

Planting Date and Row Width Effect on Severity of Brown Stem Rot and Soybean Productivity

C. R. Grau, E. S. Opiinger, E. A. Adee, E. A. Hinkens, and M. J. Martinka

Research Question

Many farmers in the Upper Midwest have implemented management practices, such as earlier planting date and narrow row width, to increase the yield of soybean. Not all farmers have experienced an increase in soybean yield after implementing these practices. It is not known if brown stem rot (BSR) modifies the anticipated response of soybean to early planting date and narrow rows.

The purpose of this research was to determine if BSR influences the expected yield response of soybean planted at early dates and in narrow rows. A BSR-resistant and -susceptible cultivar were compared for yield and reaction to BSR at different planting dates and row widths.

Literature Summary

Early planting dates and narrow row widths have been proven to increase soybean yields. Several soybean diseases have been shown to increase in severity when soybean are planted at reduced row widths. Data is not available on whether BSR modifies the anticipated yield increase of soybean planted earlier and in narrow row widths.

While several diseases of soybean are related to stressful growing conditions, BSR is most severe when conditions are optimal for soybean growth. Yield loss to BSR is greater in cultivars with a longer relative maturity. Increasing the number of days soybean are grown at cooler temperatures (64-75 °F) also increases the severity of BSR.

Study Description

This study was conducted for 2 yr on Plainfield loamy sand at Hancock, WI.

Treatments: A: Planting dates (3)—1 May, 15 May, 30 May

B: Row width (2)—7 and 30-in.

C: Cultivar (2)—Corsoy 79 (BSR-susceptible) and BSR 101 (-resistant)

Weed control: 1988: alachlor and chloramben (pre-emergence), and acifluorfen (post-emergence).

1989: metolachlor and chloramben (pre-emergence), and acifluorfen and sethoxydim (post-emergence).

Hand weeding as necessary.

Irrigation: 19.8 in. from 18 May to 15 Sept. 1988

10.8 in. from 25 April to 26 Aug. 1989

Growing conditions: Rainfall was 6 in. below normal and air temperatures were 5 to 8°F above normal in 1988.

Conditions were adequate for optimal yields in 1989.

Applied Questions

How does planting date and row width influence the severity of BSR?

The severity of BSR was greater in Corsoy 79, a susceptible cultivar, when planted earlier (Fig. 1). When a resistant cultivar was planted, however, there was no difference in BSR severity due to planting date. Row width did not significantly influence the severity of BSR.

Does BSR affect the yield potential of soybean planted earlier in narrow rows?

Yes There was no yield response to either earlier planting date or narrow rows by the susceptible cultivar Corsoy 79. The yields of resistant BSR 101 planted in late May were 25 to 31% lower than if planted in early May (Fig. 2). BSR 101 in narrow rows yielded 19% more than in wide rows when averaged over all planting dates.

How does the combination of best management practices compare to the worst combination?.

In 1989 the cultivar BSR 101 planted on 1 May in narrow rows yielded 70.6 bu/acre, while Corsoy 79 planted 30 May in wide rows yielded 26.7 bu/acre. As growers incorporate best management practices for soybean, they may be disappointed in the yield response if a factor such as BSR is limiting the maximum yield of soybean. However, awareness of current and potential disease problems in a field can enable a grower to select cultivars with resistance or implement management practices such as crop rotation and tillage to avoid yield loss to disease without reducing the yield potential of soybean.

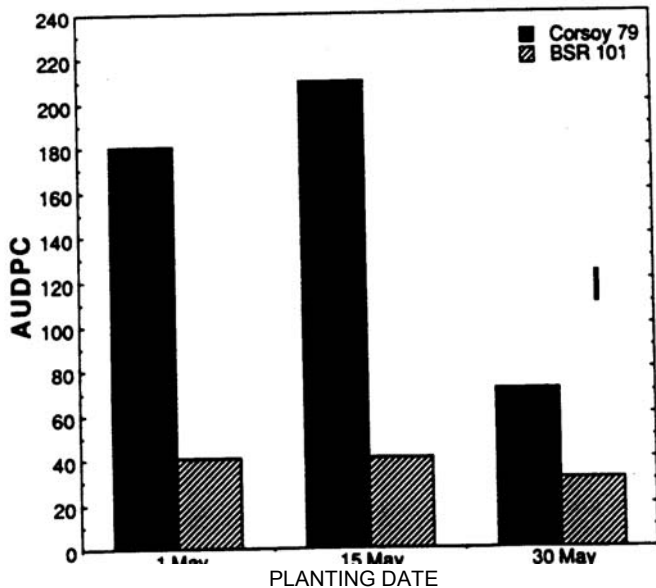
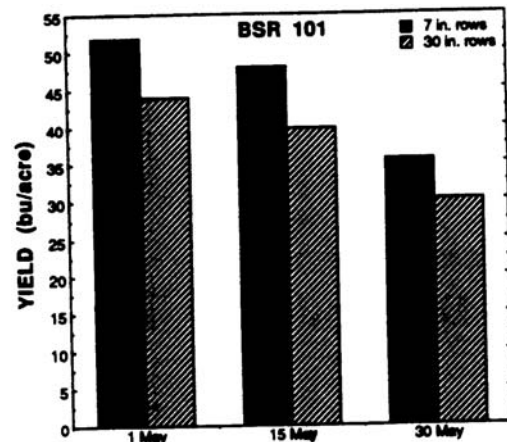
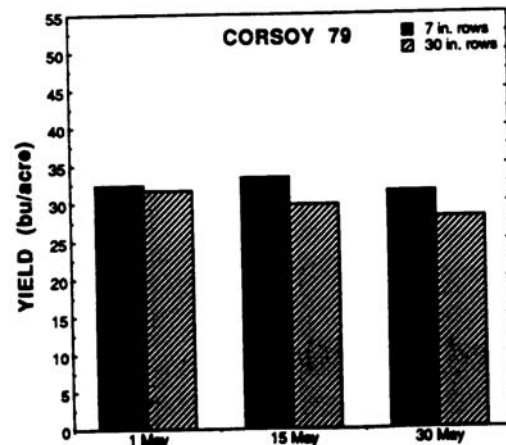


Fig. 1. Severity of brown stem rot of soybean as influenced by planting date and cultivar ($P < 0.001$) in 1999, averaged over row widths. Severity of foliar symptoms of brown stem rot were presented as area under disease progress curve (AUDPC). Vertical bar represents FLSD(0.10).



PLANTING DATE



PLANTING DATE

Fig. 2. Yields of brown stem rot resistant (BSR 101) and susceptible (Corsoy 79) soybean cultivars in response to planting date and row width, averaged over 2 yr.