

NEW DEFENSE STRATEGIES AGAINST TURFGRASS DISEASES

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To combat invasions by disease causing organisms, plants possess many different lines of defense. In addition to pre-existing physical and chemical barriers, activated defenses can be “turned on” following infection. Once stimulated through infection, the plant possesses an enhanced level of resistance that is capable of protecting against a wide variety of pathogens. This phenomenon is known as “Systemic Acquired Resistance” (SAR). SAR has been known for decades and has been demonstrated in numerous plant types and it is now reaching the turf world. New products are becoming available that aim to take advantage of the plant's own ability to fight off disease. In contrast to conventional chemical fungicides that directly inhibit the invading fungus, these new compounds stimulate the plant to activate its own defenses.

Early research in this area demonstrated the chemical compound salicylic acid (SA) to be important in activated defenses. SA has been shown to stimulate the production of a group of proteins called pathogenesis-related proteins (PR proteins). These PR-proteins include enzymes such as chitinases that break down the cell wall of the invading fungus. Consequently, chemical compounds have been developed that mimic SA and turn on SAR and PR-proteins.

This defense strategy does have its limitations. First, turfgrass plants are continuously mowed which removes the leaf tissue containing PR-proteins and any other activated defense compounds. Second, the continual loss of leaf tissue would require frequent applications. Third, this strategy most likely would not work for all diseases. Lastly, although it is very likely that turfgrass plants are capable of activating their own defenses through SAR, this phenomenon has yet to be demonstrated in turf. Research is now being conducted to evaluate critical questions concerning SAR in turf and its application in the industry. This is a relatively new area of turf research and is being considered to be part of an integrated pest management (IPM) system. Most likely activated defense alone will not provide adequate protection against diseases. However, their role in pest management may reduce chemical inputs and serve as an IPM alternative as pesticide use becomes increasingly regulated.