In vitro screening of turfgrass species and cultivars for

RESISTANCE TO DOLLAR SPOT

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In vitro screening of turfgrass species and cultivars for resistance to dollar spot at Landvik

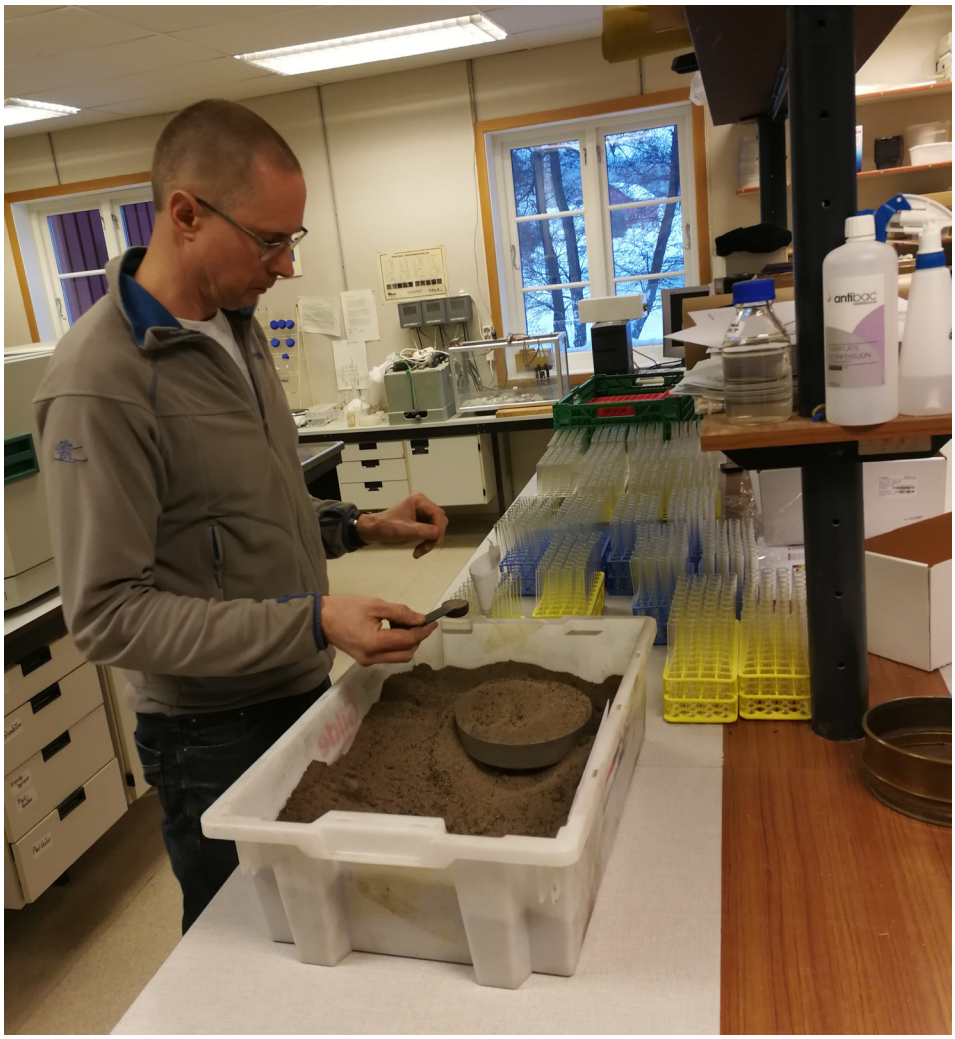

Photo 1. *Trond O. Pettersen fills glass vials with growth medium Green Mix, 4 Feb. 2019. Photo: T. Espevig.*

Since dollar spot was officially documented in Norway in 2013 and in Sweden in 2014, STERF has so far funded two research projects focusing on the occurrence, spread and control of this serious disease in the Nordic countries. This article gives a brief overview and current results from the screening of resistance to dollar spot in different species and cultivars.

The second test round with cultivation and inoculation of various grass species and cultivars with dollar spot in glass vials was conducted at Landvik in winter-spring 2019 (Photo 1 and 2). We used 10 different dollar spot isolates from Norway, Denmark, Sweden, UK and USA. The experiment was carried out in a growth chamber at temperatures more or less similar to a Norwegian summer, namely 16 °C night and 21 ° C day. The first test round had been carried out in the spring of 2018 (Photo 3) and our plan was to compile, analyse and publish data from both test rounds together in a scientific report. However, because the results from 2018 trial had been presented at the Swedish Golf Federation seminar in the fall of 2018 already, and because the industry showed interest for the results, this article will be limited to preliminary results from the first test round only.

Due to limited space, we were unable to test more than 20 turfgrass cultivars. Twenty cultivars in combination with 10 dollar spot isolates in 4 replicates and control treatments resulted in as many as 880 glass vials. The most aggressive isolates were one from UK and two from USA, while the weakest were a Norwegian isolate and another from the UK. Isolates from Denmark and Sweden were intermediate in aggressiveness. Turfgrass resistance to dollar spot varied among the cultivars within each isolate (data not shown).

The ranking of resistance in different turfgrass species and cultivars on average for either all 10 fungal isolates or only the 5 Nordic isolates is shown in Table 1. Both cultivars of perennial ryegrass, 'Fabian' and 'Bargold', and both cultivars of slender creeping red fescue, 'Nigella' and 'Cezanne', were most resistant. In contrast, there was a significant variation among cultivars with Chewings fescue, and colonial bentgrass. Thus, Chewings fescue 'Musica' and colonial bentgrass 'Jorvik' were among the least resistant cultivars, while Chewings fescue 'Bargreen II' and 'Lystig' and colonial bentgrass 'Greenspeed' had higher resistance. Most creeping bentgrass cultivars had resistance scores between

***Table 1**. The ranking of resistance to dollar spot of 20 turfgrass cultivars in glass vials at Landvik in winter-spring 2018.*

Average for 10 dollar spot isolates				Average for 5 Nordic isolates				Species, abbreviation and colour code	
Spp.	Cultivar	Resistance: scale1-9, 9=most resistant		Spp.	Cultivar	Resistance: scale 1-9, 9=most resistant			
Lp	Fabian	7.3	a*	Lp	Bargold	7.4	a	Creeping bentgrass	Ast
Lp	Bargold	7.2	a	Lp	Fabian	7.4	a	Colonial bentgrass	Acap
Frl	Nigella	7.0	a	Frl	Nigella	7.2	a	Velvet bentgrass	Acan
Frl	Cezanne	6.6	ba	Frl	Cezanne	7.1	a	Chewings fescue	Frc
Frc	Bargreen II	6.1	bc	Frc	Bargreen II	6.6	ba	Slender creeping red fescue	Frl
Frr	Frigg	5.8	dc	Frr	Frigg	6.5	ba	Strong creeping red fescue	Frr
Pp	Limousine	5.7	dc	Pp	Limousine	6.4	ba	Kentucky bluegrass	Pp
Frc	Lystig	5.2	de	Acan	Avalon	6.3	ba	Perennial ryegrass	Lp
Acan	Avalon	5.1	de	Pp	Julius	6.2	ba	Annual bluegrass	Pa
Pp	Julius	5.0	de	Acan	Villa	6.2	ba		
Acap	Greenspeed	4.5	fe	Acap	Greenspeed	5.7	bc		
Acan	Villa	4.5	fe	Frc	Lystig	5.6	bcd		
Pa	Two Put	4.0	fg	Ast	Independence	4.7	ecd		
Ast	Independence	3.9	fgh	Pa	Two Put	4.4	efd		
Ast	Declaration	3.5	igh	Ast	Declaration	4.3	ef		
Acap	Leirin	3.2	ijh	Ast	Crystal Blue	4.0	efg		
Ast	Crystal Blue	3.1	ij	Ast	Luminary	3.4	hfg		
Ast	Luminary	2.9	ij	Acap	Leirin	2.8	hg		
Acap	Jorvik	2.5	kj	Acap	Jorvik	2.8	hg		
Frc	Musica	2.0	k	Frc	Musica	2.3	h		
Fisher least significant difference (LSD):		**0.9**		**Fisher least significant difference (LSD): (LSD):**		**1.2**			

* Two cultivars with the same letter has no significant difference.

3 and 5 (on a scale from 1 to 9 where 9 is the highest resistance), and there was no significant difference among, for example, 'Crystal Blue', 'Luminary' and 'Declaration'. It was surprising that 'Independence' obtained a higher score than 'Declaration' since the National Turfgrass Evaluation Program in USA ranks these cultivars opposite for dollar spot resistance. However, in our experiment the difference was small and not significant.

On average for the 5 Nordic isolates, velvet bentgrass had higher resistance than creeping bentgrass. Annual bluegrass had the same level of resistance as creeping bentgrass. Both cultivars of Kentucky bluegrass scored 5 or higher.

We would like to emphasize that screening of turfgrass cultivars for resistance to dollar spot in glass vials provides a general indication of resistance, but that this ranking will not necessarily be the same as in the field. Thus, the main purpose of screening species and cultivars in glass vials is to select varieties for further testing. Dollar spot is a growing problem in the Nordic countries, especially in Denmark and southern Sweden, and the resistance of turfgrass species and cultivars should be tested under field conditions. However, because the disease is not well known in the Nordic countries and we don't want to spread it, we have so far been reluctant to inoculate our variety trials with dollar spot in the field. That is why we started with these experiments under controlled conditions.

***Photo 2.** Kristine Sundsdal sterilises glass vials with growth medium by autoclaving and makes them ready for seeding, 15 Feb. 2019. Photo: T. Espevig.*

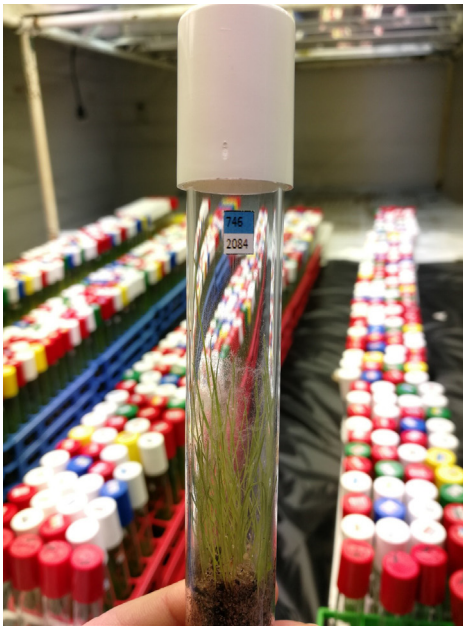

***Photo 3**. Screening of turfgrass species and cultivars for resistance to dollar spot isolates of different origin in grass vials in a controlled environment at Landvik in spring 2018. Photo: T. Espevig.*