ON THE AUXIN-SENSITIVITY OF THE COLEOPTILES OF DIFFERENT AVENA VARIETIES

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Introduction

Since fundamental experiments of FITTING (4), BOYSEN—JENSEN (3), NIELSEN (6, 7) WENT (8) and others the application of the Avena test in investigating the growth substance has widely spread. Prior to the paperchromatographic separation technique the Avena curvature test was used generally. Since LUCKWILL (5), later BENNET—CLARK (1), employed the paperchromatography to separate the growth substances, this method has been almost entirely superseded by the Avena straight growth test. In the examinations of this study also the Avena straight growth test has been used to determine which of the oat varieties grown in our country is the most suitable for biological test. To this end the auxin sensitivity of the coleoptiles of five well and evenly germinating oat varieties was examined.

Material and method

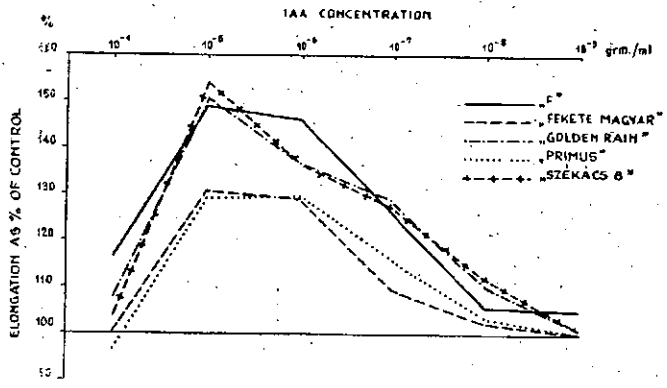
The auxin — indol-3-acetic acid (Merck) — sensitivity of the »*F*«, »*Fekete magyar*« (»Hungarian black oat«), »*Golden Rain*«, »*Primus*« and »*Székács 8*« of the varieties of the *Avena sativa* L. has been examined in 10^{-4}—10^{-9} gm/ml concentrations. 5 ml of the single dilutions has been used. The seeds of the crop were kept soaked for 12 hours before sowing, then they were sown 5 mm deep in heated and washed sand fixed previously to 80% water capacity. The quantity of the water evaporized was supplied in every 24 hours after sowing.

The single varieties did not reach simultaneously the corresponding length 16 to 20 mm. The »*Fekete magyar*« and »*Primus*« reached the afore-mentioned lenght 84 hours while the »*F*«, »*Golden Rain*« and »*Székács 8*« only after 93 hours.

5 mm subapical cylinders were obtained by the method of BENTLEY and HOUSLEY (2) and the rate of elongation was measured after 24 hours. Having measured the 10—10 coleoptile cylinders the average values were calculated, then as control, compared with the mean value of the coleoptile sections incubated in the bidistilled water the elongation was expressed in percentage.

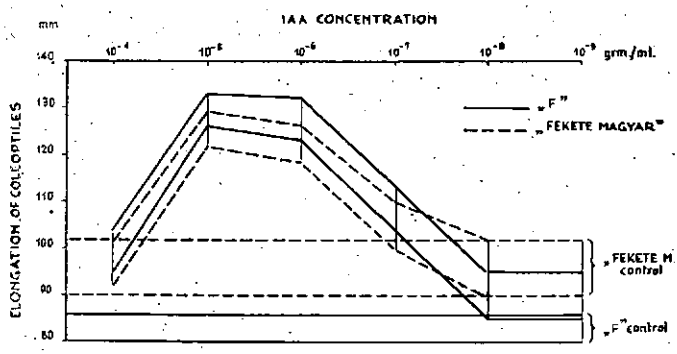
Results and discussion

Results are shown in graph 1. where the indole-3-acetic acid (IAA) concentration ranges on the abscissa and the corresponding elongations on the ordinata — referring to the control — are expressed in per cent.



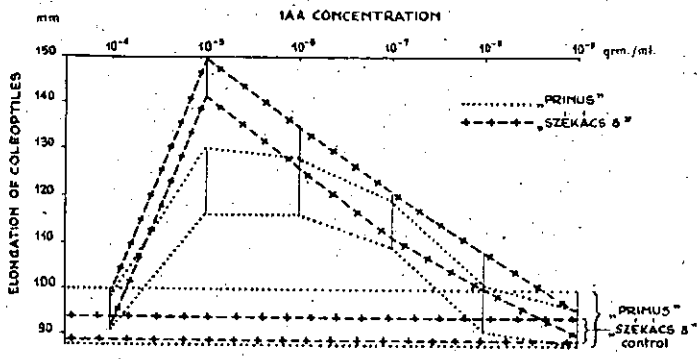
Graph 1.

Graph 2 shows standard deviation of the elongated coleoptiles of the varieties »*F*« and »*Fekete magyar*«, on graph 3 are represented the »*Székács 8*« and »*Primus*«, while graph 4 illustrates the »*Golden Rain*«.

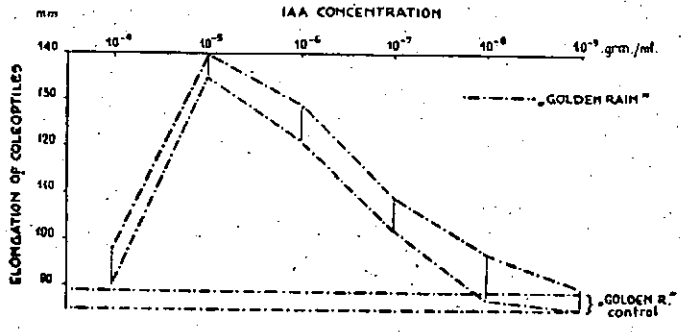


Graph 2.

According to the results obtained »*Székács 8*« and »*Golden Rain*« are very responsive to IAA, namely they grew most intensively at 10^{-5} concentration. Next to them is the »*F*« variety which is also highly sensitive and beside gave a high growth reaction at a relatively wide range of concentration. The above-mentioned conclusion is supported also by the standard deviations shown in graphs 2, 3, and 4.



Graph. 3.



Graph. 4.

Summary

On the basis of the results of examinations the »*Székács 8*«, »*Golden Rain*« and »*F*« as enumerated proved to be the most adequate varieties of the oats examined as biological test. Their adequacy is increased by their uniform and rapid germination as well as by their relatively slight deviation.

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