Banded Fertilizers

As in past years, several PFI cooperators evaluated starters and other banded fertilizers in 1994. By now it should be no surprise that results were mixed. Even where these fertilizers increased crop yields, there was sometimes no clear economic advantage.

Even before the advent of color photography Ron Rosmann holding court at field days

Doug Alert and Margaret Smith, Hampton, were among the ridge-tillers trying out the deep placement applicator shoe for the Buffalo planter. In soybeans, the fertilizer, placed two inches directly below the seed, increased yield 3.1 bushels, but the benefit was less than the cost of the 2-6-12 suspension fertilizer (Table 1). In the corn trial, Doug and Margaret compared placement below the seed, two inches to the side, and a no-starter check treatment (Table 3). Their soil tests very high in phosphorus and high in potassium. There was no observable yield difference among the three treatments. Don and Sharon Davidson, Grundy Center, also used the deep banding planter shoe in a soybean trial (Table 1). There was no significant effect on yield. Jeff and Gayle Olson, Mt. Pleasant, evaluated a planter band too, this one two inches to the side of the soybean seed and consisting of just potash fertilizer (Table 3). There was no yield effect. The potassium soil test there is between medium and high.

The usual method of deep banding involves a separate pass with an implement in the fall. **Harlan and Sharon Grau**, Newell, took this approach, comparing a fall deep band, fall broadcast, and a no-fertilizer check treatment. The corn in the deep band treatment yielded significantly better than the check treatment (nearly 16 bushels), with the broadcast treatment falling in between (Table 3). Soil tests are medium-to-very-high for phosphorus and high-to-very-high for potassium. Different results were obtained by Allen and Jackie Tibbs, Alden, who no-till planted soybeans directly over a fall band of fertilizer. They reported no yield increase from the fertilizer band (Table 1). The soil on this field tests low -to-medium for phosphorus and high for potassium.

Ron and Maria Rosmann, Harlan, have put their home farm in a transition to organic certification. They evaluated two rates of a mined rock phosphate on soybean yield, but saw no effect (Table 1). Their soil test for phosphorus was already medium-to-high.

Ray and Marj Stonecypher, Floyd, evaluated 3-18-18, a low-salt starter, which they placed right with the corn seed (Table 1). The 11 gallon per acre rate amounted to about 1+6+6 of nitrogen, phosphate, and potash. Surprisingly, leaf tissue tests showed a reduction in both nitrogen and magnesium where the starter had been applied. For the third year running, the Stonecyphers saw no yield effect from a low -salt starter. Their soil tests very high in P and K.

Probably the most ambitious starter trials in 1994 were carried out by **Dick and Sharon Thompson**, Boone, who evaluated both starters and timing of manure applications for corn and for soybeans (Table 2). How do you test both manure timing and starters in one trial? They used what is called a "split plot" design. The "main plots" represented different manure application times - fall (in the corn trial), spring, and a no-manure check plot. Each of these main plots was split into a subplot with starter fertilizer and one without starter, the location of each subtreatment being chosen at random.

In the Thompsons' soybean trial neither manure nor starter affected yields measurably. However, in the corn trial, both manure and starter had an effect on yield. Fall applied manure was significantly better than the no-manure treatment, with spring- applied manure in between. The highest yielding treatment was fall-manure-plus-starter. However, because of spreading costs even this treatment lost money compared to the no-manure-no-starter treatment. Table 2 shows the economics calculated both for in-year costs and "prorated" spreading costs. Dick Thompson distributes spreading costs across all the crops of the five-year rotation, with each crop's charge weighted according to its nutrient withdrawal. It's worth noting that this field has been manured two or three years out of five for some time, so all treatment yields reflect the long-term benefits of manure. Soil tests for P and K are both very high here.

Table 1. STARTER & OTHER FERTILITY TRIALS

STARTER & OTHER FERTILITY TRIALS

COOPERATOR	CROP	TREATMENT "A" DESCRIPTION	TREATMENT "A" YIELD (bu.)	TREATMENT "B" DESCRIPTION	TRT "B" YIELD (bu.)	DIFFERENCE YIELD DIFF.	DIFFERENCE YLD LSD (bu.)	DIFFERENCE YLD SIG.	$ BENEFIT OF TRT "A"	COMMENT
ALERT	SOYBEANS	STARTER, 2" BELOW SEED	46.2	NO STARTER	43.1	3.1	1.9	*	($6.63)	8+24+48 AS 2-6-12 SUSPENSION
DAVIDSON	SOYBEANS	STARTER FERTILIZER	37.6	NO STARTER	37.9	-0.3	1.8	N.S.	($6.33)	2+7+13 AS 2-6-12 1" BELOW SEED. HP204 EDIBLE BEANS
STONECYPHER	CORN	STARTER ON SEED	143.1	NO STARTER	150.6	-7.5	10.9	N.S.	($9.45)	1+6+6 IN STARTER
ROSMANN	SOYBEANS	45 LB/ACRE ROCK PHOSPHATE	69.0	7.5 LB/ACRE ROCK PHOSPHATE	69.2	-0.3	0.9	N.S.	($3.75)	BLACK PHOSPHATE METERED THROUGH PLANTER INSECTICIDE BOXES. SOIL P1 TEST=21 PPM (HIGH)
TIBBS	SOYBEANS	BANDED 22+70+90	54.5	NO FERTILIZER	53.6	0.8	1.7	N.S.	($33.82)	BEANS PLANTED DIRECTLY OVER FALL DEEP BAND. THREE REPS ONLY.
FRANTZEN	CORN	80+8+50 AFTER BERSEEM CLOVER	171.1	20+8+50 AFTER BERSEEM CLOVER	169.1	2.0	8.1	N.S.	($13.38)	LATE SPRING SOIL NITRATE: HIGH RATE 77 PPM, LOW 71 PPM. STALK NITRATE: 673 PPM HIGH RATE, 605 PPM LOW RATE
LUBBEN	SOYBEANS	ACA W. HERBICIDE ON 6/27	62.7	NO ACA, JUST HERBICIDE	62.8	-0.1	2.3	N.S.	($4.14)	UNRANDOMIZED TRIAL, STATISTICS WEAKENED
OLSON	SOYBEANS	GROZYME™ /AGRI-SC™ PREPLANT BAND	63.9	ZERO CHECK	65.0	-1.0	5.2	N.S.	($10.76)	GROZYME™ SAID TO RELEASE SOIL NUTRIENTS, AGRI-SC SOLD AS SOIL CONDITIONER
OLSON	CORN	GROZYME™ /AGRI-SC™ POST BAND	165.2	ZERO CHECK	164.0	1.2	16.1	N.S.	($10.76)	" "
STOCK	SOYBEANS	ACHIEVE™ & REMEDY™ PREPLANT BROADCAST	54.0	ZERO CHECK	53.0	1.0	6.3	N.S.	($13.85)	BIOLOGICAL EFFECT SOMEWHAT CONFOUNDED WITH STRIP "SIDE" (NORTH-SOUTH) EFFECT
STOCK	CORN	ACHIEVE™ & REMEDY™ PREPLANT BROADCAST	159.5	ZERO CHECK	160.5	-1.0	9.6	N.S.	($13.85)	
WURPTS	SOYBEANS	BIOLOGICAL FERTILITY PROGRAM	60.6	ISU FERTILITY RECOMMENDATIONS	60.3	0.3	2.3	N.S.	($8.75)	
WURPTS	CORN	BIOLOGICAL FERTILITY PROGRAM	184.7	ISU FERTILITY RECOMMENDATIONS	187.3	-2.6	7.2	N.S.	($10.11)	

Table 2. MANURE TIMING AND STARTER FERTILIZER

MANURE TIMING AND STARTER FERTILIZER

COOPERATOR	CROP	PREVIOUS CROP	YIELD SIGNIFI-CANCE	TREATMENT "A" DESCRIPTION	TREATMENT "A" YIELD (bu or T)	TREATMENT "A" STAT.	TREATMENT "A" TRT COSTS	TREATMENT "A" $ BENEFIT	TREATMENT "B" DESCRIPTION	TREATMENT "B" YIELD (bu or T)	TREATMENT "B" STAT.	TREATMENT "B" TRT COSTS	TREATMENT "B" $ BENEFIT	TREATMENT "C" DESCRIPTION	TREATMENT "C" YIELD (bu or T)	TREATMENT "C" STAT.	TREATMENT "C" TRT COSTS	TREATMENT "C" $ BENEFIT	OVERALL COMMENTS
THOMPSON	CORN	SOYBEANS	*	NO MANURE, NO STARTER	165.9	b	$0.00	$0.00	FALL, NO STARTER	170.8	ab	$21.66	($21.66)	SPRING, NO STARTER	170.0	ab	$21.66	($21.66)	
				(PRORATED COST ¤)			$0.00	$0.00	(PRORATED COST ¤)			$17.73	($17.73)	(PRORATED COST ¤)			$17.73	($17.73)	
				NO MANURE, STARTER	170.1	ab	$6.37	($6.37)	FALL, STARTER	173.8	a	$28.04	($12.24)	SPRING, STARTER	171.0	ab	$28.04	($28.04)	
				(PRORATED COST ¤)			$6.37	($6.37)	(PRORATED COST ¤)			$24.10	($8.31)	(PRORATED COST ¤)			$24.10	($24.10)	
	MAIN EFFECT: MANURE TIMING			NO MANURE	168.0	b	$0.00	$0.00	FALL MANURE	172.3	a	$21.66	($13.00)	SPRING MANURE	170.5	ab	$21.66	($21.66)	
				(PRORATED COST ¤)			$0.00	$0.00	(PRORATED COST ¤)			$17.73	($9.06)	(PRORATED COST ¤)			$17.73	($17.73)	
	SUB EFFECT: STARTER FERTILIZER			NO STARTER	168.9	b	$0.00	$0.00	STARTER FERTILIZER	171.6	a	$6.37	($0.96)						
THOMPSON	SOYBEANS	CORN	N.S.	NO MANURE, NO STARTER	69.5	a	$0.00	$43.80	SPRING, NO STARTER	70.5	a	$21.66	$22.14						LATE SPRING SOIL NITRATE 38 PPM, FALL STALK NITRATE LOW IN ALL TRTS
				(PRORATED COST ¤)			$0.00	$35.65	(PRORATED COST ¤)			$13.51	$22.14						
				NO MANURE, STARTER	68.7	a	$22.14	$21.66	SPRING, STARTER	69.2	a	$43.80	$0.00						
				(PRORATED COST ¤)			$22.14	$13.51	(PRORATED COST ¤)			$35.65	$0.00						
	MAIN EFFECT: MANURE TIMING			NO MANURE	69.8	a	$0.00	$21.66	SPRING MANURE	69.8	a	$21.66	$0.00						
				(PRORATED COST ¤)			$0.00	$13.51	(PRORATED COST ¤)			$13.51	$0.00						
	SUB EFFECT: STARTER FERTILIZER			NO STARTER	70.0	a	$0.00	$22.14	STARTER FERTILIZER	69.0	a	$22.14	$0.00						

¤ PRORATED MANURE APPLICATION COSTS CALCULATED ON THE BASIS OF NUTRIENT WITHDRAWAL OF THE CROP IN THE FIVE-YEAR ROTATION.

Table 3. MULTIPLE-TREATMENT PLANT POP. & FERTILIZER TRIALS

COOPERATOR	CROP	PREVIOUS CROP	YIELD SIGNIFI-CANCE	TREATMENT "A" DESCRIPTION	TREATMENT "A" YIELD (bu or T)	TREATMENT "A" STAT.	TREATMENT "A" TRT COSTS	TREATMENT "A" $ BENEFIT	TREATMENT "B" DESCRIPTION	TREATMENT "B" YIELD (bu or T)	TREATMENT "B" STAT.	TREATMENT "B" TRT COSTS	TREATMENT "B" $ BENEFIT	TREATMENT "C" DESCRIPTION	TREATMENT "C" YIELD (bu or T)	TREATMENT "C" STAT.	TREATMENT "C" TRT COSTS	TREATMENT "C" $ BENEFIT	OVERALL COMMENTS
RICEVILLE FFA	NK4242	CORN	*	24,200 SEEDS/ACRE (22,200 PLANTS)	151.7	c	$27.19	$0.00	27,700 SEEDS 25,400 PLNTS	158.7	b	$31.13	$10.11	32,000 SEEDS 28,200 PLNTS	162.9	a	$35.96	$13.68	
RICEVILLE FFA	P3751	CORN	*	24,200 SEEDS/ACRE (22,200 PLANTS)	141.8	c	$24.73	$0.00	27,700 SEEDS 25,400 PLNTS	144.6	b	$28.31	$1.89	32,000 SEEDS 28,200 PLNTS	150.2	a	$32.70	$8.76	
ROSMANN	CORN	SOY BEANS	*	21,950 SEEDS/ACRE (16,840 PLANTS)	136.7	c	$18.59	$0.00	24,400 SEEDS (19,800 PLANTS)	146.1	b	$20.67	$16.68	28,200 SEEDS (23,760 PLANTS)	157.7	a	$23.89	$36.76	LATE SPRING SOIL NITRATE 38 PPM, FALL STALK NITRATE LOW IN ALL TRTS
ALERT	CORN	SOY BEANS	N.S.	20 LBS P, 40 LBS K 2" BELOW SEED (DEEP PLANTER SHOE)	137.0	a	$34.59	$0.00	20 LBS P, 40 LBS K TO THE SIDE OF THE SEED	140.2	a	$34.59	$0.00	CHECK TREATMENT: NO BANDED P & K	136.9	a	$22.30	$12.29	TWO REPS DISCARDED BECAUSE OF MISSING DATA
GRAU	CORN	SOY BEANS	*	BROADCAST P & K	174.4	ab	$28.73	($28.73)	DEEPBAND P & K	182.1	a	$29.41	$2.26	CONTROL (NOFERT.)	166.3	b	$0.00	$0.00	TREATMENT $ BENEFIT IS RELATIVE TO CONTROL TRT
OLSON	SOY BEANS	CORN	N.S.	75 LB K PLANTER BAND	64.2	a	$9.50	$9.50	150 LB K PLANTER BAND	65.4	a	$19.00	$0.00	ZERO K	61.2	a	$0.00	$19.00	SOIL K TEST: 125 PPM, MEDIUM-HIGH
NEELEY-KINYON	CORN	SOY BEANS	*	0 LBS ANHYDROUS NITROGEN	136.4	b	$0.00	$0.00	75 LBS ANHYDRS. N	154.3	ab	$8.63	($8.63)						* RATE SET W. SOIL NITR. TEST . THREE REPS ONLY
									* 110 LBS ANHYDRS. N	166.7	a	$12.65	$48.83	150 LBS ANHYDRS. N	167.5	a	$17.25	$44.23	