

# Identification of forage grasses germplasm for water-limited environments and different soil type

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Permanent grassland are a source of healthy forage for a large group of ruminant animals. They also serve to conserve biodiversity, reduce environmental pollution, including nitrogen oxide and sulfur in the air. They can contribute to the agro ecosystem sustainability by reducing soil erosion and conserving soil water. Ecotypes may provide genetic resources to improve resistance / tolerance for water stress limit or different soil type. Water conservation is the responsibility of every citizen, not just in areas with drought or low moisture conditions. Drought resistance is being increasingly labelled as being a 'complex trait'. We also need to take into consideration soil conditions, lighting, use and maintenance issues, and even the visual appearance. Preliminary tests could be conducted under control conditions, however finally obtained results should be confirmed under field conditions.

In the recent study as a plant material ecotypes and commercial hybrid which belong to 7 cool-season grass species were used: tall fescue (*Festuca arundinacea*), meadow fescue (*Festuca pratensis* Huds.), red fescue (*Festuca rubra* L.), perennial ryegrass (*Lolium perenne* L.), Timothy-grass (*Phleum pratense*), Kentucky bluegrass (*Poa pratensis*) and Deschampsia cespitosa. Ecotypes were collected from semi-natural area representing different part of Poland. Next, based on the preliminary description, 15 – 17 genotypes which represent each species, were included into recent study. Collection is evaluated under field experiments (seed production system – one environment and green mass production system – second environment) and under greenhouse conditions (water limit tolerance and soil type tolerance).

For the greenhouse test seedlings were taken from the experiment conducted under field conditions and after vegetative propagation they were planted into pots. They grow for six weeks at an optimum moisture content of the soil (35 – 42%; soil type - mixture: 3 peat : 1 sand), cut every 7 days at a height 7 cm (red fescue - 4 cm), and regrowth measured.

After this time resistance for water deficit and different type of soil was evaluated. Different type of soil test is conducted in three treatments: control (mixture: 3 peat : 1 sand) and two types of soil taken from devastated area Water deficit test:- two treatments (control - optimal soil moisture and treatment where watering was stopped and soil moisture quickly go down to 8 – 10% and after 4 weeks, when the first genotypes start to dry up, watering started again and capacity for regeneration was determined; the same soil type in both treatments). It was found that: (1) timothy, and red fescue are characterized by the largest decrease in the rate of regrowth with a deficit of water, (2), tall fescue and Deschampsia cespitosa quickly regenerating after a period of water deficit (3 ) meadow fescue has a low ability to regenerate after water deficit, and (4) in all species it was possible to find genotypes tolerant for water deficit.

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