

RESEARCH PROJECT

Project title:	FAIR-WATER I: Towards better drought resistance and reduced water consumption on golf course fairways
Date of report:	19 January 2024
Project start date:	Project completion date: 31 December 2025
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Funding, kSEK							
	2021	2022	2023	2024	2025	2026	Total
STERF			567	572	580	0	1719
Other sources			629	491	250	0	1370
Total			1196	1063	830	0	3089

Project objectives
<p>The principal objective of this project is to develop management strategies for resilient golf fairways that retain acceptable quality with no or strongly reduced consumption of potable irrigation water. Specific objectives are to:</p> <ul style="list-style-type: none"> • Identify the most drought-resistant cultivars of turfgrass species/subspecies commonly seeded on fairways in Northern Europe, including mixtures of species. • Screen seven soil surfactants for their potential to prevent drought stress, reduce water consumption and enhance recovery after drought. • Validate in field trials in Norway and Germany the two most drought-tolerant blends/mixtures and the two best-performing surfactants identified in previous steps to optimise fairway quality under drought.

Project summary and status January 2024
<p>During the past decade, many golf courses (GCs) have experienced more frequent and more severe droughts due to climate change. Scarcity of potable water for irrigation is now an issue even in the Nordic countries. This project is studying methods to reduce irrigation while retaining turf quality on golf course fairways. The project has three work packages (WPs), of which two started in 2023: In WP1, turfgrass breeders and seed companies throughout Europe and North America were invited to submit seed of their most drought-resistant varieties. The invitation resulted in 42 varieties</p>

representing 10 species which were sown on a sandy soil in mid-May 2023. The original plan was to impose drought under a rain shelter in July. However, due to slow grow-in, notably of some fine fescues, the varieties were allowed to develop mature canopies with more and deeper roots and an extended drought period will be initiated in 2024.

In WP2, we are currently testing the capacity of soil surfactants to retain fairway quality, while minimising irrigation inputs in a trial under a mobile rain shelter operated by a rain sensor. Seven surfactants were applied according to their label (two applications 3 weeks apart for most) to a Kentucky bluegrass/red fescue stand before imposing drought from 14 July to 8 September 2023. The products (and collaborating company) were: H2PRO Trismart (ICL), Qualibra (Syngenta), Magnum 357 Calibre (Indigrow), PBS 150 Liquid (Aqua Aid), Hydra 30+ (Aqua Aid), ProWet Evolve (RhizoSolutions/Turf Care), and Revolution. Additional treatments included a negative control (same drought period, but no surfactant) and a positive control that was irrigated to field capacity three times a week. Digital images were taken of each plot three times a week and analysed using the software Turf Analyzer (<https://turfalyzer.com>). Plots were hand-irrigated with 8 mm every time turf coverage was <70% (see photos). There were no significant differences in turf quality, turf coverage or water use between the surfactant treatments. On average for the seven products, water use during the 8-week period was 54 mm on surfactant-treated plots and 70 mm on untreated plots with reference evapotranspiration of 136 mm. This experiment will be repeated in early summer 2024.

In WP3, we are planning parallel trials to be conducted at NIBIO Landvik, Norway, and Osnabrück University, Germany, in 2025 (and perhaps 2026), combining the most drought-resistant varieties from WP1 with the best surfactants from WP2.