



An alternative to chemical algae control in lakes is the use of aquatic plants placed in underwater greenhouses called "Nutri-Pods."

Nutri-Pods require routine maintenance for optimum performance. Dave hired a local landscape contracting firm, Contra Costa Landscape, to install and maintain the Nutri-Pods. Maintenance involves checking the pods on a monthly basis, cleaning the fiberglass mesh, adjusting the depth of the pod, and removing or restocking the coontail as necessary to maintain approximately 25 percent plant matter in the pod.

Although the Nutri-Pods have not completely eliminated algae growth, Dave is convinced they have made a positive impact and have significantly improved water quality. Monthly water tests have indicated that the Nutri-Pods have reduced the amount of nitrogen and phosphorus by 15 to 20 percent. This same biological technology is also being used in wastewater treatment plants to remove nutrients before the water is delivered to customers, and it shows promise for other applications. So if algae-infested lakes make you feel like abandoning ship, a new *flotation device* may be your lifesaver.

HOW DRY I AM

by **ROBERT VAVREK, JR.**

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WHY IS IT that more putting green turf is lost each season due to overwatering than by underwatering? A common reason is the absence of a well-designed irrigation system for greens and the surrounds. The pattern of irrigation coverage is especially important when a green possesses significant undulations and contours. Such a green is frequently overwatered to minimize the development of localized dry spots on the elevated portions of slopes and knobs. Heavily shaded greens are also likely to receive excess irrigation because the lack of sunlight and air movement limit the evaporation of water from the putting surface and the root zone. Irrigation cycles often cannot be, or simply are not, adjusted for shaded greens and other site-specific requirements.

Excessive irrigation during the peak heat stress of midsummer can contribute to the decline of turf on greens.



It's only natural that many superintendents err on the heavy side when applying irrigation to greens. After all, a sand-based green or a green on a frequent topdressing program should be able to handle any amount of water, right? Furthermore, the adverse effects of overwatering are slower to develop and are less visible than a localized dry spot or a wilted, drought-stressed portion of a green. Golfers can readily distinguish brown turf from green turf, but are much less interested in or aware of black layer or a weak, shallow root system until these conditions affect the appearance or quality of the playing surface.

An extreme, but very effective way to minimize the potential for overwatering heavily shaded greens was used during the 1994 season by Chris Hague, superintendent at Crooked Stick Golf Club, in Carmel, Indiana. His four most heavily shaded greens are also located in pocketed sites that restrict air movement across the putting surface. It should come as no surprise that dew, rain, or irrigation is slow to evaporate from these sites and that the percentage of *Poa annua* is greater here than on greens in full sun. Most superintendents can relate to the concerns

associated with these *problem* greens that develop during prolonged periods of hot, humid weather. The frequency and severity of disease, black layer, and the decline of *Poa annua* are only a few of the problems that frequently occur in such sites.

When hot, humid weather arrived at Crooked Stick, the full-circle sprinklers around the greens were removed and replaced with part-circle heads designed to irrigate *only* the surrounds. There was no opportunity to overwater greens using automatic irrigation on these holes. Even the temptation to provide a short five-minute cycle at night was gone. The sprinklers were not replaced until early fall. The employee responsible for hand-mowing the greens each morning was also carefully instructed to apply irrigation by hand-held hose only to droughty portions of the greens, usually collars, slopes, and high spots. The same employee checked the green for symptoms of drought stress several times a day during the late morning and mid-afternoon. If needed, portions of the greens were irrigated or syringed to prevent severe wilting. Needless to say, training the crew to apply as little water as possible is a challenging

task, but a task that pays dividends for turf in difficult sites.

The key to success is to apply minimal amounts of irrigation only to droughty portions of the greens. The low areas may not require irrigation for several days during humid weather in shaded sites, even though the midday air temperatures are consistently in the 90s. The need for more irrigation can significantly increase if the weather turns hot/dry instead of hot/humid, and it may be necessary to utilize full-circle irrigation again.

The results last season spoke for themselves. Greens that typically thinned out during midsummer remained dense and firm throughout the peak stress period of July and August. Playing conditions were consistent, with little loss or stress of *Poa annua* observed. Is this *rocket science* or should everyone suspend automatic irrigation on greens during midsummer? Of course not, but the success at Crooked Stick last summer underscores the importance of careful irrigation to minimize stress to greens. Furthermore, the program emphasizes the importance of managing problem sites differently.

The key to a successful hand irrigation program is to apply as little water as possible and apply irrigation only to dry portions of the green.

