The Role of Silica in the Turfgrass Plant

Silica

These days silica (Si) is one of the most talked about beneficial elements in turfgrass management. Despite the fact that Si is the second most abundant element in the ground (28% of the earth's crust is Si) plant deficiencies are common; with most soil Si existing as a complex with other nutrients, inaccessible to the plant. Much of the recent interest in the benefits of Si to the turf plant has stemmed from research conducted on another member of the Poaceae family (grasses) of huge socioeconomic importance: rice (*Oryza* spp.).

Si has long been known to play many important roles in the physiology of rice, and the application of Si products has been proven to have a vast array of direct and indirect benefits on the physiology of the plant. It is only recently that many of these benefits are being applied to a turfgrass situation, with exciting results.

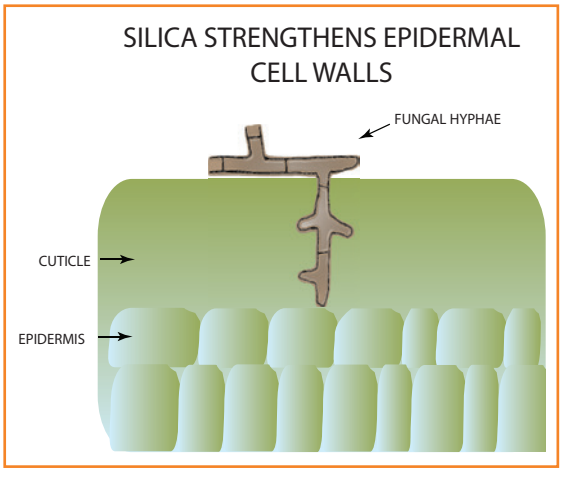
Many of the benefits Si offers the turf plant can be attributed to its role in the strengthening of cellular and intercellular materials. Si is taken up by the plant either from the soil through the root system, or through foliar means from applied fertiliser products. The Si is then carried through the plant via the transpiration stream and is deposited as a gel in plant tissues where cell strengthening occurs. This occurs in various locations throughout the plants physiology, the result of which has benefits of increased strength and tolerance to abiotic and biotic stresses.

One of the most noticeable and direct benefits of cell strengthening is the increased rigidity of the leaf blade. Soon after a foliar application the leaf blades will become erect and stand upright allowing for a much cleaner cut, improved ball roll and overall improvement of the playing surface. As well as these benefits to play, this increased rigidity in the plant also acts to improve wear tolerance considerably, and the erect growth habit allows for more efficient interception of sunlight, resulting in improved photosynthesis.

The strengthening of cellular materials within plant tissues results in many improvements in the plants ability to withstand environmental stresses. Through the summer months in particular applications of Si can offer excellent benefits through improved transpiration efficiency, resulting in better water economy within the plant, meaning increased drought resistance. Applications of Si will also help to alleviate the pressures of detrimental salts resulting from poor quality irrigation water. Through the winter months applications of Si can be just as effective, greatly increasing the plants ability to withstand cold stresses and directly improving tolerance to frost damage.

Studies have been conducted on many crop species highlighting the ability of plants applied with Si to resist infection from fungal pathogens. Most pathogens of turfgrass infect the plant through penetrating epidermal tissue.

The strengthening of cell walls in the epidermis of turf roots, stems and foliage makes it more difficult for pathogens to penetrate the plant, thus increasing disease resistance.



Many of the benefits of Si can be improved through correct use and application. In many of the beneficial actions that Si performs within the plant calcium (Ca) is also required to be present. In its own right, Ca is an important nutrient for cell strength and function, greatly increasing wear tolerance and general stress resistance.

FoliMAX Strength Si, a new turf specific product from Nuturf is the perfect fit for the management of intensively managed sportsturf.

FoliMAX Strength Si is a unique liquid fertiliser containing ideal ratios of silica, calcium and potassium. When applied as a foliar spray, these nutrients are known to work in synergy to strengthen the plant cells, thus hardening the leaf tissue to enhance stress resistance.

FoliMAX Strength Si is the ideal product to apply to the plant prior to the onset of temperature extremes, to strengthen the plant from foliar pathogens or surface traffic, and to enhance surface uniformity for improved ball roll in fine cut turf.