TIMING HERBICIDE APPLICATIONS

Product labels limit timing of some herbicides to certain months, weed growth stage, temperatures, crop growth stage, or days to harvest. Some of this information is summarized in Tables 21and 22. Detailed information is included on the product labels.

TANKMIXES

● If no statement concerning tankmixing of two or more herbicides is given on product labels, mixing is legal, though a test for compatibility will be necessary.

● Do a small-scale jar test as follows: Place one pint of water in a quart jar. Add each pesticide or a pre-mix of pesticide in water, one at a time, and shake well with each addition. Use each product in about the same proportion to water as it will be in the field mixture. **One half of a measuring teaspoon of herbicide in a pint of water is approximately equivalent to one pint or one pound of herbicide in 25 gallons water.** Unless labels indicate otherwise, add pesticides in this order: wettable powders, followed by flowables, emulsifiable concentrates, water solubles, and recommended adjuvants. However, when compatibility enhancers are used (tankmix adjuvants such as Blendex, Buffer-X, Compex, Sponto 168D, Uni-Mix, Unite) these should be added first to the water. Invert the jar 10 times, then inspect the mixture immediately and again after 30 minutes. If a uniform mix cannot be made or if non-dispersable oil, sludge, or clumps of solids form, the mixture is incompatible and should not be used. Minor separation after 30 minutes (without sludge or clumps) that remixes readily with 10 jar inversions, is tolerable if spray tank agitation is good.

● When you tankmix in volume, put 2/3 of the water in the tank first. Then add pesticides one by one, with wettable powders first. Agitate for thorough mixing after each addition, before pouring in the next. Finish filling the tank with water.

● Maintain continuous agitation until the tank is empty.

NOTES ON HERBICIDES

Since publication of the 2000-2001 Guide, there has been a proliferation of "Roundup-like" products containing Glyphosate, and the introduction of several new pre-emergent herbicides for non-bearing orchards.

Basamid (Basamid Granular) -This is a soil fumigant for use in the pre-plant soil preparation stage only. It will control many weeds including weeds from seed plus soil nematodes and certain soil diseases. Proper use of this product requires very specific attention to detail on soil temperatures (54 -64°F), soil moisture (at least 50% field capacity for up to 14 days prior to treatment and 7 days post treatment), soil tilth (soil finely tilled with no clods), and timing (generally applied in early fall). In addition, This material must be incorporated to a depth of 8 inches or more, and the soil surface must be compacted or tarped immediately. Improper use including application when soil temperatures are below 46°F can lead to plant injury.

Clethodim (Select ^{R} 2EC) – A post-emergent selective (annual and perennial grasses only) herbicide, similar to Poast, Fusilade, etc. Somewhat effective on quackgrass, however, addition of ammonium sulfate or a crop oil concentrate at 1% or minimum 1 pint/acre is suggested. (Avoid spraying foliage of trees.) Follow all label precautions to avoid crop injury. For NON-BEARING apples pears, stone fruit (i.e., first leaf trees) only. **Restricted-entry interval (REI) 24 hours.**

Dichlobenil (Casoron) – Dichlobenil volatilizes rapidly under warm, moist soil conditions. Apply before the soil temperature exceeds 45°F to minimize such loss. Application of 100 lbs. of 4% granules/A is effective on many annual grasses and broadleaf weeds, whereas 150 lbs./A are usually required for control of most established perennials.

Diuron (Direx, Karmex) – Effective against germinating annual broadleaf weeds and some annual grasses. For best results, it must be used in combination with an herbicide that is more effective on grasses. It is not effective on established perennial grasses and broadleaf weeds. Rate must be determined in relation to soil texture and organic matter content.

Fluazifop-butyl (Fusilade) – Effective for post-emergence control of annual and perennial grasses. Good for control of grasses in newly planted orchard. Two applications are usually necessary with perennial grasses such as quackgrass. Spot treatments are suggested unless a severe grass problem exists. Inclusion of a nonionic surfactant enhances uptake by grass leaves. Avoid contact with peach tree foliage.

Glufosinate-ammonium (Rely) -A non-selective contact herbicide for post-emergence control of a broad range of annual and perennial grasses and broadleaf weeds, and certain woody species. It gives faster results than gylphosate, but somewhat slower than Gramoxone. It has no residual activity in the soil. Excellent control of root suckers on established trees, however Rely will injure or kill all green vegetation contacted by the spray. If desirable vegetation is contacted, the sprayed portion should be rinsed with water immediately to reduce potential injury. The maximum label rate (6 quarts per acre in 20 gallons water) produced serious bark and wood injury on mature apple tree trunks in a Connecticut orchard in 1995. The chemical, or its formulated surfactant, penetrated an inch or more into the wood beneath wetted bark, killing both contacted tissues. To avoid such injury, tree trunks should be protected from wetting if the high rate of Rely is applied in a low per-acre volume of water. Rely is subject to foaming in the spray tank. Nonionic anti-foaming agents are suggested if needed.

Glyphosate (Roundup Ultra Max, Touchdown, Glyphomax 4SC, Rattler) – As the Monsanto patent for this chemical has expired, several manufacturers are producing products containing Glyphosate, a nonselective broad-spectrum contact herbicide for controlling established annual and perennial grasses and broadleaf weeds, plus woody brush, vines and trees. No residual soil activity on mineral soils. Best timing for application depends on the target weed(s), but is usually after the weeds have developed full foliage or have begun to flower. Two (or three) applications of glyphosate during the growing season may give effective, season-long control of most weeds, including grasses in the tree row.

Glyphosate efficacy is reduced by hard water. You should have your spray tank water tested for hardness, and use a water conditioner (Choice, Quest, ammonium sulfate) if necessary.

Can be combined with 2,4-D or a nonionic surfactant to increase effectiveness or with a pre-emergence herbicide as well. Less effective on weeds that have been recently cut or are under moisture stress. Avoid glyphosate use later in the summer. Hard water can reduce the effectiveness of glyphosate sprays, so use of a water conditioner or ammonium sulfate is recommended. Do not expose glyphosate to galvanized metal or unlined steel tanks as explosive gas may result.

Glyphosate is absorbed by green tissue and can translocate through the entire plant. However, rapidly growing broadleaf weeds and woody species translocate it almost entirely to above-ground growing points, where it may produce a burn-back response rather than complete kill. If applied when top growth has stopped, glyphosate moves to the root, resulting in whole-plant kill.

May be applied by directed spray or by weed wiper underneath apple, pear or cherry trees. Avoid use of glyphosate later in the summer (after about August 1). Do not allow contact with foliage or green bark of fruit trees. Be especially careful to shield trunks of young trees (1st leaf) from spray. Rootsuckers or low branches that might be contacted by glyphosate should be removed at least 10 days before application. Use only wiper application for all stone fruits other than cherry. Do not use on peaches and plums since both are EXTREMELY SENSITIVE to glyphosate, and ANY contact with leaves, small branches, or trunks of young trees may cause severe damage or tree death.

Isoxaben (Gallery 75DF, Gallery is a trademark of Dow AgroSciences) - For selective, pre-emergent control of broadleaf weeds in NON-BEARING (non-crop) fruit trees only. **(NON-BEARING means trees will not bear fruit for at least one year after treatment.)** Apply in late fall or early spring. In newly planted trees, allow soil to settle before application. Tank mix with post-emergent herbicide and/or Prowl to control emerged broadleaf weeds and grasses. **Restricted-entry interval (REI) 12 hours.**

Napropamide (Devrinol) – Effective against most annual grasses and many annual broadleaf weeds. Does not give good control of ragweed and Pennsylvania smartweed. Napropamide must be present in the soil before weed seed germination; it does not control established weeds. Can be applied in newly planted orchards as soon as the soil settles around the roots and no open cracks are present. Combination with a contact herbicide (glyphosate, paraquat) is required to help control established weeds and those not effectively controlled by napropamide.

Norflurazon (Solicam) – Controls most annual grasses and many annual broadleaf weeds, and suppresses quackgrass and nutsedge. Must be moved into the soil by water before weed seed germination. Application rate depends on the type of tree-fruit, and on soil organic matter and clay content. Does not control established perennial weeds.

Oryzalin (Surflan) – Effective against most annual grasses and some annual broadleaf weeds. Does not give good control of ragweed and Pennsylvania smartweed. Not effective against established grasses and broadleaf weeds. Requires 1/2" rain or irrigation to move into the soil before weed seed germination. Oryzalin can be used in newly planted orchards as soon as the soil settles around the roots and no open cracks are present.

Oxyfluorfen (Goal) – Primarily effective against seedling broadleaf weeds. Has pre-emergence and post-emergence contact activity. Uptake can be through leaves, stems, or roots, but very little translocation occurs in the plant. Does not control grasses or established perennial broadleaf weeds. To avoid possible damage from vapors, oxyfluorfen must be applied while trees are dormant, before buds swell.

Paraquat (Gramoxone Extra) – Nonselective contact herbicide that effectively kills emerged annual broadleaf weeds and grasses, and top-kills and suppresses perennials. Contact with foliage, branches, and green bark on trunks of young trees can result in damage to the trees. Paraquat is more hazardous to workers than the other tree-fruit herbicides listed, follow safety precautions on label. **REI is 48 hours, written worker notification required.**

P**endimethalin (Prowl)** – Effective for pre-emergence control of most annual grasses and some annual broadleaf weeds. Can be used in newly planted orchards. Limited to nonbearing trees.

Pronamide (Kerb) – Effective against winter annual and perennial grasses. Must be applied in late fall (but before soil freezes), and moved into the soil by water to be effective. Range of activity against broadleaf weeds is limited. Application rate depends on the type of grass being controlled and soil texture.

Sethoxydim (Poast) – Selective herbicide for controlling established annual and perennial grasses. Does not control broadleaf weeds or sedges. Rain within 1 hour of application will decrease effectiveness. A crop-oil concentrate must be used with sethoxydim. Rate of application depends on height of grasses being treated.

Simazine (Princep) – Effective against a wide range of annual broadleaf weeds and grasses. Does not control established perennials. Must be moved into the soil before weed seeds germinate, so late fall or very early spring application is suggested. Activity is reduced in soils with low pH. Weeds such as pigweeds and lambsquarters have developed resistance to simazine where it has been the principal herbicide used. Control of these weeds can be achieved with diuron, oryzalin, or pendimethalin. Type of tree-fruit, tree age, soil texture and organic matter content determine the simazine dosage required for weed control and crop tolerance.

Snapshot 2.5TG (Snapshot is a Trademark of Dow AgroSciences, a premix of 2% trifluralin and 0.5% isoxaben) - For NON-BEARING apples and stone fruit. Provides broader spectrum of control than either chemical alone (i.e., both broadleaf weeds and annual grasses). Not effective on emerged weeds. Apple late fall or spring, or immediately after cultivation. **Restricted entry interval (REI) 12 hours.**

Sulfosate (Touchdown) -A post emergence herbicide that, like glyphosate, offers broad-spectrum, non-selective weed control and also carries a risk of tree injury if not applied in a manner that prevents exposure of leaves, bark, suckers and fresh pruning wounds. Sulfosate should be applied to actively growing emerged weeds. For perennial weeds, apply at the flowering or seedhead stage for best control.

Terbacil (Sinbar) – Effective in controlling most annual grasses and broadleaf weeds. Also provides partial control or suppression of perennials such as quackgrass, horsenettle, and nutsedge. Residual activity in the soil is relatively long-lived. Application rate and crop tolerance depends on soil texture and organic matter content, as well as the type of tree-fruit and tree age.

2,4-D amine (Several brand names, including Amine 4, Saber, but use only those with a label for orchards) -Selective post-emergence foliar herbicide effective against many annual and perennial broadleaf weeds. It is particularly effective in controlling dandelions when applied in late fall. Do not use during bloom. BEWARE of drift as grapes, flowers, and vegetables are extremely sensitive to 2, 4-D. Do not use near Gala trees. Preferred application timing is after harvest and before frost. No more than 2 applications, with minimum 75-day interval. Do not allow spray or drift to contact tree. Combination of 2,4-D amine with glyphosate is effective in controlling many difficult perennial broadleaf weeds. **REI is 48 hours.**