Value for Cultivation and Use (VUC)- testing of potential turf grass varieties for the Scandinavian marked: **Lawn – Sports turf – Fairway**

Evaluation of turfgrass varietes for use on Scandinavian lawns and fairways, 2011-2014.

- Results from the seeding year (2011).

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INTRODUCTION

SCANTURF is a variety testing program organized by the turf grass seed industry and researchers in Denmark, Sweden, Finland, Iceland and Norway. The program started in 2005 and is entirely funded by entrance fees.

The program includes optional testing for ordinary lawns, sport fields and/or fairways, but not for greens where testing is organized as a separate project (SCANGREEN).

The five Nordic countries have been divided into one northern (mostly continental) test zone and one southern (mostly coastal) zone with contrasting climates and different requirements to winter hardiness (Fig.1).

Seed companies can specify whether they want their varieties tested in the northern, southern or both testing zones. The testing period is of one seeding year plus three evaluation years.

For the testing period 2011-2014, only varieties for the southern zone lawn / fairway testing program were entered.

METHODS

Test sites

The location of test sites in the southern climatic zone was Landvik (Norway, 58.20°N) and Tystofte (Denmark, 55.15°N) as indicated in figure 1.

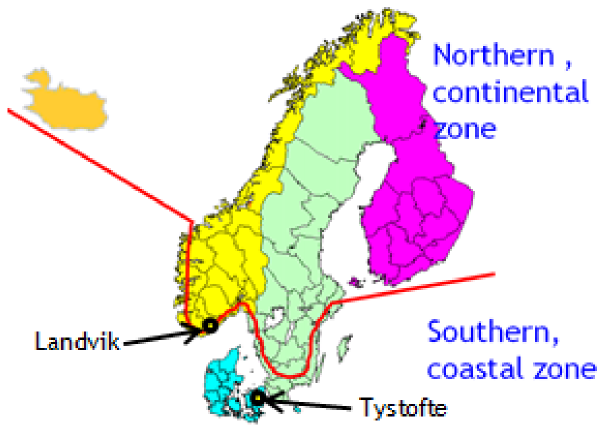

Figure 1. Map over the five Scandinavian countries roughly divided in two climatic zones.The southern zone test sites at Landvik and Tystofe are indicated.

Plant material

In total, 17 varieties including controls, were entered into the evaluation program in 2011 (table 1).

Table 1. Candidate and reference (control) varieties.

Species	ID	Candidate / reference variety	Breeder / company
Festuca rubra ssp. *Commutata*	1	Center (control)	
	2	Calliope (control)	
	3	Nikky	DLF-Trifolium
	4	DPFR 31646	DLF-Trifolium
Festuca rubra ssp. *Trichophylla*	5	Barcrown (control)	
	6	Beudin	DLF-Trifolium
Festuca rubra ssp. *Rubra*	7	Rossinante (control)	
	8	Heidrun	DLF-Trifolium
Poa pratensis	9	Conni (control)	
	10	Limousine (control)	
	11	Yvette	DLF-Trifolium
	12	Miracle	DLF-Trifolium
Lolium perenne	13	Bargold (control)	
	14	Vesuvius (control)	
	15	Cyrena	DLF-Trifolium
	16	Clementine	DLF-Trifolium
	17	Double	DLF-Trifolium

In addition, the three varieties Musica (*Festuca rubra* ssp. *commutata*), Barcampsia (*Deschampsia cespitosa*) and Supranova (*Poa supina*) were included at Landvik, but not at Tystofte.

Experimental design and establishment

The trials were established according to a split-plot design with three replicates with species on main plots and varieties on subplots, allowing different management of the various species. Plot size was 1,3 m x 1,3 m (1.7 m^2) at Landvik and 1,5 x 1,5 m (2,25 m^2) at Tystofte.

Seeding dates in 2011 were 10-11 August at Landvik and 1 September at Tystofte. The seeding rates of *Festuca rubra*, *Poa pratensis*, *Lolium perenne* were 25000, 75000 and 12000 seeds/m^2, respectively. At Landvik *Deschampsia cespitosa* and *Poa supina* were both sown at a rate of 75000 seeds/m^2.

Before sowing the trials were fertilized with 0.5 kg N/100 m^2 at Landvik and 0.2 kg N/100 m^2 at Tystofte) in form of compound NPK-fertilizer. At Landvik additional N was applied with one or two week's intervals during autumn on all plots, with decreasing N rates from 0.1 kg / 100 m^2 (two weeks after sowing) to 0.03 kg/ 100 m^2 (late October, 11 weeks after sowing). In total, plots at Landvik received 1.0 kg N/100 m^2 (included N input before sowing) in the seeding year. At Tystofte only plots of Poa pratensis was given additional N (0.3 kg / 100 m^2), three weeks after sowing.

The cutting height varied at the two sites. At Tystofte the plots were cut with a rotary lawn mower at a height of 40-55 mm and gradually reduced to 25 mm, normally once or twice a week (depending on growth rate). At Landvik a more frequent cutting regime (2-3 times a week with a cylinder lawn mower) at a lower height (25-30 mm down to 15 mm) was practiced. At both sites, grass clippings were removed after mowing.

Registrations

Per cent plant cover was registered twice during autumn at both locations, about three weeks (1 September at Landvik and 23 September at Tystofte) or about 12 weeks (1 November at Landvik and 28 November at Tystofte) after sowing.

Photo1. The field site at Landvik at the end of the growing season (9 December 2011) in the seeding year. Photo: Trygve S. Aamlid.

Other registrations included visual observations of fungal diseases (%) on each plots. At Tystofte, only rust in *Poa pratensis* was registered. At Landvik, the most prevalent fungus in all species was pink snow mold (*Microdochium nivale*) at both dates in autumn. In addition, visual observation of grass dormancy colour, on a scale from 1(pale, or brown) to 9 (most intensely green), was performed on each plot on 28 November (Tystofte) or 16 December (Landvik).

At both locations the seedlings developed into a normal dense stand by the end of the growing season. However, the last registration of plant cover in autumn at Tystofte was accomplished soon after mowing at a low cutting height which exposed more bare soil than at the first date of registration. Thus, in some species, e.g. *Lolium perenne (Table 1b and 2b) and Festuca rubra ssp. trichophylla (Table 1b and 5b)*, the plant cover at Tystofte was recorded lower 12 weeks than 3 weeks after sowing.

Photo 2. The field site at Tystofte on 24 September 2011, three-four weeks after sowing. Photo: Gerhard Deneken.

RESULTS

The results from both test sites in the seeding year are given in Tables 1-6.

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Table 1. Comparison of species in the seeding year (2011)

a) Landvik

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus[1)]), 9 wk after seeding, %	Disease (fungus[1)]), 12 wk after seeding, %	Dormancy colour (1-9)
D. cespitosa	97.3	100.0	0.0	0.0	4.2
F. rubra com.	94.3	95.3	0.3	4.1	6.2
F. rubra rubra	77.7	93.0	6.8	3.3	6.8
F. rubra trich.	97.5	98.8	0.0	1.2	7.6
L. perenne	93.9	99.5	0.0	0.0	8.2
p. pratensis	96.8	96.3	4.1	2.8	5.2
P. supina	98.7	99.0	0.7	0.3	3.3
P%	1	<1	2	<0.1	<0.1
LSD 5%	10.4	2.9	4.2	1.6	0.9

[1)] Pink snow mold (*Microdochium nivale*)

b) Tystofte

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (rust), 12 wk after seeding, %	Dormancy colour (1-9)
F. rubra com.	64.2	68.3	-	.	5.6
F. rubra rubra	57.5	57.5	-	.	6.5
F. rubra trich.	80.0	70.0	-	.	4.5
L. perenne	93.4	54.0	-	.	4.5
p. pratensis	64.6	82.1	-	31.4	3.9
P%	<0.1	<0.1	-	-	<0.1
LSD 5%	10.4	8.7	-	-	0.6

c) Mean of two sites.

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
F. rubra com.	79.9	81.9	-	-	5.8
F. rubra rubra	67.6	75.3	-	-	6.6
F. rubra trich.	88.8	84.4	-	-	6.0
L. perenne	93.7	76.8	-	-	6.3
p. pratensis	80.7	89.2	-	17.1	4.6
P%	<0.1	<0.1	-	-	<0.1
LSD 5%	7.6	4.3	-	-	0.4
Site x species	<1	<0.1	-	-	<0.1

Table 2. Comparison of varieties of perennial ryegrass (*Lolium perenne*) in the seeding year (2011).

a) Landvik

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus[1]), 9 wk after seeding, %	Disease (fungus[1]), 12 wk after seeding, %	Dormancy colour (1-9)
Bargold (C)	94.3	99.7	0.0	0.0	8.0
Clementine	96.0	99.3	0.0	0.0	8.2
Cyrena	96.7	99.7	0.0	0.0	8.2
Double	87.3	99.3	0.0	0.0	8.3
Vesuvius (C)	95.3	99.7	0.0	0.0	8.2
P%	8	>20	-	-	>20
LSD 5%	-	-			-

[1] Pink snow mold (*Microdochium nivale*)

b) Tystofte

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Bargold (C)	98.0	43.3	-	-	4.3
Clementine	88.3	46.7	-	-	4.3
Cyrena	89.3	66.7	-	-	4.7
Double	98.0	53.3	-	-	4.7
Vesuvius (C)	93.3	60.0	-	-	4.3
P%	13	5	-	-	>20
LSD 5%		12.5	-	-	-

c) Mean of two sites

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Bargold (C)	79.9	81.9	-	-	6.2
Clementine	67.6	75.3	-	-	6.3
Cyrena	88.8	84.4	-	-	6.4
Double	93.7	76.8	-	-	6.5
Vesuvius (C)	80.7	89.2	-	-	6.3
P%	<0.1	<0.1	-	-	>20
LSD 5%	7.6	4.3	-	-	-
Site x variety	1.0	3.0	-	-	>20

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Table 3. Comparison of varieties of Smooth Meadow-grass (*Poa pratensis*) in the seeding year (2011).

a) Landvik

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus[1]), 9 wk after seeding, %	Disease (fungus[1]), 12 wk after seeding, %	Dormancy colour (1-9)
Conni (C)	95.7	96.0	2.7	2.7	4.3
Limousine (C)	97.3	98.3	6.0	1.0	5.3
Miracle	97.3	94.0	4.3	5.3	5.7
Yvette	96.7	97.0	3.3	2.3	5.5
P%	>20	17	>20	6	>20
LSD 5%	-	-	-	-	-

[1] Pink snow mold (*Microdochium nivale*)

b) Tystofte

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (rust), 12 wk after seeding, %	Dormancy colour (1-9)
Conni (C)	56.7	78.3	-	43.3	3.0
Limousine (C)	61.7	75.0	-	50.0	3.0
Miracle	70.0	81.7	-	2.3	6.3
Yvette	70.0	93.3	-	30.0	3.3
P%	2	<1	-	<0.1	<0.1
LSD 5%	8.8	6.9	-	12.8	0.9

c) Mean of two sites

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Conni (C)	76.2	87.2	-	23.0	3.7
Limousine (C)	79.5	86.7	-	25.5	4.2
Miracle	83.7	87.8	-	3.8	6.0
Yvette	83.3	95.2	-	16.2	4.4
P%	<1	<0.1	-	<0.1	1.0
LSD 5%	4.1	3.6	-	4.1	1.3
Site x variety	1	<0.1		<0.1	9

Table 4. Comparison of varieties of chewings fescue (*Festuca rubra ssp. commutata*) in the seeding year (2011).

a) Landvik

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus[1]), 9 wk after seeding, %	Disease (fungus[1]), 12 wk after seeding, %	Dormancy colour (1-9)
Calliope (C)	97.0	98.7	0.0	1.3	5.5
Center (C)	95.0	95.3	0.0	4.0	6.3
DPFR 31646	96.7	93.0	0.0	6.7	5.8
Musica	89.3	94.7	0.7	4.0	6.8
Nikky	93.7	94.7	0.7	4.3	6.7
P%	16	2	>20	3	7
LSD 5%	-	3	-	2.8	-

[1] Pink snow mold (*Microdochium nivale*)

b) Tystofte

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Calliope (C)	80.0	76.7	-	-	5.0
Center (C)	53.3	56.7	-	-	5.3
DPFR 31646	73.3	70.0	-	-	6.0
Nikky	50.0	70.0	-	-	6.0
P%	<0.1	>20	-	-	>20
LSD 5%	8.8	-	-	-	-

c) Mean of two sites

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Calliope (C)	88.5	87.7	-	-	5.3
Center (C)	74.2	76.0	-	-	5.8
DPFR 31646	85.0	81.5	-	-	5.9
Nikky	71.8	82.3	-	-	6.3
P%	<0.1	<0.1	-	-	5.0
LSD 5%	4.1	4.2	-	-	0.7
Site x variety	<0.1	<1	-	-	>20

Table 5. Comparison of varieties of slender creeping red fescue (*Festuca rubra ssp. trichophylla*) in the seeding year (2011).

a) Landvik

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus[1]), 9 wk after seeding, %	Disease (fungus[1]), 12 wk after seeding, %	Dormancy colour (1-9)
Barcrown (C)	98.3	97.7	0.0	2.3	7.2
Beudin	96.7	100.0	0.0	0.0	8.0
P%	13	7	>20	7	20

[1] Pink snow mold (*Microdochium nivale*)

b) Tystofte

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Barcrown (C)	76.7	73.3	-	-	4.0
Beudin	83.3	66.7	-	-	5.0
P%	18.0	>20	-	-	>20

c) Mean of two sites

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Barcrown (C)	87.5	85.5	-	-	5.6
Beudin	90.0	83.3	-	-	6.5
P%	>20	>20	-	-	7.0
Site x variety	7	>20	-	-	>20

Table 6. Comparison of varieties of strong creeping red fescue (*Festuca rubra ssp. rubra*) in the seeding year (2011).

a) Landvik

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus[1]), 9 wk after seeding, %	Disease (fungus[1]), 12 wk after seeding, %	Dormancy colour (1-9)
Heidrun	95.3	94.7	2.3	3.7	6.7
Rossinante (C)	60.0	91.3	11.3	3.0	6.8
P%	18	>20	1	>20	>20

[1] Pink snow mold (*Microdochium nivale*)

b) Tystofte

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Heidrun	78.3	75.0	-	-	6.7
Rossinante (C)	36.7	40.0	-	-	6.3
P%	1	2	-	-	>20

c) Mean of two sites

	Coverage 3 wk after seeding, %	Coverage 12 wk after seeding, %	Disease (fungus), 9 wk after seeding, %	Disease (fungus), 12 wk after seeding, %	Dormancy colour (1-9)
Heidrun	86.8	84.8	-	-	6.7
Rossinante (C)	48.3	65.7	-	-	6.6
P%	1	<1	-	-	>20
Site x variety	>20	<1	-	-	>20