Fertility Paradigms

Sometimes it's not what you fertilize with but how you fertilize that's important. With funding from the USDA SARE program, PFI has been comparing two competing philosophies, or paradigms, of fertility. One approach is to look at a soil test and ask "Is there enough available nutrients?" This could be termed the "sufficiency" tack. The other approach asks "Are the nutrients available in the right proportions?" This orientation looks at the ratio of nutrients on the soil cation exchange, so it could be called a ratio methodology.

Dennis and Eve Abbas are part of the fertility paradigm study.

Six cooperators and two ISU farms are hosting side-by-side comparisons of the ratio and sufficiency approaches to fertilization. In 2000, the second year of the study, some farms were in their second year and some were new. Table 4 summarizes yields and input costs. Whereas in 1999, there were no significant yield differences, 2000 produced two - one in favor of the ratio approach and one in which the sufficiency treatment yielded more. The table also shows treatment costs.

Keep in mind that one year's yields or financial benefits do not tell the whole story. If yields or economic trends appear, it will be over time. The cost of amendments must be spread over the period of their effectiveness. Other effects may take several years to emerge. With assistance from the National Soil Tilth Lab, soil samples are being analyzed for changes in organic matter and microbial biomass. Leaf tissue and grain are being analyzed for nutrient content and feed quality. With SARE approval, this study would continue into a third year, when these long-term outcomes should become clearer.

Table 4. Fertility Paradigm Trials

COOPERATOR	CROP	TRT."A", RATIO FERTILITY			SUFFICIENCY TRT.	Fertility Paradigm Trials						
						SUFFICIENCY		DIFFERENCE				COMMENT
		DESCRIPTION	YIELD (bu.)	TREATMENT COST	DESCRIPTION	YIELD (bu.)	TREATMENT COST	YIELD DIFF.	YLD LSD (bu.)	YLD SIG.	$ BENEFIT OF TRT "A"	
ABBAS	SOYBEANS	POTASSIUM SULFATE, ROCK PHOSPHATE, ZINC	32.2	$44.79	POTASSIUM SULFATE, ROCK PHOSPHATE	30.3	$67.37	1.9	2.3	N.S.	$22.58	FIRST YEAR OF TRIAL
ARMSTRONG	SOYBEANS	CALCITIC LIME	37.0	$75.38	DOLOMITIC LIME	36.7	$54.77	0.3	1.7	N.S.	–$20.61	–$38.54 IN 1999
BOKELMAN	CORN	11-52-0, CALCITIC LIME, ZINC	96.1	$85.71	11-52-0, DOLOMITIC LIME	100.0	$66.74	-3.9	2.7	*	–$24.20	FIRST YEAR OF TRIAL
BRUNER	SOYBEANS	18-46-0, ZINC	56.1	$15.64	18-46-0, DOLOMITIC LIME	56.4	$22.16	-0.3	4.3	N.S.	$6.52	–$10.67 IN 1999
HESTAD	SOYBEANS	0-0-60, 11-52-0, ZINC	53.1	$28.81	0-0-60, 11-52-0	52.8	$28.06	0.4	1.5	N.S.	–$0.75	FIRST YEAR OF TRIAL
LUBBEN	CORN	GYPSUM	154.0	$19.00	NO AMENDMENTS	148.4	$0.00	5.6	1.8	*	–$17.79	–$49.62 IN 1999
MUGGE	SOYBEANS	GYPSUM	51.4	$19.00	DOLOMITIC LIME	50.9	$20.38	0.5	1.8	N.S.	$1.38	–$48.07 IN 1999
NEW MELLEREAY	SOYBEANS	POTASSIUM SULFATE, ZINC	60.4	$21.33	NO AMENDMENTS	58.1	$0.00	2.3	4.6	N.S.	–$21.33	–$3.45 IN 1999
		AVERAGE CORN:	125.0			125.0					–$21.00	
		AVERAGE SOYBEANS:	48.4			48.4					–$2.04	