

TURFGRASS EXPERIMENTS IN THE INDOOR RESEARCH FACILITY, NATIONAL UNIVERSITY OF LA PLATA, LA PLATA, ARGENTINA 1997-1998

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Introduction

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In November 1995 representatives of two La Plata, Argentina football clubs and stadium officials visited the experimental dome on the Michigan State University (MSU) campus. Their objective was to investigate the possibility of building a domed stadium in their city while maintaining a natural grass playing system. They enlisted the involvement of turfgrass researchers in early 1997 to design and oversee construction of an indoor turfgrass research facility on the agriculture research farm of the National University of La Plata (UNLP). The construction of the facility was completed in August 1997. The MSU researchers designed and implemented two experiments in April-August 1997 to investigate the Ultralux fabric from Birdair, Inc. (Buffalo, New York) and to further evaluate the management and maintenance of turfgrass under reduced light conditions, particularly in a warm climate.

La Plata is located in a warm temperate area (similar to Atlanta, Georgia), and because of the reduced environmental conditions in the dome, it was necessary to test a wide variety of grasses beyond those tested in the MSU Research Dome from 1992-1997. In addition to cool season grasses, it was also necessary to evaluate warm season species. In general, cool season grasses can be established from seed and this is the preferred method. Because the chosen warm season could not be established from seed, and the very short window allowed to conduct this study (1 year), it was necessary to research these grasses in the form of mature sod. Therefore the specific tests and their objectives were developed to determine the best grass or grasses for domed stadia conditions in La Plata.

Objectives

Seeding study

The objective of this study was to establish and evaluate three cool season turfgrass species (*Poa pratensis*, *Lolium perenne*, and *Poa supina*) under trafficked conditions and then response to various management schemes involving fertility and growth regulation (Plant Growth Regulators, PGR).

Sodding Study

Because of the nature of this study and the difficulties in importing turfgrass sod into Argentina (the particular varieties of turfgrasses in question were not cultivated in Argentina at the time of the study), the sodding study had these objectives, all of which were subjected to traffic.

1. To evaluate mature sodded turfgrasses (three warm season, 'Diamond' zoysiagrass, 'De Anza' zoysiagrass, and 'Santa Ana' bermudagrass, and one cool season, *Poa supina*) under PGR.
2. To evaluate the overseeding of the three warm season species with *Poa supina* and the effects of PGR.
3. To evaluate the overseeding of 'Santa Ana' bermudagrass with three cool season species (*Poa supina*, *Lolium perenne* and *Festuca arundinacea*).

The rationale behind these extensive studies was to test as many grasses under the new Ultralux fabric as possible under a short time frame. The cool season grasses were chosen for their performance in previous studies at MSU. The warm season grasses were chosen specifically for their tolerance to low light conditions in studies by researchers at other Universities. The use of PGR on turfgrasses under reduced light has shown to benefit turfgrass quality. The overseeding of the cool season grasses into the warm season grasses is a very typical practice for athletic fields located at similar latitudes to La Plata, and provided an opportunity to evaluate the germination and establishment of these grasses under the reduced light conditions of this fabric.

The overall purpose of this study was to find appropriate grasses for the conditions of a domed stadium in La Plata, Argentina. This meant finding the limits for these turfgrasses under these conditions (e.g. excessive traffic). While these grasses were managed to some degree as one would manage a sports field, by no means was the management as intense (e.g. no continual overseeding, core cultivation, etc). These limiting conditions were amplified by the lack of overall turfgrass management experience of the UNLP researchers. This should be kept in mind during this report and will be revisited in the conclusion section of this document.

Research was conducted by MSU researchers over the last two years at the Estacion Experimental "Ing J. Hirschhorn" Facultad De Ciencias Agrarias Y Forestales, UNLP, where construction for an indoor research facility to mimic the proposed stadium was initiated in March 1997 and finished in October 1997.

Conclusions

Based on the results of these experiments, it has been found that the Ultralux fabric allows through enough light to germinate, grow, and maintain turfgrasses under both extremes of conditions in La Plata, Argentina (hot humid summers versus cool, low light winters). However, several grasses, such as bermudagrass and *Lolium perenne*, did not persist throughout the seasons and provide an acceptable turf quality. These grasses have been deemed inadequate for low light conditions.

In contrast, Diamond zoysiagrass and *Poa supina* did persist throughout the seasons, and provided reasonable turf quality for playing fields. It is encouraging to note that these grasses performed as they did under less than optimal and atypical management practices. It should be pointed out that these grasses were never reseeded, nor was the soil compaction ever alleviated through core cultivation. These are very common practices for athletic field management. In addition the quality of these grasses was compromised by the lack of turfgrass management experience of the day to day managers. In spite of all these shortcomings these turfgrasses were able to grow and recover under regular traffic conditions.

This study was a simulation of the conditions in La Plata Stadium, and one of the goals was to identify limits of turfgrass due to these conditions under traffic. This normally means testing turfgrass beyond their point of recovery until death even if they (the turfgrasses) are well suited for the situations if normal event scheduling is followed. Similarly, turfgrass density for particular species in this report may not be a final reflection of its ability to provide a suitable field. Many games have been contested on fields less than 100% density, as this quality is only one in the requirement of a superior field. This aspect combined with the need for proper management techniques and a qualified turf manager give reason to believe this project can be successful.

Finally, it is important to reiterate that the complexity of these experiments due to the space confinement made these studies difficult to interpret. Persons without knowledge of the plot plan or strategies could have easily drawn incorrect conclusions regarding the status of these experiments.

Final Recommendations

The following recommendations are based upon the experiments conducted in La Plata from April 1997-August 1998. They represent our opinions based on research data as well as our previous experience with turfgrass under reduced light conditions from 1992-1997. While these recommendations are listed singularly and can be interpreted as stand alone items, it is the list in total that is the official recommendations.

- 1) The Ultralux fabric from Birdair should be used to cover La Plata Stadium. It does transmit enough light to maintain turfgrass under reduced light conditions.
- 2) 'Diamond' zoysiagrass should be planted for use as the turfgrass in La Plata Stadium. It has shown the ability to grow under these reduced light conditions in La Plata. If managed properly in terms of mowing and cultivation it will only perform better than our tests.
- 3) The 'Diamond' zoysiagrass should be overseeded in April of each year with cool season grasses. Our recommendation is *Poa supina*. *Poa pratensis* and *Festuca arundinacea* can also be used in a mixture with *Poa supina*. This will likely be an annual process, as the 'Diamond' zoysiagrass will go dormant during this period.

- 4) The field for La Plata Stadium should be portable for maximum utility of the stadium. The grass will not tolerate abuse from concerts, etc., and still be suitable for football. Therefore, a portable field is necessary, if the stadium is to be used efficiently. The type of portable field is still a question, but our recommendation is for the architect to lead these discussions. Mr. John Hope of Manderley Corporation should also be consulted.
- 5) We recommend that the turfgrass be maintained and managed following the turfgrass under reduced light condition scheme developed by MSU researchers. These practices were again successful in a simulated setting and will be critical in the overall success of the field.
- 6) Within these specifications for Turfgrass Management Under Reduced Light Conditions, we recommend that special attention be paid to the soil root zone mix. This specification must be strictly followed as to provide adequate drainage and necessary stability.
- 7) For this project to be successful long-term we recommend the hiring of a qualified turf field manager to maintain the field at La Plata Stadium. This person needs a formal education in turfgrass science and management. They also need practical experience in the field of turfgrass management, preferably with athletic fields.
- 8) The turf manager will only be successful if they have the tools to implement the proper management practices. We recommend that resources, in terms of equipment and personnel, not be limiting.
- 9) Finally, we recommend that the construction of the field begin immediately with the planting of 'Diamond' zoysiagrass at an Argentina sod farm. This will ensure its readiness for the opening of the stadium in 2000. We also recommend that the building of the field be monitored closely to ensure quality control.