TurfComms

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PURPOSE: To pass on what we learn willingly and happily to others in the profession so as to improve turf conditions around the country.

SODIC SOILS: Distribution, Properties, Management, and Environmental Consequences, a book edited by Malcolm Sumner and Ravendra Naidu;
and
SALT-AFFECTED TURF- GRASS SITES by Carrow and Duncan.

Two new texts for those of us dealing with salt contaminated irrigation water and soil. Until I moved to Texas some twenty years ago from the upper East Coast I had little education or experience with sodic soils (soils with high amounts of sodium on the exchange complex) or salt-affected soils. Occasionally coastal areas would flood during a hurricane and also pumping of well water for irrigation during summer droughts near the Atlantic Ocean (Long Island or Cape Cod) would result in high sodium soils.

In the 13 semi-arid states I covered when I first got here working for the USGA Green Section I quickly had to learn the differences from high salt problems vs. the even more destructive high sodium problem soils and irrigation waters. Those problems have increased as the building of new golf courses continues to increase in an area where good water is very limited and golf courses are expected to get by with what's left over. **Even here in the Greater Dallas area well water has terribly high sodium levels; while the salt levels in that well water are very low.** I know that last line does not make much sense to my Eastern friends but high sodium combined

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with high bicarbonate make for very nasty water that is relatively low in salts.

Turf research results from College Station, TX should always be viewed as being effected by the high sodium water in use there for irrigation. Therefore, when I saw release of the above books I immediately ordered a copy of each.

In conjunction with this there is an excellent article in Sulphur in Agriculture, V.20, '97 by S. Miyamoto where the changes in salinity for turf areas in the El Paso City Park System measured in 1978 and then again in 1997 are compared. The author shows that as the soil texture becomes finer (more clay) the salinity increases the most over this 19 year period. Salinity measured in dS m^{-1} units goes from a range of 1 - 3 in '78 to 2 - 34 in '97. A 100% salinity increase in sandy soils doesn't look too bad when you see a 400 to 1000% increase in silty clay soils.

Which leads me to believe some golf courses using salty water and having high clay soils are going to be in sorry shape about 20 years down the road. Not the turf on their greens but fairway turf will have to go to seashore paspalum or alkaligrass. In fact I have already recommended this to two clients and can see the need developing on a third course with high clay soils.

Now back to the texts. First, anyone dealing with problems similar to what I have described above needs to purchase a copy of Drs. Carrow and Duncan's book. Then you must read it at least once or more depending on how proficient you were in this area at the start. The text is not easy reading but, much easier than **SODIC SOILS: Distribution, Properties, Management, and Environmental Consequences,** edited by Sumner and Naidu. The Carrow and Duncan's book is exclusively turf oriented; while the latter is crop and soil oriented. There are few books on this subject matter. Carrow and Duncan's book is the first with a solely turfgrass orientation. It appears to be well written from my vantage point.

The Sodic Soils I dropped half way through to read C & D's. The audience for Sodic Soils is the well trained and educated agronomists wanting a further understanding of sodic soils. It has a world wide approach and for those that have looked at the 1954 pamphlet Diagnosis and Improvement of Saline and Alkali Soils by USSL Staff as the guide text on the subject the authors gently suggest that this be thrown out the window when it comes to describing sodic soils. As they write, "Because Na-affected soils are likely to exhibit their worst behavior physically under rainfed conditions (very low EC), there can be little justification for the retention of the ESP >15 criterion established at an elevated EC and supported by little confirmatory data as a universal threshold for sodic behavior." I found frequent use of abbreviations one drawback of this text. EC is electrical conductivity, ESP is Exchangeable Sodium Percentage.

My experience with sodic soils makes me very willing to accept the authors' above suggestion. Sodium in the soil can affect the behavior of the soil at levels far below an ESP of 15. Their explanations make sense whereas a criteria of ESP >15 did not explain what I was seeing in the field. I need to go back and read this text again.

I did note with interest the authors' assertion that magnesium under some conditions can also have a deleterious effect on soil structure and permeability. I also don't ever remember hearing of the phenomenon of piping or tunneling in soils. Apparently this is more common in Australia and India than the U.S. But, under sodic conditions some clays tend to disperse and then at saturated water flow in the soil profile they move with the flow and a pipe or tunnel in the soil develops.

This under normal conditions results in erosion as eventually a collapse of the tunnel occurs and a crevasse develops. If it occurs in a large soil dam a catastrophe occurs.

With the world's exponential increase in population and the resulting need to feed more and more people the use of salty irrigation water and soils grows. Thus as the authors write, "It follows that the need for understanding how to properly manage sodic and saline-sodic soils will increase in order to maintain and improve crop productivity in many areas of the world."

SOIL STEALING: I have talked to many superintendents over the years that have experienced the disappearance of ornamental plants from time to time. These include small annuals to potential Christmas trees. In fact one superintendent had such a large seasonal disappearance of small conifers that he treated all his small conifers so that they would give off a terrible stink when brought into a warm house. This cut down his losses considerably the next year.

Well be prepared for a new depletion of your supplies. Civilian contractors have been stealing topsoil from Israeli occupied Lebanon admits the Israeli government as reported in World Press Review, Feb. '99, pg. 19. So don't be surprised someday when part of your topsoil or compost pile disappears overnight.

HYDRAULIC OIL SPILLS: According to research done at Penn State U. and reported in first in Pennsylvania turfgrass Council's "Keynoter" magazine and then in "Turfgrass Management in the Pacific Northwest" V.1, I.4, Peat Sorb is considerably better for reducing damage from hydraulic spills (leaks) then calcined clay or doing nothing. In looking at the data it appears clear cut that if you expect to deal with hydraulic leak damage you should have a hundred pounds or so of Peat Sorb on hand to treat the damaged areas.

TIFEAGLE BERMUDAGRASS: There is an article in the Fall 1998 issue of "Texas Turfgrass" by Dr. Wayne Hanna, the geneticist and unofficial promoter of this new cultivar. Although the article does supply some useful information basically the comparisons made and data presented is with Tifdwarf and Tifgreen. The new dwarf cultivars all provide better putting surfaces in the short run than those two old standards. The big question is which of the new dwarfs is the best choice for your putting greens? This article is of no help in answering that question but it is nice to see some competition in the Texas area to Champion which has a two year jump on Tifeagle in this area.

MOSSES: Putting greens in the north are having a increasing problem with this primitive class of plants. Dr. Fred Yelverton in TURFAX, V.6, No.1 points out several interesting facts and observations about mosses. First, these primitive plants lack a functioning root system. They do have rhizoids that anchor the plant but apparently these absorb very little water. Mosses are usually found in areas having relatively high humid, and acid soil. He feels that the loss of mercury based fungicides along with lower mowing heights is allowing the mosses to invade putting greens. Mosses are quite sensitive to heavy metals, including mercury he writes. As there are very few moss specialist in the world getting the moss identified and learning its ecology are going to be difficult first steps to obtaining control.

PESTS FROM OTHER WORLDS: In Turfax V.6, No.1, Dr. Beard tells of wild pigs being a serious problem to turf on golf courses in Europe. Apparently they root up fairways worse than armadillos and skunks combined. In that same issue Don Tolson, now supt. in CO but formerly

of MT, tells of dealing with the European invader to the US, spotted knapweed. Shortly after reading that I picked up *World Watch* magazine. It had a long article on the subject of invading pests from viruses to plants and animals. It includes documentation of the damage they do not just in the U.S. but, the damage our natives do when they get to foreign countries. If you are interested in this subject Worldwatch Institute has just published a book, *Life Out of Bounds: Bioinvasion in a Borderless World*. It was published by W.W. Norton & Co. in Oct. '98.

THE ONE-STRAW REVOLUTION, by Masanobu Fukuoka: Seeing that this book has been out in an English translation since 1978 I imagine a few of you have already read it. The book is about organic farming Japanese style but goes beyond the ordinary organic book. One of the things of interest to me is that the American (English translation) publisher is Rodale Press. Although the Rodale people are among the early modern day leaders in organic farming they tend to emphasis making compost to such an extent that I would think they would have reservations about publishing a text that has a section labeled "No Need to Prepare Compost", and one of the writer's four principles is that no **prepared** compost is needed.

For those of you that are private gardeners you definite need to read this small book. His four principles are: 1) no cultivation, 2) no chemical fertilizer or prepared compost, 3) no weeding by tillage or herbicides, and 4) no dependence on chemicals. All these are well explained with theory and examples. Fukuoka is trained as a pathologist, but he knows his agronomy.

I know those of you growing a fine turf monoculture are far removed from organic or 'natural' farming, but many of you are trying to naturalized some areas and may have a vegetable garden in the back yard. This book (181 small pages) will perhaps point out why you never are going to "organic" style management over most of the golf course while helping you understand what will work in the back yard garden if the spouse lets you get away with being **messy**.

A case in point: he firmly emphasizes in rice farming the need to scatter the resulting straw back on to the land. In this discussion he notes that **scattered** is critical. It won't work properly if laid neatly on the surface and he tells you why. **Messy works - neat fails!** Go ahead tell that to your members; I'll bet even the spouse won't let you get away with it in the backyard vegetable garden.

Part four of this five part book is on natural foods and nutrition; while the fifth part is on philosophy. I did not find these last two sections so interesting. For the agronomics you need only read the first 123 pages. Read the rest for the soul.

THE MEANING OF IT ALL - Thoughts of a Citizen-Scientist: This is the book published early in 1998 of the 3 lectures given by Richard P. Feynman as the John Danz Lecturer at the Univ. of Washington in 1963. This small text is a non-physics text by one of the world's former great physicist. **In this text relevant to today's world he points out why we shouldn't expect successful politicians to be truthful**. He discusses in detail the conflict between science and religion with a little of its history. Why good scientist always live with doubt and uncertainty because that is how successful scientists constantly examine the world about them. I enjoyed the first two lectures more than the third where he rambles. Another small text worth reading.

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