

Plant Pathology Green House Needed at the Langdon Research Extension Center

Our farmers grow a wide range of field crops here in North Dakota! We continue to require science based research regarding crop diseases to achieve results fast enough to assist growers avoid production losses of yield and quality. Our region has had a tough past with crop diseases seeing the loss of the durum triangle in the 1990's from scab, no more barley production and the threat of losing acres to new soil borne diseases threatening pulse crops and canola. Weather in the Langdon area is congenial for pests especially crop disease development year after year. Our climate poses an opportunity for an expanded crop disease research program at Langdon.

Research Project Enhancements with the Addition of a Plant Pathology Greenhouse

Clubroot Pathotype Determination: Situation demands faster results as the disease is spreading rapidly in North Dakota where no chemical control for this disease exists. Only the use of resistant canola varieties work. Using resistant varieties frequently leads to resistance breakdown due to development of new pathotypes/races. In order for me to determine the pathotypes/races of clubroot in ND, it took one year to get 25 percent of my sample results. To speed up the work on all the samples I was invited to their greenhouse to complete the remaining work. **Note:** The researchers we have been collaborating are from University of Alberta, Edmonton, Canada. Consider the time, money, travel, and the economic importance of crop.

Clubroot Germplasm Evaluation: There is an urgent need to screen for clubroot resistance canola lines, as current clubroot resistance is from a single source; it is vulnerable to faster resistance breakdown.

Clubroot Soil Amendments in Greenhouse: saves time and money, in single year we can research two years' worth of field trials.

Environmental Control: Sometimes we lose a research trial, as the crop did not get significant disease due to warmer weather; consider the time, money and efforts we lose here. Whereas, in greenhouse under controlled condition we can perform the trial twice in a season with desirable disease.

Blackleg Germplasm Evaluation: Every year we test 100's of germplasm to evaluate canola lines for blackleg resistance in field condition, if we have a greenhouse in Langdon, can test up to 500 in one season.

Soybean Cyst Nematode prevalence is increasing in ND, just a bioassay in the greenhouse will determine presence or not in the soil of growers field.

Resistance to fungicides: Repeated use of fungicides on a pathogen leads to resistance, we can determine far ahead by conducting lab and greenhouse studies.

New Crop Introduction: Crops in ND without prior data on possible diseases can be infected, for instance, Faba bean white mold and Chocolate spot (we did the first reports from Langdon by field studies and collaborative studies) and similarly, hemp is infected with quite a few diseases, not able to prove to the scientific and grower community as the seed cannot be given to other researchers, if we had a greenhouse we could have provided this work by now.

Other Research Projects that can be done at our research center greenhouse: Bioassays of wild oat resistance to various herbicides, flea beetle resistance to insecticides on canola greenhouse studies (one of our colleague stays in Fargo for two weeks to perform the trial and then travels once in a week to monitor, hires a student hourly, consider the time, travel, lodging.