cations made early in the season. Conversely, the more slowly-growing, late-season-fertilized turfgrass plants may possess a larger carbohydrate pool during the spring period. As will be discussed later, the process of spring root production can benefit from this greater concentration of carbohydrates.

Another possible advantage resulting from late-season fertilization is that the levels of stored carbohydrates are higher than those found in spring-fertilized turf as summer approaches. The higher levels of carbohydrates are desirable at this time of year since greater stress tolerance and/or increased ability to recover from pest-, traffic-, or stress-induced damage may be realized.

Effects on Root Growth

For years, researchers have claimed that fall and winter root growth of cool-season turfgrass species should be stimulated by late-season and/or winter nitrogen applications. It had been hypothesized that this would occur as fall temperatures declined to the point where root growth is favored over shoot growth. Researchers have shown that root growth of cool-season turfgrass species does indeed occur during the fall after shoot growth has slowed or ceased. This situation develops because roots grow qyite well when soil temperatures are between 40 and 65°F (4-18°C), while shoot growth is favored when temperatures exceed 55°F (13°C). In fact, some root growth will occur as long as the soil remains unfrozen.

DROUGHT STRESSED TURF IN SOUTHERN ONTARIO

Turf and plants in general are normally stressed during the hot, dry months of July and August, however, as we write this report, Ontario lawns, athletic turf and golf courses have suffered unprecedented high temperatures with minimal rainfall since May 22nd. Recent rainfall has alleviated the situation but we are not out of the woods yet since hot, droughty periods can still occur.

Turf managers should rationalize their approach to providing fields for fall activities, those with irrigation systems will be able to cope. What do those with severe water restrictions such as the Waterloo region, or no irrigation, do?

Fortunately most grass species in lawns are capable of withstanding drought by going dormant until adequate rainfall, shorter days and cool nights arrive. This capability for many turf managers can be a plus, in that annual bluegrass common in turf cannot survive such severe drought conditions and will not easily compete with other grasses at this time.

The general approach would be to boost growth in time with ideal growth conditions, i.e. apply a slow release fertilizer of a 3-1-3 or 4-1-4 ratio at .75 kg (1.5 lb) per 100m^2 (1000 ft.^{2}) in mid-August to early September.

There has been speculation that many fields will have to be resodded; we feel that this is not necessarily so, waiting until regrowth appears would be the wiser policy at the moment. No doubt sod will thin out in areas oriented towards the hot afternoon sun (west), on steep slopes and berms and on gravels or thin topsoils.

Observation indicates that turf under shade trees did not suffer as much as that in open stands which means that heat stress was more of a problem than soil moisture deficiency. For instance, Creeping Red Fescue, normally considered a drought-tolerant grass suffered considerably from heat stress. Another side effect will be the proliferation of crab grass due to thinning out of turf swards.

To produce acceptable playing surfaces, turf managers should consider a low cost program of overseeding, a technique which has been used on the University of Guelph athletic fields since 1981. The program involves slit seeding mixtures of the turf type perennial ryes and/or with Kentucky Bluegrasses during the last two weeks of August.

Seeding should be done in two different directions for adequate coverage; one can also aerate or verticut and apply seed with a spinner type spreader.

Depending upon the type of overseeding mixtures used, rates of seeding will vary from 2.5 kg (5.0 lb.) to 3.5 kg (8.0 lb.) per 100 m^2 (1000 ft.^{2}). Ryegrasses should be applied at the higher rates and those mixtures containing Kentucky Bluegrass at the lower.

These timely techniques plus a winterizer application of nigrogen at .5 kg (1.0 lb) actual N per 100 m^2 (1000 ft.^{2}) in late fall should carry our athletic turf in fine shape through the coming winter.

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