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Decomposition of Potato, Corn, and Wheat Crop Residues

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This study was conducted in Paterson on a sandy soil. The decomposition of crop residue and transformation of organic nitrogen (N) into ammonium (NH_4) and nitrate (NO_3) forms (a.k.a. N mineralization) provide sources of plant available N. Estimating N availability from mineralization of crop residues, including potato residue, is important in fertility management decisions. The purpose of this study was to estimate the contribution of N from mineralization of corn, wheat, and potato residues. Toward this end, we measured N mineralization in the field from corn, wheat, and potato residues, January – September, 2000.

Figure 1 shows the technique used in this study for measuring N mineralization. PVC columns (8 inch diameter x 14 inch height) were driven into soil to 12 inch depth. The incubation columns were installed after harvesting potato, corn, or wheat and incorporating the respective crop residues. The study area was kept free of vegetation to minimize the contribution of N from additional vegetation growth. The sampling area was irrigated using a center

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pivot irrigation system to provide adequate soil moisture for N mineralization. The columns were capped to prevent any precipitation or irrigation water on the soil inside the column, which could leach the mineralized nitrogen beyond the sampling depth. Each column had 8 holes (0.5 inch diameter) along the wall to facilitate lateral flow of air and water, aiming to make soil conditions inside and outside the column as similar as possible. During the installation of these columns, we measured NO_3-N and NH_4-N concentrations adjacent to the column at 0-6" and 6-12" depths to represent baseline conditions. Each depth soil sample was sieved to separate all plant residue, which was oven dried, weighed, ground, and assessed for N concentrations. We excavated columns at the end of pre-determined incubation periods, and measured N concentrations as we had done with the baseline samples. The difference in N concentrations between the baseline sample and the post-incubation sample represents the amount of N mineralized. The above procedure was repeated over several time intervals to determine N mineralization at different incubation times over the entire year. Summation of mineralized N (NH_4-N plus NO_3-N) at each consecutive incubation time represents the total N mineralized from the crop residues during the entire study duration.

Figure 2 shows the residue decomposition curves, the curves for residue nitrogen available for mineralization, and the cumulative amount of N mineralized over the 9 month period. Total N content in the crop residue was used as an estimate of total N that is available for mineralization at each sampling time. The total residue N in the top 12 inches was 355, 338, and 108 lbs/acre for corn, wheat, and potato residues, respectively. During January through September, total N mineralized (in the form of NO_3-N and NH_4-N) in the top 12 inches from corn, wheat, and potato residues were 153, 114, and 64 lbs/acre, respectively.

The amounts of N mineralized during January through September represented 34, 43, and 60 percent of the residue total N in January for wheat, corn, and potato, respectively. Nitrogen mineralized during January to May represented about 50% of the total mineralized during the study. This fact is important because this period represents very little N uptake. In contrast, the N mineralized during May through September can be utilized by the crop.

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Note: The preceding information in this summary is extracted from a detailed paper presented at the 7th International Symposium on Soil and Plant Analysis, Edmonton, Canada, July 2001, and the full paper will be published in Communications in Soil Science and Plant Analysis-Special Volume.

Please contact Dr. Ashok Alva with questions or comments on this research.

Potato Tuber Rot Samples

Tuber rots were a serious problem in storage last season, particularly *Pythium* and pink rot. One of the research projects funded this year by the WSPC will be testing samples of three rot diseases of potato for sensitivity/resistance to mefenoxam, the active ingredient in Ridomil Gold. Dr. Debra Ann Inglis will be collecting samples of *Pythium*, pink rot (*Phytophthora erythroseptica*), and late blight (*P. infestans*) from throughout Washington this season.

Dr. Inglis requests your help in collecting tuber rot samples. She has prepared Potato Tuber Rot Kits which can be used to FedEx samples to her in Mt. Vernon. WSU will pay the cost of the shipment. Tuber Rot Kits can be obtained directly from Dr. Inglis, from the WSPC office, or from the extension offices in Pasco and Ephrata.

Mustard Green Manure Field Day for Potato Growers

Potato growers can learn about mustard green manures at an October 16th field day, at 10am at the Dale Gies farm, 1.5 miles west of Rd M on Rd. 5 SE, Moses Lake. Gies, who has been using mustard cover crops for six years, will be on hand to discuss the management of the mustard and the benefits he has seen. Attendees will also have the opportunity to see the mustard crop in the field and hear the results of WSU on-farm research. For more information, contact Andy McGuire, with WSU Cooperative Extension, at 754-2011 ext. 413.

On-Line Newsletter of Interest

The following on-line newsletter may be of interest to some in the potato industry.

Agrichemical and Environmental News, Published by WSU Cooperative Extension
This newsletter is a multi-page book-style publication carrying the subtitle: "A monthly report on pesticides and related environmental issues." The Tables of Contents for the past two issues are as follows:

August 2001

- Is "Good" Enough? Proper Time and Place for GLP
- NRSP5's Role in Keeping Fruit Trees Virus-Free
- IR-4 Projects 2001 & 2002, Part 2
- Of Microbes and Men: Food Safety
- More QBL "Garden Path" Awards
- An Interesting Conundrum: 24C Protects WA Apples
- Insect of the Month: Dragonfly

July 2001

- Pesticide Illness Data in Washington, 1995_1999
- Bushwhacked by Arsenic? Part 2: Water, Water, Everywhere, and a Drop of Arsenic, Too
- IR-4 Projects 2001 & 2002, Part 1
- Foodborne Pathogens: Is No One Safe?
- Pesticides as "Fertility Drugs" for Mites

Find the *Agrichemical and Environmental News* at http://www.aenews.wsu.edu/.

WSPC Request for Proposals

The new and revised Request for Proposals is now available on the WSPC web site. Please note that several changes have been made to proposal preparation and review guidelines. All new items in the RFP are underlined. To view the RFP, go to www.potatoes.com and click on "Research," then click on "2002/03 Request for Proposals." Please contact Andrew Jensen, WSPC Director of Research & Technical Affairs, to request a hard copy or word processing copy of the RFP, or to ask questions about WSPC research (ajensen@potatoes.com; 509-765-8845).