THE BASICS OF SUCCESSFUL LAWN CARE

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QUESTIONS/DECISIONS

What are the expectations? How perfect a lawn is wanted or needed? Must lawn applications be organic?
How much time will be devoted to proper care and maintenance?
Is it worth the expense of doing the work with/without professional assistance?
If a company is hired, what questions should be asked? What information should the company provide?
Will grass grow on the site? What are possible alternatives to a grass lawn?

THE BASICS

Sun vs. Shade: Most turfgrasses need sunny locations. The fine fescues (especially hard fescue) tolerate light to moderate shade. Tall fescue, a few varieties of perennial rye, and a few varieties of bluegrass will tolerate light shade. No grasses tolerate dense shade.
Water: All grasses can go dormant in dry weather, some for longer periods than others. Supplemental irrigation can keep grass green all season. Is irrigation needed or available?
Soil: Grass can be grown in almost any soil, but a well-drained sandy loam enriched with organic matter is ideal. The depth of the soil should be at least 6-8". A good sandy loam soil contains about 45% minerals (sand, silt, clay), 5% organic matter, 25% air space, and 25% water. Heavy clay soils and very light sandy soils require amending to best support grasses. The ideal pH range (level of acidity) for most grasses is 6.0 and 6.5.

GRASS TYPES

Grass selection is based on expectations of turf use and turf quality, site conditions, and maintenance (time and expense) requirements. The seed must be adapted to the site. ***A poor seed choice leads to a poor lawn*.**

COOL SEASON TURFGRASSES

KENTUCKY BLUEGRASS (*Poa praetensis*)
- Generally luxurious, needs ample water and fertilizer, germinates in 15 to 27 days – about 3 weeks.
- Tremendous variation between cultivars
- Spreads by rhizomes. Recuperates well from damage and fills in bare spots well
- Prefers sunny, well-drained site with pH 6.0 to 7.0. Some varieties exhibit a little shade tolerance
- Generally medium to high maintenance requirement
- There are no endophyte enhanced varieties

PERENNIAL RYEGRASS (*Lolium perenne*)
- Many improved cultivars, some with endophytes for insect and disease resistance
- Tolerate a wide range of conditions
- Good wear tolerance
- Injured by low temperatures, ice, winter desiccation, and drought
- Germinates in 5-7 days – about 1 week.
- Spreads by tillering, fills in slowly, can be clumpy
- Prefers sunny, well-drained site with pH of 6.0 to 7.0
- Maintenance medium to high

FINE FESCUE (*Festuca* spp.) hard, Chewings, and creeping red types
- Tolerant of shade and drought, but not poor drainage
- Not tolerant of heavy fertilizer applications
- Germinates in about 14 days - 2 weeks.
- Prone to damage in high traffic areas
- Hard and chewings spread by tillers, creeping red by rhizomes

Creeping red fescue

- Most compatible of fine fescues with Kentucky bluegrass
- Higher needs for irrigation and fertilizer than other fine fescues

Chewings fescue

- Tolerates closer mowing better than hard fescue
- Survives well under low fertility
- Prefers cool summer

Hard Fescue

- Tolerates heat, drought and low fertility better than creeping and Chewings fescues
- Excellent for low maintenance turf
- Slower to establish than other fescues
- Some hard fescues are endophyte enhanced

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TALL FESCUES (*Festuca* spp.)

- Many improved fine-bladed varieties; older varieties (e.g. K-31) are coarse textured
- Excellent wear tolerance and tolerance to difficult growing conditions after well established
- Drought tolerant because of extensive root system
- Prefers sun but tolerant of some shade
- Susceptible to winter injury
- Germinates in about 14 days
- Some are endophyte enhanced
- Spreads by tillering. Breeding to produce rhizome spreaders is being researched. Clumpy in mixed stands or under poor maintenance
- Dwarf cultivars require less mowing
- Maintenance low to medium

SPECIAL USE GRASSES

- **bentgrass**: Used to be very popular because of its manicured appearance. Still used on golf greens and fairways. Not generally used in lawns because of its exceptionally high maintenance. Requires low mowing.
- **roughstalk bluegrass** (*Poa trivialis*): Is used in shady wet spots only. Not terribly desirable anywhere else.
- **annual ryegrass**: quick growing, short-lived, cheap, establishment grass. Often in "quick grow" and contractor's mixes. Undesirable.
- **alkaligrass**: Adapted for coastal seaboards, salt-tolerant.
- **native grasses**, including little bluestem, blue sheep fescue, side oats grama. For very low maintenance areas, unmowed wildlife cover, meadow. Not for turf.

WARM SEASON

Bermuda, St. Augustine grass, Centipedegrass, Bahia, carpet grass (all grown in the South), zoysia, buffalograss

Zoysia:

- Also grown in the South, but is hardy as far north as NJ
- Green from mid-May to mid-October. Special paint available for artificial green
- Forms a vigorous, invasive turf
- Recommended only for summer homes or confined areas, such as the tree lawn between sidewalk and street
- Mowing height is quite short: ¾ to 1¼ inches
- Fertilize only in May, July, or August when actively growing
- May be fire hazard when dormant

SEED LABELS

The following information must be included on the manufacturer's/producer's label:

- Name and address of labeler
- Kind(s) and variety(s) by name and % by weight of each
- % germination and test date
- Place of origin

- Weed seed % by weight (0.5% highest acceptable for undesirable grasses; 1.0% for weed seed)
- Other crop seed % by weight (includes undesirable forage grasses)
- % by weight inert matter
- Noxious weeds - name and amount (0% the only acceptable amount)
- Lot number and ams number
- Net weight

MAINTENANCE

MOWING

Height

Keeping the mower height at 2½ to 3½ inches will leave more leaf blade surface for photosynthesis and food production. Higher mowing is especially important in summer and in shady areas. Not recommended to remove more than 1/3 of the blade at each mowing.

Close mowing is a stress that reduces tillering and rhizome production and root growth. Root health impacts turf susceptibility to patch diseases, anthracnose, rust, dollar spot, melting out, and leaf spot. Leaving grass too high increases moisture in the turf canopy and is favorable for diseases like pythium blight, brown patch, and typhula blight.

Frequency

The shorter a lawn is maintained, the more often it has to be mowed. Mow often enough (sometimes more than once a week) so that no more than 1/3 of the leaf blade is removed at one time. Scalping, or removal of green leaf tissue down to brown stemmy material, is a serious stress to turf.

Quality of Cut

Keep the mower blade sharp to prevent shredding, tearing, and bruising of leaf tissue. This can impact aesthetics because of the "silvered" appearance of turf with shredded blade ends. It may also impact disease by allowing entrance of disease organisms through the shredded tissue. In May and June when grasses are attempting to go to seed, the "stemminess" that occurs with the seed stalk may also reduce the appearance of the grasses when cut and may lead to a more raggedy cut.

Pattern

It is helpful to vary the cutting pattern, if possible, every few weeks. Constantly walking over the same path each time leads to soil compaction. Varying the pattern also helps lifts grasses that may be lying down.

Clipping Removal

It is a good idea to leave the clippings on the lawn if they are not too long. They do not contribute appreciably to thatch build-up. Clippings are high in nitrogen and decompose quickly to put nitrogen and other nutrients back in the soil. A mulching mower recuts the grass as it circles inside the mower housing, so dropped clippings are finer and decompose more quickly.

Collected clippings can be used as thin mulch in flower or vegetable gardens only if no broadleaf weed killers have been applied. Clippings can also be composted with high carbon materials.

WATERING

Timing

The best time of day to water for reduced evaporation and decreased time the blades are wet is from 5:00 to 7:00AM, but the acceptable range is from midnight to about 9:00AM while grass blades are already wet from dew. Because of increased disease potential, the worst times of day to water are late morning (9:00 AM to noon) and late afternoon to early evening (5:00-7:00PM). Mid afternoon watering can cool the grass crown and reduce summer heat stress, but this syringing is generally only used on golf courses.

Water anytime if the lawn is in water stress or if local restrictions regulate hours.

Guttation fluid is a high nutrient secretion from the grass leaf that contains sugars that can feed pathogens. Early morning watering removes guttation fluid from the leaf surface thus limiting this nutrient availability to disease organisms.

Amount

Lawns need about 1 inch on clay soils and 1½ inch on sandy soils of water per week, rain plus irrigation, to actively grow. Placing coffee cans or rain gauges in several locations, checking the time, and turning on the sprinkler, can measure irrigation amount. When 1 inch has been collected in most of the cans, check the time again. The elapsed time is how long it takes to apply one inch of water.

Overwatering is more of a problem than underwatering. Too much water applied leads to a condition called waterlogging which results in a poorly developed root system and greater probability of diseases like necrotic ring spot, anthracnose, and summer patch.

Lawn grasses will go dormant when insufficient water is applied and should come out of dormancy when rainfall resumes. Generally a single rainfall will not be enough to bring grasses out of dormancy. Grasses may not recover after an extended drought, where drought intolerant grasses are grown, or when proper cultural and/or maintenance practices are not followed. Hard fescue and tall fescue are more tolerant of drought stress than other types.

EDGING

Edging along the sidewalk, driveway, or gardens will maintain an even border, but will open up exposed soil in which weeds will grow. Edge regularly or use an herbicide on the bare soil to prevent weed development.

EQUIPMENT

Mowers: reel, gas-push, gas-self-propelled, electric, riding, mulching
Spreaders: drop-type, cyclone-type, hand held
Edgers: manual blade, electric
Rakes: bamboo, metal tine grass, Cavex dethatching
Rental/For Hire: above equipment plus: aerifiers: hollow-tine/core-type, solid tine/shattercore, spike or pin, slice aerators, water injection systems, dethatchers, verti-groovers, slicer/seeders, lawn vacuums

SOIL TESTS

Necessary to determine soil reaction (pH) and levels of major nutrients (P, K, Mg, and Ca), a soil test should be done at least once when establishing a new lawn or starting care of an established turf, then every 3-5 years. Nitrogen levels are generally not tested. Nitrogen is generally applied in rates varying from 1.0 to 5.0 lb. actual nitrogen per 1000 sq. ft. per year. Individual applications are usually at 0.5 to 1.0 lb. actual nitrogen per 1000 sq. ft. Rates are dependent on grasses grown, clipping removal, irrigation use and natural rainfall.

Inexpensive testing kits are available at many garden centers. The most complete and accurate tests are done at the Rutgers Soil Lab or at private laboratories. The standard $10 fee charged for the Rutgers soil mailer covers tests for phosphorus, potassium, magnesium, calcium, zinc, boron, copper, manganese, iron, and pH. Tests for texture, organic matter, cation exchange capacity (CEC), soluble salts, inorganic nitrogen, and others are additional fees.

LIME

Limestone (calcium carbonate and magnesium carbonate) is essential for most NJ soils to raise pH or make soil less acidic. Dolomitic (high magnesium) or calcitic types are available. Limestone is a source of the nutrients calcium and magnesium. Raises pH (soil acidity) in ½ point increments to the preferred levels of 6.0 to 6.5 (7 is neutral. Below 7 is acidic. Above 7 is alkaline.)

Total needs may be rototilled into the top 6-8" of soil at establishment (best) or surface applied in increments of 50 lbs./1000 sq. ft. every 6 months until the test needs are met. Retest at that time to confirm. Liming may be needed about every 2-3 years on sandy type soils and 4-5 years on loam and clay soils.

There are three grades of limestone for lawn use:

Ground or pulverized - Texture like flour, so is applied with drop spreader only to prevent drift. Takes about 6 months when surface applied to raise the pH ½ point. Reacts more quickly when incorporated prior to seeding or sodding.
Pelletized - Ground limestone compressed into little pellets. Reacts in the soil like ground limestone, but easier to spread. Relatively expensive.
Granular - Texture like dusty sand. Easier to spread; use drop or cyclone spreader. May take up to 2 years when surface applied to raise the pH ½ point. Use other grades, not granular, if soil pH is below 5.7

FERTILIZER

Fertilizers are needed to supply nutrients, especially nitrogen (N), phosphorus (P), and potassium (K). Grasses grown, irrigation, clipping removal, and maintenance determine amount. Phosphorus ($P_20_{5)}$ and potassium (K_20) rates are determined by soil test.

Simply stated, nitrogen gives grass its green color and stimulates blade growth, phosphorus stimulates root development, establishment rate, and energy utilization, and potassium imparts environmental stress tolerance and disease resistance. Most lawn fertilizers are high in nitrogen and contain an analysis such as 10-6-4, 29-3-4, etc. Fall fertilization may have a more even ratio for low maintenance turf (1:1:1 ratio, such as 17-16-18) or N levels of 2 times the K level, (4:1:2 ratio, such as 24-6-12), which improves fall rooting, disease resistance, and winter hardiness.

The numbers on a fertilizer bag refer to the percentage of actual nutrient. For example, 10-6-4 contains 10% actual N, 6% P in the form of phosphoric acid or P_2O_5, and 4% K in the form of potash or K_2O. Sometimes sulfur (S) or iron (Fe) are added and a percentage given. The remainder is an inert carrier such as clay pellets or ground corncobs.

Application rate is based on the N alone. P and K are determined by soil test and crop need. To determine application rate, divide the first number of the fertilizer analysis into 100. This will give the rate of application per 1000 sq. ft. For example, a 20-5-5 is applied at 5-lb./1000 sq. ft. (100÷20=5), 10-6-4 is applied at 10-lb./1000 sq. ft. (100÷10=10), or 33-4-3 is applied at 3-lb/1000 sq. ft. (100÷33=3)

Nitrogen

Nitrogen may be available quickly or release slowly. A fertilizer containing slow-release N (water insoluble or WIN) is generally best for turfgrass. Not only does it make N more slowly available to the roots so there isn't a rapid flush of growth, but also it is less likely to burn grass blades or roots and leach into groundwater. Nitrogen is applied by pounds of actual nitrogen per thousand square feet (lb. actual N/1000 sq. ft.)

Fertilizers are available with organic sources of N, (including *Milorganite* composted sewage sludge, aged cow manure, and brands that use feather meal, and other organic N). Some synthetics like SCU (sulfur coated urea) are not organic, but release slowly. Naturally organic N is almost never over 10%.

Quickly available N (water soluble or WSN) may be desirable for turf establishment or for turf that is in extremely poor condition and needs a fast push in cool, not hot, weather. Ammonium nitrate, ammonium sulfate, and urea are examples.

Timing

Late summer into fall (late August through November) is the most important time for fertilizer applications, because at this time strong roots are developing. Avoid heavy nitrogen applications in spring unless the turf is in extremely poor condition. When N is needed in spring, 2 half-rate applications about 6 weeks apart will assist plant health without stimulating excessive growth. Heavy N applications may stimulate disease development and cause the blades to grow so fast that carbohydrate reserves in the roots are exhausted.

Cool season grasses grow best in spring and fall and less effectively, if at all, in summer. It is not an efficient use of fertilizer to apply it in summer when grasses are already heat stressed and not growing well. Fertilizers should not be applied when the lawn is obviously stressed by heat or drought in any season.

Rules of Thumb – Fertilization (dates approximate)

- For moderate maintenance sunny lawn, clippings removed: Memorial Day, Labor Day, and Veteran's Day
- For moderate maintenance sunny lawn, clippings left: Labor Day and Veteran's Day
- For shady lawn, clippings left: Memorial Day and/or Labor Day
- For high maintenance, sunny lawn, irrigated, clippings removed: Tax Day, Mother's Day, Father's Day, Labor Day, Veteran's Day
- For low maintenance lawn, clippings left: Labor Day or no fertilization

Rates per Year

N: 2-5 lb/1000 sq. ft. /year	$P_2 0_5$: 1 lb/1000 sq. ft./year	$K_2 0$: 2-5 lb/1000 sq. ft./year

WEED CONTROL

WEED TYPES: MONOCOTS (grass-type plants) **VS. DICOTS** (broad-leaved plants)

ANNUAL GRASSES

Ex. crabgrass, goosegrass

These weeds germinate, grow, set seed and die in same year. May be prevented with pre-emergence materials applied before April 23 or when the forsythia is in full bloom. [BALAN (*benefin*), DACTHAL (*DCPA*), *pendimethalin*, BETASAN (*bensulide*), RONSTAR (*oxadiazon*), TEAM (*benefin + trifluralin*) and TUPERSAN (*siduron* - the only one which can be used on new seedings] are available materials. Corn gluten products, such as WOW, can be used where organic materials are desired.

If crabgrass has already germinated, it can be controlled while small with post-emergence chemicals such as the organic methanearsonates DSMA, AMA, CAMA, or MSMA. Products for professional use include DIMENSION (for homeowners, too) (*dithiopyr*) and ACCLAIM *(fenoxaprop-ethyl).*

The best way to keep crabgrass from taking over is to keep the lawn thick and mowed high so there is no light available at the soil surface for the seed to germinate. Then **no** pre- or post emerge herbicide will be needed at all.

PERENNIAL GRASSES

Ex. nimblewill, bentgrass, quackgrass, unimproved varieties of perennial rye or tall fescue.

These plants live for many years, as do desirable turfgrasses, and can't be controlled without injuring or killing the lawn. They may be tolerated as "just another grass." They may be dug up to remove roots and rhizomes if entire areas are infested. May be controlled chemically with ROUNDUP or KLEENUP (*glyphosate*), *cacodylic acid*, or PARAQUAT while actively growing. May also kill using steam solarization of the soil. This involves wetting the ground, covering the area with heavy weight clear plastic sheeting pinned down at the edges, and waiting 2-6 months for all vegetation under the plastic to be killed by the sun.

SEDGES

Ex. yellow nutsedge.

Sedges are grass-like plants that prefer moist sites, but tolerate drought when established. They grow more rapidly in early summer than surrounding grasses, are lighter green, and have an umbrella-like seed head. Pulling nutsedge leaves the nutlets in the ground to grow into new plants. Repeated pulling may weaken plants enough that they die. Chemically controlled with *bentazon* (BASAGRAN), *halosulfuron* (MANAGE), or post-emergence crabgrass controls (*methanearsonates* such as MSMA, CAMA, etc.), *sulfentrazone*, and others.

ANNUAL BROAD-LEAVED PLANTS

Ex. chickweed, lambsquarter, black medic, buckhorn plantain, henbit.

Annuals grow, set seed, and die in the same year. They may be controlled culturally by pulling, by maintaining the proper mowing height, and by establishing a thick healthy turf. These weeds are controlled by some pre-emergence controls such as isoxaben (GALLERY) for winter annuals. They can also be killed using the post-emergence broadleaf chemicals 2,4-D, MCPP (*mecoprop*), MCPA, and/or *dicamba* (BANVEL). Also available are products containing *triclopyr* and/or *dichlorprop*.

Broadleaf weed controls are available alone or in combination, in "weed and feed" products, and in spray or granular materials. They have the capability of severely damaging other landscape and garden plants, especially dogwood and tomato. (Weed killers can't differentiate between what is or isn't called a weed.)

PERENNIAL BROAD-LEAVED PLANTS

Ex. mouseear chickweed, dandelion, mugwort, wild garlic, ground ivy, red sorrel, clover (sometimes not considered a weed), broadleaf plantain, oxalis

Perennials are plants that return year after year from the same root system. They are often more difficult to control than annual weeds, especially the perennials that reproduce by rhizomes rather than by seed spread, so repeat applications of broadleaf weed controls (see Annual Broad-Leaved Plants above) may be necessary. Do not repeat applications of "weed and feed" products. To do so will cause overfertilization. If more than one application of an herbicide is needed, use a liquid spot treatment. Some populations are reduced by pulling, digging to remove as much of the root system as possible, and by good cultural practices.

INSECT CONTROL

SURFACE FEEDERS: CHINCH BUG

These are small nymph and adult insects that suck the juices out of desirable grasses and can be especially bad in dry, hot years. Not found in the shade. Chemical controls are usually applied in early June and late August. May be controlled naturally by a fungus disease (*Beauvaria bassaniana*) in wet years. Big-eyed bug is a predator.

Populations can be monitored by using a large can with both ends cut out, placing it on the margin of good and bad area, and filling it with water. After 10 minutes or so, chinch bugs will float to the top.

IPM Control Strategies: chinch bugs

Biological	naturally occurring fungus disease *Beauvaria bassaniana*
	predator – big eyed bug, ground beetles
Cultural	keep turf irrigated
	plant grass cultivars containing endophytes
	reduce thatch and fertilize properly
Mechanical/Physical	
Chemical biorational	neem, *Beauvaria bassaniana* (Naturalis-T)
Chemical synthetic	acephate, bifenthrin, carbaryl (Sevin), cyfluthrin, deltamethrin, ethoprop, isofenphos, lambda-cyhalothrin, permethrin

SURFACE FEEDERS: SOD WEBWORM

This is larva of the lawn moth, a whitish miller moth with a long snout attracted to porch lights in summer. It flutters out of the lawn when it is mowed. The adult lays eggs in the grass. After hatching larvae build silken nests in the thatch layer or at the crown to hide during the day. They feed on grass stems and blades at night.

May be forced out of hiding by drenching suspect areas with a pyrethrum or soap solution. Using cranberry girdler pheromone in a wing trap set near the ground also monitors populations.

IPM Control Strategies: SOD WEBWORM

Biological	Use perennial rye and fescues containing endophytes
	Parasitic wasps and flies, predators such as ground beetles, rove beetles, ants, birds
	Beneficial nematodes such as *Steinernema glaseri*
Cultural	irrigate during dry periods, maintain proper turf fertility
Mechanical/Physical	birds feeding on the lawn
Chemical – Apply in late afternoon or evening, do not water or mow area for 1-3 days.	synthetics: *carbaryl* (Sevin), *cyfluthrin*, *isofenphos*, *lambda-cyhalothrin*, *trichlorfon*, *spinosad*, *pyrethrin*,
	Biorationals*: for young larvae: Bacillus thuringiensis* (Dipel, Thuricide,) and neem. For older larvae: *Beauvaria bassaniana*, *halofenozide* (Mach 2, GrubEx), *spinosad*, beneficial nematodes such as *Steinernema glaseri*

ROOT FEEDERS: WHITE GRUB COMPLEX*:*

This group includes the larvae of chafer beetles, such as Japanese beetle, June beetle, Oriental beetle, Asiatic garden beetle, and masked and rose chafer. They are root feeders, sometimes destroying grass roots so badly that the lawn can be rolled up like a carpet. Larvae are C-shaped, mostly white with black features, and are differentiated by the rastral pattern of hairs on their lower abdomens.

Japanese beetle adults are attracted to the floral lure and pheromone sex attractant in commercially sold beetle traps. They should not be used on home grounds (unless large numbers of traps are placed on the property) because they attract beetles from some distance away. Most of them will lay eggs in the turf before they are trapped. These traps can be used commercially for monitoring populations.

Birds (especially crows) and skunks feeding on turf indicate high grub populations. The best way to tell is by cutting out a 12" section of grass (in early August when grubs are small), lifting it, and counting grubs. Three to six per square foot is the tolerable limit. Any more will result in serious damage.

IPM Control Strategies: WHITE GRUBS

Biological	*Paenibacillus popillae* (Milky spore disease) - suppresses Japanese beetle grub populations, but no others
	Scoliid wasps, lightning bug larvae, and soldier beetles are predators
	Beneficial nematodes (*Steinernema glaseri, Heterorhabditis bacteriophora*, H *megidis*) give good control of Japanese beetle grubs in warm, moist soil, but are short-lived.
	Beauvaria bassiana (Naturalis-T)- an entomopathogenic fungus
Cultural	Do not grow plants that attract Japanese and other beetles.
	Maintain vigorous turf by proper fertilization and mowing
	Grow deep-rooted grasses such as turf-type tall fescue.
	Do not irrigate turf in July – beetles are attracted to moist soil for egg laying.
Mechanical/Physical	'Spikes of Death' lawn aerator sandals
	Birds, skunks, and moles offer some control, but rip up the turf in their quest
Chemical (Remove excess thatch first. Apply to moist soil. Apply ½" water)	Apply mid-August to mid Sept. or March/April: *trichlorfon* (Dylox), *carbaryl* (Sevin) Apply mid-Apr to mid-Aug (best – June 1 to July 1): *halofenozide* (Mach 2, Grub-ex), *imidacloprid* (Merit)

DISEASE CONTROL

Disease can be caused by bacteria, fungi, and viruses. Fungi cause most diseases in turf. On the home grounds, the effects of most diseases can be diminished by cultural means, such as having a soil test run to determine nutrient needs and pH, watering and fertilizing correctly, removing thatch, maintaining pH between 6.0 and 6.5, mowing at the proper height and frequency, and using disease resistant varieties of grasses. There are fungicides available for disease management, but on residential turf they should be saved as a last resort.

PROBLEM SOLVING

There are other causes of lawn damage. The easiest way to control problems is by knowing about them, and using that knowledge to prevent their occurrence.

THATCH

Thatch is a buildup of dead roots and stems. Grass clippings do not contribute appreciably to thatch build-up. Overfertilizing, growing grasses that tend to produce thatch (such as zoysia, bluegrass and creeping red fescue), and using fungicides will contribute to thatch. A layer up to 1/2" thick between the crown of the plants and the soil is acceptable. Any layer over 1/2 inch should be removed with a dethatching machine or a vertigroover. The ideal time is late August or early September, although other times will work, too. Biological thatch digesters can reduce thatch layers, but testing of products available has yielded spotty results.

SOIL COMPACTION

Compacted soil has had the air and water spaces between soil particles eliminated, so that roots have a hard time growing. Rain on heavy soil over the years, pedestrian traffic, and lack of organic matter all contribute to the

problem. To alleviate the problem, rent a core aerator, which removes 3 inch or longer cores of soil from the compacted area. (Turf professionals also use Verti-Drains and other heavy duty aerifiers that can aerify 8 inches deep or more and fracture hardpans.) Be sure the soil is moist before attempting aeration, because dry compacted soil is about as workable as brick or concrete.

Encouraging earthworms in the soil helps relieve soil compaction. Using organic fertilizers, topdressing with thin layers of sifted compost, reducing pesticide use, and leaving grass clippings on the lawn will also contribute to an increase in earthworm populations. Earthworms aerate soil by coming to the surface to get organic matter, then carrying it back down through their tunnels.

ANIMAL PROBLEMS

The presence of moles tunneling, birds pecking holes, and skunks ripping up the lawn usually indicates an available food source, probably insects such as sod webworms, cutworms, and grubs. These animals can be considered a natural control. If that is not acceptable, chemical controls can be used to control the insects or live traps may catch the animal.

To keep dogs off your lawn, there are repellents available. Sometimes a squirt of water from the garden hose at the offending dog may also prevent its return.

CHEMICAL MISUSE ***Read the label! The label is the law!***

Never misuse any lawn chemical. By law every chemical has all necessary use information on its label. Some mistakes include:

- **Improper chemical**: Each chemical has a purpose and a target. If the wrong chemical is used, phytotoxicity or plant damage may occur. Using the wrong chemical may also be a threat to the environment.
  Ex. Using most pre-emergence crabgrass controls and broadleaf weed killers on newly seeded grass will kill the germinating and/or seedling grass. Their use will also affect how soon grass can be seeded after their application.

- **Improper timing:** Most chemicals have a period of time when they are most likely to be effective. Using a chemical when it will not work, such as an insect control when the damage is seen, but the insect is no longer present or controllable, is an example. Grub damage from spring feeding may show up in June, but that is not an effective time to apply most controls. Applying chemicals when the lawn is in heat or drought stress may cause damage unrelated to the insect or disease.

- **Improperly calibrated equipment**: Make sure spreaders and sprayers work properly. Applying fertilizers or pest controls at the wrong rate because your equipment is poorly calibrated may cause damage.

- **Improper application**: Overlaps, misses, and spills can cause interesting patterns of damage or death of entire lawn areas.

FAULTY OR IMPROPERLY MAINTAINED EQUIPMENT

Dull mower blades, oil leaks, and unevenly set wheel height on the mower are three common examples of poorly maintained or faulty equipment.

WEATHER STRESSES

Extended drought, excess rain, cover by sheet ice, heat stress, sudden high or low temperature fluctuations, and hail can cause damage to lawns.

SURFACE AND SUB-SURFACE DEBRIS

Buried blocks of concrete, stone, bricks, tree stumps and other construction debris are some of the subsurface obstructions that block root growth or create dry pockets in lawns. Piles of firewood left for more than a few days, layers of fallen leaves in autumn, a pool cover left on the lawn in June sun, or a storm window laid in the sun while cleaning windows are all innocent everyday occurrences that can cause damage to lawns.

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Rutgers Cooperative Extension TURF FACT SHEETS: Web address http://www.rce.rutgers.edu/pubs/

FS102 *Your Lawn and Its Care*
FS104 *Steps to an Instant Lawn*
FS108 *Renovating Your Lawn*
FS119 *Common Weeds Around the Home*
FS184 *Chemical Control of Turfgrass Diseases*
FS385 *Broadleaf Weed Control in Cool Season Turfgrasses*
FS389 *Minimizing Waste Disposal: Grass Clippings*
FS426 *Moss in Lawns*
FS544 *Tall Fescue Varieties for NJ Sports Fields*
FS545 *Kentucky Bluegrass Varieties for NJ Sports Fields*
FS546 *Perennial Ryegrass Varieties for NJ Sports Fields*
FS555 *Best Management Practices for Watering Lawns*
FS584 *Seeding Your Lawn*
FS633 *Fertilizing the Home Lawn*
FS635 *Managing Soil pH for Turfgrasses*
FS684 *Turf Seed Selection for Home Lawns*
FS735 Nutrient Sources/ Growing Plants by Organic Method
FS738 *New Jersey Seed Standards for Sod Certification*
FS740 *Thatch Management in Turf*
FS766 *Lawn Fertilizer Spreader Calibration*
FS797 *Soil Testing for Home Lawns and Garden*
FS814 *Managing Diseases of Landscape Turf*
FS829 *How to Protect Water Quality and Have a Beautiful Lawn*
FS839 *How to Calculate Amt of Fertilizer Needed for Your Lawn*
FS 921 *Conserving Water on Home Lawns and Landscapes in NJ*
FS1007 *Sod Webworms*
FS1008 *Hairy Chinch Bug*
FS1009 *White Grubs*
FS1015 *Billbugs*

Some turf INFORMATION SHEETS authored by Barbara J. Bromley

Available on Mercer Co. Master Gardener website (www.mgofmc.org) or at Rutgers Cooperative Extension of Mercer County office, 930 Spruce St., Trenton NJ 08648 (609.989.6830):

- *Common Lawn Care Myths*
- *Fundamentals of Weed Management in Turf*
- *Growing Grass in the Shade*
- *Late Summer and Fall Lawn Care*
- *Lawn Care in Spring/Summer of a Drought Year*
- *Lawn Establishment and Renovation: Summary*
- *Management of Residential and Utility Turf Using IPM Cultural Strategies*
- *Managing Diseases of Landscape Turf Using IPM Strategies*
- *Residential Lawn Care: Expectations and Management Levels*
- *Spring and Summer Lawn Care*
- *Ten Most Common Lawn Care Mistakes*