PROGRESS REPORT
TO
NORTH CAROLINA SMALL GRAIN GROWERS ASSOCIATION, INC.

TITLE: **Problem Diagnosis Support for Cooperative Extension Agents**

LEADER(S): **L.C. Gatiboni[1] and L.D. Thiesen[2]**

COOPERATOR: **K.A. Hicks[3]**

DEPARTMENT(S): **Crop and Soil Sciences,[1] Entomology & Plant Pathology[2]**
North Carolina Department of Agriculture & Consumer Services[3]

REPORT:

Our approach to strengthening crop problem diagnosis efforts is to request funding from each of several commodity groups to fund analysis of samples submitted by cooperative extension agents. This project funded analysis of soil and plant tissue samples at the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Agronomic Division Laboratory and plant and soil samples at the NCSU Plant Insect & Disease Clinic that were collected from problem wheat fields. This is not intended to cover all analytical needs, but for program support to allow agents to diagnose specific problems important to their region of the state. Rather than distributing voucher quotas, funds are managed through a spreadsheet tallying cumulative samples & remaining funds for each commodity involved. Fund availability is advertised to NCSU and NCA&TSU Cooperative extension agents.

As examples of the type of extension program support provided, during fiscal years 2010/11 through 2018/19 a total of 209 small grain problem plant tissue samples were analyzed. During the 2019/20 small grains crop season, 41 plant tissue samples were analyzed. The NCDA&CS Agronomic Division plant tissue lab maintains summary statistics on all wheat samples analyzed. The diagnosis of “low” and “deficient” levels of specific nutrients in wheat samples from the 2019/20 crop was in order from highest to lowest frequency: N (76%) > Mg (73%) > Cu (58%) > K (55%) > Zn (48%) > Ca (35%) > S (27%) > P (16%) > Mn (9%) > B (1%) > Fe (0%). In other years, at least some samples with "low" levels of each of the nutrients tested except for iron have been found. 39% of wheat samples analyzed by NCDA&CS in 2019 had nitrogen to sulfur (N:S) ratios in excess of the recommended limit of 18:1.

During fiscal year 2019/20, a total of 30 samples of small grain were analyzed by the NCSU Plant Disease & Insect clinic that had commodity funding applied to them. The majority of the injuries were caused by abiotic factors. The frequency of each diagnosed problem were: Pythium root and/or crown rot (22%), Sooty mold (11%), High pH damage (11%), freeze, frost, cold damage (7%), low pH, nutrient imbalance (4%), wheat powdery mildew (4%), wheat leaf rust (4%), take-all (4%), nutrient imbalance (4%), Hessian fly (3%), unknown abiotic disorder (26%).

When pooled with funds provided by other commodity groups (corn, cotton, soybean, tobacco), samples from most of the counties with some agricultural activity have been analyzed. This project thus represents a personnel training resource for a substantial portion of the agricultural extension agents of the state. Program results are also used in support of other training events related to crop nutritional problem diagnosis. These events include professional agronomist training events and winter meetings with farmers, extension personnel and stakeholders.

FINANCIAL STATUS UPDATE (through 7/10/2020):

Expenditures:

Personnel..... $0.00
Materials and Supplies..... $0.00
Travel..... $0.00
Other costs (analysis)..... $591.00

IMPACT:

This program should result in more qualified agricultural agents, and in farmers that better understand their production constraints. Once the value of these diagnostic efforts is better understood, we expect producers will be more willing to pay the standard diagnostic fees themselves. This project will also allow us to monitor problem diagnosis and more formally document the potential crop losses or economic benefits if managed per recommendations. For relatively new crops such as canola and rapeseed, very few historical samples are available to assess "normal" crop status, so these data are especially useful.