SOIL INTERFACES

By dictionary definition, an interface is a surface forming a boundary between two bodies or spaces. Applied to horticulture, an interface is a layering of dissimilar soils or soil-like materials that forms a boundary between the plant material and soil beneath it. Since there should be no such boundary, an interface is inherently undesirable.

Interfaces are increasingly common in landscape plantings. Interfacing in turf plantings is more common than in any other type of planting — and potentially more damaging. Some of our most serious turf diseases are closely associated with this condition.

But to properly understand this relationship, you must first understand the characteristics of various soil types.

Soil types

Soils are made up of solids and fluids. The solid portion may be mineral or organic, and determines the soil type — sand, silt, clay, loam, peat or a combination of these.

SANDS contain relatively large soil particles. Individual grains are recognizable to the naked eye. Pore spaces between the particles tend to be large, holding little water in relation to the amount of air. Such soils tend to be well drained, with the greater amount of water moving through the soil rapidly following rains or irrigation.

SILT SOILS contain rather fine particles with capillary-sized pore spaces. They are generally poorly drained, with water moving through the soil slowly. Silts tend to exist in a perpetually puddled state.

CLAYS are made up of complex microscopic particles. Such soils do not drain when compacted or puddled. Pore spaces are less than capillary in size and remain filled by water. Puddled clays are used to line ponds for water retention and, in some places, result in perched water tables in natural soils.

Clays, however, have the ability to form aggregates, or granulars, of many clay particles with large pore spaces between them. Aggregated clays are said to have good tilth or good structure, and are the most productive of agricultural soils. The aggregates are very fragile and easily destroyed by improper tillage or handling.

LOAM SOILS contain proportions of sands, silts and clays so that no single characteristic dominates.

PEAT SOILS are made up of plant parts in various degrees of decomposition. Peats are light in weight and well aerated. The individual particles often retain the cellular structure of the plants from which they came and are able to hold large amounts of capillary water. If peats are allowed to dry out, they wet very slowly; water tends to run off rather than be absorbed. If properly handled, peats provide the best of two worlds between good water retention and good aeration.

Interface problems

Problems occur when soil materials with different porosity and drainage characteristics meet, forming an interface. Moisture and air movement are impeded, as is the development of roots through the interface.

In nature, dissimilar soils do exist in layers without apparent difficulty. Examples are silt loams over gravelly subsoil, and clay loams over clay subsoil. However, an interface does not exist in these instances because the change from one type to another is gradual. When the change in soil type is abrupt, problems occur. We all have encountered shallow peats over clays that waterlog during wet seasons and dry up during drought. This happens because capillary water cannot move up from the clay into the peat.

In turf plantings, interfaces may be inadvertently created because of certain cultural practices. Lawns are often started on what are disturbed sites. The builder has spread a thin layer of topsoil over heavy, compacted clay. The topsoil is also heavy and compacted from spreading and leveling.

Establishing turf areas

Unless overstimulated with fertilizers, a satisfactory turf can be produced under such conditions. A seeded lawn develops when the roots break up the compaction of the topsoil, and weathering eventually breaks up the subsoil, enabling roots to penetrate.

However, mineral-grown sod placed on such a site will grow poorly. Roots and rhizomes will grow along the **surface** of the soil rather than into it.

Peat-grown sod is in an even worse situation because of the great differences between the two media, which creates an interface.

For healthy, vigorous sod to develop under these conditions, a few roots must penetrate the soil surface. If this occurs the sod will develop rapidly, provided adequate moisture is present to prevent drying of the sod. When roots are unable to penetrate the soil, the roots and rhizomes fill the sod layer and the turf quickly becomes thatchy, with an inch or more of thatch accumulating in a season. Virtually the entire turf is growing above the soil surface, rather than in it.

Thatch is a poor medium for growing grass. It has poor moisture and nutrient retention, and no insulating properties. Consequently, grass growing in the thatch is subjected to wide fluctuations in moisture, temperatures and nutrients. Stress results. And grass growing under stress is a ready target for disease.

Causes of disease

Heavy thatch accumulations are quickly invaded and decomposed by organisms seeking nutrients. These organisms, called saprophytes, live on dead organic matter. Some of these organisms are also parasites that attack living plants under the right conditions. Fusarium, Rhizoctonia, and Pythium are such parasites. These nearly universal organisms are beneficial, provided the thatch layer is minimal and the grass is firmly established. When it is not, disease results.

Fusarium blight, Brown Patch, Low-temperature Rhizotonia (yellow patch), and Pythium presently decimate lawns throughout the country. But the disease is not the problem, only the **result** of the problem. Since all three organisms are usually present in thatch, the resultant disease is determined by the conditions prevailing when the disease appears. Fusarium develops under hot, dry conditions; brown patch and Pythium under hot, wet conditions; and yellow patch when it is cool and wet.

While sodded lawns are more apt to develop the thatchy condition conducive to these troublesome diseases, seeded lawns are not immune. Overstimulating the grass so that it grows faster than the natural organisms present can decompose it, or inhibiting those factors, will aid thatch accumulation. Once the grass develops in the thatch, soil rooting diminishes and soil compaction begins. At this point further growth ceases.

Attempts to cure the disease problem without correcting the conditions that caused it are usually disappointing.

While some turfgrass professionals routinely deal with interface problems, only recently have lawn maintenance firms become interested.

Prevention

Primary in control of interfacing problems is prevention. Before installing turf on disturbed sites (seed or sod), the subsoil should be thoroughly tilled to alleviate compaction. Topsoil should be added to a depth up to twelve inches for proper root development. Or, the topsoil should be thoroughly mixed with the subsoil to form a gradual transition from one to the other.

Sod soil should match the site's soil as closely as possible. If dissimilar soils must be installed, the resulting interface must be handled immediately.

Vigorously core-cultivate the sod when it begins to knit, then repeat this while the interface exists. Core cultivation will remove cores of sod and soil and deposit them on the surface.

The mineral portion of the core should be mixed with the sod by dragging it into the turf. This modifies it to closely resemble the soil beneath. Roots of the grass will grow into holes left in the soil.

Every precaution should be taken to preserve the earth worm population, or to re-establish it if the worms have been killed.

To prevent compaction, do not work the lawn when soils are wet. Use high flotation equipment or hand mowers wherever possible.

Elimination of the existing interface is equally important. When thatch accumulation has developed, power raking often results in removal of the lawn. Repeated core cultivation will bring the thatch under control.

Thatch prevention

Thatch accumulation and resulting interfaces can be prevented. Do not stimulate the grass growth beyond the ability of organisms to decompose it. Do not interface with the earthworm population. Avoid using chlordane or arsenicals. Avoid compacting the soil.

If thatch has not accumulated, slicing will prevent compaction, and will fracture interfaces so roots can penetrate.

Many rumors and accusations have surfaced in the last few years as to who is to blame for the "Fusarium problem." It is hoped that the above information will help shed some light on the problem and lead to its resolution. A leading national turfgrass expert has repeatedly said, "You must grow the grass as close to the ground as possible." Golf courses spend a great deal of time and money doing just that. If we want high quality turf on our landscape plantings, shouldn't we be doing the same?

James Fizzell, U. of I. extension service
"Landscape Contractor", May 1983

Hi Fred,

"NOVEMBER BLESSINGS"

November's Leaves of many colors,
Pay Homage to the Year.
Though Their beauty is short lived,
Their Essence demand a cheer.
Ice and Snow will fill their void,
And Winter winds will blow.
Why this Phenomenon occurs,
Seems Nature deems it so.
Let's enjoy Fall's blessings,
As long as they will last,
For Their memory will warm our Heart,
In the midst of Winter's blast.

Superintendently, **Kenneth R. Zanzig**

The Ray Gerber Editorial Award for 1983

David Ward, Superintendent Ravisloe C.C.

His article appeared in the October 1982 issue

"Sand Topdressing: Something Old, Something New, Mostly Borrowed, Never Blue"

Left to right: Marshall Dann from Western Golf Association; Roy Damer, Chicago Tribune; Peter Leuzinger, President MAGCS; Fred Opperman, Editor

The above picture represents the Editorial Review Committee for the "Ray Gerber Editorial Award". A traveling plaque will be given each year and an individual plaque will stay with the winner of this award. The winner is one of our MAGCS Superintendents who writes an article for **The Bull Sheet** and meets the following criteria:

a. Article provides useful technical data or information.
b. The article is clear and easy to comprehend.
c. Illustrations, tables, photographs, charts, etc. help explain or support the text and add to the article's value
d. The article is timely (information is current and is presented at the appropriate time of the season).
e. The article is useful to the Superintendent in the performance of his duties and responsibilities.

'OCTOBER GLORY' HEALS SLOWLY

Scientists at Ohio State University's Shade Tree Evaluation Plot compared wound healing in three cultivars of red maple, **Acer rubrum**. Results indicate that 'October Glory' closes wounds more slowly than 'Red Sunset' and 'Autumn Flame'. Growers and nurserymen report that graft incompatability is also more of a problem with 'October Glory' than with 'Red Sunset'. 'October Glory' is often killed by severe winters, when temperatures drop below -20 degrees F, and has exhibited more wind damage at the Shade Tree Evaluation Plot than any other red maple.

Horizons, June 1983