

EUROPEAN TRENDS

Fifteen lectures were presented by J. Beard in thirteen countries across Europe in January. Attendance and participation via interactive questions were excellent. In Austria, the very first turfgrass educational program was held. There are now 101 golf courses in Austria with 85 individuals in attendance at the seminar. The following comments are based on observations made during the lecture tour.

Gnawed Turf. A unique turfgrass injury problem was seen on a golf course near Toulouse, France. A putting green located adjacent to a pond was damaged by large, irregular shaped areas scattered across approximately 20% of the turf. **Close, consecutive rows of elongated, closely defoliated turfgrass shoots were revealed.** Further examination revealed a **gnawed-like appearance**, much like that of rats gnawing on wood. The damage was attributed to what they call a water rat in France, which had been introduced from the United States. It most probably is what is known in the United States as the muskrat (*Ondatra zibethica*), an aquatic rodent.

It Won't Happen Here! Water restrictions on turfgrass areas continue to increase worldwide. There are now water restrictions in place for golf courses and certain other turf areas in such countries as Denmark, Luxembourg, and parts of the United Kingdom. As I have stated in many lectures over the years, **water will be the key limiting factor in the culture of turfgrasses during the 21st century.**

Moss Problems. Questions concerning moss and algae problems are common in most countries. This is a reflection of the trend to closer mowing heights in order to meet the demand of golfers for faster putting speeds on

greens. As a result, many of the older turfgrass cultivars become thinned, resulting in sunlight reaching the soil surface. This provides conditions favoring the invasion of moss and algae.

A striking example of this was on a golf course in The Netherlands. There was no history of moss problems on the golf course. **For the entire 1999 growing season, it was decided to not fertilize the back championship tees.** By the end of the season and at the time of the visit **there was approximately 30% moss invasion only on the back championship tees.** It can be concluded that the lack of fertilization resulted in thinning of the turf to the extent that light reached the soil surface, thereby facilitating moss growth.

Disease Trends. The appearance of what are termed "new" diseases is occurring in certain countries in Europe. This is most probably a result of newer developments in the recognition and knowledge of the causal pathogens. In other words, these diseases have probably always been present to varying degrees, but were not properly diagnosed. For example, southern blight (*Sclerotium rolfsii*) has become a problem on putting greens in southern France. In the United Kingdom there is increased concern for such diseases as yellow patch (binucleate *Rhizoctonia* AG-D(I) and summer patch (*Magnaporthe poae*). Pythium blight (*Pythium* spp.) has become a threat in northern Italy. One of the more notable recent developments in the United States has been an accelerated problem with gray leaf spot (*Pyricularia grisea*) on closely mowed perennial ryegrass (*Lolium perenne*) turfs in warm-humid climates. 

RESEARCH SUMMARY

The Influence of Humic Substances on Rooting and Nutrient Uptake

The potential for humic substances, including humate and humic acids, to influence root growth and nutrient uptake of creeping bentgrass (*Agrostis stolonifera*) was assessed in a sand root zone and in solution culture, both under greenhouse conditions. Humic substances are defined as a category of naturally occurring, biogenetic, heterogeneous, organic substances that can generally be characterized as being yellow to black in color, of high molecular weight, and refractory. The results revealed that **humate incorporated to a depth of 4 inches (10 cm) stimulated a 45% increase in root mass in the upper 4 inches (10 cm) and a 30% increase in root mass at the 4 to 8 inch (10–20 cm) depth, plus an increase in maximum root length of 15%.** In con-

trast, **foliar applied liquid humic acid did not exhibit significant affects on rooting.** The uptake of such nutrients as nitrogen, potassium, calcium, magnesium, and iron was not affected by humic substance applications. **By R.G. Cooper, C. Liu, and D.S. Fisher. 1998. *Crop Science*. 38:1639–1644.**

Comments. These findings now need to be confirmed by research under normal field turfgrass growing conditions involving a living, biologically active soil condition. The question that needs to be determined is whether the response to humate incorporation into a 100% sand would give a similar response under field conditions that include organic matter in the root zone. 