Analysis of the relationship between root development, field performance and resource capture of 4 contrasting lettuce cultivars under transplant stress

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In conventional agriculture, breeding of modern lettuce cultivars (Lactuca sativa L.) has been focusing mainly on types with high shoot:root ratios, providing high yields, but with minor demands on the roots as conventional farming systems are able to supply a constant flow of water and nutrients. Organic agriculture aims at optimizing the production system rather than the individual crop, and thus has fewer means to control growing conditions. Improving the root system of lettuce is thought to provide varieties better adapted to the fluctuant growing conditions of organic/low input systems. This study was undertaken to investigate the effect of transplant stress on the relationship between root development, nitrate and water uptake, and product quality of 4 contrasting lettuce genotypes at 3 transplant ages (i. e. 3 shoot:root ratios). Three field trials were performed at 2 locations (Wageningen, NL, in spring 2009 and 2010, and Voorst, NL, in spring 2009).