

# Extreme winters at Losby Golf Club



**Agronomist Charles Henderson has worked on Losby Golf Club's course advisory board since 2011 along with Agnar Kvalbein from the Scandinavian Turfgrass and Environmental Research Foundation (STERF). Charles explains how BIGGA member Alex Cawley tackles extreme winters in Oslo**





**Losby Golf Club is one of Oslo's top courses, having hosted many professional events. Designed by the Swedish architect Petter Nordwall the complex consists of an 18 hole championship course and a nine hole course set within a National Park.**

Course Manager Alex Cawley has managed the facility since March 2011. During this period Alex has faced many challenges posed by the Nordic climate. As Agnar Kvalbein from the Scandinavian Turfgrass and Environmental Research Foundation (STERF) said: "The Oslo area represents an extremely difficult and unpredictable winter climate. Alternating snowfall and rain, frost and mild days often creates ice on the greens. Around 70% of courses in the region face remedial works on greens in spring as a result of winter kill."

Losby is set within a low lying valley and is famous for 1.8ha of greens on its championship course. These characteristics amplify extreme winter challenges faced by the team each year.

### Oslo Climate And Growth Potential

Norway represents one of the shortest growing seasons in Europe. Potential for turf growth and development is short with the golfing season mostly lasting from mid May/June to mid October/November. Temperatures are comparatively low and present difficult winter management and complex spring recovery issues.

### Understanding Winter Kill

Winter kill is a generic term used within the industry and covers various forms of turf kill.

**Low temperature kill** – The result of rapid drops in temperature down to 0°C (32F) and colder resulting in ice crystal formation.

**Desiccation** – The dying of leaves and plants through drying whilst in a dormant state. This is most commonly experienced on open and exposed sites and usually affects certain greens more than others depending on where they are situated.

**Crown hydration** – Caused by daily swings in temperatures. Snow melt causes the accumulation of water in low lying areas of greens, which in turn refreezes during low night temperatures.

In this process plants uptake water into the crown and upon freezing the water turns to ice, expands and ruptures plant cells resulting in serious injury or death.

This can occur in very sporadic patterns.

**Snow mold disease** – Both Pink and Grey snow molds are relevant to winters in Norway. Pink snow mold (fusarium patch) is a condition experienced through most of northern Europe. Of equal concern is the development of Grey snow mold. Grey snow mold requires more specific temperature requirements of between 0-2.2°C (32-36F) to develop and prolonged snow cover experienced in Oslo can provide this.

**Ice encasement** – Agnar explained: "The most lethal winter stress in Oslo is ice encasement that causes suffocation. Lack of oxygen forces the grass cells and the soil microbes to change from normal cell respiration to fermentation of sugar reserves. This is a very inefficient metabolic process, and the plant may run out of energy, but more often the grass is killed by the high concentration of toxic metabolites (several organic acids and hydrogen sulfide) that is trapped under the ice. These chemicals may also inhibit germination of grass seed. Re-establishing partly dead greens can therefore be very challenging. When to break the ice on greens is one of the most difficult decisions Norwegian greenkeepers make."

### Preparing For Winter

As with most clubs throughout northern Europe, Losby's winter preparation starts with the prevention of fusarium patch. Disease occurrence early in the autumn/winter leaves limited chance to recover from disease. Already infected patches act as continuous hosts to recurring fusarium infections under snow with the right conditions.

Losby has retained high levels of Creeping Bentgrass varieties within greens. Poa annua is present but at very low levels. With decreasing fungicide availability, keeping poa annua alive into and through winter is becoming increasingly difficult.

At Losby, continual levels of growth are sustained for as long as feasible through September and early October. Both nitrogen deficiencies and excesses are avoided, light applications of 3-5 N units/ha applied as required. Ammonium Sulphate based fertiliser is used at this point in the year. Frequent use of Iron sources is sustained and potassium is at a 2:1 ratio with nitrogen although this necessity is under review.

Meltwater, crown hydration and ice encasement is the biggest and

### about the author



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most obvious cause of winter kill in greens. To understand the challenges faced by Losby, soil profiles freeze down to a depth of 500mm to 2000mm depending on temperatures.

Cutting off meltwater at source is the first stage of preparations. Small fences are erected in known problem areas to divert meltwater away from greens. Channels 40mm wide and 70mm deep are cut around immediate green perimeters where water moves onto greens. These channels are directed to non-playing areas.

Solid tining or hollow tining prior to winter is a technique used by some courses in the region. The opening of the immediate surface can provide channels through which meltwater can drain vertically down the greens profile.

In this sense such work is advantageous. But, such work can also cause complications with heaving of the soil profile and excessive surface softening during spring.

### Once Under Snow

Snow is allowed to accumulate on the greens surfaces - common practice in most of Norway. Ideally the surface will be frozen before the snow falls, this reduces the potential for disease occurrence.

This doesn't always occur, in which case gradual freezing through light snow covering is the next best scenario. With a good covering (30cm or more) the turf surface is insulated from extremely cold temperatures normally around -1°C to -4°C.

Alex said: "Removal of snow over the immediate green surrounds is carried out through winter. This provides low lying ground onto which snow can be removed from greens and surrounds in spring.

"This is limited to a couple of applications to avoid compaction of snow and increased ice encasement."

### Spring Snow And Ice Clearing

Spring is an intense period for all courses in Norway. Determining the exact condition in which the greens will come out of winter is heavily affected by decisions made in spring.

Timing of snow clearing is a very difficult decision. Avoiding excess snow cover over 120 days is desirable to avoid favourable anoxic soil conditions meaning there is pressure to remove early. In contrast, removing during high day-night temperature swings (varying from +5 to -15°C) creates risks of crown hydration. Once snow removal



ABOVE: Course Manager, Alex Cawley

commences the speed at which the operation is completed is critical.

Alex commented: "Snow clearing is carried out with initial use of a snow plough and 70hp tractor complete with spiked tires and snow chains. This is then followed by a snow blower driven by a 50hp tractor."

Once temperatures rise above freezing in spring snow starts to melt. Commonly, meltwater seeps through snow cover forming additional ice layers over the turf surface. This creates additional work to remove it with the potential for 10cm thick ice layers and further increased risks of crown hydration.

He added: "Ice clearing is achieved through application of black sand, charcoal prills and/or organic fertilisers, this speeds up the melting of the upper ice profile. Mechanical removal is only implemented as required."

### Determining The Spring Recovery Programme

The exact condition of greens is unknown for sometime during spring. Determining the exact extent to which grass will recover takes time. Plants suffering crown hydration in spring will not always show obvious symptoms and they can appear as if recovery will take place.

### 2013 Spring Recovery Programme

Last year Losby hosted the Norwegian National Junior Championships in July and a Challenge Tour event in August, presenting the club with additional pressure to deliver first-class greens surfaces. 2013 presented moderate levels of winter kill and poorer than usual spring germination and recovery of existing plants.

Once it was apparent some areas of greens turf were not going to recover, overseeding becomes an essential first stage of recovery. Deciding when to overseed is challenging. Too early and temperatures will not support germination resulting in seed rot and low germination rates.

Losby use a verti-cutting and drop seeding programme in spring to achieve a uniform spread of new creeping bentgrass plants within sward. Use of germination sheets is essential at this point for both new seed and recovery of existing plants.

### Recovery of existing plants

Growth potential remains very low normally until June. However growth can be forced through late

April and May. As important as the establishment of new plants is the recovery of existing plants within the green.

Textbook feeding programs in these circumstances are of little regard. Promotion of growth is a priority to regain density. Between 100-150 units of actual N/ha is applied between the months of March and June, some 50-75 % of the annual nitrogen budget.

### Contingency Turfing

Each year Losby makes contingency orders for turf imported from Sweden and/or Austria. In 2013, 3500m<sup>2</sup> of turf was laid on the worst affected greens. Turfing of greens in Norway is less than ideal but commercial pressures dictate its necessity in some circumstances. From laying to play Losby has achieved suitably smooth surfaces in both 2012 and 2013 in around five to six weeks.

Sports Agronomy Services (SAS) and Agnar Kvalbein of Bioforsk worked closely with Losby through early 2013 along with support from the European Tour. They implemented a combination of seeding, turfing works, plugging, protective mowing heights and early season feeding programmes.

Through these patient regimes, which were fully supported by the club, Losby enjoyed positive recovery for the season and the crucial Challenge Tour event.

Following the event The European Tour commented: "Alex and his greenkeeping staff put in a monumental effort. They presented a championship course in a condition which drew huge praise from the players and the tournament staff, including the Challenge Tour's Tournament Director Kevin Feeney."

### In Summary

Losby (and Oslo in general) presents extreme winter conditions every year. The prediction of recovery and predicting the success of spring seeding is extremely difficult. In contrast, the demand to produce playing surfaces of quality regardless of weather remains constant – something the vast majority of greenkeepers will be able to identify with!

There is still much to learn about winter kill and STERF continue to invest in this. Effective spring recovery strategies are continually under review in the region. SAS continue to work with Losby on this and other agronomic matters, which it feels many clubs in Europe can gain value from.

