



Row-middle weed management methods

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Florida growers face problems throughout the year due to favorable weather conditions that allow rapid proliferation and lush growth of weeds in groves. While a weed-free tree row is desired to minimize competition with citrus, it is also essential to manage the weeds or vegetation in the row middles to help reduce soil erosion from rain and wind.

A management program should be in place to control the row-middle vegetation in order to obtain a 'sweet spot' to effectively hold the soil in place without infesting into herbicide-treated tree rows or under-tree areas. Row-middle weed management in citrus can be accomplished by including mechanical (e.g., mowing), chemical (e.g., herbicide wiping) or cultural (e.g., cover crops) strategies, or by utilizing a combination of these methods (e.g., chemical mowing).

MECHANICAL MOWING

Currently, the primary method for mechanical management of citrus row middles is mowing. Mowing when the vegetation is approximately 1 to 2 feet high trims down the tall-growing and upright weeds, such as grasses.

The frequency of mowing is dependent on the type of vegetation and season. A rule of thumb is that mowing has to be done before the weeds get too big and certainly before they go to seed. Row-middle mowing operations before seed setting will prevent the seed

dispersal and consequent weed infestation in the tree rows.

Shorter and prostrate growing plants are not affected by the mowing operation, allowing them to establish in the groves. Moisture availability and chances for drought conditions in the grove should be considered while selecting mowing as a row-middle management method. Frequent mowing will increase the regrowth vigor of vegetation, resulting in an increase in water use and water extraction from the soil.

Conventionally during mowing,

growers leave the cuttings and clippings in the citrus row middles. There is another approach to mowing that is gaining popularity, called ecological mowing (or eco-mowing), where the clippings are added in the tree rows (under the citrus trees). The resulting plant biomass in the tree rows can potentially increase the organic matter under the tree canopy and provide a mulching effect. In an ongoing project in Southwest Florida, a University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) research group is currently evaluating this practice for its benefits and drawbacks.

WIPING WEEDS

Wiping allows selective application of herbicide to row middles to manage growth of tall weeds. Glyphosate is typically used for herbicide wiping in Florida citrus row-middle management. The herbicide solution is applied through a wet surface of wiping equipment for suppressing vegetative growth of weeds and establishing low-growing row-middle vegetation.

A carpet wiper (Figure 1A, page 12) utilizes a modified herbicide spray boom that is wrapped with a carpet-type material. The herbicide solution (suggested rate: 5 to 30 percent) is applied on the back of the carpet, soaks through the carpet and then is wiped

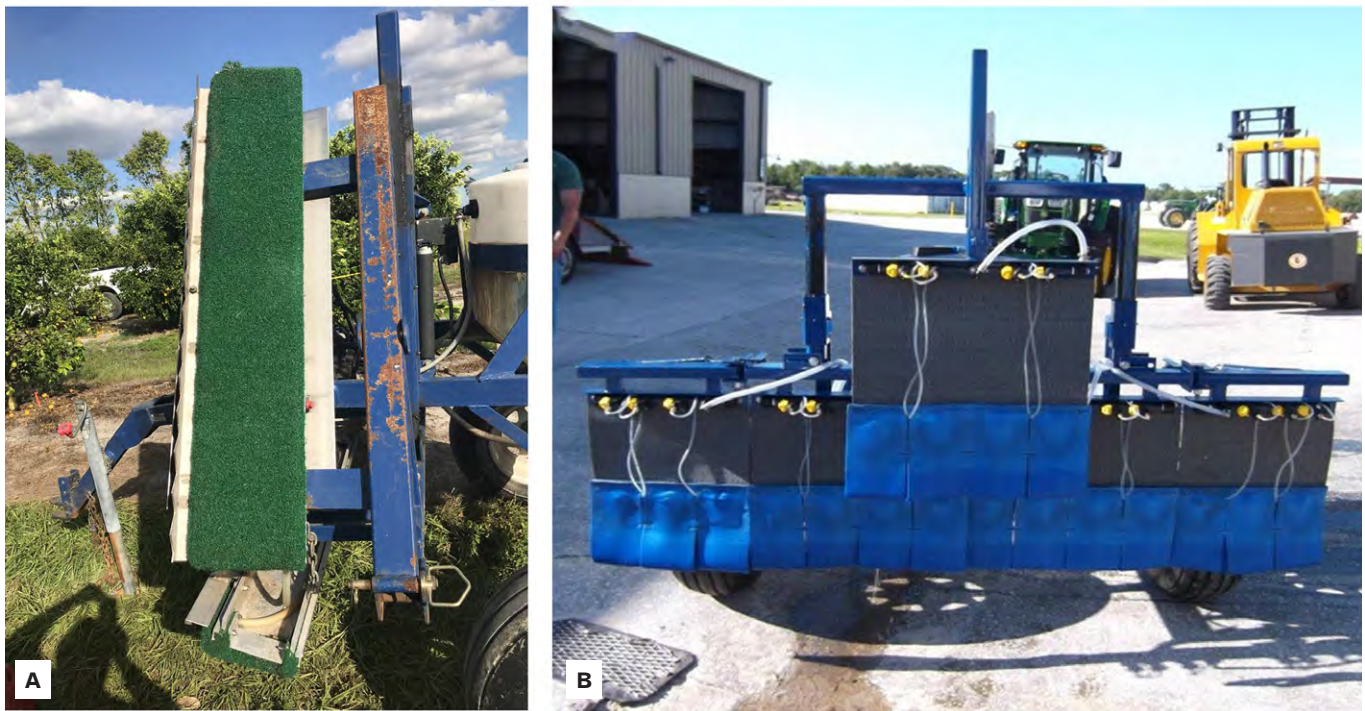


Figure 1. A carpet wiper (A) and panel wiper (B) are used to apply herbicide solution in citrus row middles.



Figure 2. A mixture of cover crops can be planted in citrus row middles for weed management.

onto the target vegetation. In the panel wiper (Figure 1B), herbicide solution (50 to 80 percent) is applied evenly to a panel that passes over the target weed at a specified height.

Both types of wipers usually work best at a 0.5 to 1 gallon per acre application rate. The flow regulation mechanism is critical for maintaining an even application of herbicide solution to the carpet or panel. Chemical wiping reduces the potential for herbicide drift and hence minimizes the likelihood of injury to citrus trees.

AN INTEGRATED APPROACH

Chemical mowing is another popular method of weed control used by

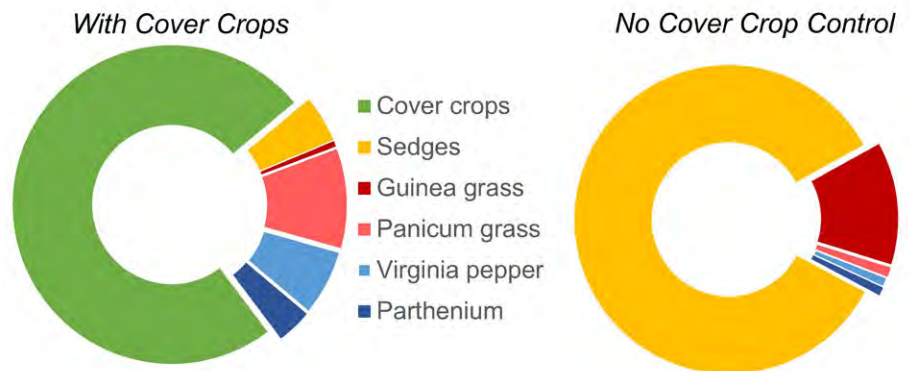


Figure 3. Vegetation composition in citrus row middles with cover crops (left) and without cover crops (right). The cover crop mix utilized in this study included daikon radish, white clover, crimson clover and buckwheat.

citrus growers in Florida. Chemical mowing consists of the use of sub-lethal rates of post-emergent herbicides, such as glyphosate, in conjunction with mechanical mowing. The herbicide is applied to slow down the row-middle vegetation regrowth following a mowing operation. The use of reduced doses of herbicides helps in reducing the frequency of mechanical mowing operations.

Herbicide spraying will control the vegetation growth in row middles for up to 1.5 months, depending on the type of vegetation and time of year. When weeds begin their regrowth, they are mechanically mowed to approximately 6 inches before another herbicide application. Mowing must

be done one to two weeks before the herbicide application. Care should be taken to use a low herbicide rate for chemical mowing, as selecting a high rate will potentially kill all the vegetation in the row middles.

Also, vegetation must be in an actively growing stage and not under any stress at the time of herbicide application for maximum regrowth suppression. For more details on glyphosate rates for chemical mowing, refer to the weeds chapter in the Florida Citrus Production Guide (<https://edis.ifas.ufl.edu/cg013>).

COVER CROPS

Cover crops for row-middle management are gaining much popularity

as there are several benefits associated with their use. Advantages include minimizing soil erosion, suppressing weeds and adding organic matter. An article discussing the use of cover crops in citrus production was published in the April 2019 issue of Citrus Industry magazine.

Cover crops planted in row middles are incorporated into the soil once they mature. Nitrogen-fixing leguminous crops such as hairy indigo, perennial peanut, clover, etc. can potentially add nitrogen to the soil. Planting a mixture of different cover crops (Figure 2, page 12), for instance leguminous and non-leguminous, can bring substantial benefits to citrus production.

Preliminary results from a field trial in Southwest Florida revealed that cover crops significantly reduced the weed density in treated areas and induced shifts in microbial communities of the tree rhizosphere. In addition, cover crops improved the biodiversity of vegetation in the treated row middles (Figure 3, page 12).

Sedges and grasses were the predominant species in row middles without cover crop plantings, whereas more broad-leaved vegetation was found in row middles with cover crops. Sedges and grass weeds can be relatively more competitive with citrus trees for soil moisture.

CONCLUSION

Several factors, such as grove location, weed pressure, soil type and environmental factors influence the type of vegetation present in the row middles as well as its growth. Hence, there is no silver bullet or a single best strategy to manage citrus row middles successfully. The integration of mechanical, chemical and cultural strategies should be put to work for an effective, economical and environmentally safe row-middle weed management program in citrus. 🍊

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