Seeding Rates for Full-Season and Double-Crop Soybean

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**Introduction**

- Soybean [Glycine max (L.) Merr.] seed cost has increased dramatically over the last two decades from $27 ha⁻¹ in 1996 to $150 ha⁻¹ in 2015 due to the introduction of glyphosate resistant cultivars.
- Determination of site-specific economically optimum seeding rate continues to be a major agronomic challenge.

**Objective**

- Determine the optimum seeding rates for full-season and double-crop soybean under different yielding environments.

**Materials and Methods**

**Year & Location**
- 2003 to 2011 at seven locations in VA

**Cropping System & Planting Date**
- Full-Season: early- to late-May

**Seeding Rate**
- Full-Season: 74,000 to 445,000 seeds ha⁻¹
- Barley: 99,000 to 593,000 seeds ha⁻¹
- Wheat: 222,000 to 667,000 seeds ha⁻¹

**Yielding Environment**
- Low Yield: 1350 to 2700 kg ha⁻¹
- Medium Yield: 2701 to 3700 kg seeds ha⁻¹
- High Yield: 3701 to 4700 kg ha⁻¹

**Statistical Analysis**
- Soybean yield was regressed across seeding rates using linear-plateau (LP) and quadratic (Q) models of SAS

- Seeding rate explained 40 to 65% of the full-season relative yield variability.
- Optimum seeding rates:
  - Low: 238,000 to 288,000 seeds ha⁻¹
  - Medium: 222,000 to 282,000 seeds ha⁻¹
  - High: 187,000 to 264,000 seeds ha⁻¹

- Seeding rate explained 39 to 69% of the full-season relative yield variability.
- Optimum seeding rates:
  - Low: 212,000 to 335,000 seeds ha⁻¹
  - Medium: 327,000 to 382,000 seeds ha⁻¹
  - High: 329,000 to 399,000 seeds ha⁻¹

- Seeding rate explained 42 to 56% of the full-season relative yield variability.
- Optimum seeding rates:
  - Low: 586,000 to 630,000 seeds ha⁻¹
  - Medium: 492,000 to 560,000 seeds ha⁻¹
  - High: no data for high yielding soils

- Late-planted soybean requires more seeds to produce desired leaf area and maximize yield due to a shorter growing season.
- Results suggest that optimum soybean seeding rates may depend on yield potential, offering potential for variable-rate seeding.