UF IFAS Extension UNIVERSITY of FLORIDA

HS-1007

Maximizing Weed Control in Florida Citrus[1]

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With growers being squeezed between rising production prices and declining yields due to Huanglongbing (HLB, also referred to as citrus greening), Florida citrus growers and production managers need to consider every opportunity to reduce production costs and maintain profitability. Currently, weed control is an expensive and major component of Florida citrus growers' annual citrus production costs. In the central Florida citrus production region, annual weed control costs account for approximately $246 or 11% of the total $2,278 annual production cost per acre for the 2014–2015 season.

Costs vary in other citrus production regions due to local conditions and management programs. Information about annual costs in various regions can be found on EDIS at http://edis.ifas.ufl.edu/topic_a41452410 and on the CREC website at http://www.crec.ifas.ufl.edu/extension/economics/.

In an effort to improve weed control, the grower may begin by asking: "What is a weed?" A weed is simply an unwanted plant or a plant growing out of place. In the grower's case, a species growing in the row middles may be desirable, whereas the same species growing under a tree is undesirable and considered a weed. Thus, depending on the plant's location, the plant's importance may change.

Weeds compete with citrus trees for water, nutrients, light, and space. Weeds may reduce crop yield and increase production and harvesting costs. The objective of today's weed management program is to suppress and control weeds so that they do not cause damage to the tree, impact yield, or impede grove and harvesting operations. Complete and total elimination of all weeds from the grove floor is not necessary nor warranted.

When developing a weed management program, growers must consider 1) weeds present or anticipated, 2) stage of weed growth, 3) material selection, 4) amount of herbicide used, 5) application site, method, and timing, and 6) herbicide band width. These items are discussed in detail below.

Weeds Present or Anticipated

Growers should scout the grove to determine if weeds are present. If weeds are present, efforts should be made to identify the weed by name or weed type (for example, as grass, broadleaf, or sedge). By knowing the type of weeds present, the proper herbicide material(s) can be chosen to provide effective control. In many cases, preemergence herbicides that control grasses may not control broadleaf weeds, or those that control broadleaf weeds may not control grasses. Thus, proper weed identification is an important first step in developing a successful weed control program. Knowing the area and what weeds have been problems in the past can help growers anticipate weed types and develop an effective weed management program.

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Stage of Weed Growth

The stage of weed growth also affects the effectiveness of herbicides. Compared to mature weeds, seedlings are generally the easiest to control and allow for the use of lower herbicide rates.

Seedlings are small plants that are rapidly growing. Weeds that are in a vegetative growth stage are fast-growing and actively producing stems, roots, and foliage. Weeds in the seedling and vegetative growth stages are the easiest to control because the plants' rapid growth hastens systemic herbicide movement within the plant. Plants that are mature or are in seed production tend to be more difficult to control than those in the seedling or vegetative growth stages because these plants grow more slowly, which slows movement of materials into and within the plant.

Material Selection

When choosing herbicide material or materials, growers need to be aware of and follow specific label restrictions and recommendations. An important step prior to the purchase or use of any pesticide is to read the label information to identify use recommendations and restrictions. Some commonly used herbicides may have either county limitations on rate per acre per year or, in other cases, may be prohibited from use on ridge type soils.

Herbicides are generally classified as either preemergence or postemergence herbicides.

Preemergence herbicides are those materials that are applied to the soil surface and must be applied prior to weed emergence for maximum effectiveness. Preemergence herbicides generally do not control weeds that have emerged from the soil. Some preemergence herbicides may have postemergence activity, but this is limited mainly to actively growing, small seedling plants. To be effective, preemergence herbicides generally require incorporation into the soil by irrigation or rainfall to move the product into the zone of seed germination. Examples of commonly used preemergence herbicides include bromacil (Hyvar), diuron (Diuron, Karmex), bromacil + diuron (Krovar), indaziflam (Alion), pendimethalin (Prowl), simazine (Caliber 90, Princep, Simazine), and norflurazon (Solicam).

Postemergence herbicides are applied after the weed has emerged from the soil and generally lack soil activity or root absorption against those weeds that will emerge after the herbicide application. In many cases, the grower may choose to mix both pre- and postemergence herbicides together to improve weed control. Examples of commonly used postemergence herbicides include: carfentrazone-ethyl (Aim), fluazifop (Fusilade), glyphosate (many brand names), glyphosate + 2,4-D (Landmaster), paraquat (Gramoxone), saflufenacil (Treevix), and sethoxydim (Post Plus). However, when applying pre- and postemergence herbicides together, consideration should be given to the likelihood of the emerged weeds blocking the placement of the preemergence herbicides to the soil surface which thereby reduces future weed control.

Materials can further be classified as either systemic/translocated or contact herbicides. Systemic materials move within the plant and reach all plant parts—roots, stems and leaves—thus providing complete weed control if applied at an adequate rate and coverage. An example of systemic herbicide includes the many formulations of glyphosate.

Contact herbicides do not move within the plant and kill only the plant part that the herbicide actually contacts. Contact herbicides usually provide partial plant control, allowing the roots or untreated plant parts to regrow. An example of contact herbicides include the various formulations of paraquat.

Amount of Material Applied

The amount and type of herbicides applied to a given location varies with the age of the tree as well as the site's location within the state (ridge vs. flatwoods). For most of the recommended herbicides, a range of rates will be provided on the label. These rates will offer recommendations based upon tree age as well as soil conditions. Rates are usually lower for trees less than one year of age or where the soil is poorly drained.

For recommended application rates of herbicides, please refer to ENY601, *Pesticides Registered for Use on Florida Citrus*, at http://edis.ifas.ufl.edu/cg017 or for a document on weed management please see http://edis.ifas.ufl.edu/cg013.

Application Site, Method, and Timing

Some herbicides have application restrictions that prohibit their use in specific locations such as the well-drained soils of the central Florida ridge area. Additional label restrictions may prohibit use based on specific tree age, with young trees receiving lower rates than mature trees.

Materials may also be classified for use on bearing or non-bearing citrus trees. Materials labeled for bearing trees can be applied to trees that have or anticipate having a

crop within 12 months of application. Materials labeled for non-bearing should not be use if a crop will be harvested within twelve months of last application. This means that application of materials labeled for non-bearing trees should be limited to the first 18 to 24 months after planting, depending on tree growth and when the first crop will be harvested.

Application method is also important. When applying preemergence herbicides via a herbicide boom, complete, uniform coverage of the soil surface is important for improved weed control. Factors that can affect uniformity of coverage include worn or damaged nozzle tips or excessive vegetative growth of weeds. As nozzles become worn, delivery rates increase and distribution patterns from the individual nozzles become distorted. Additionally, weeds present will also affect spray coverage because these emerged weeds affect spray patterns and block the herbicide from reaching the soil surface. The herbicide label may also state special application equipment requirements. These requirements may include special herbicide boom designs that minimize drift or potential contact with tree foliage.

Application pressure is also important because pressure affects the size of the spray droplets. Higher pressure decreases the spray droplet size, thus increasing the chances of off-target damage due to spray drift. The manufacturer's specified operation pressure range should be considered when selecting nozzles.

Timing of herbicide application is important. Preemergence herbicides should be applied to a relatively weed-free soil surface. If significant weed growth is present, consider applying a postemergence herbicide following this with a preemergence application after weed growth has been reduced.

Band Width

Application band width has a major impact on the amount of herbicide material applied per grove acre, thus directly affecting total weed control costs. When trees are small, herbicide band width should be rather narrow, only covering an area of 3 to 4 feet on each side of the tree. As the tree canopy width increases, the herbicide band width should also increase.

When the trees are small, a narrow band width will help minimize soil erosion and maintain water quality in bedded grove situations.

For example, where trees are planted with 25-foot row spacing and the band width varies from 4 (8 foot total band width) to 7 feet (14 feet total band width) on each side of the tree, the soil surface treated area increases from 32 to 56% per grove acre and will likewise increase the material cost per grove acre.

Conclusion

Growers need to be aware of all factors to minimize weed control costs while improving weed control in Florida citrus groves. Consideration of the above factors will aid in weed control decision making.