

EVALUATION OF MEDIC SPP. AS A POTENTIAL COVER CROP IN CORN AND SOYBEANS. Douglas D. Buhler, E. Charles Brummer, Keith A. Kohler*, and Lowell D. Sandell*, Chair and Professor, Associate Professor, Research Technician, and Agricultural Specialist, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824, Department of Agronomy, Iowa State University, Ames IA 50011, USDA-ARS National Soil Tilth Laboratory, Ames, IA 50011, and Department of Agronomy, Iowa State University, Ames, IA 50011.

Intercropping forage legumes with row crops such as corn has been proposed as a strategy to suppress weeds, control soil erosion, and contribute nitrogen to companion or subsequent crops. *Medic* species are annual legumes extensively used in Australian farming systems and as a cover crop in California. These species are relatively uncommon in the Midwest United States, yet possess many desirable attributes that would make them candidates for use as a cover crop in a corn/soybean rotation. Sufficient genetic variability exists within *Medic* species to allow for selection of plant types specifically suited for use as smother plants. The incorporation of a *Medic* cover crop may have the potential to aid in the correction of many significant environmental issues associated with current production practices. Developing symbiotic cover crop varieties that are compatible with primary crops may provide assistance in reducing soil erosion, reducing weed pressure, and providing soil nutrient and soil quality benefits.

The model for a successful cover crop is a plant that can produce dense vegetation quickly while not growing too tall to compete with the primary crop species. Another aspect of a successful cover crop is life cycle duration. Currently, many species that are considered viable options have a life cycle that is too long and results in excessive competition with the primary crop species. The numerous varieties of annual *Medic* species provide a wide breadth of plant growth capabilities that display a range of suitability for use as cover crops. For this reason a *Medic* nursery was established in Ames, IA in 1996 and 1997. This nursery of 25 *Medic* species, replicated four times was established to evaluate the suitability of a wide range of genetic material. Plant height, ground cover, life cycle length and a comprehensive relative suitability rating, on a 1 to 10 scale, were evaluated in this study.

There were wide ranges in each data parameter collected for these varieties each year. In 1996 plant height ranged from 5 to 34 cm, percent ground cover ranged from 34 to 90, and plant maturity ranged from fully vegetative to near 90% bloom. In 1997 plant height ranged from 3 to 27 cm, percent ground cover ranged from 49 to 89, and plant maturity ranged from full vegetative growth to 95% bloom. When comparing the comprehensive suitability ratings over years, the *Medic* varieties 'polymorpha, p.i.283651' (poly51) and 'disciformis, p.i.487333' (disci33) were among the highest rated each year. These two species had intermediate height, 21 and 13 cm for poly51 and 16 and 8 cm for disci33 in 1996 and 1997, respectively. The ground cover measurements for these species were not numerically the highest, but they did not differ significantly from the species with the highest mean in each year. Both varieties were among the furthest advanced in their life cycle at the time of data collection. In contrast, non-*Medic* varieties of annual forages included in the nursery ('Mecca II' and 'Vernal') were rated as the least suitable entries for each year. These varieties were characterized by tall plant height, 23 and 26 cm for 'Mecca II' and 24 and 24 cm for 'Vernal' in 1996 and 1997, while attaining % ground covers of 43 and 49 for 'Mecca II' and 39 and 58 for 'Vernal' in 1996 and 1997. At the time of data collection in 1996, both varieties displayed less than 10% bloom, while in 1997 both varieties were absent of bloom, and were continuing to compile vegetative growth.

Considering this wide range in genetic potential and the multiple morphological factors needed to achieve appropriate plant architecture, breeding compatible cover crops may be a difficult yet attainable goal.