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### PROSPECTIVE SPECIES OF MEDICINAL PLANTS OF THE FAMILY RANUNCULACEAE IN THE FLORA OF THE UKRAINIAN CARPATHIANS

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The Ukrainian Carpathians are part of the Eastern Carpathians in Ukraine, whose flora includes about 2000 species of plants belonging to more than 540 genus. Among this diversity 102 plant species belonging to 22 genus of the family Ranunculaceae Juss. deserve particular attention [15, p. 571-582; 11, p. 170].

The work presents *Clematis vitalba* L. (subfamily *Ranunculoideae* Arn.), *Consolida regalis* Gray (subfamily *Ranunculoideae* Arn.) and *Thalictrum foetidum* L. (subfamily *Thalictroideae* Raf.) of the family Ranunculaceae, which have long been used in traditional medicine by Ukrainians and many other peoples of the world, as they have an invaluable potential for the development of new drugs with a wide range of action.

*Clematis vitalba* L. (syn. – *Anemone vitalba* (L.) K.Krause) is a montane species, the range of which extends within Eastern Carpathian Foothills of Bukovyna, Transcarpathia and Mountainous Crimea on the territory of Lviv, Ternopil, Ivano-Frankivsk, Zakarpattia, Chernivtsi, Vinnytsia Oblasts and Autonomous Republic of Crimea [7, pp. 153-154]. *C. vitalba* is a perennial bush 2-5 m high, inflorescence is panicle, white flowers. Flowering period – from July to August [9, pp. 97-98]. Leaves, herbs, roots and flowers of the plant are used as medicinal plant raw materials. A complex of biologically active plant compounds includes essential oil, triterpene saponins, terpenoids, alkaloids, protoanemonin, anemonin [3, p. 398; 4, p. 40; 14, p. 6].

The plant has antibacterial, analgesic, anti-inflammatory, antipyretic, antiepileptic, cough and diuretic effects. Thanks to its wide range of action, it is used in folk medicine for rheumatism, vertigo, dermatitis, to stimulate hair growth, etc. [3, pp. 398-399; 4, p. 40; 17, pp. 508-514].

*Consolida regalis* Gray (syn. – *Delphinium consolida* L., *Consolida arvensis* Opiz) is a flat species with a characteristic range of distribution within the forest and forest-steppe zones, occasionally occurring in the Steppe [7, pp. 123-124]. *C. regalis* is an annual herbaceous plant 15-50 cm high, inflorescence is panicle, flowers from blue to violet. Flowering period – June, August [9, pp. 44-46]. Herbs, flowers and seeds are used as medicinal plant raw materials.

The plant contains diterpene alkaloids, fatty acids, monoterpenoids, sesquiterpenoids, phenolic acids, lignans, flavonols and flavones [1, p. 4; 8, pp. 153-156; 16, p. 5950].

The plant has antioxidant, antimicrobial and antifungal activity [1, p. 7-8; 16, p. 5954-5955] and is used in folk medicine to treat hypertension, cough, liver and female genital diseases [10, p. 810; 12, p. 108]. Recent studies show the potential of extracts as enzyme inhibitors in the pathogenesis of diseases such as Alzheimer's disease (cholinesterases), hyperpigmentation (tyrosinase), diabetes ( $\alpha$ -amylase and  $\alpha$ -glucosidase) [1, p. 5-7; 16, p. 5955].

During 2004-2014, the Ukrainian pharmaceutical market saw the presence of «Delocet» (produced by «Herbapol» The Cracow Herb Company SA, Poland), which contained ethanol extract of *C. regalis* (1:10) and acetic acid and was used to treat pediculosis of hair in adults and children. The insecticidal effect against lice and their eggs was due to the content of the alkaloid delsonin in the extract.

*Thalictrum foetidum* L. (syn. – *Thalictrum alpestre* Gaudin, *Thalictrum vaginatum* Royle) is a flat and montane species, whose distribution area is located within the Western Forest Steppe and Western Podillya in Lviv, Ternopil and Khmelnytskyi Oblasts [7, pp. 282-283]. *T. foetidum* is a

perennial herbaceous plant 15-50 cm high, inflorescence is panicle, violet flowers. Flowering period – throughout July [9, p. 140]. Both aboveground and underground plant organs are used as medicinal plant raw materials. *T. foetidum* is listed in the Red Book of Ukraine and is considered to be a relic species with a disjunctive range.

The main components of the complex of biologically active compounds of *T. foetidum* are isoquinoline and aporphine alkaloids, triterpene glycosides, tannins, flavonoids, cardenolides, fatty acids [5, p. 698; 6, p. 1; 13, p. 25].

The plant has antimicrobial, antitumor and hypotensive effects [2, p. 181] and is actively used in folk medicine to treat diseases of the liver and kidneys, tumours, dysentery, angina, bronchitis, enteritis, pulmonary tuberculosis, diarrhoea, stomach ulcers, malaria, jaundice, edema and as a staunching agent [5, p. 698; 6, p. 3; 13, p. 24].

Conclusions. Considering the results of the literary review, it is safe to say that such representatives of the Ranunculaceae family as *Clematis vitalba*, *Consolida regalis* and *Thalictrum foetidum* have an invaluable potential for developing new modern medicines, despite the presence of valuable compounds in the complex of biologically active substances of plants, a wide range of their pharmacological action and centuries of experience in traditional medicine.

### References:

1. A UHPLC-QTOF-MS screening provides new insights into the phytochemical composition and biological properties of six *Consolida* species from Turkey / G. Rocchetti [et al.]. *Industrial Crops and Products*. 2020. Vol. 158. P. 1-10.

2. Alkaloid content of *Thalictrum foetidum* L. / R. Istatkova [et al.]. *Comptes rendus de l'Académie bulgare des Sciences*. 2008. T. 61. No. 2. P. 181-186.

3. Buzzini A. Antimicrobial activity of extracts of *Clematis vitalba* towards pathogenic yeast and yeast-like microorganisms. *Fitoterapia*. 2003. Vol. 74. P. 397-400.

4. Dimitrova V. Medical plants on the territory of Petrohan training and experimental forest range, Bulgaria. *Agriculturae Conspectus Scientificus*. 2019. Vol. 84. No. 1. P. 37-46.

5. Ding C.-F. New aporphine alkaloids with selective cytotoxicity against glioma stem cells from *Thalictrum foetidum*. *Chinese Journal of Natural Medicines*. 2019. Vol. 17(9). P. 698-706.

6. Ding C.-F. Thalictfoetine, a novel isoquinoline alkaloid with antibacterial activity from *Thalictrum foetidum*. *Tetrahedron Letters*. 2019. Vol. 60. P. 1-3.
7. Ekoflora Ukrainy: v 2 t. [Ecoflora of Ukraine: in 2 volumes] / ed. by Ya.P. Didukh. Kyiv: Phytosociocentre, 2004. Vol. 2. 480 p.
8. Essential oils in the Ranunculaceae Family: Chemical Composition of hydrodistilled oils from *Consolida regalis*, *Delphinium elatum*, *Nigella hispanica*, and *N. nigellastrum* seeds / L. Kokoska [et al.]. *Chemistry & biodiversity*. 2012. Vol. 9. P. 151-161.
9. Flora URSS: v 12 t. [Flora of the USSR: in 12 volumes] / ed. by M.V. Klokov, O.D. Visiulina. Kyiv: Naukova dumka, 1960. Vol. 5. 528 p.
10. *In vitro* anthelmintic effects of medicinal plants used in Czech Republic / J. Urban [et al.]. *Pharmaceutical Biology*. 2008. Vol. 46. P. 808-813.
11. Novikov A.V. Ranunculaceae Zakhidnoi Ukrainy. II. Kliuch i kharakterystyka rodiv [Ranunculaceae of Western Ukraine. II. Generic identification key and characteristics]. *Modern Phytomorphology*. 2015. Vol. 8. P. 169-182.
12. Pender K., Szcześniak E. *Consolida regalis* (Ranunculaceae) na Dolnym Śląsku – gatunek na progu zagrożenia [*Consolida regalis* (Ranunculaceae) in Lower Silesia – a species at the edge of threat]. *Acta Botanica Silesiaca*. 2011. Vol. 1. P. 108-110.
13. Savelyeva E.V., Vladimirova I.N., Lukianova L.V. How *Thalictrum foetidum* extract influences the lipid peroxide oxidation and antioxidant system in rats subjected to chronic immobilisation stress. *Bulletin of National Academy of Sciences of the Republic of Kazakhstan*. 2020. Vol. 3. No. 385. P. 24-28.
14. Segneanu A.E. Therapeutic use of some Romanian medicinal plants. *Pharmacognosy–Medicinal Plants* / A.E. Segneanu, C. Cepan, I. Grozescu [et al.]. London: IntechOpen, 2019. P. 1-17.
15. Tamura M. Ranunculaceae. *Flowering Plants · Dicotyledons*. Springer, Berlin, Heidelberg, 1993. P. 563-583.
16. Ucar E. In-vitro antioxidant and antimicrobial activities and various enzyme inhibitory activities of ethanol extracts from different organs of *Consolida regalis*. *Fresenius Environmental Bulletin*. 2018. Vol. 27. No. 9. P. 5950-5957.
17. Yesilada E., Küpeli E. *Clematis vitalba* L. aerial part exhibits potent anti-inflammatory, antinociceptive and antipyretic effects. *Journal of Ethnopharmacology*. 2007. Vol. 110. P. 504-515.