to 160 lb N/acre with 15 lb S/acre). Fall-spring split applications of N, and select N fertilizer treatments with no added S are also included.

Residual inorganic soil N was low at both locations in 2011, 73 lb N/acre at the Wilke Farm and 103 lb N/acre at PCFS. Spring canola grain yields at PCFS were higher than in previous years, and therefore more responsive to N fertilizer additions (see graph). No consistent yield responses to S additions were observed. The economically optimum N rate (at $0.22/lb canola and $0.56/lb N as urea) at the Wilke Farm was 69 lb N/acre, while at PCFS it was determined that no N fertilizer added under these yield response and price scenarios paid for itself.

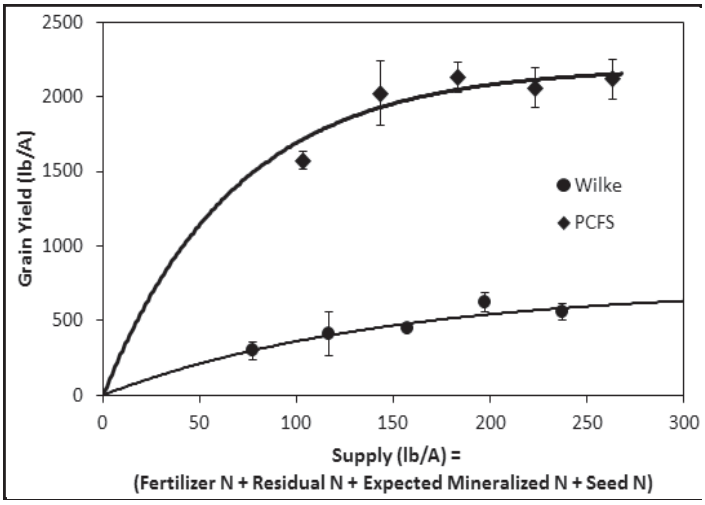

Fig. 1. Canola seed yield response to N supply at Pullman (PCFS) and Davenport (Wilke). The left-most plotted point on each response curve represents 0 N fertilizer applied.

The four year N x S fertility experiment indicates that accurate estimation of soil N supply and canola yield potential is critical in determining proper N fertilization rates. In recognition that canola can aggressively utilize residual soil N supplies if available, N fertilizer rates should be reduced when residual soil N is present. In addition, canola returns significant crop residue N to the soil following harvest. Thus, we have expanded the study in 2012 to follow the carryover N from canola residues and its effects on subsequent legumes and wheat grown in rotation. This research is leading towards a modification of existing regional guidelines for canola fertility management with a goal of maximizing yield and oil productivity.

Establishing Switchgrass for Biofuel in the North Columbia Basin

STEVE FRANSEN, WSU-PROSSER IAREC

Switchgrass biofuel research started at WSU in 2002 in Prosser after observing irrigated circles of switchgrass seed produced by Rainier Seed Company in 2001. This project was initiated to investigate new 'windows' for successful establishment of switchgrass in the Columbia Basin and to evaluate long term storage of switchgrass hay for bioenergy conversion. Cellulosic biorefineries will operate daily for about eleven months per year. Crops cannot be harvested continuously over this time so the feedstock will require storage.

Date of planting studies were conducted at WSU-Othello in 2008 and 2009 and a study evaluating long-term storage as dry or high moisture hay was initiated at Othello in 2008 intending for two complete grass hay harvests in 2009, 2010 and 2011. These are the first hay results from a lowland switchgrass (Kanlow) or Eastern Gamagrass (Nemaha) from as far north as WSU-Othello (46° N). Results confirm that warm season grass hay can be consistently produced in the northern Columbia Basin region.

This study will conclude after the post-storage hay bales are processed and NIRS scanning completed on cored samples. Our studies will provide four years of data that can be used in developing guidelines for long term storage. Results from the date of planting studies have been incorporated into a switchgrass production Extension bulletin that is expected to be published in 2012.

Extension and Outreach Activities

KAREN SOWERS, DENNIS ROE, BILL PAN, AND DEB MARSH; DEPT. OF CROP AND SOIL SCIENCES, WSU

The Washington State Biofuels Cropping Systems Research and Extension Project (WBCS) has been funded since 2007, and has included 15-20 projects, 18 principal investigators, 12 collaborators, and nearly 50 agency and university affiliates, technicians, and graduate students. Written and online publications; a dedicated website; and presentations at workshops, field days, and