One potential benefit of cover crops is the potential to suppress summer annual weeds such as waterhemp. Winter annual weeds occupy a similar niche to winter annual cover crops in a corn-soybean rotation and may also provide suppression of summer annual weeds. Delaying cover crop or winter annual weed control until the time of soybean planting maximizes winter cover biomass but may have negative effects on soybean yield. Early-planted soybean maximizes soybean yield potential, but limits the amount of cover crop biomass that can be grown and may limit the weed suppression benefit of the cover crop. The objective of this research was to compare the effects of winter annual weeds or a rye cover crop on waterhemp suppression as affected by winter cover removal time and soybean planting date. Two experiments (one rye cover, the other winter annual weed cover) were laid out side-by-side and were established at two locations (AFL and Kerr farms). Rye (Secale cereal) was drilled on October 2, 2013 at the two study locations. Winter rapeseed (Brassica napus) was broadcasted concurrently with the rye, but did not survive the severe cold of winter. Winter annual weeds and cover crops were removed using a burndown herbicide application of glyphosate at four times relative to the treatment planting date: Fall (Nov 15, 2013), 28 DBP (days before planting), 14 DBP or 0 DBP. Soybeans were planted on three different dates: early (May 8, 2013), middle (May 13, 2013) and late (June 7, 2013). Winter cover biomass was measured at the time of removal. Weed counts were made in two 0.1 m² quadrats per plot at planting, 5 WAP (weeks after planting), and 8 WAP. Biomass samples were collected from the quadrats at 5 and 8 WAP, dried and weighed. Biomass at the time of winter cover removal increased as removal time was delayed until planting. The greatest amount of biomass was accumulated in the rye cover crop for the late planting date. Waterhemp counts at the time of planting following winter annual weed cover was greatest at the 28 DBP removal time (2.4 plants/0.1m²). Waterhemp counts following the rye cover were not consistent between locations. At AFL counts were greatest for the Fall removal time (5.1 plants/0.1m²) and declined until 0 DBP (0.1 plants/0.1m²), but there were no differences in counts between the removal time treatments at Kerr (average of 0.8 plants/0.1m²). Waterhemp counts at 5 WAP and 8 WAP were not affected by planting date or removal time following winter weeds or a rye cover crop.