

**NewLeaf Potatoes: Friend or Foe**  
A study of the GMO potato

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**English 320 Final Paper**  
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**5/6/04**

**Introduction:**

In 1995 a new potato variety was introduced to the market, this new potato had something special about it not seen in the industry before. This new potato had the ability to fight off insects and viruses without having to spray chemical insecticides. In the potato industry chemical applications are very common and usually very expensive. During the summer months in the United States potato crops often receive between 13 - 15 applications of usually fungicide and or insecticide. Annually in the United States 1.3 million acres of potatoes are grown. On these acres is annual insecticide costs average \$207. This figures out to an estimated \$270 million industry in just the United States (Thornton 235). This may sound like way to many chemicals are being sprayed on the crops we eat, however studies have shown just how important it is to apply these chemicals. An article in Choice Magazine in 1994 stated that, "It has been estimated that reducing pesticide use by 50% would result in a 27% reduction in potato production, while 100% reduction in pesticide use would reduce yields by approximately 57% (Knutson et al., 1994)." From this data a person can see how important it is to protect your crop to the best of your ability, especially with average base price for input cost around \$1000 dollars an acre.

Early after the potato was introduced into the market many farmers seeing the benefits of raising the crop started raising the crop themselves. In 1995 only 1500 acres in the United States were planted and by 1999 the crop was really starting to catch on with 50,000 acres across the U.S. and 5% of the market (Kilman, 2001). However with

the anti-GMO crisis that was going on in Europe and spreading throughout the rest of the world including the United States the whole industry was getting attacked. In late 1999 and early 2000 many different companies began to pull GMO products off the shelves and decided not to have anything to do with the technology. Companies such as Gerber, Frito Lay and McDonald's all decided to distance themselves from all of the controversy. Large processing companies also decided to distance themselves from the GMO potatoes. Since the processing companies would no longer accept the potatoes farmers were raising they had no one to sell the potatoes to. By the 2000 growing season acreage dropped to 10,000 acres and in 2001 Monsanto decided to pull the potatoes off the market all together until a later date.

As of now the potatoes are still off the market, however in the past couple year's public perception has slowly changed and more and more people are willing to accept GMO products being on the market. In the future it is very likely that the NewLeaf potatoes will be introduced again, with better results.

**Narration:**

As discussed in short in the introduction the NewLeaf potato varieties were introduced in 1995 by The NatureMark Company. The NatureMark Company is a division of the corporate giant Monsanto one of the leading companies in the advancement of GMO products.

The NewLeaf potato is much like other crops that have been introduced in to the market. Like other GMO crops the NewLeaf potatoes use *Bacillus thuringiensis* commonly known as Bt as the main technology. Bt is a common bacteria used by many farmers as a natural insecticide. Many organic farmers also apply Bt to there crops as well. However the difference with raising GMO crops that use Bt is that the Bt is actually programmed to grow within the crop its self. This means that as the plant grows the chemical that is toxic to the insect, the chemical produced is actually a protein within the plant that does not have any effect on humans or animals, only the insects. These actions all takes place within the plant as it grows. This means that from the time the plant comes out of the ground until it is harvested levels of insecticide are the same.

Like other GMO crops on the market farmers using the seed potatoes grown by Monsanto need to pay a technology fee. This is a fee that Monsanto charges for the use of the seed that they grow and the technology that they have discovered. Monsanto has patented the process of putting these new genes into the crop. This leaves them with total control of the use of NewLeaf potatoes until these patents are up.

Another gene inserted into the potato also makes the plant immune to various viruses, which are very detrimental to the growth and the quality of the potatoes grown. At the last the NewLeaf Plus varieties had immunity to three different viruses, PVY, PVX and PLRV. To seed growers this is a very important advancement. Vectors usually transmit these viruses. These vectors are usually aphids which spread the disease from plant to plant if they are infected with the virus themselves. As a seed grower certification of the seed comes from tests that see if the plants have been infected with the viruses. In worst-case scenarios certification will not be given if levels are to high, this

leaves the seed grower with a crop that ends up being a complete loss. In most cases production costs of conventional potatoes that go to the produce market are around \$1400 - \$1600 however, a seed grower usually has to apply many more insecticides so they end up the production costs of upward of \$2000 per acre. The NewLeaf potatoes on the other hand had complete immunity to these viruses so farmers could cut way back on expenses that they had to put into the crop.

In conventional farming applications to control Colorado Potato Beetles and Aphids account for on average 80% of all insecticide costs (Thornton 237). For farmer in the pacific northwest cutting back as much as 80% of the insecticides they use can end up saving millions of dollars in that region alone. In a study done at the Oregon State University, average costs of insecticide in Washington alone are \$585 an acre per year. A study done by the National Center for Food and Agriculture Policy, (NCFAP) showed that if Idaho, Oregon and Washington used the NewLeaf potatoes they would end up saving an estimated \$58 million dollars if they were to raise NewLeaf potatoes on all 620,000 acres of potato ground in the area. This would also reduce insecticide amounts by as much as 1.45 million pounds per year, which would be excellent for the environment.

The Monsanto page reports that in the future they are working on advancing the potatoes even further by incorporating other new genes that will lower the amount of bruising that the potatoes tend to get from harvest and putting them into storage. Other field tests have also shown that in the future potatoes will be tolerant to Roundup, which is a commonly used herbicide used. Roundup ready Soybeans, Corn and Wheat have already been introduced and are being raised throughout the country and some countries

throughout the world. These other Roundup ready crops have already shown to be a huge success, which is encouraging news if they can put these new technologies into potatoes as well. It has also been talked about that there is work being done to try and raise levels of nutrition and maybe even add vaccines to these developing potatoes.

As of now the NewLeaf potatoes have not been banned from the market, Monsanto has chosen to take them off of the market. In fact at the present six different varieties have full approval from the USDA, FDA, and the EPA. The full approval gives farmers the right to raise the potatoes and sell them for either animal or human consumption. This shows that no health related issues have been found with the GMO potatoes. The main reason that they are no longer being produced is because of the general public's view on the raising of genetic products.

**Confirmation:**

Benefits of raising these crops can easily be seen in the first year. Many of these benefits directly help the grower. For the farmer it directly cuts down on the amount of inputs that he has to put into the crop. As previously discussed use of NewLeaf potatoes reduces insecticide input costs by an average of 80%. For most farmers across the country this works out to an average of \$150 per acre. In other areas like Washington an 80% decrease could possibly work out to be much higher savings than that. Over many years it has been shown that Colorado Potato Beetles are very resilient insects with the ability to build up resistance to many different synthetic chemistries used in insecticides. Over many years of study results have shown that there are no resistance issues showing

up by using Bt on crops. This will also help save the chemistries that still work for the future. Another benefit for a farmer would be that he would be getting a much higher return on his produce. By raising a crop with fewer beetle issues and no viruses not only would he get a higher yield without any foliar damage from the beetles, he would also get a higher contract price based on a crop that has fewer deformities thus raising the quality by not being susceptible to the viruses. The possible future benefits will also come to help the farmer. By reducing the amount of bruises that a potato receives he will again get higher contract prices by having higher quality. The Roundup Ready potatoes will also be a very helpful management practice taking the guessing out of what weed control to use. The benefits of this management practice are already helping many farmers across the country. The major advantage to Roundup is that it is a non-selective systemic herbicide that kills almost anything that it touches. One of the biggest advantages for farmers will be the reduction in the amount of insecticide that they will have to apply. This will make the farming much safer for them and their families. By not having to handle any herbicides they will not have to be around them at any time, which will be very good for the health of the farmer.

As touched on a little in the previous paragraph the use of these potatoes will increase the quality of the product for the farmer making him more money but it will also raise the quality of the product that the consumer will be getting. By doing this the final product the consumer gets will look much better, which is important to almost everyone even if they do not admit it. Having these higher qualities will also help the consumer for instance having a product with no problems that will tend to last longer, making it more convenient by not having to buy new products all the time.

One of the biggest issues people have with farmers is the chemicals that are used. By using these NewLeaf potatoes and cutting the insecticides that need to be sprayed, this will only mean good things for the environment. Possibly cutting out 80% of all insecticide applications this should put smiles on environmentalist's face around the world. It is well known that insecticides are very dangerous to humans and animals alike. By eliminating this element from environment I can see no reason why anyone would want to oppose the raising of the crop.

**Refutation:**

On the other side of the coin three main issues have been brought up about the fears of using NewLeaf potatoes. First are the environmental threats from raising Bt crops. Some fear that the Bt produced through the course of the plants life will have effects on non-target species. Even though this should be a concern for everyone no dramatic information has surfaced that we should have to worry about damaging side effects. Another worry along with this is that the Bt toxin will bind to the soil and remain active for a period of time, which may also cause problems for non-target organisms. It has been shown that the product will persist in the soil for 5 – 20 days. This may sound bad but there are many insecticides used that last much longer than 20 days in the soil with more severe damaging effects.

The second worry is that resistance to Bt will threaten many organic farmers. This may be a concern but over decades of use no resistance in a field situation has ever been documented with organic growers and other conventional farmers as well. The



concern about resistance should not be worry, however in all varieties of NewLeaf potatoes the concentration of the Bt is 10 to 50 times the lethal amount needed to kill a Colorado Potato Beetle.

Last is a worry that the build up of antibiotic resistance may end up hurting humans and animals. I could see this being a worry for some however no research of any kind has this ever shown up to prove this theory even remotely close to being true. All elements of this argument are a stretch trying to tie multiple un-related issues together to scare people.

**Conclusion:**

In conclusion there are many different reasons why NewLeaf potatoes should be on the market again. With all of the possible benefits to be reaped it is only a matter of time until these potatoes will be back on the market. For this to happen two major events need to occur, first is that consumer confidence needs to be higher because they are the ultimate decision maker on what will be in a market or not. The second is for large companies like McDonald's and Frito Lay to again accept these potatoes and sell them to the consumers once more. All of this will happen again, it just a matter of time. It'll come back; its just to useful." For a number of reasons, predicted Al Mosely, potato specialist with the OSU Extension Service and an associate professor (Martinez 2000.)

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