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# What's Up with Weed Control?

By Joel Jackson, CGCS

After Illoxan came out in the late 1990s to provide a new weapon for goosegrass control and Basagran and Manage were rolled out to battle the sedges, it seems like there has been a long gap in new weed-control products other than the controversial clopyralid (Lontrel) for broadleaf control. Users who did not follow the label and let clippings of treated grass get into municipal compost operations caused the problem. Meanwhile we have relied so heavily for so long on MSMA for grassy weed control; perhaps the recent concerned focus on arsenic levels in golf course soils stirred the pot and hastened new products in the pipeline. Maybe they just needed a nudge.

Whatever the cause, Revolver and Monument have debuted recently and, according to two of the articles below, have proven to be effective weapons and can replace MSMA in some cases. One holdout that still seems to respond only to MSMA is tropical signalgrass. Sure hope the scientists are working on an alternative. The makers of MSMA are still negotiating with EPA and Florida DEP to do a study to prove that MSMA is not a problem for arsenic loading in the soil, but the jury is still out on the successful defense of the product. Don't be surprised to see some label changes in the near future.

Just to restate some of the obvious trends that will be evident in the articles below and echoed in the cover story on St. James Bay, the days of large-scale boom spraying are over. There may be some isolated cases of course renovation and cleanup after years of neglect where large-area boom-spraying may be required, but the trademark of responsible pest management is spot spraying.

Over the past 10 years, the business and environmental climates have forced superintendents be more frugal and sensitive to the environments they manage. Consequently less material is being applied and only where needed.

From the manufacturing side, products are becoming targeted to specific weeds. While that may drive up one aspect of the cost of weed control, the amount of active ingredient required is smaller,

helping to offset the cost. Some courses are resorting to consistent, gradual hand-pulling of obvious weeds.

If you are using less MSMA and 2,4,D, make a note of that fact. Document your chemical use, especially if you are using less overall. This is a good story and needs to be shared with our regulators and legislators. From my travels, it appears to be the trend, but I don't want to generalize. Now read on for current weed control programs at three Florida courses.

## Keeping it Simple at Seminole

At the Seminole Golf Club we try to follow strong agronomic practices such as proper fertility and irrigation to keep the bermudagrass as healthy as possible, thus reducing weed intrusion and the need for chemicals for weed control. My worst weed problems have come either from over-irrigation or weak bermudagrass turf. As a result, 90 percent of our current weed control is hand-spraying post-emergent herbicides, or hand-cutting and -pulling bigger weeds such as goosegrass.

The only time we really boom-spray for weeds is during the summer when the golf season is over, mainly because of the potential for discoloration of the turf and, of course, most of our weeds are more active that time of year. We do not use pre-emergent weed control because of our strong post-emergent control program.

For the first time, we now have a full-time chemical technician who works only on weed and insect control. This has almost eliminated the need for boom spraying and pre-emergent control at Seminole.

We use the following products:

- 1) Broadleaf weeds - Lesco 3 way, Quicksilver and Manor (for spurge)
- 2) Grassy weeds - MSMA, Illoxan
- 3) Sedges - Basagran, Manage

We have experimented with Monument but have seen no great advantage over the products mentioned previously. Again, the key for us has been to keep the turf healthy and constantly "spot spray" or cut out weeds, which reduces the use of herbicides. We try to keep our weed control as simple as possible.

*Hal Hicks, Superintendent  
Seminole Golf Club*

## Good for the Goose, Good for the Sedge

Goosegrass was the No. 1 weed problem when I arrived four years ago, but we started an aggressive weed pulling program which I feel was very helpful in removing future seeds. Then we started spot-spraying with MSMA and Sencor in a

15-gal. sprayer. At the same time we applied Ronstar at 2 lb. of active ingredient per acre in January, April and October. This has really worked well for us.

I did try a fourth application in the summer twice and did not think it was cost effective.

Currently our two biggest weed problems are crabgrass and the sedges. We are using Monument on sedges with fantastic results, and MSMA on the crabgrass. The areas of sedge infestation are large enough right now to use a boom sprayer but that should change as we get a better control of the problem.

We are using a 15-gal. electric sprayer for spot-treating the crabgrass. This year we also used Monument in the rough on some goose grass with very good results. The chipping green also had large areas of goosegrass that got out of control after the hurricanes this year. I used Monument on the Tidwarf for these areas and saw no damage to the 'Dwarf and had excellent control of the goosegrass.

*Michael Carver, Superintendent  
Monarch Country Club*

## Timing is Everything

Revolver is great for goosegrass, but it may require two, three or, in some cases, four applications to really get the goosegrass under control, especially in heavily infested areas. Timing is critical to be successful. I made a second application 10 days after the initial application. Generally this will kill the mature weeds.

For heavily infested areas, third and fourth applications at 10-12-day intervals may be needed to control juvenile plants springing up from the germinating seed bank in the soil as long as the weather is favorable for germination. A little lower rate will work in the follow-up applications because you'll be going after the seedlings. Again timing is the most important thing using Revolver. Goosegrass is tough and loves heavy traffic areas, so you need to be aggressive with the turf you have, and try to cultivate a healthy turf cover to prevent infestation.

Revolver also took out *Poa annua* in bermudagrass very well, but *Poa* seed can lie dormant for years so problem areas will probably need multiple applications over the years.

I did a test study for Syngenta before Monument was labeled for the U.S. It works great on all of the sedges and kyllinga. It seemed to eliminate the sedges after two applications, where as Basagran and Manage seemed to do as well on the root systems. Monument gave longer control and it also worked well on taking out unwanted *paspalum* in bermudagrass. It is also labeled for torpedograss

## MSMA vs. Arsenic: The Facts

MSMA is an organic herbicide that has been used safely and performed reliably for over 40 years. Its toxicity and behavior in the environment have been studied extensively. All studies have shown that there are no significant health effects associated with MSMA, and that it does not pose risk to the environment.

The molecule of MSMA contains arsenic just like the molecule of water (H<sub>2</sub>O) contains hydrogen and oxygen, or the molecule of table salt (NaCl) contains sodium and chlorine. Arsenic, like hydrogen and chlorine, can be dangerous in certain forms and not in others.

There are two groups of arsenic compounds – organic and inorganic. Organic compounds of arsenic are those in which a carbon atom (C) is bound to the arsenic atom (As). MSMA is an organic compound of arsenic. Organic arsenic compounds are less prevalent in nature and are 10 to 100 times less toxic than inorganic compounds. They are much less toxic to aquatic organisms, are not mutagenic, and unlikely to be carcinogenic to humans.

Arsenic is a ubiquitous element occurring nearly everywhere on earth as a component of soils and natural rock formations. The common form in nature is inorganic arsenic and hence the term “arsenic” usually refers to the inorganic form. Long-term exposure to inorganic arsenic can cause health problems.

The carbon-arsenic bond found in organic arsenic is stable under a variety of environmental conditions, thus it is highly resistant to chemical degradation. A small number of soil micro-organisms are capable of metabolizing MSMA via cleavage of the carbon-arsenic bond, to form inorganic arsenate. However, conditions in field soils are unfavorable for these processes. If small amounts of inorganic arsenicals are released through this process they are rapidly inactivated in soils by forming insoluble salts of iron and aluminum.

Inorganic compounds are used in the glass and ceramic industries and as feed additives for poultry and swine. Arsenic trioxide (As<sub>2</sub>O<sub>3</sub>), the most important commercial arsenic compound, is produced as a byproduct of the smelting process of copper and lead ores. Inorganic arsenic compounds are no longer used in agriculture because of their toxicity. Organic compounds of arsenic, including MSMA, are

used in agriculture, forestry and turfgrass management as pesticides and herbicides.

The greatest portion, by far, of applied MSMA binds to soil particles in the top-most layers of the soil. Most soils have been shown to have extensive capacity to trap and hold organic arsenicals tenaciously, so they are not dislodged through the soils by natural flow of water from irrigation or rainfall. In fact, when performing soil analysis in the laboratory, rigorous digestion processes (i.e. digestion in strong acids at high temperatures for a day or two) are required to remove the bound arsenic from soil particles. Such processes never happen in the natural environment. This binding or “sorption” acts as a scavenging mechanism, preventing MSMA residues from leaching into underlying groundwater. Proper application of MSMA is not likely to cause leaching of organic arsenical residues in a wide range of soil types.

In conclusion, MSMA is a nontoxic organic compound that has been safely used as a highly effective broad-spectrum herbicide for grassy weeds for over 40 years without risk to human health or the environment.

*(Editor's note: The facts and statements above were taken from fact sheets supplied by the MAA (MethaneArsenic Acid) Task Force (MAATF). The Problem: The only way to test for arsenic in the field samples is to measure total arsenic. The samples are put through the rigorous “un-natural” laboratory digestion process and the arsenic amounts do not specify where the arsenic came from (soil, water, fertilizer, mulch, rock or herbicide or previous human activity). The state says it currently must regulate by total arsenic levels. In some previous studies, samples from mix/load sites were combined with random samples on the golf courses thus confusing the results of normal use accumulations versus a more controllable mix/load location. The MSMA manufacturers are currently working with Florida regulators to conduct specific tests to see if the normal use of MSMA does pose a risk to the environment. If you have any questions regarding the use of MSMA or want more information, you can contact Dr. Michal Eldan, Ph.D. at MAATF, P. O. Box 33856, Washington, D.C., 20033-0856. Phone: (800) 890-3301; Fax: (901) 761-9477; Email: meldan@luxpam.com*

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but I prefer Drive at 0.5 oz. in 5 gallons of water. It doesn't burn the bermuda. Multiple applications will be needed. Torpedograss is a real tough one to control.

Tropical signalgrass is also a tough customer to deal with. I use MSMA at 2.25 pints/acre tank mixed with Sencor at 0.25 oz./acre with a spreader-sticker. This mix is applied on roughs mowed at 1.5 inch height and up.

When spraying tee tops and fairways, we apply the same products at two-thirds the previous rate. Second and third applications will be needed. Timing again is important. Use a 7- to 10-day interval between applications, not 7 to 11 days.

When mixing small quantities for spot spraying, the DEP people and some labels require 0.5 ounces of MSMA per five gallons of water. This just doesn't work.

*(Editor's note: When you break down the ratio of MSMA (2.25 pints = 40 ounces) in a 100-gallon tank, it comes to 2 ounces of MSMA per 5 gallons of water. There seems to be a conflict concerning boom application and hand spraying concentration of MSMA in a given square foot.)*

For broadleaf weeds I typically use Lesco Three-way, Trimec Southern formula, and Pro-Source Strike Three at 0.75 oz./gal. for spot spraying, and no more than 40 oz./acre with a good surfactant if using a boom sprayer. Again timely repeat applications at 7-10 days have to be done or you're just throwing money away.

As far as equipment, I use 2-gal. pump-ups and 15-20-gal. electric sprayers. I also have a small 10-foot boom sprayer calibrated to 30 gal/acre and pull it behind a cart and use it where I can.

I think the boom sprayer has been a valuable tool. You can cover in an hour what would take someone all day to spot spray. For those concerned about over-spraying beyond a solitary target

weed, I feel that with the small boom you are taking out small immature weed seedlings not readily visible, especially in chronically infested areas.

Royal Poinciana is more than 30 years old. Weed control will be an ongoing program. You just have to stay with it and have some good guys or gals who like their jobs and don't let it get to you. With a good timing program, you'll get great results. Remember to follow all of the Personal Protection Equipment requirements on the product label.

*Ken McCalister*

*IPM Manager, Royal Poinciana Golf Club*

**Q&A with Jim Walker, Greynolds Park G.C.**

**What is your No. 1 weed problem at a high-traffic municipal golf course, and how do you manage it?**

Our biggest challenge is goosegrass. We apply Barricade at the label rate in October and February. We spot treat with a MSMA and Sencor mix for any weeds that break through.

**Do you do any boom spraying these days or is it all spot treatments?**

The only time we use a boom is for treating large patches of sedge.

**Last year there was a lot of discussion about MSMA on golf course and the debate continues. What has been your approach?**

We have reduced our overall use of MSMA 90 percent. As I said earlier, we only spot-treat using a 15-gal. electric sprayer to limit the treated area.

**Have you tried some of the new products like Revolver?**

We tried it once, but had poor results.

**Anything else?**

Well, we mechanically remove (hand-pull) weeds from tee tops, collars and fairways or obvious weeds anywhere. I use a paint brush to dab on MSMA on signalgrass. It's the only product currently on the market that will touch it.



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# Wagons Ho!

## Improving the Utility of a Utility Vehicle

By Darren Davis

The phrase, "Give credit where credit is due," was instilled in me at an early age and I have

capacity of a Toro Workman vehicle.

The idea of converting the Workman into a stake-bed "wagon" originated more than five years ago when my local Toro distributor, Wesco Turf, delivered a piece of equipment that I had ordered. I noticed that the driver also had a Workman utility vehicle on his truck. The Workman caught my eye because of the high wooden sides that someone had constructed on the



Creating a high-sided wagon accessory for the Toro Workman cost less than \$100. Photo by Darren Davis.



This view shows the tailgate assembly and the "tension" chain that keeps the back and sides from rattling during transport. Photo by Darren Davis.

always tried to live by that rule. Unfortunately, in the case of this Super Tip, I am unable to credit the originator of this idea that increases the utility

bed of the vehicle. I took a few pictures of the construction and stored them away for future use. Recently, I came across those pictures and I was reminded of the idea.

The task of recreating the Workman wagon was subsequently assigned to my long-time equipment manager, Guillermo Gomez. Guillermo, or "Memo" as we refer to him, accepted the assignment, analyzed the pictures, and went to work on the task. As you will see in the pictures, it is not an overly complicated piece of equipment and Memo completed the construction of two wagon accessories in less than eight hours.

The wagon rails can be installed in or removed from our Workman 3200 full-bed utility vehicles in less than five minutes. Tools that were used on the project include a measuring tape, a circular saw to cut the boards, a table saw with a blade capable of cutting steel, a paint brush, and two socket wrenches to attach the boards to the metal supports.

The sides, back, and tailgate are four boards high, extending 23 inches above the Workman bed. The side boards measure 64 inches in length, the back boards measure 51 inches in length, and the tailgate boards are 53 inches in length. The wood planks that we used are 5-5/8 inch high by 1/2-inch wide.

Both the side- and back boards are bolted to a 2 by 1-inch piece of channel iron that is cut to a length of 34 inches. The channel is attached to the boards (open side out) so that the channel can slide into the 2-1/4-inch square holes on the back and sides of the Workman bed. To add stability to the side and back pieces, a piece of 2-inch-wide, flat metal stock (23 inches in length) was bolted to the boards in the middle of each section.

When the two side rails and the back section are placed in the Workman bed there is a little play, which can create a rattle, and be annoying to the operator and/or distracting to golfers. For ease of storage when not in use, and for ease of installation onto the Workman bed, we did not want to permanently affix the side rails to the back. Therefore, to stabilize the sides and back when the wagon is in use, a bolt with a "hook" end was placed on both sides at the top, back of both side pieces. Between the two hooks, a 43-inch piece of chain is attached, and when the bolts are tightened it pulls the chain tight which squeezes the back of the wagon snugly into the sides.

The tailgate was constructed to the same height as the sides (23 inches) and the width is 53 inches. A 23-inch piece of metal plate was bolted to the boards in three locations to secure the tailgate. When the tailgate is desired, it easily slides into a groove created by a 23-inch piece of 2-inch "L" steel that was bolted on both side pieces. When installed, the base of the wooden tailgate rests on top of the Workman tailgate. Two 6-inch handles were also attached to the wagon tailgate for easier installation and removal.

The final step in construction was to apply a coat of Kilz primer, and then the following day a coat of "rust-stopper" black enamel was applied. Excluding labor, the cost of each wagon accessory was under \$100.

Obviously, the engineers at Toro have a designed load capacity for the Workman that should not be exceeded. However, we have found the wagons very useful when we are hauling bales of pine straw, picking up palm fronds, or other light debris. We have also found the wagon beneficial when we are transporting walk-behind spreaders. The high sides decrease the likelihood of the spreaders tipping over or falling out.



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# Hurricanes Set Record Nobody Wants Broken

By John H. Foy

The 2004 Atlantic hurricane season will certainly go down in the record books, and I for one hope the record is never broken!

Things got started off with Charlie taking a sharp right turn and making landfall in Port Charlotte on Aug. 13. This devastating category 4 storm traveled across the central part of the state and moved out into the Atlantic near Daytona Beach. Over Labor Day weekend, Hurricane Frances made landfall on the south end of Hutchinson Island. This very slow-moving category-2 storm affected the lower east coast from Palm Beach County north through Vero Beach and Melbourne. After making landfall, Frances turned north and worked her way up through the central part of the state, crossing over the earlier path of Charlie. Less than two weeks later,



John Foy

Hurricane Ivan threatened the Florida west coast on a similar path to Charlie before making landfall just east of Mobile Bay. Ivan was an extremely powerful storm that devastated a good portion of the Florida Panhandle before moving up through the southeast and exiting into the

Atlantic. While Ivan never regained hurricane strength, its remnants did circle back south, and dropped an additional 4 to 6 inches of rain over Florida.

After making a circle move out in the Atlantic, Hurricane Jeanne turned west and made landfall during the last weekend of September. Along with intensifying to a category-3 storm, the eye of Jeanne made landfall within two miles of where Frances came on shore. The odds of winning the Florida lottery are better than the odds of two hurricanes coming on shore so close together. With four major hurricanes hitting Florida, the entire state has been impacted and some areas endured the path of two or even three storms.

For the few days before and after a storm, the news media provides ample coverage of hurricane preparations, the actual storms, and then the impacts of these natural disasters. However, it is impossible to fully appreciate the disruptions and impacts on every-

day life caused by hurricanes.

Battening down the hatches and taking on supplies in preparation for a hurricane consumes several days, and during this time everyone's mental and physical stress progressively increases.

Regardless of whether you evacuate to a shelter or ride out the storm in your home that has been closed up with plywood or storm shutters, stress levels hit a peak. The electricity inevitably goes out and you end up spending hours sitting in the dark listening to the howling winds and battering rain. Once the storm passes, people gradually come out and make initial



Impacts to golf courses from Florida's 2004 hurricane season may last longer than just debris clean up. Photo by Greg Phenegeer

damage assessments. For the first several days after a storm, recovery efforts are very slow to begin because of downed trees and power lines that make the roads very hazardous. Once recovery efforts begin in earnest, life slowly begins to return to normal, but it still takes weeks to fully get back to pre-storm routines.

Essentially every Florida golf course was impacted as a result of the hurricanes. The exception to the rule were the lucky few who were on the outer edges of the storms and experienced only minor wind damage and periods of heavy rain. For the vast majority, extensive tree and landscape plant material damage was experienced. Reports of 100 or more trees blown down are common, and for courses along the Treasure Coast that were in the path of both Frances and Jeanne, damage to 300 to 500 trees was typical. While it will be possible to save many of the trees, the aesthetic character of the golf courses has forever

been changed.

Another consequence of the storms was defoliation of trees and landscape plant material. The result is a look similar to the mid-winter as opposed to the end of the summer. While regrowth has been occurring, it will not be possible to make a full recovery prior to the onset of the winter play season.

On a positive note, the hurricanes did help address some tree and landscape problems. While certainly not as selective as desired, damage and loss of trees has effectively alleviated shade problems that existed at many courses. The challenge will now be fighting off demands to replant trees, which would re-create shade problems a few years down the road. At many South Florida golf courses, over-planting and the use of noxious, exotic plant material is a common problem. Hurricane damage is an excellent reason for removal of this material and, where necessary, replanting with native and better-adapted materi-

al. Damage at facilities where pruning and on-going landscape management programs were in place was less compared areas to where this basic component of course management was ignored.

Along with the obvious damage to trees and landscape plantings, bunker damage was another major consequence of the storms. In addition to the loss of sand due to wind erosion, severe washouts and sand contamination was experienced. At some courses, working the remaining sand back into place and adding an inch or two of new material will suffice. However, at the vast majority of courses that I have visited, the bunker sand is so severely contaminated with soil, rocks, shell, and organic debris that complete removal and replacement is the only option for recreating pre-hurricane conditions.

Repairs to damaged turf perimeters and internal drainage systems also are needed. Replacement sand costs alone can easily exceed





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\$50,000 to \$75,000, and then there is the challenge of finding a contractor to perform this work. No doubt at some courses it will not be possible to complete the repairs and refurbishment work before next year.

Thunderstorms and a lot of rain can always be expected in Florida during September. However, in Palm Beach County the hurricanes dumped more than 28 inches, which broke all previous records for monthly rainfall in September. Naturally, course flooding was a common problem, and matters were compounded at facilities located on the barrier islands, which were inundated with salt water. It has been my experience that the bermudagrasses are a resilient species, and can recover after being under water for a couple of weeks or longer. As soon as the water recedes, aeration of flooded areas is recommended to aid in the recovery process.

Unfortunately, we are quickly running out of good growing weather and thus a complete recovery will not be possible. Record-setting rainfall has flushed all nutrients from the soil, and it is necessary to start all over with fertilization programs.

Clean-up of storm debris that littered every square foot of golf courses is very time-consuming and must be completed before routine maintenance practices, such as mowing, can be re-initiated. Debris clean-up can easily take a week or two, and it is being reported by many courses that finding extra help has been very difficult, further prolonging the clean-up process. Direct turf damage from the hurricanes fortunately did not occur, but having to take heavy clean-up equipment out onto the very wet and soft turf causes damage and will require additional repair work.

At the very least, the hurricanes caused a two- to three-week setback in course preparations for the upcoming winter season. For those who have had to deal with two or even three storms, the preparation setback is more in the six- to eight-week range. To compensate for environmental stresses, heights of cut have been raised, and several weeks

will be required to gradually work heights back down and reestablish appropriate conditioning. It is very important to minimize scalping damage so as not to exert additional mechanical stress and further slow growth and recovery.

I have been impressed with the speed at which recovery efforts have progressed so that the courses can be reopened to play in pretty good overall condition. As we go into the winter season with a much weaker base turf cover, there will be additional challenges and problems with maintaining course condition and quality in keeping with expectations during the winter season. Regardless of inputs, making a full recovery from the hurricanes will not be possible for many until next spring and summer. Ongoing golfer education efforts throughout the winter months are advisable to foster a degree of understanding and patience about the impacts of the 2004 hurricane season.

## Green Section Internship Program – A Valuable Experience

*By Todd Lowe*

The USGA Green Section Internship Program offers opportunities for students studying turfgrass at universities throughout the United States to travel with USGA agronomists for one week each year. Some students hope to be golf course superintendents while others aspire to be turfgrass researchers, professors, or active in some other aspect of the industry. In any case, the internship is a real eye-opener as to the issues that superintendents face on a daily basis.

The Florida Region recently completed the 2004 Green Section Internship Program. Two graduate students from the University of Florida, Tina

Duperron and Nick Pool, learned a great deal about golf course renovations, managing golfer expectations, and factors affecting the long-term health and playability of golf course turf. The interns also evaluated the playability of seashore paspalum for Florida golf courses.

Some of the agronomic issues discussed during Turfgrass Advisory Service visits included putting green playability and issues affecting turf health. Nematodes were active at most of the golf courses during the visits, and various chemical and cultural programs were discussed. Also, with the peak golfing season approaching, protecting the turf against excessive cart traffic was a common topic as well.



*Todd Lowe*

Numerous other topics were discussed and the interns were busy taking notes during each visit.

The action-packed week was filled with TAS visits, courtesy stop-by visits as well as a regional golf course superintendents meeting. The interns also interacted with Edison Community

College's Golf Course Operations director, Dr. Lee Berndt, as they toured research/demonstration plots and discussed an upcoming USGA-funded research project that will be conducted at the college. Lastly, the interns attended a golf club membership meeting, where a presentation on putting green renovation was followed by a lively discussion with the members.

Having once been an intern myself, I know that the USGA Green Section Program is a valuable experience. No matter what segment of the golf course business the interns choose following graduation, the information gained during the internship will certainly benefit them and the entire industry.

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