

EFFECT OF OXYFLUORFEN ON SUNFLOWER PLANTS IN LABORATORY CONDITIONS

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Summary

Effect of oxyfluorfen on some genotypes of cultivated sunflower in the laboratory conditions was estimated in this paper. Length of above-ground part and root and dry weight of above-ground part and root were used as criteria for estimation. Oxyfluorfen had negative effect on sunflower plants and brought to significant reduction of all tested characteristics of treated plants in comparison to control. As the obtained results are in agreement with the results of other authors, used method can be considered convenient for estimation of effect of herbicides on sunflower.

Key words: effect, oxyfluorfen, sunflower, laboratory conditions

Introduction

Presence of the weeds in the early stages of sunflower (*Helianthus annuus* L.) development usually brings to significant reduction of yield (Covarelli and Pecetti, 1986). Today, there are a great number of herbicides for chemical weed control. But, some weed species are becoming more present and numerous thanks to their active and passive resistance to the most of herbicides which are used today.

Use of relatively new herbicides can, in some years, cause a weaker or stronger phytotoxicity on some sunflower hybrids (Dixon *et al.*, 1989). In this experiment, the effect of relatively new herbicide, oxyfluorfen, on some sunflower inbreds and hybrids have been investigated in laboratory conditions, with the use of a new method.

Materials and methods

Seeds of sunflower inbreds OCMS-74, OCMS-98, RHA-CD and RHA-583 and hybrids NS-H-17, NS-H-45 and NS-H-111 which have been incubated in distilled water for 24 hours and than dehulled, surface sterilized in 70% ethanol for 5 minutes and rinsed in two changes of sterilized distilled water were placed on sterilized filter paper. After two days, seeds which have germinated were placed on MS medium (Murashige and Skoog, 1962) supplemented with following concentrations of oxyfluorfen (Goal preparation): 2 ml⁻¹ (G₁), 2.5 ml⁻¹ (G₂) and 3 ml⁻¹ (G₃). Seeds of control plants were placed on basic MS medium. After seven days of culture length of above-ground part and root and dry weight of above-ground part and root were determined.

Results and discussion

Length of above-ground part

Plants grown on media supplemented with oxyfluorfen had reduced length of above-ground part in comparison to control plants (*Figure 1*). The reduction ranged from 46% (OCMS-74 on G₂ medium) to 83% (NS-H-111 on G₂ medium).

Statistical analysis showed that treated plants differed significantly in length of above-ground part from the control plants.

These results are in agreement with the results of *D'Alessandro and Zora (1992)* obtained in the field conditions and the results of *Konstatinović et al. (1995)* obtained in the laboratory conditions. According to *D'Alessandro and Zora (1992)* use of oxyfluorfen brought about a significant reduction in height of the uprooted seedlings.

Root length

Oxyfluorfen brought to significant decrease in root length of all tested genotypes (*Figure 2*), which ranged from 39% (NS-H-111 on G₁ medium) to 100% (NS-H-17 on G₂ medium).

Statistically significant differences of root length of control and treated plants were found in all genotypes.

Similar results were obtained by *Konstatinović et al. (1995)* in the laboratory conditions.

Dry weight of above-ground part

Plants grown on media supplemented with oxyfluorfen had reduced dry weight of above-ground part (*Figure 3*). The reduction ranged from 3% (RHA-583 on G₃ medium) to 62% (NS-H-45 on G₂ medium).

Statistical analysis showed that reduction of dry weight of above-ground part was significant in all genotypes. Exceptions was inbred line RHA-CD which had small reduction of dry weight of above-ground part which ranged from 32% to 36%.

The obtained results are in agreement with the results of *D'Alessandro and Zora (1992)*. According to these authors, use of oxyfluorfen brought about a significant reduction in dry weight of uprooted seedlings. *Konstatinović et al. (1995)* found a significant reduction of dry weight of above-ground part of plants treated with oxyfluorfen in laboratory conditions.

Dry weight of root

Oxyfluorfen brought to statistically significant decrease of dry weight of root in all tested genotypes, which ranged from 15% (OCMS-98 on G₂ medium) to 100% (NS-H-17 on G₂ medium) (*Figure 4*). Exceptions were plants of inbred line OCMS-98 grown on G₁ medium and plants of inbred line RHA-CD grown on G₂ medium which had increased dry weight of root in comparison to control plants. The increment ranged to 63% (OCMS-98) to 70% (RHA-CD).

Similar results were obtained by *Konstatinović et al. (1995)* in laboratory conditions.

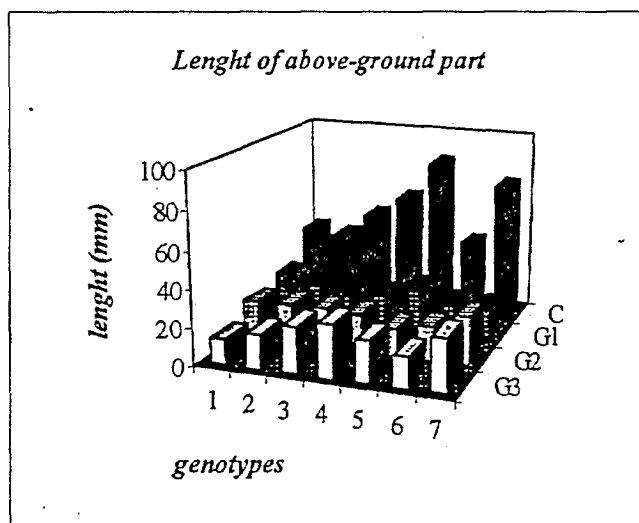
Conclusion

On the basis of the results obtained in this experiment it can be concluded that oxyfluorfen had a great effect on sunflower plants in laboratory conditions as it brought to significant reduction of all tested characteristics. This is in agreement with the results of other authors obtained in field and laboratory conditions (D'Alessandro and Zora, 1992; Konstatinović et al., 1995). The used method was found reliable and convenient for estimation of effect of herbicides on sunflower.

Literature

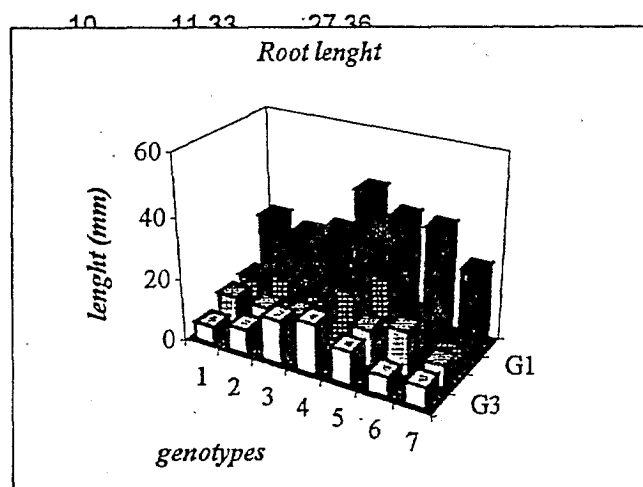
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Figure 1. Effect of oxyfluorfen on length of above-ground part of tested sunflower genotypes



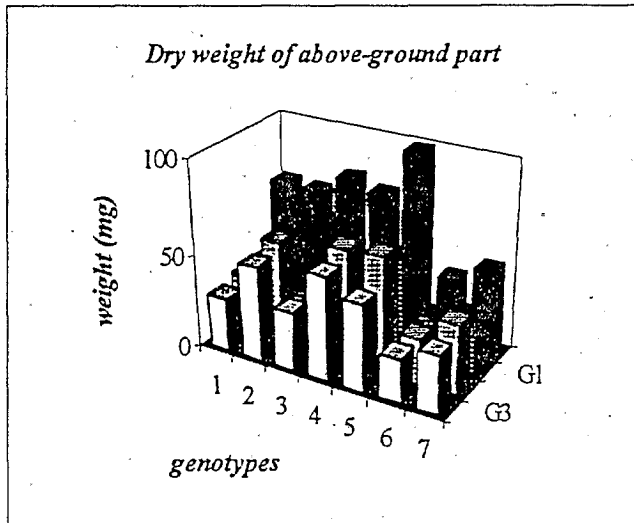
Genotypes: 1 - OCMS-74; 2 - OCMS-98; 3 - NS-H-45; 4 - NS-H-17; 5 - NS-H-111; 6 - RHA-CD; 7 - RHA-583

Figure 2. Effect of oxyfluorfen on root length of tested sunflower genotypes



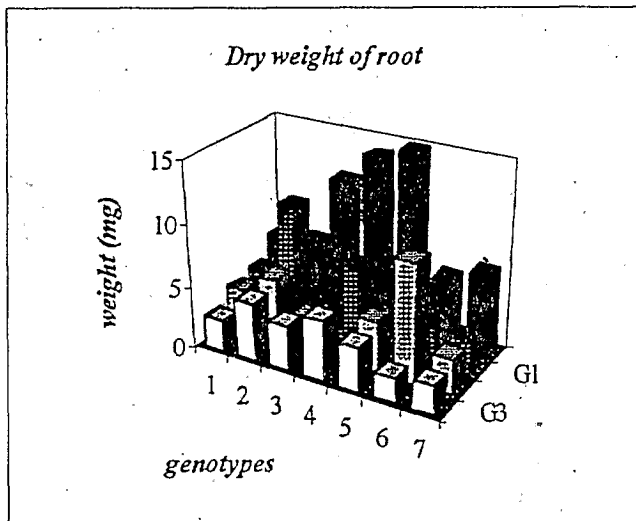
Genotypes: 1 - OCMS-74; 2 - OCMS-98; 3 - NS-H-54; 4 - NS-H-17; 5 - NS-H-111; 6 - RHA-CD; 7 - RHA-583

Figure 3. Effect of oxyfluorfen on dry weight of above-ground part of tested sunflower genotypes.



Genotypes: 1 - OCMS-74; 2 - OCMS-98; 3 - NS-H-45; 4 - NS-H-17; 5 - NS-H-111; 6 - RHA-CD; 7 - RHA-583

Figure 4. Effect of oxyfluorfen on dry weight of root of tested sunflower genotypes



Genotypes: 1 - OCMS-74; 2 - OCMS-98; 3 - NS-H-45; 4 - NS-H-17; 5 - NS-H-111; 6 - RHA-CD; 7 - RHA-583