Abstract

The aim of the diploma thesis was to design protocols and other subsidiary educational materials that could be used at secondary highschools for the purpose of teaching experimental plant biology, which demonstrates the importance of mineral nutrition necessary for growth of plants and for society. These educational materials should also help students better understand principles of scientific work and raise their interest in experimental plant biology. The diploma thesis was worked out on the basis of integration of our team from the Department of Plant Physiology in the international project GLOBE – Carbon cycle[2].

Literary introduction was written as a theoretical background for the practical part of the thesis as the text is supposed to serve as an educational and factual basis for teachers or interested and talented students. It summarises basic knowledge about the history of mineral nutrition, effects of fertilization on agriculture and on evolution of civilization. It also records the progress of ideas about mineral nutrition and resumes the basic findings about its importance for a plant, which includes the intake and transport of elements of mineral nutrition and the effect of their insufficiency on the growth of a plant. These findings were enriched with additional information from scientific journals.

For designing the protocols and educational materials it was necessary to select and verify experiments that would induce deficiency of a particular element of mineral nutrition. There had to be fulfilled several criteria for the selection of an experiment. The experiment had to be simple, 100% reliable, financially and materially modest, and demonstrative in terms of an observed effect and in terms of principles of scientific work, which includes the process of laying down and proving the hypothesis and conclusion about its validity. The experiments that induce deficiency of nitrogen, potassium, phosphorus, magnesium, iron and calcium proved to be the most reliable. Protocols created for these experiments were introduced to seven pilot schools at the GLOBE seminar in May 2008. Verification and finalization of the protocols proceeded in several ways in collaboration with the association TEREZA. Firstly the materials were verified during the personal presentations at pilot schools and secondly by questionnaires sent to teachers from pilot schools. The protocols were modified according to the feedback from the pilot schools in order to be feasible and in compliance with the conditions at secondary highschools. Educational materials in the

[2] http://www.globe.gov/projects/carbon, http://kfrserver.natur.cuni.cz/globe/index.html

diploma thesis were conveyed to the project management of the project GLOBE – Carbon cycle and they are tested at pilot GLOBE schools in the USA. According to the feedback it should be to some extent possible to incorporate the educational materials into GLOBE protocols in more countries all over the world.