

**Cooperative Project To Develop Birdsfoot Trefoil
With Multiple Disease Resistance**

D. R. Viands, N. J. Ehlke, Y. A. Papadopoulos, and R. R. Smith

Cornell Univ., Ithaca, NY;
Univ. of Minnesota, St. Paul, MN;
Agriculture Canada, Nappan, Nova Scotia;
U.S. Dairy Forage Research Lab., Madison, WI.

During the 1993 technical committee meeting of the NE-144 Regional Cooperative Research Project, "Forage Crop Breeding to Improve Yield and Stability", breeders indicated that specific pathogens recently were identified in different areas of North America that reduce productivity and stand life of birdsfoot trefoil. Because of limited resources for breeding birdsfoot trefoil, each breeder is not able to embark on a new breeding program for every disease resistance. Therefore, plans were developed this past year to cooperate in breeding birdsfoot trefoil with multiple disease resistance.

The table below lists the cooperators and the pathogen(s) isolated from each location. Because of apparent plant genotype X *Fusarium oxysporum* isolate interaction for disease severity, the isolates from NY and WI will be treated separately in the selection programs.

<u>Location</u>	<u>Breeder</u>	<u>Pathologist</u>	<u>Pathogen</u>
Minnesota	N. J. Ehlke	D. Samac	<i>Fusarium acuminatum</i> <i>F. equisiti</i>
Wisconsin	R. R. Smith	C. R. Grau	<i>F. oxysporum</i>
New York	D. R. Viands	G. C. Bergstrom	<i>F. oxysporum</i>
Nova Scotia	Y. A. Papadopoulos	J. Kimpinski	<i>Pratylenchus penetrans</i>

Each cooperator will conduct recurrent phenotypic selection for resistance to the disease identified at his/her location. Selection will be done within a source population from each of the other cooperators as well as his/her own. Source populations will be kept separate until three to four cycles of recurrent selection are complete. At the completion of selection, the following is proposed:

1. Determine progress from selection for resistance to each of the diseases.

2. Evaluate the impact resistance makes on productivity and persistence at various field locations.
3. Return selected subpopulations to the breeder from which they were derived. Each breeder has the option of pooling subpopulations derived from his/her own source population. Pooling subpopulations probably will result in a population with moderate levels of resistance to all these diseases. If desired, further selection may increase the level of resistance.

We hope this research will result in birdsfoot trefoil germplasm with resistance to many of the major diseases that limit production within northern USA and Canada. This cooperative effort is necessary where breeders are able to devote only a small proportion of their total effort on this crop. Collectively, significant impact is anticipated in developing birdsfoot trefoil that will maintain broad adaptation.