which ones will survive and pass the qualifications.
5. Regenerate these exoplants, using tissue culture, to make whole plants.
6. Verification of the process. Tests are conducted to determine the number of copies inserted into the plant, whether or not the chromosomes are intact, and whether or not
they will interfere will the functions of other genes.
7. If they pass all of these tests and the technology works with the design, field trials are
conducted. This leads to commercial production.
8. The safety assessment is the final test. Once the food-safety and environmental
requirements are met, the product can be open to the market.

Results/Discussion:

The study compared Monsanto's glyphosate resistant corn to resistant Nicosulfuron corn. The two crops showed no differences in agricultural characteristics. The major difference was shown by testing rats with glyphosate resistant corn in lab. The rats that were fed for two years with this corn developed a much larger amount of tumors than the other rats. Also the glyphosate, which is an herbicide, was inserted into their drinking water and accounted for a large amount of tumors in the rats. Glyphosate which is used in many genetically modified corn farms also poses a threat to humans. On the other hand Nicosulfuron was shown to have no effect. Through transgene processes it was discovered that the herbicide killed all of the surrounding weeds and did not affect the corn plants like expected. The corn plants were genetically modified to have a Nicosulfuron detoxifying gene, similar to the Glyphosate corn plants, that allowed Nicosulfuron to kill the weeds and not harm the plants or animals.

GM crops can disrupt natural crops and cause them to change because of cross pollination, which can also create super weeds which are resistant to herbicides. A benefit of GM corn that are pest resistant is that the amount of pesticide used will drop. This will make it safer to eat.

Events	Nicosulfuron			Glyphosate		
	Total plants	Surviving plants	Survival (%)	Total plants	Surviving plants	Survival (%)
R450-42	19	10	52.6	16	9	56.3
R450-58	20	9	45.0	18	9	50.0
R450-59	17	8	47.1	15	8	53.3
CK	7	7	100.0	8	0	0.0

The T0×Zheng-58 hybrid plants of R450-42, R450-58 and R450-93 along with non-transgenic ones (CK) were cultured in a greenhouse and sprayed with 60 mg/L nicosulfuron or 4 g/L glyphosate. The data were recorded 10 days after spraying.
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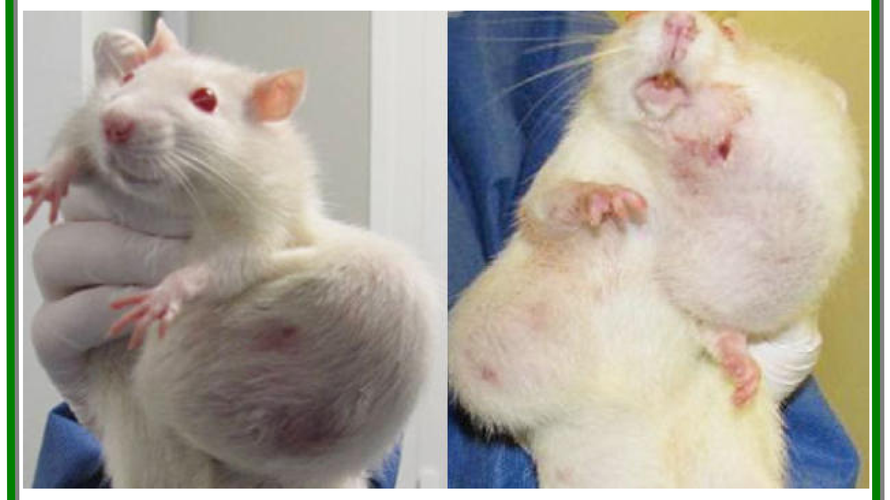

Summary/Conclusion:

Recapping, the experiment done compared two different types of genetically modified herbicide resistant corn. The Glyphosate resistant corn was found to be dangerous when consumed, the rats were found to have tumors. The Nicosulfuron resistant corn was saw to be safe for consumption. The main result, though, is that the Nicosulfuron corn is safe to eat and would be able to go to testing to get into the production market. Finally, the risks and benefits are still being found, but some GM corns can be harmful to eat and can cause herbicide resistant weeds. Benefits include the decreasing use of pesticides with GM corn that is pest resistant.

Future work would be done to push for these products to be approved for sale in the market. More safety trials will be conducted to find the right combination of herbicides and genetically modified crops so that the benefits of this process will far outweigh the risks. Predictions for future testing would expand genetic modification to the other food groups as well.

Citations:

Butler, Declan. "Hyped GM Maize Study Faces Growing Scrutiny." *Nature*
Casassus, Barbara. "Study Linking Genetically Modified Corn to Rat Tumors Is Retracted." *Scientific American*.
Gewin, Virginia. "Genetically Modified Corn--Environmental Benefits And Risks." *Plos Biology* 1.1 (2003)
"Process of Developing Genetically Modified (GM) Crops." *African Biosafety Network of Expertise ABNE*

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