



Good turn-out to study winter survival of greens at NIBIO Apelsvoll, Norway

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Photo 1. ICE-BREAKER trial at NIBIO Apelsvoll on March 7th. Treatment 2 (snow and ice removal throughout winter) in the foreground. Photo: Jørgen Hornslien.

After two year with many cancelled meetings due to Covid 19, about 60 Norwegian superintendents, golf club managers and other industry people met at NIBIO Apelsvoll on May 19th to look at trials and hear the latest news from the projects ICE-BREAKER and SCAN-GREEN.

The project ICE-BREAKER, funded by the Norwegian and Swedish Golf Federations, Scandinavian Turfgrass and Environment Research Founda-

tion (STERF), the Research Council of Norway and four Norwegian Golf Clubs, was presented at the WINTER TURF blog in early April (<https://winterturf.umn.edu/>). In that article we mentioned our preliminary observations from 2021-22, i.e. that the unstable winter with little snow cover appeared to be taking its toll on many annual bluegrass greens Norway, Sweden and Finland this winter.

The major focus of the field day was ICE BREAKER Subproject 2: Field

trials with various winter treatments on plots covered with annual bluegrass, creeping bentgrass or red fescue (blend of Chewings and slender creeping) on a push-up green at NIBIO Apelsvoll (61°N, 250 m a.s.l.). Photos 1-3 show the main outcome of this trial:

- A (man-made) 10 cm ice cover from Dec. 2nd until natural ice melt around April 10th (about 130 days; treatment 1) resulted in total winter-kill of all three species.

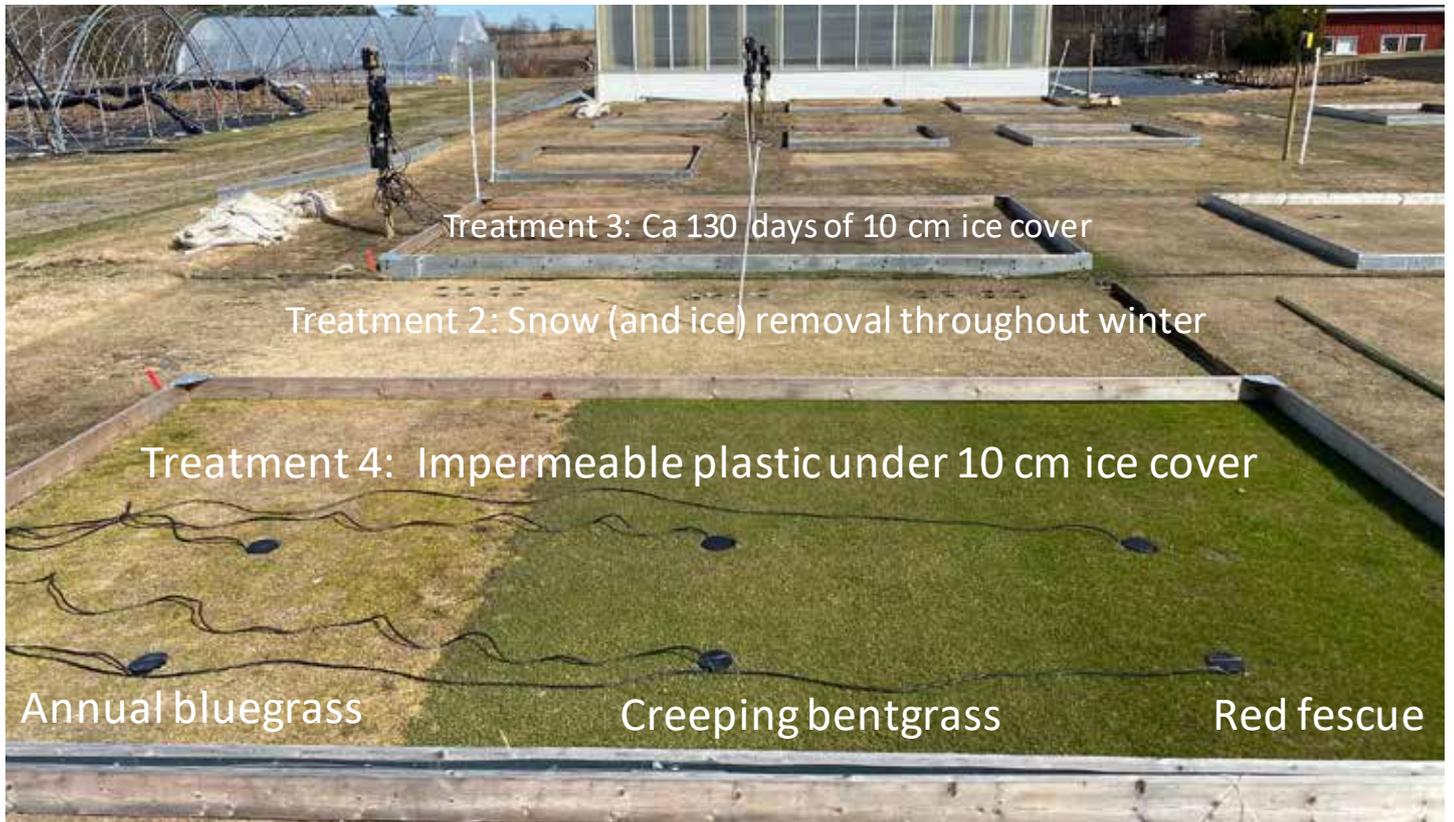


Photo 2. Strips with annual bluegrass, creeping bentgrass and red fescue subjected to three different winter treatments on April 21th. Photo: Jørgen Hornslien.

Mechanical ice removal followed by spring covers from mid March (treatment 6) made little difference except for slightly better survival of creeping bentgrass in Rep I. Treatment 5 in which the plots were kept free of snow and ice for enhanced hardening until the ice layer was laid out on Jan 5th (97 days under ice) had better survival of creeping bentgrass and red fescue, but 97 vs 130 days of ice cover made little difference in annual bluegrass.

- What made a difference was the impermeable plastic sheet installed in treatment 4 on Nov. 28th. The plastic stayed on the green until April 19th (140 days) of which 135 days (from Dec. 2nd) had a 10 cm ice layer above the plastic. Under the plastic there was spring tarp, but no ventilation pipes. In this treatment creeping bentgrass and red fescue were both green and very attractive at

cover removal (Photo 2) and there were no indications of anoxia or loss of color during the first days after removal (Photo 1). Annual bluegrass appeared to be slightly injured but recovered except for some spots where melting water most likely had been seeping in under the plastic from the wooden frame that surrounded the plot (Photo 3).

- The control treatment with ‘natural winter’ (treatment 1) and the treatment with clearing of snow thicker than 5 cm throughout the winter were both pale (yellow) at snow melt in April, but creeping bentgrass and red fescue, and to a lesser extent annual bluegrass, recovered nicely during the following weeks. The similarity between these treatments is not surprising given the fact that maximum snow depth on the greens was only around 30 cm (Photo 1). From late January there was a

natural ice layer under the snow in treatment 1, but the ice was rather porous and apparently had little impact on survival of creeping bentgrass and red fescue.

In conclusion, although the natural winter treatment (treatment 1) came out quite nicely this winter, in the discussion after the presentation, many superintendents argued that 2-3 weeks earlier opening in spring after use of plastic sheets is very important to most golf clubs.

The average cost for covering an 18 hole golf course in Norway was estimated to about 13.000 USD, which may be regarded as an insurance premium to severe winter kill that may otherwise occur once or twice in ten years.

Rep I	Annual bluegrass	1. Control. Natural winter, no measures taken	6. 10 cm ice cover from 2/12 - Ice cracked in Mid March	5. Snow and ice cleared until 1/5. 10 cm ice from 1/5 to 4/10.	4. Coverd with plastic on 11/28. 10 cm ice over plastic from 2/12 to 4/19.	2. Snow >5 cm and ice removed throughtout winter.	3. 10 cm ice cover 2/12 - 4/10
	Creeping bentgrass						
	Red fescue						
Border seeded with red fescue							
Rep II	Red fescue	1. Control. Natur winter, no measures taken	4. Coverd with plastic on 11/28. 10 cm ice over plastic from 2/12 to 4/19.	3. 10 cm ice cover 2/12 - 4/10	6. 10 cm ice cover from 2/12 - Ice cracked in Mid March	2. Snow >5 cm and ice removed throughtout winter.	5. Snow and ice cleared until 1/5. 10 cm ice from 1/5 to 4/10.
	Annual bluegrass						
	Creeping bentgrass						
Rep III	Red fescue	6. 10 cm ice cover from 2/12 - Ice cracked in Mid March	2. Snow >5 cm and ice removed throughtout winter.	5. Snow and ice cleared until 1/5. 10 cm ice from 1/5 to 4/10.	4. Coverd with plastic on 11/28. 10 cm ice over plastic from 2/12 to 4/19.	3. 10 cm ice cover 2/12 - 4/10	1. Control. Natural winter, no measures taken
	Creeping bentgrass						
	Annual bluegrass						

Photo 3. Drone photo of trial at NIBIO Apelsvoll on May 13th, treatments indicated. The plots shown in Photo 2 are indicated by a red frame. Photo: Jørgen Hornslien.



Photo 4. Superintendents around dead or alive plots at NIBIO Apelsvoll, May 19th. Photo: Mai Onsrud.