

Chapter 17.

Potato Production in Florida

C.M. Hutchinson, E.H. Simonne, W.M. Stall, S.M. Olson, S.E. Webb, T.G. Taylor,
S.A. Smith, and P.D. Roberts

BOTANY

Nomenclature

Family – Solanaceae

Potato – *Solanum tuberosum* L.

Origin

The potato is native to the Andean highlands of Peru.

Related Species

Tomato, pepper, and eggplant are other important vegetables in the Solanaceae family. Tomatillo and pepino, of much less economic importance in Florida, are also in this family. In addition, many plants in this family are used as ornamentals. Some, like tobacco, contain powerful alkaloids which may be addictive, poisonous, or useful as pharmaceuticals.

VARIETIES

Variety selection, often made several months before planting, is one of the most important management decisions made by the grower. Failure to select the most suitable variety or varieties may lead to loss of yield or market acceptability.

The following characteristics should be considered in selection of potato varieties for use in Florida:

Yield – The selected should have the potential to produce crops at least equivalent to the current market standards. The typical yield for Florida fresh market varieties ranges from 225 – 350 cwt/acre. Production falls on the lower end of the scale in the southern counties and increases as production moves into northern counties.

A typical yield for chip potato production is 275 – 400 cwt/acre. Chip potato production areas are located from mid-state counties on both coasts to northern counties.

Disease, Insect, and Nematode Tolerance – Varieties having disease, insect, and nematode tolerance should be selected when all other factors are equal.

Horticultural Quality – Earliness is an important characteristic for Florida production as the average season length is 100 days. Other important qualities, depending on variety usage, include appropriate skin type, set, and color; taste and mouth feel; uniform tuber shape and size; shallow eyes; and relative specific gravity should all be considered.

Adaptability – Potatoes in Florida are grown as day length increases and temperature change from cool to warm. This is opposite compared to many other production areas in the world. New varieties should be tested on limited acreage and accepted by the public and/or processor before planting on wider acreage. All popular northern varieties *do not* produce well in Florida because of Florida growing conditions.

Market Acceptance – New varieties must have characteristics that are appreciated by consumers. In addition, many other entities in the production chain such as packer, processor, and/or retailer all have demands that the variety must meet.

POTATO VARIETIES FOR COMMERCIAL PRODUCTION

Chipping Varieties

ATLANTIC - With high yield potential, high specific gravity and uniform tuber size and shape, Atlantic is the standard variety for chipping from the field or from very short-term storage. The cultivar is tolerant to scab and Verticillium wilt; resistant to pinkeye; and highly resistant to Race A of golden nematode, virus X and tuber necrosis. Tubers are susceptible to internal heat necrosis, particularly in sandy soils in warm, dry seasons. Hollow heart in the larger diameter tubers (> 3 in) can be serious in some growing areas when growing conditions over the season fluctuate

HARLEY BLACKWELL –Harley Blackwell is a round, white-, netted-skinned cultivar, resistant to internal heat necrosis, for chipping directly from the field in the mid-Atlantic states. Harley Blackwell is resistant to race A of golden nematode, air pollution susceptible, Verticillium

wilt, late blight. It is moderately susceptible to early blight with intermediate resistance to common scab and some tolerance to powdery scab.

Fresh Market/Table Varieties

RED LASODA - Red LaSoda is an early to medium season, red-skinned variety that is primarily grown in the southeastern U.S. It is harvested in the winter months as a fresh market variety. Red LaSoda has a high yield potential of tubers with a bright red color. Tubers size early. Tuber eye depth and off-shape tubers are limitations. The cultivar is susceptible to early and late blights, scab, corky ringspot, and bacterial wilt. Red LaSoda is the top planted red-skinned potato variety in Florida.

LAROUGE - LaRouge is a early to medium maturing, red-skinned variety that has a high tuber yield potential with tubers sizing early. Primary growing areas are in the southeastern U.S. The variety is grown for the fresh market and is generally not stored. LaRouge has good scab resistance but is susceptible to early and late blights, corky ringspot, and bacterial wilt. The deep eyes and irregular tuber shape are the major limitations. When harvested in southern states the relatively high yield, bright color, and good boiling qualities make it popular for markets in the late winter.

LACHIPPER - LaChipper is an early to midseason variety with moderate to high tuber yield and moderate specific gravity. It is the top planted fresh market white-skinned variety in Florida. Tubers are more elongated than round, somewhat flattened. Skin is smooth and white with medium to deep, cream colored eyes that are fairly evenly distributed. Tuber flesh is very white. La Chipper possesses some resistance to late blight. It is moderately susceptible to common scab. Exposure to air pollution can result in defoliation and reduction in tuber yield. Deep eyes and irregular shape are disadvantages on the tablestock market.

SEBAGO - Sebago was released by the USDA and the Maine Agricultural Experiment Station in 1938. Tubers are elliptical to round with a smooth, ivory skin. Specific gravity is medium to low. Sebago is recognized statewide as having excellent flavor but it lacks some important horticultural qualities to compete equally with current fresh market standards. When grown in the south, the variety's maturity is considered medium. Tubers grown under ideal conditions are attractive but are susceptible to prominent lenticels under wet conditions. Sebago is resistant to net necrosis and wart and has moderate resistance to early and late blight, southern bacterial wilt, PVX, PVY, PVA and some resistance to scab. The variety is highly susceptible to blackleg.

YUKON GOLD - Yukon Gold has early-medium maturity, moderate yields, moderate specific gravity and relatively attractive tuber type. Tubers slightly oval, may

be somewhat flattened with yellow-white skin and light yellow tuber flesh. Its shallow, pink eyes distinguish Yukon Gold from other yellow-skinned, yellow-fleshed cultivars. Yukon Gold is resistant to mild mosaic, moderately resistant to leafroll virus and susceptible to virus Y, common scab and air pollution. In some growing areas, hollow heart and internal heat necrosis may be a problem. Yukon Gold retains the yellow flesh color when baked, boiled or french-fried.

GOLDRUSH - Goldrush is a medium maturing russet cultivar grown primarily for the fresh market. Russet-skinned tubers are oblong to long and average approximately 6-10 tubers per plant. Eyes are very shallow and well distributed; under some conditions they may show a reddish blush. Tuber flesh is very white and tuber dormancy is medium in duration. Goldrush has been observed to have moderate resistance to Verticillium wilt, good resistance to scab, moderate resistance to blackspot and some resistance to silver scurf. It is considered susceptible to most common potato viruses and other potato diseases, such as early blight, late blight, soft rot and Fusarium dry rot.

GENERAL INFORMATION – Production, quality, and disease resistance information is not provided for proprietary varieties. Information on proprietary varieties can be obtained by private or licensing company.

For further information on potato varieties for Florida production refer to the following EDIS documents:

Fresh market red and purple-skinned potato varieties for commercial production in northeast Florida. <http://edis.ifas.ufl.edu/CV283>

Fresh market white-skinned potato varieties for commercial production in northeast Florida. <http://edis.ifas.ufl.edu/CV282>

Fresh market russet potato varieties for commercial production in northeast Florida. <http://edis.ifas.ufl.edu/CV281>

Chip potato varieties for commercial production in northeast Florida. <http://edis.ifas.ufl.edu/CV280>

Potato vine killing or desiccation. <http://edis.ifas.ufl.edu/HS181>

Growing potatoes in the Florida home garden. <http://edis.ifas.ufl.edu/HS183>

Potato physiological disorders – growth cracks. <http://edis.ifas.ufl.edu/HS182>

Potato physiological disorders – brown center and hollow heart. <http://edis.ifas.ufl.edu/HS197>

SEEDING AND PLANTING

Planting date and seeding information are given in Table 1.

Table 1. General potato planting information.

Planting dates	
North Florida	Jan-Feb
Central Florida	Dec-Feb
South Florida	Oct-Jan ¹
Planting information	
Distance between rows (inch)	36 - 42
Distance between plants (inch)	5 - 10
Planting depth (inch)	3 - 4
Average seed piece size (oz)	2.5 - 3.0
Average seed per planted acre (lb)	2000 - 3000
Days from planting to tuber maturity	85 - 110.

FERTILIZER AND LIME

For subsurface or sprinkler irrigated crops, band all P₂O₅, micronutrients, K₂O (50%), and nitrogen (50%) in bed at planting. When plants reach a 10-12 inch growth stage (approximately 35-40 days after planting), band or

Table 2. Planting information for potato.

Planting dates	
North Florida	Jan-Feb
Central Florida	Dec-Feb
South Florida	Oct-Jan ¹
Planting information	
Distance between rows (in)	36 - 42
Distance between plants (in)	6 - 12
Planting depth (in)	3 - 4
Seed pieces per acre (lb)	2,000 - 3,000
Days to maturity: seed pieces	85 - 110
Plant population ² (acre)	29,040
¹ February plantings in Glades	
² Population based on closest between and within row spacing.	

Table 3. Soil test and fertilizer recommendations for mineral soils for potato (based on 40 to 42 inch centers).¹

Target pH	N (lb/A)	K ₂ O (lb/A)	P ₂ O ₅ (lb/A/crop season)				
			VL	L	M	H	VH
6.0	200	150	120	120	60	0	0

¹ See Chapter 2 section on supplemental fertilizer application and best management practices, pg 11.

Table 4. Plant tissue analysis for potato plants 10 inches tall. Dry wt. basis.

Status	N	P	K	Ca	Mg	S	Fe	Mn	Zn	B	Cu	Mo
	Percent						Parts per million					
Deficient	<3.0	0.2	3.5	0.6	0.3	0.25	40	30	30	20	5	0.1
Adequate range	3.0-6.0	0.2-0.8	3.5-6.0	0.6-2.0	0.3-0.6	0.25-0.50	40-150	30-60	30-60	20-60	5-10	0.1-0.2
High	>6.0	0.8	6.0	2.0	0.6	0.50	150	60	60	60	10	0.5

Table 5. Sufficiency ranges for petiole sap testing for potato.

Crop development stage	Fresh petiole sap concentration (ppm)	
	NO ₃ -N	K
Plants eight-inches tall	1200-1400	4500-5000
First open flowers	1000-1400	4500-5000
50% flowers open	1000-1200	4000-4500
100% flowers open	900-1200	3500-4000
Tops falling over	600-900	2500-3000

inject remaining K_2O and nitrogen into side of bed (Table 3). In seepage irrigated potatoes, banded or infected fertilizer must be placed deep enough in the bed to reach the capillary fringe of the perched water table.

PLANT TISSUE ANALYSIS

Plant tissue analysis for potato is listed in Table 4. This data corresponds to nutrient concentrations in the most recently matured leaf of 10 inch tall plants.

PETIOLE SAP TESTING

Fresh sap can be pressed from leaf petioles and analyzed for nitrogen and potassium concentrations. Results can be used to make fertilizer adjustments within the first 40 days after planting. Application of fertilizer near or after full flower will not result in tuber yield increase. Sufficiency ranges for sap testing for potato are presented in Table 5.

IRRIGATION

Potato plant growth peaks at or soon after full flower. The highest demand for water occurs in the growth stages leading up to full flower. Plant water requirements increase from about 40% of ETo (see Chapter 3, Table 1) during the initial plant growth stages to 110% of ETo at peak foliar growth and tuber development. Tubers bulk rapidly after full flower when the foliage begins to senesce. Plant water use decreases to about 70% ETo. The depth of the perched water table in the seepage irrigated potatoes should be carefully maintained. The perched water table should be dropped before expected periods of heavy rainfall. Over irrigation late in the season can cause lenticels to expand detracting from fresh market tuber quality. In addition, over irrigation late in the season can lower specific gravity in chipping potatoes.

WEED MANAGEMENT

Weed control early in the season is important to maximize tuber yield and quality. A combination of herbicide application and working potato acreage will reduce weed pressure. Care should be taken to implement a weed control program that reduces weed pressure late in the season after foliage begins to senesce. Failure of a weed control program late in the season will impact tuber bulking and the ease at which potatoes can be harvested. Water furrows should be maintained weed free as they can serve as a

weed seed bank to re-infest the planted acreage. Herbicides labeled for weed control in potatoes are listed in Table 6.

POTATO VINE DESICCANTS

Potatoes grown in Florida fit into two marketing niches. A few potato varieties are grown for the processing market (chip or diced). For the processing market, it is often not necessary to produce a fully mature tuber with excellent skin quality as the potato will be processed shortly after harvest. However, many tubers in Florida enter the fresh market. Fresh market tubers are sold on appearance and taste. It is important for these tubers to have excellent skin quality and the ability to maintain quality for a short period of time.

Non-mature tubers will “skin” when harvested. Skinned tubers appear untidy due to bits of protruding skin. Skinned areas will also discolor turning from tan to dark brown. Non-mature tubers also lose significantly more weight than unskinned tubers in storage and transit. Skinned areas are sites of soft rot infection resulting in rejected loads.

Tubers can be induced to mature in the field by killing the potato vines either mechanically, with herbicides, or a combination of both. Rapid killing of vines under stressful (water or heat) conditions can result in discoloration of the tuber vascular tissue. Discoloration does not increase in storage or affect storage quality.

Killing the potato vines induces tubers to mature rapidly and causes the periderm to set. Tubers should remain in the field at least 14 to 21 days after vine kill and dependent on herbicide label information. The longer the period between vine kill and harvest, the less chance tubers will skin at harvest. The time it takes for tubers to mature after vine kill is variety dependent. A small plot of tubers should be dug periodically by hand and rubbed to test for skin slippage. It is difficult to get the skin to slip on mature tubers. It will take tubers longer to mature when plants are killed under active growing conditions (vines green and vigorous) compared to tubers under senescing vines.

When vines are killed, sunburning and/or greening can affect tubers not sufficiently covered with soil. Hilling soil around the plant to keep tubers covered is important. Vine desiccants are listed in Table 7.

DISEASE MANAGEMENT

Chemicals approved for disease management of potato are listed in Table 8.

PRODUCTION COSTS

Production costs for chip and table potatoes in major Florida potato growing areas are given in Table 10 (Hastings-chip) and Table 11 (Hastings-table).

INSECT MANAGEMENT

Table 9 outlines the insecticides approved for use on insects attacking potato.

Table 6. Chemical weed controls: potatoes.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Carfentrazone (Aim)	Potatoes	Directed-hooded row-middles	0.008-0.025	0.008-0.025
Remarks: Aim may be applied as a post-directed hooded burn-down application to emerged broadleaf weeds in row middles. Aim is not labeled for grassy weeds. May be tank mixed with other herbicides registered for this treatment pattern. May be applied at 0.33 oz (0.008 lb ai) to 1 oz (0.025 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant (nis) at recommended rates.				
Carfentrazone (Aim)	Potatoes	Preplant Directed-hooded Row-middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burn-down of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant at recommended rates.				
Clethodim (Select 2 EC) (Arrow) (Select Max)	Potatoes	Postemergence	0.09-0.25	
Remarks: Postemergence control of actively growing annual grasses. Apply at 6-16 fl oz/acre (Select, Arrow) or 9-16 fl oz/acre (Select Max). Higher rates are listed for perennial grasses. Use a crop oil concentrate for Select and Arrow, but a non-ionic surfactant may be used for Select Max. Do not apply within 30 days of harvest.				
DCPA (Dacthal W-75)	Potato	Preemergence or early layby	6.0-8.0	---
Remarks: Controls germinating annuals. Apply to moist soil. Note label precautions of replanting non-registered crops within 8 months.				
EPTC (Eptam 7E) (Eptam 10G)	Potato	Postemergence or early layby; Preplant, Dragoff, Layby	3.0 3.0	---
Remarks: Granular formulation may be applied Preplant incorporated, at Dragoff and incorporated or at Layby and incorporated into clean cultivated soil. Emulsifiable formulation should not be applied on winter and early spring potatoes. Apply only after potatoes have emerged and true leaves have formed or at layby. There is a 45-day preharvest interval for application.				
Flumioxazin (Chateau)	Potato	Pre emergence	0.048	---
Remarks: Chateau may be applied to potatoes at 1.5 oz product after hilling for the preemergence suppression of several broadleaf weeds. A minimum of 2 inches of soil must cover the potato at the time of application. Chateau should be tank-mixed with other labeled herbicides for broad spectrum weed control, especially the grass weeds.				
S-Metolachlor (Dual Magnum)	Potato	Preemergence; Preplant incorporated; Postplant incorporated	.95 - 1.9	---
Remarks: Applications must be made before crop emergence. Preemergence and postplant incorporated should be made after drag off but before potato or weed emergence. May be tank mixed with Sencore/Prowe as preemergence treatment. When used alone, label states control of many grasses and broadleaf weeds including crabgrass, fall panicum, goosegrass, signalgrass, yellow nutsedge, galen-soga, pigweed and Florida pusley. Note: Under prolonged cool, wet conditions, minor foliage injury has been seen.				

Table 6. Continued.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
S-Metolachlor+ Metribuzin (Boundary)	Potato	Preemergence	1.5 to 2 pints	
Remarks: Boundary is apremix herbicide of s-metolachlor and metribuzin. The product contains 5.25 lbs of s-metolachlor and 1.25 lbs of metribuzin per gallon. Apply the product after planting but before potato emergence. This includes after drag-off. Do not incorporate. Post emergence applications to 'Atlantic' are precoutioned against.				
Metribuzin (Sencor DF) (Sencor 4)	Potato	Preemergence	0.5 - 1.0	---
Remarks: Apply to soil surface after drag-off but before crop emergence. Do not incorporate. Use lower rate on sandy soil.				
Metribuzin (Lexone DF) (Sencor DF) (Sencor 4)	Potato	Postemergence	0.25 - 0.5	---
Remarks: Not to be used on early maturing white or red skinned varieties. Apply only if there have been 3 consecutive days of sunny weather. Treat before weeds are 1" tall. Do not apply within 60 days of harvest. Split applications of pre plus postemergence may be made. Do not use more than 1 lb. per season.				
Paraquat (Gramoxone Inteon) (Firestorm)	Potato	Preemergence	0.47	0.47
Remarks: Controls emerged weed seedlings. Apply after planting, but before potatoes emerge. Use a non-ionic spreader.				
Pelargonic Acid (Scythe)	Potato	Preplant Preemergence Directed-Shielded	3-10% v/v	3-10% v/v
Remarks: Product is a contact, nonselective, foliar herbicide. There is no residual activity. May be tank mixed with soil residual herbicides. Consult label for rates and timings of applications.				
Pendimethalin (Prowl)	Potato	Preemergence; Preemergence Incorporated	0.75	---
Remarks: May be applied after planting but before potatoes and weeds emerge or after drag-off. Most effective when incorporated by rainfall or mechanically into top 1 to 20 of soil within 7 days after application. Will not control established weeds. May also be applied early postemergence (from emergence to 6-inch stage of growth). Use this application on trial basis only. May be tank mixed with Sencore/Lexone, Eptam. Label states not for use on peat or muck soils.				
Rimsulfuron (Matrix)	Potato	Preplant Preemergence Directed-Shielded	0.25-0.38 oz	0.25-0.38 oz
Remarks: Apply at a rate of 1 to 2oz of product to clean soil following hilling or drag-off. Product must be activated by irrigation or rainfall with 5 days. Apply postemergence to actively growing small weeds after crop emergence. Add as non-ionic surfactant to postemergence applications. Do not apply within 60 days of harvest. Do not exceed 2.0 oz product per acre/growing season. Preemergence tank mixes of Matrix with Lexone, Eptam, Prowl, Lorox or Dual are labeled. Postemergence tank mixes of Matrix plus Lexone an Eptam are labeled. Note and follow rotational crop guidelines.				
Sethoxydim (Poast)	Potato	Postemergence	0.188 - 0.28	0.188 - 0.28
Remarks: Controls actively growing grass weeds. A total of 5 pts. product per acre may be applied in one season. Do not apply within 30 days of harvest. Apply in 5 to 20 gals. of water adding 2 pts. of crop oil concentrate per acre. Unsatisfactory results may occur if applied to grasses under stress. Use 0.188 lb ai (1 pt.) to seedling grasses and up to 0.28 lb ai (1.5 pts.) to perennial grasses emerging from rhizomes, etc. Consult label for grass species and growth stage for best control.				

Table 7. Chemical desiccants for potato production.

Active Ingredient	Common Name	Manufacturer	Product Rate	PH Interval ¹	Relative Desc. Rate ²
Carfentrazone	AIM	FMC	3.2-5.8 fl oz/A	7 days	Fast
Diquat	Reglone	Syngenta	1-2 pt/A	7 days	Fast
Endothal	Desiccate II	Cerexagri	1.5-2 qt/A	10 days	Slow
Gulfosinate	Rely	Bayer	3 pints/A	9 days	Slow
Pelargonic Acid	Scythe	Dow	7-10% sol.	1 day	Fast
Pyraflufen	ET	Nichino	2.75-5.5 fl oz/A	14 days	Slow

¹ Preharvest interval is the minimum time between application and harvest. It is not necessarily the time required to achieve tuber maturity and good skin-set.

² Relative desiccation rate for each herbicide.

Table 8. Disease management for potato.

Chemical (Active ingredient)	Fungicide Group	Maximum Rate Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Acres Per Season			
Acrobat 50WP (Dimethomorph)	40	6.4 oz	32 oz	4	Late blight	
Agri-tin (Triphenyltin hydroxide)	30	3.75 oz	11.5	7	Early blight Late blight	
Agri-Mycin 17, Bac-Master, Firewall (Streptomycin)	25	100 ppm				Seed treatment
Amistar 80DF (Azoxystrobin)	11	5 oz	2.5 lb	14	Early blight Late blight (Various: See label)	Apply in rotation with non-group 11 fungicides
Blocker 4F (Pentachloronitrobenzene (PCNB))	14	10 pt/A	20 lb		Stem canker Black scurf	Apply at planting
Endura 70WP (Boscalid)	7	10 oz	20.5 oz	10	Early blight See label	Do not make more than 4 apps at low rate or 2 apps at high rate
Curzate 60DF (Cymoxanil)	27	3.2 oz	22.4 oz	14	Late blight	Limit is 7 apps/year. Use in combination with a protectant fungicide. It is best to alternate Curzate with other fungicides such as mancozeb or chlorothalonil.
Dithane M45, Dithane DF Rainshield, Dithane F45 Rainshield, Manzate Flowable, , Manzate Pro-Stick, Nubark Mancozeb, Penncozeb 4FL, Penncozeb 80WP, Penncozeb 75DF (Mancozeb)	M3	See label	See label	3	Early Blight Late Blight (see label)	See label for seed piece treatment.

Table 8. Continued.

Chemical (Active ingredient)	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Distinguish 480SC (Pyrimethanil; Trifloxystrobin)	9 & 11	10 fl oz	50 fl oz	7	Early blight	Apply in rotation with non-group 11 fungicides
Manex (Maneb)	M3	1.6 qt	11.2 qt	3	Early blight Late blight	0.8 qt./10 gal of water for seed piece treatment. Allow to dry and do not use as livestock feed.
Maneb 75DF (Maneb)	M3	2 lb	14.9 lb	3	Early blight Late blight	Same as for Maneb 80 WP
Maneb 80WP (Maneb)	M3	2 lb	14 lb	3	Early blight Late blight	1 lb/10 gal. water for seed piece treatment. Allow to dry and do not use as livestock feed.
Evito 480SC (Fluoxastrobin)	11	3 fl oz	22.8 fl oz	7	Early blight Late blight	Apply in rotation with non-group 11 fungicides
Forum (Dimethomorph)	15	6 oz	30 oz	4	Late blight	Tank mix with another chemistry. Do not make more than 2 sequential applications before alternating to a non-group 15 fungicide
Gavel 75DF (Mancozeb; Zoxamide)	M3 & 22	2.0 lb	12 lb	3	Early blight Late blight	This product contains 66.7% mancozeb so do not exceed maximum allowed for mancozeb considering this and other mancozeb-containing products.
Gem 500SC (Trifloxystrobin)	11	3.8 fl oz	23 fl. oz	7	Early blight Late Blight	Limit is 6 appl./crop and alternate chemistry
Headline 2.09F (Pyraclostrobin)	11	12 fl oz	72 fl oz	3	Early blight Late blight (See label)	Alternate with non-group 11 chemistry between applications.
Heritage (Azoxystrobin)	11	10.5 oz Use 3.2 oz product/A rate for early and late blight	4.0 lb	14	Early blight Late blight (See label)	Alternate with non-group 11 chemistry between applications
Ridomil Gold Copper 64.8W (Copper hydroxide; Mefenoxam)	M1 & 4	See label	See label	14	Late blight	Limit is 3 appl./crop of this product & other Ridomil products Add protectant fungicide, see label.
Ridomil Gold Bravo SC (Chlorothalonil; Mefenoxam)	M5 & 4	2.5 lb	See label	14	Late blight Early blight (See label)	Limit is 4 appl./crop
Bravo Ultrex, Bravo ZN, Equus 720SST, Bravo Weather Stik 6L, Chloronil 720, Echo 90DF, Echo 720, Echo ZN, Equus DF, Initiate 720 (Chlorothalonil)	M5	See label	See label	7	Late blight Early blight See label	Read label for application directions

Table 8. Continued.

Chemical (Active ingredient)	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Rovral 4F and Iprodione 4L (Iprodione)	2	2 pt	8 pt	14	Early blight Sclerotinia	Limit is 4 appl./crop
Polyram 80DF (Metiram)	M3	2 lb	14 lb	3	Late blight Early blight	Limit is 7 appl./season
Quadris 2.08FL (Azoxytrobilin)	11	15.5 fl oz	2.0 lb ai/A	14	Late blight Early blight (See label)	Alternate with non-group 11 chemistry between applica- tions
Quadris Opti (Azoxytrobilin; Chlorothalonil)	11 & M5	1.6 pt	See label	14	Late blight Early blight (see label)	Alternate with non-group 11 chemistry between applica- tions
Quadris Ridomil Gold (Azoxytrobilin; Mefenoxam)	11 & 4	0.82 fl oz./1000 ft. of row	See label		Rhizoctonia canker, Pythium (See label)	Apply at planting
Alude, Fosphite, Fungi- Phite, Topaz, Prophyt (Potassium phosphite)		See label	See label	0	Late blight	Check label for required mini- mum gallons per acre, restric- tions for use following copper application, plant and environ- mental conditions that restrict use, and for compatibility with other materials.
Oxidate (hydrogen dioxide)						See label for specific instruc- tions for use with potato
ManKocide 61.1DF (Copper hydroxide; Mancozeb)	M1 & M3	5 lb	74.66 lb	3	Early blight Late blight	
Maxim 4FS (Fludioxonil)	12	0.16 oz/100 lb seed			See label	Seed treatment. Must be made using specific equip- ment. See label.
Maxim MZ (Fludioxonil and Mancozeb)	12 & M3	0.5 lb/100 lb seed			See label	Seed treatment
Maxim Potato Seed Protectant (Fludioxonil)	12	0.5 lb/100 lb seed			See label	Seed treatment
Bac-Master, Firewall 17 (Streptomycin)	25	100 ppm			Soft Rot Blackleg	Seed treatment; add fungicide for fungal diseases; see label
Moncut 70DF (Flutolanil)	7	1.1 lb			Rhizoctonia	In-furrow use only
Omega 500F (Fluazinam)	29	8 oz	3.5 pt	14	Late blight White mold	
Potato Seed Treater 6% and Potato Seed Treater PS (Mancozeb)	M3	1 lb/100 lb seed			Fusarium	Seed treatment
Ranman (Cyazofamid)	21	2.75 fl oz/A	27.5 fl oz	7	Late blight (See label)	Alternate with non-group 11 chemistry between applica- tions

Table 8. Continued.

Chemical (Active ingredient)	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Reason 500SC (Fenamidone)	11	8.2 fl oz	24.6 fl oz	14	Late blight Early blight (See label)	Alternate with non-group 11 chemistry between applica- tions
Previcur Flex (Promocarb hydrochloro- ride)	U	1.2 pt	6.0 pt	14	Late blight Early blight	Use with a tank mix. See label for seed piece treatment.
Ridomil Gold SL (Mefenoxam)	4	Apply 0.42 oz/1000 lin- ear ft			Pythium and Phytophthora damp- ing-off	Apply at planting
Ridomil Gold MZ (Mancozeb; Mefenoxam)	M3 & 4	2.5 lb	10 lb	3	Late blight Early blight (See label)	
Revus Top (Difenoconazole; Mandipropamid)	3 & 40	7 fl. oz	28 fl. oz.	14	Early blight Late blight (See label)	Do not make more than 2 con- secutive applications
Scala SC (Pyrimethanil)	9	7 fl. oz	35 fl. oz	7	Early blight (See label)	
Serenade ASO (<i>Bacillus subtilis</i> strain QST 713)		6 qt		0	Early blight Late blight	Tank mix with other fungicide for late blight
Serenade Max (<i>Bacillus subtilis</i> strain QST 713)		3 lb		0	Early blight Late blight	Tank mix with other fungicide for late blight
Sonata (<i>Bacillus pumilus</i> strain QST 2808)		4 qt		0	Early blight Late blight	Tank mix with other fungicide for late blight
Rhapsody (<i>Bacillus subtilis</i> strain QST 713)		6 qt/100 gal			Early blight Late blight	Tank mix with other fungicide for late blight
Sulfur (Dusting sulfur, Kumulus DF, Micro Sulf, Microthiol Disperss, Sulfur 90W, Super Six, Thiosperse 80%, Wettable Sulfur, Yellow Jacket Wettable Sulfur) (Sulfur)	M2				See label	Do not apply in warm weather. Do not apply within 2 weeks of an oil spray.
Super-Tin 80WP (Triphenyltin hydroxide)	30	3.75 oz	11.25 oz	7	Early blight Late blight	For use with closed tractor cabs only. Super Tin should be tank-mixed with a man- cozeb fungicide (e.g. Manex, Dithane, Manex, Manzate or Penncozeb)
Tanos (Cymoxanil; Famoxadone)	27 & 11	8 oz	48 oz	14	Early blight Late blight (See label)	Do not make consecutive applications. Rotate to material with different mode of action

Table 8. Continued.

Chemical (Active ingredient)	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Terraclor 75WP (Pentachloronitrobenzene (PCNB))	14	6.66 lb			Rhizoctonia	At planting
Terraclor F (Pentachloronitrobenzene (PCNB))	14	10.4 fl oz 1000 linear ft	15 pt	45	Rhizoctonia White mold	At planting or see label for white mold
Thiophanate Methyl 85WDG (Thiophanate-methyl)	1	1.2 lb	3.2 lb	21	White mold	
Topsin M WSB, T-Methyl (Thiophanate-methyl)	1	1.5 lb	4 lb	21	White mold	
Topsin 4.5FL (Thiophanate-methyl)	1	30 fl oz	80 fl oz	21	White mold	
Topsin M 70WP (Thiophanate-methyl)	1	1-1 ½ lb/A	4 lb	21	White Mold (Sclerotinia)	May be tank mixed with other fungicides labeled for early and late blight control. Aerial application is not recom- mended.
Ultra Flourish (Mefenoxam)	4	0.84 oz/1000 linear ft			Pythium and Phytophthora-caused seed decays	At planting
Tops 2.5D (Thiophanate-methyl)	1	1 lb/100 lb seed			Fusarium and Rhizoctonia-caused seed decays	
Various copper com- pounds (Badge SC, Basic Copper 53, COC DF, COC WP, COC WDG, Champ DP Dry Prill, Champ 2 FL, Champion, Cuprofix Ultra 40 Disperss,, Copper- Count-N, Cuprofix MZ Disperss, Copper sulfate crystals, Copper Sulfate Instant Powder, Kentan DF, Kocide 101, Kocide 2000, Kocide 4.5LF, Kocide DF, Kocide 3000, Nordox, Nu Cop 50WP, Nu-Cop 3L, Nu-Cop 50DF, Nu-Cop HB, Quimag Copper Sulfate Crystal, Tenn-Cop 5E, Stretch.)	M1		See indi- vidu- al labels	See indi- vidual labels	Early blight Late blight (see individual label)	See individual labels

Table 9. Selected insecticides approved for use on insects attacking potatoes.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Acramite 4SC (bifenazate)	16-24 fl oz	12	14	twospotted spider mite	un	One application per year.
Actara (thiamethoxam)	1.5-3.0 oz	12	14	aphids (higher rate), Colorado potato beetle, potato leafhopper	4A	Toxic to bees. Do not use follow- ing soil application of Platinum. Maximum 6 oz/acre per season.
Admire Pro (imidacloprid)	5.7-8.7 fl oz seed piece: 3.5- 7.0 fl oz/100 lb seed	12	at plant- ing, see label for options	aphids, Colorado potato beetle, flea beetles, potato leafhopper, wire- worms (seed-piece only)	4A	Do not apply more than, 0.31 lb ai per acre per season. Seed piece rate is based on seeding rate of 2000 lb/acre.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	1.0-2.0 lb	4	0	lepidopteran larvae (cat- erpillar pests)	11	Apply when larvae are small for best control. OMRI-listed ² .
*Agri-Mek 0.15 EC (abamectin)	8-16 fl oz	12	14	Colorado potato beetle, <i>Liriomyza</i> leafminers, spider mites	6	No more than 2 sequential appli- cations. See label for resistance management.
*Ambush 25W (permethin)	3.2-12.8 oz	12	14	cabbage looper, Colorado potato beetle, potato aphid, potato flea beetle, potato leafhop- per, potato tuberworm	3	Do not apply more than 1.6 lb active ingredient per season (102.4 oz).
*Asana XL (0.66 EC) (esfenvalerate)	2.9-9.6 fl oz	12	7	beet armyworm (aids in control), cabbage looper, Colorado potato beetle, cucumber beetles (adults), cutworms, flea beetles, grasshoppers, potato aphid, potato leafhopper, potato tuber- worm, tarnished plant bug	3	Do not apply more than 0.35 lb ai/ acre per season (7 applications at highest rate).
Assail 70WP (acetomiprid)	0.6-1.7 oz	12	7	aphids, Colorado potato beetle, leafhoppers, flea beetle	4A	Do not make more than 4 applica- tions per season. Do not exceed a total of 0.3 lb ai per acre per season.
Assail 30 SG	1.5-4.0 oz					
Avaunt (indoxacarb)	2.5-6.0 oz	12	7	cabbage looper, Colorado potato beetle	22	Do not apply more than 24 oz/acre per crop.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, cat- erpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpil- lars, leafhoppers, leaf- miners, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator.
*Baythroid XL (beta-cyfluthrin)	0.8-2.8 fl oz	12	0	cabbage looper, Colorado potato beetle, cutworms, flea beetles, potato leafhopper, pota- to tuberworm, tarnished plant bug	3	Allow at least 5 days between applications. A maximum of 16.8 oz may be applied per acre per season.

Table 9. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Belay 50WDG (clothianidin)	1.9-2.8 fl oz 1-1.5 oz	12	14	aphids, Colorado potato beetle, flea beetle, leafhoppers	4A	See label for in-furrow or side dress applications.
Beleaf 50 SG (flonicamid)	2.0-2.8 oz	12	7	aphids, plant bugs	9C	Begin applications before pest populations reach damaging levels. Do not apply more than 8.4 oz/acre per season.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
*Brigade 2 EC (bifenthrin)	19.2 oz at-plant (soil) 3.2-9.6 oz at lay- by (soil)	12	21	cucumber beetles, flea beetles, sweet-potato weevil adults (foliar), whitefringed beetle adults, white grub adults, white grubs (lay-by), wireworm adults, wireworms (at-plant and lay-by)	3	No more than 2 foliar applications, at least 21 days apart. Do not apply more than 0.5 lb active ingredient per acre per season, including soil applications.
*Capture LFR	2.1-6.4 oz (foliar) See label for rates for LFR.					
Clinch (Abamectin)	1 lb	12	0	fire ants	6	Apply when ants are actively foraging. Apply after dew or rainfall has dried for maximum effectiveness. Do not apply if rainfall is anticipated within 4-6 hours.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11	Use higher rates for armyworms. OMRI-listed ² .
Dimethoate 4 EC, 2.67 EC (dimethoate)	4EC: 0.5-1 pt 2.67: 0.75-1.5 pt	48	0 - 2.67 2 - 4E	aphids, grasshoppers, leafhoppers, leafminers	1B	Highly toxic to bees.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
Entrust (spinosad)	1-3 oz	4	7	armyworms, Colorado potato beetle, loopers, thrips	5	Do not apply to consecutive generations of Colorado potato beetle. Do not apply more than 4 times/crop. OMRI-listed ² .
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.

Table 9. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Fulfill (pymetrozine)	2.75-5.5 oz	12	14	green peach aphid, potato aphid	9B	Apply when aphids first appear. Do not exceed 11.0 oz/acre/ season.
*Furadan 4F (carbofuran)	1-2 pts	48	14	Colorado potato beetle, flea beetles, leafhoppers	1A	See label for restrictions based on soil type and water table.
Imidan 70 W (phosmet)	1.3 lb	24	7	Colorado potato beetle, flea beetles, potato leaf- hoppers	1B	Use only on potatoes to be har- vested by machine.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.5 lb	4	0	most caterpillars, but not <i>Spodoptera</i> species (armyworms)	11	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
Kryocide (cryolite)	10-12 lb	12	0	Colorado potato beetle	9A	Application to exposed tubers may result in excess residues.
*Lannate LV; *SP (methomyl)	LV: 1.5-3.0 pt SP: 0.5-1.0 lb	48	6	aphids, beet armyworm, fall armyworm, flea bee- tles, leafhoppers, loop- ers, potato tuberworm, variegated cutworm	1A	
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	1.0-2.0 lb	12	0	for most caterpillars, including beet army- worm (see label)	11	Treat when larvae are small. Thorough coverage is essential.
Malathion 8F (malathion)	1-3 pt	12	0	aphids, false chinch- bugs, grasshoppers, mealybugs, leafhoppers	1B	
*Mocap 15 G, *EC (ethoprop)	See labels	48	preplant or at planting	symphylans, wireworms	1B	
*Monitor 4 EC (meth- amidophos)	1.5-2 pts	4 days	14	aphids, armyworms, cabbage looper, Colorado potato beetle, cutworms, flea beetles, <i>Lygus</i> bug, potato leafhopper, potato tuber- worm	1B	
Movento (spirotetramat)	4.0-5.0 fl oz	24	7	aphids, psyllids, white- flies	23	Maximum of 10 fl oz/acre per season.
M-Pede 49% EC Soap, insecticidal	1-2% V/V	12	0	aphids, Colorado potato beetle, leafhoppers, plant bugs, thrips, whiteflies, mites	--	OMRI-listed ² .
*Mustang Max EC (zeta-cypermethrin)	1.28-4.0 oz	12	1	cabbage looper, cucumber beetles, cutworms, flea beetles, grasshoppers, leafhop- pers, tarnished plant bug, vegetable weevil, whitefringed beetle (adult), yellowstriped armyworm; aids in con- trol of aphids and beet armyworm	3	A maximum of 0.15 lb ai/acre per season may be applied.
Oberon 2SC (spiromesifen)	8-16 fl oz	12	7	potato psyllid, twospot- ted spider mite, white- flies	23	Maximum amount per crop: 32.0 fl oz/acre. Maximum applications: 2.

Table 9. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*PennCap-M (methyl parathion)	2-6 pt	4 days - See label	5	Colorado potato beetle, cutworms, flea beetles, grasshoppers, potato leafhopper, tarnished plant bug	1B	Do not apply more than 24 pt per acre per year.
Platinum 75SG (thiamethoxam)	5-8 fl oz 1.66-2.67 oz	12	applied at plant- ing or at plant emer- gence	aphids, Colorado potato beetles, flea beetles, potato leafhoppers	4A	For many crops that are not on the label, a 120-day plant-back interval must be observed. To manage resistance, avoid using Actara or Provado in conjunction with Platinum.
*Pounce 25 WP (per- methrin)	6.4-12.8 oz	12	14	aphids, aster leafhopper, beet armyworm, cab- bage looper, Colorado potato beetle, cutworms, flea beetles, leafhoppers, potato tuberworm, tar- nished plant bug	3	Do not apply more than 0.8 lb ai/ acre per season.
Provado 1.6 F (imida- cloprid)	3.8 oz	12	7	aphids, Colorado potato beetle, flea beetles, leaf- hoppers	4A	Do not use if other 4A insecticides have been used at planting.
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, Colorado potato beetle, cucumber beetles, flea beetles, leafhoppers, leafminers, loopers, <i>Lygus</i> bugs, mites, plant bugs, stink bugs, thrips, vegetable weevil, whiteflies	3, 21	
Radiant (spinetoram)	6-8 fl oz	4	7	armyworms, Colorado potato beetle, <i>Liriomyza</i> leafminers, loopers, thrips	5	No more than 4 applications per year.
Requiem (extract of <i>Chenopodium ambrosioides</i>)	2-3 qts	4	0	green peach aphid	un	Treat when threshold reached.
Rimon 0.83EC (novaluron)	9-12 fl oz	12	14	armyworms, Colorado potato beetle, loopers, other foliage feeding caterpillars, potato tubermoth, whiteflies (suppression)	15	Do not apply more than 24 oz per acre per season. Limited to 2 applications.
Sevin XLR, 4 F; 80 S (carbaryl)	XLR, 4F: 0.5- 2.0 qt 80S: 0.63-2.5 lb	12	7	Colorado potato beetle, corn earworm, cut- worms, fall armyworm, flea beetles, leafhoppers, stink bugs, tarnished plant bug	1A	Do not apply more than a total of 6 qt (4F, XLR) or 7.5 lb (80S).
SpinTor 2 SC (spinosad)	3-6 fl oz	4	7	armyworms, Colorado potato beetle, leafminers (<i>Liriomyza</i> spp.), loop- ers, thrips	5	Do not apply to consecutive gen- erations of Colorado potato beetle, or make more than 2 applications per single generation.
Sun Spray 98.8%, JMS Stylet-Oil, others (oil, insecticidal)	3-6 qt/100 gal (JMS)	4	0	leafhoppers, leafminers, thrips, whiteflies, mites	--	See label for tank mix cautions. Organic Stylet-Oil is OMRI-listed ² .

Table 9. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Telone C-35 (dichloropropene + chloropicrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for additional use restrictions for certain counties.
*Telone II (dichloropropene)						
*Temik 15 G (aldicarb)	14-20 lb	48	At planting	aphids, Colorado potato beetle, flea beetles, leafhoppers	1A	Do not apply after planting. See label for other restrictions.
*Thimet 20 G (phorate)	See label - varies with soil type and time of application.	48	90	aphids, Colorado potato beetle, flea beetles (larvae), leafhoppers, leafminers, wireworms	1B	One application per season.
*Thionex 3 EC *Thionex 50W (endosulfan)	0.66-1.33 qts	24	1	aphids, armyworms, Colorado potato beetle, false chinchbugs, flea beetles, leafhoppers, plant bugs, potato tuberworm, stink bugs, three-lined potato beetle, whiteflies	2	No more than 6 applications per year. Do not exceed 4 qt/acre per year.
Trigard (cyromazine)	2.66-5.32 oz	12	7	Colorado potato beetle larvae, leafminers	17	Most effective for control of 1 st and 2 nd instar larvae.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	un	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .
Venom Insecticide (dinotefuran)	foliar: 1-1.5 oz soil: 6.5-7.5 oz	12	foliar - 7 soil - at planting	Colorado potato beetle, flea beetle, potato leafhopper, psyllid	4A	Soil application one time either at preplant, preemergence, or at ground crack.
*Vydate L (oxamyl)	foliar: 1-4 pt	48	7	aphids, Colorado potato beetle, flea beetles, leafhoppers, tarnished plant bug	1A	No more than 8 foliar applications per crop.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

Table 9. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.						
¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 6.1 August 2008. <ul style="list-style-type: none"> 1A. Acetylcholinesterase inhibitors, Carbamates (nerve action) 1B. Acetylcholinesterase inhibitors, Organophosphates (nerve action) 2A. GABA-gated chloride channel antagonists (nerve action) 3. Sodium channel modulators (nerve action) 4A. Nicotinic acetylcholine receptor agonists (nerve action) 5. Nicotinic acetylcholine receptor allosteric activators (nerve action) 6. Chloride channel activators (nerve and muscle action) 7A. Juvenile hormone mimics (growth regulation) 7C. Juvenile hormone mimics (growth regulation) 9B and 9C. Selective homopteran feeding blockers 10. Mite growth inhibitors (growth regulation) 11. Microbial disruptors of insect midgut membranes 12B. Inhibitors of mitochondrial ATP synthase (energy metabolism) 15. Inhibitors of chitin biosynthesis, type 0, lepidopteran (growth regulation) 16. Inhibitors of chitin biosynthesis, type 1, homopteran (growth regulation) 17. Molting disruptor, dipteran (growth regulation) 18. Ecdysone receptor agonists (growth regulation) 22. Voltage-dependent sodium channel blockers (nerve action) 23. Inhibitors of acetyl Co-A carboxylase (lipid synthesis, growth regulation) 28. Ryanodine receptor modulators (nerve and muscle action) un. Compounds of unknown or uncertain mode of action 						
² OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.						
* Restricted Use Only.						

Table 10. Breakeven production costs of chip potatoes at various yield levels in the Hastings area, 2005-2006.

	Cost per acre	Yield (cwt/acre)				
		175	200	225	250	275
Variable Costs	\$1,623.43	\$9.28	\$8.12	\$7.22	\$6.49	\$5.90
Fixed Costs	\$612.53	\$3.50	\$3.06	\$2.72	\$2.45	\$2.23
Harvest Cost/unit		\$1.10	\$1.10	\$1.10	\$1.10	\$1.10
Total Cost/unit		\$13.88	\$12.28	\$11.04	\$10.04	\$9.23

Table 11. Breakeven production costs for table potatoes at various yield levels in the Hastings area, 2005-2006.

	Cost per acre	Yield (cwt/acre)				
		150	169	188	206	225
Variable Costs	\$1,992.18	\$13.28	\$11.79	\$10.60	\$9.67	\$8.85
Fixed Costs	\$698.40	\$4.66	\$4.13	\$3.71	\$3.39	\$3.10
Harvest Cost/unit		\$3.85	\$3.85	\$3.85	\$3.85	\$3.85
Total Cost/unit		\$21.79	\$19.77	\$18.16	\$16.91	\$15.81