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Airborne hyperspectral and LiDAR data integration for weed detection

János Tamás (1), Éva Lehoczky (2), János Fehér (1), Tünde Fórián (1), Attila Nagy (1), Éva Bozsik (1), Bernadett Gálya (1), and Péter Riczu (1)

(1) University of Debrecen, MÉK, Debrecen, Hungary (attilanagy@agr.unideb.hu), (2) Hungarian Academy of Sciences, Institute for Soil Science and Agricultural Chemistry

Agriculture uses 70% of global available fresh water. However, ca. 50-70% of water used by cultivated plants, the rest of water transpirated by the weeds. Thus, to define the distribution of weeds is very important in precision agriculture and horticulture as well. To survey weeds on larger fields by traditional methods is often time consuming. Remote sensing instruments are useful to detect weeds in larger area. In our investigation a 3D airborne laser scanner (RIEGL LMS-Q680i) was used in agricultural field near Sopron to scouting weeds. Beside the airborne LiDAR, hyperspectral imaging system (AISA DUAL) and air photos helped to investigate weed coverage. The LiDAR survey was carried out at early April, 2012, before sprouting of cultivated plants. Thus, there could be detected emerging of weeds and direction of cultivation. However airborne LiDAR system was ideal to detect weeds, identification of weeds at species level was infeasible. Higher point density LiDAR – Terrestrial laser scanning – systems are appropriate to distinguish weed species. Based on the results, laser scanner is an effective tool to scouting of weeds. Appropriate weed detection and mapping systems could contribute to elaborate water and herbicide saving management technique.
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