

# Avoiding Summer Decline

Much has been written lately about summer decline, but what exactly is it? Summer decline is a stress related syndrome caused by the interaction of external environmental and cultural stresses, internal cellular damage caused by free radicals (oxidative stress) and disease, marked by a deterioration of turf quality when the weather turns hot and dry.

While stress related diseases often occur in grasses experiencing summer decline, pathogens are not the primary cause. As temperatures increase, the turf has to work harder to maintain regular functions and it becomes weakened. This leaves turf in a state where it is less able to fight off pathogens and is more susceptible to infection.

## The disease triangle

For disease to occur, three elements – pathogen, host, and environment – are necessary; any one of these factors on its own cannot initiate disease. Problems begin when all three come together in a specific way, and the environment is a critical component. If the environment is not conducive to what the host needs to survive effectively, the stress this places on the host weakens it, and the pathogen takes advantage of this weakness.

## Types of Stress

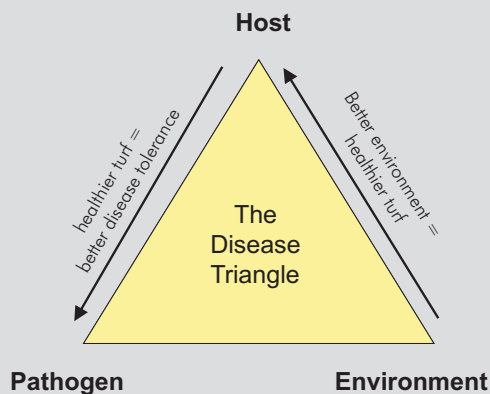
There are a number of cultural and environmental stresses that can contribute to summer decline: high temperature, high relative humidity, low mowing heights, poor air movement, high soluble salts, excessive or insufficient soil moisture, and LDS/soil water repellency. Note that all of these stresses are external to the plant.

When turfgrass is under stress from these external factors, free radicals are produced inside the plant at accelerated rates, causing significant cellular damage. This internal stress

is called oxidative stress, and is a significant component of summer decline. Revolution helps protect your turf from oxidative stress, which is vital in guarding against summer decline. (For further information on this topic, please refer to the Revolution: Proven Plant Health Benefits brochure).

By improving the rootzone environment to diminish internal and external stress conditions, Revolution® strengthens the host and reduces the impact of diseases associated with summer decline. The result is healthier, more resilient turf in the heat of the summer.

## Revolution Influences the Disease Triangle



The lack of proper environmental conditions to support turf health can weaken your turf and leave it more susceptible to pathogens.

By creating a thin, continuous film of water on soil particles, Revolution® enables water and air to be distributed more evenly in the rootzone. This promotes greater initial drought avoidance and stress tolerance, providing healthier turf with better disease tolerance.\*