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# Assessment of forest nutrient pools in view of biomass potentials - a case study from Austria oak stands

S. Yan (1,4), V. J. Bruckman (1,2), G. Glatzel (1,2), and E. Hochbichler (3)

(1) Institute of Forest Ecology, Department of Forest and Soil Science, University of Natural Resources and Life Sciences, Vienna, Austria (yanshuai111@gmail.com), (2) Commission for Interdisciplinary Ecological Studies (KIOES) of the Austrian Academy of Sciences. Vienna, Austria (viktor.bruckman@oeaw.ac.at), (3) Institute of Silviculture, University of Natural Resources and Life Sciences, Vienna, Austria (eduard.hochbichler@boku.ac.at/ , (4) Northwest A&F University, Yangling, China

As one of the renewable energy forms, bio-energy could help to relieve the pressure which is caused by growing global energy demand. In Austria, large area of forests, traditional utilization of biomass and people's desire to live in a sound environment have supported the positive development of bio-energy. Soil nutrient status is in principle linked with the productivity of the aboveground biomass. This study focuses on K, Ca and Mg pools in soils and aboveground biomass in order to learn more on the temporal dynamics of plant nutrients as indicators for biomass potentials in Quercus dominated forests in northeastern Austria. Three soil types (according to WRB: eutric cambisol, calcic chernozem and haplic luvisol) were considered representative for the area and sampled. We selected nine Quercus petraea dominated permanent plots for this study. Exchangeable cations K, Ca and Mg in the soils were quantified in our study plots. Macronutrients pools of K, Ca and Mg in aboveground biomass were calculated according to inventory data and literature review. The exchangeable cations pool in the top 50 cm of the soil were 882 – 1,652 kg ha-1 for K, 2,661 to 16,510 kg ha-1 for Ca and 320 – 1,850 kg ha-1 for Mg. The nutrient pool in aboveground biomass ranged from 29 to 181 kg ha-1 for K, from 56 to 426 kg ha-1 for Ca and from 4 to 26 kg ha-1 for Mg. The underground exchangeable pools of K, Ca and Mg are generally 10, 22 and 58 times higher than aboveground biomass nutrient pools. Our results showed that the nutrient pools in the mineral soil are sufficient to support the tree growth. The levels of soil nutrients in particular K, Ca and Mg in our study areas are reasonably high and do not indicate the necessity for additional fertilization under current silvicultural practices and biomass extraction rate. The forest in our study areas is in favorable condition to supply biomass as raw material for energy utilization.