Planting Rate Recommendations for Organic Soybean Producers

Organic animal products comprise the fastest growing sector of the organic food industry. This market has created a large demand for organic soybean. The selling price for organic soybean can be more than twice that of conventionally managed soybean.

However, weed infestations can dramatically reduce yield and discourage soybean producers from taking advantage of this market opportunity. Because synthetic herbicides are prohibited under organic production standards, organic soybean producers must rely on multiple tactics to control weeds. Increased soybean seeding rates may be one tactic for organic soybean producers to improve crop competitiveness and enhance weed control.

Over several years and multiple locations in North Carolina, Dr. Jim Dunphy, an NC State University soybean specialist, has demonstrated that soybean yield does not significantly increase with plant densities exceeding 100,000 plants/acre. This is the case in conventional production with herbicide use, but for organic soybean producers, increased seeding rates improve early soybean canopy density, which shades out weeds in the early stages of weed competition. Compared with the cost of genetically modified organism (GMO) seed technology fees, organic soybean producers can increase seeding rates with much less of a negative impact on economic return.

The NC State Organic Cropping Research program investigated the planting rates of 75,000, 125,000, 175,000, and 225,000 seeds/acre for soybean CV 'Hutcheson' (Maturity Group V) at three locations over two years.

High soybean planting rates improved weed control for the organically managed plots (Figures 1 and 2). Conventionally managed plots were essentially weed free due to herbicide application, thus, higher planting rates were not advantageous. Weed pressures were very light in Plymouth, NC, 2007; moderate in Goldsboro, NC, 2006; and heavy in Kinston, NC, 2007.

Figure 1. Improved weed control in organic soybeans due to increased soybean planting rates. The plot on the left was planted at 225,000 seeds per acre, while the plot on the right was planted at 75,000 seeds per acre.

At all three locations, organic soybean yields were greatest with the highest planting rate of 225,000 seeds per acre (Figure 3). At the Goldsboro location, soybean yield with conventional weed management was greater than soybean yield with organic weed management. However, at the Kinston and Plymouth locations, organic and conventional soybean yields were not statistically different.

The observed yield response due to increased planting rates was unexpected

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for conventionally managed soybeans. Such results are contradicted by years of variety testing trials in North Carolina. The recommended soybean planting rate for conventional soybean producers is typically 100,000 seeds per acre. Producers using GMO soybeans are interested in reducing the number of planted seeds per acre even below this recommendation to reduce the cost of seed technology fees.

For organic soybean production, the highest economic returns were achieved with the highest seeding rate tested at each of the three locations (Table 1). Although no soybean lodging was observed in this study, it could become an issue at higher soybean planting rates.

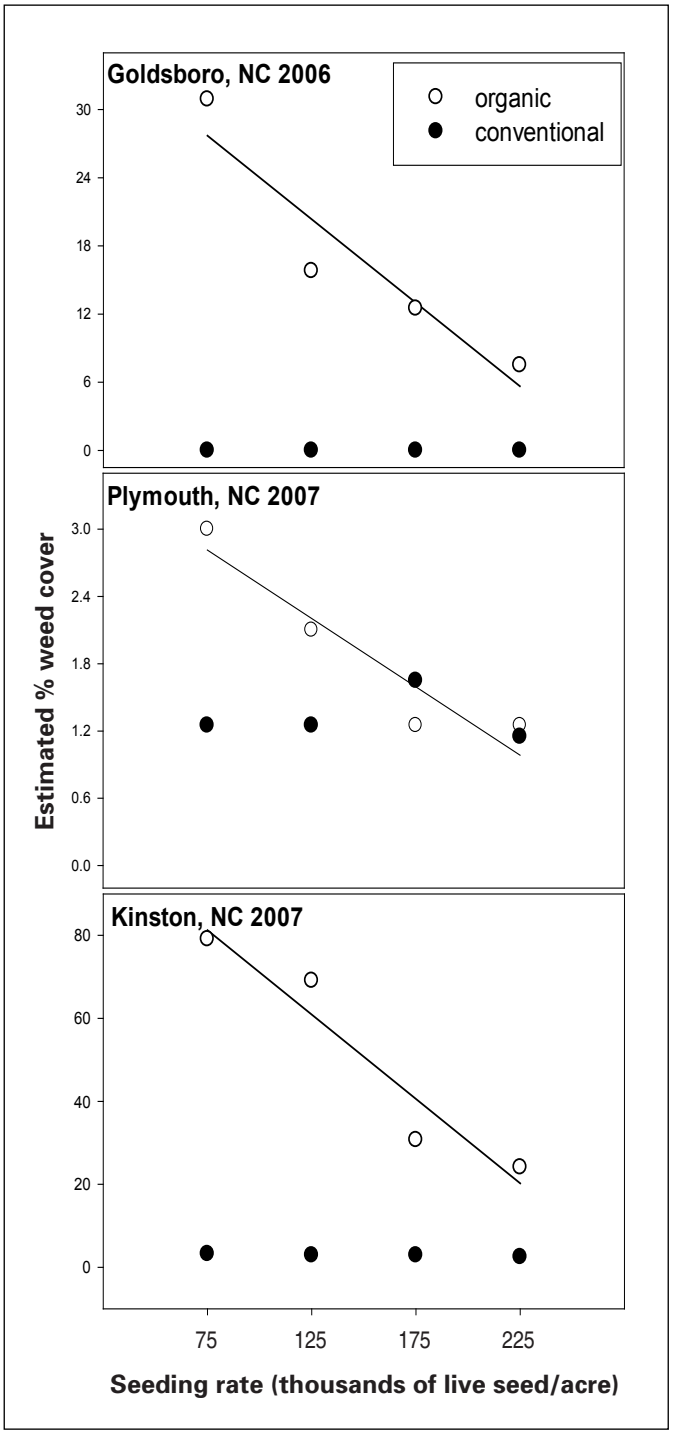

Figure 2. Soybean planting rate effects on the percent weed cover in organic and conventionally managed plots.

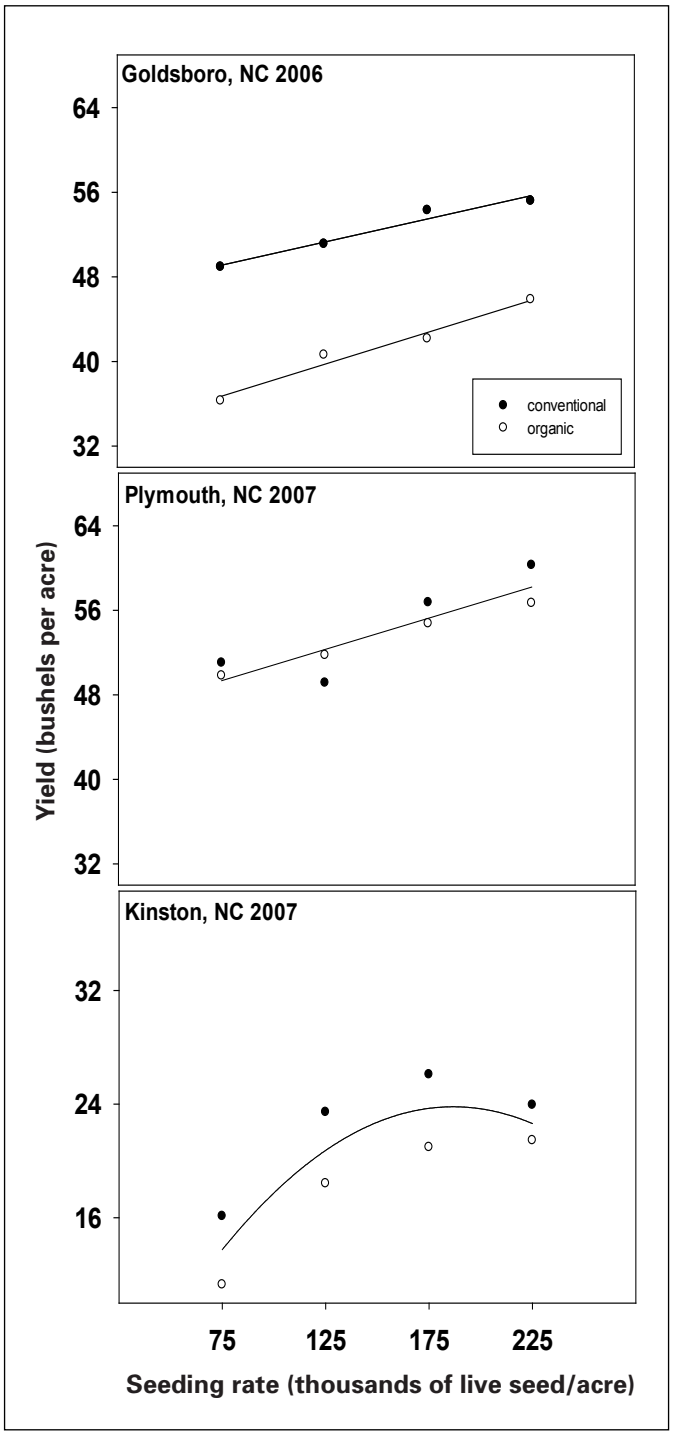

Figure 3. Soybean planting rate effects on soybean yield organic and conventionally managed plots.

Goldsboro, NC 2006		
Seeding Rate	Yield bushels per acre	Organic Return per acre
75,000	36.3	$0
125,000	40.6	$54
175,000	42.2	$69
225,000	45.9	$114

Plymouth, NC 2007		
Seeding Rate	Yield bushels per acre	Organic Return per acre
75,000	49.8	$0
125,000	51.8	$21
175,000	54.8	$56
225,000	56.7	$76

Kinston, NC 2007		
Seeding Rate	Yield bushels per acre	Organic Return per acre
75,000	11.3	$0
125,000	18.4	$93
175,000	21.0	$122
225,000	21.4	$122

Table 1. Soybean planting rate effects on economic return for organic management assuming $16 per 120,000 seeds and $14 per bushel of organic soybeans.

For more information visit: NC organic grain production guide, www.organicgrains.ncsu.edu/

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