

Light Rate – Results Great!

A simple, fast, and safer way to apply fertilizers, fungicides, and plant growth regulators for the entire golf course.

by WALT SMITH

MOST turf professionals have heard about or experienced the dramatic improvements to turf health, playing conditions, and ease of maintenance resulting from the application of Primo. When combined with light and frequent fertilizer applications, green speed, overall plant density, and mowing requirements can be noticeably enhanced. While many golf course superintendents would like to implement a turf maintenance program with this PGR as their focal point, the whole process seems daunting, excessive, and expensive. We faced this dilemma at Missoula Country Club in 1999, but we were determined to build a sprayer that would greatly reduce the headache of making light, frequent applications of Primo and fertilizer. The spraying system created at Missoula C.C. is efficient, while taking advantage of the spraying process without the corresponding time loss, pain, and negative impact on the budget. Here is a look at the step-by-step process followed to create this spraying system.

Sprayer Capabilities

Once we had determined that Primo and liquid fertilization would be an integral part of our operation, we needed to determine the sprayer capabilities. These included:

- Four-product injection to allow the application of fertilizers, fungicides, and a PGR with one pass and requiring only water in the tank.
- On-course tank refilling to reduce time-consuming transport.
- Enclosed cab for operator protection and comfort.
- All controls located in the cab and simplified for ease of operation.
- Product containers with enough capacity to eliminate the need for refilling and mixing when spraying a minimum of nine holes of tees, greens, and fairways.
- High-volume centrifugal pump that allows operation of the sprayer with very little drop in pressure and has a maximum pressure that is below the

limit of typical solenoid-operated valves.

Sprayer Components

With these needs in mind, the first task was to find an accurate, inexpensive, and durable injection method to design the sprayer around. The search led to a manufacturer of greenhouse proportional fertilizer injectors, Dosatron. With unit prices considerably below \$1,000, Missoula C.C. decided to try two units for the 1999 season to test their durability and accuracy. As purely mechanical units, they act independently of pressure, viscosity, or any voltage fluctuations. They inject and mix at an adjustable ratio of product to water. Once set, the dose remains constant despite changes in water flow or pressure.

Units are available with a mix ratio of as little as 1 to 500 or as much as 1 to 10. The Dosatrons chosen for this application were from the D8 series. This series accurately injects with flow rates as low as 2.2 gpm and as high as 40 gpm. The units have proven to be accurate even when tank mixing wettable powders. They require very little maintenance, consisting only of cleaning an internal screen after applying wettable powders. After two seasons of spraying nine holes of tees, greens, and fairways every week, the units were devoid of wear or any sign of failure.

Finding an injection system that worked flawlessly made the rest of the sprayer construction a matter of procuring the necessary parts and attaching them accurately to the right vehicle. The choice for a vehicle was a two-wheel-drive Toro Workman with an enclosed cab, flat bed, and a 21 hp diesel engine. This vehicle is very maneuverable and easy to operate. The governor is easy to adjust and, surprisingly, maintains speeds very consistently.

A Hypo centrifugal pump with a gear reduction was chosen, model #9006P-0. The pump is driven by a Honda 5.5 hp electric-start motor.

Pulley sizes for the pump and motor were 14" and 3", respectively, using twin-belt pulleys. An electric start allows the operator to turn the pump off and on from the cab. The centrifugal pump is capable of 90 gpm and only about 70 psi. This eliminates the need for a pressure relief-valve and gives us the ability to control pressure with the Honda's engine speed rather than with a pressure-regulating butterfly valve. Very little drop in pressure versus static pressure is desired when spraying. The minimal pressure drop is due to the high volume of water recirculated by the centrifugal pump through 1" plumbing, versus the relatively low demand (6 gpm) of the spraying system. Controls for the engine are located in the cab for easy start, shutoff, and engine speed control, and once the engine speed is set, it does not vary, giving us consistent spraying pressures. After the Honda and Toro governors are set, the operator need only keep vigilance over the area being sprayed.

Spraying controls consist of a bank of three electric solenoid valves, giving us the option of using one, two, or three boom sections. Booms are hydraulically lifted and lowered and are independent of each other. We use a foam marking system with small tube outlets that leave a fine line of foam that disappears in a matter of minutes, and with the small outlets we do not have to worry about running out of foam before we finish a nine-hole application. Electric gate valves are used to control which side the foam is emitted from. The only other control is a pressure gauge so the operator can monitor spraying pressures. With a total of six switches and two throttle controls, operation of the sprayer is very easy after the initial setting of the throttle governors.

Plumbing the tank for a 1" hose and attaching a 1" quick coupler to the end facilitates refilling on the golf course. With 20' of hose, the operator is able to fill up at any green in about a minute. The quick refilling time makes the 100

Missoula Country Club (Montana) built an innovative spray unit capable of making light, frequent liquid applications. There is no need to tank mix the chemicals, the unit can be refilled on-course, and the sprayer can apply multiple products with one pass.



gal. tank adequate for the sprayer's needs. In addition, the use of a 100 gal. tank leaves us with plenty of room on the flatbed for our four product tanks and reduces vehicle spraying weight. Tanks holding 8 gallons were chosen for the PGR, minors fertilizer, and fungicides, yielding enough room for a minimum of two weeks of applications. The main fertilizer tank has a 50 gal. capacity, which at .15 lb. N per 1,000 sq. ft. is just enough capacity to spray nine holes of fairways and tees using a 22-1-2 liquid fertilizer.

What Are The Advantages of This System?

Now that the sprayer is configured, what has been accomplished? This is what has been noted at Missoula C.C. during the past two years of operation:

- The sprayer can now apply multiple products with one pass.
- There is no longer a need to tank-mix chemicals.
- With the enclosed cab, operator exposure to chemicals is extremely limited.
- On-course refilling allows the operator to spray nine holes of greens, tees, and fairways, approximately 17 acres, in about 2.5 hours!
- Triple-rinsing the tank is no longer needed. The operator simply turns off the Dosatron and sprays out another 25 gal. of water to flush out the lines.
- The spraying activity allows the use of liquid fertilizer to spoon-feed the turf at about a quarter the cost of slow-release granular fertilizers.

• The improvement in playing conditions on the greens, tees, and fairways from the use of Primo has netted complete acceptance of the spraying program by members.

What has been accomplished? As the subtitle of this article states, we've established a fairly simple, fast, and safe way to apply products for the majority of the golf course in one pass.

The Missoula Country Club Spray Program

Through the spray program at Missoula C.C., we apply 0.15 oz. Primo per 1,000 sq. ft. and 0.15 lb. N per 1,000 sq. ft. to nine holes of fairways and tees each week. We apply 0.15 oz. Primo per 1,000 sq. ft., a pythium fungicide, and a leaf spot/pink snow mold fungicide to the greens every other week. On alternate weeks, we apply 0.15 lb. N per 1,000 sq. ft. and 3 oz. per 1,000 sq. ft. of a liquid minors product to the greens. We also apply 1 lb. K per 1,000 sq. ft. in the form of K₂O and 1 lb. N per 1,000 sq. ft. in the form of ammonium sulfate to our fairways in both the spring and the fall. We apply our initial applications of Primo the second week of April and end applications at the end of September. The manufacturer recommends waiting until full green-up to start applying Primo (May in Missoula). Waiting until May to make the first application is difficult, but greens can experience a setback after hard frosts in the early spring when under growth regulation. In addition, we applied the entire year 2000 winter

PCNB application for the greens, tees, and fairways using the Dosatron. Using a 40% flowable PCNB product in the fertilizer tank, no tank mixing was necessary other than the rinsate from the product containers and the fertilizer tank. The savings in time and operator aggravation were tremendous!

Summary

In essence, Missoula C.C. has traded a small amount of sprayer time for a significant amount of mowing and mechanic setup time. The savings in fertilizer expense offsets the cost of the Primo, with the increased quality of the playing surfaces as the ultimate bonus. We have about \$21,000 in hard costs in the sprayer, which is far less than trying to buy one pre-built to these specifications. It is also far less than the cost of another fairway mower that would need to be added to the depreciation schedule if the mowing schedules of the past were maintained over the life of the sprayer. Has it been a bonus for our operation? Ask the players at Missoula Country Club and they will say, "With a light rate, the results are great!"

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