

# Improving Stress Tolerance In Turfgrasses

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Whether managing a putting green or bowling green, a football field or a racing course, maximizing the survival potential of the turfgrass stand is one of the highest priorities of every sporting turf professional. It has been demonstrated that SAND-AID™ Granular Sea Plant Meal and PanaSea™ Liquified Sea Plant Extract can improve stress tolerance in golf course turf. The question here is whether they offer similar stress tolerance benefits for professionals managing other types of sporting turf.

Three years ago at Michigan State University, Dr. Paul Rieke, a Professor of Soil Science specializing in Turfgrass Soils, began evaluating the long-term effects of various organic soil amendments on the stress tolerance of golf course greens. Michael T. McElroy, a research technician assisting Dr. Rieke in this study, made the following field observations during the summer of 1987, a summer characterized by intense heat stress:

"Overall, the quality of turf in the plots treated with SAND-AID was visibly superior...Quality was determined by the visual rating of color, density, texture and other commonly agreed-upon criteria...The differences between treated and untreated areas were even more striking under stress. The complex of symptoms that characterize stress... were far more visible in the untreated controls during periods of more intense stress."

*"Improving Stress Tolerance" Michigan State University  
Continuing Research Field Observations July 24 and August 24, 1987*

Whereas SAND-AID improves stress tolerance by improving the soil's physical and chemical properties, PanaSea works directly on the turfgrass plant itself. At each stage of growth and development, from seedling through full maturity, PanaSea maximizes turfgrass' survival potential. In the early stages, it not only improves germination but enhances early establishment.

"An increase in germination percentages was obtained using PanaSea...An increase in the total root weight was seen...A dramatic visual response was observed in all seed varieties treated with PanaSea in regards to root formation. Treated seeds showed a distinctly more fibrous root system as compared to untreated seeds."

*"The Influence of PanaSea of Germination and Growth  
of Penncross Creeping Bentgrass, Perennial Ryegrass, and Festuca Rubra"  
Thesis, 1982, David W. Gourlay, Texas A&M University*

Applied as a foliar spray, PanaSea builds bigger, stronger root systems:

"PanaSea at the recommended rate showed 79% better root development than the control."

*"Root Strengthening in Sod Production"  
Virginia Polytechnic Institute, VPI Turfgrass Field Days, September 14-16, 1982*

While it's clear that these materials offer benefits for professional turf managers trying to improve stress tolerance in golf course turf, there are some strong indications that they also benefit other types of sporting turf.

Internationally-recognized sporting turf professionals like Dr. Eric Lee, Tracks Manager of the Royal Hong Kong Jockey Club incorporate SAND-AID in the construction and maintenance of their sand-based racing tracks. Dr. Lee, who was a featured speaker at the GCSAA Conference in 1986, uses SAND-AID in much the same way and for much the same reasons golf course architects and superintendents do. That is, to minimize some of the problems associated with building and maintaining high sand content sporting turf surfaces.

Similarly, PanaSea is used on many major athletic fields in North America; again for some of the same reasons it's used on golf course turf. Nothing is more central to improving stress tolerance and thereby survival potential than maximizing root development. Therefore, PanaSea is finding its way into more and more fertility regimes as a supplement to stimulate root development and delay senescence.

Two of the most unique and valuable constituents in the sea plants we harvest and process are a group of naturally-occurring hormones called cytokinins and a natural carbohydrate-alginic acid. Cytokinins are key ingredients in PanaSea and alginic acid is the major component in SAND-AID, making up more than 26% of the dry weight analysis.

The cytokinin hormones in PanaSea play a vital role in boosting stress tolerance in turfgrass because they stimulate **both** division **and** elongation in the turfgrass root cells. The result: bigger, stronger root systems. There appears to be a synergistic interaction between the hormones and naturally chelated trace elements present in our extract because in university tests, PanaSea outperformed synthetic products with equal amounts of hormones.

"PanaSea at the recommended rate showed from 25-36% better root development than the synthetic product."

*"Root Strengthening in Sod Production"  
Virginia Polytechnic Institute, VPI Turfgrass Field Days, September 14-16, 1982*

The cytokinins in PanaSea can also delay senescence. Premature senescence or rapid aging decline can be "triggered" by prolonged periods of heat stress.

PanaSea can raise the threshold at which stress-induced senescence occurs. Therefore, it's an ideal material in turfgrass stress management programs.

Similarly, because of its unique makeup, SAND-AID is an optimal material for stress management programs. Like PanaSea, it contains an extraordinary range of micronutrients and trace elements. However, SAND-AID's most important ingredient from a stress management point of view is alginic acid. This naturally-occurring carbohydrate emulsifies in sand and can dramatically reduce both nutrient leaching and water losses.

When SAND-AID is applied in conjunction with topdressing, aerifying and verticutting operations, it helps solve many of the problems associated with sand, like localized dry spots. Moreover, SAND-AID is the only natural organic constituent that can safely be incorporated into an all-sand regime with no risk of layering.

"In recent years, as the ancient cultural practice of sand topdressing has made a comeback, so has the use of seaweed materials for supplementing pure sand in topdressing programs...The reason is that sea plants have very little lignin and a relatively narrow C:N ration. Consequently they break down quickly."

*"Organic Amendments to Soils"  
Dr. Michael J. Hurdzan, ASGCA Golf Course Management Magazine December, 1987*

Alginic acid is a poly electrolyte; that is, it carries both positively and negatively charged particles. Thus, when SAND-AID is introduced into heavier soils with higher clay content, it stimulates a natural electrochemical attraction between the negatively-charged clay particles which help them to aggregate together into a more friable crumb structure. The end result over time is improved soil porosity. All in all, it's an ideal additive for topdressing, verticutting and aerifying programs.

SAND-AID is also used extensively as an organic additive for building, rebuilding or renovating golf course tees and greens.