

2003 RUTGERS Turfgrass Proceedings



THE NEW JERSEY TURFGRASS ASSOCIATION

In Cooperation With

RUTGERS COOPERATIVE RESEARCH & EXTENSION
NEW JERSEY AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

Distributed in cooperation with U.S. Department of Agriculture in furtherance of the Acts of Congress on May 8 and June 30, 1914. Rutgers Cooperative Research & Extension works in agriculture, family and community health sciences, and 4-H youth development. Dr. Karyn Malinowski, Director of Extension. Rutgers Cooperative Research & Extension provides education and educational services to all people without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs). Rutgers Cooperative Research & Extension is an Equal Opportunity Program Provider and Employer.

2003 RUTGERS TURFGRASS PROCEEDINGS

of the

New Jersey Turfgrass Expo December 9-11, 2003 Trump Taj Mahal Atlantic City, New Jersey

The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2003 New Jersey Turfgrass Expo. Publication of these lectures provides a readily available source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to those individuals who have provided support to the Rutgers Turfgrass Research Program at Cook College, Rutgers, The State University of New Jersey.

Dr. Ann Brooks Gould, Editor
Dr. Bruce B. Clarke, Coordinator

SPORTS TURF UPDATE - INFIELD MIX DEMONSTRATION, 2003

Bradley S. Park, John Grande, Rob Shortell, and James A. Murphy¹

Management and potential selection of an infield mix are an integral part of a sports turf manager's responsibilities if he or she is required to oversee the maintenance of a baseball or softball field. In many cases, a field manager will only be familiar with his or her infield mix and may be unaware of the variety of mixes that are available on the market. In summer 2003, we created plots at the Rutgers Snyder Research and Extension Farm for the purpose of demonstrating different infield mixes.

Our goals in selecting mixes were to choose various mixes that fell within American Society for Testing and Materials (ASTM) standards as well as to choose materials that did not meet ASTM specifications. According to ASTM specifications utilizing sieve designations, no more than approximately 7% of an infield mix may contain gravel (particle sizes greater than 2.0 mm), and 80 to 94% of the mix should be comprised of sand. The remaining portion of a mix should be silt and clay. However, the ASTM standards contain a passage which states, "In the absence of particle size data to assess materials, a reasonable approach would be to prepare a mixture using 15 to 30% clayey soil and 70 to 85% sand..." Using these criteria, we designed the summer 2003 demonstration to include a total of 5 mixes; two mixes fell within ASTM standards, and three fell outside ASTM standards.

MATERIALS AND METHODS

A uniform, non-sloped, well-drained site was chosen, and three pits (approximately 30 x 10 ft) were excavated by rototilling to a depth of 3.0 inches and removing the loosened soil with a front-end loader. Large stones were removed from the pits, and the base of each pit was scarified to a depth of 1.0 inch and rolled.

Two pits were individually filled with two mixes that generally fell within ASTM specifications at the high (Mix 1) and low (Mix 2) end of percent sand composition. Approximately 0.5 inch of mix was added to a pit, rolled to create a firm surface, and additional mix was added and rolled at 0.5 inch increments. We divided the third pit into three equal 10 x 10 ft sections and filled each section with a mix that clearly fell outside the range of acceptability as defined by the ASTM standards.

Mix 3 (excessive sand) was prepared by modifying Mix 1 with additional sand. The volume of a 10 x 10 ft pit was determined, and a calculated volume of sand was added to a known volume of Mix 1 to completely fill the 10 x 10 ft pit. Using similar methods, additional gravel was added to Mix 2 to create Mix 4 (excessive gravel).

While Mix 5 falls outside of ASTM standards due to excessive silt/clay, it must be noted that this mix is acceptable for use in the construction of pitchers' mounds and batters' boxes. Individual mixes and percentages of sand, silt/clay, and gravel are shown in Table 1.

MAINTENANCE REGIME AND DISCUSSION

Following installation, the infield mixes were left uncovered and therefore exposed to weather conditions ranging from heavy rainfall to prolonged dryness. To maintain a "game-ready" infield surface under dry conditions, it was necessary to supply moisture to Mixes 1 to 4 several times daily followed by hand raking. We define a "game-ready" infield surface as that which is firm yet cork-like (using one's thumb to create an imprint in the mix) and can be worked with a rake or other scarification tool to create a loosened "cap layer" of mix.

¹Sports Turf Education and Research Coordinator, Director Snyder Research and Extension Farm, Research Assistant, and Associate Extension Specialist in Turfgrass Management, New Jersey Agricultural Experiment Station, Cook College, Rutgers Cooperative Extension, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

Table 1. Composition of sand, silt/clay, and gravel in demonstration infield mixes installed in summer 2003 at the Rutgers Snyder Research and Extension Farm, Pittstown, NJ.

Mix	Sand	Silt/clay (%)	Gravel
1	88	12	0
2	70	21	9
3*	95	5	0
4*	66	17	17
5*	50	44	6

* Does not conform to American Society for Testing and Materials (ASTM) standards

While the addition of moisture to Mix 3 (excessive sand) added some stability to the mix, because of the excessive sand content and subsequent inability to retain moisture, we deemed Mix 3 to be commercially unacceptable. Mix 5 (excessive silt/clay) was extremely difficult to manage and was rarely game-ready. During dry weather, this mix became rock-hard and cracked. Following rainfall, Mix 5 was soft, slick, unplayable, and an illustration of another commercially unacceptable mix.

Mixes 1 and 2 (both conforming to ASTM specifications) showed differing moisture requirements and drying times following exposure to dry and wet conditions, respectively. Under dry conditions, Mix 1 (88% sand) required the addition of more moisture compared to Mix 2 (70% sand) to bring to game-ready conditions. Following heavy rains and subsequent dry weather, Mix 1 required less drying time to become “workable” with hand rakes and thus easier to prepare for a game-ready surface.

Under all conditions, Mix 4 (excessive gravel) displayed identical characteristics (wetting and drying) to Mix 2, indicating that the additional gravel had minimal impact on the behavior of the mix. The 17% gravel content comprising Mix 4 (ASTM standards suggest 7% maximum) presents a significant safety hazard and, in our opinion, mixes similar in composition to Mix 4 should not be used as infield playing surfaces.

After several weeks of allowing the mixes to be exposed to variable weather conditions, we made the decision to cover the mixes with tarps. We made this decision, in part, by noting that the ASTM specifications say, “When budget allows...areas should be

covered with an appropriate impervious cover when not in use. Such covers prevent evaporation in dry weather and protect the area from excess water during rainfall or general irrigation of an infield.” When considering Mixes 1 and 2 (both conforming to ASTM standards) only, following rainfall, the covers kept the mixes dryer and reduced the amount of time necessary to prepare the mixes for game day conditions. Despite covering the mixes, Mix 1 (88% sand) continued to require less time to prepare compared to Mix 2 (70% sand).

Conversely, Mix 2 retained moisture longer compared to Mix 1 following prolonged dry weather and removal of covers. As part of this demonstration, we estimated that infield mix maintenance inputs were reduced by as much as half as a result of covering the mixes.

As part of the Sports Turf Workshop held on October 2, 2003 at the Rutgers Snyder Farm, we allowed 1/3rd of each mix to remain uncovered for approximately 2 weeks, and the other portion of the mixes to remain covered until the morning prior to the workshop. We prepared the covered portions of all the mixes to game-ready conditions on the morning of the workshop. The advantages of covering were evident on October 2 as the covered areas were game-ready whereas the uncovered sections were extremely hard and were deemed as unacceptable playing surfaces.

ADDITIONAL CONSIDERATIONS

The infield mix plots at the Rutgers Snyder Farm demonstrated concepts described by the ASTM specifications, most notably the fact that management of an infield mix is affected by relative percentages of sand and silt/clay in the mix. According to the ASTM standards, “...top mixes with 6 to 10% silt/clay (90 to 94% sand) are better suited in rainy climates due to greater internal drainage. In dry periods, they will require frequent irrigation to minimize dust and to provide a firm surface.” Whereas, “...the presence of clay is desirable from the standpoint of providing both a firm and stable surface for good footing...top mixes 11 to 20% silt/clay (80 to 89% sand) will drain more slowly but will retain more water. Frequency of irrigation will be less. These mixes will be more cohesive and will be more difficult to loosen when they compact.”

Sports field managers should consider their budgets, availability of labor, and typical environmental

conditions (dry climate vs. moist climate) when choosing an infield mix. Infield mix maintenance has often been considered as much an “art” as it a “science.” While the ASTM standards provide a starting point from which to choose a particular mix, and we effectively demonstrated three mixes that are not acceptable (Mixes 3 to 5), the quality of an infield playing surface is most significantly affected by the actions and decisions made by the sports field manager.

“It has often been observed that the skills of the grounds manager are a greater contributing factor to high quality skinned areas than the materials used to construct these areas. Successful grounds managers must select management practices that are appropriate for the field at hand, or modify field conditions to match a given maintenance program.” – ASTM Standards F 2107-01

ACKNOWLEDGMENTS

Much appreciation is given to Sports Field Managers Association of New Jersey for financial support of this project, Jim Hermann, CSFM, for project design input and help in mix maintenance and installation, and Rob Shortell for the creation of infield mix pits, mix installation, and daily maintenance of the mixes. Additionally, Geo. Schofield Co. Inc. and Partac Peat Corporation are recognized and appreciated for the donation of materials used in this demo.

LITERATURE CITED

ASTM. 2002. Standard Guide for Construction and Maintenance of Skinned Areas on Sports Fields. Volume 15.05: Designation F 2107-01.