

Weed Suppression by Integrating Cultural Tactics in Western Canadian Soybean Production

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Soybean [*Glycine max* (L.) Merr.] seeded area in western Canada has grown by 36% in the past decade. As a warm-season species, soybean is at a competitive disadvantage when growing with cool-season weeds in this short-season environment. A strip-plot randomized complete block design field experiment was conducted near Lethbridge, AB in 2020 and 2021 and near Indian Head, SK and Carman, MB in 2021 and 2022 to determine the impact of integrating cultural weed management tactics on soybean yield, yield loss due to weeds, and weed biomass. The four cultural factors included presence vs. absence of a shoulder-season fall rye (*Secale cereale* L.) cover crop terminated before soybean planting, slender vs. bushy soybean cultivar, narrow (19–25 cm) vs. wide (61–76 cm) row spacing, and recommended (400,000 target plants ha⁻¹) vs. 1.5 times the recommended target density. The strip-plot factor included weedy vs. weed-free conditions. Among environments, the fall rye cover crop reduced weed biomass by 20% and reduced weed-free soybean yield by 4%. The bushy cultivar had 14% lower weed biomass and 5% greater weed-free yield than the slender cultivar. The narrow row spacing reduced weed biomass by 20%, increased weed-free yield by 11%, and reduced yield losses due to weeds by 4% compared with wide rows. The higher soybean target density reduced weed biomass by 15%, increased weed-free yield by 7% and reduced yield losses by 4% compared with recommended densities. When implemented together as part of a comprehensive integrated weed management program, planting a bushy soybean cultivar in narrow rows at higher densities into a terminated fall rye cover crop reduced weed biomass by 58%, increased weed-free soybean yield by 16% and reduced yield losses due to weed interference by 8% compared with a slender cultivar in wide rows at recommended target densities and without a cover crop.