

Beans: Snap, Dry and Lima

Culture

Snap Beans

Snap beans also are known as green beans and include wax (yellow), podded and pole beans. Most commercial beans in Ohio are produced on bush-type plants. Pods are flat, oval or round, depending on variety. Pole beans are grown in hills around a pole or on a trellis. Good commercial yields for fresh market are 150+ bu/A.

Beans thrive on well-drained loam-type soils. They do not grow well on wet soils. Planting should begin only when soil temperatures have reached 55-60°F, unless planting for an early market. Optimum seed germination temperatures occur at 70°F and higher.

Irrigation is necessary at the time of bloom in order to ensure maximum pod set under dry soil conditions. Temperatures above 90°F or below 50°F cause poor pod set.

Good commercial yields are 200+ bu/A for fresh market and 4 ton/A for processing.

Dry Beans

The most popular types are the pea beans and the light red kidney types. It is important to obtain western-grown, certified disease-free seed, because seedborne diseases such as “halo blight” and anthracnose commonly are introduced on infested seedlots. A good yield is 2,200 lb/A.

Lima Beans

Lima beans are of minor importance in Ohio. However, there now is increased interest for roadside stands. Limas grow best in coastal regions of the United States. Seed germination is poor in cool soils (below 60°F). A good yield of shelled beans is 3,000 lb/A.

Varieties

Snap beans

| | | |
|--------------------|-----------|-----------------|
| Main Season | Bronco | Eureka (wax) |
| | Matador | Gold Mine (wax) |
| | Derby | Gold Rush (wax) |
| | Strike | Sunburst (wax) |
| | Tema | |
| | Valentino | |

Processing

Bush Blue Lake types

Bush Romano (Romano type)

Dry Beans

White Marrow

Pinto

California Light Red Kidney

Redkloud Kidney

Lima Beans

Fordhook 242

Fordhook 1072

Lime and Fertilizer

Maintain soil pH at 6.0-7.0.

Apply 20-40 lb N/A. Apply P₂O₅ and K₂O according to soil test. Nitrogen amounts less than 20-40 lb/A may be desirable if beans are mechanically harvested (which reduces the amount of leaves). Adjust to soil test or prior experience

with a given harvesting system. Apply in band 2 inches below and 2 inches to the side of the seed. Keep fertilizer away from the seed, and do not band more than 80-100 lb P₂O₅ plus K₂O.

Sidedress with additional nitrogen if needed. Excess nitrogen prevents concentrated fruit-set and causes more vine growth.

Spacing and Seeding

Snap beans

Plants should be spaced 1.5-2.0 inches within rows and 30-36 inches between rows. Multirow harvesters can plant on 18- to 20-inch rows with 3-4 plants/ft of row, use 50% more fertilizer. Some white seeded varieties should be planted in warmer soils.

Use higher plant populations (up to 95,000 plants/A) under a favorable environment. Sow 75-120 lb of seed/A, depending on seed type and percent germination. Planting depth is 1-2 inches, depending on soil type and moisture.

Lima beans

Plants should be spaced 3-4 inches within rows and 30-36 inches between rows. Use 40-60 lb of seed/A. Plant 1 inch deep in moist, heavy soils and 2 inches deep in dry, sandy soils.

Dry beans

Plants should be spaced 2-3 inches within rows and 28-36 inches between rows. Amount of seed required depends on type—about 75-100 lb/A for marrow and kidney types. Contact seed companies for specific recommendations.

Harvest

Dry beans

Dry beans should not be harvested until they are thoroughly matured. Let pods mature on the plants, but harvest before the pods dry to the point of shattering. The mature beans should be so hard that seeds cannot be easily bitten.

Disease Control

Damping Off

Buy seed commercially treated with Apron Maxx or Thiram to reduce the incidence of damping-off caused by Phytophthora, Pythium, Rhizoctonia, and Fusarium. If Pythium and Rhizoctonia are a significant problem, apply **Ridomil Gold** PC GR at 0.75 lb/1,000 ft of row at planting.

Bacterial Blights

Plant western-grown, certified disease-free seed. Practice a 2-year rotation and plow under bean stubble in the fall. Spray with a fixed copper product (e.g., Kocide, Champ, Cuprofix) at 5-7 day intervals to reduce spread (0 days-PHI) if weather conditions (rainy) favor disease.

Anthracnose

Plant disease-free seed. Spray one of the following fungicides at 7-day intervals:

Bravo WeatherStik 1.4-2 pt/A (dry beans only, 6 wks)

***Topsin M** 70 WP or 70 WSB 1-1.5 lb/A beginning when 10-30% of plants have at least one open bloom (14 days-PHI [snap, dry]; 28 days-PHI [lima]).

Equus 720 1.4-2 lb/A (7 days-PHI).

***Quadris** 2-5 oz/A (0 days-PHI).

***Quadris Opti** 1.6-2.4 pt/A (dry beans only, 14 days-PHI).

***Headline** 6-9 fl oz/A (21 days-PHI for dry beans/7 days-PHI for snap bean).

Rust

Spray at intervals shown below or as indicated on the label, starting at first signs of disease with one of the following: **Bravo Ultrex** 1.25-2.7 lb/A (7 days-PHI). Other products containing chlorothalanyl (e.g. Echo, Equus, Initiate, Chloronil) may also be used. See labels for details.

Quadris Opti 1.6-2.4 pt/A (dry beans only, 14 days-PHI).

Bravo Weather Stik 1.4-3 pt/A (snap, 7 days-PHI).

Equus 720 1.4-3 pt/A (snap), 1.4-2 pt/A (dry) (14 days-PHI).

Folicur 3.6 DF 4-6 fl oz/A (not for succulent shelled beans) (14 days-PHI). 14 day spray interval.

TopCop S 6F 0.2-1.75 pt/A (0 days-PHI).

***Rally** 40W 4.0-5.0 oz/A. 7-day spray interval. (0 days-PHI).

***Headline** 6-9 fl oz/A (21 days-PHI for dry beans/7 days-PHI for snap bean).

Sclerotinia White Mold and Botrytis Gray Mold

Plant on well-drained soil not recently planted to beans, potatoes, peppers, tomatoes, lettuce or cabbage. Orient rows in an east to west direction (parallel to prevailing winds) and use wide spacing (36 in) to reduce moisture in the canopy. Avoid planting in shaded fields, fields bordered on two or more sides by trees or fields that drain poorly. For management of white mold, fungicide sprays should be used when the soil has been wet for 6-10 days before bloom or during bloom. Rovral has been inconsistent in managing white mold but should be used in combination with Topsin M for gray mold control. Spray beans beginning at first bloom as follows:

Topsin M 70 WP or WSB (white mold): 1.0-1.5 lb/A at 4-7 day intervals beginning when 10-30% of plants have one open bloom (snap, 14 days-PHI; lima, 28 days-PHI).

Rovral 4 F 1.5-2.0 lb/A (0 days-PHI), maximum two applications per season.

Botran 75-W 4 lb/A (snap beans only); 4 lb/A pole beans (2 days-PHI) at 7-day intervals.

Contans WG 2-4 lb/A (in 50-100 gal water). This is a biological fungicide that has shown promise in some states. Apply immediately after harvest of beans or other hosts of white mold. Alternatively, apply 3-4 months before planting beans. See label for details.

***Endura** 8-11 oz/A (dry, 21 days-PHI; snap and lima, 7 days-PHI), maximum two applications per season.

***Switch 62.5 WG** 11-14 oz/A, repeat at 7-day intervals. Maximum two applications before switching to a fungicide with a different mode of action. A single application at 10-20% bloom may provide adequate control of white mold in some locations.

Proline 480 SC 4.3-5.7 fl oz/A (7 days-PHI) (dry beans only). Apply at 5-14 day intervals.

For Botrytis only, apply one of the following:

Bravo Ultrex (snap beans only) 2.7 lb/A, 7 days-PHI.

Equus 720 3 pt/A (7 days-PHI), repeat at 7-day intervals.

Bean Yellow Mosaic Virus (BYMV)

No adequate control method is known. Eliminating overwintering host plants, such as wild sweet clover, from nearby bean fields may reduce infection. Some tolerant cultivars are available.

*Follow guidelines for fungicide resistance management on the product label (see pages 58-59).

Insect Control

See the table on the next page for overview of insecticides used to control bean pests.

Note on edamame soybeans: Edamame soybeans are not the same as either snap beans or dry soybeans, in terms of pesticides allowed. In the crop grouping scheme used by EPA, legume vegetables are in crop group 6 and in three sub-groups within group 6. Sub-group 6A includes succulent edible-podded crops such as snap beans, snow peas, and "soybean (immature seed)", which is edamame. Sub-group 6B includes succulent shelled crops such as lima beans and garden peas. Sub-group 6C included dried shelled beans. Regular dry soybeans are in group 6 but not in any of the subgroups. Many recently registered pesticides include whole groups or sub-groups, while many of the older pesticides are registered for use on just a specific crop (such as snap bean), without the entire crop group. Insecticides that can be used on edamame are: Acramite, Admire, Brigadier, BT, Capture, Hero, Intrepid, Mustang, Proaxis, Provado, Sevin, Thiodan, Warrior.

Insecticides for Use on Beans in Ohio

(E = excellent; G = good; F = fair; P = poor; ✓ = pest listed on label but efficacy uncertain; - = pest not on label; rating in parentheses = pest not on label but product known to provide some control)

| Pest >> | Pre-harvest interval (days) | Soil pests | Potato leafhopper | Bean leaf beetle | Mexican bean beetle | Spider mites | European corn borer | Aphids | Impact on beneficial insects |
|-------------------------------------------------------------------------------------------------|-----------------------------|------------|-------------------|------------------|-------------------------------------------------------|--------------|---------------------|--------|------------------------------|
| <i>How often an insecticide has been needed on Ohio farms for this pest in the past>></i> | | occasional | most years | most years | most years in some locations, rare in other locations | occasional | rare | rare | |
| ORGANOPHOSPHATES | | | | | | | | | |
| Dibrom (naled) | 1 | - | ✓ | - | - | ✓ | - | ✓ | moderate/disruptive |
| dimethoate (Cygon) | 0 | - | G | G | ✓ | G | - | G | disruptive |
| malathion (Cythion) | 1 | - | F | - | ✓ | F | - | F | low/moderate |
| Mocap (ethoprop) | - | ✓ | - | - | - | - | - | - | moderate |
| Orthene (acephate) | 7, 30 | - | ✓ | F | ✓ | - | ✓ | G | moderate/disruptive |
| Pennacp-M (methyl parathion) | 15 | - | F | - | ✓ | - | ✓ | F | disruptive |
| Thimet (phorate) | - | ✓ | G | - | ✓ | ✓ | - | P | moderate |
| CARBAMATES | | | | | | | | | |
| Lannate (methomyl) | 1, 3, 14 | - | G | (G) | ✓ | - | ✓ | G | disruptive |
| Sevin (carbaryl) | 3, 21 | - | G | G | ✓ | - | ✓ | - | disruptive |
| Temik (aldicarb) | 90 | - | ✓ | - | ✓ | ✓ | - | ✓ | moderate |
| PYRETHROIDS | | | | | | | | | |
| Asana (esfenvalerate) | 3, 21 | - | G | (G) | ✓ | - | ✓ | F | disruptive |
| Brigade, Capture (bifenthrin) | 3 | ✓ | G | G | ✓ | F | ✓ | F | disruptive |
| Mustang (zeta-cypermethrin) | 1 | - | G | G | ✓ | - | ✓ | - | disruptive |
| Proaxis (gamma-cyhalothrin) | 7 | - | G | G | ✓ | ✓ | ✓ | ✓ | disruptive |
| Warrior (lambda cyhalothrin) | 7 | - | G | G | ✓ | - | ✓ | - | disruptive |
| NEONICOTINOIDS | | | | | | | | | |
| Admire (imidacloprid) | 21 | - | - | - | - | - | - | G | low/moderate |
| Assail (acetamiprid) | 7 | - | ✓ | ✓ | ✓ | - | - | G | low/moderate |
| Cruiser (thiamethoxam) | - | ✓ | ✓ | ✓ | - | - | - | ✓ | low/moderate |
| Provado (imidacloprid) | 7 | - | G | - | - | - | - | G | low/moderate |
| OTHER INSECT NERVE POISONS | | | | | | | | | |
| Pyronyl, PyGanic (pyrethrins) | 0 | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | moderate |
| Radiant (spinetoram) | 3, 28 | - | - | - | - | - | ✓ | - | |
| SpinTor (spinosad) | 3 | - | - | - | - | - | ✓ | - | low |
| Thionex (endosulfan) | 3 | - | F | - | ✓ | - | - | G | moderate |
| INSECT GROWTH REGULATORS | | | | | | | | | |
| Courier (buprofezin) | 14 | - | - | - | - | - | - | - | low/moderate |
| Intrepid (methoxyfenozide) | 7 | - | - | - | - | - | ✓ | - | low/moderate |
| Neemix, Aza-Direct (azadirachtin) | 0 | - | - | ✓ | ✓ | - | - | - | low/moderate |
| Trigard (cyromazine) | 7 | - | - | - | - | - | - | - | low/moderate |
| MISCELLANEOUS | | | | | | | | | |
| Acramite (bifenazate) | 3 | - | - | - | - | ✓ | - | - | low |
| <i>Bacillus thuringiensis</i> (B.t.) | 0 | - | - | - | - | - | ✓ | - | very low |
| Brigadier (bifen. + imidac.) | 7 | - | ✓ | ✓ | - | - | ✓ | ✓ | disruptive |
| Kelthane (dicofol) | 21 | - | - | - | - | G | - | - | low/moderate |
| soap (M-Pede) | 0 | - | F | - | - | F | - | F | low |

• Commercial seed treatment

Imidacloprid

Gaucha 480: 2-4 fl oz per cwt for wireworm, bean leaf beetle, aphids.

Thiamethoxam

For wireworm, seedcorn maggot, bean leaf beetle, aphids, and plant leafhopper.

Cruiser 5FS: 1.28 fl oz per 100 lbs seed.

• Preplant broadcast treatment

Ethoprop (snap and lima beans)

For garden symphytan, nematodes.

Apply from 3 days before planting to at-planting.

Mocap 6EC: 1-1.3 gal/A.

Mocap 15G: 40-54 lb/A.

• At-planting treatment

Aldicarb (dry beans only; 90-day PHI)

For aphids, leafhoppers, mites, Mexican bean beetle, nematodes.

Temik 15G: 5.5-7.5 oz/1,000 ft for aphids; 7.5-15 oz/1,000 ft for other pests. Limit 14 lb/A per year.

Bifenthrin (3 days-PHI)

For maggot, wireworm, grubs.

Brigade 10WSB: 8-16 oz/A. Apply in-furrow with seed.

Ethoprop (snap and lima beans)

For garden symphytan and nematodes.

Do not allow granules to contact seed.

Mocap 6EC: 2-4.4 fl oz/1,000 ft (1.33-2 qt/A for 36-inch rows).

Mocap 15G: 0.9-1.4 lb/1,000 ft (13-20 lb/A for 36-inch rows).

Imidacloprid (21 days-PHI)

For aphids, leafhoppers, thrips, whiteflies.

Admire 2F, Alias 2F: 16-24 oz/A.

Admire Pro (4.6F): 7.0-10.5 fl oz/A.

Phorate

For seedcorn maggot, aphids, leafhoppers, mites, Mexican bean beetle.

Thimet 20G; Phorate 20G: 4.5-9.4 oz/1,000 ft for Mexican bean beetle; 4.5-7 oz/1,000 ft for other pests.

• Bait treatment

Metaldehyde (0 days-PHI)

For slugs.

Deadline MP (4B): 20-40 lb/A.

Metaldehyde 7.5G: 20 lb/A.

• Foliar treatment

Accephate (14 days-PHI, snap and dry beans; 0 days-PHI, lima beans)

Orthene 75SP: 0.7-1.3 lb/A for aphids, bean leaf beetle, leafhoppers, Mexican bean beetle; 1-1.3 lb/A for European corn borer. Limit 2.7 lb/A per season.

Orthene 97: 4-16 oz/A. Limit 2.12 lb/A per season.

Bracket 90S: 0.25-1.1 lb/A.

Acetamiprid (7 days-PHI)

For aphids, leafhoppers, bean leaf beetle, Mexican bean beetle, whiteflies, thrips.

Assail 30SG: 2.5-5.3 oz/A. Limit 16 oz/A per season.

Bifenazate (3 days-PHI)

For two-spotted spider mite.

Acramite 4SC: 16-24 fl oz/A.

Bifenthrin (3 days-PHI)

Brigade 2EC, Capture 2EC, Discipline 2EC, Fanfare 2EC, Sniper 2EC, Tundra 2EC: 1.6-6.4 fl oz/A for leafhoppers; 2.1-6.4 fl oz/A for bean leaf beetle, corn borer, aphids; 5.12-6.4 fl oz/A for mites.

Brigade 10WSP: 4-16 oz/A.

Bifenthrin + imidacloprid (7 days-PHI)

For bean leaf beetle, leafhoppers, Japanese beetle, aphids, thrips, European corn borer and other caterpillars.

Brigadier 2EC: 3.8-5.5 fl oz/A.

Bifenthrin + zeta-cypermethrin (3 days-PHI)

For bean leaf beetle, Mexican bean beetle, leafhoppers, spider mites, aphids, European corn borer.

Hero 1.24EC: 4-10.3 fl oz/A.

Buprofezin (14 days-PHI)

For whiteflies.

Courier (70W): 8.7 oz/A.

Carbaryl (3 days-PHI, snap; 21 days-PHI, dry)

For leafhoppers, bean leaf beetle, European corn borer, Mexican bean beetle.

Carbaryl 90DF: 0.6-1.6 lb/A.

Carbaryl 4L; Sevin 4F; Sevin XLR Plus (4EC): 1 qt/A for leafhoppers; 1-1.5 qt/A for European corn borer; 0.5-1 qt/A for bean leaf beetle, Mexican bean beetle.

Sevin 80S: 1.25 lb/A for leafhoppers; 1.25-1.88 lb/A for European corn borer; 0.67-1.25 lb/A for bean leaf beetle, Mexican bean beetle.

Sevin 50WP: 2 lb/A for leafhoppers, bean leaf beetle; 2-3 lb/A for European corn borer; 1-2 lb/A for Mexican bean beetle.

Cyromazine (7 days-PHI, lima beans only)

For leafminers.

Trigard 75WP: 0.17 lb/A.

Dicofol (21 days-PHI)

For spider mites.

Dicofol 4EC: 1-3 pt/A.

Kelthane MF (4EC): 1-3 pt/A.

Dimethoate (0 days-PHI)

For aphids, leafhoppers, mites, bean leaf beetle, Mexican bean beetle.

Dimethoate 4EC: 0.5-1 pt/A.

Dimethoate 2.67EC: 0.75-1.5 pt/A.

Endosulfan (3 days-PHI, snap and dry beans)

For Mexican bean beetle, leafhoppers, aphids.

Limit 3 applications per year or 4 qt/A per year.

Thionex 3EC, Endosulfan 3EC: 0.67-1.33 qt/A.

Thionex 50WP: 1-2 lb/A.

Esfenvalerate (3 days-PHI, snap beans; 21 days-PHI, dry beans)

For leafhoppers, Mexican bean beetle, European corn borer.

Asana XL 0.66EC, Adjourn 0.66EC: 5.8-9.6 fl oz/A for leafhopper, borer; 2.9-5.8 fl oz/A for Mexican bean beetle. Limit 39 fl oz/A per season.

Gamma-cyhalothrin (7 days-PHI)

For leafhoppers, bean leaf beetle, Mexican bean beetle; suppression of spider mites.

Proaxis (0.5EC): 1.92-3.84 fl oz/A.

Imidacloprid (7 days-PHI)

For aphids, leafhoppers, whiteflies.

Provado 1.6F, Pasada 1.6F: 3.5 fl oz/A. Limit 10.5 fl oz/A per year.

Imidacloprid + cyfluthrin (7 days-PHI, dry beans only)

For leafhoppers, aphids, tarnished plant bug, caterpillars.

Leverage 2.7SE: 3.5 fl oz/A.

Lambda-cyhalothrin (7 days-PHI)

For beetles, leafhoppers, caterpillars.

Warrior II 2.1 SC: 0.96-1.92 fl oz/A.

Warrior 1EC, Silencer 1EC, Taiga Z 1CS: 1.92-3.84 fl oz/A.

Malathion (1 day-PHI)

For leafhoppers, Mexican bean beetle, aphids, mites.

Malathion 5EC: 1.5-2.5 pt/A for leafhoppers, Mexican bean beetle; 2-2.5 pt/A for aphids.

Malathion 8EC: 1-1.5 pt/A.

Malathion 8 Aquamul: 1.25-1.75 pt/A.

Cythion 9.3EC: 8 oz/A.

Methomyl (1 or 3 days-PHI, snap beans, depending on rate; 14 days-PHI, dry beans)

For leafhoppers, Mexican bean beetle, aphids, European corn borer.

Limit 10 applications/crop.

Lannate 90SP: 0.25-1 lb/A for leafhoppers, Mexican bean beetle; 0.5-1 lb/A for aphids, European corn borer.

Lannate LV (2.4EC): 0.75-3 pt/A for leafhoppers, Mexican bean beetle; 1.5-3 pt/A for aphids, European corn borer.

Methoxyfenozide (7 days-PHI)

For caterpillars.

Intrepid 2F: 4-8 fl oz/A for young plants or light infestations; 8-16 fl oz/A for larger plants or heavy infestations. Limit 64 fl oz per acre per season.

Methyl parathion (15 days-PHI, dry beans only)

For aphids, leafhoppers, Mexican bean beetle, European corn borer.

Do not apply to blooming crops or weeds when bees are foraging.

PennCap-M (encapsulated 2F): 2 pt/A for aphids, leafhoppers, Mexican bean beetle; 2-4 pt/A for European corn borer.

Limit 12 pt/A per season.

Naled (1 day-PHI, snap, lima, and dry beans)

For aphids, leafhoppers, mites.

Dibrom 8EC: 1-1.5 pt/A.

Pyriproxyfen (7 days-PHI)

For whiteflies.

Esteem 35WP: 2.5-3 oz/A. Limit 2 applications or 6 oz/A per season.

Spinetoram (3 days-PHI, snap beans; 28 days, dry beans)

For European corn borer.

Radiant 1SC: 3-8 fl oz/A. Limit 6 applications per crop.

Spinosad (3 days-PHI, succulent; 28 days-PHI, dried)

SpinTor 2SC: 3-6 fl oz/A for European corn borer; 4-6 fl oz/A for armyworms, corn earworm, loopers; 6 fl oz/A for leafminers, thrips. Limit 29 fl oz/A per year.

Entrust (80WP): 1-2 oz/A.

Zeta-cypermethrin (1 day-PHI)

For leafhoppers, beetles, caterpillars.

Mustang 1.5EW: 3.0-4.3 fl oz/A.

Mustang Max (0.8EC): 1.28-4.0 fl oz/A.

Weed Control

Preplant Incorporated

Alachlor: Controls germinating annual grasses, some broadleaf weeds and yellow nutsedge. Do not use on red kidney beans.

Lasso 4EC and Micro-Tech: 2.5-3 qt/A.

Partner WDG: 3.8-4.5 lb/A.

Frontier 6.0 (dimethenamid) controls emerging annual grasses, some broadleaf weeds and yellow nutsedge. For use on dry beans only. Apply 1-2 pt/A.

Trifluralin: Controls germinating annual grasses and some broadleaf weeds. Incorporate once within 24 hours of application and again before planting.

Dry Beans

Albough Trifluralin, Gowan Trifluralin 4, Riverside Trifluralin 4EC, Tri-4 HF, Trilin 4EC, Treflan HFP: 1-2 pt/A.

Gowan Trifluralin 5EC, Trilin 5EC: 0.8-1.6 pt/A.

Riverside Trific 60DF: 0.875-1.66 lb/A.

Gowan 10G, Treflan TR-10, Trilin 10G, Wilbur-Ellis Trifluralin 10G: 5-10 lb/A.

Lima and Snap Beans

Albough Trifluralin, Gowan Trifluralin 4, Riverside Trifluralin 4EC, Tri-4 HF Trilin 4EC, Treflan HFP: 1-1.5 pt/A.

Gowan Trifluralin 5EC, Trilin 5EC: 0.8-1.2 pt/A.

Riverside Trific 60DF: 0.875-1.33 lb/A.

Gowan 10G, Treflan TR-10, Trilin 10G, Wilbur-Ellis Trifluralin 10G: 5-7.5 lb/A.

Dry Beans and Green Beans

Eptam 7-E controls germinating annual grasses and some broadleaf weeds. Incorporate immediately after planting. Do not use on adzuki beans, lima beans and other flat podded beans except Romano. Use 3.5-4.5 pt/A.

Metolachlor/s-metolachlor: Controls germinating annual grasses, yellow nutsedge and some broadleaf weeds. Incorporate into the top 2 inches of soil within 14 days of planting.

Dual 8E and Dual II: 1.5-3 pt/A.

Dual Magnum: 1-2 pt/A.

Prowl 3.3EC/ Prowl H20: Controls most germinating annual grasses and some broadleaf weeds. Use on dry beans, lima beans and snap beans. Apply Prowl 3.3EC at 1.2 to 3.6 pt/A; apply Prowl H2O at 2-3 pts/A. Other pendimethalin containing products include: **Acumen, Pendant 3.3 EC, Pendimax 3.3, and Stealth**.

Preemergence

Command 3ME: Green beans. Controls annual grasses and suppresses some broadleaf weeds. Apply 0.4-0.67 pt/A after seeding but before crop emergence.

Frontier 6.0: Controls emerging annual grasses, some broadleaf weeds and yellow nutsedge. For use on dry beans only. Use 1-2 pt/A.

Metolachlor/s-metolachlor: Controls germinating annual grasses, yellow nutsedge and some broadleaf weeds. Incorporate into the top 2 inches of soil within 14 days of planting.

Dual 8E and Dual II: 1.5-3 pt/A.

Dual Magnum: 1-2 pt/A.

Dacthal 75W controls germinating annual grasses and broadleaf weeds. Apply at seeding. Rainfall, irrigation or light incorporation improves weed control. Use 8-10.6 lb/A.

Sandea: For control of broadleaf weeds, apply a single application of 0.5-1.0 oz/A (0.66 oz/A maximum to dry beans) after seeding but before ground crack. Apply only once per crop cycle and do not exceed 2 oz/A in a 12-month period.

Postemergence All Beans

Assure/Targa: Dry and snap beans. Controls annual and perennial grass weeds. Apply 5-10 oz/A depending on annual grass species and size. Apply 10-12 oz/A for quackgrass or johnsongrass. Always use a crop oil concentrate or non-ionic-surfactant. Snap bean (15 days-PHI). Dry bean (30 days-PHI).

Basagran: Controls emerged annual broadleaf weeds and yellow nutsedge. Control depends on timing application to coincide with susceptible growth stage of various weeds. Use 1-2 pt/A. For lima beans, delay application until the crop is 6 to 8 inches high. For other beans, apply after the crop has at least the first trifoliolate leaf fully expanded. May cause bronzing, temporary stunting and delayed maturity on some bean types, especially when weather is hot and humid. Delaying application until the 2 trifoliolate leaf stage has fully expanded will minimize injury (30 days-PHI on green succulent beans).

Frontier 6.0: Controls emerging annual grasses, some broadleaf weeds and yellow nutsedge. For use on dry beans only. Apply during the 1 to 3 trifoliolate stage of the crop before weed emergence. Use 1-2 pt/A.

Poast: Controls emerged annual and perennial grasses. Use 1-2.5 pt/A plus 2 pt/A of crop oil concentrate. Maximum use rate per season is a total of 4 pt/A/season (30 days-PHI on dry beans; 15 days-PHI on succulent beans).

Pursuit: Dry and succulent beans including garbanzo, kidney and white beans. Controls annual broadleaf weeds and grasses. Apply a maximum of 4 oz/A when bean crops have at least 1 trifoliolate leaf. Use only non-ionic-surfactant. Crop maturity may be delayed. Succulent bean (30 days-PHI). Dry bean (60 days-PHI).

Reflex: Dry beans and snap beans. Controls annual broadleaf weeds and suppresses some grasses. Apply 1.25-1.5 pt/A depending on location within Ohio (see Reflex product label). For information on required adjuvant, see the Reflex product label. Do not use liquid nitrogen as an adjuvant in Reflex applications to edible beans. Delay application until dry beans have at least four fully expanded trifoliolate leaves and snap beans have at least one fully expanded trifoliolate leaf. Do not use Reflex more than once every two years. Dry beans (45 days-PHI). Snap beans (30 days-PHI).

SelectMax: Apply 9-16 fl oz/A plus non-ionic surfactant at 0.25% of final volume. Repeat applications can be made at 14-day intervals for maximum allowed use per season of 64 fl oz/A. Pre-harvest interval is 1 day. **Select 2 EC** (dry and lima beans only): Apply 6-8 fl oz/A plus crop oil concentrate at 1% of final volume. Do not apply more than 8 fl oz/A in a single application. For repeat applications make on a minimum of a 14 day interval (30 day PHI).

Directed/shielded application

Gramoxone Extra: Controls emerged annual weeds and top growth of perennials. Apply 1.5 pt/A between rows after crop establishment. Prevent contact with crop otherwise crop injury will result. See the label for specific precautions.

Aim EC: Controls emerged broadleaf weeds. Apply to as a directed spray, using a shielded sprayer, to actively growing weeds up to 4 inches in height. Add non-ionic surfactant at 0.25% or crop oil concentrate at 1-2%. Formulations available include: **Aim EC:** Use 1-2 fl oz/A, and **Aim EW HERBICIDE:** Use 0.5 to 1.6 fl oz/A.