PROJECT TITLE: TRAFFIC TOLERANCE TESTING OF GRASSES FOR ATHLETIC FIELDS

Rationale/Description of Problem:

A joint project between NTEP and the Sports Turf Managers Association (STMA), Safer Athletic Fields Environments Foundation (SAFE), this project evaluates traffic tolerance and performance of cool-season grasses used on athletic fields under *simulated football-type* conditions. There are many species, blends and mixtures available to turf managers but little information on their relative traffic tolerance and persistence under athletic field conditions. NTEP conducts traffic tolerance evaluations as ancillary evaluations of their official trials, however, the number of sites is very limited, blends and mixtures are not evaluated, and different species are not evaluated and compared, side-by-side, in the same trial. This project proposes to take the next step in athletic traffic evaluations, with more trial locations and comparative evaluations of species, blends and mixtures.

Objectives:

To determine the best cultivars, blends, mixtures and species for football traffic on athletic fields. We want to obtain specific information on establishment, color, density, traffic tolerance, recovery from traffic, disease and other problems. Our project is unique in being the only coordinated traffic tolerance trial, national in scope, covering broad geographic areas with extensive data collection.

Materials & Methods

General - Evaluation protocols and site selection will be jointly undertaken together by representatives of STMA, SAFE, university scientists, seed company representatives and NTEP, via an advisory committee. Trials will be conducted for three full growing seasons. Trial locations will be established in fall 2009, with traffic applied in fall 2010, fall 2011 and fall 2012. Plot size will be 25 sq. ft , replicated three times. Overseeded and nonoverseed plots of the same entry can be established adjacent to each other or randomized with the block (rep).

Trial Locations - The university locations will be chosen based on their geographical location, traffic equipment available, willingness to participate and their ability to conduct high quality trials. The following six university locations have been chosen to conduct this trial: Riverside, CA, East Lansing, MI, University Park, PA, Ames, IA, Puyallup, WA and Lexington, KY. One or two additional locations may be selected if entry numbers exceed expectations.

Standard entries –

One high traffic tolerant cultivar (most likely P-105) and one low traffic tolerant cultivar from the BMVG type (Merit or Baron) will be used as indicator plots (see traffic protocols below). These grasses are also chosen because of their popularity, availability and familiarity among sports turf managers.

Seeding rates –

Initial seeding rates will be 3 lbs./1000 sq. ft for Kentucky bluegrass, 6 lbs./1000 sq. ft. for perennial ryegrass and 8 lbs./1000 sq. ft. for tall fescue. These rates are at the high end of what is generally recommended cue to the need to discourage *poa annua* contamination at establishment. Rates for mixtures will be determined by the advisory committee after it is determined what types of mixtures (and their species composition) will be entered by sponsors.

STMA members were surveyed concerning their overseeding rates. Based on this information, in the spring following fall traffic, plots will be overseeded once with 6 lbs./1000 sq. ft. for perennial ryegrass, 2 lbs./1000 sq. ft for Ky. Bluegrass, and 6 lbs./1000 sq. ft for tall fescue. Blends and mixtures overseeding rates will be the same as initial seeding rates (to be determined).

Fertility rates/timing, mowing height – Again, STMA members surveyed provided insights into these parameters. Therefore, cooperators will apply 0.5 lbs. of Nitrogen per growing month equivalent to approximate 4 lbs. per year in an eight month growing season. Other nutrients will be applied based on soil-test needs. Mowing height will be 1 ¾ - 2 ¼" with the preferred height being two inches.

Irrigation protocol - Water should be applied as needed to prevent significant drought stress.

Traffic protocols - For each season (8-10 week period in fall), traffic will be applied such that plots experience a 30% loss of ground cover by mid-season and a 70% loss of ground cover by the end of the season. The number of simulated traffic passes applied per week will be suggested by the advisory committee but ultimately, the cooperator at each location will need to determine the number of traffic simulator passes to achieve the above ground cover goals. The two Kentucky bluegrass indicator cultivars (as described above) will be used as a gauge to measure how much traffic should be applied weekly. Cooperators will monitor the ground cover % of the two indicator plots and adjust the amount of traffic accordingly. For instance, the goal is to have ground cover (averaged over the two indicator plots) at 30% after 4 – 5 weeks and at 70% at 8 – 10 weeks of traffic. The number of passes applied will be based on the indicator plots as well as soil moisture, trial location and weather. Typically, traffic should be applied regardless of weather conditions or soil water content. Occasionally, due to heavy precipitation or schedule conflicts, traffic cannot be applied on the scheduled day. In these cases, traffic should be applied on the following day.

Compaction, soil moisture, hardness measurements – Compaction and soil moisture levels are an important variable in athletic traffic tolerance. Therefore, the cooperators will be required to measure bulk density (at a two inch depth), soil moisture and hardness (using the ASTM F1702-96(2002)e1 method for the Clegg impact hammer) immediately before traffic is applied in a season and immediately after traffic is completed for that season. For those cooperators with access to the Troxler (or equivalent) instrument, these measurements will be collected *for each plot*. For those cooperators that do not have access to the Troxler equipment, the requirement is reduced to the *standard entries only.* Cooperators must report soil type and particle size analysis.

Turfgrass performance data collection – Turfgrass quality will be rated at the beginning of each traffic period. Percent (%) plot cover will be rated weekly during the traffic period. In the spring following the traffic period, percent plot cover will be rated weekly until the top KB indicator plot achieves 100% cover. The establishment rate of overseeding will be evaluated, along with the species composition of each plot at the end of the study (using tiller counts).

Reseeding protocols - To simulate reseeding that typically is undertaken on athletic fields, one-half of each plot will be overseeded in the spring after traffic is completed for each fall season. The same seed used for the original planting will be used in the overseeding. Overseeding will be conducted in spring when it is appropriate for each location and the establishment of the overseeding will be compared with recovery rates of the non-overseeded half. To enable good seed/soil contact for the overseeding, a verticutter will be run over the entire plot area. Seeding, like the initial seeding, will then be conducted

along with sufficient irrigation for germination and development.

Trial Specifics

The NTEP will function as the coordinating agent for this three-year trial. Trials will be conducted under mutually agreed upon guidelines, procedures and funding outlined in a research agreement to be drafted and signed by appropriate representatives of STMA/SAFE and NTEP. Trials will be conducted under the leadership of a university turfgrass research scientist (i.e. research cooperator), who has a faculty appointment. This person will sign a research agreement and will be responsible for establishment of the trial, coordination of the maintenance regime, collection and submission of the data to NTEP.

NTEP will solicit entries for the trial from sponsoring companies. Trials will be conducted with named cultivars and commercially available blends or mixtures. Various cool-season species used on athletic fields, such as perennial ryegrass, tall fescue and Kentucky bluegrass will be allowed. Experimental lines that will be released in the immediate future (i.e. before the end of the testing cycle) may also be included in this trial at the sponsor's discretion.

Trials will be maintained according to agreed upon procedures. Establishment and maintenance procedures will be based on the recommendations set by an advisory committee consisting of representatives from STMA, SAFE, NTEP, universities and the turfgrass seed industry.

NTEP will administer the program and its funding, set the advisory committee and gather their input and recommendations for the trial. NTEP will organize and distribute the seed which will constitute entries for each trial location. NTEP will also provide maintenance and data collection protocols to each site, collect, analyze and disseminate the performance data in annual and final reports, and conduct an annual site visit of each trial site.

Data Collection

The research cooperator will be responsible for data collection. The research cooperator will be responsible for submission of data to NTEP by February 1 of each year. Annual funding will be based on receipt of a complete set of data by the February 1 deadline.

Planting Dates and Funding

This trial be established in late summer or fall 2009. Research cooperators will be paid a total of $15,000 if all requirements of the research agreement are fulfilled.