Studies have shown that scab is more actively developed in areas with high humidity. Here, climatic factors don't play the main role, but also along with the physiological condition of the tree, the condition of the leaves, the providing the plant with nutrients, other valuable factors also play an important role in development and spread og fungi diseases.

Research shows that the early-ripening varieties of pears are more susceptible to scab than late-ripening varieties.

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DOES EPIGENETIC HEREDITY INFLUENCE THE RESISTANCE OF THE AUTUMN WHEAT GENOTYPES TO HEAT AND FROST?

Under the influence of abiotic and biotic stress factors, gene expression can be altered with or without the involvement of stress hormones (a); changes in gene transcription may be made (b); stress factors can directly affect chromatin by methylation of DNA, modification of histones terminal parts and influence the condensation and recondensation of chromatin (c). These changes are largely reversible, but can alter the metabolic or morphological characteristics of plants under stress conditions. These processes can contribute substantially to variations in plant growth, influencing morphology and plasticity, especially under stress conditions. Usually, new phenotypes are not transmitted to the offspring, although the uniformity of the characteristics of the new combinations of epigenetic diversity is observed. The epigenetic inheritance which presupposes the transmission of information from one generation of an organism to the next that affects the traits of offspring without alteration of the primary structure of DNA is very rare. In most researches on epigenetic hereditary phenomena it is not excluded the involvement of genetic mechanisms (such as quantitative traits, segregation distortion, and cytoplasmic inheritance) or effects that require the ongoing presence of the stimulus that can lead to non-Mendelian patterns of inheritance. Actually, the term epigenetic heredity is often include the transmission of the acquired in ontogenesis information not only through mitosis, but also to the next generation through meiosis.

Our researches aimed to investigate the possible implication the epigenetic phenomena in determining the resistance to heat and cold stress of different genotypes of hexaploid wheat. In researches of the primary resistance to high temperatures and frost were involved germinated seeds that represented 12 wheat genotypes with different resistance at extreme temperatures. One set of seeds was reproduced in the Kharkov region (Ukraine), and another - in the central area of the Republic of Moldova. Our studies aimed to determine whether conditions of seed reproduction influenced genotype primary resistance to high temperatures and frost. Obtained results have shown that conditions of seeds reproduction substantially influenced the distribution of wheat genotypes according their resistance to both high temperatures and frost. At the same time, the distribution of genotypes by their resistance to high temperatures or frost was different, in both location of seeds multiplication. Only one genotype from twelve demonstrated high resistance to both factors, regardless of the zone of seed reproduction. These data demonstrate that epigenetic phenomena influence the primary resistance of wheat to extreme temperatures. In our previous researches we have shown that after the second phase of winter hardening the plants resistance to frost was different, depending of genotype. These results support the vision that the processes characteristic for adaptation to extreme temperatures might involve the epigenetic inheritance. Of particular interest are the data about kinetics of wheat seeds germination during their incubation at 1 or 4°C. They have demonstrated that the seeds of genotypes with higher primary resistance to frost germinates slower in mentioned conditions. Surprisingly, these results has common connotations with the law of Bergonié and Tribondeau regarding the resistance of biological systems to ionizing radiation. According to this law the high proliferation rate for cells and high growth rate for tissue result in increased radiosensitivity: Cells are most radiosensitive when actively proliferating, highly metabolic, undifferentiated, and well nourished.

Phenomena related with epigenetics inheritance are observed after treatment of plants with compounds that induce the establishment of a unique primed state of defense or resistance. Primed plants show enhanced defense reactions upon further challenge with biotic or abiotic stress. Our results demonstrated that primed state, induced in winter wheat genotypes after treatment seeds before sowing with biostimulator *Reglalg,* is triggering wheat plants resistance to heat and cold stress. The influence tends to remain functional during ontogenesis and in the next generation, without supplementary treatment. The progeny of primed plants has a higher basal level of resistance to cold stress and an enhanced capacity to react to additional priming treatments. When transgenerationally primed plants were subjected to an additional priming treatment, their descendants displayed a stronger primed phenotype, suggesting that they can inherit a sensitization for the priming phenomenon. This is evidence that plants have a memory of encountered stress situations that allow them to better adapt to changing conditions. These results confirm the information of scientific literature that demonstrates the implication of the epigenetic mechanisms underlying plant defense responses to biotic and abiotic stresses.

Good examples of epigenetic mitotic memory of environmental conditions represent vernalization of autumn wheat. Vernalization is the exposure to long-term cold that occurs during this overwintering period and renders plants competent to flower early in the spring. Seeds of this specie germinate in the fall; plants overwinter in vegetative state, and subsequently, develop transition to generative development in the spring season when the days lengthen. We show that the autumn wheat transition to generative state during vernalization is accompanied with induction of the transcription of at least 200 structural genes. Plants with this lifecycle can take advantage of an ecological niche that enables successful development in the early spring, when many other plant varieties have just begun to germinate. Although the specific mechanisms of vernalization vary between species, clear evidence shows an epigenetic basis of vernalization in *Arabidopsis*. Before the extended period of cold, the floral repressor is expressed, in part, by changes to chromatin, including histone modifications. This altered chromatin and expression state is then stably transmitted mitotically and renders plants competent to flower, even in the absence of cold temperature. Vernalization is not meiotically heritable, because it resets every generation. Failure to reset the requirement for vernalization could be detrimental, because it would lead plants to flower rapidly before the onset of winter, reducing overall reproductive success.

The description of a phenomenon as epigenetic becomes particularly difficult in organisms that are not tractable to genetic studies. Epigenetics inheritance suppose the stable transmission of information through mitosis or meiosis in the absence of the original inducing signal, that also are not the result of underlying genetic changes. These requirements were only rarely assured in real experiments and were misapplied with the label epigenetic without showing the lack of primary sequence differences driving the phenomenon. By implying different signals, such as small RNAs, are created self-perpetuating signals that can also trigger RNA-directed DNA methylation, thereby providing signals that are later translated into potentially heritable modifications of chromatin. In most cases, the results of the epigenetic legacy after a complex analysis were based on the transmission of the traits acquired through mitosis or various purely genetic mechanisms. For example; transposon insertions can cause unstable phenotypes that behave in unexpected fashions. Studies on heritable changes of some flax (*Linum usitatissimum*) varieties in response to environmental stress also point to genetic rather than epigenetic changes.

The role of epigenetics in plant development is most likely limited to mitotic transmission of gene expression states. If the epigenetic memory of developmental decisions was inherited through meiosis, it would likely interfere with development of the subsequent generation. Conceptually, mitotically transmissible memory that programs responses to environmental cues may provide part of the mechanism that plants use to alter gene expression in response to the environment. They also can imply the ongoing presence of the stimulus that is provided from the surrounding cells and tissues and thus assuring the meiotic inheritance. The influence of such mechanisms is confirmed by the maternal effects which describe the situation when an organism shows the phenotype expected from the genotype of the mother, irrespective of its own genotype, often due to the mother supplying messenger RNA or proteins to the embryo. Maternal inherence is important for the evolution of adaptive responses to environmental heterogeneity.

The presented results have obvious implications for natural and agronomical ecosystems. Inheritance of the primed state as observed in transgenerational priming is expected to contribute to improved adaptation of the progeny to environments. The influence of the conditions seed reproduction on the primary resistance of the plants obtained from them suggests the need to test the resistance of new selected genotypes in different areas. Generally, they support the view that the processes of acclimatization of plants in different areas may involve the induction of different epigenetic mechanisms for increasing the primary resistance of plants to excessive temperatures. Long time cultivation and breeding processes in new conditions may of harmonious combinations between epigenetic mechanisms and the new genetic modifications. Of particular interest is the induction of epigenetic adaptations under the influence of biostimulants, maintaining these specific states during the entire period of ontogenesis.

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ПИВОВАРНІ ЯКОСТІ СОРТІВ ХМЕЛЮ УКРАЇНСЬКОЇ СЕЛЕКЦІЇ

Хміль – найбільш дорога і дефіцитна сировина, що використовується під час виробництва пива. Виходячи з того, що хміль є найбільш специфічним, незамінним і найдорожчим видом сировини для виробництва пива, високоякісну продукцію можна одержати лише за умови використання хмелю окремих селекційних сортів.

В Україні вирощують ароматичні та гіркі сорти хмелю, які відрізняються між собою біохімічним складом, що впливає в кінцевому результаті на його вміст і збереженість у хмелесировині, а отже і пивоварні якості.

Таким чином оцінка пивоварних якостей шишок хмелю ароматичних і гірких сортів, що використовуються у вітчизняній пивоварній промисловості є актуальною задачею сьогодення.

Метою досліджень була оцінка пивоварних якостей шишок хмелю найбільш поширених у виробничих умовах ароматичних і гірких сортів.

Дослідження проводилися на кафедрі технології зберігання, переробки та стандартизації продукції рослинництва ім. проф. Б.В. Леси-