Crop Profile for Green Beans in Ohio

(*Phaseolus vulgaris*)

Prepared: September, 2000

General Production Information

- Acres in Ohio: 1703
- Percent of US Acreage/Rank: 0.6%/22nd
- Number of Growers: 392

Location of Production:
Counties with the most acres in green beans grown for the processing market are located in the northwest region of the state. The counties with the most acres in fresh market green beans are in the northeast region of the state. The following counties are the top green bean producers in the state: Henry (1300), Portage (60), Lorain (51) and Summit (42).

Production Methods:
Green beans, also known as snap beans, grow well on well-drained loam-type soil with a pH between 6.0 to 7.0. Bean should be planted when the soil temperature has reached at least 55-60˚F. However, optimal seed germination occurs at 70˚F. Seeds are planted 1 to 2 inch deep at a rate of 75 to 120 lbs of seed per acre. Fertilizer is applied in band 2 inches below and 2 inches to the side of the seed. Potassium and phosphorus are applied according to a spring soil test while nitrogen is usually applied at a rate of 20-40 lbs/A. Beans need an about 1-1 ½ inches of water each week either from rain or irrigation. Irrigation is required at bloom in order to ensure optimal pod set if soil conditions are dry. Effective weed management is important because beans do not compete well with weeds. Beans are harvested approximately 8 weeks after planting. In Ohio a good commercial yield is 200+ bu/A for fresh market and 4 tons/A for processing.

Insect Pests

Bean Leaf Beetle:
The bean leaf beetle is reddish to yellowish brown and about ¼ inch long. They may or may not have black spots on their wing cover. The wings are usually rimmed in black and the distinguishing

characteristic is a black triangle just behind the head. They overwinter as adults in wooded areas, litter, weeds and pastures. In the spring as the temperature rises these beetles become active and move into bean fields. The beetles feed on the foliage, chewing small round holes into the leaves. Adult feeding reduces plant vigor, plant size and yield. Later in the season, the second generation beetles will feed directly on the bean pod. Damage to the pods can be severe if European corn borer or corn earworm programs are stopped earlier than 12 days before harvest during the second generation emergence.

Potato Leafhopper:
The potato leafhopper overwinters in the south and is blown north each spring. The adult is spindle-shaped, about 1/8 inch long and yellowish green in color with six light spots immediately behind the head. Potato leafhoppers will usually jump instead of fly when disturbed. The nymphs are smaller versions of the adults except they do not have wings so they cannot fly. Both the adults and nymphs can cause damage to the bean plant. They extract sap from the undersides of leaves causing them to crinkle and curl downward. Extensive feeding can cause a characteristic triangular yellowing or bronzing of the leaf tip known as "hopperburn." These plants are usually stunted, have small root systems and have reduced yields and quality.

European Corn Borer:
The European corn borer overwinters as a mature larvae in the stem of the plant on which if fed in the fall, usually field corn. The larvae ¾ to 1 inch long and grayish pink in color with a dark head and rows of small brown spots on their backs. The larvae pupate in late spring and the adults emerge to begin mating and laying eggs. The eggs are laid in groups of 5 to 50 resembling overlapping fish scales. They will hatch in approximately 5 days. The young larvae do the most damage to green bean. They feed on leaves, buds, or flowers for 4-6 days before boring into stem or the beans when the temperature reaches 70˚F. If the temperature is higher the larvae will enter the stems and beans more quickly. There are usually 2-3 generations of European corn borers in Ohio.

Corn Earworm:
The corn earworm generally overwinters in areas from the southern part of the state and southward. Normal prevailing winds will move the adults northward. The first generation of corn earworms appears early in the growing season so they provide little damage to green beans. The second generation that begins with moth flights in late July, is usually larger and more serious doing most of its damage in late August through September. The larvae vary in color from light green to tan, brown, pink maroon or nearly black and have light and dark stripes running the length of the body. Their body is covered by short dense microspines. The small larvae will feed bore into a pod to eat the seed. The larvae then back out and look for other feeding sites.

Occassional Insect Pests

Wireworms and Seedcorn Maggots:
Beans that are planted following sod, alfalfa or set-aside could be at risk for damage from wireworms and seedcorn maggots. Wireworms are cylindrical, hard-bodied larvae of the click beetle. They are

brownish-yellow, shiny and ½ to 1½ inches long. Seedcorn maggots are white to yellow-white beetle larvae. They have no legs and have a pointed head. Both insects feed on the bean seed causing poor germination and tall spindly seedlings. Planting under cool, moist soil conditions favor the development of both of these pests.

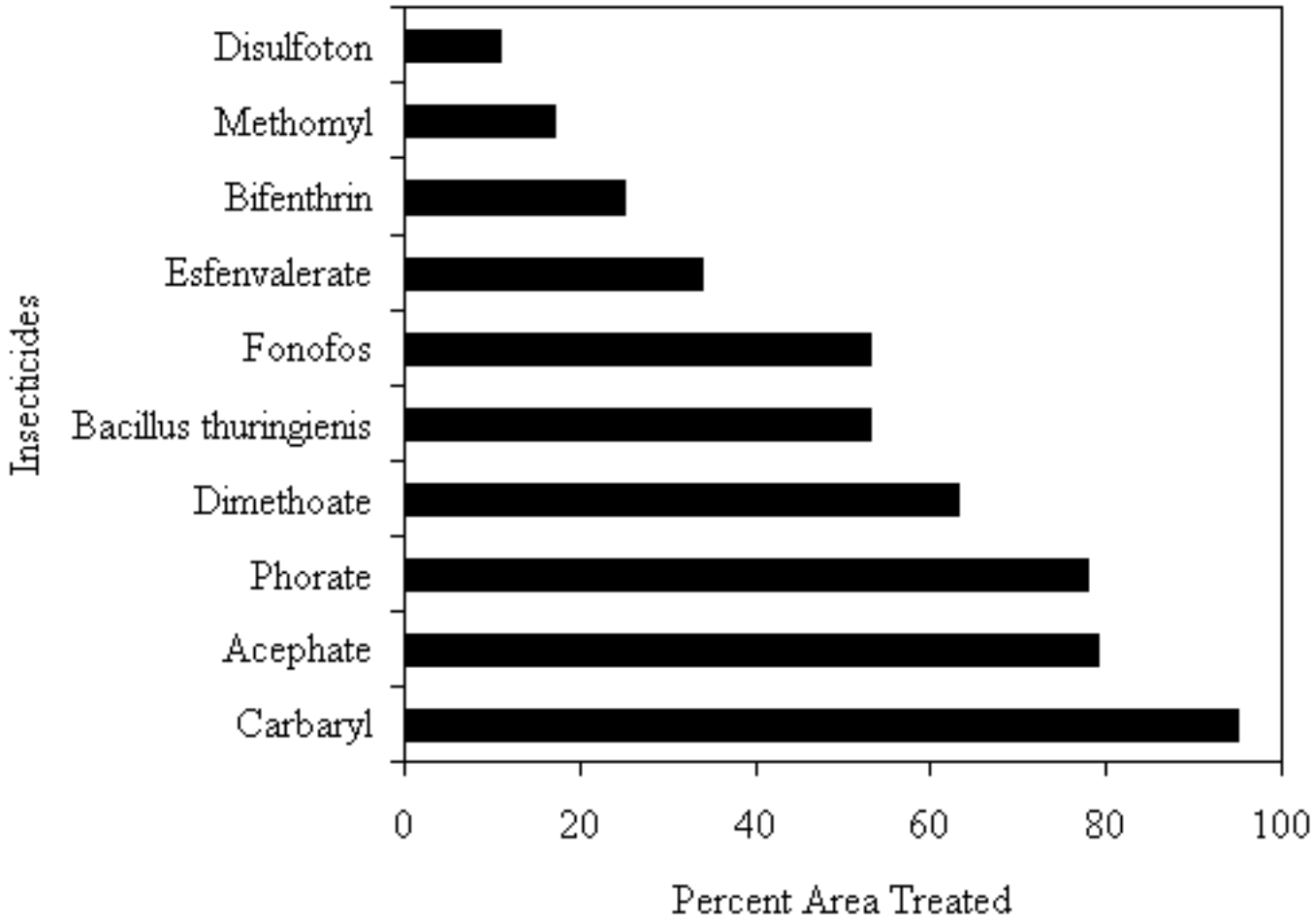
Chemical Insect Controls:(2,4)

Carbaryl (Sevin)
Percent acres treated: 95%
Target pests and timing: Bean leaf beetle, Potato leafhopper, European corn borer and Corn Earworm
Average rate of most common formulations and frequency of application: (4)

Sevin 80S – 1 lbs/A, twice
Sevin XLR Plus – 0.9 qt/A, twice
Sevin 50WP – 1 lb/A, twice
Sevin 4F – 1.5 lb/A, once
PHI: 7 – 14 days
Efficacy rating: Good to Very Good

Acephate (Orthene)
Percent acres treated: 79%
Target pests and timing: Bean leaf beetle and European corn borer
Average rate of most common formulation and frequency of application:

Orthene 75SP – 0.9 lb/A, once
PHI: 16-18 days
Efficacy rating: Good to Very Good



Phorate (Thimet)
Percent acres treated: 78%
Target pests and timing: Bean leaf beetle
Average rate of most common formulation and frequency of application:

Thimet 20G – 8bs/A, once
PHI: 60 days
Efficacy rating: Average

Dimethoate
Percent acres treated: 63%
Target pests and timing: Bean leaf beetle, aphids and mites
Average rate of most common formulation and frequency of application:

Dimethoate 4EC – 0.9 pt/A, twice
PHI: 3-7 days
Efficacy rating: Good

Bacillus thuringiensis (Dipel, XenTari)
Percent acres treated: 53%
Target pests and timing: European corn borer and corn earworm
Average rate of most common formulation and frequency of application:

Dipel 4L – 2 pt/A, once
XenTari WDG – 1 lb/A, once
PHI: 0 days
Efficacy rating: Good

Fonophos (Difonate)
Percent acres treated: 53% (commonly used once every two years)
Target pests and timing: seedcorn maggots andwireworms
Average rate of most common formulation and frequency of application:

Difonate II 15G – 27 lb/A, once pre-plant in the furrow
PHI: 60 days
Efficacy rating:

Esfenvalerate (Asana)
Percent acres treated: 34%
Target pests and timing: European corn borer and Corn earworm
Average rate of most common formulation and frequency of application:

Asana XL – 6.5 oz/A, once
PHI: 7 days
Efficacy rating: Good

Bifenthrin (Capture)
Percent acres treated: 25%
Target pests and timing: Bean leaf beetle
Average rate of most common formulation and frequency of application:

Capture – 5oz/A, once
PHI: 10 days
Efficacy rating: Very Good

Methomyl (Lannate)
Percent acres treated: 17%
Target pests and timing: Bean leaf beetle and leafhoppers
Average rate of most common formulation and frequency of application:

Lannate LV – 1.5 pt/A, once
PHI: 16days
Efficacy rating: Good

Disulfoton (Di-Syston)
Percent acres treated: 11%
Target pests and timing: Bean leaf beetle
Average rate of most common formulation and frequency of application:

Di-Syston 15G – 4.5 lb/A, once at planting
PHI: 60 days
Efficacy rating: Average

Cultural Controls:(2,3)
Delay planting until the soil is warmer and seeds can germinate more quickly. Choose cultivars that have a lower susceptibility to insect damage. Monitor European corn borer and corn earworm population using scouting or blacklight traps so that chemicals can be applied when the insects are the most vulnerable. Use insecticides with action against multiple pests.

Diseases

White Mold:
White mold is caused by the fungus *Sclerotinia sclerotiorium* that overwinters in residues from diseased plants in and near bean fields. During wet spring weather fungal spores are produced and then carried by wind to the bean plants. The fungus commonly colonizes senescent petals and injured tissues. Infection occurs after prolonged periods of wet conditions. Symptoms of the disease first appear as watery rot on stems, leaves and pods. White cottony growth appears on the infected pods and stems. The affected tissue dries quickly and bleaches to a pale tan or white color. Entire branches or stems may be killed but if the main stem is infected near the soil line, the entire plant may be killed.

Gray Mold:
Gray mold is caused by the fungus *Botrytis cinerea*. The fungus is commonly present in most any dead organic matter in fields. It is spread by wind and promoted in wet weather. Gray mold primarily infects the pods of bean plants where it causes a distinctive grayish powdery mold to develop. Pods resting on the soil or touching another decaying pod or leaf are most easily infected.

Rust:
The fungus *Uromyces phaseoli* var. *typica* causes the disease rust in beans. The fungus overwinters on residues from diseased plants. The underside of leaves are usually first infected with the fungus. They develop small spots that enlarge, turn red and develop a blister-like appearance. Eventually the pustules

rupture and release millions of brick red spores that can be transported long distances by wind. Severely infected leaves turn yellow, begin to dry and then drop from the plant. Rust attacks when the weather is cool and wet with frequent and prolonged dew or rain.

Bacterial Blight:
There are several types of bacteria that cause disease in green beans in Ohio. The most common causal bacteria is *Xanthamonas campestris* pv. *phaseoli*. The bacteria overwinter in infected seed and in the residues of diseased plants left in the field. Infection of bean foliage is favored by conditions of high humidity and moisture. Symptoms of the disease appear as water-soaked spots on the underside of the leaves. The spots enlarge and the tissue in the centers dies and turns brown. A characteristic lemon-yellow ring develops around the irregular shaped spots. The spots can grow together, causing the death of the entire leaf and the defoliation of the plant. Infected pods also show small watersoaked spots that develop into large, dark irregular spots but under moist conditions a yellow ooze is produced by these spots.

Chemical Disease Controls:(2,4)

Chlorthalanil (Bravo)
Percent acres treated: 92%
Target diseases: White and Gray Molds and Rust
Average rate of most common formulation and frequency of application:

Bravo 720 – 2.5 pt/A, 1.8 times
PHI: 12-14 days
Efficacy rating: Good

Fixed Copper
Percent acres treated: 78%
Target diseases: Bacterial blights
Average rate of most common formulation and frequency of application:

Fixed Copper – 1 lb/A, 1.5 times
PHI: 4-7 days
Efficacy rating: Average

Benomyl (Benlate)
Percent acres treated: 80%
Target diseases: White and Gray Molds
Average rate of most common formulation and frequency of application:

Benlate 50DF – 1.75 lb/A, twice
PHI: 7 days

Efficacy rating: Good

Thiophanate-methyl (Topsin)
Percent acres treated: 30%
Target diseases: White and Gray Molds
Average rate of most common formulation and frequency of application:

Topsin M 4.5F– 1 lb/A, twice
PHI: 7-14 days
Efficacy rating: Good

Cultural Controls:(2,5)
Plant green beans in well-drained soil not recently planted with beans, potatoes, tomatoes, lettuce or cabbage. If possible, orient rows parallel to the prevailing winds and use wide row spacing to help keep low levels of moisture in the plant canopy. Avoid planting in shaded field, fields bordered on two or more sides by trees or fields that drain poorly. Plant disease free seeds and use disease resistant cultivars when available. Practice a 2-3 year rotation and deep plow infested debris.

Weeds

Broadleaves and grasses:

Chemical Controls:(2,4)

Metolachlor (Dual)
Percent of acres treated: 87%
Target Weeds: germinating annual grasses, yellow nutsedge and some broadleaf weeds
Average rate of most common formulation and frequency of application:

Dual 8E – 1.6pt/A, once (pre-emergence)
PHI: 55-60 days
Efficacy rating: Average to Good

Dimethenamid (Basagran)
Percent acres treated: 80%
Target weeds: emerged annual broadleaf weeds and yellow nutsedge
Average rate of most common formulation and frequency of application:

Basagran – 1.6 pt/A, as needed (post-emergence)

PHI: 20-28 days
Efficacy rating: Average

EPTC (Eptam)
Percent acres treated: 53%
Target weeds: germinating annual grasses and some broadleaf weeds
Average rate of most common formulation and frequency of application:
PHI: 60 days
Efficacy rating: Good

Trifluralin
Percent acres treated: 9%
Target weeds: germinating annual grasses and some broadleaf weeds
Average rate of most common formulation and frequency of application:

Trifluralin 4EC– 1.2 pt/A, once (pre-plant)

PHI: 55-60 days
Efficacy rating: Average to Good

Clomozone
Percent acres treated: 7%
Target weeds: germinating annual grasses and some broadleaf weeds
Average rate of most common formulation and frequency of application:

Command 4EC – 1.5 pt/A, once (pre-plant)

PHI: 60 days
Efficacy rating:

Cultural Controls:(3)
Use shallow mechanical weed cultivation can be used to manage weed in the rows until there is a potential for plant damage by the cultivation equipment.

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