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PROMISING DIRECTIONS OF USE OF *ECHINACEA* MOENCH. IN UKRAINE

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The introduction of plants is an important task of modern botanical science. Relevance is significantly increased when introduced species are multifunctional in use. According to our research, these criteria are met by representatives of the genus *Echinacea* (*Echinacea* Moench.), which for the most part, previously positioned only as medicinal plants.

Use in food technology. The unique chemical composition of *echinacea*, which combines phenolic compounds (chicory acid, echinacoside and others), lectins, polysaccharides, alkylamides, macro- and micronutrients, allows you to successfully use it in foods and dietary supplements. We have developed tea compositions based on *echinacea* herb, which included black or green *baikhovi* tea, as well as widely used food and medicinal plants of the Ukrainian flora, which were selected in certain proportions, which provided not only the presence of biologically active components, but also a pleasant aroma and flavor. The novelty and originality of new products is confirmed by 16 patents of Ukraine for utility models [1].

Use in beekeeping. It was found that on one hectare of phytocenoses of *echinacea*, starting from the second year of plant life, you can get from 50 to 100 bee colonies, which provides good honey yields. In the conditions of the west of Ukraine they fluctuate from 75 to 130 kg/ha, Forest-steppe – 100 – 200 kg/ha, Steppe – 150 – 200 kg/ha. It is also important that *echinacea* honey has immunomodulatory, radioprotective, gastroprotective and other medicinal properties.

Derived varieties of *Echinacea purpurea* 'Star of Mykola Vavylov' and *Echinacea pallida* 'Beauty of the Prairies' differ in terms of flowering, which is a significant advantage for beekeeping, as it allows to provide a prolonged gathering. The earlier flowering period is a characteristic of *Echinacea pallida* – it begins flowering in early June and lasts 40 – 55 days. *Echinacea purpurea* begins to bloom in early July and this process lasts 60 – 75 days. One tubular flower blooms for 3-4 days, and one inflorescence for about 30 days. The period from the flowering of the first to the end

of flowering of the last inflorescence of one plant lasts from 70 to 75 days. Thus on 10 m² of a phytocenosis it is possible to observe work of 19 – 24 bees.

Taking into account the biological features of these species, we have developed an original technology for the creation of honey phytocenoses, which includes biological and technological parameters, as well as provides for the integrated use of previously created phytocenoses. The novelty of the research is protected by 5 patents of Ukraine [1].

Use in livestock. It is established that the aboveground part of *Echinacea purpurea* can be an effective medicinal raw material. This makes it a promising addition to the main feed for all species of animals, especially cattle and pigs, although our country has accumulated positive experience in its use in poultry, fish and even in fur farming.

Zootechnical analysis of the above-mentioned varieties of echinacea revealed that its aboveground mass contains more than 25% dry matter, in which 38% of carbohydrate components of varying degrees of digestibility; vitamin C 230 mg/100 g of green mass, and protein in the range of 18.3 - 20.5%. Due to this, echinacea purpurea is classified as a high-protein crop. In terms of the number of essential amino acids, its protein is comparable to the protein of peas, clover, vetch. In addition, the aboveground mass is rich in macro- and microelements, polysaccharides, polyphenols, especially hydroxycinnamic acids.

It was found that one kilogram of green mass of echinacea contains up to 0.58-0.65 feed units, and digestible protein – 72-74 g, which provides 130-132 g of digestible protein per feed unit instead of the recommended norm of 100-120 g. All this, together with the high yield of aboveground mass of echinacea, provides a high yield of feed units per hectare.

A new level of research was the study of echinacea extracts. We found that the use of echinacea pale extract in pig breeding increased the fertility of sows by 3.8-9.8%, a significant increase in the average daily gain of piglets by 15-16%. More significant results were obtained when using phytogenics when watering suckling piglets without watering sows before birth. The obtained results indicate the prospects of using echinacea extract as a feed additive in breeding pigs.

According to the research conducted at Vinnytsia National Agrarian University, adding a medium dose of edible echinacea extract in the amount of 12 mg / kg of live weight to complete rations for quails increases the number of erythrocytes by 3.3%, ESR by 12%, alkaline phosphatase by 4,7% and cholesterol by 3.7% in accordance with control, productivity and product quality. An important result of the study was the development of regulatory and technical documentation "Echinacea pale extract" and phytogenics "Echinobioactive". This direction of echinacea use is very promising in the development of organic livestock, which is relevant not only in Ukraine but also around the world.

Use to harmonize the environment. In Ukraine, echinacea species are not used enough in landscaping and park construction. And this despite the fact that they all replenish the atmosphere with oxygen, emit volatiles, do not contain toxic substances.

Ukrainian scientists have bred varieties of *Echinacea purpurea* 'Princess', 'Inessa', 'Vitaverna', 'Charivnytsia', 'Polish Beauty', 'Star of Mykola Vavylov', as well as

the variety of echinacea pale 'Beauty of the Prairies'. Their inflorescences have different colors, from dark pink to red and crimson.

All of them can be successfully used for different areas of phytodesign: group plantings on the background of bushes or bare-seeded trees; decorating lawns, curbs, rockeries; borders of paths, fences, ponds. Of particular importance are the mentioned varieties and forms of echinacea acquired to create individual modules in well-lit areas, as well as components of gardens of continuous flowering. The long flowering period of echinacea purpurea (almost 80 days) allows you to use it in compositions with ornamental grasses. This style is called "Country", and the compositions - "Persian carpets".


Thus, in recent years, the limits of use of the genus *Echinacea* Moench are significantly expanding, which provides prospects for further research.

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