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Perspectives of growing some essential oil-bearing plants in South Steppe

Aim Result of long-term researches of biological features and economic valuable signs of the 3rd most perspective epoxy-cultures in the conditions of Steppe South. Methods of researches. After the investigated plants conducted ecological and phenological supervision. In a period their mass flowering carried out the account of harvest. Mass part of essential oil was determined by the Ginsberg method. Component composition of essential oil was studied by chromatography of Agilent Technology 6890 N. Results of researches. The set, which is the index of the productive and component composition of essential oil between the cultures grown in Crimea and Kherson, a significant difference is not. Conclusions. In the conditions of Kherson lavender, thyme and hypos are marked by high frost-resistance and drought-resistingness, have a satisfactory amount of essential oil of a kind quality. The investigated plants are fully suitable for industrial growth in the Steppe South.

Keywords: lavender, thyme, гисоп, phenological supervisions, economic valuable signs.

Raising of the problem. Ethereal oils from plants due to their valuable components industrially grow in many countries of the world with appropriate climatic terms, in particular in the Crimean region of Ukraine. The oils extracts and infusions received from plants apply for making perfumeries, cosmetics, prophylactic-curative preparations. Yes, the components of thyme have anti-inflammatory action, giospo, lavender and thyme - antimicrobial. They enter in the complement of cosmetic creams, dental elixirs, used in aromatherapy. The proper economic constituent of growing essential oils is provided by the high cost of essential oils in the world market. The lack of agrarian complex from the growing of essential oils in Ukraine is its placement in one region, which is why a major problem is the research on the distribution of these cultures in other regions of the country.

Analysis of the latest researches and publications. Creation and successful introductory tests of a few thousandth of a row of essential oils, spices, aromatic and medical plants became the result of long-term researches of the Crimean scientists, some of them, in particular lavender and lavender, sandy, clary medical, rose and others like that, grew in industrial scales [12-14,17]. Attempts introduce took place ethereal cultures are also certain to more moderate climatic terms: lavender - in the Moscow suburbs, lavandin - to Kuban, thyme - to Belarus, giosop to western Siberia [2, 3, 7, 9, 16]. Creation became completely logical at the end of the 90th of the last century in the State enterprise "The Experienced Economy of Novokakhovsky", which entered the complement of the Nikitsky Botanical Garden - the National Scientific Center (NSC), the collections of the most widespread Ethereal cultures, the further introductory tests that have been designed for their distribution to Steppe South..

Aim of researches. Result of long-term researches of biological features and economic value signs, 3rd most perspective of epiractive cultures for their growing in the conditions of the Steppe South.

Materials and methodology of researches. The experienced economy of Novokakhovsky is placed in the first agroclimatic Northland of the Kherson region for that characteristic mildly continental climate with a short spring, comparatively by a long-sultry and droughty summer, green with frequent snow thaws. Sumy temperatures above 10 ° C present in this region 3200-3300 ° C for the vegetation period, and the amount of precipitation for this period is 215-220 mm at an annual norm of 380-430 mm, and the hydrothermal coefficient is 0.7. Middle period of period with temperatures above zero - a 175-180 twenty-four hours, vegetation - a 215-225 twenty-four hours. Spring ground frosts cease mostly in the 3rd to the ten-day period

of April, but in individual years can last up to III of the ten-day period of May. Middle term of the beginning of the autumn earth frosts - The second ten-day period of October is sometimes the end of September. For Kherson typical annual hot winds, 40% from that is very intense [1, 11].

The Earth of the experienced economy of Novokakhovsky belongs to the Kakhovka arena of the Lower Dnipropetrovsk Sands; soils - black earth light-loamy, cespititious-steppe sandy-loam and cespititious-steppe linked loose. The collection area of the airborne cultures is placed on a black earth of light-loamy soils with a power of humus layer a 76 cm and by the content of humus in the arable layer of 1.33% and partly on cespititious-steppe sandy-loam soils with a power of humus layer a 87 cm and by the content of humus of 0.99% [10].

In experiments investigated such collection cultures: lavender narrow-leaved - Lavandula of angustifolia of Mill., Lavender - Lavandula of hybrida of Rev., types of thyme - Thymus of vulgaris of L., Thymus of striatus of L., Thymus of serpyllum of L, Thymus of kotschyanus of L. but Hysop - Hyssopus of officinalis of L.

The ecological and phenological observation plants during a vegetation conducted according to the methodology of the NBS-NSC [13]. A frost-resistance was determined by visual quantitative supervision, the selections of ether-based cultures carried out the account of damages wreckers and illnesses on the methodology [15]. The account of harvest was carried out in the period of mass flowering of plants on the methodology of field studies of Dospekhov [5]. Essential oil was obtained from fresh inflorescences of plants in this period; The mass of the essential oil was determined by the Ginsberg method on the Klevenger vehicles, calculating the absolute dry mass of the digester [4, 6]. Component composition of essential oil was determined by chromatography of Agilent Technology 6890 N with a mass spectrometer detector 5973 N. Terms of analysis: column capillary quartz HP 5MS, temperature of the detector and vaporizer - 250 ° C., gas-transmitter helium, speed is a 1 ml / of min, introduction of a test with a division of the stream of 1:50. Temperature to the thermos 50 ° C with programming of 3 ° / min to 220 ° C. The individual components of the essential oil identified in the results of the comparison of the mass masses-spectra of the substances included in the investigated mixtures with the data of the NISTO-2 mass spectrometry library. The components of the components retained on the results of the control analyzes of essential oils with a set of normal alkanes [20].

Results of researches. The results of the long-term phenological observation of the explored plants during vegetation show that most of them pass through all stages of development and give valuable seeds. Thus the beginning of vegetation of different types of plants is significantly dependent on climatic and weather conditions. If the beginning of the spring is growing at a thyme and the hippopotamus is on the third ten-day period of March - And the ten-day period of April, then in a lavender and lavender it is displaced on an end AND - II of the ten-day period of April In the most investigated plants, the maximum increase in biomass is observed before the budding phase and lasts until the beginning of flowering, which is on the sultry summer months. In this period, taking into account the additional watering and air dryness on the investigated plants practically is not designated. On the whole, flowering and fruitfulness (in August) in the conditions of New Kakhovka begin at a 5-10 twenty-four hours later than on the South Bank of Crimea, but it does not affect the complete ripening of garden-stuffs. The important line of the investigated cultures is a high frost resistance to them, peculiar and to the new varieties, say, Lavandina Rabat and Snow Ounce. From the position of phenology in relation to the investigated types of airborne plants of limits, their economic use has not been in the conditions of the north of the Kherson area.

In the conditions of the Kherson area in the phase of mass flowering the harvest of the floral raw material of the lavender narrow-leaved presents 150-400 gs on a 1 plant of 3th of vegetation, the massive part of the essential oil - 0,7-1 , 57% from raw mass, or 1.6-3.9% - from absolutely dry. The most out of essential oil was given by the forms of lavender 7/10 and 19/11. For comparison, in the conditions of the Moscow area a lavender narrow-leaved vents essential oil of 1.1-1.93% [7].

In lavender in the investigated terms, the exit of essential oil represents 0.9-3.0% of the raw mass of plants. As in the conditions of the Krasnodar edge [2], this index was somewhat higher (1.3-3.7%), we gave a comparative description of the 2nd to the selection types of the Nikitsky Botanical Garden, grown on the South Bank of the Crimea And Kherson (table 1). From the given data, in the conditions of the Kherson area, both types have more habitus of bush, while there are only high quality differences in other indexes.

That climatic terms of growing of plants are less meaningful than them specific or of high quality specificity (speech goes about 2 contiguous regions), confirmed on the example of 4th types of investigated timiāna. Yes, the most harvest of floral raw material of thyme is ordinary on a 1 plant (434-670 g), it is got in the conditions of Kherson, that is 25% more than on the South Bank of the Crimea. At the same time, the productivity of thymus of striatus in the conditions of Crimea is higher by 50%; This kind of oil also has the increased output of essential oil - in the middle 0.8% from raw mass, while the maximum level of this index on Kherson in Thymus of vulgaris and Thymus of kotschyanus - in the middle of 0.60 and 0.61% respectively . Thyme the usual in the conditions of the Kherson region has higher productivity indexes.

At such types, as a gypsum ordinary, the crop of floral raw material in the conditions of the north of Kherson can be taken twice: first - in the second to the ten-day period of July, second - in September. Set, which is the current harvest, is 1.2-1.6 kg / m2, Which is 20-25% above the analogical index for the South Bank of Crimea. Thus, the mass fraction of essential oil, depending on a form, in Kherson is, in the average, represents 0.34% of the crude mass of the digester, in Crimea - 0.39% [18].

For essential oils, there is component composition of essential oil. The 21st connection in a lavender narrow-leaved has been identified by the conducted analysis, among which 7 components in the composition of essential oil have a share of over 1% (table 2).

From the resulted data, the basic components of the essential oil of lavender, grown in the conditions of Kherson, are linalilacetate and linalol with a mass part more than 72%. Except marked in the table of other connections, with maintenance less than 1%, it also identifies? -phenyl, octenol-3, mircen,α -flundren, 1,8-cineol, cis- and trans-oxides linalol, bromine, camphor, terpinen-4-ol, bornilacetate, α- and β-caryophyllins. Will mark that content of linalool and linalilacetate as the main components of the lavender of the culture narrow-leaved, regardless of the place of growth, confirmed by many researchers. Yes, in the composition of the essential oil of lavender, grown in Moscow Suburbs, part of linalol and linalilacetate hesitate accordingly within the limits of 22.8-43.5% and 14.8-21.85% [7]. These vibrations depend, obviously, from concrete weather conditions during the vegetation of plants and their belonging to certain forms or sorts. For an example, we distinguish the form of lavender with the mass portion of linalilacetate 48%.

Deployment of lavender, the id est hybrid form of lavender narrow-leaved and lavender broad-leaved (Lavandula of angustifolia x of Lavandula of latifolia), actively propagandized by many researchers due to the increased output of him from essential oil. However, some scientists are marking the less value of the got oil as a result of enhanced maintenance of camphor. The conducted chromatographic analysis of lavender has shown (table 3) that the dominant components of essential oil in him remain linalool and linalil acetate, but already in other correlation.

From other basic ingredients in essential oil of lavender is only lavendilyl acetate, there is the increased maintenance of 1,8-cineole, and the content of the camphor that worsens the quality of oil does not exceed 5% of the total mass of kmponents in essential oil. Less than than 1% contained in the lavandulol, 1-octene-3-ol, α -terpenol, 2,6-dimethyl-3,7-octadien-2,6-diol, cariofillenoxide and the other.

Did the analysis of the component composition of the above-ground part of the 4th types of thyme give a chance to identify 30 connections basic from that being thymol,γ -terpene, tris- sababinene-hydrate and π-cymol, thus the most valuable part of them - to the thymol-presents, except for Thymus of serpyllum, 50.16-69.9%. Although in the last part of thymol also prevails, but is significantly less and depends on the natural and climatic terms of growing. More credible than all, thyme, creeping genetically more remote from 3rd other investigated types.

Wide changeability of different types of thyme is well-traced and its other representatives. Yes, level of Thymol in a thyme Crimean - Thymus of Tauricus of Klock.et of Shost presents only 11.01%, considerably anymore is part of carvacrol - 36.09% and shimena - 19.11%; In a thyme good - Thymus of pulcherrinus of Schur part of carvacrol - 25,01 also prevails part of thymol - 16,11% [8].

Yet less part of thymol (3.6%) with a predominance of camphor (to 33.4%) of boron, and? -cariofilene with its oxide (up to 51.2%), creeping contained in thyme in the conditions of Belarus [3]; At the same time at a thyme a flea - Thymus of pulegioides at these terms his level was given 40,6%. Thus, 3 of the 4th types of thyme investigated by us in the comparative terms of the Kherson and Crimea product essential oils with predominance of thymol, thus its part in the Kherson standards is even somewhat higher.

In essential oil of hypochondria, grown on Kherson, 32 components basic from that is pinocammon and its derivatives with mass proportion in essential oil of 71.7% are identified. In the standard of Hippo, Crimea is grown on the South Bank, also foam camphon prevails and its derivatives with mass share in essential oil of 72.6-78.7% [12]. In the conditions of the pre-mountain Crimea, essential oil of the hypoa contained 73.5% of the penecomphone and isopinocamphon, and in the conditions of Western Siberia this index represented 59.3% [9,19].

Conclusions

The long-term researches of perspective for the Steppe of the South of the Eurorethician cultures - the lavender, to the thyme and the hypos have proven that for growing in the conditions of Kherson they pass all the peculiar to them stages of development and give valuable seeds. All investigated cultures are marked by high frost resistance and on condition of additional watering - drought-resistingness. Set, that the productivity of these cultures depends not so much on the select region of growing (Crimea, Kherson area), but rather on a particular sort of form of plants. Component composition of the essential oil obtained from these cultures is largely typical for them regardless of the growing place, however, it no longer depends on the sort or culture form. Lavender, thyme and gypsum for the industrial growth in the Steppe of the South with the objective receipt of essential essential oils.

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