An electrostatic quadrupole to assess the *in situ* water content of rapeseed canopy . Apllication to the precocity discrimination among Rapeseed cultivars

P. Boissard[1], J.-J. Schott[2] and J.-P. Buis[3]

[1]Institut National de la Recherche Agronomique, Unité de Recherches Intégrées en Horticulture, Route des Colles, Sophia-Antipolis, 06410 Biot, France
[2]GEVES Unité expérimentale de la Minière, 78285 Guyancourt Cedex, France
[3]CIMEL Électronique, 172 rue de Charonne, 75011 Paris, France

An electrostatic multipole-quadrupole (xy dimensions = 0.5m x 0.5m, z adjustable), devoted to the in situ and non-destructive estimation of plant water content is presented. This technique potentially offers an alternative to the gravimetric method of water content determination by weighing the fresh and the dry biomass. A previous theoretical study on wheat has shown that the multipole can assess the water content vertical profile of horizontally stratified canopies and an experimental validation has been performed showing that simultaneous estimations of spike and stem water contents can be performed. A new experiment was designed in La Minière (France) in order to test the capability of the multipole, used as a quadrupole, to discriminate among rapeseed cultivars in field conditions, as far as precocity is concerned. Results showed that the quadrupole can detect variations of plant water content between plots at a given time but differences are mainly explained by grain and siliqua amount inside the siliqua measured space (upper layer of the rapeseed canopy). However temporal measurements of marked plots carried out in order to follow the water content several weeks before the harvest proved to be useful to discriminate among the cultivars and to analyze the precocity range. Especially one noticed that this non-destructive methodology is a new way to separate between two agronomical variables: the biomass amount and the plant percentage of humidity. In the near future the electrostatic quadrupole could help forecasting the yield or the harvest time.