

## Public Abstract

First Name:Ricardo

Middle Name:

Last Name:Costa Silva

Adviser's First Name:Reid

Adviser's Last Name:Smeda

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Effective weed control is one of the most yield-limiting factors in organic corn and soybean production. Additionally, the amount of tillage needed to control weeds in organic practice is often criticized for its negative impacts on soil quality. This research was conducted in central Missouri from 2016-2017 to compare cultivation, flame application, between-row mowing, and hot water spray for in-season weed control in organic corn and soybeans. Between-row mowing and hot water application were paired with no-tillage and a crimped winter cover crop of cereal rye (*Secale cereale* L.). When weeds reached 10.2 cm, weed control practices were implemented and repeated as necessary until canopy closure. Grass and broadleaf weed biomass between crop rows was determined at multiple dates throughout the 2016 and 2017 seasons and in-row weed levels were determined at the final collection date for each crop each year. Broadleaf weed biomass at the end of the soybean season in 2016 was lower in the two treatments utilizing no-till and cover crops as primary weed control and hot water and mowing as secondary control. Soybean yield was adversely affected by flaming but not significantly different for the cultivation, mowing and hot water treatments. In 2017, soybean had less between-row grass biomass in the cultivation and flaming treatments than in hot water and mowing, but broadleaf levels were the same in the mowed treatment as the cultivated and flamed treatments. In 2016, grass biomass was lower in the no-till treatments between corn rows and higher in the crop rows than the other two treatments. Weed control treatments led to no significant differences in corn yield in 2016 and higher yields in the no-till treatments in 2017. In-row weed levels were significantly higher in corn in 2017 for the hot water treatment. Hot water at the levels applied in this research was not an effective weed control method. Since the overuse of cultivation can decrease soil organic matter levels and increase soil erosion, alternatives techniques are important to grant farmers the possibility to use their land for a long time. The crimped cover crop used in the no-till treatments limited weed growth in early-season corn and soybean and when coupled with between-row mowing is a potential alternative to cultivation in organic crop production. Flaming is also a potential alternative to cultivation in corn production.