Crop Profile for Potatoes in Ohio

(*Solanum tuberosum*)

Prepared: November, 2000

General Production Information

- Acres in Ohio: 15,182
- Percent of US Acreage/Rank: 3.8%/23rd
- Number of Growers: 281

Location Of Production(1)

Counties with the most acres in potatoes are located in the northern region of the state. The following counties are the top potato producers in the state: Wayne, Fulton, Henry, Portage, Champaign and Washington.

Production Methods(2)

Potatoes grow well in a well-drained, fertile, sandy-loam to silt loam soil with a pH of 5.4 or slightly lower. Variety selection is important to fit well with specific soil and climate condition and markets. Planting is not done in fields planted with potatoes or other solenaneous crops in the previous year in order to reduce problems with Colorado potato beetle. Depending upon soil type, 75-150 lb/A of nitrogen is added each year with the amount of potassium and phosphorus added based on a spring soil test. Seed potatoes are cut, cured, treated with fungicide and then warmed several days before planting to aid rapid emergence of the sprout. Seed pieces are spaced according to weight, cultivar type and desired tuber size. Planting is done from March in Southern Ohio to as late as mid-July in Northern Ohio. Fields are cultivated and plants hilled as soon as the potato plants are established. Before harvest, potato vines are killed (usually chemically) to improve storage quality and prevent disease problems. Potatoes are harvested when the potatoes are mature and the vines dead. During mechanical harvesting, great care must be taken not to damage tubers. After harvest, potatoes are cured at 55-60° F and at high relative humidity (90-95%) for 10 days to heal cuts and wounds. Yields range from less than 200cwt/A to more than 400 cwt/A depending upon variety, planting date, weather conditions, production practices and harvest date.

Insect Pests

Colorado Potato Beetle:

The most common and potentially devastating insect pest of potatoes is the Colorado potato beetle. The adult beetle has a thick oval body with black and yellow stripes running lengthwise along the wing covers. The beetle overwinters in the soil usually in field borders or woody areas. They emerge in May, about the time that newly planted potatoes come through the ground. After mating the females lay their orange-yellow eggs in clusters on the underside of the potato leaf. The eggs hatch in a few days and the dark red larvae emerge. The larvae feed on the potato leaves and turn more orange colored as they develop. There are two rows of large black dots on both sides of larvae. When mature they leave the plant, enter the soil, pupate and emerge as adults several days later. These adults feed much more than the overwintered adults and can do extensive foliar damage. There are usually 1-2 generations of Colorado potato beetles each year.

Potato Leafhopper:

Another serious pest of potatoes is the potato leafhopper. The adult leafhopper is vivid lime green to yellow green, somewhat wedge-shaped, and about 3 mm long with tiny white spots on its head and pronotum. They are very mobile and readily fly. The potato leafhopper does not overwinter in the Midwest, but is blown up on winds from the Gulf States in the spring. Eggs are laid by singly insertion into stems or large leaf veins and hatch in 7-10 days. Development to the adult stage takes 2-3 weeks. Injury to the potato plant occurs when the adults and more importantly the nymphs feed and damage the conductive tissues. Margins of the leaf beyond the point of feeding turn yellow and roll. Eventually the entire leaf will turn brown and die, causing the characteristic damage known as hopperburn.

Aphids:

Two types of aphids can cause problems on potatoes, the green peach aphid and the potato aphid. Aphids can injure potato plants by sap feeding, however population density must be high to affect yield. Aphids can also transmit viruses while they feed. The virus will not affect yields the season it is transmitted but can severely limit production in subsequent crops. The green peach aphid has an egg-shaped creamy white to light peach body. They have very short generation times and reproduce quickly so many overlapping generations occur each year. The potato aphid has a longer body and range from green to pink in color. They are much bigger than the green peach aphid and very mobile when disturbed. The potato aphid has a short generation time and gives rise to many offspring, so large populations can develop quickly.

Potato Flea Beetle:

The potato flea beetles overwinter as adults in the soil where they matured. They emerge in the spring and begin feeding on the new growth of the young potato plants. The adults are small, black to dark brown beetles with hind legs designed for jumping. The females lay their tiny white eggs in the soil near the base of the plant. The eggs hatch in 7-14 days and the slender white larvae then feed on root hairs, seed pieces and developing tubers for 2-3 weeks. Pupation occurs in 11-13 days followed by the emergence of the new adults usually in July. If the population is large the second generation of flea beetles can cause economic damage to potato tubers. The potato flea beetles feeding injury gives a plant a shotgun blast appearance. Severely damaged leaves may not recover. Feeding damage to tubers by larvae can reduce their quality.

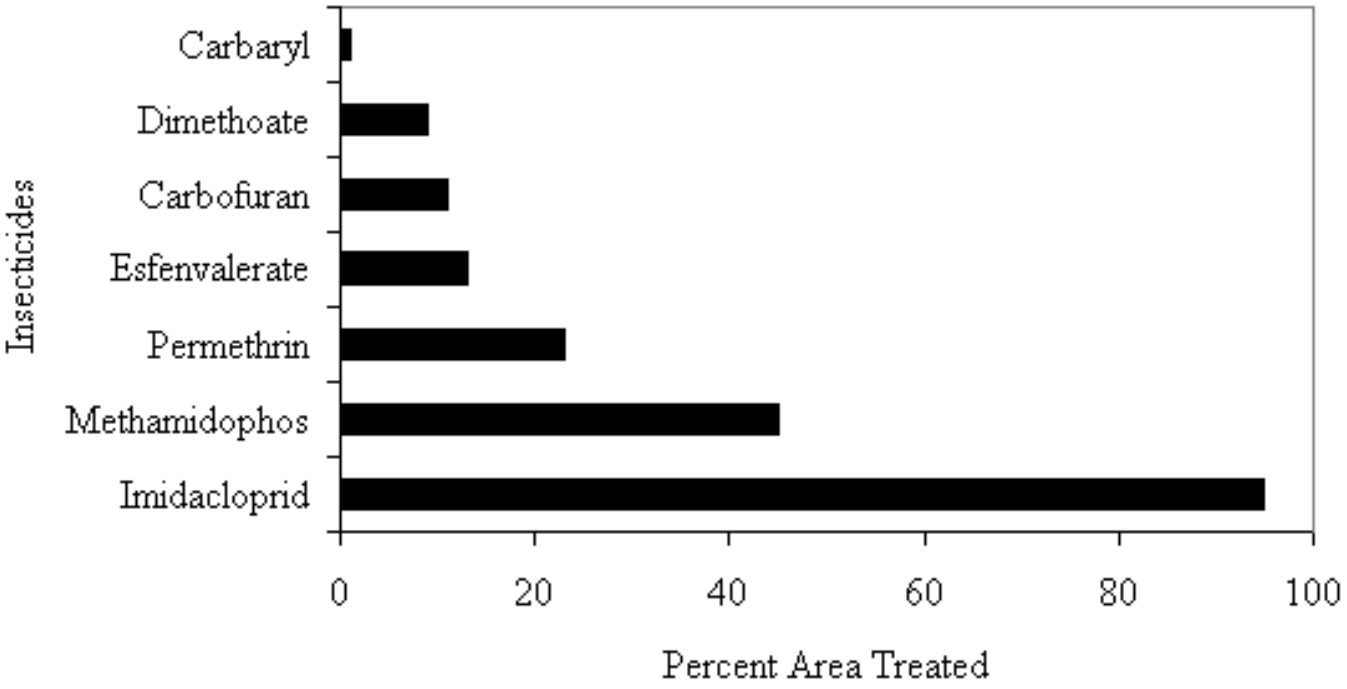
Wireworms:

Wireworms are shiny, slender, cylindrical, hard bodied, yellow-to-brown larvae of the click beetle. Wireworms are a pest of many different crops. In potatoes they feed on seed pieces soon after they are planted sometimes causing enough damage to reduce the stand. Later in the season wireworms feed on the tubers, chewing deep pits and tunneling into the potato thereby decreasing the quality of the crop. This injury also favors the development of soil-borne diseases like *Rhizoctonia* in the tubers.

Chemical Insect Controls:(2,4)

Imidacloprid (Admire, Provado)
Percent acres treated: 95%
Target pests and timing: Colorado Potato Beetle, Leafhoppers and Aphids
Average rate of most common formulation and frequency of application:

Admire – 14.6 oz/A, once, OR
Provado – 3.7 oz/A, 1.8 times
PHI: 90 days
Efficacy rating: Very Good



Methamidophos (Monitor)
Percent acres treated: 45%
Target pests and timing: Flea Beetles, Colorado Potato Beetle, Aphids and Leafhoppers
Average rate of most common formulation and frequency of application:

Monitor – 1 qt/A, 1.5 times
PHI: 30 days
Efficacy rating: Good

Permethrin (Ambush, Pounce)
Percent acres treated: 23%
Target pests and timing: Colorado Potato Beetle and Leafhoppers
Average rate of most common formulation and frequency of application:

Pounce – 6.5 oz/A, twice
Ambush – 12.8 oz/A, twice
PHI: 7-14 days
Efficacy rating: Good

Esfenvalerate (Asana)
Percent acres treated: 13%
Target pests and timing: Colorado Potato Beetle, Leafhoppers and Aphids
Average rate of most common formulation and frequency of application:

Asana – 1 qt/A, twice
PHI: 7 days
Efficacy rating: Good

Carbofuran (Furidan)
Percent acres treated: 11%
Target pests and timing: Colorado Potato Beetle
Average rate of most common formulation and frequency of application:

Furidan – 11 lb/A, 1.5 times
PHI: 90 days
Efficacy rating: Good

Azinphos-methyl (Guthion)
Percent acres treated: 9%
Target pests and timing: Colorado Potato Beetle, Leafhoppers
Average rate of most common formulation and frequency of application:

Guthion 50WP – 1 lb/A, once
Guthion 3F – 1 pt/A, once
PHI: 20 days
Efficacy rating: Good

Dimethoate
Percent acres treated: 9%
Target pests and timing: Leafhopper and aphids
Average rate of most common formulation and frequency of application:

Dimethoate 400 – 0.5 pt/A, once
PHI: 0 days

Efficacy rating: Very Good

Carbaryl (Sevin)
Percent acres treated: 1%
Target pests and timing: Potato Leafhopper and Flea Beetles
Average rate of most common formulations and frequency of application:(4)

Sevin 50WP – 1 qt/A, twice
Sevin XLR Plus – 1 qt/A, 3 times
Sevin 5B – 1lb/A, 3 times

PHI: 30 days
Efficacy rating: Average to Good

Cultural Controls:(2,3)
Crop rotation is important for Colorado potato beetle control because it reduces and delays infestations in the spring. Trap cropping and propane flamers can also be used to help manage Colorado potato beetles. Scouting for Colorado potato beetle, potato leafhopper, aphids and potato flea beetle infestations helps with timing insecticide sprays to be most effective. Choose potato variety less susceptible to hopperburn. Avoid using chemicals that kill natural enemies of the insect pests.

Diseases

Late Blight:

Late blight is caused by the fungus *Phytophthora infestans*. The fungus will over-winter in infected tubers, in cull piles and can be introduced in infected seed tubers. Under cool, damp conditions the fungus first infects leaves and stems. If moist conditions persist, the fungus forms a whitish mold on the underside of leaves and on infected stems. Late blight will spread rapidly if left unchecked, killing plants within a week or so. Fungal spores can be washed into the soil and infect tubers, causing them to rot in the field or in storage.

Early Blight:

Early blight is caused by the fungus *Alternaria solani*. The fungus overwinters in dead vines and leaves where it can persist for at least one year. Infection on leaves first appears as dark brown spots with dark concentric rings. Stem infections first appear as small brown spots. The spots increase in size and can cause the leaf to die prematurely resulting in substantial defoliation. Early blight occurs under a wide variety of weather conditions. It is promoted by heavy dews and rainfall and is severe on unhealthy plants, particularly those with insufficient nitrogen.

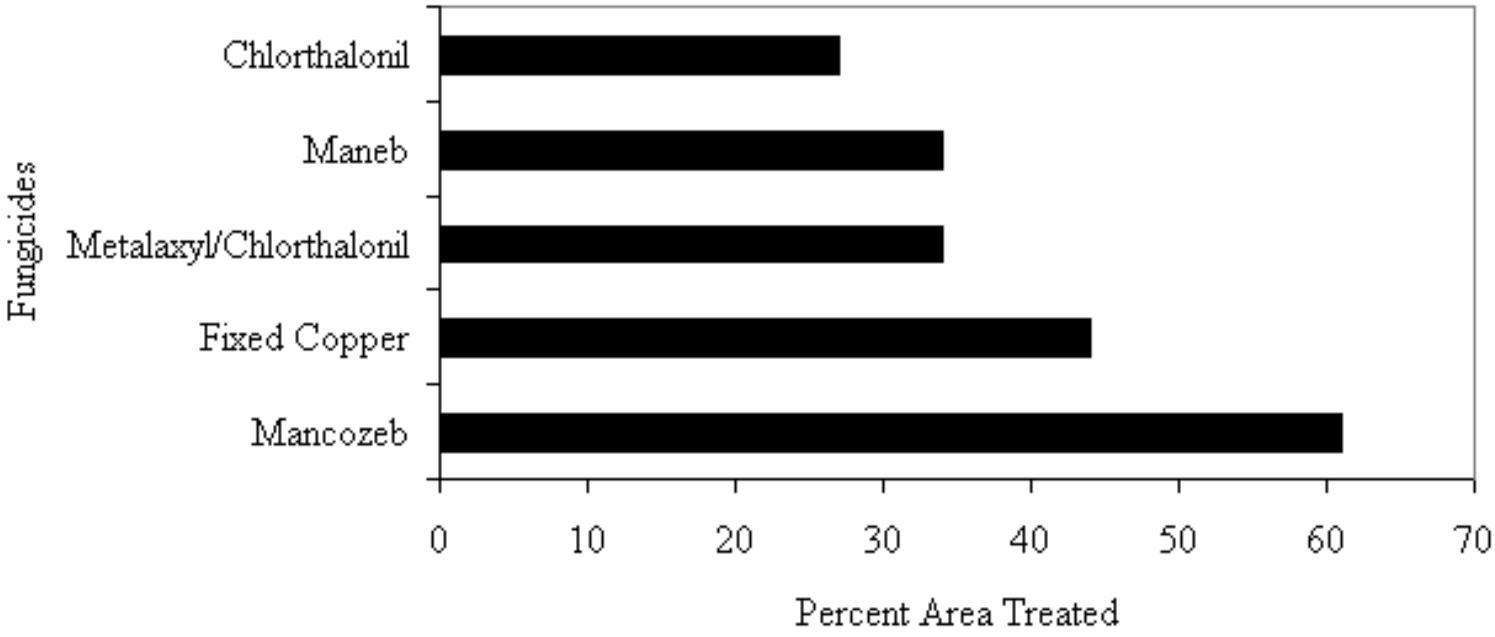
Seed Piece Decay:

Seed piece decay is caused by many species of soil and seed borne fungi and bacteria. They attack seed pieces before or after planting and enter through wounds or natural openings, including the cut surfaces or through

mechanically damaged tissue. Seed pieces may develop dry rot or soft rot depending upon the microorganism involved. Insect injury, freezing, low soil temperatures, excess soil water or fertilizer and improper use of seed treatments can aggravate the decay.

Pink Rot:

Pink rot is caused by the soil-borne fungus *Phytophthora erythroseptica*. Plants of all ages are susceptible to pink rot but the disease is most frequently observed in mature plants approaching harvest. The fungus infects the tubers usually on the stem end and then progresses through the tuber in a very uniform manner. When cut, the infected tuber tissue is watery and turns pink within 20-30 minutes, then darkens to brown and finally black. Tubers infected only by the pink rot fungus do not develop a slimy rot, but diseased tissues are often invaded by soft rot bacteria that can cause this symptom.



Chemical Disease Controls:(2,4)

Mancozeb
Percent acres treated: 61%
Target diseases and timing: Early and Late Blight, Seed Piece Decay
Average rate of most common formulation and frequency of application:

Mancozeb 80DF – 1.7 lb/A, 5.9 times
PHI: 10 days
Efficacy rating: Good

Fixed Copper (Kocide, Champ)
Percent acres treated: 44%
Target diseases and timing: Late Blight

Average rate of most common formulation and frequency of application:

Kocide 4L – 1.5 pt/A, 3 times
Champ – 2 lbs/A, once

Efficacy rating: Average

Metalaxyl/Chlorthalonil (Ridomil/Bravo)
Percent acres treated: 34%
Target diseases: Early Blight, Late Blight and Pink Rot (Botrytis secondarily)
Average rate of most common formulation and frequency of application:

Ridomil/Bravo 81 WP – 2 lb/A, twice

PHI: 7 days
Efficacy rating: Good

Maneb
Percent area treated: 34%
Target diseases: Seed Piece Decay
Average rate of most common fomulation and frequency of application:

Maneb 8% - ½ lb/cwt, once applied to seed pieces before planting.

PHI: 90 days
Efficacy rating: Good

Chlorthalonil (Bravo)
Percent acres treated: 27%
Target disease: Early and Late Blight (Botrytis secondarily)
Average rate of most common formulation and frequency of application:

Bravo 720 – 1.3 pt/A, 4.3 times
Bravo 500 – 1lb/A, 4 times

PHI: 10 days
Efficacy rating: Very Good

Cultural Controls:(2,5)
Practice crop rotation. Plant disease free seed pieces. If cutting seed potatoes, treat and plant the same day. Plant whole seeds and warm them to near soil temperature prior to planting. Plow down all crop residues and bury culls or spread culls on field prior to winter. Maintain adequate nitrogen.

Weeds

Broadleaves and grasses

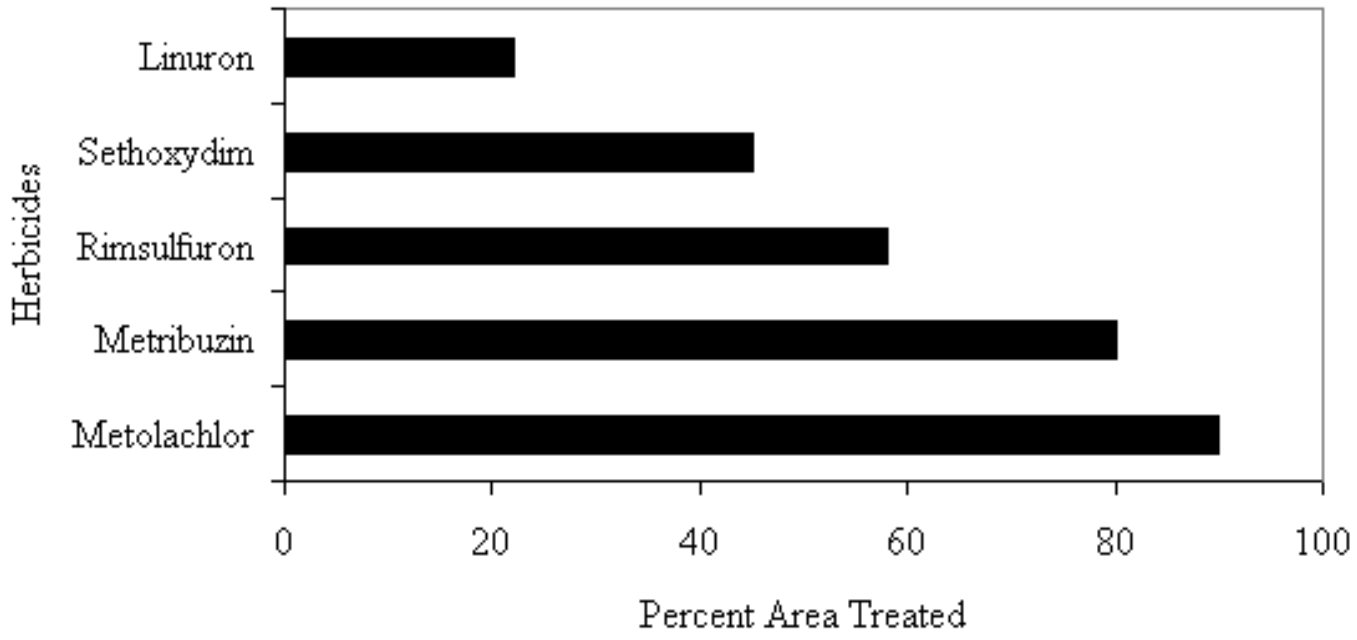
Chemical Controls:(2,4)

Metolachlor (Dual)
Percent acres treated: 90%
Target weeds: Germinating annual grasses, certain broadleaf weeds and yellow nutsedge
Average rate of most common formulation and frequency of application:

Dual 8E – 1.4 pt/A, once pre-emergent
PHI: 90 days
Efficacy rating: Good to Very Good

Metribuzin (Sencor)
Percent of acres treated: 80%
Target Weeds: Annual and certain perennial grasses
Average rate of most common formulation and frequency of application:

Sencor 4 – 2/3lb/A, once post-emergent
Sencor DF – ½ lb/A, once post-emergent
PHI: 90 days
Efficacy rating: Good to Very Good



Rimsulfuron (Matrix)
Percent acres treated: 58%
Target weeds: Annual grasses and broadleaf weeds
Average rate of most common formulation and frequency of application:

Matrix – 1.25 oz/A, once post-emergent

PHI: 90 days
Efficacy rating:

Sethoxydim (Poast)
Percent acres treated: 45%
Target weeds: Annual and perennial grasses
Average rate of most common formulation and frequency of application:

Poast 1.5 EC – 1 pt/A, once when grass is actively growing
PHI: 60 days
Efficacy rating: Good

Linuron (Lorox, Linex)
Percent acres treated: 22%
Target weeds: Seedling broadleaf weeds and grasses
Average rate of most common formulation and frequency of application:

Lorox DF– 1.25 lb/A, once pre-emergent
Linex 50DF – 2.8 lbs/A, once pre-emergent
PHI: 90 days
Efficacy rating: Good to Very Good

Cultural Controls:(2)
Cultivation is a common practice to help control weeds. Most growers will cultivate 2-3 times per season. In some of the smaller fields, hand hoeing is used on the most difficult weeds.

Contacts

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