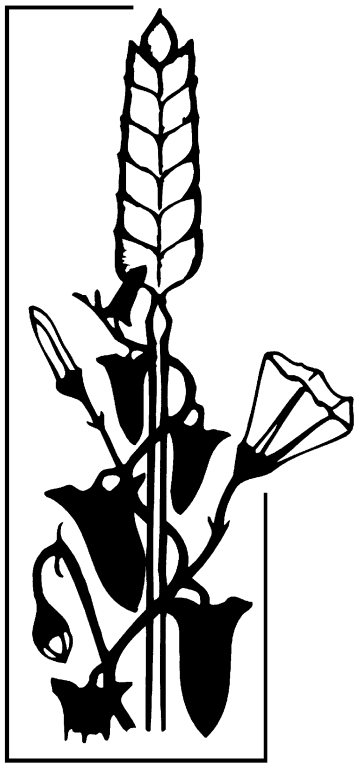

Europäische Gesellschaft
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Abstracts

3rd EWRS Workshop on Physical Weed Control

Wye College, UK
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Jesper Rasmussen
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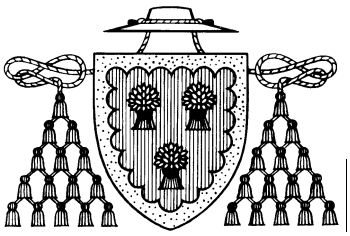

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Laboratory assessment of crop tolerance to selective flaming

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Abstract

In selective flaming, flames are directed to hit the crop row at soil surface at the base of the crop plants. However, the soil surface is often uneven, and flamers do not follow the soil surface nor the crop row exactly. As a consequence, the flames do not always hit where they are intended. Flames that unintentionally heat the upper parts of the crop plant may damage it, but in field conditions it is difficult to separate flaming injury, weed competition and impact of other factors on crop yield. To overcome these difficulties, we developed a laboratory method which enables researchers of thermal weed control to assess crop tolerance to selective flaming.

Two burners were mounted on a trolley on steel rails. They were directed at an angle of 40° from both sides towards the crop plant. The burners were alternately mounted, 20.5 cm apart. Propane dose was adjusted by changing the velocity of the trolley. Temperature measurements: K-type thermocouples were mounted on a vertical steel bar in 2.5 cm intervals to show the vertical heat distribution of the flame. The steel bar with thermocouples was mounted in line with the test plants.

The flame height was adjusted to hit the vertical center line of the crop i) at soil level, ii) at middle of the height of the crop plant, or iii) at the top of the crop plant. Crop plants for the laboratory test were grown in pots, one plant per pot. We flamed four plants, with 50 cm intervals, during one pass, and had three "replicates". Thus twelve plants received each treatment. After flaming the plants were grown for further 14 days. The fresh weight of the plants were recorded.

We have tested cabbage and red beet tolerance to flaming with this method. We used two growth stages of each crop species, recording number of leaves, average height of the plants, and thickness of the stem and leaf of randomly selected plants.

The method can be used to determine whether there are susceptible plant parts, that do not tolerate misdirected flames, i.e. is the exact directing of the flame essential to avoid crop damage. Also, the feasible dose at each growth stage may be assessed with this method. When several dose levels are used in the laboratory test, it is possible to estimate the dose-response relation at the given growth stages and flame directions.