



Super Science

//TRAFFIC TRAUMA

DEFICIT IRRIGATION AND TRAFFIC IMPACTS BERMUDAGRASS FAIRWAY PERFORMANCE

Reagan Hejl and Ben Wherley, Ph.D.

Golf course water use in Texas has become increasingly regulated in the past decade due to persistent drought conditions, diminishing water supplies and rapidly growing population. Many golf courses have been faced with considerable cutbacks to irrigation allocations, but information is limited regarding critical levels needed for maintaining adequate turf quality, persistence and recovery from divots and traffic.

A field study was conducted over two years in College Station, Texas, to determine the effects of continuous reference evapotranspiration (ET⁰)-based deficit irrigation levels on quality of Tifway bermudagrass (*Cynodon dactylon* x *C. traansvalensis* Burt. Davy) fairway plots. Turf quality evaluations from both seasons demonstrated that in the absence of traffic, irrigation levels of 30% x ET⁰ (supplied 3x/week on a fine sandy loam soil) were sufficient to maintain acceptable turfgrass quality during summer months. Canopy temperatures noticeably increased with deficit irrigation practices, with up to a 30°F temperature increase observed between irrigated and unirrigated plots.



Simulated traffic being applied to deficit irrigation research plots at the Texas A&M Turfgrass Field Laboratory.

Upon resumption of full irrigation levels in October of both years, deficit and unirrigated plots quickly recovered to ~90 percent green cover by late November 2012, but these same plots were much slower to recover after the 2013 season, indicating cumulative drought stress effects, especially in unirrigated plots. In both years, traffic delayed fall recovery of turf at all irrigation levels. This research was supported by the GCSAA's Environmental Institute for Golf and the Lone Star Chapter of Golf Course Superintendents.

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NEWS UPDATES

BAYER CROPSCIENCE RECEIVES AGROW AWARD FOR INDAZIFLAM

Environmental Science, a division of Bayer CropScience LP announced indaziflam, the herbicidal active ingredient in Specticle, received an Agrow Award in the category "Best New Crop Protection Product."

Specticle is a pre-emergent herbicide that provides turfgrass professionals superior control of more than 90 grasses, broadleaf weeds and annual sedges at up to 40 times

lower use rates than current standards. "The need for new herbicides with alternative modes of action and resistance-breaking capabilities is more urgent than ever," said Dr. Hermann Stübler, Head of Weed Control Research



at Bayer CropScience. "In a team effort we created and developed indaziflam, employing our leading expertise in herbicide research and our deep knowledge of weed control."

“WITH INTRINSIC FUNGICIDES, THE TURF IS ABLE TO RECOVER FROM STRESSES MORE QUICKLY DUE TO INTERNAL PHYSIOLOGICAL CHANGES AND A STRONGER ROOT SYSTEM.”

Renee Keese, Ph.D.
(see full story on page 42)

//NEW ACTIVE INGREDIENT

BASF unveils Xzemplar and Lexicon Intrinsic

By Renee J. Keese, Ph.D., BASF

BASF research and development is the process of carrying out investigations to create a product to bring to market. This is a time consuming and expensive part of our industry, but necessary for the launch of new products.

For the past six years BASF has been developing a new active ingredient for use in turf markets, as well as agricultural crops. Fluxapyroxad is a SDHI (succinate dehydrogenase inhibitor) and blocks the process of plant respiration at Complex II. Growth of fungal cells is stopped when the biosynthesis of building blocks is interrupted. Fluxapyroxad quickly penetrates to the interior leaf tissue; where it is bound to wax layers within the leaf, and this contributes to making it rainfast as

“Lexicon Intrinsic is a next generation Intrinsic product that delivers both superior disease control and advanced plant health...”

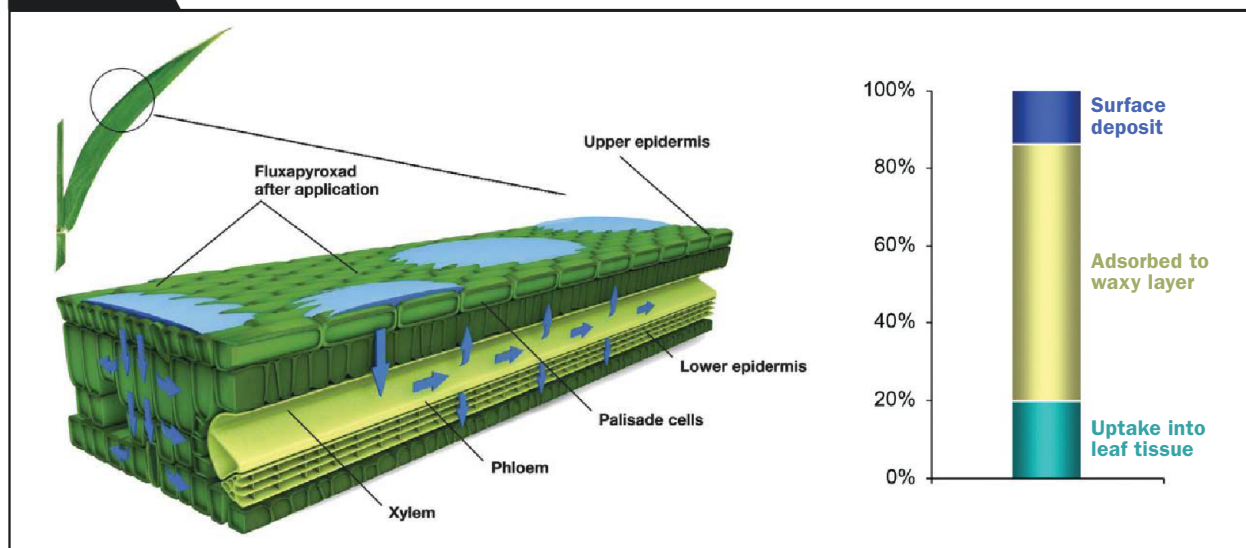
soon as the spray is dry (Figure 1). It moves upward in the plant through the xylem and protects parts of turf blades that did not receive spray application. This new active ingredient has been shown in field trials to be effective at very low rates due to its high level of biological activity in fungi.

SDHI chemistries belong to FRAC Group 7. Emerald fungicide, which contains boscalid, is also a carboxamide belonging to this same mode of action. But fluxapyroxad has lower use rates than boscalid-containing products. Early testing compared this

new chemistry to boscalid, and determining the use rate and application interval took a few years of study. Once the formulation and load of the active ingredient in the product are determined, the use rate and application intervals can be evaluated. Xzemplar, the product containing fluxapyroxad, is a 300 g/L SC (suspension concentrate) formulation.

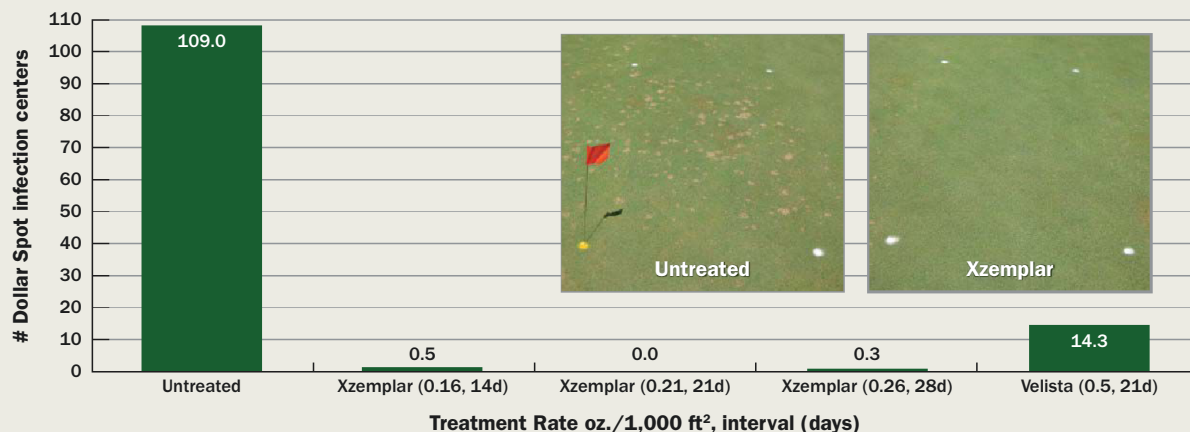
The process of bringing new products to market takes multiple years and requires many tests. Since 2008, over 200 field trials have been conducted with university or private contract turfgrass

FIGURE 1



Fluxapyroxad delivery into leaves drives good systemicity. The fungicide coats the leaf surface then penetrates internally where it moves upward in leaf tissue, with the flow of water in xylem. Seven days after application the bulk of fluxapyroxad is found adsorbed to the wax layer in leaves. (Courtesy of BASF)

FIGURE 2

Preventive dollar spot control (*Sclerotinia homoeocarpa*) at varying rates and intervals.

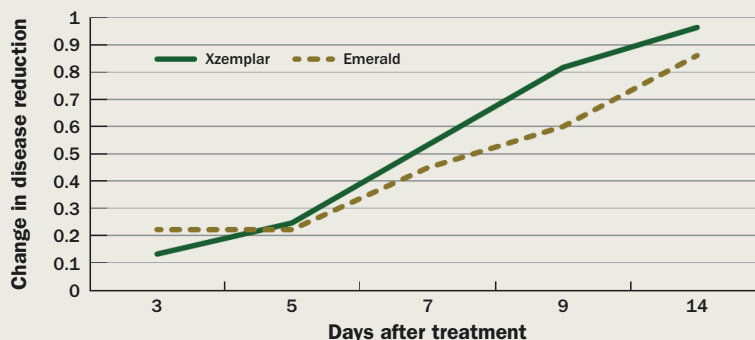
Data from John Inguaggiato, Ph.D., University of Connecticut, 2012 trial. Evaluation 40-days after initial treatment and 14-days after the last treatment. Three applications made on 14-day interval, two applications on 21- and 28-day intervals. LSD=17.42 at P=.05. Photos from Florence, S.C., courtesy of BASF.

researchers. Use rates of Xzemplar are lower than Emerald and under moderate disease pressure, the interval can be extended. Many superintendents will be familiar with the product Emerald, which historically has provided strong dollar spot control; Xzemplar controls dollar spot (*Sclerotinia homoeocarpa*, soon to be known as *Clarireedia homoeocarpa*) and brown patch (*Rhizoctonia solani*), the two most important and prevalent turf diseases, as well as several other patch diseases. Continued testing demonstrated this new product has broader disease spectrum than Emerald fungicide. Dollar spot efficacy from fluxapyroxad is both preventive and curative (Figure 2). Whether disease has actively begun to infect, or conditions are right for growth, fluxapyroxad will stop further growth when it contacts the fungi. Activity across four trials in the US in 2012 demonstrated efficacy faster than Emerald (Figure 3).

The Xzemplar label provides flexibility in application rates, with rates as low as 0.16 fl. oz./ 1000 sq. ft., or a mid-rate of 0.21 fl. oz. and up to 0.26 fl. oz./1000 sq. ft. This allows superintendents to vary their application intervals based on the fungicide program they use or disease pressure on the golf course.

FIGURE 3

Curative dollar spot control from Xzemplar and Emerald applications, 14 days after one application.



Data from four 2012 trials in Mo., N.C., Pa. and S.C. Disease pressure at initiation of trial averaged 15%. Average disease pressure between eight-10 days was 31 percent dollar spot incidence. The change in disease is compared to the previous rating within the identical plot. The steeper slope of line indicates faster control.

For light disease pressure the lower or mid-rates are sufficient and the interval can be increased to 21- or 28-days. The Xzemplar label includes diseases such as brown patch, dollar spot, large patch, snow molds and summer patch, along with reduction of algae. Use sites include golf courses, residential and commercial lawns, parks, athletic fields, cemeteries and sod farms.

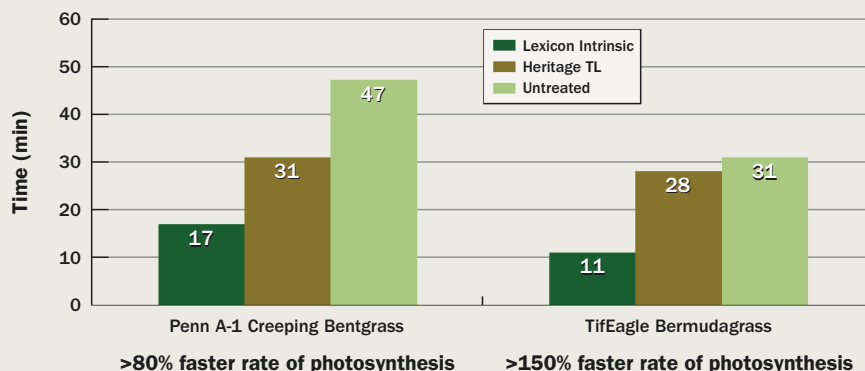
A combination product was also developed containing fluxapyroxad and the active ingredient (pyraclostrobin) in Insignia SC Intrinsic brand fungicide.

This combination is very broad spectrum and provides excellent dollar spot control. The flexibility of two modes of action (SDHI and QoI - Quinone Outside Inhibitor) is an excellent tool for resistance management. The combination product, Lexicon Intrinsic brand fungicide, is also a suspension concentrate (SC) formulation like Xzemplar, and can be used on the same turf use sites. This 500 g a.i. /L formulation contains 167 g of fluxapyroxad and 333 g of pyraclostrobin. Excellent

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FIGURE 4

Float time of 50 percent of Penn A-1 creeping bentgrass and TifEagle dwarf bermudagrass leaf segments treated with Lexicon Intrinsic or Heritage TL fungicides.



Continued from page 43
control of diseases like anthracnose (*Colletotrichum graminicola*), brown ring patch, caused by *Waitea circinata* pv *circinata*, and leaf spots like *Bipolaris* and *Dreschlera* spp. was achieved with Lexicon Intrinsic at both labeled rates (0.34 and 0.47 fl. oz. /1000 sq. ft.). Lexicon Intrinsic is a next generation Intrinsic product that delivers both superior disease control and advanced plant health, including the ability to withstand stresses such as extreme temperatures, drought, mechanical processes such as aerification, etc.

To demonstrate the impact on rate of photosynthesis, fungicide-treated leaf disks or segments were put into a sodium bicarbonate solution with detergent. This solution provides a carbon source for photosynthesis and breaks the surface tension on the leaf surface. After drawing a vacuum to remove the cellular interstitial space, the leaves sink to the bottom and are placed in the dark for five minutes. The leaf segments were then placed into cuvettes under light, and as oxygen was released and bubbles formed on the leaf surface, the leaf segments floated. The quicker float

time indicates a faster rate of photosynthesis and healthier turf plants; Lexicon Intrinsic treated turf (0.47 fl. oz. /1000 sq. ft.) had the fastest photosynthetic rate compared to Heritage TL (2 fl. oz. /1000 sq. ft.) or untreated leaves (Figure 4).

With Intrinsic fungicides, the turf is able to recover

from stresses more quickly due to internal physiological changes and a stronger root system. Research indicates that Lexicon Intrinsic Brand Fungicide is effective on over 30 disease organisms, and is a fast acting fungicide, which provides additional plant health benefits. Both Lexicon Intrinsic and Xzemplar received US EPA registration December 17, 2013. Always read and follow label directions.

Renee Keese, Ph.D., is a biology project leader for turf and ornamentals for BASF.

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