

# Organic starter fertilizer for profitable production of winter barley

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## INTRODUCTION

Winter barley can yield as much as 130 bushels per acre in New York, but its yields are highly variable. The highest yields realize a substantial profit, so it is worth investigating how to get them on a regular basis.

We thought a major limiting factor could be fall tillering, because barley tillers little in the spring. Tillering is, in turn, limited by fertility in the fall. Our test was to apply a starter fertilizer with the seed to see whether tillering and yield were increased.

## MATERIALS AND METHODS

The experimental design was six split fields with starter fertilizer in half of each field. The fields were approximately 2 acres each.

Barley was planted on Sept. 11, 2003 following a spring oats crop. Field corn was the 2002 crop. The seeding rate was 150 lb/ac.

In treatments receiving starter fertilizer, Kreher's composted poultry manure was mixed with the seeds at 100 lb/ac, to supply approximately 5 lb each of N and P<sub>2</sub>O<sub>5</sub>. The C/N ratio is approximately 4. The analysis as applied was approximately 5-5-2.

Field	Preparation	Mehlich P after harvest
90 A	3000 lb/ac Wegmans compost	14
92 B	5000 lb/ac Wegmans compost	25
92 D&F	5000 lb/ac Wegmans compost, clover	16
92 J	no compost	29
94E	3000 lb/ac Wegmans compost	14
94B	6500 lb/ac Wegmans compost	53

Note: Wegmans compost is uses poultry litter and fine wood chips as starting material. The C/N ratio is 10.8. The analysis as applied was 1.4-1.6-1.5.

Tillers were counted on Nov. 12, 2003 at the end of fall growth. Representative 1-foot samples were dug up and separated before counting tillers.

## CONCLUSIONS

- Starter fertilizer increased tillering by 20 – 30%.
- Starter fertilizer could be mixed with seed to produce a uniform stand.
- Fall tillering was not a limiting factor this year, yield was limited by kernel size. Kernel size is determined by conditions after seed set.
- Starter fertilizer mattered only where yields were < 70 bu/ac, and added only several bushels to the yield. Since fall tillering was not a limiting factor, starter fertilizer would be expected to have little or no effect.

## RESULTS

### Starter fertilizer improved tillering

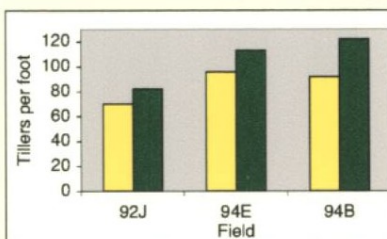


Figure 1. Effect of banded starter fertilizer on fall tiller production in winter barley.



Figure 2. Effect of banded starter fertilizer on fall top growth in winter barley.

### Mixing starter fertilizer with seed

For growers without the equipment to band, a possibility is to mix the starter fertilizer and the seed together in the grain drill. For mixing and for getting an even seeding rate, the fertilizer must be about the same size as barley grains.

The application rate of the fertilizer cannot be much more than the seeding rate. In our case 100 lb of fertilizer and 150 lb of seed worked well.

On many drills, opening the gate far enough to deliver 250 lb/ac results in seed clumping. Such clumping doesn't give the plants room to tiller, reducing yield and negating the effect of the starter. For this trial, the gate was opened to the range where it worked well, and a shaft transmission was used to increase the speed relative to the tractor.

We have used three different methods for mixing the fertilizer with seed.

1. Use a batch fertilizer mixer, like a small cement mixer.
2. Layer in the planter box, 1 bag seed, then a 6 gal pail of fertilizer. Stir with a stick. Repeat until full.
3. Layer in a tote bag. Hang the tote bag on a forklift and fill with alternate layers of 1 bag seed and a 6-gallon pail of fertilizer. No stirring is needed. Lift the full tote bag over the planter box to fill and mix.

### Actual yield well short of potential

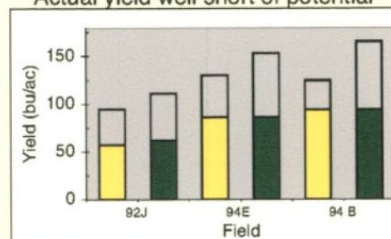


Figure 3. Starter fertilizer increased the potential yield (tiller number) but the actual yield was unaffected. Potential yield was calculated from tiller number, expected kernel number per head, and expected kernel size. The actual kernel size was less than the predicted size of 45 grams per thousand kernels.

### Yield response only in low-yielding fields

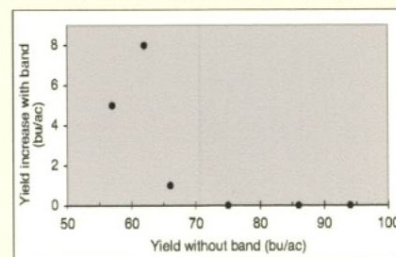


Figure 4. Yield increase due to starter fertilizer in all six split fields. We found no association with the rate of broadcast compost or with soil fertility measured as Mehlich P.

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