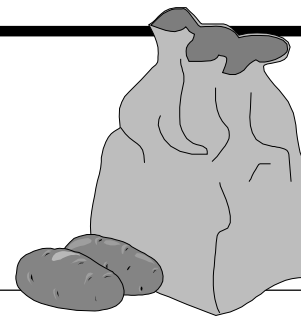


# POTATO EYES



Vol. 12, Issue 5, September 2000 • Alexander D. Pavlista, Extension Potato Specialist

## Regulating Genetic Modification

Genetic modification of crops (GM-varieties) through 'biotechnology' is jointly regulated by the USDA, EPA and FDA since the 1980s. The USDA through APHIS oversees field testing of GM-varieties. Under FIFRA, the EPA evaluates pesticide properties. And, the FDA assesses food and feed safety issues. Although traditionally-bred crop varieties do not undergo governmental regulation, GM-varieties must.

**Regulatory Steps:** From its concept, it takes as much as 10 years to commercialize a GM-variety. The development of the GM-variety can be questioned or even stopped by a Federal agency at 10 separate points in the process and there are six opportunities for the public to speak out. The 10 major steps toward release of GM-varieties are:

1. Biosafety Committee Review – Under the auspices of the NIH, an advisory group evaluates the potential risks of the concept. **(Public Review and Comment)**

2. Greenhouse Approval – USDA determines adequacy of research facility.

3. Field Authorization – USDA approves field trials; field inspections may be conducted. Attention is given to risks of out-crossing.

4. Transport of Seed – USDA oversees shipment of seed of GM-varieties.

5. Commercialization Permission – APHIS reviews all field trial studies. This review may take a year and requires from developers: environmental effects such as cross-breeding, wildlife effects such as on birds, beneficial insects and mammals, and weediness which deals with keeping the GM-variety controlled. If at any time APHIS decides that the GM-variety is a pest, development stops. **(Public is notified and comments solicited through the Federal Register.)**

6. Experimental Use Permit – If a GM-variety has anti-pest activity, then the EPA must issue approval for tests of 10 acres or more (an EUP). **(Public is notified and comments solicited through the Federal Registry.)**

7. Food Tolerance – Limits are established for pest-control proteins. The EPA examines: variety characteristics such as growth behavior, toxicology such as breakdown of protein in the digestive system, allergenicity dealing with normal dietary protein degradation, specificity to target organisms (pest), environmental fate such as breakdown of protein in soil, and pest resistance potential that will direct GM-variety management. **(Public is notified and comments solicited through the Federal Registry.)**

8. Registration – This step takes 18 months during which time the EPA reviews the environmental and toxicological data. If at any time the EPA questions the GM-variety's safety, development and sale is stopped. **(Public notified and comments are requested.)**

9. Safety Review – The FDA reviews the food and feed safety a GM-variety at least four months prior to its release. The review includes: assessment and testing to determine attributes such as allergenicity, consumption history of protein and identification of unsuspected effects, biological and agronomic characteristics relating modification to unmodified variety, and nutritional composition which compares levels of vitamins etc. between the modified and unmodified variety. The FDA determines that the GM-variety is not substantially different from the conventional variety and approves else it can stop development and sale. **(Public is notified and comments solicited through the Federal Registry.)**

10. Post-commercialization – All three agencies have the authority to halt sales if new data questions consumer safety or the environment.

## New Potato Products Summary

The following is a review of new active ingredients recently released or going through registration. Under each is listed their Trade Name (possibly for other crops), Manufacturer, Active Ingredient, Chemical Family, Mode of Action, Target Use, and Registration Status. Products are listed Fungicides, Herbicides, Insecticides, and Plant Growth Regulators.

### I. FUNGICIDES

**Product** **Acrobat**  
**Manufacturer** American Cyanamid (now BASF)  
**Common Name** Dimethomorph  
**Chemical Family** Cinnamic Acid derivative  
**Mode of Action** Cell wall formation inhibitor  
**Targets** Late Blight  
**Status:** Registered on POTATO. Mix with other products.

**Product** **BAS 510 and BAS 516**  
**Manufacturer** BASF  
**Common Name** unreleased  
**Chemical Family** unreleased (strobilurin ?)  
**Mode of Action** unreleased  
**Targets** Early and Late Blights  
**Status:** Registration pending on POTATO. It is a candidate as a 'reduced risk' product under FQPA.

**Product** **Curzate**  
**Manufacturer** DuPont  
**Common Name** Cymoxanil  
**Chemical Family** Acetamide  
**Mode of Action** Nucleic and amino acid synthesis inhibitor  
**Targets** Late Blight (limited curative activity)  
**Status:** Registered on POTATO. Mix with other products.

**Product** **Cygnus / Sovran**  
**Manufacturer** BASF  
**Common Name** Kresoxim-methyl  
**Chemical Family** Strobilurin  
**Mode of Action** Mitochondrial electron transport inhibitor  
**Targets** Powdery Mildew, Blights (?)  
**Status:** Registration is pending on POTATO.

**Product** **Famoxate**  
**Manufacturer** DuPont  
**Common Name** Famoxadone  
**Chemical Family** Oxazolinedione  
**Mode of Action** —  
**Targets** Early Blight  
**Status:** Registration is pending on POTATO. It is a candidate as a 'reduced risk' product under FQPA. Probably will be marketed in a mix with cymoxanil as the product Tanos.

**Product** **Flint**  
**Manufacturer** Syngenta (Novartis)  
**Common Name** Trifloxystrobin  
**Chemical Family** Strobilurin  
**Mode of Action** Mitochondrial electron transport inhibitor

# New Potato Product Summary

**Targets** Early Blight  
**Status:** Registration is pending on POTATO. It is a 'reduced risk' product under FQPA.

**Product** **Gavel**  
**Manufacturer** Rohm and Haas  
**Common Name** Zoxamide  
**Chemical Family** Amide  
**Mode of Action** Mitosis inhibitor (Cell Division inhibitor)

**Targets** Early Blight  
**Status:** Registration is pending on POTATO. It is a 'reduced risk' product under FQPA.

**Product** **Guardian**  
**Manufacturer** LG Chemicals  
**Common Name** Ethaboxam  
**Chemical Family** Thiazole Carboxamide  
**Mode of Action** —  
**Targets** Late Blight (preventive and curative activity)  
**Status:** Has *potential* use on POTATO and legumes.

**Product** **Headline**  
**Manufacturer** BASF  
**Common Name** Pyraclostrobin  
**Chemical Family** Strobilurin  
**Mode of Action** Mitochondrial electron transport inhibitor  
**Targets** Early and Late Blights  
**Status:** Registration is pending on POTATO. It is a 'reduced risk' product under FQPA.

**Product** **Maxim**  
**Manufacturer** Syngenta (Novartis)  
**Common Name** Fludioxanil  
**Chemical Family** Phenylpyrrole  
**Mode of Action** —  
**Targets** Fusarium dry rot, Rhizoctonia stem canker, Silver Scurf, others  
**Status:** Registered on POTATO as seed treatment. It is a 'reduced risk' product under FQPA.

**Product** **Melody**  
**Manufacturer** Bayer  
**Common Name** Iprovalicarb  
**Chemical Family** Amino Acid Amide Carbamate  
**Mode of Action** —  
**Targets** Late Blight  
**Status:** Has a *potential* use on POTATO.

**Product** **Moncut**  
**Manufacturer** Gowan & Nikon Nohyaku  
**Common Name** Flutanol  
**Chemical Family** Benzamide  
**Mode of Action** —  
**Targets** Rhizoctonia Stem Canker and Verticillium Wilt  
**Status:** Registration is pending on POTATO.

**Product** **Omega**  
**Manufacturer** Syngenta (Zeneca & ISK)  
**Common Name** Fluazinam  
**Chemical Family** Pyridinamine  
**Mode of Action** —  
**Targets** Early and Late Blights, Common Scab (?)  
**Status:** Registration is pending on POTATO. It is a 'reduced risk' product under FQPA.

**Product** **Oxidate**  
**Manufacturer** Bio Safe Systems  
**Common Name** Hydrogen Peroxide  
**Chemical Family** Peroxygen  
**Mode of Action** Oxidant  
**Targets** Storage Diseases  
**Status:** Registered on POTATO.

**Product** **Purogene**  
**Manufacturer** Bio-Cide Intern.  
**Common Name** Chlorine Dioxide  
**Chemical Family** Chlorine releaser  
**Mode of Action** Oxidant  
**Targets** Storage Diseases  
**Status:** Registration is pending on POTATO. It is a 'reduced risk' product under FQPA.

**Product** **Quadris**  
**Manufacturer** Azoxyastrobin  
**Common Name** Syngenta (Zeneca)  
**Chemical Family** Strobilurin  
**Mode of Action** Mitochondrial electron transport inhibitor  
**Targets** Early Blight and Late Blight (preventative and curative activities)  
**Status:** Registered on POTATO. It is a 'reduced risk' product under FQPA.

**Product** **RPA 407213**  
**Manufacturer** Aventis  
**Common Name** Fenamidone  
**Chemical Family** Imidazolinone  
**Mode of Action** Electronic transport inhibitor  
**Targets** Early Blight (preventative and curative activity)  
**Status:** Registration is pending on POTATO. It is a candidate as a 'reduced risk' product under FQPA.

**Product** **Scala**  
**Manufacturer** Aventis  
**Common Name** Pyrimethanil  
**Chemical Family** Anilinopyrimidine  
**Mode of Action** —  
**Targets** Early Blight  
**Status:** Has a *potential* use on POTATO.

**Product** **Tattoo**  
**Manufacturer** Aventis  
**Common Name** Propamocarb Hypochloride  
**Chemical Family** Carbamate  
**Mode of Action** Fatty acid and phospholipid synthesis inhibitor

**Targets** Late Blight (Pythium Leak and Pink Rot ?)  
**Status:** Registered on POTATO. Mix with other products.

**Product** **TM 210**  
**Manufacturer** Tomen Agro  
**Common Name** unreleased  
**Chemical Family** unreleased  
**Mode of Action** unreleased  
**Targets** Late Blight (Pink Rot ?)  
**Status:** Registration is pending on POTATO. It is a 'reduced risk' product under FQPA.

## II. HERBICIDES

**Product** **Affinity / Aim**  
**Manufacturer** FMC  
**Common Name** Fenclazone  
**Chemical Family** Aryl Triazolinone  
**Mode of Action** PPO Inhibitor  
**Targets** Broadleaves including cocklebur & water hemp  
**Status:** Registered on field corn, soybean and wheat. It is pending on POTATO.

**Product** **Authority / Spartan**  
**Manufacturer** FMC  
**Common Name** Sulfentrazone  
**Chemical Family** Aryl Triazolinone  
**Mode of Action** —  
**Targets** Broadleaves and Grasses  
**Status:** Registered on soybean. Has *potential* use on POTATO.

**Product** **Axiom**  
**Manufacturer** Bayer  
**Common Name** Flufenact  
**Chemical Family** Thiadizode  
**Mode of Action** —  
**Targets** Soil-applied for annual grasses and some broadleaves  
**Status:** Registered on corn and soybean in a pre-mix. Has a *potential* use on POTATO.

**Product** **Balance**  
**Manufacturer** Aventis  
**Common Name** Isoxaflutole  
**Chemical Family** Isoxazole  
**Mode of Action** —  
**Targets** Soil-applied for many annual grasses and some broadleaves.  
**Status:** Registered on field corn in some States. Has a *potential* use on POTATO.

**Product** **Ecopant**  
**Manufacturer** Nikon Nohyaku  
**Common Name** Pyraflufen-ethyl  
**Chemical Family** new  
**Mode of Action** Prototox Inhibitor  
**Targets** Total Vegetation Control, Desiccant

# New Potato Product Summary

Status: Registration is pending for POTATO desiccation and on wheat. It's a candidate for 'reduced risk' under FQPA. It's active at very low rates, one gram ai/acre).

Product **Frontier X-2**  
 Manufacturer BASF  
 Common Name Dimethenamide-P  
 Chemical Family Chloroacetamide  
 Mode of Action —  
 Targets Annual Grasses, Broadleaves, yellow nutsedge

Status: Not Registered.  
 Registration is pending on POTATO, corn, sugar beet, and soybean. It is being considered for 'reduced risk' under FQPA.

Product **Inferno**  
 Manufacturer Griffin  
 Common Name Copper Ethylenediamine  
 Chemical Family Organic Copper  
 Mode of Action —  
 Targets Desiccant, Aquatic Weeds  
 Status: Recently registered for POTATO desiccation.

Product **Matrix**  
 Manufacturer DuPont  
 Common Name Rimsulfuron  
 Chemical Family Sulfonylurea  
 Mode of Action ALS inhibitor  
 Targets Annual Grasses and Broadleaves, Triazine-resistant weeds. Methyl-Bromide alternative.  
 Status: Registered on POTATO.

Product **Permit / Sempra**  
 Manufacturer Monsanto / Gowan  
 Common Name Halosulfuron  
 Chemical Family Sulfonylurea  
 Mode of Action ALS Inhibitor  
 Targets Broadleaves including cocklebur and velvetleaf, and nutsedges. Methyl-Bromide alternative.  
 Status: Registered on corn and sorghum. Has a *potential* use on POTATO and dry bean.

Product **Rely / Liberty**  
 Manufacturer Aventis  
 Common Name Glufosinate  
 Chemical Family Butanoic Acid  
 Mode of Action —  
 Targets Total Vegetation Control, Desiccant  
 Status: Recently registered on POTATO for desiccation. Also registered on field corn and soybean, and pending on sugar beet.

Product **Select / Prism**  
 Manufacturer Valent  
 Common Name Clethodim  
 Chemical Family Cyclohexanone  
 Mode of Action ACCase Inhibitor  
 Targets Grasses (only)  
 Status: Registered on several crops including sugar beet, dry bean, alfalfa and soybean. It is pending on TUBER vegetables.

### III. INSECTICIDES

Product **Adage / Actara / Platinum**  
 Manufacturer Syngenta (Novartis)  
 Common Name Thiamthoxam  
 Chemical Family Neonicotinoid  
 Mode of Action Neurotoxin; Ingested Systemic: seed, soil and foliar treatments  
 Targets Soil-dwelling, sucking and feeding insects: aphids, leafhopper and some beetles. Organo-phosphate alternative.  
 Status: Registration pending on tuberous crops.

Product **Admire / Provado / Gaucho**  
 Manufacturer Bayer  
 Common Name Imidacloprid  
 Chemical Family Chloronicotiny  
 Mode of Action Neurotoxin; Ingested Systemic: seed, soil and foliar treatments  
 Targets Sucking and feeding insects: aphids, beetles, psyllids, and grubs. Organo-phosphate alternative.  
 Status: Registered for furrow and foliar applications to POTATO; registration pending as seed treatment.

Product **Ammo**  
 Manufacturer FMC  
 Common Name Cypermethrin  
 Chemical Family Pyrethroid  
 Mode of Action Neurotoxin, Sodium Flux; Contact or Ingested  
 Targets Aphids, beetles et al.  
 Status: Registered on POTATO.

Product **Aztec**  
 Manufacturer Bayer  
 Common Name Tebupirimphos + Cyfluthrin  
 Chemical Family Organophosphate  
 Mode of Action Neurotoxin, Acetylcholine inhibitor; Contact or Ingested; Soil application  
 Targets Wide range including grubs and wireworm  
 Status: Has a *potential* use on POTATO.

Product **Baythroid**  
 Manufacturer Bayer  
 Common Name Cyfluthrin  
 Chemical Family Pyrethroid  
 Mode of Action Neurotoxin, Sodium Flux; Contact or Ingested  
 Targets CPB, ECB, leafhopper, fleabeetle  
 Status: Registered on POTATO.

Product **Clinch**  
 Manufacturer Syngenta (Novartis)  
 Common Name Abamectin  
 Chemical Family Avermectin  
 Mode of Action Neurotoxin  
 Targets Feeding insects as CPB  
 Status: Registered on POTATO and other vegetables.

Product **Decis**  
 Manufacturer Aventis  
 Common Name Deltamethrin  
 Chemical Family Pyrethroid  
 Mode of Action Neurotoxin, Sodium Flux; Contact or Ingested  
 Targets Beetles and bugs  
 Status: Registration is pending on tuber vegetables.

Product **Fulfill**  
 Manufacturer Syngenta (Novartis)  
 Common Name Pymetrozine  
 Chemical Family Pyridine azomethene  
 Mode of Action Stops feeding - death by starvation; Ingested  
 Targets Sucking insects: aphids. Organo-phosphate alternative.  
 Status: Registered on POTATO and other tuber vegetables. It has no effect on beneficial insects. It is a 'reduced risk' product under FQPA.

Product **Regent**  
 Manufacturer Aventis  
 Common Name Fipronil  
 Chemical Family Phenylpyrazole  
 Mode of Action Neurotoxin (unique mode); Systemic with long residual  
 Targets Many families  
 Status: Registered on corn. Registration is pending on POTATO.

Product **Spintor**  
 Manufacturer Dow AgroScience  
 Common Name Spinosad  
 Chemical Family Macrocylic lactone  
 Mode of Action Neurotoxin  
 Targets Several families. Organo-phosphate alternative.  
 Status: Registered on POTATO. It is a 'reduced risk' product under FQPA. It has a low environmental impact and is safe to many beneficial insects.

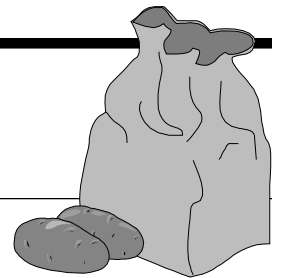


University of Nebraska  
Panhandle Research and Extension Center  
4502 Avenue I  
Scottsbluff, NE 69361

# NEBRASKA

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# POTATO EYES



## IV. PLANT GROWTH REGULATORS

**Product** Apogee  
**Manufacturer** BASF / Kumini  
**Common Name** Prohexadione Calcium  
**Chemical Family** Carboxylate  
**Mode of Action** —  
**Targets** Reduce growth balancing canopy and fruit production  
**Status:** Registered on some vegetables. Has *potential* in seed potato production. It is a 'reduced risk' product under FQPA.

**Product** AuxiGro  
**Manufacturer** Auxein  
**Common Name** Glutamic Acid and derivatives  
**Chemical Family** Butanoic Acid  
**Mode of Action** unknown, "metabolic primer"  
**Targets** Growth and Yield  
**Status:** Recently registered on POTATO.

**Product** DROPP / FreeFall  
**Manufacturer** Aventis / Griffin  
**Common Name** Thidiazuron  
**Chemical Family** Phenylurea  
**Mode of Action** Cytokinin  
**Targets** Cell Division promoter, Anti-senescence  
**Status:** May Have *potential* use on POTATO.

**Product** Ecolyst  
**Manufacturer** Valent  
**Common Name** MBTA  
**Chemical Family** Substituted Tertiary Amine  
**Mode of Action** —  
**Targets** Increased sugar accumulation  
**Status:** Novel PGR registered on citrus. Has *potential* use for processing POTATO and sugar beet. It is a 'reduced risk' product under FQPA.

**Product** PIX  
**Manufacturer** BASF  
**Common Name** Mepiquat Chloride  
**Chemical Family** Quaternary Ammonia  
**Mode of Action** Gibberellin Inhibitor  
**Targets** Shorten Internode Growth, Dwarfing  
**Status:** Registered on cotton. May have *potential* use in Fr. fry and baking POTATO.

**Check out the Nebraska Potato Eyes on the WWW at: <http://www.panhandle.unl.edu/peyes.htm>**



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