Elemental Allelopathy Influence on Native Grass Ecosystems. (A02-bottoms123210-Oral)

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Abstract:

Russian knapweed (Acroptilon repens L.) has interference mechanisms that contribute to its robustness, requiring both tillage and suppression strategies to improve grass stand sustainability. Leaf and stem tissue of knapweed was higher in Zn than in grass. On invaded grasslands in Central Wyoming knapweed mineralized Zn and deposited it as litter and duff on the soil surface where accumulations yielded 1.23 kg ha. Ten years after herbicide treatment and seeding improved grasses, most knapweed areas had recovered and again dominated the grasses. Soil Zn was still high, the surface 0-1.25 - cm in knapweed-infested areas being nearly double that of the 0-2.5-cm depth. Soil-Zn in knapweed areas at 7.5-15-cm was 3 to 5-fold greater than in noninfested areas of native grasses. Water extracts of Russian knapweed leaves (4 g dw/L) and Zn solutions (0.25 mM) showed similar patterns of inhibition on root length of four indicator species. Invasiveness of Russian knapweed may include Zn cycling to the upper soil surface to augment releases of known allelochemicals to develop an elemental allelopathic zone of interference that reduces seed germination and plant growth of some species.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002 Presentation Time: 8:45 am

Keywords:

Allelopathy, Invasive, Cycling, Grass