

## N responses in 2018

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The 2018 growing season began with very cool April weather; it was not a wet month, but with very slow drying, little planting was done before late April. Planting in Illinois began a little late, but progressed very rapidly, helped by the very warm temperatures in May. Temperatures were close to normal June through August, and rainfall was above average in June, somewhat below average in parts of northeastern-north central Illinois in July and August, and normal otherwise. With favorable weather in most parts of Illinois, corn yields are projected to be record-high, with the November estimate at 210 bushels per acre.

We think that mineralization of organic matter to provide N to the plants began slowly due to low soil temperatures in April, and that might have lowered yields at low N rates, and also may have produced N responses up to higher fertilizer rates in some cases. This can be seen in some of the N response curves for corn following soybeans in central and northern Illinois in Figure 1 below, but averaged across trials, the optimum N rate was only about 5 lb N/acre above the current MRTN, which is about 175 lb/acre. Yields were on average a little higher (240 bushels per acre) than we've found across trials in recent years.

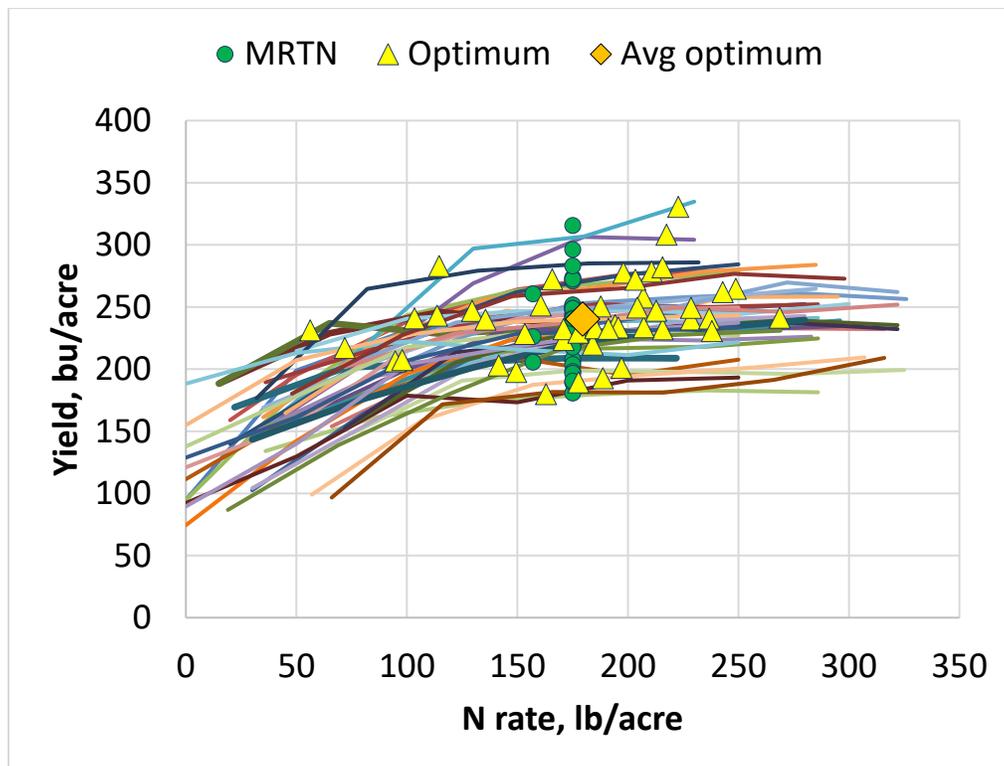


Figure 1. N responses of 45 on-farm N rate trials with corn following soybean in central and northern Illinois in 2018. MRTN values are 175 lb/acre for the 42 trials in central Illinois and 157 lb/acre for the three trials in northern Illinois.

We also had ten trials with corn following corn, and found again what we have noted in 2016 and 2017: optimum N rates measured in 2018 were lower than the MRTN values in use for the 2018 season.

## Southern Illinois

The story was somewhat different in the 13 trials conducted in southern Illinois in 2018 (Figure 2). There, an average of about 35 lb N per acre more than the MRTN was needed to produce optimum yields, and the average optimum yield was about 211 bushels per acre, higher than we have typically measured in these trials in southern Illinois.

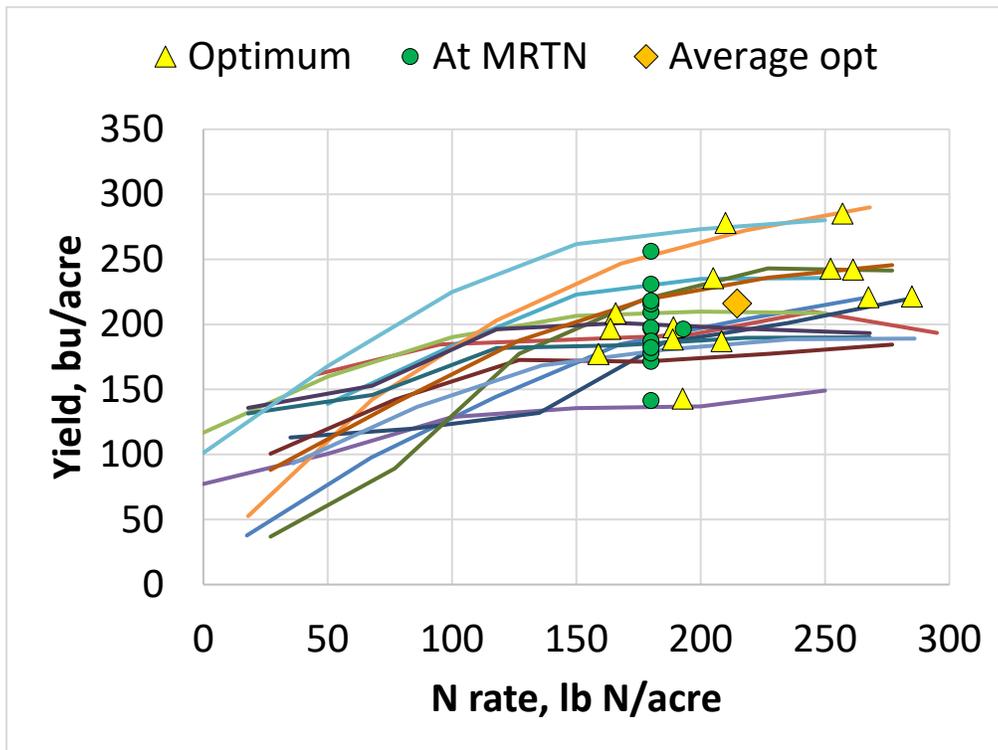


Figure 1. N responses of 13 on-farm N rate trials with in southern Illinois in 2018. MRTN values are 180 lb/acre for the 12 corn following soybean trials and 193 lb/acre for the one corn-corn trial.

### Updating the N calculator database

With optimum N rates averaging close to the MRTN (which was based on a large number of N responses through 2017), adding the data into the database underlying the N rate calculator will have minimal effect on the MRTN after the calculator is updated before spring 2019. Some older data will be removed during the update, though, and this could move the MRTN values by a few pounds.

In southern Illinois, with a smaller database and with some older data to be dropped from the N rate calculator database, adding in the 2018 data will increase the MRTN rates by some amount, perhaps 4 or 5 pounds. In the 25 trials conducted over 2017 and 2018, we have also noted that optimum N rates and yields at those rates show some correlation. This suggest that, especially if high yields can be predicted during vegetative growth, an additional application of N may be justified. Lower soil organic matter in many southern Illinois soils means lower potential N amounts coming from mineralization, and since high yields mean increase demand for N, the additional amount may need to come from fertilizer.