

Lecture 16

Fertilization

Fertilizer applied according to soil test results during the initial seeding period is sufficient for 6-8 weeks. Follow-up applications of fertilizer are made as part of a regular maintenance program. Grasses normally need nitrogen, phosphorus and potassium in greater amounts than can be supplied naturally from the soil. In most cases, turf grasses require nutrients in the ratio of approximately two parts of nitrogen to one part phosphate and one part potash. Fertilizing the lawn thrice a year is adequate to maintain rich greenness. Application of urea or ammonium sulphate at the rate of 1 kg / 50 square meters during February-March, June-July and October-November is quite beneficial. At times well decomposed compost at 10 kg / 10 sq. m area will be sufficient as top dressing. For cool season turf, if the seeding was done in the fall, fertilizer should not be applied later than November.

Liming

Many turfgrasses grow best in slightly acid soils. Soils become acidic as calcium (Ca), magnesium (Mg) and potassium (K) are removed by plants or move in water below the turfgrass root zone and are replaced by hydrogen (H) or aluminium (Al). Applying certain nitrogen containing fertilizers including ammonium nitrate, ammonium sulphate, diammonium phosphate and urea to turf also contributes to soil acidity. For best results, limestone should be uniformly broadcast over a dry turf surface. Ground agricultural limestone can be very difficult to apply with some fertilizer spreaders. Finely ground particles may 'bridge' rather than flow out the spreader openings. Ground limestone can be applied by hand to small turf areas. Drop, pendulum and spinner type spreaders are used to apply pelletized limestone. Commercial spreader trucks with flotation tires may be available for custom spreading. Immediately after liming, turf may be irrigated with 1.5 cm of water to rinse lime particles from the aerial shoots of turf grasses. Although limestone may be broadcast almost any time of year, fall is preferred. Rainfall, snow and soil heaving in winter help move limestone through thatch and into the soil.

Mowing

Proper mowing technique is an important part of lawn maintenance. Mowing lawns too short, or on an infrequent basis, causes grass to become susceptible to drought injury, weed infestations (especially crabgrass), diseases, and foot traffic injury. Begin to mow the new turf when it reaches a height one-third higher than the normal mowing. Typically, under optimum growing conditions, this is four to six weeks after seeding. Most lawn should be cut at two inches or above and mowed a regular basis as the grass is growing. During subsequent mowing follow the 'one-third' rule. One-third of the vegetation (measure from the soil line to the blade tips) should be removed at each mowing. Removing too much of the leaf blade at each cutting stresses the new lawn. Soil should be dry enough so that ruts are not formed by the wheels of the lawnmower. Mower blades should be sharp, so a clean cut is made. Generally, mowing needs to be done on a weekly basis during the growing season.

Dethatching

Thatch is a tightly intermingled organic layer of dead and living shoots, stems, and roots that accumulate just above the soil surface. Thatch accumulation is due to over-fertilization, overwatering, and/ or soil compaction. Too much thatch interferes with water and air movement, reduces fertilizer and pesticide response, and increases disease and insect activity. Dethatching machines are power rakes with blades that cut through the thatch down to the soil surface. As the blades revolve, dead and live organic material is torn loose and brought to the surface. The organic material removed by the dethatcher must be raked, removed, and used as

mulch or in a compost pile. Annual core aerification, along with improved water and fertilizer management, may require, however, several years to reduce thatch levels to less than 1.25 cm. If the thatch layer is 1.25 cm or thicker, a number of passes in different directions with the dethatcher will be necessary. Reseeding may be necessary after dethatching lawns with 1.25 cm or more of thatch. Thatch thicker than 2.5 cm is most easily removed with a sod cutter. Kentucky bluegrass should be dethatched in the spring (April) or fall (Sept.) when it is actively growing and never in the summer. *Zoysia* grass, on the other hand, should be dethatched in the summer when it is actively growing. Tall fescue and perennial ryegrass rarely develop a thatch problem because of their bunch-type growth habit.

Aerification

Aerification is the mechanical removal of soil cores. Aerification relieves soil compaction, improves water and air movement into the soil, increases rooting, and can greatly improve turfgrass health. Additionally, aerification can also reduce thatch. Aerification is needed in compacted areas such as sport fields, heavily trafficked areas next to sidewalks, and areas with intense foot or pet traffic. Aerification is most beneficial when the largest tines or spoons available are used; penetration is 5 to 8 cm deep, and when 20 to 40 holes are punched per square foot. Aerifiers with reciprocating arms are the most effective, whereas the aerifiers that roll behind garden tractors are less effective because they do not penetrate deep nor enough holes per square foot. Aerification of Kentucky bluegrass, perennial ryegrass, fine fescue, and tall fescue should be done in the fall (Sept.) or spring (April) when the turf is actively growing. *Zoysia* grass should be aerified in early to mid-summer.

Rolling

Rolling is not considered a necessary turf maintenance practice. Turf specialist generally does not recommend heavy rolling of saturated or clay soils in spring because it can cause soil compaction and increase soil moisture stress in summer. However, rollers do have some usefulness in turf. Light rolling is effective immediately following seeding to insure good seed-soil contact. Rolling should never be used to correct surface undulations caused by improper grading.

Irrigation

Newly transplanted sod is irrigated to a depth of 10 cm immediately after transplanting to promote deep root growth. The soil should be irrigated frequently to keep it moist but not saturated until the plants can develop sufficient root system to take advantage of deeper and less frequent watering. The best time to water the lawn would be during the early hours of morning. Watering during this time will allow the water to reach the roots without evaporating. Mid afternoons may lead to water getting evaporated soon and watering at night times can give rise to the possibilities of diseases. While watering, care should be taken to spread the water homogeneously across the lawn without over flooding or missing certain areas/spots. If the lawn is placed on heavy slopes make sure that the water does not run-off. Several applications of water would be necessary for such surfaces to ensure adequate penetration.

Weed management

| Weed species | Associated conditions | Cultural Management |
|---------------------|--------------------------------------------------------------|--------------------------------------------------|
| Annual blue grass | Overwatering and compacted soil | Reduce irrigation; aerate |
| Crabgrass | overwatering or frequent light watering and mowing too short | Water longer and less often; check mowing height |

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| Goosegrass | Overwatering and compacted soil | Reduce irrigation; aerate |
| Bermuda grass | Previous Bermuda grass lawn or infestation; close mowing; sun and heat | Remove plants before they spread; increase mowing height |
| Dallish grass | Overwatering and compacted soil | Remove plants before they spread; reduce irrigation; aerate |
| Common knot weed | Compact soil | Aerate |
| Nutsedge | Overwatering ; poor drainage; sun and heat; nearby infestation | reduce irrigation; remove plants before they spread |

Diseases associated with grasses and their management

| Disease | Grasses | Symptoms | Management Strategies |
|-------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Brown Patch | Bermudagrass, St. Augustinegrass | Circular brown areas up to 20 feet in diameter that develop during cool, wet weather in the spring or fall. Leaves wilt and die, resulting in large brownish-tan areas. Often present in bermudagrass at time of spring greenup. | Provide good drainage and avoid excessive nitrogen fertilization. The lawn usually recovers in warm, dry weather. |
| Dollar Spot | Centipedegrass, Bermudagrass, Zoysiagrass | Straw-colored patches 2 to 6 inches in diameter develop in late summer. Light tan lesions with reddish-brown margins develop across leaves. | Adequate fertilizer will help the grass overcome this disease. Irrigate lawn as needed to avoid drought stress. |
| Leafspot | Bermudagrass | Dark, circular, or oval-shaped lesions develop on blades and stems. Some lesions become red, purple, or tan with dark margins. Lawn appears yellow to brown if the disease is severe and grass becomes thin. | Fertilize properly and avoid close mowing in late spring and summer. Keep mower blades sharp. Water deeply but infrequently and avoid prolonged leaf wetness. |
| Fairy Rings | All grasses | Large arcs or rings consisting of very green grass, dead grass, | Remove organic matter (stumps, waste lumber) from soil before planting. Power rake to remove |

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| | | mushrooms, puffballs, or a combination of these. | thatch when it exceeds 0.5 inch. Remove soil cores, spike or force water into affected areas to allow nutrient and water penetration. Avoid overfertilization in an attempt to mask the green ring. Rototilling and replanting may eliminate fairy rings |
| Slime Mold | All grasses | White, gray, powdery fruiting bodies cover leaves in patches 6 to 12 inches in diameter during warm-wet weather. | Remove by brushing, mowing or washing the turf. Slime molds are not considered harmful. |

Insect-pest management in lawn

Several of insects and mites are found to be associated with lawn, but not all of them cause considerable economic and aesthetic damage. Insects like white grub, sod web worms, chink bug, army worm, cutworms, green bugs and ants cause considerable damage and require immediate measures. Diagnosis of insect damage, correct identification of insect, regular monitoring of insect population and need based application of correct control measures are the key factors in effective management of lawn pests.

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