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ANALYSIS OF THE ASSORTMENT OF ENERGY CROPS FOR GROWING UNDER THE CONDITIONS OF UKRAINE

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Summary: the study of introduced varieties and new, registered varieties of energy crops with the aim to obtain high-quality seed or planting material is relevant today. Also, energy crops are plants that form a powerful phytomass, they are a good raw material for the production of various energy-intensive biofuels and "green energy".

Key words: varieties, energy crops, selection, biomass, yield.

The problem of energy resources endow in the near future will be one of the most significant at both the global and local levels of individual countries. The growing rate of the consumption of non-renewable energy sources and their limited stocks in Ukraine necessitate the search for and development of new ways of active introduction of alternative energy sources, including plant resources of energy crops [1, 2]. Therefore, the study of introduced varieties and new, registered varieties of energy crops is relevant today.

Energy crops are herbaceous plants, shrubs, or other plant species whose biomass can be used as a raw material for biofuels [3].

Varieties and hybrids of energy crops have significant yield potential and other economically valuable features. The main ones are energy output from 1 ha (GJ / ha),

dry matter biomass output from 1 ha (t / ha), equivalent biofuel output from 1 ha (t / ha) and the heat capacity of fuel per 1 kg of biomass (MJ / kg) [4].

Today and in the future, the selection of energy crops will be aimed at obtaining such varieties that must be drought-resistant, resistant to pests and diseases, well-rooted (form a secondary root system) with insufficient moisture. As a final result – a new variety of energy crop is supposed to form a significant biomass yield with high energy performance.

Currently, the Register of varieties includes the following energy crops: four varieties of miscanthus giganteus; two varieties of miscanthus sacchariflorus; two varieties of Chinese miscanthus; three varieties of switchgrass; two varieties of rumex; two varieties of sida; two varieties of perennial sorghum; five varieties of compass plant; five varieties of willow; one variety of paulownia [5].

All the assortment of energy crops, which are included in the Register of Plant Varieties, have an official description by morpho-biological features, yield and energy consumption of biomass. Producers have the opportunity to choose varieties for different growing areas according to the following indicators: yield, phytomass quality, ripening period, resistance to abiotic and biotic factors, etc.

Among the assortment of the genus Miscanthus, eight varieties are suitable for spreading in Ukraine, of which four varieties of giant miscanthus have been registered (“Verum”, country of its origin – Ukraine, recommended soil and climatic zones of cultivation – Polissia, Forest-steppe, Steppe; “Biotech” – Ukraine, Polissia, Forest-Steppe; Steppe; “Osinnii zoretsvit” – Ukraine, Polissia, Forest-Steppe, Steppe; “Huliver” – Ukraine, Polissia, Forest-Steppe), miscanthus sacchariflorus – two varieties (“Snihopad” – Ukraine, Polissia, Forest-Steppe; “Snihova koroleva” – Ukraine, Polissia, Forest-Steppe), Chinese miscanthus – two varieties (“Misiachnyi promin” – country of its origin – Ukraine, recommended soil and climatic zones of cultivation – Polissia, Forest-Steppe; “Veleten” – Ukraine, Polissia, Forest-Steppe).

Panicum virgatum L. in the Register of Plant Varieties is represented by three varieties, such as “Morozko” (country of its origin – Ukraine, Polissia, Forest-

Steppe), “Zoriane” (Ukraine, Polissia, Forest-Steppe), “Liadovske” (Ukraine, Polissia, Forest-Steppe).

Two varieties of *Rumex patientia L x Rumex tianshanicus* A. Los are suitable for spreading in Ukraine. These are the following varieties: “Kyivskyi ultra” (country of its origin – Ukraine, Polissia, Forest-Steppe), “Nastavnyk” (Ukraine, Forest-Steppe).

Sorghum almum Parodi assortment in the Register of Plant Varieties is represented by two varieties: “Columbo” (country of its origin – Ukraine, Polissia, Forest-Steppe, Steppe), “Parana” (Ukraine, Polissia, Forest-Steppe).

Silphium integrifolium Michx is represented by two varieties of Ukrainian selection – “Yuvileinyi”, “Krasen” and *Silphium perfoliatumL.* – by the following varieties – “Peremozhets”, “Bohatyr”, “Kanadchanka”, “Sonechko”.

The structure of herbaceous energy crops in the Register of Plant Varieties is shown in Fig. 1. Of all the species of miscanthus, the largest number of varieties in the Register is represented by giant miscanthus (4 pcs.), and also there are only 3 varieties of switchgrass. Other herbaceous energy crops (miscanthus sacchariflorus and Chinese miscanthus, *Rumex, Sorghum almum and Silphium integrifolium*) have a small assortment – 2 registered varieties each.

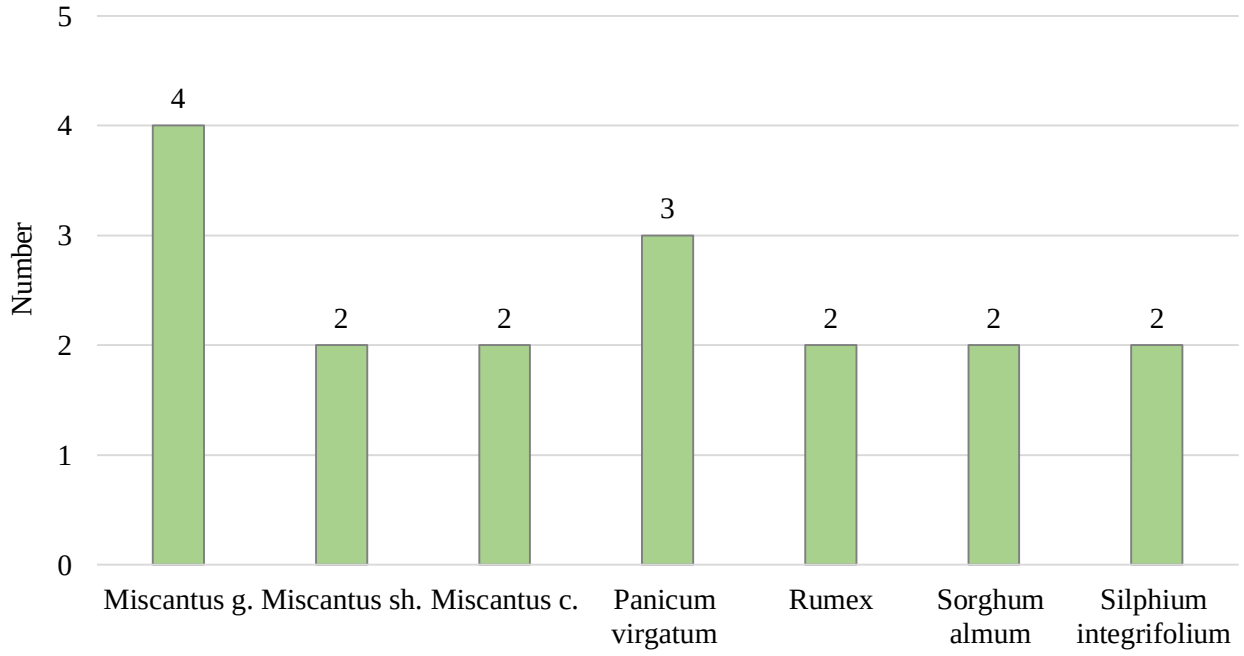

Fig. 1. The number of plant varieties of herbaceous energy crops included in the Register of Plant Varieties of Ukraine

Five varieties of willow *(Salix)* are included in the Register of Plant Varieties: among them there are four varieties of osier willow – "LINNEIA" (country of its origin – Sweden, recommended soil and climatic zones of cultivation – Polissia, Forest-Steppe, Steppe), "Wilhelm" (Sweden, Steppe), "Martsyiana" (Ukraine, Polissia), "Zbruch" (Ukraine, Polissia, Forest-Steppe, Steppe) and one variety of white willow – "CORVINUS" (Hungary, Polissia, Forest-Steppe, Steppe).

Sida hermaphrodita (L.) Rusby crop in the Register of Plant Varieties is represented by the following varieties: "Virginia" (country of its origin – Ukraine, Polissia, Forest-Steppe, Steppe), "Phytoenergy" (Ukraine, Polissia, Forest-Steppe).

Among the representatives of *Paulownia* Sieb. et Zucc, today, only one variety of paulownia "In Vitro 112" (Paulownia Clone in Vitro 112) is registered in Ukraine. The variety is recommended for cultivation in the zones of Steppe, Forest-Steppe and Polissia and is characterized by high yield of raw biomass – 345 t / ha, energy output (2602.45 GJ / ha), dry matter output is 142.6 t / ha. The heat capacity of fuel is 18.25 MJ / ha.

The structure of varieties of shrub energy crops is presented in Fig. 2. Of these, the most registered varieties are *Salix*, others – *Sida hermaphrodita* and *Paulownia* respectively – 2nd and 1st variety.

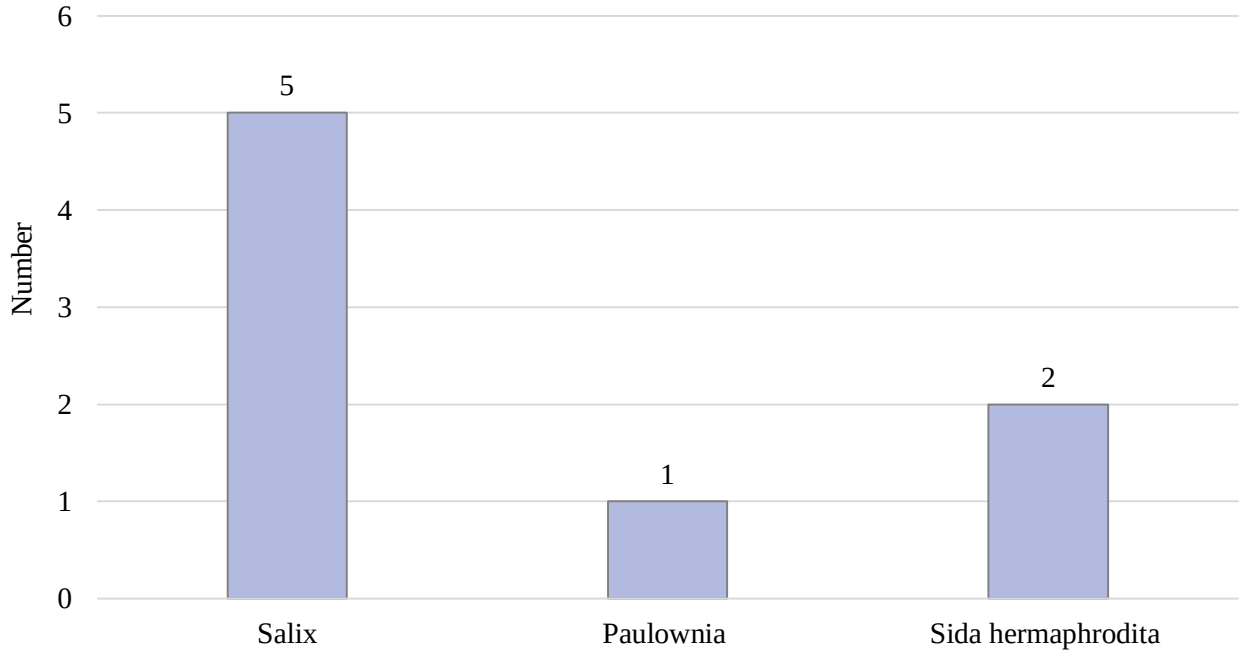

Fig. 2. The number of plant varieties of shrub energy crops included in the Register of Plant Varieties of Ukraine

Analyzing the above graphs, we can say that the number of varieties of energy crops registered in Ukraine is quite low. Therefore, it is necessary to intensify selection work in the direction of creating new varieties and expanding the varietal diversity of energy crops. At the same time, the introduction of new varieties of plants into production and their cultivation will increase the efficiency of agricultural production. The main advantage of the efficiency of industrial cultivation of newly created varieties of energy crops along with adaptive properties and economically valuable features is their ability to quickly accumulate a powerful and energy-intensive phytomass with the appropriate cultivation technology. After using the appropriate methods of energy conversion, it is possible to get cheap energy from energy crops and provide consumers with "green energy". In the long run, this will enable to reduce the energy dependence of territorial communities and increase the welfare of the population of Ukraine as a whole.

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