

FROST TOLERANCE IN MARSH BIRDSFOOT TREFOIL (Lotus pedunculatus)

J.H. McAdam and L.V. Lynch

Department of Agricultural Botany, Queen's University,
Newforge Lane, BELFAST BT9 5PX, N. Ireland.

A screening technique for frost-tolerance in L. pedunculatus cv. 'Grasslands Maku' involving 14 days hardening (5 days at 13°C followed by 9 days at 1.5°C) and 16 or 32 hours freezing at -8°C was developed. The frost-tolerance of the species in relation to freezing duration, plant age and soil pH was investigated with the parameters plant survival, leaf area, dry weight, visual leaf damage score and nitrogen fixation being assessed.

Plant survival, leaf area and plant dry weight were reduced and leaf damage was increased by freezing. Nitrogen fixation (assessed after thawing using the acetylene reduction technique) was stopped by freezing but following 16 hours freezing, recovered to its previous level after 18 days although 32 hours freezing caused a complete cessation of nitrogen fixation, even where the plants were not killed.

Frost damage was found to be primarily dependent on the duration of the freezing period and on the size of the plants rather than on plant age. Frost-tolerance of plants was unaffected by the pH of the growing medium.