Nitrates affect orchid seed germination depending on orchid species and fungal symbiont

Tomáš FIGURA[1,*], **Jan PONERT**[1,2]

[1] Department of Experimental Plant Biology, Faculty of Science, Charles University, Viničná 5, CZ-128 44, Prague, Czech Republic
[2] Prague Botanical Garden, Trojská 800/196, CZ-171 00, Prague, Czech Republic
[*] **figura.tomas@gmail.com**

Many orchid species recently disappeared from their sites without obvious reason and mature seeds of such species do not germinate in vitro, making its cultivation for scientific or rescue purposes impossible. We focused on nitrates as possible inhibitors of orchid seed germination. We tested whether seeds of various terrestrial orchids would be sensitive to nitrates at naturally occurring concentrations. We sowed seeds both symbiotically (*Ceratobasidium, Sebacina, Tulasnella*) and asymbiotically *in vitro*. The response differed markedly between taxa and was different in presence of fungal symbiont. In asymbiotic culture, *Pseudorchis albida* native to oligotrophic mountain meadows was extremely sensitive to nitrates while *Himantoglossum robertianum* and *Anacamptis laxiflora* which frequently occupy nutrient-rich biotopes like abandoned fields and eutrophic marshes, were nearly insensitive. The sensitivity generally correlated with trophy level of studied species. In symbiotic cultures, some fungi were able to induce germination even at concentrations, which were inhibitory in asymbiotic culture indicating that the fungi are able to modulate the nitrate effect on orchids.

Soil nitrate concentration has been increasing rapidly in last century. Therefore, nitrate deposition could be partially responsible for recent decrease in number of European orchid sites.

Suported by project LO1417 of Czech ministry of Education Youth and Sports.