Features:

Crops:

Small Grain Planting Date and Seeding Rate ..........Page 2
Cover Crops.................................................................Page 2
Limitations to Biomass Production .........................Page 3

Forage:

Freeze and Forages........................................................Page 4

Weeds and Pesticides:

Butterweed/Cressleaf  Groundsel in Pastures ..........Page 5
Glyphosate Applications for Winter  Weed Control
in Lawns .................................................................Page 6
Best Management Practices for Triazines in Sugarcane ...Page 6
Rotala: A Wicked Aquatic Invader of Southern
Florida .................................................................Page 7
Preparing the Sprayer for Storage ...............................Page 9

Miscellaneous:

Calendar of events..........................................................Page 2

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Employment Opportunity-Affirmative Action Employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, age, handicap or national origin. For information on obtaining other extension publications, contact your county Cooperative Extension Office. Florida Cooperative Extension Service/Institute of Food and Agricultural Sciences/University of Florida/Nick Place, Dean.

“Agronomy Notes” is prepared by: Ken Quesenberry, Interim Chair and Y. Newman, Extension Forage Specialist (ycnew@ufl.edu); J. Bennett, Crop Physiology (jmbt@ufl.edu); J. Ferrell, Extension Weed Specialist (jferrel@ufl.edu); F. Fishel, Pesticide Information Director (weeddr@ufl.edu); L. Gettys, Aquatic Weed Specialist (lgettys@ufl.edu); L. R. Leon, Weed Specialist (rglg@ufl.edu); Calvin Odero, Weed Specialist (dcodero@ufl.edu); Brent Sellers Extension Weed Specialist (sellersb@ufl.edu); D. Wright, Extension Agronomist (wright@ufl.edu). The use of trade names does not constitute a guarantee or warrant of products named and does not signify approval to the exclusion of similar products.
Small Grain Planting Date and Seeding Rate

With high prices for wheat and other grain crops, there is currently more interest in wheat than in the past few years. Most wheat varieties do best when planted in November rather than December. Wheat or other small grain planted after December 15 have reduced yields and result often in breakeven or less. Plant as soon after December 1 as possible to ensure vernalization of the recommended varieties. Wheat can be planted at 20 seed per foot of row with a conventional 7” spaced grain drill. This amounts to about 35 seed per square foot of area. Seeding rates should be increased by 15% or more for late planting.

Cover Crops

There are many advantages to using cover crops and some of these well known benefits include erosion control and contribution to increase OM. What is not as well known is that it also increases biological diversity of soil microorganisms resulting in favorable impacts to soil structure and influencing organisms that impact nutrient cycling. Grazing livestock on these cover crops enhances soil microbial populations even more resulting in more advantage to following crops. Many growers often plant cover crops later than they should be planted. Make a plan to plant cover crops timely as if it were a cash crop since the cover crops do often result in increased yields of following crops.

Calendar of Events

To follow the link, press “Ctrl” and put cursor over link, and “click.”

Dec 9-12 5th National Conference on Grazing Lands, Orlando, FL  
http://www.glci.org/5NCGL.html

Jan 6-8 American Forage and Grassland Council Annual conference, Covington KY  
http://www.afgc.org

Feb 4-7 Weed Science Society of America Annual Meeting, Baltimore, MD  
http://www.wssa.net
Limitations to Biomass Production

In the November issue of Agronomy Notes I discussed biomass production of crops. An example of biomass accumulation for corn, a warm season crop, was used to illustrate the rate of biomass accumulation and to estimate the potential total biomass accumulation over a 100-day period of growth. I was later asked “does the same apply for crops grown during the winter months” in Florida? Particularly in South Florida, winter temperatures may be adequate for crop growth, so, the question is -- can high biomass be produced during the winter months in Florida?

Several years ago we did some crop simulation modeling studies that clearly showed that even with warm temperatures that are not restrictive to crop growth, biomass production during the winter months will be limited, compared to the summer months. This conclusion is a result of reduced light intensities during the winter months. Because light drives photosynthesis, it is not surprising that the biomass of most crops is closely, and generally linearly, related to the cumulative amount of radiation (sunlight) that is intercepted by the crop over the entire growth period.

Radiation (sunlight) received at the earth’s surface is reduced during the winter months in Florida primarily because of: 1) lower sun angles and 2) shorter day lengths. With the sun being at a lower angle over the southern horizon during the winter, light must pass through much more atmosphere before striking the earth’s surface, compared to the amount of atmosphere that radiation must pass through during the summer months when the sun is at higher angles. As light transverses more atmosphere, more light is reflected back to space and dispersed resulting in less light intensity at the earth’s surface. In addition, the day length is less during the winter months. For example, the day length at Belle Glade, FL (latitude of 26° 4’) on June 15 is 13.5 hours while on December 15 the day length at the same location is 10.3 hours, a 24% shorter day during the winter. Thus, both the duration and the intensity of light during the winter months are significantly less in the winter months resulting in less light to use for biomass production.

The bottom-line conclusion of our modeling studies was that with all other factors being optimal (that is, temperature, fertility, water limitations, etc.), the biomass that could potentially be produced during the winter months would be only 50-60% of the potential that could be expected during the summer months. This reduced potential is solely because of the lower light that is available for crop production during the winter months. This conclusion has important implications for expectations of crop biomass production during the winter months in South Florida, or for that matter, production of other cool-adapted crops that grown across the state during the winter months.
Freeze and Forages

Freeze can cause certain changes in forage plants that make them highly toxic (poisoning) to livestock. These toxicities can be associated to prussic acid or nitrate poisoning. Plants like sorghums or millets (both in the sorghum family), and other plants like oats, wheat, rye, and pigweed (Amaranthus spp) can be toxic for a few days if they undergo frost because of prussic acid.

Nitrate toxicity can also occur with freezing. In this case, freezing slows the metabolism of the plant allowing for nitrates to accumulate in cool-season plants like oats. Special care must be followed if hay is cut right after a freeze.

Prussic acid is one of the most toxic conditions when forages undergo frost. Livestock may show symptoms of poisoning within minutes after consumption of feed. Different from nitrate poisoning, prussic acid dissipates or goes away when the hay is properly cured because the toxic compound volatilizes over time.

What are the conditions triggering prussic acid? Prussic acid occurs in plants that are growing too rapidly, or in damaged tissue such as after a freeze. Under these stressed conditions the tissue cell breaks mixing compounds that when together create prussic acid or cyanides.

What to do after a killing freeze of plants?—Prevent animals from grazing wilted plants for about 1 to 1 ½ weeks until material has dried and prussic acid dissipate or goes away.

If suspecting hay with prussic acid, unroll the hay the night before allowing animal access for a day or 2. You will waste some hay, but will not lose animals. Allow the hay and the haylage to aerate. Bales can be made safer by grinding the leaf and stem material.
Butterweed/cressleaf groundsel (Packera glabella/Senecio glabellus) is a winter annual. It is not a new weed to the state as it is found in nearly all counties, but for some reason it has increased in severity over the past several years. It has been blamed for cattle deaths in at least a couple of situations, and is thought to cause abortion in cattle.

Butterweed is a winter annual that typically germinates in the late fall or early winter. It initially forms a basal rosette of leaves (Figure 1). Rosette leaves are highly variable in shape and deeply lobed. As plants begin to mature in early spring (March to April), flowering stems are produced. Stems are capable of growing as much as 3 feet in height and are typically light green in color (Figure 2). Stems are also hollow, thick, and succulent, and often have red veins running the length of the stem. Leaves are alternate on the stem and are very much like those on the rosette as they are deeply lobed, but get progressively smaller near the top of the stem.

Butterweed is typically not recognized until it begins flowering. Many bright yellow flowers are produced on the stems. Individual flowers, like many of those in the aster family, have both inner (disk) and outer (ray) flowers (Figure 3). Butterweed will have 5 to 15 outer ray petals, which helps differentiate this species from mustards, which only have 4 petals in a cross-like pattern. Seeds are dispersed by wind through a white feathery pappus.

Since this species has been blamed for both cattle death and abortions, controlling this plant in pastures is important. Control with 2,4-D or 2,4-D + dicamba at 1 qt/A is likely the most economical choice, but these herbicides must be applied prior to stem elongation (during the rosette stage) for optimum control. If plants have initiated stem elongation, Grazonnext HL at 1.5 pt/A is the best option. However, if this weed has been a problem in the past, it is best to get a handle on this species early to limit potential livestock poisoning.
Glyphosate Applications for Winter Weed Control in Lawns

We are entering the time of the year in which winter weeds such as annual bluegrass, dandelion, and mustards, start emerging in lawns. Many homeowners and landscapers rely on products containing glyphosate (e.g. Roundup ProMax®) to control heavy infestations of winter weeds in bermudagrass and bahiagrass lawns. However, it is very important to make sure that the turf is dormant at the time of application. Otherwise, the herbicide could injure the turf delaying greening up during the spring and even causing dead patches if the rate use is too high. This is especially important in the southern part of Florida where warm temperatures might prevent the turf to go completely dormant.

These are few points that will help you prevent injuries when using glyphosate in bermudagrass or bahiagrass turf for winter weed control:

- If temperatures are above 60°F and the turf produces green leaves after proper irrigation, then the turf is not completely dormant, and there is a higher risk of herbicide injury.
- Spray weeds when they are small, and make sure that the application is done before the plants produce flowers. For most turf weeds, it is desirable that plants are treated before they are 4 inches tall or in diameter. This will allow using low rates of the herbicide while obtaining proper weed control and minimal or no impact on the turf.
- Avoid spraying glyphosate over the same area more than twice during the winter. Although the individual rates used might be low, the herbicide can accumulate within the turf tissue potentially impacting its re-

Best Management Practices for Triazines in Sugarcane

Sugarcane planting and harvesting is currently ongoing in southern Florida. Fields are being planted following the fallow period or successively. Consequently, weed control in both newly planted and stubble (ratoot) sugarcane fields are very critical for profitability. Triazines are the most widely used herbicides in sugarcane for weed control in both plant and stubble cane. Atrazine, the most widely used triazine in sugarcane in southern Florida is applied at 8 pts/acre either preemergence or postemergence. Other triazines including metribuzin and ametryn are also commonly used in sugarcane for weed control. Metribuzin is applied at 1.3 to 2.6 lbs/acre preemergence or early postemergence on muck soils only. Ametryn is applied at 0.5 to 1.5 lbs/acre post-directed at the base of cane to emerged weeds up to 3 inches in height. These triazines are very important in sugarcane production in Florida because of their consistent performance and are good tank-mix partners with other herbicides. But, good stewardship is required when using these triazines just like other herbicides. The current ongoing use of triazines in sugarcane coincides with drier months in the region thus eliminating potential movement to off-target sites by surface water. However, growers need to apply these herbicides only as specified by the label. Atrazine, the most widely used is a restricted-use herbicide due to ground and surface water concerns. It should not be mixed, loaded, or used within 50 ft of water edges such as canals. In addition, atrazine should not be applied directly to water or to areas where surface water is present. Application of atrazine should be avoided when environmental conditions favor drift to off-target sites. The practices that prevent lateral movement of these herbicides to surface water must be followed by sugarcane growers for good environmental stewardship.
Rotala: A Wicked Aquatic Invader of Southern Florida

Rotala (*Rotala rotundifolia*), also called roundleaf toothcup, is a relative newcomer to Florida and was first found in Broward County in 1996. The species has since established large but mostly isolated populations throughout the southern regions of Florida and is especially problematic in Lee and Collier counties and along the state’s west coast (Jacono and Vandiver 2007). This aquatic weed was introduced through the aquarium and water garden industry because it has attractive red stems, bright green leaves and spikes of fuchsia flowers (Figure 1) and is easy to cultivate. Rotala is primarily a shoreline plant and quickly colonizes areas with moist soil. The plant produces large, dense mats that dominate the surface of the water. This greatly reduces ecosystem services because oxygen level and light penetration are hampered; in addition, water flow is restricted due to the excessive growth of the species. Many of the canals in south Florida are critically important components of the flood control system and resource managers rely on these systems to quickly move stormwater. Because the rapid and vigorous growth of rotala inhibits water flow, the ability of infested canals to function properly in flood control systems is greatly hindered. As such, management of this aquatic weed is a major concern for resource managers.

I recently received a note from a colleague at the South Florida Water Management District (SFWMD), who requested guidance on how to control rotala in flood control canals in Lee County. The District has cleared part of the invaded system using mechanical harvesting; however, rotala can quickly root and form new populations from the fragments produced during mechanical harvesting, so SFWMD was seeking a longer-term solution to this vexing problem. In order to assess the extent of the infestation, we agreed to meet and visit the site together. Upon our arrival at Miller Canal, one of the sites targeted for rotala control in Lee County, it was clear that SFWMD had a problem on their hands (Figure 2). Miller Canal has a water depth of around 4 feet during the wet summer season, while water levels fall to around 2 feet during the dry winter season. Rotala had successfully colonized the banks of this canal and formed large, dense mats of weeds. Because the Miller Canal is part of SFWMD’s flood control system, it is imperative that water able to flow freely so that stormwater can be quickly moved out of the surrounding areas. In addition to serving as a flood prevention system, several homeowners and stakeholders with canal-side property pull irrigation water from the Miller Canal.

This is an important factor to be taken into consideration when selecting a herbicide because a number of products labeled for use in aquatic systems restrict the use of treated water for a number of purposes, including irrigation. Only a few aquatic herbicides provide an acceptable level of control of rotala. Endothall and flumioxazin do not cause measurable damage to the species, and diquat (at 400 ppb) provides only around 80% control. On the other hand, applications of triclopyr and 2,4-D (either product at 2 ppm) can be expected to result in total or near-total control of rotala (Puri and Haller 2010). Both of these herbicides are organo-auxins, which are known to cause significant damage at very low concentrations to sensitive species. In fact, although both triclopyr and 2,4-D are labeled as “general use” aquatic herbicides in the Sunshine State, The Florida Organo-Auxin Herbicide Rule (5E-2.033 in the Florida Pesticide Law and Rules) outlines specific guidelines that must be followed when using these and other organo-auxin products. These restrictions and prohibitions include droplet size criteria, wind speed limitations, and other applicator requirements, but Section 8 of the Rule states that “Applicants who apply organo-auxin herbicides to ditches, canals, or the banks of similar waterways will assure that they are not treating water that will be directly used for irrigation of sensitive crops” (Fishel et al. 2012).

Continues next page...
Based on this information, certain precautions will need to be taken before triclopyr or 2,4-D can be used to control rotala in the Miller Canal in order to ensure compliance with the Florida Organo-Auxin Herbicide Rule and prevent damage to sensitive, non-target plants. The primary challenge will be preventing irrigation from the canal until the level of organo-auxin in the treated water has fallen below a target concentration (as outlined on the herbicide label). This can be accomplished by notifying homeowners and other stakeholders along the system that a herbicide treatment is imminent and that irrigation from the Miller Canal will be prohibited until further notice. Signage will also need to be positioned along the canal to notify others that swimming, fishing and other uses of the water are not allowed during this period. In addition, flow through the canal must be stopped to ensure that treated water does not travel into other parts of the system. Because the Miller Canal is part of the SFWMD flood control system, treatment with an organo-auxin should be scheduled for early spring to coincide with a period of active plant growth (for best herbicide efficacy) and minimal rainfall (to reduce the risk of stormwater accumulation). We hope to develop additional recommendations for control of the aquatic weed rotala in canals and have agreed to work with SFWMD to evaluate a number of treatment options next year.

Literature cited


Preparing the Sprayer for Storage

For some areas of the state, producers and commercial applicators will be putting the sprayer away for winter. Regular equipment maintenance is a must for pesticide applicators. There are two good reasons for this:
1. Pesticide misapplication is very likely if a treatment is made with faulty equipment.
2. In Florida, it’s against the law for a pesticide applicator to operate faulty or unsafe equipment. Put simply, your sprayer will only work as well as you maintain it.

The issue of crop injury due to sprayer contamination is of premium concern due to the prevalence of nonselective herbicide use, such as glyphosate. Likewise, similar concerns are realistic when preparing a sprayer for storage that has held an organo-auxin herbicide, such as 2,4-D, dicamba, or triclopyr. Injury symptoms to desirable crop species are usually quite visibly apparent when a spraying system has been contaminated with an organo-auxin herbicide.

To prepare spray equipment for storage or use on a different crop, follow the instructions in the equipment service manual and/or the pesticide product(s) label(s). If there are no instructions, and the equipment has NOT been used to apply an organo-auxin herbicide, do the following:

1. Add one-half tank of fresh water and flush tanks, lines, booms, and nozzles for at least 5 minutes using a combination of agitation and spraying. Rinsate sprayed through the booms is best sprayed onto a labeled site to avoid accumulation of pesticide-contaminated rinsate. Thoroughly rinse the inside surfaces of the tank, paying particular attention to the surfaces around the tank fill access, baffles, and tank plumbing fixtures. The use of a rinsing nozzle, such as the TeeJet Model 55270 or D41892, can automate the thorough cleaning of tops and sides of the tanks. Pressure sprayers are useful for removing caked-on internal and external residues. Hot water can increase penetration of dried residues, but the addition of hot water rinsing may cause unacceptable health hazards due to the vapors produced. Carefully review labeled safety precautions for the agrichemicals and cleaning products used.

2. Fill the tank with fresh water and add one of the cleaning solutions listed below or a commercially available tank cleaner and agitate the solution for 15 minutes. Add one of the following to each 50 gallons of water to make a cleaning solution:
   • 2 quarts of household ammonia. Let stand in sprayer overnight for organo-auxin herbicides.
   • 4 pounds of trisodium phosphate cleaner detergent.
   Operate the spray booms long enough to ensure that all nozzles and boom lines are filled with the cleaning solution. Let the solution stand in the system for several hours, preferably overnight. Agitate and spray the solution onto an area suitable for the rinsate solution, such as a site approved for application according to the product’s label.

3. Add more water and rinse the system again by using a combination of agitation and spraying. Remove nozzles, screens, and strainers and clean separately in a bucket of cleaning agent and water.

Continues next page...
4. Rinse and flush the system once again with clean water. This procedure is recommended for all herbicides unless the label specifies a different cleanout procedure.

Sprayer Cleaning Agents

Cleaning agents should be selected based on the herbicide and formulation to be cleaned. Cleaning agents should penetrate and dissolve pesticide residues and allow them to be removed when the rinsate is removed from the sprayer. The functions of cleaning agents are dilution, solubilization and deactivation. Commercial tank-cleaning agents and detergents help remove both water- and oil-soluble herbicides. The commercial tank-cleaning agents usually perform better than household detergents and can deactivate some herbicides in addition to solubilizing them.

Some tank-cleaning agents and ammonia solutions also raise the pH of the rinsate solution, making some products such as sulfonylurea herbicides more water soluble and thus easier to remove from internal sprayer parts. Chlorine bleach solutions will accelerate decomposition of sulfonylurea and some other herbicides into inactive compounds. However, chlorine is less effective at dissolving and removing sulfonylurea herbicide residues from spray tanks than ammonia solutions. Chlorine bleach should never be added to ammonia or liquid fertilizers containing ammonia because the two materials react to form toxic chlorine gas, which can cause eye, nose, throat, and lung irritation. Fuel oil or kerosene is effective for removing oil-soluble herbicides such as esters and emulsifiable concentrates. The fuel oil or kerosene should be followed by a detergent rinse to remove the oily residue.
Happy Holidays

University of Florida — IFAS
Agronomy Department