

"LET US SPRAY — PROPERLY"

A two-part article on accurate pesticide application by Carl Landgrebe, CGCS, Superintendent, Hinsdale Golf Club, Hinsdale, Illinois, and Frank Gasperini, Sales Representative, E.I. Du Pont de Nemours & Company, Inc., Schaumburg, Illinois.

PART I

"LIVE OR DIE BY THE SWORD - LIVE OR DIE BY THE PEST"

A very strong comparison indeed! Possibly, to many, even absurd! However, anyone responsible for propagating golf course turf can relate to the job security threat turf pests present. The superintendents largest operating expense - second only to labor - are the pesticides necessary for control of the pests. Consequently, pesticides provide our second best opportunity to be sure we are getting the most out of each budget dollar spent in these difficult economic times.

So, what's the big deal, you say? Your pesticide program is cast in concrete. You know just when to roll your spray rig and just what to put in it. No little critter can get a jump on you, eh? You know your diseases and cannot go wrong.

True, our arsenal of pesticides is impressive and our faith in our programs is strong. But - it never hurts to regularly assess our pesticides, spray equipment, and procedures. Keeping in mind that the efficacy of pesticides depends on 5 variables:

1. Proper pest identification - this is the kingpin - miss it and you've got no chance. Mis-diagnosis is like choosing the wrong path in a maze. There is no way you will get to your destination - trapped in a dead-end course - forced to turn back and start over. Golf cart diagnosis leaves much to be desired also. Although similar, pythium and dollarspot mycelium can appear from the seat of your golf cart in the daylight's waning haze. The same goes for wilting poa annua at 2:00 p.m. on an August afternoon. You must get on all fours to get to the "root" of the problem.

2. Selection of the proper control - just as important as diagnosis - but with more chance of success if you do make a mistake. Why? Because some pesticides overlap in their control. Occasionally, you can diagnose properly, use the wrong chemical, and get control by accident. Don't leave anything to chance, however, be sure! Check all your sources before deciding from your list of possibilities. A pest controlled by a correctly chosen chemical is not only a result of a successful program, but also results in a financially prudent program.

3. Proper method of application - certainly the component of your program having the fewest alternatives to choose from. Alas, a decision with finite probable parameters. Whether you choose helicopter or ground applied, whether you go with boom-mounted fan nozzles, single floods, multiple floods, or mist blower - whether you follow with drench, syringe, or your own secret ceremonial sundance - should all be determined by the desired pest to pesticide relationship. Scrutinize this part of your program critically. What may seem the obvious method or an old reliable procedure may rather have become a dilemma. Some practices have become routine as a result of "the easiest is best" philosophy or that "no change is the best change".

4. Proper rate of application - finally, a phase of our program requiring no major decisions. The recommended rate of application is right on the side of the container. Just dump in the proportionate amount. STOP! HALT! ALTO! Not so. We have some important groundwork to do before we open that container. We

want to apply only what our experience - and our label - has shown will give us control **and no more**. So we do have more decisions to make. We must choose ground speed, pressure, and nozzle flow rate. In other words, you have to calibrate, mate! Part II deals with the actual calibration.

5. Weather, cultural practices, golfers, and all other uncontrollable variables - in your pest control decision, you must factor in as many of the above variables as possible. When making your decisions, you must consider what you **know** might occur - if other factors might occur - if other factors might occur -- hopeless? Sometimes it seems so when we consider all the possible combinations of variables. Thank goodness we've got the computer-like faculties to **always** make the right decision.

Carl Landgrebe

PART II

"APPLICATION ACCURACY"

In discussing calibration, it is important to keep in mind that a sprayer is a piece of equipment - a machine. We should adjust the machine to do what we want it to do - **not** adjust our spraying practices to what the machine is doing.

On a sprayer, there are only 3 variables to control. They are: 1) pressure (psi), 2) ground speed (mph) and 3) gallons per minute (gpm) - controlled by nozzle size and spacing.

We will confine this discussion to boom-type sprayers using flat fan nozzles on 10" spacings. Pull type or cart mounted sprayers make no difference to the calibration.

When should you calibrate?

1. Before you spray for the first time each season.
2. Any time you change nozzles, psi, speed, or any major sprayer part. This includes pump repair or overhaul (affects psi), major tuneup or repair to pulling vehicle (affects speed), major hose replacements, etc.
3. Several times during the season. Nozzle wear will eventually raise the gallons per minute output.

How to calibrate?

1. Select speed (mph). With most golf course sprayers, you will have an optimal operating speed for that particular vehicle. It is important that you know the actual ground speed in miles per hour - not the speed indicated by the odometer or tachometer. One way to do this is to stake out a 176-foot area [on turf]. Run the sprayer over this course at the speed you intend to spray. It is a good idea to fill the tank with water to more closely simulate actual spraying conditions. If the sprayer is run by pto, it is also a good idea to actually spray water as you do this.

Note the time it takes to cover this course in seconds and note the rpm or miles per hour showing on the vehicle's gauge. It is a good idea to cover this course at least 3 times and average the number of seconds required. Use the following formula to calculate actual miles per hour:

$$\text{SPEED (MPH)} = \frac{120}{\text{seconds needed to travel 176 feet}}$$

Select spray pressure. If your sprayer does not have a pressure gauge on the boom or on the boom controller, it would be a good idea to consider adding one. The pressure at the spray nozzles is very much different than the pressure measured right at the pump.

The rubber hose which carries the material from the pump to the boom, the boom itself, all of the fittings, screens, etc. involved reduce pressure.

For flat fan nozzles, the pressure at the boom should

not exceed 40 psi. 25 to 30 psi is an even better spraying pressure. Flat fan nozzles will give much better spray coverage at these lower pressures than at pressures of 50, 60 or higher psi. Believe it or not, at higher pressures, a great deal of the spray material that you have paid for never reaches the turf. At pressures over 40 psi, the amount of spray material which is so fine that it floats away in the form of drift, increases rapidly.

3. Select gallons per minute need. Find the application rate required in gallons of spray solution per 1000 square feet. Use the miles per hour you have calculated and 10 inches if your nozzles are on 10 inch spacing. Plug these numbers into the following formula and get the gallons per minute required:

$$\text{GPM} = \frac{\text{gal/1000 sq ft} \times \text{MPH} \times 10 \text{ inches}}{136.36}$$

3. Select the proper nozzle. Here is where many people rely on chance and simply use the nozzle supplied with the sprayer; don't do this. You should select a nozzle that will do the job you want it to. You may be able to do a better job of spraying and in the process, save money by using different nozzles at different times. To select the proper nozzle size, you will need a catalog from one of the major nozzle manufacturers. In this catalog, you will find that the nozzles are listed by type, and that if you find the correct gallons per minute (or close to it) on the same line as the pressure you wish to spray at, this catalog will indicate the correct nozzle number to purchase.

A note about nozzle material and replacements: No matter what material nozzles are made of, they should be replaced every year or more often. Wettable powder and flowable pesticide formulations can be quite abrasive and will change the nozzle size considerably over a season. Soft tips like brass should be replaced more often than stainless.

Almost all of the golf course sprayers I have seen have been fitted with brass nozzles. Brass is a good nozzle material - but stainless steel is less susceptible to abrasion and corrosion, and I would highly recommend the use of stainless steel nozzles if possible.

4. Now, you have determined your actual ground speed, selected your delivery pressure and purchased your new nozzles based on the gallons per minute required to spray the pesticide you are using. All that is left is to check and fine tune your calibration. Put in your new nozzles, set the pressure of your sprayer, and with the tank partially full of water, operate the boom. Using a bucket, pitcher, or some other container, catch the effluent from the nozzle for 60 seconds. Multiply the gallons per minute figure by 128 to equal ounces per minute. Measure the effluent from one of your nozzles and see how close you are. Some slight adjustment of the pressure may be necessary to get exactly the proper number of ounces per minute.

If you have collected more ounces than you should have, reduce the pressure slightly and try again. If you have collected fewer ounces per minute than planned, increase the pressure and try again. When you have achieved the proper number of ounces per minute, and checked several (preferably all) of the nozzles on the boom, then you are ready to spray in an efficient and economical manner.

In the future, after you have sprayed for a certain amount of time, say once a month, checking your calibration is very easy. Simply catch the effluent from a nozzle for 60 seconds, and see how close you are to your original ounces per minute figure. If your output has changed, adjust the pressure to bring it back in line or replace the nozzles.

For copies of this catalog, which will help you select

specific nozzle sizes, I suggest you write to: Spraying Systems Company or Delevan, who are manufacturers of nozzles - or discuss this with your distributor sales representatives.

Frank A. Gasperini

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