

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 <sub>05</sub>	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.

#### REFERENCE

1. Volk, T. A, Luzadis, V. A. (2009) Willow biomass production for bioenergy, biofuels, and bioproducts in New York, chapter 11. Solomon and Luzadis (eds). In: Renewable energy from forest resources in the United States. Routledge: London, pp. 238–260.
2. Józef Mosiej, Agnieszka Karczmarczyk, Katarzyna Wyporska, Aleh Rodzkin / Biomass Production in Energy Forests, p. 196–202 // Ecosystem Health and Sustainable Agriculture 3. Editors: Lars Rydén and Ingrid Karlsson. The Baltic University Programme, Uppsala University, 2012 ISBN 978-91-86189-11-2, 325 pages. III.
3. Review about investigations of salix spp. in Europe. Irëna Pučka, Dagnija Lazdiņa // Research for Rural Development. Issue 19/2013, vol. 2. (2013), p. 13–19.
4. Overexpression of quinone reductase from *Salix matsudana* Koidz enhances salt tolerance in transgenic *Arabidopsis thaliana* / Xixi Song, Jie Fang, Xiaojiao Hana, Xuelian ,Mingying Liu, Jianjun Hua, Renying Zhuo // Gene 576 (2016) 520–527.
5. Expression profile of miRNAs in *Populus cathayana* L. and *Salix matsudana* Koidz under salt stress / Jing Zhou, Mingying Liu, Jing Jiang // Mol Biol Rep (2012) 39:8645–8654.

## 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

печени было найдено на самых высоких уровнях во всех образцах печени. Имели место существенные различия в содержании минералов в печени ( $p < 0,05$ ). Высокое содержание металлов, обнаруженное в образцах печени, может быть вызвано загрязнением и самой окружающей средой, скорее всего вторичным загрязнением, вызванным сельскохозяйственной практикой и кормом для животных. Накопление тяжелых металлов значительно варьирует от одной ткани к другой внутри животного и изменяется также между одним животным и другим. Для наших результатов наблюдалась такая же вариация. По сравнению с литературой, это могут быть разные значения для почти всех параметров элемента.

*Keywords:* Wild duck, livers, minerals, heavy metals, ICP-AES.

*Ключевые слова:* дикая утка, печень, минералы, тяжелые металлы, ИСП-АЭС.

In his study, livers of five different ducks were analysed for macro and micro elements. The aim of current study is to determine mineral and metal and non-metal contents of several duck livers. The mineral contents of several duck livers were determined by Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). P contents of duck livers ranged from 8172,87 mg/Kg (Civil) to 9699,64 mg/Kg (K1l). K contents of liver samples were found between 7848,39 mg/Kg (Kaşıkcı) and 8900,19 mg/Kg (K1l). While Fe contents of livers range from 669,12 mg/Kg (Civil) to 3808,90 mg/Kg (K1l), Na contents were found between 3142,2 mg/Kg (Yeşil) to 4756,8 mg/Kg (K1l). Zn contents of samples varied between 52,40 mg/Kg (Kaşıkcı) and 104,20 mg/Kg (Civil). Cu contents of livers were established between 16,48 mg/Kg (K1l) and 72,73 mg/Kg (Civil). There were significant differences in mineral contents of liver types ( $p < 0.05$ ). Liver can be used as supplement for good personal health.

The high metal content found in the liver samples may be caused by pollution and the environment it self, more probably by secondary contamination caused by agricultural practices and live stock feed, as well. Contamination is transferred to animals through direct sewage water and industrial effluent. In addition, contamination of liver can also be caused by vehicle emission and from dirty slaughter places.

The accumulation of heavy metals varies significantly from one tissue to another within an animal and varies also between one animal and another. This study is carried out to determine the levels of heavy metals in livers of different ducks. The same variation was observed for our results. In comparison with literature, it may be different values for almost all element parameters. Differences among the values of liver element contents can be probably due to feeding, environmental conditions, ingredients used in animal feed and analytical conditions. The Ca, K, Mg, and P contents of livers were found in the highest levels in all liver samples. Liver can be used as supplement for good personal health.

## **THE RECREATIONAL RESOURCES OF UNKNOWN CORNERS OF BELARUSIAN LAKE DISTRICT**

## **РЕКРЕАЦИОННЫЕ РЕСУРСЫ МАЛОИЗВЕСТНЫХ УГОЛКОВ БЕЛОРУССКОГО ПООЗЕРЬЯ**

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The recreational possibilities of little-known corners of the Byelorussian Poozerie, which can be used for the development of ecotourism in Belarus, are considered in the work.

Рассматриваются рекреационные возможности малоизвестных уголков Белорусского Поозерья, которые могут быть использованы в целях развития экотуризма в Республике Беларусь.

*Keywords:* Recreational resources, ecotourism, Poozerie.

*Ключевые слова:* рекреационные ресурсы, экотуризм, Поозерье.

The aim of this work is the development of ecological tourism in Belarus.

The task was to give a full description of the recreational resources of unknown corners of Belarusian Lake District.

From June 19 to June 24 the pupils of our gymnasium went on expedition in order to study the recreational resources of the corners of Belarusian Lake District. The route of the expedition was developed during the preparation: the Station Zybki ( railway line Krulayshina – Polotsk) – lake Dolgoe – lake Beloe – lake Karavayna – lake Dolgoe – station Zybki.