

## Reaction of winged aphids to different mulch materials

Master-Thesis at the Department of Agricultural and Biosystems Engineering

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Witzenhausen, November **2019**

### Abstract

Straw mulch applied on a crop is known to reduce virus incidences e.g. in potatoes by interfering with aphid landing behavior. To investigate the effect of different organic mulch materials on the landing behavior of aphids, mulch materials (grayish and yellowish straw mulch, vetch-triticale, alfalfa-grass and a control without mulch) were tested in two consecutive experiments in the field. In field experiment I, the landing on 1 x 1 m in mulch plots surrounded by bare soil was tested by setting up transparent glass traps. The aim was to determine the attractiveness of mulch materials as a landing target against the bare soil background. In field experiment II yellow pan traps were used instead of glass traps, so that the influence of the mulch materials as background (with the yellow pan traps as landing target) could be tested. All traps, mulch materials and the soil were spectrometrically characterized to predict the aphid catches for subsequent comparison using a colour-opponency model. The model is influenced by the green-blue contrast of the target and background and is thus able to explain the aphid reduction by straw mulch observed by several authors. In field experiment I, the aphid catches in the glass dishes were highest on the control and lowest on the grayish straw mulch, although, according to the color-opponency model, the number of aphids should be highest on the yellow straw mulch and lowest on bare soil. In field experiment II, the aphid catches in yellow pan traps were statistically indistinguishable, although the color-opponency model predicted differences. Thus, differences in the attractiveness of the mulch materials were other than expected from the results of the color-opponency model or the successful aphid reduction by straw mulch in experiments of other authors. Possible influences by the 'Erdfaktor' (soil factor), UV light or olfactory components are discussed.