Fertility Paradigm Trials

Readers of the PFI newsletter may remember that in 1998 the organization received a grant from the USDA SARE program to evaluate "fertility paradigms." Paradigms are ways of looking at the world, constructions that we put on reality to make sense of it. There are two important ways of looking at soil fertility, which can be characterized as the "sufficiency" paradigm and the "ratio" paradigm. The sufficiency perspective looks at a soil sample and asks "is there enough" of available crop nutrients. The ratio approach looks at the cation (positively charged) nutrients attracted to the (negatively charged) soil cation exchange (clay minerals and organic matter) and asks "are they in the appropriate proportions" for optimum crop growth. There has not been much communication between the two schools of thought, with universities taking the sufficiency approach and some crop consultants and testing laboratories espousing the ratio approach. Farmers are left to make their own decisions when it comes to soil amendments, and the related expenditures can be great.

This project compares the ratio and sufficiency approach in side-by-side strips on six farms and two ISU experiment farms. Several producers from the Organic Crop Improvement Association (OCIA) are also cooperating in the study, as are ISU organic specialist Kathleen Delate and National Soil Tilth Lab scientist Doug Karlen. Crop consultant Keith Cuvelier is also a partner in the project, providing ratio-based recommendations.

In the first year of the effort, no significant differences appeared in crop yields (Table 6). Input costs are shown in the table, but neither yields nor costs should be taken too seriously after one year. Soil fertility is not necessarily a "one shot deal"; it will take several growing seasons for any long term effects to become evident and for input costs to be amortized. Thanks in part to the Tilth Lab, quite a number of soil and crop quality components are being examined. These also may take some years to develop patterns. Expect to see more of these trials in 2000.

Table 6. Fertility Paradigm Trials

Cooperator	Crop	Treatment "A"			Treatment "B"			Difference			Comment
		Description	Yield (bu.)	Trt Cost	Description	Yield (bu.)	Trt Cost	Yield Diff	Yld LSD (bu.)	YLD Sig.	
Alert	Beans	18-46-0, Gypsum,Zinc	_	$32.60	18-46-0	_	$12.57	_	_	_	Broadleaf weed biomass Less in Ration TRT
Armstrong	Corn	18-46-0, Gypsum, Zinc	121.2	$48.66	18-46-0	119.6	$10.12	1.6	13.3	NS	Higher grain crude protien in ratio TRT
Bruner	Corn	18-46-0, 0-0-60, Zinc	152.4	$35.80	18-46-0	152.0	$25.13	0.4	20.3	NS	
Dorsheimer	Corn	Gypsum, Zinc	133.6	$24.66	nothing	133.4	$0.00	0.2	5.8	NS	
Hennings	Oats	Rock Phosphate, Calcitic Lime, Zinc	_	$102.58	Rock Phosphate, Dolomitic Lime	_	$96.19	_	_	_	
Lubben	Beans	0-0-60, Calcitic Lime	63.0	$88.54	0-0-60, Dolomitic Lime	62.0	$38.92	1.0	1.3	NS	
Mugge	Corn	Calctic Lime	172.0	$48.07	Nothing	171.3	$0.00	0.7	4.0	NS	
New Melleray	Corn	Rock Phosphate, Zinc	168.9	$25.60	Rock Phosphate	165.3	$22.15	3.6	12.4	NS	
Average				$50.81			$25.64				