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CORE CULTIVATION STUDIES FOR GREENS

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Turf cultivation is used to improve some physical properties of the soil surface. The conventional method of coring removes cores of soil with tines or spoons to a maximum depth of approximately 3 inches. The diameter of tine or spoon sizes ranges from 1/4 to 1 inch.

The objectives of cultivation are: 1) reduce compaction in the soil surface, 2) improve gas exchange, 3) increase infiltration of rainfall and irrigation water, reducing runoff, 4) break up undesirable surface soil layers, 5) bring soil to the surface to be mixed into the thatch; enhancing thatch decomposition, 6) allow lime and nutrients to penetrate below the surface, and 7) enhance overseeding and renovation of turfs. The overall goal is to help the turf become more vigorous and stress tolerant.

Cultivation practices are best performed at times of minimal stress to reduce the amount of injury sustained by the turf. Periods of active growth are best and will enable the turf to recover quickly from any injury incurred. However, if the turf is dead, cultivation is useful in achieving more rapid establishment.

It is essential to perform cultivation under proper soil moisture conditions. If the soil is too dry, the tine may not penetrate the soil to an adequate depth. If done when the soil is too wet, the tine may plug and the coring process could actually increase compaction and disruption of the soil surface.

Also, when coring, attention should be given to weed seed germination periods which may result in weed encroachment. If a preemergence crabgrass chemical has been applied cultivation should not be practiced. Cultivation can disrupt the chemical barrier in the soil and allow more weed seed germination.

Another consideration is the amount of surface area affected through coring. Table 10 illustrates the percentage of surface affected with varying tine size and spacings. Generally, a small percentage of the surface is affected. Therefore, it may require several passes to make coring effective on a continuing basis over a period of years.

A few golf course superintendents are substituting the hollow coring tines with solid tines, a method sometimes referred to as shattercore aerification. Theoretically, this practice works on the principles of ballistics, shattering or fracturing the area around the coring holes. Proponents of shattercore aerification suggest the benefits from this practice include: 1) eliminating the problem of what to do with the soil cores, 2) more uniform and longer wear of tines, and 3) more efficient labor use. This should result in reduced costs of operation.

One concern of shattercoring is whether this relieves compaction or if compaction is actually increased. Soil moisture affects at the time of coring may be very important. If the solid tines are used under dry soil conditions, some shattering or fracturing of soil could result although this has not yet been documented scientifically. It has been documented that cultivation when the soil is wet results in increased compaction even though the solid tine leaves a temporary opening.

Our current studies have shown that the plots receiving solid tine coring heal over more quickly than with the hollow tines when both are cored with 1/2 inch tines. This is reasonable since no soil is removed with solid coring and the natural tendency will be for the soil to settle back into its original position with time. This is consistent with results from similar kinds of practices used in farming. The amount of cutworm activity and injury was found to be much greater on plots receiving standard hollow tine coring treatments compared to the solid tine coring. Since the soil settles back into place after solid tine coring, there is less room for cutworms to get into the coring holes.

Table 10. Percent of surface area affected as influenced by size and spacing of tines.

Diameter of tine	Area of tine	Spacing of tines, inches			
inch	sq. in.	2 x 2	4 x 4	4 x 6	6 x 8
0.25	.05	1.2%	0.3%	0.2%	0.1%
0.5	.20	5.0	1.3	0.8	0.4
0.75	.44	11.0	2.8	1.8	0.9
1.0	.79	19.6	4.9	3.3	1.6