Geophysical Research Abstracts
Vol. 12, EGU2010-9608, 2010
EGU General Assembly 2010

Root characters of Lucerne (Medicago sativa L.) under rain-fed and irrigated conditions

amir raza (1), Ali Moghaddam (1), Willibald Loiskandl (2), Jürgen K. Friedel (1), Margaritta Himmelbauer (2), and Gernot Bodner (3)

(1) Division of Organic Farming (IFÖL), Department of Sustainable Agricultural Systems, University of Natural Resources and Applied Life Sciences (BOKU), Vienna, Austria.Author: IFÖL, BOKU, Gregor Mendel Str. 33, A- 1180, Vienna, Austria. Phone (Fax): +43 1 47654 3775 (3792), E-mail: amir.raza@boku.ac.at, (2) Institute of Hydraulics and Rural Water Management, BOKU, Vienna, Austria, (3) Institute of Agronomy and Plant Breeding, Department of Applied Plant Sciences and Plant Biotechnology, BOKU, Vienna, Austria

In organic farming, only limited use of selected fertilizers is allowed and plants have to meet their nutritional requirements through mobilization of nutrients provided by organic amendments, crop residue input within the rotation, and released from the soil reservoir. The crop varieties used in such systems shall be efficient in nutrient and water uptake. Root length, surface area and depth distribution are important root characters that demonstrate a potential for nutrient and water uptake. Detailed information on these root characters is lacking for Lucerne, one of the most important legume crop widely used in organic farming. A study was designed to compare three lucerne cultivars from different geographical origin viz. Niva, Mohajaren and Sitel for their root characters in two different sets of experiments planted under rain-fed and irrigated conditions in 2007. The irrigated experiment should provide root traits under potential growth conditions while the rain-fed experiment should highlight root characteristics under water limited conditions. The experiments were conducted on fields of the research station Groß Enzersdorf of the University or Natural Resources and Applied Life Sciences(BOKU), Vienna, Austria. Both experiments were laid out in -lattice design with two replicates. At the end of vegetation period, root samples were taken for every 30 cm soil profile depth till the depth of 90 cm. From each plot, one sample was taken on the row and two samples between the rows using a cylindrical auger for sampling depth of 0 - 30, 30 - 60 and 60 – 90 cm. Root samples were washed out and analyzed with WinRhizo software to determine root length, surface area, root volume and average diameter. Results revealed that cultivars under rain-fed conditions had higher root length density and surface area than under irrigated conditions. The differences in root parameters estimated for each of the Lucerne cultivars are discussed.