Considerable interest in methane (CH$_4$) sources and sinks has arisen due to reports of a gradual increase in atmospheric CH$_4$ concentrations of 1% per year (Blake & Rowland, 1988). Because of the role of CH$_4$ in tropospheric and stratospheric chemistry and absorption of planetary infrared radiation, such an increase has implications for ozone (O$_3$) depletion and global warming. For example, Pearce (1989) estimates that atmospheric CH$_4$ levels account for 18% of current greenhouse warming, and will be the major greenhouse gas within 50 yr.

Flooded rice (Oryza sativa) has been identified as the most important source of anthropogenic CH$_4$, with estimates of annual emissions ranging between 50 to 170 Tg yr$^{-1}$ and representing 21 to 25% of total emissions from all sources (Schütz et al., 1989; Sass et al., 1990). These levels are likely to increase as rice production expands to meet the needs of rising populations. Furthermore, management strategies utilized in flooded rice systems may enhance CH$_4$ emissions. For example, green manures, while contributing significantly to the sustainability of rice production in poorer countries where inorganic fertilizers are otherwise unavailable or expensive, may promote CH$_4$ production by providing C substrate for methanogenic bacteria. Schütz et al. (1989) and Yagi and Minami (1990) reported significant increases in CH$_4$ emissions with rice straw. However, no research has been conducted to determine CH$_4$ emissions from green manures.

The objectives of this experiment were to: (i) quantify and compare CH$_4$ emissions over a growing season from flooded rice with and without a green manure amendment; and (ii) determine the effect of soil type on CH$_4$ emissions from this system.