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Rubigan® — (fenarimol, Elanco)
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Circle No. 119 on Reader Inquiry Card

DELAVAN RAINDROP

Spray pattern: Delavan's Raindrop nozzle has a wide-angle (120°), hollow-cone spray pattern and is designed for drift reduction. Its patented swirl chamber produces fewer driftable "fines", as less than one percent of the spray volume consists of droplets under 200 microns.

Best application: Raindrop nozzles should be positioned at a 45° tilt for a uniform spray pattern. Also, spray should overlap 100 percent for most consistent coverage. Pressures should be 30 to 40 psi.

Illustration 3

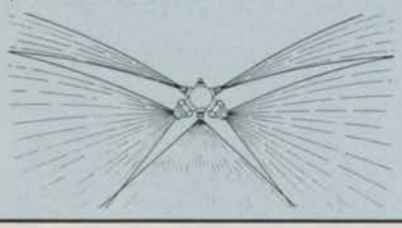
(BOOMJET)

Spray pattern: Boomless nozzles use a combination of up to five nozzles to produce an overall wide swath flat spray. These nozzles should be 100-percent overlapped on successive passes to achieve uniform distribution. Boomless nozzles can be used at pressures from 20-40 psi and achieve swaths of 30-60 feet when mounted at three feet off the ground.

Best application: Boomless nozzles are a good choice when terrain or obstructions make boom sprayers impractical. Spray

Illustration 4

distributions are not as even as a properly operated boom sprayer. Boomless sprayers should be operated at the lowest pressure possible to reduce drift.

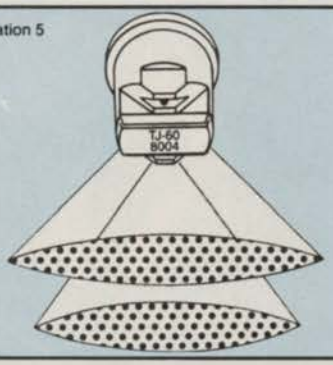


(TWINJET)

Spray pattern: Twin flat spray tips provide two flat fan nozzles offset by 60 degrees. When used at pressures of 30-60 psi these nozzles produce excellent coverage with smaller droplets.

Best application: The smaller droplets offer excellent coverage for contact herbicides and insecticides. Twin flat spray nozzles are not recommended when drift is a concern.

Illustration 5

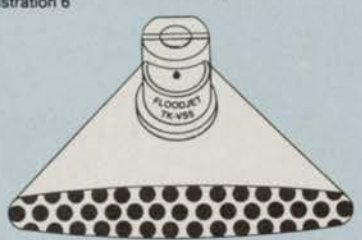


(FLOODJET)

Spray pattern: Flooding nozzles have a wide pattern with heavier edges and are typically used at pressures of 10-25 psi.

Best application: Sometimes used for systemic pesticide application if drift is a concern. Heavier pattern edges require double-overlap to improve uniformity.

Illustration 6



DELAVAN LFR COLOR JET

Spray Pattern: Delavan's LFR Color Jet tip is a 110° flat fan pattern tip that maintains a good pattern across the 15 to 60 psi range.

Best Application: An overlap of 50 percent is recommended for flat fan patterns, and the angle of delivery should be slightly skewed to avoid spray impingement.

Illustration 7

be operated at higher pressures (30 to 60 psi) to produce smaller droplets and better coverage (see illustration 2).

Hollow cone nozzles

Wide-angle hollow cone spray nozzles are also used on many turf sprayers. The large nozzle orifice reduces clogging and a dual chambered nozzle design produces larger droplets to minimize drift. The wide-angle hollow cone nozzle operates at a pressure range of 20 to 50 psi. The circular pattern is not as uniform as full cone spray tips of the same size.

Wide-angle hollow cone nozzles can be used for all systemic pesticides. When used to apply contact pesticides, these nozzles should be used with larger spray volumes to improve coverage of the target (see illustration 3).

Boomless nozzles

Boomless nozzles are a good choice for application situations where terrain or obstructions make it impractical to use a boom sprayer. Typically boomless nozzles, or cluster nozzles, are mounted at the rear of the sprayer and operate at pressures of 20 to 40 psi.

These nozzles can deliver a swath of 30 to 60 feet. This assembly of up to five separate nozzles produces a wide, flat spray pattern.

Mounting the assembly at an angle lowers the nozzle height and decreases the drifting effect of wind on the pattern without reducing pattern width. Since boomless nozzles must project droplets over a much wider distance than most other nozzles, spray distribution is not as uniform as a boom sprayer.

Double overlapping can improve coverage to some degree, but remember, this doubles the total spraying time and the amount of spray material per square foot (see illustration 4).

Twin flat tips

Twin flat spray tips offer excellent coverage for contact herbicides and insecticides and are also a good choice for growth regulators. The twin flat nozzle design incorporates two flat fan nozzles, one 30 degrees forward, one 30 degrees backward, into one nozzle body. The dual angle of attack improves spray coverage.

Recommended for use at pressures of 30 to 60 psi, the twin flat nozzle produces small droplets for more thorough coverage (see illustration 5).

Flooding nozzles, or wide angle flat spray tips, are sometimes used for systemic pesticide application. With a

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With today's heightened awareness of the environment, it's important to make sure that every chemical application is as accurate as possible.

typical operating pressure of 10 to 25 psi, these nozzles produce large droplets that resist drift.

The large, circular orifice of a flooding nozzle reduces clogging. The large outer droplets in a flooding nozzle pattern create heavy spray pattern edges and necessitate 100 percent overlap to improve application uniformity (see illustration 6). **LM**

Dr. Pearson is Ag Technical Services Manager of Spraying Systems Co., located in Wheaton, Ill.

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A CLOSER LOOK AT THE CONTROVERSY: ARTIFICIAL OR NATURAL?

Leading athletic field experts claim a place for artificial turf. But, like George Toma of the Kansas City Royals, most would opt for natural grass, given the chance.

by Jerry Roche, executive editor

Though turf experts continue to prefer natural grass athletic fields, they say 'higher-ups' seem more willing to drop big dollars on artificial surfaces.

Contrary to what many athletic turf managers would like to believe, there *is* a place in sports for synthetic turf. At least, so says George Toma.

Toma is field director for the Kansas City Royals Baseball Club and an advisor to the National Football League.

"There are places for both surfaces," Toma says. "Artificial turf can be used in domes, places like high schools where there's a lot of traffic or maybe in colleges or in city parks. The thing I emphasize is that you have the money within 8 to 10 years to replace that turf.

"Your magazine ran an article about how five-year-old artificial turf is about as hard as asphalt (see chart). So either you have the money to replace the turf or the kids are playing on concrete. And how many high schools or colleges have the money to replace artificial turf when it gets hard?"

Toma believes that a misconception exists among field administrators, who hold the purse strings.

He recently consulted with a school system in Texas that had 36 athletic fields and wanted to install two artificial fields. "Now, what good would two artificial fields do for a couple million dollars when they could take that money and improve those 36 fields to be just as good as artificial turf?" he asks. "Grass grows good in Texas...there's just never any money for grass, but millions for artificial turf.

"If you could tell your superiors

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IMPOSSIBLE, YOU SAY? REAL TURF INDOORS

Many people don't remember that the original turf used in Houston's Astrodome was natural.

In the mid-'60s when the Astrodome was completed, hybrid bermudagrass was sodded under the translucent dome. In the beginning, the stadium sported a lush, green natural grass field that grew quite well. However, when baseball players began complaining that they couldn't see fly balls because of the glare and bright sunlight streaming in through the dome's sky windows, the windows were darkened to appease them. As a result, the light reaching the natural grass surface was severely reduced. With the added stress placed on the surface with both baseball and football, the grand experiment was ended and the natural grass scrapped.

The forerunner

The preceding series of events led Judge Roy Hofheinz, who owned the Astrodome, to contact Monsanto and 3M, who at the time were under a Ford Foundation grant to develop synthetic playground surfaces for inner-city schools. Finally, in 1966, a synthetic turf surface was introduced and installed by Monsanto in the Astrodome.

This was the first major installation of a synthetic turf, the forerunner of hundreds of similar installations. From this point forward, it has been assumed that natural grass cannot and will not grow in the environment of a domed or closed stadium.

Setting the stage

Twenty-five years ago, the situations and conditions of natural grass athletic fields were at an all-time low. The grounds personnel who cared for natural grass athletic facilities were undertrained, received meager budgets for field maintenance, had to cope with severely over-used facilities, mud, bare surfaces, hard ground, compaction, poor drainage, antiquated grass varieties, haphazard irrigation systems and much more. Turfgrass science, soil technology and drainage engineering lagged far behind the demands of the user, the expectations of the general public and the need of those working in the field. There was no new natural grass concept available to sell.

The stage was set for something new and different. So in the door came synthetic surfaces with all the solutions to the previous problems. Ironically, however, that brought a new set of problems: player injuries, high maintenance costs, high replacement costs and hard, hot abrasive surfaces.

Today, the technology and expertise is available to grow natural grass inside a domed stadium. It would require a stadium with a retractable roof similar to Toronto's Skydome.

Dr Kent Kurtz is a professor at Cal Poly-Pomona and a special advisor to the Rose Bowl.

The capability to start a natural grass indoors and have it ready for the baseball season and use it through the football season is possible with current knowledge. The roof would need to be open half-days during the grass's prime growing season (daily 9 a.m. to 3 p.m.) and could be closed for events. All events of major proportion (motocross, trade shows, etc.) could be scheduled for between football and baseball seasons. The turf could be allowed to go dormant or be terminated after the football season, and then replaced in time for the baseball season.

This would be similar to what several major outdoor stadiums experince each year after motocross and major off-road events. Anaheim Stadium, the Los Angeles Memorial Coliseum and the Rose Bowl completely re-work, re-establish and re-sod their playing field surfaces following motocross and/or off-road events. The event promoter assumes the expense of putting the field back in playing condition. Less destructable events such as concerts, circuses or religious events could be held on the field during the playing season just like the outdoor stadiums do by covering the grass with a geotextile cover (polyester fabric) to protect the grass.

The light problem

To achieve the light necessary to grow grass indoors would require supplemental lighting. Supplemental lights can be installed in units or gangs which could move back and forth or around as needed. They could be monitored by a computer which would control all environmental conditions within the domed stadium.

This would be comparable to the technology currently available in the Indianapolis Hoosier Dome. The Hoosier Dome has over 800 light fixtures, generating over 1 million watts. Its roof conditions are constantly monitored by a weather and computer station. The roof is equipped with an automatic snow melting system. Sensors on the roof measure wind velocity, moisture and temperature; when any of these sensors indicates a change, hot air is discharged to melt the snow. Domed stadium lighting to reach acceptable brightness levels to grow natural grass could function in a similar manner.

Other systems

In many natural grass surfaces today, soil sensors tell sprinklers when to water the grass or when not to water the grass. They tell electric heat cables and hot water pipe systems when to warm up the soil for optimum turf growth or when not to warm up the soil.

We can grow grass indoors in greenhouses. Why wouldn't or couldn't dome stadiums be similar to greenhouses? Modern greenhouses are equipped with fully automatic, environmentally-controlled systems to grow plants. The technology is available, the equipment is available, the people to manage natural grass in a domed stadium are available. Now all that is needed is a domed stadium to show the world that it will work.

Synthetic turf can be put on and off a domed stadium surface. But this is a very tedious and time-consuming job. Natural grass is less costly and much less expensive to maintain.

—*Dr. Kent Kurtz*□