

Progress Report

Updating University of Missouri Soil Test Recommendations

Principal Investigator: John A. Lory

The objectives of this project are to:

- Update and revise University of Missouri Soil Test Recommendations and the supporting publication "Soil Test Interpretations and Recommendations Handbook."

This project supports a 0.5 FTE position for two years to provide support to faculty developing proposals for changes to MY soil test and fertilizer recommendations. The proposal stated the work of the research specialist will include performing literature reviews, summarizing data from completed experiments and editing proposals. The funds were not to be used to undertake new lab or field research.

Ten-Month Accomplishments

Vicki Hubbard was identified as the research specialist to work on the project and started working on the project in March 2009. She has spent 45% of her time working on the project from March through December 2009. Funds spent to date supported 35% of her anticipated effort for the two-year project.

During this period her primary contribution has been to complete extensive literature reviews needed as part of updating the phosphorus and potassium soil test recommendations. These include:

- The effect of applied phosphorus on soil test phosphorus and soil phosphorus saturation.
- The effect of applied potassium on soil test potassium.
- The relationship of soil test phosphorus on phosphorus concentration in runoff.
- The nutrient content of wheat grain, rye grain, rice, rice stover, cotton and sugar beets.

She also summarized data and helped develop proposals. These included:

- Spatial analysis of subsoil potassium levels in Missouri.
- Contributed to the development of the proposal by Peter Scharf for lower critical soil test levels in fields managed with site-specific management.

Progress towards updated MU soil test and fertilizer recommendations

The following steps have been completed toward updating MU recommendations:

- Proposed update to the lime recommendations chapter. The chapter does not change the basic approach used for determining lime recommendations but does implement a new

rating system that uses that identifies the desired soil pH as the “optimum” soil test level. The text was extensively modified to improve readability and clarity.

- Proposed update to the magnesium recommendations chapter. The proposed chapter does not change how magnesium ratings are calculated but does change how they are interpreted. Magnesium soil tests will be rated “low”, “optimum” or “high”. Also, application of magnesium will only be recommended through the application of dolomitic limestone. The text was extensively modified to improve readability and clarity.
- Approved change to ratings categories for soil test results. The new rating system will classify soil test results for phosphorus, potassium and pH as “very low”, “low”, “optimum”, “high” and “very high”.
- Progress on developing nutrient removal values for row and harvested forage crops that are supported by references. A draft MU guide has been developed on this topic to meet the needs of the Missouri Nutrient Management Technical Standard for Concentrated Animal Feeding Operations.
- Initial work on an extensive revision of forage fertilizer recommendation system. An initial step was to develop a proposal to expand the list of forages by separating warm season grasses into multiple categories. The new categories reflect differences among warm-season grasses in responsiveness to fertilizer.
- Proposal submitted to the Soil Fertility Working Group for approval by Peter Scharf to lower the critical values for phosphorus and potassium for fields using site-specific management. The proposal is currently under consideration.

Soon after this project was initiated in March John Lory, the P.I., had an unanticipated family situation that significantly reduced the time he could commit to this and other projects in 2009. This did not affect the amount of work Vicki Hubbard could complete collecting information to support proposed changes although it is why she applied 45% instead of 50% of her time to the project over the first 10 months of the project. It did result in less progress in developing proposals for changes and coordinating their review in 2009 than was initially anticipated. This will not be an issue in the ~14 months of funding remaining on this project.

Year-Two (plus) Objectives

1. Approve new lime and magnesium recommendations chapter for the MU Soil Test Interpretations and Recommendations Handbook.
2. Approve changes to the equation used to calculate soil test build rates for phosphorus and potassium.
3. Approve changes to the critical values used for phosphorus and potassium for row and forage crops. This may include different critical values for fields managed using site-specific

management. This will include critical values for the new warm-season grass forage categories.

4. Develop and approve proposal for update to row crop nitrogen recommendations.
5. Develop and approve proposal for update to forage nitrogen recommendations.
6. Complete update of MU Soil Test Interpretations and Recommendations Handbook based on approved changes.
7. Develop a list of priority research projects for further improvements to MU soil test and fertilizer recommendations.

This will complete an overhaul of the MU soil test and fertilizer recommendations. Upon completion of the project arrangements will need to be made to implement the approved changes in the software used by the Missouri Soil Testing Laboratory to generate soil test reports from the lab on their web page.

Proposed Budget

Salaries:	\$24,838
<u>Benefits:</u>	<u>\$7,103</u>
Total:	\$31,821

This budget reflects the approximate remaining funds for the project as of January 1, 2010. It will provide funding for ~0.5 FTE of Vicki Hubbard's salary for a period of ~14 months completing the two-year project. This budget is consistent with the initial budget and the start date of March 1, 2009 for this project.