

Drawbacks of deep aeration involve more surface damage occurring than shallow depth models. The initial expense also prevents many clubs from purchasing a unit since it is more of a renovation tool than a regularly scheduled maintenance practice. However, these units are generally available for rent or contract use or several clubs may choose to share the cost and use of purchasing a unit. Care must also be used when aerifying golf greens built to those specifications as outlined by the United States Golf Association as not to penetrate the 2 to 4 inch coarse sand layer that is located 12 to 14 inches deep. This would destroy the theory behind these greens maintaining a 'perched' water table for the turf to be grown in.

The newest aeration technique involves using high pressure water injection. Fine streams of high velocity water are injected over the turf surface resulting in little, if any, surface disruption. Play, therefore, is not disrupted from aerification holes unlike traditional machines. These high pressure units will also be beneficial in wetting hydrophobic soils such as localized dry spots. Disadvantages are the initial high cost, a water source must be available at all aerification sites, and effectiveness may be reduced on heavy soils where the high pressure water stream can not adequately penetrate. Thatch control is also minimum and sand cannot be incorporated back into the green's profile since holes produced are not generally large enough. The hole spacing and penetration depth is, however, adjustable through multiple pulses, changing of nozzle spacing, or varying speed. Water-injection cultivation should be used as needed as a supplement to traditional core aeration and not as a replacement.

## Vertical grooming

Two other cultural practices available to help relieve surface compaction and promote better water penetration and aeration are spiking and slicing. A slicer has thin, V-shaped knives bolted at intervals to the perimeter of metal wheels that cut into the soil (Fig. 8). Turf is sliced with narrow slits about 1/4-inch wide 2 to 4 inches deep (Fig. 9). Slicing can be performed much faster than coring and does not interfere with turf use since there is no removal of soil cores, thus no cleanup is necessary after the operation. Slicing is also typically performed on fairways and other large, trafficked areas during mid-summer stress periods when coring may be too injurious or disruptive. Slicing, however, is less ef-

fective than coring and is most effective when used in conjunction with coring. As with coring, slicing is best accomplished on moist soils.

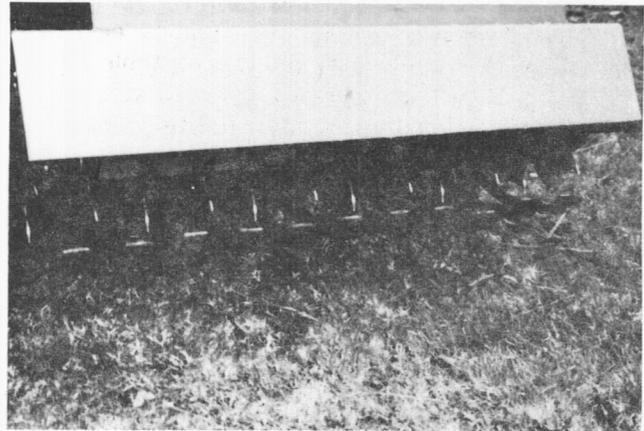


Fig. 8. A slicer with V-shaped blades mounted on a rotating wheel.



Fig. 9. Slicing pattern on golf greens.

A spiker provides an effect similar to a slicer but the penetration is limited to approximately 1 inch and the distance between perforations along the turf's surface is shorter. Because of these reasons, spiking is practiced primarily on greens and tees. Solid tines are associated with a spiker and holes are punched by forcing soil downward and laterally. This results in some compaction at the bottom and along the sides of the holes. A spiker is used for: a) breaking up soil surface crusting; b) breaking up algae layers; and, c) improving water penetration and aeration. Since only minor disruptions of soil surfaces occur, spiking and slicing can be performed more often (e.g. every 7 to 14 days) than core aeration (e.g. every 4 to 8 weeks).