CONSERVATION CROP ROTATION

Florida Conservation Practice Standard 328 Guidance

Natural Resources Conservation Service, Florida **September 2015**

PURPOSE

The purpose of this guidance is to provide additional information for crop rotation as outlined in Florida Conservation Practice Standard, Code 328.

CROP ROTATIONS

A crop rotation is a series of different crop categories grown in a planned recurrent sequence over a given number of years. There are multiple types of crop categories that can be used in a rotation. Crop rotations can vary in one or more of the following ways:

- Plant family – grass vs. broadleaf

  Ex.: Corn vs. Cotton

- Life cycle – annual vs. biennial vs. perennial

  Ex.: Wheat vs. Celery vs. Citrus

- Season of growth – winter annual vs. spring/summer annual

  Ex.: Rye vs. Peanuts

- Rooting depth – shallow vs. moderate vs. deep

  Ex.: Cucumber vs. Corn vs. Cotton

- Row spacing –drilled or close row spacing vs. wide row spacing

  Ex.: small grain, narrow row soybeans vs. corn or regular row spacing soybeans

- Residue production – light vs. heavy

  Ex.: Soybeans vs. Corn

- Residue type – fragile vs. non-fragile

  Ex.: Vegetables, Peanuts, and Small Grains vs. Corn, Sorghum, and Cotton

- Water use efficiency – high vs. low

  Ex.: Bahia-Bahia-Peanut-Cotton vs. Cotton-Peanut-Cotton-Cotton

Crop rotations should not have the same annual crop grown more than 2 years in succession; to avoid this a annual crop from a different plant family should be used (e.g., Cotton-Cotton-Peanut vs. Cotton-Cotton-Cotton). This minimizes the potential for build-up and carryover of insect and disease populations, and maintains some degree of diversity in the cropping system.

BENEFITS OF CROP ROTATIONS

Crop rotations that are properly designed provide many benefits and give producers more options in their cropping systems. When planning a crop rotation with a producer, the planner should emphasize the

importance of maintaining the planned sequence of crops. This is because the benefit of the rotation, whether it is erosion reduction or pest management, depends on the crops being grown in the designated order. Crop rotations can address the following resource concerns:

Pest Management: Rotations can reduce the incidence and severity of weeds, insects, and diseases. By using a different crop each year, pest problems that may have carried over from the previous year do not continue to build up. Because of this, the levels of any given pest are kept at levels that make them easier to manage. A crop rotation also allows the use of different management strategies for pest problems. Herbicides and insecticides with differing modes of action can be used, reducing the possibility that some species will become resistant to chemical control. Different crops each year may allow tillage to be used to control pests, further reducing the need for chemical controls. An example of a crop rotation that controls an insect pest is growing a root-knot nematode non-host crop such as bahiagrass, bermudagrass, millet, and sorghum at least one year prior to planting a field to peanuts. This rotation reduces the level on root-knot nematodes in the soil.

Erosion control: There is a higher potential for wind or water erosion with rotations that consist of continuous row crops and excessive tillage, than with rotations that include closely-spaced row crops, perennial crops, or crops that require less intensive tillage. One reason is that often different crops have different growth and development periods so that one crop may provide protection from erosive forces during a period of the year that another may not. Additionally, closely spaced row crops, such as small grains or narrow-row soybeans, or perennial crops provide more canopy and surface cover than wide-row crops and reduce the potential for erosion.

Table 1 – High and low residue producing crops.

High Residue Producing Crops	Low Residue Producing Crops
Corn for grain	Soybeans
Grain sorghum for grain	Peanuts
	Cotton
	Silage corn
	Silage sorghum
	Watermelons
	Sunflowers
	Vegetables

Surface residue: The most effective erosion reduction measure is surface residue. High residue producing crops following low residue producing crops maintain higher levels of crop residue on the soil surface (Table 1). Closely spaced annual crops (e.g., those planted with a grain drill or narrow row planter) can be planted for 2 years of the rotation and still meet the requirements of the cropping system as long as the residue remaining is essentially the same.

If there is a reduction in the amount of residue that is produced by any crop in any category, the integrity of the rotation is affected. For example, when corn is harvested for silage instead of grain, peanut vines are baled for hay instead of being left on the field, or a cover crop is grazed, then these crops will not accomplish their purpose in the rotation. If these or similar actions are taken, other steps may be needed to accomplish the purpose of the rotation. Options might be planting a cover crop after harvesting corn silage, or changing tillage practices where a cover crop has been grazed in order to leave more residue on the surface. Residue management practices, such as mulch till or no-till, can help maximize the amount of crop residue on the soil surface during critical erosion periods.

Soil Quality: Crop rotations that include perennial vegetation produce greater soil aggregate stability than systems that have continuous grain crops. Even for rotations that have all grain crops, greater aggregate stability occurs when crops that produce higher amounts of residue are used. For example, rotations that alternate grain sorghum with soybeans result in greater carbon levels in the soil than with continuous soybeans.

Nutrient management: Rotations that have forage legumes or legume cover crops preceding grain crops can reduce the need for nitrogen (N) fertilizer for the grain crop. Average corn yields of 160 bushels per acre have been obtained with corn following alfalfa. Leguminous cover crops can provide an estimated 60 to 70 pounds of N per acre. Small grain crops following legumes can scavenge the nitrogen fixed by the legume, reducing the potential for N losses by leaching.

Water management: Dryland crop rotations can take advantage of stored soil moisture by alternating shallow and deep-rooted crops.

Livestock feed production: For livestock operations, crop rotations that include hay and pasture can provide a major portion, and in some cases, all of the livestock forage and feed.

REFERENCES

Wright, D.L., J.J. Marios, T.W. Katsvair, and J.R. Rich. 2012. Use of Perennial Grasses in Peanut/Cotton Rotations: Effects on Pests. Univ. Florida, Inst. Food Agric. Sci. SS-AGR-125. 3 p.

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