SPEKTROFLUORYMETRIYA CEREALS LASER IN VIVO

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Development tools and methods for rapid accurate analysis of crops during development and under the influence of stress factors is one of the most pressing issues of modern plant. Correlation quantitative chlorophyll fluorescence parameters of the overall process of photosynthesis is rather difficult to predict, chlorophyll fluorescence radiation and can make ̃25% of the absorbed energy. This figure largely depends not only on the intensity and wavelength of the exciting radiation, but also the type of chloroplast, age and physiological state of the plant, and - the possible stress conditions of different nature [1, 2]. Impact typical stress on photosynthetic activity of plants and fluorescent options highlighted in the recent literature [3, 4]. The basic principles of fluorescence spectroscopy and fluorescence analysis of plant devoted [5, 6]. Method spektrofluorymetriyi plant facilities described in detail in [7, 8].

The purpose of research. The aim of this work was to study the feasibility of laser spektrofluorymetriyi to determine the age and genetic characteristics of individual grass plants.

Materials and methods of research. The experiments used leaded sprouts and yellow stalks of cereals (soft and hard types, winter and spring varieties) - wheat, rye, barley and hybrids from the collection of the National Agricultural University of Ukraine. As a source of nitrogen used fluorescence excitation laser.

How spectral criteria of agricultural crops used fluorescent following indices: F1 = 430/460, F2 = 460/530, F3 = 690/735, F4 = 460/690, F5 = 430/690, F6 = 530/690, F7 = 430 / 735, F8 = 460/735, F9 = 530/735, F10 = 430/530.

Results. Value indices fluorescent leaded shoots and stems of cereals are shown in Table 1:

Apparently, index values lie within: F1 from 0.8 to 1.0; F2 1.5 to 2.8; F10 from 1.2 to 2.7. The value of other indices vary widely. This indicates that spectral band in the blue region of the spectrum (430 nm, 460 nm and 530 nm) can be used as the comparison of reference and will enable them to evaluate changes in fluorescence intensity in the red (690 nm and 740 nm) spectrum.

For example, the transition from leaded to yellow germ stem (wheat "Bilotserkivska-47") characterized by a decrease F3 index from 2.8 to 1.4; F4 from 3.4 to 2.0; F5 from 3.0 to 1.6; F7 from 8.5 to 2.2; F8 from 9.6 to 2.7.

One can assume some increase in the indices of spring crops compared to winter, so the index increased by 1.4 F3 (spring wheat "From Kiev") to 2.9 (winter wheat "alumina"); from 2,0 (winter barley "Crimea") to 2.2 (barley).

Results irradiation with white light (4000 lux) for 1.5 days shown to reduce F3 index from 3.0 to 1.9 (spring wheat "Kharkov-7") and from 13.0 to 4.3 (spring wheat "Diana"). The same is true of indexes F4, F5, F7 and F8.

For almost all the corn sprouts have a high ratio of value because the red intensity maxima is small. Note that corn shoots are white, while other cultures sprouts - white with a yellowish tint. To explain this fact can be delayed process of accumulation protohlorofilidu.

We have not found significant differences among the indices of fluorescent samples has various genetic forms (winter and spring crops) and chlorophyll fluorescence, depending on the type and grade of wheat.

Conclusions

Using laser spektrofluorymetriyi for diagnosis and age specific differences cereals and maize showed the most significant changes fluorescence characteristics manifest themselves at different stages of development. The dependence of the fluorescence indices old, grade and genetic forms not found.