

It is shown that the rate of flag leaf transpiration during the period of grain filling was more stable than the rate of photosynthesis. This accounts for less stomata apparatus dependence on nitrogen content in the leaf that gradually decreased due to this element remobilization to grain.

The correlation coefficients for all varieties between CO<sub>2</sub> assimilation of whole leaf and grain productivity, as measured by weight and number of grains, accounted for penultimate leaf respectively 0.322 and 0.488 (GS 37), and for flag leaf — 0.655 and 0.826 (GS 61-65).

Thus wheat flag leaf plays a leading role in supplying of ear with assimilates and formation of grain productivity. Its assimilation activity is particularly important in a period of intense growth of grain. Assimilation activity of penultimate leaf is important during the period of stem elongation and ear emerging, when vegetative growth processes are highly intensive, up to unfolding of flag leaf.

**Kolesnikov M., Paschenko U.**

### **THE REACTION OF PEA'S PLANTS PRO-ANTIOXIDANT SYSTEM ON BIOSTIMULANTS STIMPO AND REGOPLANT TREATMENT**

Tavria state agrotechnological university  
18 B.Khmelnytsky Ave, Melitopol, 72310, Ukraine  
e-mail: maksym.kolesnikov@tsatu.edu.ua

Peas (*Pisum sativum* L.) are one of the main leguminous plants grown in Ukraine. The sown square of peas is 0,3 mln. ha and 25% of them is in stepp. Peas are very light-, water- and soil-demanding culture, that's why not realize its genetic productivity potential under adverse environmental conditions, owing to photosynthetic and photophosphorylation processes malfunctioning, changing in water state and development of oxidative defence. The usage of growth regulators normalize the metabolism and increase the crop production. The antioxidant system is very important for plant adaptation, and biostymulants Stimpo and Regoplant increase the plants stress resistance. The aim of presented work was to determine the impact of bioregulators Stimpo and Regoplant on the peroxidation processes, changes of antioxidant enzymes activity, proline content during peas onthogenesis under the conditions of South Steppe of Ukraine.

The seeds of peas Oplot variety (F1) sown with the amount 110 germinating seeds/m<sup>2</sup>. Seeds of experimental variant were treated with Stimpo (25 ml/t) and Regoplant (250 ml/t), prepared on Liposam solution (5ml/l). Folia treatment with biostymulants was carried out in recomended concentrations at inflorescence emergence stage (BBCH 51-59). The plant sampling was carried out at 2-3 and 5-6 leaves development stages, inflorescence emergence, flowering, development of fruit. It was determined the content of thiobarbiturate-active products (TBAAP) in the leaves with the use of mmolar malonic dialdehyde adsorption coefficient, proline content in reaction with ninhydrin reagent, catalase activity (CAT) evaluated according to hydrogen peroxide content in reaction with ammonium molibdate, peroxidative activity (POx) estimated in reaction of guaiacol oxidation.

Biostymulants Stimpo and Regoplant prodused by State Enterprise ISTC "Agrobiotech" are composite polyfunctional preparations, products of fungi-micromycetes *Cylindrocarpon obtusiuculum* 680 biotechnological cultivation from root system of ginseng. Analogues of phytohormones, amino acids, fatty acids, oligosaccharides, microelements, and bioprotective compounds) and Aversectin.

During peas ontogenesis we noticed the gradual of peroxidation processes increasing in leaves tissues. The seeds and plants treatment led to decreasing of TBAAP in leaves by 5,4-26,8% while vegetation. It is shown the intensification of peroxidation processes in peas at development of fruit stages which were treated by biostimulants.

The intensification of proline synthesis hold while stress reaction development, but its accumulation is an adaptive reaction of plant organism. Slowly raise of proline content in leaves during vegetative phase changed by exponential increasing during generative stage. Under Stimpo and Regoplant influence the proline content stayed lower then control index from 6,2% to 40,8% during all researched stages.

The high CAT activity noticed at the start period of peas vegetation, in further ontogenesis, the rapid decreasing of CAT activity observed. The effect of biostimulants varied during peas ontogenesis, from CAT activity stimulation at vegetative stage to a minor inhibition at fruit development stages. The diminution of CAT activity in leaves of peas under influence of biostimulants at physiologically tense development period is a mirror reflection of TBAAP and proline content changes. The ontogenetic changes of POx activity are similar to CAT activity changes in leaves. Greatest rise of POx activity under Stimpo and Regoplant affects by 34,6% and 22,1% respectively, fixed at the beginning stage of peas ontogenesis. It's noticed the reduction of stimulated affect of preparations on POx activity at physiologically tense development period which caused by flowering and peas fruit forming.

Hereby, under the condition of its presowing and folia usage, Stimpo and Regoplant improved the adaptive state of peas plants due to TBAAP and proline content decreasing, CAT and POx activity increasing during vegetation growth.

**Козеко Л.**

### **РЕГУЛЯЦІЯ СТІЙКОСТІ І ПЛАСТИЧНОСТІ РОЗВИТКУ РОСЛИН ШАПЕРОНАМИ HSP90**

Інститут ботаніки ім. М.Г. Холодного НАН України  
вул. Терещенківська, 2, м. Київ, 01601, Україна  
e-mail: liudmyla.kozeko@gmail.com

**Kozeko L. REGULATION OF STABILITY AND PLASTICITY OF PLANT DEVELOPMENT BY CHAPERONS HSP90.** Involvement of HSP90 into stabilization of plant growth and morphogenesis as well as regulation of HSP synthesis and cross-tolerance was investigated. A hypothetic molecular mechanism that interfaces the different HSP90-dependent processes will be presented.

Рослинам як багатоклітинним організмам притаманне динамічне поєднання стійкості та пластичності розвитку. Пластичність реалізується через зміни програми експресії генотипу під впливом зовнішніх стимулів і здатність формувати різні фенотипи у рамках норми реакції (Bradshaw, 1965; Кордюм і др., 2003). Стійкість забезпечується каналізацією обраної траєкторії розвитку при внутрішніх стохастичних процесах, незначних варіаціях факторів середовища та генетичному поліморфізмі (Waddington, 1942), а також підтримкою життєздатності організму при впливі екстремальних зовнішніх чинників. Розглядається участь в цих процесах шаперонів HSP90, від яких залежить активність значного ряду регуляторних білків. Метою доповіді є представлення гіпотетичного молекулярного механізму