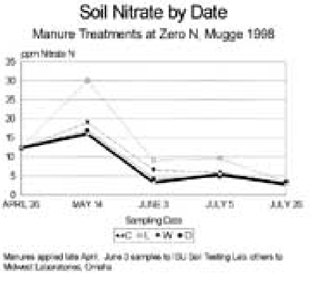
Manure Trials

Colin Wilson mixing the compost

Back in northwest Iowa, **Dan and Lorna Wilson** and **Colin and Carla Wilson** want to know how to use the manure and bedding that come out of their swine hoophouse and Swedish-style nursery facility. The nutrients in this mixture are wonderfully stable - good from an environmental standpoint but not necessarily for crop production. To "cook out" some of the extra carbon from the material, the Wilsons let it age on a cement pad before application to the land. They then spread strips of this passively-composted manure on land that had already received 130 lbs of N as UAN solution. As in Dennis McLaughln's trial, the late spring soil nitrate test indicated adequate nitrogen - especially where the compost was applied - but stalk tests at the end of the year suggested the crop may have been short of nitrogen (Table 2). ISU Ag Engineer Tom Richard suggests that only 10-15 percent of the nitrogen in compost may be available the first year. If the Wilson's bedding/manure was incompletely composted, that would account for the higher -than-expected spring soil nitrate, and it could mean that carbon in the bedding tied up soil nitrogen later in the season. There was no statistical difference in yield between corn that received the extra nutrients and corn that did not.



Maunres applied late April. June 3 samples to ISU Soil Testing Labs, others to Midwest Laboratories, Omaha.
Figure 2. Soil nitrate availability over the spring and summer in the Mugge manure trial. (treatment description in Table 3.)

We are in the early stages of learning how to use the manure/bedding that comes from hoophouses, and as more hoops go up around the Midwest, this becomes an important issue. **Paul and Karen Mugge**, Sutherland, put up a hoophouse recently, and this year Paul added hoophouse manure to a trial he began in 1997. That trial examined the crop growth and nitrogen availability for corn receiving liquid swine manure or no manure - at four levels of nitrogen sidedressing. In 1998, Paul added two grades of hoophouse manure/bedding, spreading the wetter material separately from the drier stuff. Neither of the hoophouse treatments received additional N sidedressing. Tables 3 and 4 show yields, leaf nitrogen, and stalk nitrate-N for the trial. Figure 2 traces soil nitrate in one-foot core samples over the course of the spring.

The four sidedressing levels were 0, 40, 80, and 120 lbs per acre. The whole field received 24 lbs of N as diammonium phosphate the previous fall. Where 3,000 gallons of liquid manure was applied, the crop did not respond to sidedressed N. In the no-manure control treatment, there was a strong response to additional N. Table 4 focuses on the response to sidedressing where no manure was applied and on the response to the different kinds of manure where no additional N was applied. At zero additional N (other than the fall-applied 24 lbs), the liquid manure far outperformed the other treatments. Was nitrogen limiting? The only "adequate" soil nitrate reading was 30 ppm in the liquid manure treatment on May 14. Leaf N levels of 2.75 percent and higher would normally be considered adequate, but the treatment yields did follow the same order as the treatment leaf N readings. Stalk nitrate-N was very low in all manure treatments where no N was sidedressed.

How much manure nitrogen was getting to the crop? Soil nitrate numbers suggest that the hoophouse manure/bedding was about the same as no manure at all (Figure 2). Yields indicate it was only a little better. Clearly this material needs to be managed in a way that makes it a source of nitrogen and not a nitrogen "sponge." PFI cooperators hope to work with ISU agricultural engineer Tom Richard to determine just how much handling is necessary to make hoophouse manure an asset to crop production and not a liability. Answers should start to emerge in 1999.

Ron and LaDonna Brunk and **Steve and Tara Beck-Brunk**, Eldora, generate lots of liquid swine manure in producing breeding gilts. In 1998 they modified a 1997 trial in which they evaluated the benefit of 30 lbs purchased N after 3,200 gallons of liquid manure. In 1998, they evaluated 0, 45 and 90 lbs sidedressed after preplant applications of 3,300 gallons + 30 lbs N. In 1997, they saw no benefit from an additional 30 lbs of N; in 1998, the 45 lbs of N sidedressing increased yield, but there was no greater yield from 90 lbs. Results are somewhat inconclusive because field equipment damaged four of the six replications of the trial.

Table 3. Mugge Manure and Nitrogen Trial.

YIELD - TRTS AND N RATES

N RATES	C		L		W	D
24	135.7	c	171.2	a	146.1	139.9
64	157.9	b	177.9	a		
104	170.7	ab	180.2	a		
144	174.9	a	179.3	a		

YIELD - MANURE TRTS AT ZERO N

C	135.7	c	C=CONTROL (NO MANURE)
L	171.2	a	L=LIQUID MANURE
W	146.1	b	W=WET HOOPHOUSE MANURE
D	139.9	bc	D=DRY HOOPHOUSE MANURE

LEAF N - TREATMENTS

N RATES	C		L		W	D
24	2.74	c	3.47	a	3.21	3.00
64	3.32	b	3.63	a		
104	3.74	a				

STALK NITRATE - TREATMENTS

N RATES	C		L		W	D
24	59	b	89	b	37	55
64	65	b	415	b		
104	79	b	585	b		
144	620	a	2428	a		