

CHANGES OF GROWTH HORMONES CONTENT IN GENERATIVE ORGANS OF RAPESEED IN RELATION TO LEVELS OF NITROGEN FERTILIZATION

Změny obsahu růstových hormonů v generativních orgánech řepky v závislosti na úrovni hnojení dusíkem

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Souhrn, klíčová slova

Pokusem jsme ověřovali vliv dávky dusíku (0, 75, 150, 225 and 300 kg N . ha⁻¹) na obsah rostlinných hormonů v generativních orgánech ozimé řepky. Z analýz změn obsahu biologicky aktivních látek v průběhu generativního období vyplývá souvislost mezi úrovní hnojením dusíkem a obsahem nativních látek. Jako nejefektivnější se v roce 1995 a 1999 v období květení jevíla varianta hnojení 150 kg N . ha⁻¹.

řepka, rostlinné hormony, ABA, IAA, Z, ZR, iP, iPA, poupata, květy, šešule, dávky dusíku

Summary, keywords

Verifying of the influence of nitrogen doses (0, 75, 150, 225 and 300 kg N per ha) on the content of plant hormones generative organs of winter rapeseed was made in experiments. From analyses of changes of biologically active substances during the generative period were found the correlation between the level of nitrogen fertilizing and the contents of hormones. The variant fertilized with 150 kg N per ha seems to be the most effective during period of flowering in the year 1999.

rapeseed, plant hormones, ABA, IAA, Z, ZR, iP, iPA, buds, flowers, pods, nitrogen doses

Introduction - Úvod

It is generally known, that the time of the flowering is decisive for the future yield. This period is obviously also the time of strong hormonal and metabolic activity. However, the role of hormones in the process of elaboration of the yield of rapeseed is a little researched domain and therefore interesting for those possibly interested. This fact was decided about our experimentation.

Methods - Metody

Exact experiment was carried out in the Research Station of the Faculty of Agronomy the CUA in the years 1995 and 1999 on the winter rapeseed variety LIRAJET (60 plants per m²). Variants were based on 4 repetitions and maintained in accordance to the standard technology of rapeseed growing – SVŘ. The content of biological compounds was analysed in plant material sampled during flowering period from different variants of N fertilization at 0, 75, 150, 225 and 300 kg N per ha. After sampling on the field, all samples were frozen in liquid nitrogen and transported in IEB. During analyses samples were lyophilised, homogenised and afterwards (always under presence of antioxidants) extracted in 80% methanol. Biologically active substances were separated by use of liquid chromatography (HPLC) and determined by means of immunology-enzymatic method (similar to ELISA procedure).

Results - discussion – Výsledky - diskuse

The buds of terminals of all variants sampled in the stage of yellow bud 1995 show higher initial total contents of CK in comparison to buds of terminals sampled in 1999, what would hint to the higher metabolic activity. Moreover, in this period there is a lower level ABA than in case of buds in the year 1999. If this hormone controls the apical domination, there could be certain relation with the increased level CK in growing buds. Levels of auxine determined on

generative organs in the year 1999 were ten times lower, than those measured in 1995. This fact can only be stated.

In the stage of full flowering we have determined the generally increased hormonal level by comparison of values, be it in connection with CK or with the ABA. We have observed increased hormonal levels particularly in flowers in comparison to buds and pods. On generative organs of all variants sampled in 1999 a significant growth of ZR takes place in this period, which *De Bouille et al. (1988)*, based on observation by *Leea et al. (on soya, (1985)*, connect to embryogenesis. The highest growth of the level of this hormone we observe at 150 and 225 kg N per ha. An opposite trend can be observed on samples of the year 1995.

For the stage of the green ripeness is interesting the comparison between levels of Z and ZR in pods of the upper and lower halves of racemes in the year 1999. High contents of ZR in all variants are significant. Slightly increased contents of Z can also be observed. According to *de Bouille et al. (1988)* the influence of this hormone group on cell division is assumed.

In conclusion, we must note: (1) that the variant fertilized with 150 kg N per ha seems to be the most effective one during period of flowering in the year 1999 and (2) that exact analytic methods lose their efficiency in case of material sampled in field conditions.

References - Použitá literatura

De Bouille, P., Sotta, B., Miginiac, E., Merrien, A. (1988): Hormones et développement reproducteur chez le colza *Brassica napus* L., variété Oleifera Metzg, cultivar Bienvenu, CETIOM S.I.T. no 103, 1988:91-103

Applied abbreviations - Použité zkratky

SVŘ - System of rapeseed production, IEB - Institute of experimental botany, Academy of sciences of the Czech republic

IAA - indole-3-acetic acid, ABA - abscisic acid, CK - cytokinins: Z-zeatin, ZR- zeatin ribotide, iP- isopentenyl adenine, iPA - isopentenyladenosine

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