Many endophytic bacteria possess plant growth promoting properties (Ryan et al., 2008). We are investigating the possibility of exploiting these plant growth promotion properties for improving agricultural sustainability of bioenergy crop production (Germaine et al., 2010). Our focus is on two bioenergy crops Miscanthus (used for biomass production) and Oilseed rape (used for biodiesel production). An experiment was designed to screen this collection of strains for growth promotion in Oilseed rape which involved inoculating seeds with mixed inocula and a number of treatments were found to have resulted in a significant increase in plant biomass. The strains from these mixed inocula were inoculated individually onto Oilseed rape to assess their potential contributions to plant growth promotion and they were characterized in more detail for phosphate solubilization, indole-3 acetic acid production, ACC deaminase activity, production of volatile compounds, biocontrol ability, resistance to heavy metals and metabolism of organic xenobiotics (Redondo-Nieto et al., 2012). The data indicated that there was a correlation between the growth promotion observed through inoculation of multiple strains and the presence of various plant growth promotion traits carried by these strains. A field trial is planned this year in collaboration with Teagasc (the Irish Food and Agricultural research institute) on Oilseed Rape to evaluate survival of selected strains within the crop under field conditions and to determine their effect on plant growth and seed yield.

**Keywords:** Pseudomonas, endophyte, plant growth promotion, Miscanthus, Oil seed rape