Florida Potato Crop/Pest Management Profile

Prepared: January 27, 1999
Revised: March 12, 2008

Production Facts

- Florida's high-value winter and early spring potato production is responsible for the state being ranked 7th nationally in the value of potatoes produced in the U.S. (1).
- Florida produces less than two percent of the U.S. annual supply, but one-third of the winter/spring crop (1).
- Approximately 781,000,000 pounds of potatoes valued in excess of $163 million were produced in Florida during the 2007 crop year on 27,200 acres (1).
- Average Florida potato yield in 2006 was 43,100 pounds per acre, with a marketable yield of 37,300 pounds per acre (2).
- Average production costs vary widely, dependent on production region and whether the crop is produced for potato chips or fresh table stock. Production costs for table potatoes are estimated to be $2,525 per acre while chip potato costs are estimated to be $2,135 per acre (3).
- St. Johns County is the state leader in potato production acreage at approximately 13,000 acres (4).

Production Regions

The majority of potato production in Florida is near the Hastings area (St. Johns, Putnam, and Flagler counties). Approximately two-thirds of the acreage is located in this area with the rest located in central Florida counties near or south of I-4 (1,4).

Production Practices

In the Hastings and other spring production regions, the white-skinned "Atlantic" variety dominates. Approximately half of the statewide production goes to the potato chip industry. Seed potatoes are planted from late December through early March at a row spacing of 36-42 inches with 6-12 inches between plants, at a depth of 3-4 inches. Maximum plant density per acre is approximately 29,000 plants per acre. A total of 2,000-3,000 pounds of seed pieces are planted per acre. Approximately 100 days elapse between seed piece planting and maturity. For subsurface and sprinkler irrigated crops, fertilizer is applied by banding in the row bed at planting or anytime up to crop emergence (3). Irrigation is required during initial plant growth, as potato plant water requirements rapidly increase during this time. Water requirements during the final growth period of tuber development decrease. As with other root crops, continuous moderate levels of soil moisture must be maintained. Except for a small portion of chipping potatoes, the vines are killed before harvest because the mature tubers harvested from living vines are likely to skin and severely bruise, and heavy green foliage interferes with harvest machinery. Tuber harvest occurs 14-21 days after the vines are desiccated to allow time for the periderm (skin) to set on the tuber. This reduces the amount of skinning and scuffing. Vine killing is accomplished with herbicides and occasionally by mowing. Hilling soil around plants to keep the tubers completely covered is important to prevent sunburn and greening of the tubers when the vines are killed. Sunburn and greening reduces the quality of the tubers, grower yield and return. Although most producers use ground application equipment to apply pesticides to the field or crop, a substantial amount of the of the regularly-applied fungicides are aerially treated. A high proportion (90 percent) of potato acreage is scouted on some schedule (3,4).

Worker Activities: During the field preparation, soil may be treated with a multipurpose biocide such as dichloropropene or metam. Plastic mulch is not used in potato fields, so biocide application and cutting cross-ditches in the rows are conducted by personnel in enclosed cabs. The operators can fumigate several hundred acres in one day. The only time a worker would be in the field is to repair irrigation function as the harvest of the crop is mechanical (4).

Insect Pests

Colorado Potato Beetles. The Colorado potato beetle is becoming an increasingly significant pest in the Hastings area. However, it is not believed that pesticide resistance has increased. The major food plant of the Colorado potato beetle is potato and other members of the same plant family. Eggs are orange and football-shaped. Larvae are soft-bodied, hump-backed and feed on the leaves of the potato plant. Colorado potato beetle larvae are generally found near the top of the plant and they seldom move far from the plant on which they hatch unless all the leaves are eaten. In addition to the damage caused by feeding, the Colorado potato beetle is capable of transmitting spindle tuber virus and bacterial ring rot. When the larvae have completed their development they enter an inactive pupal stage in the soil. After 1-2 weeks, adults emerge from the pupae and begin to feed on the potato plants. Potato beetles are unaffected by high concentrations of toxic glycoalkaloids, the naturally occurring bitter compounds in potatoes. The efficient detoxification system of the beetle may also play a part in detoxifying insecticides and in the development of insecticide resistance (4,5).

Wireworms. The adult wireworms do not attack potatoes, however the larvae ("wireworms") feed on potato seed pieces and developing tubers. Wounds to seed pieces allow disease-causing organisms such as *Rhizoctonia* to enter. The greatest damage occurs when larvae tunnel into developing tubers, making them unmarketable (5).

Flea Beetles. The adult potato flea beetle's feeding produces many small "shot holes" in the leaves, but they generally do not injure the tuber. Direct damage from this insect is mainly attributable to defoliation of plants. Fungal diseases, such as *Verticillium* wilt, *Fusarium* rot, *Rhizoctonia* and common scab may also be associated with potato flea beetle damage. Transmission of bacterial diseases and spindle tuber viroid may also occur (5).

Leafhoppers. Leafhopper damage (hopper burn) late in the season is often confused with maturity of the plants (damaged leaves first turn brown along the margins but remaining foliage is often green). The adults and nymphs attack the underside of the leaves and suck the sap. This causes the leaves to curl and exhibit hopper burn symptoms. The plants may be stunted and yields reduced (5).

Aphids. Aphids are small, soft-bodied insects that cause damage by sucking juices from the underside of leaves on the above ground portion of the potato plant. They transmit viruses from plant to plant and therefore control can be extremely important in potato fields. Aphids reproduce rapidly and are capable of developing large populations in a very short time (5).

Caterpillar-type pests (beet armyworms, southern armyworms, fall armyworms, cutworms, loopers, etc.). Caterpillar-type pests attacking potatoes cause damage by their feeding. Young larvae feed on the under surface of leaflets, which leaves the upper epidermis intact ("windowpaned"). Older larvae consume foliage and eat large holes anywhere on the fruit's surface, which can also lead to secondary rots becoming established. Cutworm larva cut seedlings at the soil surface (5).

Controls

Non-chemical

Crop rotation can help reduce the numbers of many potato insect/nematode pests. Land availability, however, is a limiting factor to further implementation of this tactic. Potato plants are more severely affected by insect pests when they are also suffering other stresses, so adequate moisture and fertility and effective disease and weed management will minimize losses due to insects. Potato varieties that are tolerant to pests such as the Colorado potato beetles are not a commercially acceptable pest management alternative, primarily because of yield deficiencies. Tolerant varieties only yield about 7,300 pounds per acre, where as the potato beetle susceptible variety Atlantic yields approximately 25,000 pounds per acre (4,5).

Chemical

Effective insect control depends on a combination of cultural and chemical practices. Alternating the use of insecticides from different chemical groups helps reduce the development of resistance and increases the effectiveness of the sprays that are applied. Application of lower dosages than recommended may also induce the target insect to develop resistance more quickly. Insecticides registered for use on potato in Florida in 2007 include: abamectin, aldicarb, acetamidprid, azadirachtin, carbaryl, carbofuran, cryolite, cyfluthrin, dimethoate, dinotefuran, disulfoton, endosulfan, esfenvalerate, ethoprop, imidacloprid, indoxacarb, malathion, methamidophos, methyl parathion, methomyl, novaluron, oxamyl, permethrin, phorate, phosmet, pymetrozine, pyrethrins +/- rotenone, spiromesifen, spinosad, and thiamethoxam (3). Due to the return on even the high-value potatoes grown in Florida (approximately 20 cents per pound), chemical cost and length of efficacy are major considerations when choosing insecticides.

ALDICARB. Aldicarb is the insecticide/nematicide potato producers depend on the most in their insect/nematode pest management programs. Aldicarb is a carbamate insecticide used to manage nematodes, aphids, Colorado potato beetles, flea beetles, and leafhoppers. Aldicarb is the only material that effectively manages the *Trichodorus spp.* nematode, which vectors corky ringspot. Aldicarb is applied within the furrow of the row and buried along with the seedpiece at planting. It is applied to approximately 80 percent of the potato acreage in north Florida only one time, at a rate of approximately 3.0 pounds of active ingredient (ai) per acre. At a cost of $25 per pound of ai, the maximum-labeled application would cost $75/acre. There is a 100-day pre-harvest interval (PHI) and a 48-hour restricted entry interval (REI) on the label. There are also 6-, 8-, and 10-month plant back restrictions (6,7).

Producers indicate that aldicarb reduces the overall number of pesticide applications that must be made during a season. A single application of aldicarb manages insect/nematode pests as well as 3 to 4 applications of other alternative insecticides/nematicides. Colorado potato beetle population pressures returned with the temporary loss of aldicarb (due to regulatory issues). In response to concerns about potential contamination of ground water, the Florida Department of Agriculture and Consumer Services requires, at least 30 days prior to the date of application, submission of a *Notice of Intended Application of Aldicarb* form. All aldicarb applications must be made with positive displacement applicators pre-approved under an equipment certification program. Alternatives to aldicarb, although efficacious, are not cost effective in the production of potatoes (8).

ENDOSULFAN. Endosulfan is a chlorinated cyclic diol insecticide that has such a short PHI (1-day), it is often the insecticide of choice to combat late season outbreaks of pests such as whiteflies and southern armyworms. It is applied to approximately a third of the potato acreage once a year, at a rate of approximately 1.0 pound of ai per acre. At a cost of $11 per pound of ai, a maximum application would cost $11/acre (3,7,8).

ESFENVALERATE. Esfenvalerate is synthetic pyrethroid insecticide selectively used to manage outbreaks of late season insects such as aphids, armyworms, cabbage loopers, cucumber beetles, cutworms, flea beetles, potato psyllids, potato tuberworms, tarnished plant bugs, and leafhoppers. It is applied to less than 20 percent of the acreage an average of once per year. At a cost of approximately $220 per pound of ai, the maximum application (0.05 lb ai/acre) would cost $11 per acre. The material has a 12-hour REI and a 7-day PHI (3,7,8).

METHAMIDOPHOS. Methamidophos is an organophosphate insecticide used by potato producers primarily to control insect outbreaks late in the season. Approximately a third of the potato acreage is treated with methamidophos once per year. At a cost of approximately $20 per pound of ai, the maximum application (1 lb ai/acre) would cost $20 per acre. The material has a 48-hour REI and a 14-day PHI (4,6-8).

METHOMYL. Methomyl is a carbamate insecticide, that like methamidophos, is used by potato producers primarily to control insect outbreaks late in the season. Approximately ten percent of the potato acreage is treated with methomyl once per year. At a cost of approximately $20 per pound of ai, the maximum application (0.9 lb ai/acre) would cost $18 per acre. The material has a 48-hour REI and a 6-day PHI (3,7,8).

Biological

In addition to many subspecies of *Bacillus thuringiensis* that are registered for use in potato, *Beauveria bassiana* is available for control of soft-bodied sucking insects (3).

Bacillus thuringiensis. B.t. is a reduced risk insecticide applied in a prophylactic manner by Florida potato growers occasionally to aid in management of worm and looper (lepidopterous) pests. It is a good alternative to chemicals for integrated resistance management programs. If worms are larger and more mature, or if worm populations exceed threshold levels, then use of one of the synthetic insecticides is necessary for adequate management. B.t. is applied to less than 10 percent of the potato acreage (4).

Nematode Pests

The most important nematode pests of potatoes in Florida are species of root-knot, sting, and stubby-root nematodes. Root-knot nematodes (principally *Meloidogyne incognita*) infest roots and tubers, causing root injury that severely reduces yields and may accelerate the “early dying disease.” Root-knot nematode galling of tubers is a serious quality defect. Sting nematodes cause pruning, stunting, and necrosis of roots, depressing yields significantly. High populations of sting nematode are often associated with severely misshapen, scruffy, and abnormally russetted tubers. Stubby root nematodes apparently cause little direct damage to potatoes, but are important as vectors of tobacco rattle virus, which causes corky ringspot disease. Several other nematodes, including spiral, lesion, awl, stunt, and sheath are occasionally associated with reduced yields or quality of potatoes in Florida (9).

Nematode species and population levels, incidence of soil-borne diseases and insects, soil moisture at field preparation time, and the intended market for the potatoes can all affect the choice of nematode control measures. Growers typically use a combination of many different kinds of management tactics as feasible, since none provides perfect protection for the crop (9).

Controls

Non-chemical

Crop Rotation - Crop rotation with unrelated crops is a sound practice for reduction of several kinds of soil-borne problems. Many potato fields that have very high numbers of damaging nematodes have been cropped annually to potatoes for many years. While it is not possible to find rotation and cover crops that will reduce populations of all nematode pests of potatoes, it is helpful to alternate potatoes with crops that are least favorable to the root-knot nematodes, the most difficult nematodes to control with chemicals. Cabbage is a poor crop to rotate with potatoes, because it is susceptible to many of the same nematodes. Many growers use Sudangrass as a cover crop which is turned into the soil to provide nitrogen prior to potato planting (4).

Soil Management Practices - Land should be disced as soon as possible after a crop is harvested from it, to ensure death and desiccation or decomposition of all host plant tissues. Populations of nematodes, fungi, and other soil-borne pests can continue to feed and reproduce on roots, stolons, etc., that remain alive after harvest, so prompt discing will help reduce build-up of those pests. If other cultural considerations make it practical, a brief period of fallow during hot weather, during which the land is disced at least twice to expose additional soil to desiccation and sunlight, can reduce populations of nematodes. Prolonged periods of fallow are generally not recommended because of the potential for soil loss by erosion and loss of soil organic matter by oxidation.

Varietal Resistance - No potato varieties commercially available have resistance to any of the nematode pests encountered in Florida. Several varieties have effective resistance to corky ringspot (CRS) disease, which is transmitted by stubby-root nematodes; however, these varieties are typically low yielding and seldom planted by growers, even in fields where CRS is known to occur. Bacterial wilt caused by the bacterium, *Ralstonia solanacearum*, can be more severe when root-knot nematodes are present. Similarly, some varieties such as ‘Sebago’ and ‘Green Mountain’ have tolerance to bacterial wilt, but are seldom used (9).

Chemical

Most fields in which nematodes have previously damaged potatoes or other crops should be treated with chemical nematicides to improve potato production. Other management procedures may be combined to substantially reduce population levels of nematode pests, but they will rarely bring them below damaging levels. This is especially true on land that is intensively cropped to potatoes and other crops susceptible to the same nematodes. Selection of a nematicide is based on the kinds of nematodes and soil-borne diseases present in the field, field conditions at soil preparation time, and the intended market (degree of control needed). Use of fumigants have been more consistently effective than non-fumigants for control of root-knot nematodes in Florida (9).

Aldicarb is extensively used for nematode control in potatoes, particularly in fields where CRS has been a reoccurring problem. Ethoprop or oxamyl are only occasionally used in fields where stubby root nematode and CRS occur. Soil fumigation does not effectively control the disease under Florida growing conditions (9).

1,3-dichloropropene. 1,3-dichloropropene is a fumigant used to aid in management of nematodes, *Fusarium* wilt and other soilborne diseases, and wireworms. It is applied pre-plant to about 3,000 acres of potato at a rate of approximately 59 pounds of active ingredient per acre for a treatment cost of $75/acre. 1,3-dichloropropene will only control pests that are in the treated zone at time of treatment; it has no residual and reinfestation of a field can occur from numerous sources such as deep nematode populations, infested potato seedpieces, equipment contamination and blowing soil. 1,3-dichloropropene is applied using injector blades that inject the material approximately 12 to 14 inches deep into well-prepared soil, followed immediately by surface sealing equipment that uniformly mixes the soil to a depth of 3 to 4 inches, to effectively eliminate chisel traces that could allow direct escape of the fumigant (7-9).

METAM SODIUM. Metam sodium in combination with chloropicrin is applied to about 1,000 acres of potato. It is a fumigant product that is applied at a rate of approximately 64 pounds of active ingredient per acre for a treatment cost of $85/acre. It aids in managing nematodes, bacterial wilt, *Verticillium spp.* soilborne diseases, and some weeds. Like 1,3-dichloropropene, metam sodium will only control pests that are in the treated zone at time of treatment. Metam sodium is applied using injector blades that inject the material approximately 4 inches deep into well-prepared soil, followed immediately with a roller to smooth and compact the surface to prevent gas escape (7-9).

Diseases

Primary disease problems on Florida potatoes include late blight, early blight, corky ringspot, *Rhizoctonia* stem rot and black scurf, bacterial wilt, bacterial soft rot, black leg, brown rot, early dying, scab, *Sclerotinia* rot, *Fusarium* rot, southern blight, and various viral diseases. Potato diseases can attack the leaves, the roots and stems, and/or the tubers (10).

Late Blight. Late blight is the primary disease that drives the treatment schedule in potato production. It can infect and completely destroy entire fields of potato plants in a matter of days, so perpetual, constant fungicidal protection is essential. Late blight infection initially appears as water-soaked spots on the leaflets. The spots enlarge rapidly. Tuber infections generally result in complete tuber decay. In addition to blighting foliage, the fungus can infect tubers while they are still in the ground or in storage (4,10).

Early Blight. Early blight is one of the most common foliar diseases of potato. It can infect any part of the above ground portion of the plant. The name is a bit misleading, as it actually appears late in the growing season. Dark brown spots usually appear first on the oldest, lowest leaves, then spread to other portions of the plant. The spots enlarge rapidly, merging together to form large brown areas. Early blight can completely defoliate potato plants (10).

Corky Ringspot Virus. Corky ringspot is a disease caused by tobacco rattle virus. This disease only attacks the tubers. Infected tubers show internal necrosis in the form of corky rings, and ringspot or arc-like lesions may occur in the surface of the tuber. The disease tends to be more prevalent in years of reduced rainfall, when aldicarb uptake is limited by dry conditions (4,10).

Rhizoctonia Stem Rot and Black Scurf. This disease may kill sprouts if they are infected before or soon after emergence. It is favored by cool, wet soil conditions. Plants infected later in their development have lesions on their stolons and roots. Infected tubers have small, hard, black specks on their surface that are not easily removed (10).

Black Leg. Black leg is a bacterial disease that causes the plant stems to rot anywhere from the seed-piece to several inches above the ground. It is favored by moist conditions during planting or harvest. Infected plants have curled leaves near the top. The leaves become yellowish after the stem is girdled by the bacteria-induced lesions formed on the stem. In advanced stages, plants are wilted, foliage yellows, and leaves roll. Tubers may rot while still in the field or after being placed in storage (10).

Controls

Non-chemical

Non-chemical disease management tactics include immediate crop residue destruction, maintaining adequate fertilization and soil moisture to support plant vigor, planting seed certified clean, destroying cull piles, not planting early maturing varieties next to late maturing varieties, and using varieties that have levels of tolerance to diseases - if available and commercially acceptable/marketable (4,8).

Chemical

Approximately three-quarters of the potato growers treat seed pieces with fludioxonil and azoxystrobin is applied in furrow as well. These materials, in conjunction with aldicarb at planting cost over $100/acre, but growers believe it is money well spent so that the plants are healthy and vigorous during early growth in the field. The ethylenebisdithiocarbamates (EBDC's) mancozeb/maneb/penncozeb and the nitrile fungicide chlorothalonil are the most commonly applied materials used to manage late blight starting as soon as green tissue has emerged in the field. These broad spectrum fungicides have contact activity only, and must be re-applied whenever there is newly emerged potato leaf/stem tissue. Fungicide spraying begins following plant emergence, and applications are made thereafter on 3 to 10 day intervals, dependent upon weather conditions and whether late blight has been detected in the state (4).

Narrow spectrum fungicides cannot be relied upon to control late blight because resistance in the late blight fungus population may increase and no control will be achieved. Growers typically apply the EBDCs, and chlorothalonil using maximum allowable rates and maximum numbers of applications because of late blight pressure and corresponding fungicide coverage/frequency issues. Other fungicides registered for use in potato in Florida in 2007 include: boscalid, copper hydroxide, cyazofamid, cymoxanil, dimethomorph, famoxadone, fenamidone, fluazinam, flutolanil, iprodione, mefenoxam, metiram, PCNB, propamocarb, pyraclostrobin, pyrimethanil, streptomycin, sulfur, thiophanate, trifloxystrobin, and triphenyltin. Many of these are newly registered compounds or newly registered in potato. They are also mostly fairly narrow spectrum in fungicidal activity and expensive. They are used intermittently between the standards such as the EBDCs and chlorothalonil (3).

EBDC's. The EBDC's include mancozeb, maneb, and pencozeb, and are used to manage late blight and early blight. Applications are made to nearly 100 percent of Florida's potato acreage, beginning when plants emerge at rates of 0.4 to 0.8 pounds of active ingredient per acre. As vines increase in size the application rate increases to 1.2 to 1.6 pounds of ai per acre at 5 to 10 day intervals or 0.6 to 0.8 pounds of ai per acre at 3 to 5 day intervals. At a cost of approximately $4 per pound of ai, application cost ranges from $1.60 to $6.40 per acre. Dependent on rates and timings, sprays are administered a total of 7 to 18 times, or until the maximum seasonal amount of 11.2 pounds of ai per acre has been achieved. The REI is 24 hours for all of the EDBCs and the PHI is 3 days (3,8).

CHLOROTHALONIL. Chlorothalonil is also applied to approximately 100 percent of the state's potato acreage in the same fashion as the EBDC's. Application rates are between 0.58 and 1.16 pounds of active ingredient per acre, dependent on the time between applications. Sprays are administered a total of 9 to 14 times, or until the maximum seasonal amount of 11.0 pounds of active ingredient per acre has been achieved. At a cost of approximately $9 per pound of ai, application cost ranges from $5.20 to $10.40 per acre. On potato, chlorothalonil has a REI of 12 hours and the PHI is 7 days (8,11).

FLUDIOXONIL. Fludioxonil is a seed treatment fungicide that has seen its use double over the past eight years. It is applied to approximately 75 percent of the potato seedpieces planted. It is applied to manage *Fusarium* and *Rhizoctonia spp.* at a rate of 0.015 pounds of ai per 100 pounds of cut seedpieces (8).

PROPAMOCARB. Propamocarb is applied to approximately 30 percent of the potato acreage an average of 5.0 times at a rate of 0.9 pounds of active ingredient per acre. At a cost of approximately $13.50 per pound of ai, application cost is $12.20 per acre. Propamocarb has a REI of 12 hours and a PHI of 14 days (6,8).

THIOPHANATE. Thiophanate is used exclusively as a seed treatment protectant to manage *Fusarium* and *Rhizoctonia spp.* rots. It is applied to approximately 25 percent of the potato seedpieces used in the state at a rate of 0.4 pounds of active ingredient per 100 pounds of cut seedpieces (8).

Weeds and Vine Desiccation

Good weed and volunteer potato control in and around potato fields removes alternative food sources for many of the pest insects, particularly early in the season before the crops have emerged from the ground. Weeds also harbor insects and diseases that attack potato. Weeds present at harvest increase mechanical damage to the tubers, reduce harvesting efficiency by slowing down the harvesting operation, leaving undug tubers in the ground and/or carrying them over the diviner chain (12).

Proper tuber maturity at harvest is an important factor in producing high-quality potatoes. A mature tuber has improved skin-set, bruise resistance, and storage life. Vine killing not only benefits tuber appearance but can also limit tuber size and improve tuber release from the vine at harvest. Tuber vines are killed by one of three methods: mechanically, chemically, or a combination of the two (13).

Controls

Non-Chemical

The cultural practices of dragging off, tillage, and the planting operation itself help to control many weeds. Preventative weed control efforts include the use of weed-free seed pieces and cleaning of harvesting and tillage equipment to prevent the spread of seeds, rhizomes, or other reproductive plant parts (12).

Flail mowing and rolling are the prominent mechanical methods used to kill potato vines. Vines are mowed or rolled two to three weeks prior to harvest. Care is taken not to disturb the soil or mechanically-damage the tubers. When both methods are employed, a roller is used to bend the vine while spraying a chemical desiccant (13).

Chemical

In general, weed control in potato fields relies heavily on pre-emergence herbicides, since early season competition of weeds is extremely critical. A major emphasis on weed control is made during this period. Commonly used herbicides in Florida potato fields include pendimethalin, metribuzin, S-metolachlor, rimsulfuron, sethoxydim, and EPTC. Others registered for sale in Florida in 2007 include carfentrazone, clethodim, DCPA, paraquat and pelargonic acid (3,12).

Herbicides are used to kill vines, but they should not be applied when the weather is hot and dry due to the risk of increased vascular ring discoloration. Diquat is used exclusively for this currently, due to its cost and efficacy. Other herbicides registered for vine desiccation in Florida in 2007 are carfentrazone, endothall, glufosinate, pelargonic acid, and pyraflufen (4,13).

PENDIMETHALIN + METRIBUZIN. These two herbicides are often applied together after planting but before potatoes or weeds emerge as a tank mix to most of the potato acreage at a rate of approximately 0.55 pound ai pendimethalin + 0.38 pound ai of metribuzin per acre. Based on costs of $8 and $31 per pound of ai, respectively, an application would cost $16/acre. The tandem controls weeds such as pigweeds, cocklebur, sedges, ragweed, lambsquarter, wild mustard, crabgrass, foxtails, johnsongrass, sicklepod, smartweed, purslane, and nightshade. This treatment is most effective when adequate rainfall or irrigation is received within 7 days of the application (7,8,12).

S-METOLACHLOR. This herbicide is employed when nutsedge pressure is higher than average and it may be mixed with the aforementioned tandem of pendimethalin and metribuzin. It is used by approximately 20 percent of growers as sedge has increased in severity in the last several years. At a maximum labeled rate of 1.9 lbs ai/A and a cost of $14 lb ai/A, an application would cost approximately $27/acre (4,7,12).

RIMSULFURON. Rimsulfuron is applied to approximately 5 percent of the potato acreage 1 to 2 times at a rate of approximately 0.33 ounce of ai per acre to help manage numerous broadleaf, grass, and sedge weeds. At a cost of $896 per pound of ai, an application would cost $18.50/acre. To activate preemergent applications of rimsulfuron in the soil, a single one-inch rainfall event or sprinkler irrigation must be applied within 5 days of application. For postemergence applications, rimsulfuron is applied between the rows to small weeds (less than one inch in height) that are actively growing. The PHI is 60 days (7,8,12).

DIQUAT. Diquat is a potato plant desiccant (burn down) herbicide applied to most of the potato acreage at a rate of approximately 0.25 pound of ai per acre. At a cost of approximately $40 per pound ai, an application of diquat would cost $10/acre. Diquat cannot be applied to drought stressed potatoes as this condition renders potato foliage tolerant to diquat and desiccation will not be complete (7,8,11).

Key Contacts

Mark Mossler is a Doctor of Plant Medicine in the Agronomy Department's Pesticide Information Office at the University of Florida's Institute of Food and Agricultural Sciences. He is responsible for providing pesticide information to the public and governmental agencies. Dr. Mossler can be reached at UF/IFAS PIO, Box 110710, Gainesville, FL 32611, (352) 392-4721, plantdoc@ufl.edu

Chad Hutchinson is an Associate Professor in the Horticultural Science Department at the University of Florida's Institute of Food and Agricultural Sciences. He is responsible for conducting agricultural research and providing information regarding planting practices. Dr. Hutchinson can be reached at Box 110690, Gainesville, FL 32611, (904) 692-1792, cmhutch@ufl.edu

References

1) USDA National Agricultural Statistics Service.

2) Hutchinson, C.M. and Gergela, D. 2007. Average Yearly Potato Production Statistics for Potatoes Produced at the UF/IFAS PSREU Hastings Farm. Horticultural Sciences Department document HS1098. University of Florida/IFAS, Gainesville, FL 32611.

3) Hutchinson, C.M., Simonne, E.H., Hochmuth, G.J., Stall, W.M., Olson, S.M., Webb, S.E., Taylor, T.G., and Smith, S.A. 2007. Potato Production in Florida. Horticultural Sciences Department document HS733. University of Florida/IFAS, Gainesville, FL 32611.

4) Personal communication with C. Hutchinson, February, 2008.

5) Webb, S.E. 2007. Insect Management for Potatoes. Entomology and Nematology Department document ENY-469. University of Florida/IFAS, Gainesville, FL 32611.

6) Bayer CropScience labels, Research Triangle Park, NC.

7) Anonymous pricing data.

8) Personal communication with potato growers during a data gathering session conducted in 1998 at the Putnam County Extension Office in Palatka, FL.

9) Noling, J.W. 2005. Nematode Management in Potatoes (Irish or White). Entomology and Nematology Department document ENY029. University of Florida/IFAS, Gainesville, FL 32611.

10) Roberts, P., Weingartner, P., and Kucharek, T. 2007. 2007 Florida Plant Disease Management Guide: Potato, Irish. Department of Plant Pathology document PDMG-V3-46. University of Florida/IFAS, Gainesville, FL 32611.

11) Syngenta labels, Greensboro, NC.

12) Stall, W.M. and Hutchinson, C.M. 2005. Weed Control in Potato. Horticultural Sciences Department document HS194. University of Florida/IFAS, Gainesville, FL 32611.

13) Hutchinson, C.M. and Stall, W.M. 2007. Potato Vine Killing or Desiccation. Horticultural Sciences Department document HS925. University of Florida/IFAS, Gainesville, FL 32611.