

Md. Rasel Parvej and David L. Holshouser

Virginia Tech – Tidewater Agricultural Research and Extension Center

Contact: mrparvej@vt.edu and dholshou@vt.edu

INTRODUCTION

- ❖ Soybean [*Glycine max* (L.) Merr.] seed cost has been 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.

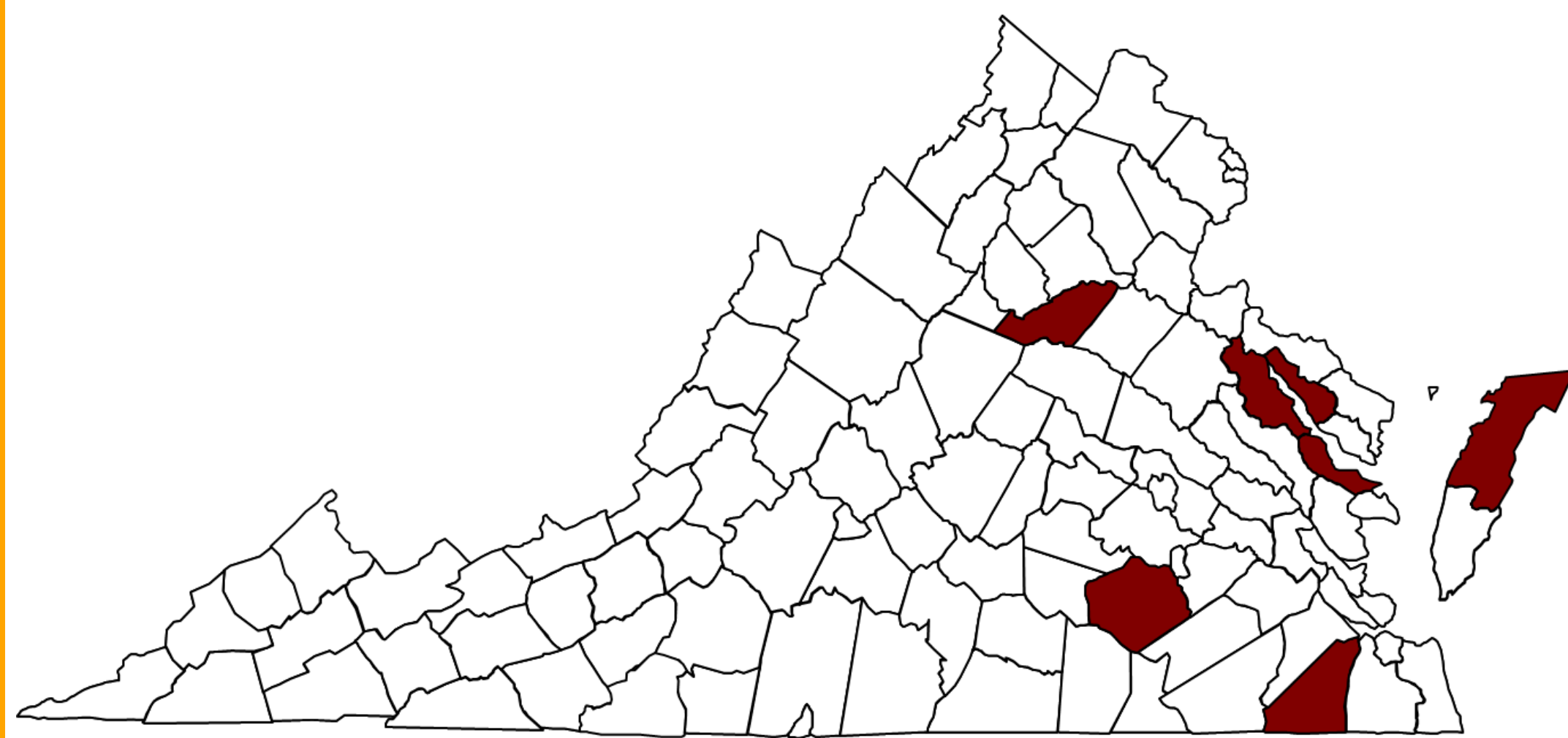
OBJECTIVE

- ❖ 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
- ❖ Double-Crop with Barley; early- to mid-Jun.
- ❖ Double-Crop with Wheat; late-Jun. to early-Jul.

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

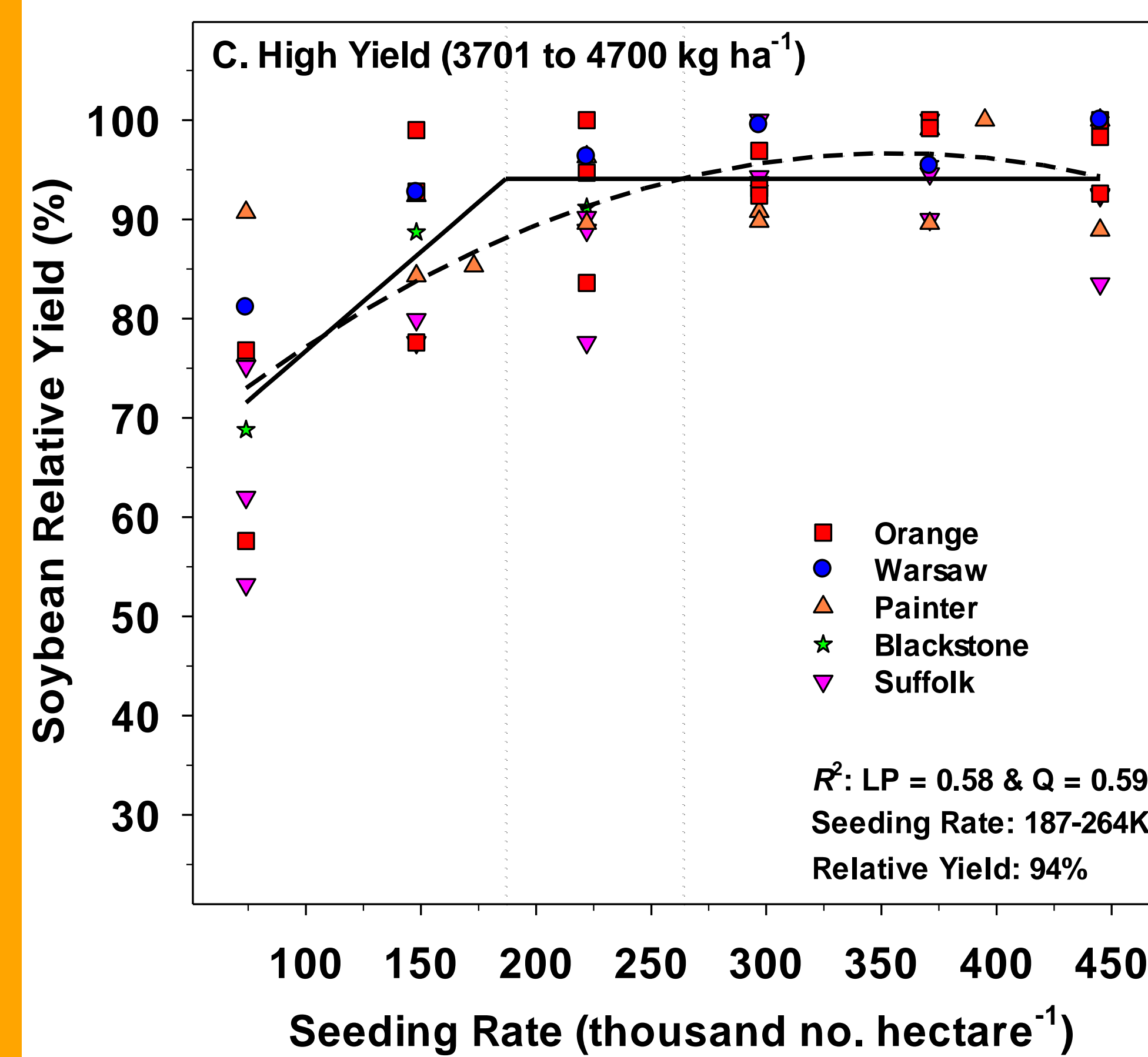
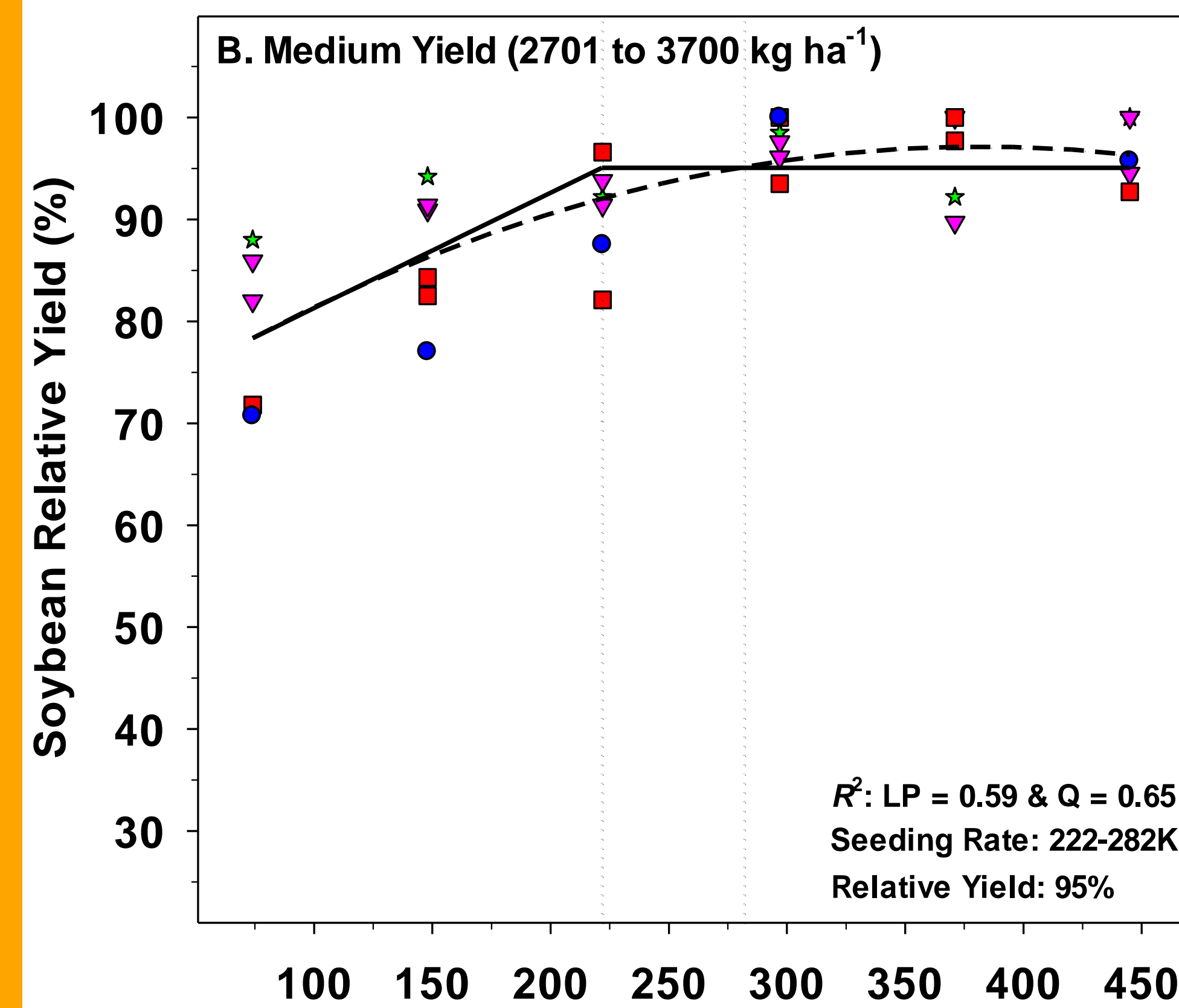
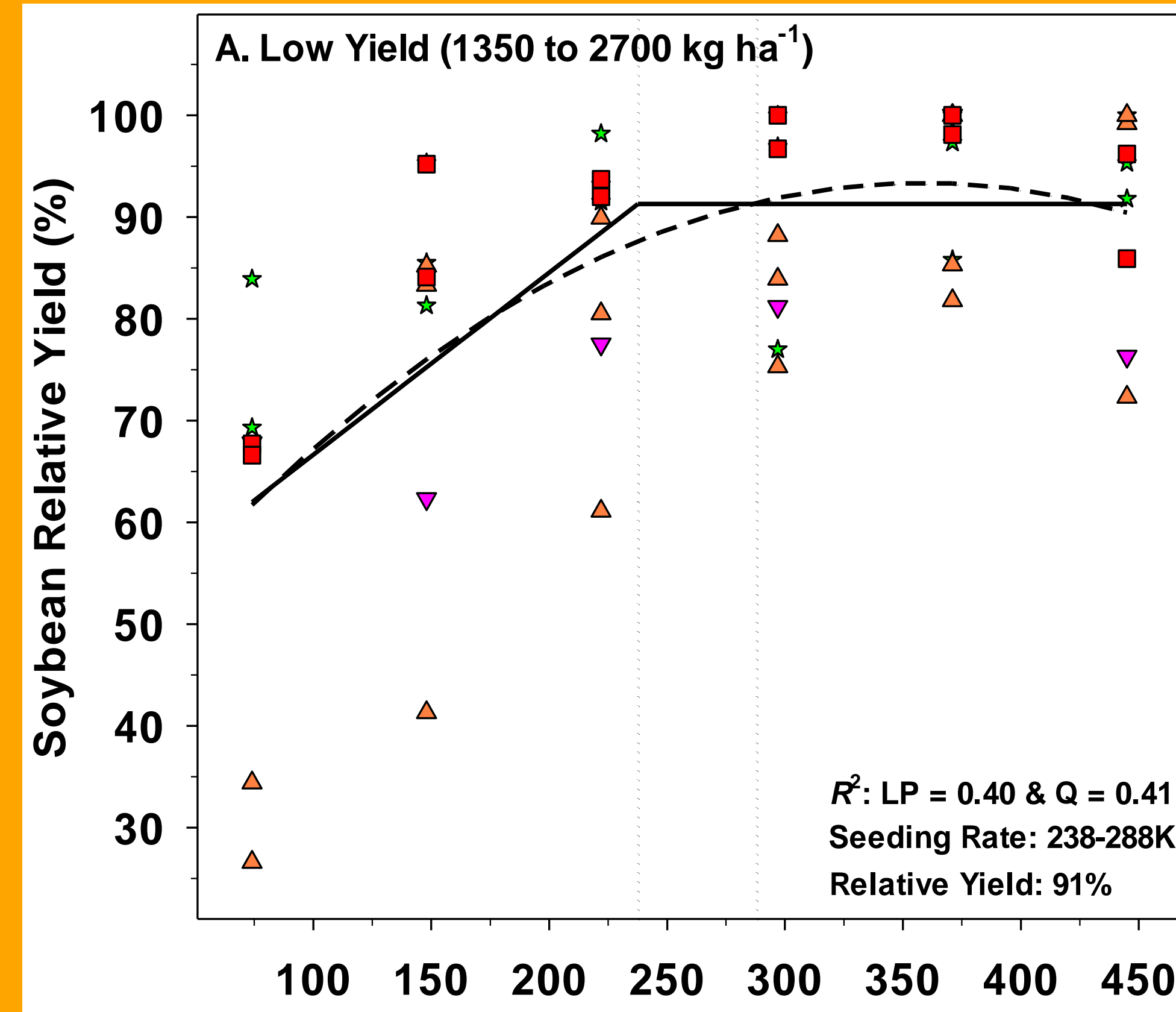
Yielding Environment

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

Statistical Analysis

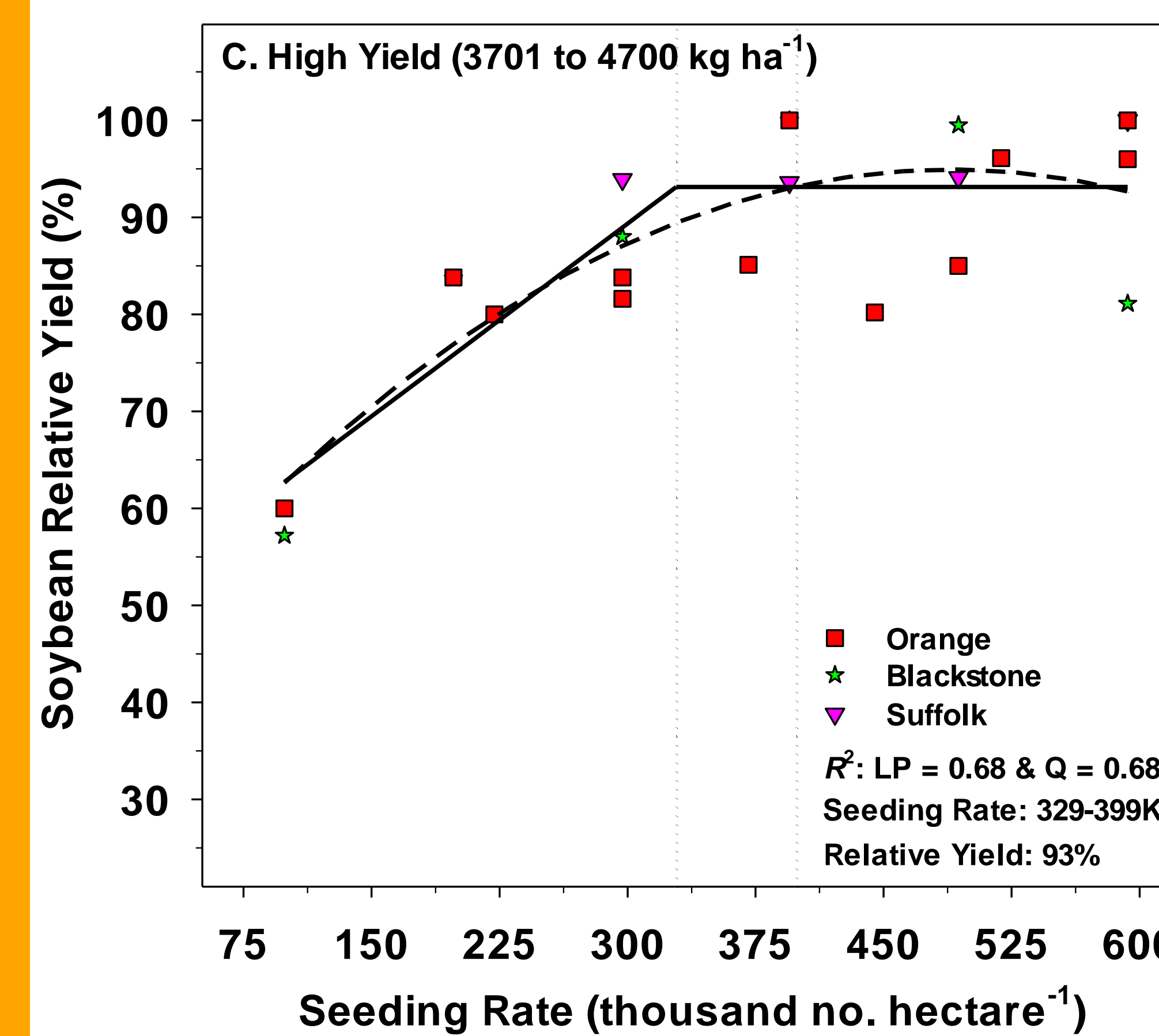
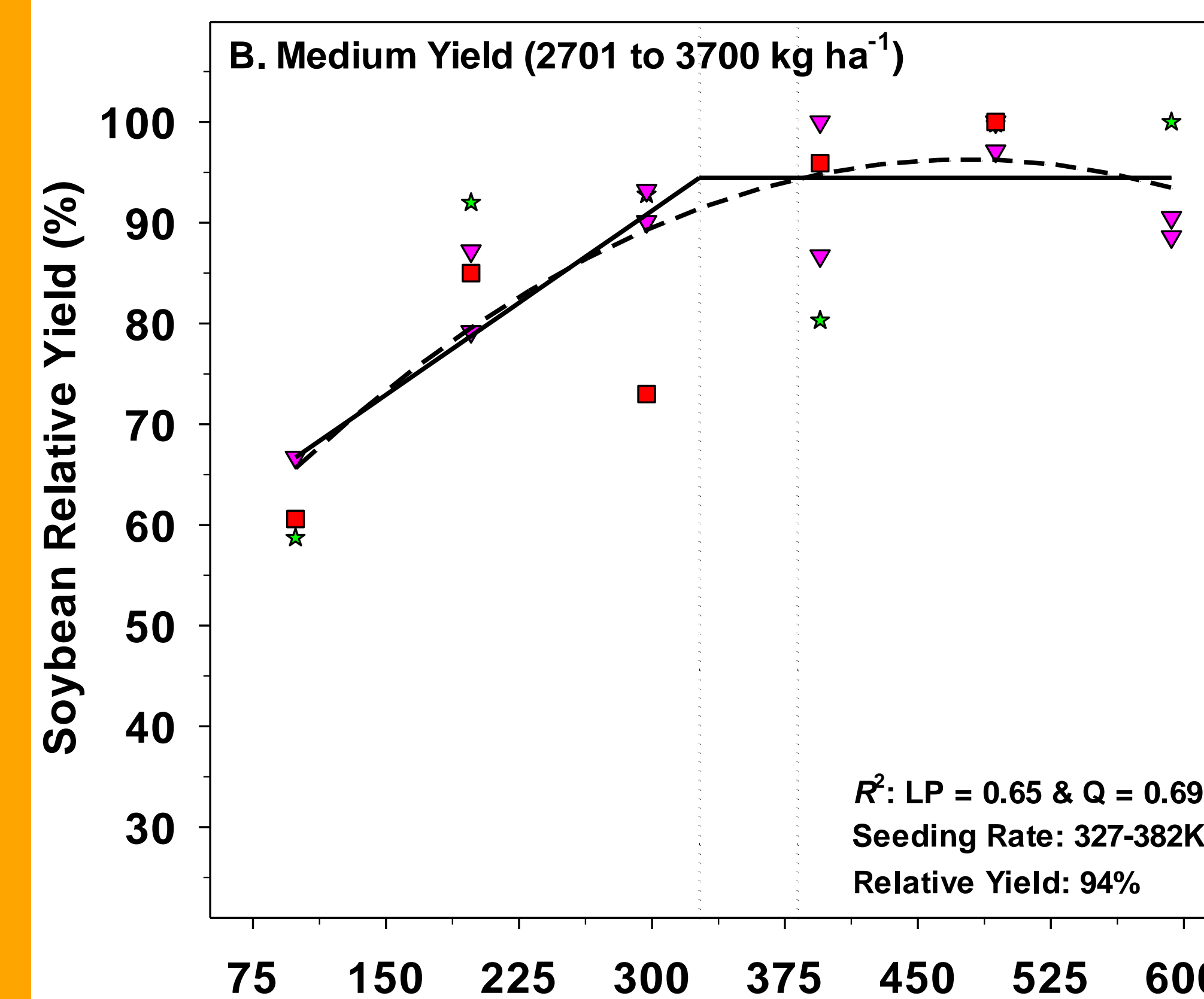
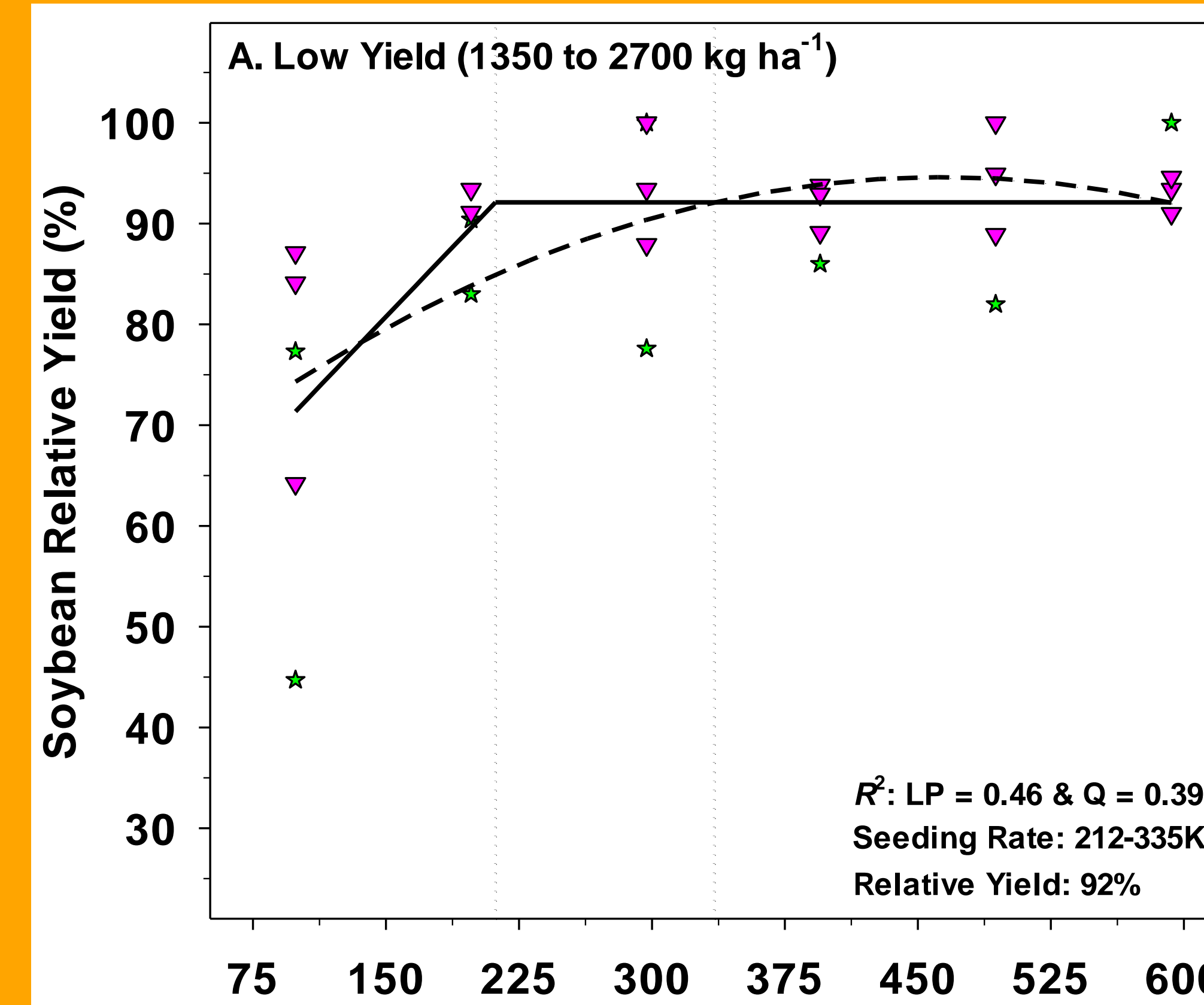
- ❖ Soybean yield was regressed across seeding rates using linear-plateau (LP) and quadratic (Q) models of SAS

FULL-SEASON SOYBEAN



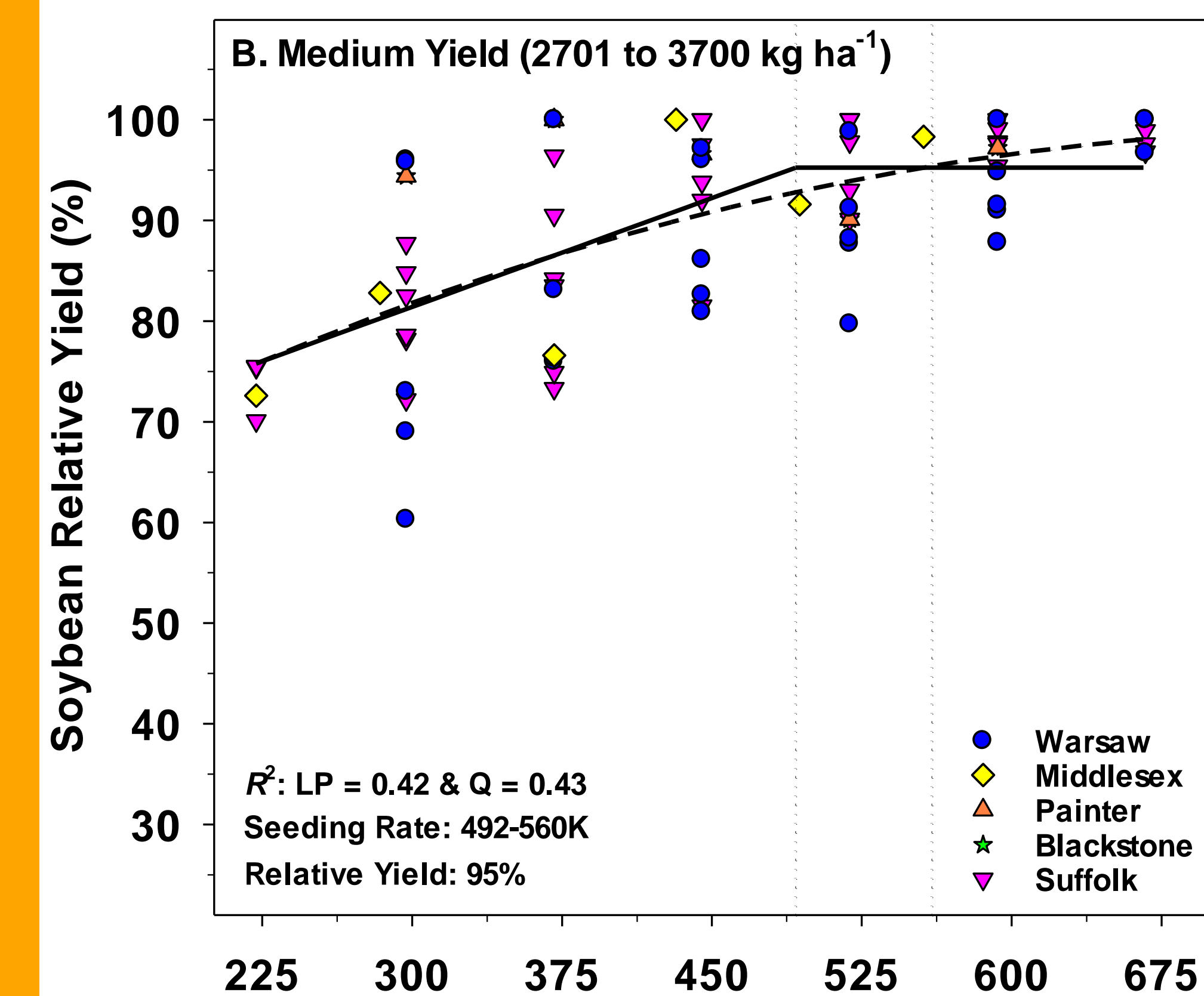
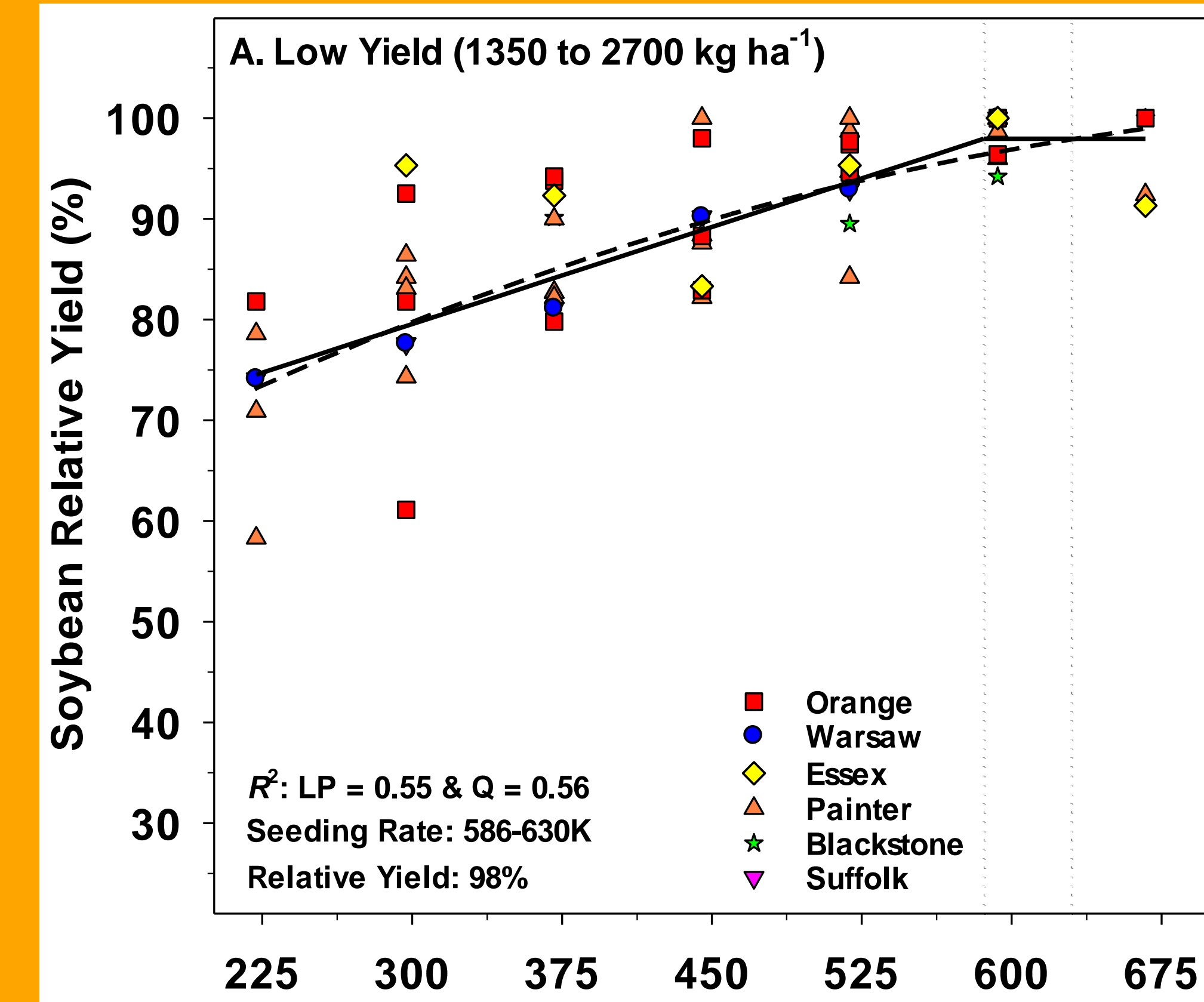
- ❖ Seeding rate explained 40 to 65% of the full-season relative yield variability.
- ❖ Optimum seeding rates:
Low: 238,000 to 288,000 seeds ha⁻¹
Medium: 222,000 to 282,000 seeds ha⁻¹
High: 187,000 to 264,000 seeds ha⁻¹

BARLEY – SOYBEAN



- ❖ 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

WHEAT – SOYBEAN



- ❖ 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.