Performance of Estonian native turfgrasses on lawns

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Introduction
Herbage breeding is in an advantageous position in Estonia: about 1.3% of the country’s territory is occupied by grassland biotopes, which have likely never been seeded with commercial seed. The exploitation perspective of indigenous grass genepool in Estonia is approved by the fact that five out of six registered domestic turfgrass varieties originate from our semi-natural grasslands.

The collection of grass accessions preserved in the genebank of Jõgeva Plant Breeding Institute has been continuously replenished since 2002 with the samples collected all over the country. The initial screening of unselected wild grass accessions on extensively managed lawns serves a goal of breeding varieties that are based exclusively on indigenous genepool. We assume that native plant genotypes tolerate poor soil fertility, have evolved to withstand local races of plant pathogens, adverse climatic conditions in summer and winter. We also explore the lawn performance of minor or unexploited grass species.

Material and methods
Two turf trials were carried out at Jõgeva Plant Breeding Institute in 2004–2009 and 2009–2012. The purpose was to assess the mean general appearance of grass ecotypes. Estonian varieties of Festuca rubra, Poa pratensis, Lolium perenne, Agrostis capillaris and Koeleria macrantha stood for check varieties. There were 12 species (Figure 1), including foreign cultivars of Festuca rubra, Lolium perenne, and Poa supina. The management featured mowing at a height of 3–4 cm at one to two weeks interval, depending on the vigour and season. The annual compound fertiliser applications were equivalent to N 130, P 20, and K 70 kg ha⁻¹. We ranked the accessions based on their visual merit—a generalized score that combines leaf fineness, sward density, greenness, disease resistance, and uniformity of growth. The plots were observed at monthly intervals on a 1–5 scale.

Results and discussion
In the experiments, altogether 8 wild accessions among 72 Festuca rubra, one accession among 38 Poa pratensis, 17 Agrostis capillaris, and 4 Festuca ovina exceeded the aesthetic value of the respective checks. The highest mean scores among the ecotypes were assigned to F. rubra ssp. commutata and Deschampsia caespitosa (both 4.1), followed by P. pratensis (4.0), F. ovina (3.8), and A. capillaris (3.5). Visual merit of the wild accessions of D. flexuosa, Briza media, F. arundinacea, Poa subcaerulea, P. nemoralis, P. compressa, and Phleum phleoides remained between 1.1–3.3. Among the varieties, F. rubra ssp. commutata ranked higher (4.5) than Koeleria macrantha (4.3) and P. pratensis (4.0).

Better turf qualities (e.g. sward density, fine texture and uniformity of growth) of breeding lines in relation to unselected ecotypes approve the efficiency of selection.

Conclusion
Natural genepool of Festuca rubra, Poa pratensis and Deschampsia caespitosa has the best outlook for indigenous turfgrass breeding in Estonia. F. rubra and P. pratensis hold sufficient phenotypic variability for selection and are easily procurable from a wide range of habitats all over the country. The major merits of unimproved wild accessions is adding variation in turf coloration and competitive ability within the collection.