FIELD PENNYCRESS (*Thlaspi arvense*

Research Initiative competitive grant #
of the USDA National Institute of Food

INTRODUCTION

Field pennycress (*Thlaspi arvense* L.) is a new potential oilseed crop that is currently being evaluated as a domestic source of biodiesel fuel. Pennycress belongs to the *Brassicaceae* family and grows as a common weed throughout the temperate climate in North America. The seed contains between 20-36 wt % of oil with high levels of erucic, linoleic, and other unsaturated fatty acids (Moser et al., 2009). This oil profile enables production of biodiesel with a high cetane number and excellent low

-

0 0

MATERIALS AND METHODS

Growth Chamber Experiment:

A growth chamber experiment was conducted using a non-dormant spring pennycress, 'Spring 32', and a dormant winter line, 'W12'. Growth chamber conditions were set to an 18 hour photoperiod (7.9µE/m^2/sec) with day/night temperatures of 24°C and 20°C, respectively. After germination, five uniform seedlings were transplanted into individual 7.5 cm square pots containing nitrogen rates of 0, 25, 50, 75, 100, and 125 lbs. of nitrogen per acre for the spring line. The same protocol was followed for the winter line but also included nitrogen rates in combination with 10 and 25 lbs. of sulfur. The winter line required 20 days of cold treatment at 4°C to induce flowering. The source of nitrogen was granulated urea fertilizer (46-0-0), and the source for sulfur was Disper-Sul (90%). Fertilizer was applied at the time of seedling transplant by hand. A wicking system was used throughout the experiment to adequately water the plants (Figure 1). Sixty days after transplanting, the plants were hand harvested at the time of full maturity (Figure 2).

Oil, Plant, and Data Analysis:

Total oil and fatty acid methyl ester content was determined utilizing an Agilent 6890 gas chromatograph with a flame ionization detector. Nitrogen % in seed and dry matter was determined by a LECO CHN2000 analyzer. Nitrogen use efficiency was calculated as seed yield (g) produced per unit of N supply (g), that is, NUE=seed yield/(Nt + Nf). Nt equals N derived from soil as determined by N uptake in seed + straw in control plots where zero-N fertilizer was applied, and Nf equals amount of N from fertilizer. Analysis of variance (ANOVA) was performed by Excel software.

RESEARCH FUNDING