

Abstract

Many orchid species are seriously endangered at present. Reasons for their disappearing from natural habitats remain often unclear. Orchids depend on mycorrhizal symbiosis in nature, however only little is known about this symbiosis. Seeds of some species do not germinate *in vitro*, making their cultivation for scientific and rescue purposes impossible. We found that seed germination of one of such reluctant species, *Pseudorchis albida*, is strongly inhibited by nitrates even at extremely low concentrations. As this species prefers oligotrophic mountain meadows, nitrate-induced inhibition probably take place in natural conditions. Surprisingly, we found similar but slightly weaker inhibitory effect also in typical mesophilic species and even in slightly eutrophic ones. The sensitivity to nitrates correlates with trophy level of species canopy. This inhibitory effect of nitrates could be weakened by application of a range of growth regulators, including auxins, cytokinins and gibberellins, and also by mycorrhizal fungi. The action of nitrate reductase is essential for this inhibitory effect of nitrates. Experiments with NO donors, scavengers, and NO quantification are pointing right at NO as compound which perhaps mediates nitrate inhibitory effect. Based on these results, the nitrate inhibitory effect on orchid seed germination seems to be a part of a complex regulatory network.