

Ranking of Turfgrass species and varieties for integrated pest management of Scandinavian putting greens

2023-2024

Results from SCANGREEN 2023-2026

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SCANGREEN 2023-2026: Turfgrass species and varieties for integrated pest management of Scandinavian putting greens,

Results from 2023-2024

Recordings in sowing year (2023): (from protocol)

- **Coverage:** Per cent of plot area covered with undiseased turf of the sown species, diseased turf (microdochium patch (MP), red thread (RT), dollar spot (DS), take all patch (TAP), weeds (moss, *Poa annua* and other weeds (i.e dicots and other grass weeds)) and bare soil is recorded for the first time three weeks after sowing* and then on the first of every month until the soil is frozen or the experiment is covered by snow.
- **Turfgrass visual quality (TQ):** This is an overall score for live ground cover, uniformity, greenness, fineness, disease resistance and shoot density, scale 1-9 where 9 is the best turf. It is recorded on the same dates as coverage.
- **Tiller density** (1-9, 9 is the highest tiller number per m²) is recorded at the last assessment for the season (either 1 October or 1 November)

*: None of the trial sites rated coverage 3 weeks after sowing in 2023 because of very uneven establishment.

Recordings in 2024:

- **Coverage, weeds and diseases** are recorded as per cent of plot area on the first of each month during the growing season (see description above)
- **Turfgrass visual quality (TQ)** is assessed on the first day of each month during the growing season (see description above)
- **Tiller density** is assessed on 1 June and 1 September (see description above)
- **Color (darkness)** (scale 1-9 where 1-very light, 3-light, 5-medium, 7-dark and 9- very dark green) is assessed on unstressed and undiseased turf on 1 June and 1 September.
- **Fineness of leaves (leaf texture)** (scale 1-9, 1-very coarse, 3-course, 5-medium, 7-fine and 9-very fine) is assessed on 1 June and 1 September.
- **Snow molds** are recorded as per cent of plot area on the same day or the day after snow melt.
- **Overall winter damage**, i.e. per cent of plot area dead due to abiotic or biotic damages should be recorded 1-2 weeks after green-up. The reason for damage should be recorded as far as possible.
- **Winter color** is the intensity of green color outside the growing season: 1-completely brown/withered, 5-pale green, 7-green and 9-intensely green. If no snow cover, winter color should be assessed on 1 December and 1 March. Otherwise, winter color should be assessed shortly before and shortly after the period of snow cover.

For further information on establishment and management see the protocol.

Table 1. Ranking of species after two years testing on putting greens in SCANGREEN trials at a) Reykjavik GC (Iceland); b) NIBIO Apelsvoll Research Center (Norway); c) Smørum GC (Denmark), d) NIBIO Landvik Research Center (Norway), Means of varieties within each species.

a) Reykjavik GC, Iceland

Spp	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	2	4		2	4	1	2	2	1	1	1	1		4					5		4	4
ACAP	4.6	4.3	5.0	.	84.3	87.0	6.0	4.6	5.8	5.9	1.3	18.1	9.7	.	0.0	.	.	.	.	1.9	.	0.00	6.4
AS	5.1	4.5	5.8	.	81.5	95.9	6.0	5.3	4.3	6.0	1.0	13.0	7.8	.	0.0	.	.	.	.	1.6	.	0.01	1.2
FRC	5.0	4.4	5.5	.	82.5	98.1	6.0	4.6	5.8	7.0	4.7	4.2	3.2	.	0.0	.	.	.	.	0.6	.	0.00	1.1
FRT	4.8	4.2	5.4	.	78.0	96.8	5.8	4.5	5.8	7.0	4.4	8.0	3.2	.	0.0	.	.	.	.	0.6	.	0.01	1.6
LP	3.5	5.2	1.7	.	88.5	48.1	4.2	4.7	.	5.0	1.0	100.0	.	.	0.0	.	.	.	.	0.0	.	0.00	29.8
PP	3.7	3.3	4.2	.	58.9	87.2	3.5	3.9	8.3	5.0	4.6	5.6	0.0	.	8.2	.	.	.	.	0.0	.	0.00	2.7
PB_3mm170N	4.1	4.3	3.8	.	92.0	93.0	4.4	2.8	4.3	3.0	4.0	29.3	8.0	.	0.0	.	.	.	.	1.6	.	0.00	0.5
PB_5mm110N	4.2	4.4	3.9	.	91.3	95.6	4.4	2.9	4.3	3.3	4.0	19.0	10.0	.	0.0	.	.	.	.	2.0	.	0.00	0.5
PB_5mm170N	4.5	5.2	3.8	.	93.2	96.1	4.4	2.7	4.8	2.7	3.3	13.0	17.3	.	0.0	.	.	.	.	3.5	.	0.00	0.5
<i>p</i>	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001				<.0001	<.0001			<.0001					<.0001		0.9336	<.0001

Abbreviations: ACAP: *Agrostis capillaris* (colonial bentgrass, mean of 4 varieties); AS: *Agrostis stolonifera* (creeping bentgrass, mean of 7 varieties); FRC = *Festuca rubra* ssp. *commutata* (Chewing's fescue, mean of 13 varieties); FRT = *Festuca rubra* ssp. *trichophylla* (slender creeping red fescue, mean of 10 varieties); LP: *Lolium perenne* (perennial ryegrass, mean of 4 varieties); PP= *Poa pratensis* (Kentucky bluegrass, mean of 3 varieties); PB: *Pleum bertolinii* (smaller cat's tail, '21PHL 1305' at three different management levels).

Table 1. Mean values for species (continued)

b) NIBIO Apelsvoll Research Center, Norway

SPP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1- 9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %				MP, % 2024	Weeds, %				
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2023	2024	MP	RT		TAP	DS	Moss	Poa	Other
No. observations →	2	3	4		4	4		1	1	1	1	1	1	3	4	4				5		4	4
ACAP	5.9	6.2	5.7	.	93.1	96.7	.	7.3	5.0	6.4	3.0	48.3	75.1	3.8	0.4	0.4	.	.	.	15.4	.	0.00	0.0
AST	5.7	5.3	6.0	.	82.8	97.8	.	7.0	6.0	5.4	1.0	99.6	99.8	0.8	0.0	0.0	.	.	.	20.0	.	0.00	0.0
FRC	5.3	5.5	5.1	.	92.9	97.6	.	4.0	5.0	7.2	1.0	58.3	97.1	0.0	0.0	0.0	.	.	.	19.4	.	0.01	0.1
FRT	4.9	5.1	4.7	.	90.2	93.9	.	4.1	4.4	7.0	1.0	89.8	99.8	0.0	0.0	0.0	.	.	.	20.0	.	0.00	0.1
LP	4.1	4.4	3.8	.	89.1	97.2	.	3.9	5.5	4.4	3.2	99.2	69.3	0.0	0.0	0.0	.	.	.	13.9	.	0.00	0.0
PP	1.7	1.7	1.7	.	23.8	49.0	.	4.0	5.7	2.7	1.0	100.0	.	0.0	0.0	0.0	.	.	.	0.0	.	0.00	0.0
PB_3mm170N	4.1	3.6	4.7	.	70.2	98.0	.	5.0	4.0	4.0	1.0	100.0	97.5	0.4	0.0	0.0	.	.	.	13.0	.	0.00	0.0
PB_5mm110N	4.3	4.2	4.4	.	88.4	94.8	.	5.0	4.7	5.0	1.0	100.0	98.3	1.8	0.0	0.0	.	.	.	19.7	.	0.00	0.0
PB_5mm170N	2.6	3.2	2.0	.	59.9	57.5	.	3.7	3.0	3.3	1.0	100.0	.	0.0	0.0	0.0	.	.	.	0.0	.	0.00	0.0
<i>p</i>	<.0001	<.0001	<.0001		<.0001	<.0001					<.0001	<.0001		<.0001	<.0001	<.0001				<.0001		0.9699	0.551

Abbreviations: ACAP: *Agrostis capillaris* (colonial bentgrass, mean of 4 varieties); AS: *Agrostis stolonifera* (creeping bentgrass, mean of 7 varieties); FRC = *Festuca rubra* ssp. *commutata* (Chewing’s fescue, mean of 13 varieties); FRL = *Festuca rubra* ssp. *trichophylla* (slender creeping red fescue, mean of 10 varieties); LP: *Lolium perenne* (perennial ryegrass, mean of 4 varieties); PP= *Poa pratensis* (Kentucky bluegrass, mean of 3 varieties); PB: *Pleum bertolinii* (smaller cat’s tail, ‘21PHL 1305’ at three different management levels).

Table 1. Mean values for species (continued)

c) Smørum GC, Denmark

Spp	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk after	2023	2024	2023	2024						2023	2024	MP	RT	TAP		DS	2024	Moss	Poa	Other
No. observations →	2	1	7		2	7	1	2	2	2	2	1	1	1	7	7	7	7	7	8		7	7
ACAP	5.4	4.9	5.9	.	96.2	98.6	6.5	6.6	6.1	5.8	6.0	.	3.3	0.9	1.0	0.01	0.0	1.0	0.00	0.4	.	0.0	0.0
AS	5.2	4.5	6.0	.	96.2	99.6	6.7	7.2	6.7	5.9	5.5	.	5.2	0.6	0.2	0.01	0.0	0.2	0.00	0.7	.	0.0	0.0
FRC	4.9	4.2	5.7	.	97.8	99.3	5.3	5.8	5.6	7.5	5.7	.	7.1	0.2	0.3	0.00	0.3	0.0	0.01	0.9	.	0.0	0.1
FRT	5.3	4.8	5.7	.	97.1	99.0	5.9	5.8	5.5	7.4	5.5	.	17.1	0.1	0.4	0.00	0.3	0.0	0.03	2.1	.	0.0	0.1
LP	4.9	4.3	5.6	.	97.2	99.4	4.7	5.5	6.5	5.4	5.2	.	0.0	0.0	0.0	0.00	0.1	0.0	0.00	0.0	.	0.0	0.1
PP	3.3	2.0	3.8	.	40.7	96.6	3.0	4.8	7.3	4.8	6.7	.	0.0	26.7	0.0	0.00	0.0	0.0	0.00	0.0	.	0.0	0.3
PB_3mm170N	3.8	4.3	3.2	.	98.3	94.1	4.8	4.5	5.3	4.6	6.0	.	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.0	.	0.0	0.0
PB_5mm110N	3.8	4.5	3.1	.	94.9	96.0	5.0	4.5	5.3	4.3	6.2	.	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.0	.	0.0	0.0
PB_5mm170N	4.0	4.0	3.9	.	95.0	91.1	5.2	5.1	5.8	4.8	5.3	.	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.0	.	0.0	0.7
p	<.0001	<.0001	<.0001			<.0001			<.0001	<.0001	0.000				0.001	0.731	<.0001	<.0001	0.000	<.0001		0.574	<.0001

Abbreviations: ACAP: *Agrostis capillaris* (colonial bentgrass, mean of 4 varieties); AS: *Agrostis stolonifera* (creeping bentgrass, mean of 7 varieties); FRC = *Festuca rubra* ssp. *commutata* (Chewing's fescue, mean of 13 varieties); FRL = *Festuca rubra* ssp. *trichophylla* (slender creeping red fescue, mean of 10 varieties); LP: *Lolium perenne* (perennial ryegrass, mean of 4 varieties); PP= *Poa pratensis* (Kentucky bluegrass, mean of 3 varieties); PB: *Pleum bertolinii* (smaller cat's tail, '21PHL 1305' at three different management levels).

Table 1. Mean values for species (continued)

d) NIBIO Landvik Research Center, Norway

SPP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1- 9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %						MP, %	Weeds, %		
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024.0	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	6	.	2	7	.	2	2	2	2	1	1	1	7	7	7	7	0	8	0	7	0
ACAP	6.9	6.9	7.0	.	55.8	98.2	.	7.8	7.1	6.3	5.3	4.7	6.1	1.3	1.5	1.1	0.4	0.2	.	1.8	.	0.1	.
AS	6.8	6.8	6.9	.	48.3	98.0	.	8.2	6.8	6.0	4.8	2.0	2.5	0.0	1.2	0.8	0.3	0.2	.	1.0	.	0.0	.
FRC	6.5	6.3	6.7	.	66.3	97.9	.	7.8	6.4	8.1	6.3	1.3	2.2	0.0	1.6	0.8	1.0	0.0	.	1.0	.	0.1	.
FRT	5.8	5.2	6.4	.	58.1	97.1	.	7.7	6.5	7.9	6.2	0.7	1.0	0.0	1.3	0.6	0.9	0.0	.	0.6	.	0.1	.
LP	5.9	6.0	5.8	.	69.6	97.6	.	6.7	6.9	6.0	5.8	0.6	1.1	0.1	1.3	0.8	0.6	0.0	.	0.8	.	0.0	.
PP	3.6	2.4	4.8	.	19.8	87.1	.	6.4	6.6	5.1	4.6	0.0	0.1	0.0	0.9	0.4	0.5	0.0	.	0.4	.	0.1	.
PB_3mm170N	3.7	2.7	4.8	.	18.0	97.0	.	5.5	4.8	3.5	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	.	0.1	.
PB_5mm110N	4.3	3.7	4.9	.	31.0	95.0	.	6.5	4.4	4.6	5.5	0.0	0.0	0.0	0.3	0.0	0.3	0.0	.	0.0	.	0.0	.
PB_5mm170N	4.1	3.0	5.2	.	26.7	91.8	.	6.5	4.8	4.3	6.0	0.0	0.0	0.0	0.8	0.4	0.5	0.0	.	0.3	.	0.0	.
<i>p</i>	<.0001	<.0001	<.0001		<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	0.000	<.0001	<.0001	0.005	0.197	<.0001	0.008		0.000		0.064	

Abbreviations: ACAP: *Agrostis capillaris* (colonial bentgrass, mean of 4 varieties); AS: *Agrostis stolonifera* (creeping bentgrass, mean of 7 varieties); FRC = *Festuca rubra* ssp. *commutata* (Chewing’s fescue, mean of 13 varieties); FRL = *Festuca rubra* ssp. *trichophylla* (slender creeping red fescue, mean of 10 varieties); LP: *Lolium perenne* (perennial ryegrass, mean of 4 varieties); PP= *Poa pratensis* (Kentucky bluegrass, mean of 3 varieties); PB: *Pleum bertolinii* (smaller cat’s tail, ‘21PHL 1305’ at three different management levels).

Table 2. Chewings fescue (*Festuca rubra ssp. commutata*) (continued)

c) *Smørum GC, Denmark*

FRC	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1- 9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	7	.	2	7	1	2	2	2	2	1	1	1	7	7	7	7	7	8	.	7	7
Bartico	5.0	4.2	5.8	.	97.3	99.1	5.5	5.8	5.3	7.4	5.3	.	10.0	1.0	0.6	0.00	0.6	0.0	0.01	1.3	.	0.0	0.1
23FRC1609	4.6	3.3	5.8	.	97.2	99.0	5.2	5.8	5.7	7.6	5.4	.	11.7	0.2	0.3	0.00	0.3	0.0	0.00	1.5	.	0.0	0.3
Ashlyn	4.8	3.8	5.7	.	98.4	99.1	5.0	5.7	5.5	7.3	5.8	.	6.0	0.0	0.4	0.00	0.4	0.0	0.01	0.8	.	0.0	0.0
Barlineus	5.0	4.3	5.7	.	97.6	99.5	6.0	5.8	5.7	7.6	5.9	.	6.3	0.0	0.2	0.00	0.2	0.0	0.01	0.8	.	0.0	0.1
Barpatria	4.7	3.7	5.7	.	97.4	99.5	5.0	5.8	4.8	7.6	5.0	.	2.2	0.4	0.0	0.00	0.0	0.0	0.02	0.3	.	0.0	0.0
CompassII	4.9	4.3	5.4	.	97.4	99.5	6.0	5.5	6.0	7.3	6.8	.	0.0	0.0	0.0	0.02	0.0	0.0	0.00	0.0	.	0.0	0.3
Zanaki	4.8	3.8	5.7	.	98.1	99.4	4.8	5.8	5.8	7.5	6.0	.	9.0	0.3	0.1	0.00	0.1	0.0	0.02	1.1	.	0.0	0.0
Dancing	5.2	4.3	6.0	.	97.7	99.5	5.7	5.9	6.1	7.4	5.8	.	9.0	0.0	0.2	0.00	0.2	0.0	0.00	1.1	.	0.0	0.0
EuroCarina	5.5	5.2	5.9	.	98.5	99.5	5.3	5.9	5.9	7.4	5.9	.	5.3	0.0	0.4	0.00	0.4	0.0	0.00	0.7	.	0.0	0.0
Gima	5.2	4.5	5.9	.	97.8	99.0	5.5	6.0	5.7	7.4	5.6	.	11.7	0.3	0.5	0.00	0.5	0.0	0.00	1.5	.	0.0	0.1
LMGFRC-3422	4.9	4.3	5.4	.	98.1	98.9	5.0	5.6	5.8	7.5	5.9	.	10.0	0.0	0.5	0.00	0.5	0.0	0.01	1.3	.	0.0	0.1
Musica	5.0	4.3	5.6	.	98.6	99.4	5.2	5.7	5.8	7.5	5.7	.	5.3	0.0	0.1	0.00	0.1	0.0	0.00	0.7	.	0.0	0.0
Orionette	4.8	4.0	5.5	.	98.1	99.5	5.3	5.8	5.4	7.6	5.6	.	6.0	0.0	0.1	0.00	0.1	0.0	0.00	0.8	.	0.0	0.0
<i>p</i>	0.608	0.654	0.200		0.668	0.413	0.097	0.077	0.001	0.134	<.0001		0.006	0.073	0.157	0.4777	0.142	.	0.581	0.0068		0.505	0.199
LSD 5%									0.45		0.37		5.65							0.71			

Table 2. Chewings fescue (*Festuca rubra ssp. commutata*) (continued)

d) **NIBIO Landvik Research Center, Norway**

FRC	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	6	.	2	7	.	2	2	2	2	1	1	1	7	7	7	7	0	8	0	7	0
Bartico	6.8	7.0	6.6	.	67.2	98.1	.	7.9	5.7	8.1	7.1	2.3	3.8	0.0	1.7	0.4	1.3	0.0	.	0.9	.	0.0	.
23FRC1609	6.9	6.7	7.2	.	68.5	97.7	.	8.0	6.6	8.3	6.0	0.7	2.2	0.0	1.7	1.3	0.5	0.0	.	1.5	.	0.5	.
Ashlyn	7.1	7.3	6.9	.	72.8	98.2	.	7.8	6.5	8.3	6.1	0.8	1.5	0.0	1.5	0.6	1.0	0.0	.	0.7	.	0.1	.
Barlineus	6.4	6.0	6.7	.	62.5	98.3	.	7.8	6.5	8.0	6.0	2.0	2.7	0.0	1.0	0.5	0.6	0.0	.	0.8	.	0.1	.
Barpatria	6.9	6.7	7.1	.	67.0	98.8	.	8.4	5.5	8.6	7.2	0.2	0.5	0.0	0.8	0.3	0.5	0.0	.	0.3	.	0.2	.
CompassII	5.3	4.7	5.9	.	61.3	97.0	.	7.2	7.2	7.4	7.1	0.0	0.3	0.0	1.4	0.0	1.4	0.0	.	0.0	.	0.3	.
Zanaki	6.5	6.0	6.9	.	68.3	97.6	.	7.8	6.5	8.1	6.1	1.3	2.8	0.0	2.1	1.2	1.1	0.0	.	1.4	.	0.0	.
Dancing	7.0	7.0	7.0	.	68.2	97.8	.	7.8	6.7	8.2	6.2	1.8	3.7	0.0	2.0	1.3	0.9	0.0	.	1.6	.	0.0	.
EuroCarina	6.3	6.0	6.6	.	64.7	97.7	.	7.6	6.5	8.2	6.2	1.2	1.7	0.0	2.0	1.1	1.1	0.0	.	1.2	.	0.1	.
Gima	6.4	6.0	6.8	.	64.0	97.2	.	7.6	6.5	8.1	5.9	2.0	2.7	0.0	2.2	1.3	1.1	0.0	.	1.5	.	0.0	.
LMGFRC-3422	6.7	6.7	6.8	.	68.0	98.3	.	7.8	6.4	8.1	6.1	0.7	2.3	0.0	1.4	0.3	1.2	0.0	.	0.5	.	0.0	.
Musica	6.5	6.3	6.6	.	66.3	97.6	.	7.8	6.5	8.2	6.2	2.2	2.3	0.0	2.1	1.3	1.0	0.0	.	1.4	.	0.0	.
Orionette	6.1	5.7	6.4	.	63.0	97.9	.	7.6	6.4	8.1	6.0	1.2	1.5	0.0	1.4	0.3	1.2	0.0	.	0.5	.	0.0	.
<i>p</i>	0.007	0.049	<.0001	.	0.188	0.002	.	0.000	<.0001	0.000	<.0001	0.117	0.486	-	0.004	0.000	0.000	.		0.008		0.004	
LSD 5%	0.78	1.38	0.36			0.71		0.37	0.25	0.34	0.23				0.69	0.63	0.37			0.86		0.21	

Table 3. Slender creeping red fescue (*Festuca rubra* ssp. *trichophylla*) (continued)

c) *Smørum GC, Denmark*

FRT	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1- 9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	7	.	2	7	1	2	2	2	2	1	1	1	7	7	7	7	7	8	.	7	7
22FRL1515	5.2	4.5	6.0	.	97.1	99.1	6.2	5.9	5.3	7.5	5.3	.	48.3	0.6	0.1	0.02	0.1	0.0	0.0	6.1	.	0.0	0.1
Barnoustie	5.6	5.5	5.6	.	97.8	98.8	5.7	5.8	5.1	7.3	5.4	.	13.7	0.0	0.4	0.00	0.3	0.0	0.1	1.7	.	0.0	0.1
Barswilcan	5.4	4.8	5.9	.	96.6	99.2	6.2	5.9	5.6	7.5	5.3	.	20.3	0.3	0.1	0.00	0.1	0.0	0.0	2.5	.	0.0	0.1
Cezanne	5.5	5.2	5.9	.	97.2	99.1	5.8	6.1	5.5	7.4	5.4	.	7.5	0.0	0.5	0.00	0.4	0.0	0.1	0.9	.	0.0	0.1
Charlotte	5.3	5.0	5.5	.	96.7	99.2	6.0	5.8	5.8	7.3	5.7	.	11.7	0.0	0.4	0.00	0.3	0.0	0.1	1.5	.	0.0	0.0
DLFFRT-4624	5.4	5.0	5.8	.	98.2	99.4	6.5	5.8	5.5	7.5	5.5	.	12.3	0.1	0.2	0.00	0.2	0.0	0.0	1.5	.	0.0	0.0
LMGFRT-4631	5.2	4.5	6.0	.	97.8	99.2	5.3	6.0	5.5	7.6	5.5	.	15.7	0.3	0.2	0.00	0.2	0.0	0.1	2.0	.	0.0	0.1
Runa (FRR)	4.8	4.8	4.7	.	96.6	98.1	5.5	5.1	5.0	6.9	6.0	.	15.3	0.2	1.1	0.00	1.1	0.0	0.0	1.9	.	0.0	0.2
SeaMist	4.7	4.0	5.4	.	97.2	98.8	6.0	5.6	5.8	7.3	6.0	.	5.5	0.0	0.6	0.00	0.6	0.0	0.0	0.7	.	0.0	0.2
Sybille	5.5	4.7	6.2	.	96.0	99.3	6.0	6.1	5.6	7.4	5.3	.	20.3	0.0	0.0	0.00	0.0	0.0	0.0	2.5	.	0.0	0.2
<i>p</i>	0.062	0.405	0.002	.	0.533	0.020	0.155	0.011	0.070	0.003	0.020	.	0.001	0.324	0.000	0.4742	0.000	.	0.3212	0.0012	.	0.457	0.572
LSD 5%			0.58			0.64		0.47		0.26	0.45		15.44		0.35		0.36		1.93				

Table 3. Slender creeping red fescue (*Festuca rubra ssp. trichophylla*) (continued)

d) NIBIO Landvik Research Center, Norway

FRT	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1- 9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %						MP, %	Weeds, %		
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024.0	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	6	.	2	7	.	2	2	2	2	1	1	1	7	7	7	7	0	8	0	7	0
22FRL1515	6.4	6.0	6.9	.	59.7	96.2	.	7.9	6.3	8.2	5.3	3.2	2.8	0.0	3.2	3.4	0.3	0.0	.	3.4	.	0.0	.
Barnoustie	6.5	6.3	6.6	.	63.2	98.6	.	7.8	6.7	8.1	6.5	1.5	0.7	0.0	0.6	0.1	0.5	0.0	.	0.2	.	0.0	.
Barswilcan	5.4	4.7	6.1	.	51.2	97.2	.	7.8	6.4	8.0	5.9	0.5	1.5	0.0	0.7	0.1	0.6	0.0	.	0.3	.	0.2	.
Cezanne	6.1	5.7	6.5	.	61.2	97.6	.	7.8	6.4	7.9	6.2	0.3	1.0	0.0	1.0	0.3	0.8	0.0	.	0.4	.	0.0	.
Charlotte	5.8	5.0	6.6	.	57.2	97.4	.	8.0	6.3	8.0	6.3	0.3	0.3	0.0	1.1	0.2	0.9	0.0	.	0.2	.	0.1	.
DLFFRT-4624	5.3	4.3	6.2	.	57.3	97.4	.	7.8	6.5	8.0	6.5	0.3	0.7	0.0	1.0	0.3	0.7	0.0	.	0.4	.	0.1	.
LMGFRT-4631	6.3	5.7	6.9	.	64.3	98.5	.	8.0	6.3	8.0	6.5	0.3	0.7	0.0	0.7	0.3	0.5	0.0	.	0.3	.	0.0	.
Runa (FRR)	4.9	4.3	5.4	.	51.5	93.1	.	7.1	6.4	7.3	6.1	0.0	0.0	0.0	2.6	0.2	2.5	0.0	.	0.2	.	0.2	.
SeaMist	5.4	4.7	6.1	.	57.2	96.6	.	7.5	6.9	7.6	6.5	0.7	0.8	0.0	2.0	0.4	1.6	0.0	.	0.5	.	0.0	.
Sybille	5.9	5.0	6.8	.	57.8	98.5	.	7.7	6.5	8.1	6.7	0.0	1.0	0.0	0.3	0.1	0.2	0.0	.	0.2	.	0.0	.
<i>p</i>	0.010	0.081	<.0001		0.467	0.011		0.001	0.002	0.001	0.002	0.002	0.473		0.005	0.001	0.000			0.002		0.124	
LSD 5%	0.85		0.47			2.56		0.35	0.27	0.36	0.56	1.26			1.40	1.23	0.77			1.26			

Table 4. Ranking of **colonial bentgrass (*Agrostis capillaris*)** varieties after two years testing on putting greens in SCANGREEN trials at: a) Reykjavik GC, (Iceland); b) Apelsvoll Research Center (Norway); c) Smørum GC (Denmark); d) Landvik Research Center (Norway).

a) Reykjavik GC, Iceland

ACAP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2024	2024	2024	2024	2023		2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	2	4		2	4	1	2	2	1	1	1	1		4					5		4	4
Heritage	4.6	4.3	4.9	.	84.8	85.3	6.0	4.5	5.8	5.8	1.0	21.7	18.3	.	0.0	.	.	.	.	3.7	.	0.00	7.0
Jorvik	4.9	4.4	5.3	.	85.7	92.9	6.1	4.8	5.8	5.8	2.0	8.7	3.7	.	0.0	.	.	.	.	0.7	.	0.00	4.8
Musket	4.5	4.2	4.7	.	83.8	85.8	5.8	4.5	5.8	5.8	1.0	19.0	9.3	.	0.0	.	.	.	.	1.9	.	0.00	6.3
Saulsbury	4.7	4.3	5.0	.	83.0	84.2	6.1	4.7	5.9	6.0	1.0	23.0	7.3	.	0.0	.	.	.	.	1.5	.	0.00	7.3
<i>p</i>	0.022	0.106	0.108		0.084	0.249	0.003	0.212	0.057	0.002	<.0001	0.301	0.467		.					0.4666		.	0.548
LSD 5%	0.22						0.14			0.09	0.00												

b) NIBIO Apelsvoll Research Center

ACAP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %				
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2024	2024	2024	2024	2023		2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	3	4		4	4		1	1	1	1	1	1	3	4	4					5		4	4
Heritage	6.6	6.5	6.6	.	95.0	98.7	.	.	5.0	6.3	5.0	28.3	58.3	3.2	0.6	0.6	.	.	.	12.1	.	0.00	0.0	
Jorvik	6.9	7.0	6.9	.	94.9	99.7	.	7.0	5.0	7.0	3.7	30.0	65.0	3.2	0.1	0.1	.	.	.	13.1	.	0.00	0.0	
Musket	5.0	5.8	4.3	.	90.9	93.3	.	7.0	5.0	5.7	2.3	53.3	79.3	3.0	0.6	0.6	.	.	.	16.3	.	0.00	0.0	
Saulsbury	5.2	5.6	4.8	.	91.6	95.0	.	8.0	5.0	6.7	1.0	81.7	97.7	5.7	0.4	0.4	.	.	.	19.9	.	0.00	0.0	
<i>p</i>	0.006	0.023	0.003		0.037	0.021				0.207	0.157	0.009	0.006	0.021	0.5465	0.5465				0.0067		.	.	
LSD 5%	0.94	0.85	1.13		3.18	3.88			0.00			27.00	17.09	1.64						3.58				

Table 4. Colonial bentgrass (*Agrostis capillaris*) (continued)

c) Smørum GC, Denmark

ACAP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2023	2024	MP	RT	TAP		DS	2024	Moss	Poa	Other
No. observations →	2	1	7		2	7	1	2	2	2	2	1	1	1	7	7	7	7	7	8		7	7
Heritage	5.8	5.2	6.5	.	96.9	99.2	6.5	6.3	6.2	5.7	6.1	.	3.5	1.4	0.5	0.0	0.0	0.5	0.0	0.4	.	0.0	0.0
Jorvik	5.7	5.5	6.0	.	95.7	98.8	6.5	6.5	6.3	5.9	5.7	.	1.2	0.0	0.8	0.0	0.0	0.8	0.0	0.1	.	0.0	0.0
Musket	5.2	4.3	6.1	.	97.5	99.4	6.7	6.6	5.9	5.7	5.8	.	2.3	1.6	0.3	0.0	0.0	0.3	0.0	0.3	.	0.0	0.0
Saulsbury	4.9	4.5	5.2	.	94.8	96.9	6.2	6.8	5.9	6.1	6.3	.	6.0	0.8	2.4	0.0	0.0	2.4	0.0	0.8	.	0.0	0.0
<i>p</i>	0.212	0.119	0.214		0.451	0.271	0.138	0.028	0.198	0.001	0.144		0.314	0.289	0.255	0.4547	0.266	0.2638	.	0.3081		0.613	0.455
LSD 5%								0.29		0.14													

d) NIBIO Landvik Research Center, Norway

ACAP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2023	2024	MP	RT	TAP		DS	2024	Moss	Poa	Other
No. observations →	2	1	6		2	7		2	2	2	2	1	1	1	7	7	7	7	0	8	0	7	0
Heritage	7.1	7.0	7.1	.	58.8	98.8	.	7.7	7.1	6.1	5.3	1.8	4.7	1.7	1.1	1.1	0.1	0.0	.	1.6	.	0.1	.
Jorvik	7.0	7.0	6.9	.	56.5	98.9	.	7.6	7.3	6.0	5.2	3.0	5.3	0.7	0.9	0.1	0.4	0.3	.	0.9	.	0.0	.
Musket	7.2	7.0	7.3	.	55.5	99.1	.	7.9	6.9	6.3	5.3	1.8	2.0	1.0	0.9	0.9	0.1	0.0	.	1.0	.	0.0	.
Saulsbury	6.6	6.7	6.6	.	52.2	96.2	.	8.1	7.2	6.8	5.3	12.2	12.3	2.0	3.1	2.3	0.9	0.3	.	3.7	.	0.1	.
<i>p</i>	0.462	0.942	0.050		0.162	0.029		0.005	0.070	0.005	0.782	0.150	0.214	0.285	0.038	0.085	0.016	0.623		0.009		0.506	
LSD 5%			0.49			1.88		0.22	0.30	0.35					1.65		0.44			1.42			

Table 7. Ranking of **perennial ryegrass (*Lolium perenne*)** varieties after two years testing on putting greens in SCANGREEN trials at a) Reykjavik GC (Iceland); b) Apelsvoll Research Center (Norway), c) Smørum GC (Denmark); d) Landvik Research Center (Norway).

a) Reykjavik GC, Iceland

LP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2023	2024	MP	RT	TAP		DS	2024	Moss	Poa	Other
No. observations →	2	2	4		2	4	1	2	2	1	1	1	1		4					5		4	4
Barhodium	3.7	5.9	1.6	.	95.5	42.0	4.9	4.0	.	5.0	1.0	100.0	.	.	0.0	.	.	.	.	0.0	.	0.00	36.0
Beckham	3.7	5.4	2.0	.	91.3	58.8	4.0	5.0	.	5.0	1.0	100.0	.	.	0.0	.	.	.	.	0.0	.	0.00	24.3
Clementine	3.8	5.7	2.0	.	93.0	59.5	4.6	4.7	.	5.0	1.0	100.0	.	.	0.0	.	.	.	.	0.0	.	0.00	18.6
DLFPS-238/3014	2.6	3.9	1.3	.	74.2	32.3	3.5	.	.	.	1.0	100.0	.	.	0.0	.	.	.	.	0.0	.	0.00	40.3
<i>p</i>	0.001	<.0001	0.040		<.0001	0.018	<.0001								.								0.035
LSD	0.38	0.35	0.54		2.48	16.76	0.24																14.643

b) NIBIO Apelsvoll Research Center, Norway

LP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %				
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024						2023	2024	MP	RT	TAP		DS	2024	Moss	Poa	Other
No. observations →	2	3	4		4	4		1	1	1	1	1	1		3	4	4				5		4	4
Barhodium	4.5	4.6	4.4	.	88.8	98.7	.	4.7	4.3	5.0	1.7	100.0	84.7	0.0	0.0	0.0	.	.	.	16.9	.	0.00	0.0	
Beckham	4.4	4.6	4.1	.	90.6	98.2	.	4.0	4.3	5.0	1.0	100.0	89.3	0.0	0.0	0.0	.	.	.	17.9	.	0.00	0.0	
Clementine	4.2	4.7	3.8	.	92.3	97.0	.	4.5	5.3	5.0	5.0	100.0	56.7	0.0	0.0	0.0	.	.	.	11.3	.	0.00	0.0	
DLFPS-238/3014	3.3	3.6	3.0	.	84.7	94.8	.	2.7	8.0	2.7	5.0	96.7	46.7	0.0	0.0	0.0	.	.	.	9.3	.	0.00	0.0	
<i>p</i>	0.003	0.005	0.006		0.016	0.067			0.000	0.000	0.000	0.455	<.0001							<.0001				
LSD	0.47	0.51	0.63		4.00				1.00	0.58	1.15		9.32							1.86				

Table 7. Perennial ryegrass (*Lolium perenne*) (continued)

c) Smørum GC, Denmark

LP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	7		2	7	1	2	2	2	2	1	1	1	7	7	7	7	7	8		7	7
Barhodium	5.0	4.5	5.6	.	97.7	99.4	5.2	5.7	6.3	5.5	4.92	.	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	.	0.0	0.1
Beckham	5.0	4.3	5.6	.	97.3	99.7	4.3	5.7	6.3	5.6	5.08	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0
Clementine	5.2	4.5	5.8	.	98.3	99.5	5.2	5.8	6.3	5.7	5.08	.	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	.	0.0	0.2
DLFPS-238/3014	4.5	3.8	5.2	.	95.5	98.9	4.0	5.0	7.1	4.9	5.83	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.2
<i>p</i>	0.183	0.299	0.076		0.229	0.029	0.025	0.000	<.0001	0.062	0.001				0.455	.	0.126	.	.	.		.	0.763
LSD						0.51	0.80	0.17	0.14		0.29												

d) NIBIO Landvik Research Center, Norway

LP	Overall impression (scale 1-9, 9=best)			Coverage, %			Tiller density (scale 1-9, 9=highest)		Color (scale 1-9, 9=very dark)	Fineness of leaves	Winter color	Overall winter damage, %	Snow molds, %	In-season diseases, %					MP, %	Weeds, %			
	Mean	2023	2024	3 wk afte	2023	2024	2023	2024	2024	2024	2024.0	2024	2024	2023	2024	MP	RT	TAP	DS	2024	Moss	Poa	Other
No. observations →	2	1	6		2	7		2	2	2	2	1	1	1	7	7	7	7	0	8	0	7	0
Barhodium	6.6	7.0	6.3	.	74.8	98.4	.	7.2	6.5	6.3	5.8	0.7	2.0	0.3	1.2	0.9	0.4	0.0	.	1.1	.	0.00	.
Beckham	6.1	6.0	6.1	.	67.5	98.0	.	6.9	6.4	6.2	5.5	0.3	0.7	0.0	1.5	0.9	0.7	0.0	.	0.9	.	0.00	.
Clementine	5.8	6.0	5.6	.	67.8	96.9	.	6.7	6.5	6.4	5.2	1.3	1.7	0.0	1.6	1.0	0.8	0.0	.	1.1	.	0.00	.
DLFPS-238/3014	5.1	5.0	5.1	.	68.3	97.1	.	6.0	8.0	4.8	6.7	0.0	0.0	0.0	0.7	0.2	0.5	0.0	.	0.2	.	0.05	.
<i>p</i>	<.0001	<.0001	0.011		0.032	0.175		0.010	0.000	0.001	0.039	0.385	0.102	0.455	0.049	0.018	0.282			0.018		0.455	
LSD	0.29	0.00	0.59		4.96			0.56	0.38	0.50	0.96				0.64	0.46			0.53				