

ФИЗИОЛОГИЧЕСКИЕ ХАРАКТЕРИСТИКИ ИВЫ КАК ФАКТОР ОЦЕНКИ ЭКОЛОГИЧЕСКОГО ПОТЕНЦИАЛА ВИДА

PHYSIOLOGICAL CHARACTERISTICS OF WILLOW AS A FACTOR OF ESTIMATION OF ENVIRONMENTAL POTENTIAL SPECIES

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Cultivation of willows is not limited to obtaining biomass on short-rotation plantations. These crops also have the potential environmental benefits to protect water and land resources and restore polluted ecosystems and habitats. Willow may be successfully used in environmental projects for remediating and reclaiming ecosystems after basic types of degradation: soil erosion; mine tailings; industrial, sludge and sewage waste; ore smelting; petroleum spilling; landfills; radionuclide and chemical pollution; eutrophication and salting of waters. The tolerance of willow to negative environmental factors is closely correlated with some physiology characteristics, such as photosynthesis process, chlorophyll contents, water regime and others. Our experiments showed that productivity of willow clones also depends of transpiration, photosynthesis and chlorophyll contents. Investigations results support that it is possible to use physiology characteristics as an indicator for potential species productivity and resistance to the environmental factors.

Интерес к культивированию ивы не ограничивается получением биомассы с короткоцикловых плантаций. Эта культура имеет значительный природоохранный потенциал, который реализуется в защите водных и почвенных ресурсов, восстановлении нарушенных экосистем и поддержании биоразнообразия. Посадки ивы могут быть использованы для защиты почв от эрозии, рекультивации полигонов отходов и солеотвалов, предотвращения эвтрофикации. Устойчивость растений ивы к негативным факторам среды (загрязнение или засоление почв) во многом определяется физиологическими характеристиками культуры. Наши эксперименты, проведенные в поле и в условиях защищенного грунта, свидетельствуют, что продуктивность ивы тесно связана с такими характеристиками как фотосинтез, содержание хлорофиллов, водный режим растений. Эти показатели могут быть использованы в качестве индикаторов для оценки потенциальной продуктивности культуры и ее устойчивости к негативному воздействию.

Keywords: physiology, willow, environmental factors, resistance.

Ключевые слова: физиология, ива, экологические факторы, устойчивость.

Plant physiology is a key biological science that extends theoretical knowledge into practical silvicultural applications. Investigations of physiological processes has shown that despite overall generalizations for plants there are a number of specific metabolic processes inherent to individual plant species and their habitats. It is important factor for t plant species, which characterize their metabolic processes and may help to assess of potential for practical. Thus, it is necessary to focus on contemporary research that stimulates the development of new solutions specific for sites in anthropogenically disturbed areas based on sustainable multi-functional and biological systems. The area of commercial plantations willow in Europe, mostly in Sweden is more than 20,000 ha [1]. For the last years, interest to willow production increased in the countries of Central and East Europe. The willow plantations established in Poland, Ukraine, Serbia, Estonia, Latvia, Lithuania, Belarus [2–3]. There are some investigations that support correlation between physiology characteristics and willow and poplar resistant to negative environmental factors.

Poplar euphraticu Olive and the hybrids (*P. tulassica* Kom X (*P. euphratica* + *Salix alba* L)) seedlings were subjected to low (50mM NaCl) and high salt (200mM NaCl) treatments to determine their photosynthetic responses to salt stress [4]. The photosynthetic pattern indicated that *P. euphratica* is a C3 plant with a high CO₂ compensation point and saturation point, but has some characteristics of C4 plants with a high light saturation point CO₂ compensation and saturation points increased with high salt treatment for both the hybrid and *P. euphraticu* while light saturation point decrease with salt treatment.

In the experiments in China the potential of willow cultivation on salty soils was mentioned was connected with enzyme contents [5]. Quinone reductase (QR) is an oxidative-related gene and few studies have focused on its roles concerning salt stress tolerance in plants. In this study, were cloned and analyzed the QR gene from *Salix matsudana*, a willow with tolerance of moderate salinity.

In our experiments the assessment of physiology characteristics of clones of *Salix alba* (Bachka, Volmianka, Drina) that were selected at Institute of Lowland Forestry and Environment of Novi Sad and clone Jorr (*Salix viminalis*) Swedish selection. The experiments were guide in greenhouse in Mitscherlich pots and in the field conditions in International park “Volma” (Republic of Belarus). In greenhouse conditions the best intensity of photosynthesis and high contents of chlorophyll were identified for clone Bachka. Investigations in the field conditions supported the high potential of this clone (table).

Table – Morphology characteristics of willow clones in the field condition

Clone	Year	Parameter		
		Height of plants, cm	Diameter, mm	Number of sprouts
Jorr	2013	401	25,2	–
Bačka	2013	428	28,5	–
Volmianka	2013	417	26,9	–
Drina	2013	387	27,3	–
LSD ₀₅	2013	14,6	1,12	0,28

Our results showed that it is possible to use physiology characteristics as an indicator for potential species productivity and resistance to environmental factors.

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ОЦЕНКА ОТДЕЛЬНЫХ МИНЕРАЛЬНЫХ И ТЯЖЕЛЫХ МЕТАЛЛОВ В ПЕЧЕНИ НЕКОТОРЫХ ВИДОВ УТОК

ASSESSMENT OF SELECTED MINERAL AND HEAVY METALS IN SEVERAL WILD DUCK LIVERS

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It is study the mineral and metal and non-metal contents of several duck livers. Liver can be used as the supplement for the good personal health. The Ca, K, Mg, and P contents of livers were found in the highest levels in all liver samples. There were significant differences in mineral contents of liver types ($p < 0.05$). The high metal content found in the liver samples may be caused by the pollution and the environment itself, more probably by the secondary contamination caused by agricultural practices and live stock feed, as well. The accumulation of heavy metals varies significantly from one tissue to another within an animal and varies also between one animal and another. The same variation was observed for our results. In comparison with literature, it may be different values for almost all the element parameters.

Это исследование минерального и металлического и неметаллического содержимого утиной печени. Печень может использоваться как дополнение к хорошему личному здоровью. Содержание Ca, K, Mg и P