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Application of dog rose (*Rosa canina* L.) in ethnomedicine of the Pirot County

Употреба дивље руже (*Rosa canina* L.) у етномедицини Пиротског округа

Abstract: *Rosa canina*, commonly known as the dog rose, is a deciduous shrub from family Rosaceae. The fruit of dog rose has a long tradition of culinary and medicinal use worldwide. The aim of this study was to analyze the ethnopharmacological application of rose in Pirot County (Southeastern Serbia). The study was conducted in the form of surveys among the population in four municipalities: Pirot, Babušnica, Bela Palanka, and Dimitrovgrad. It was noticed that rose is one of the ten best known medicinal plants in Pirot County. The fruit, named rosehip, is usually used in the folk medicine of the County in the form of herbal tea instead of coffee. Fresh rosehip contains a large amount of vitamin C and is thus usually consumed by the people of the

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Pirot County to prevent and treat colds, influenza, vitamin C deficiencies, and for disease prevention.

Key words: *Rosa canina, Pirot County, traditional use, dog rose, rosehip*

Сажетак: *Rosa canina*, у народу јозната као дивља ружа, је листопадни жбун из фамилије Rosaceae. Плод дивље руже има дуго прадајућу кулинарске и медицинске употребе широм света. Циљ ове студије је истраживање етнотехнологије употребе дивље руже у Пиротском округу (југоисточна Србија). Истраживање је спроведено у виду анкетирања становништва у четири општине: Пирот, Бабушница, Бела Паланка и Димитровград. Забележено је да је дивља ружа једна од деセти најпознатијих лековитих биљака Пиротској Општини. Плод, јо названу шијурак, најчешће се користи у виду чаја у народној медицини округа, уместо кафе. Свеж шијурак садржи витамину Ц, па ћа људи у Пиротском округу најчешће користије као извор витамина Ц, за превенцију и прегман прехладе, трија и недостатка витамина Ц, односно у превенцији болести.

Кључне речи: *Rosa canina, Пиротски округ, прадајућа народна употреба, дивља ружа, шијурак*

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INTRODUCTION

Rosa canina (Figure 1) is a deciduous shrub normally ranging in height from 1.5–2.5 m (Вукићевић, 1972). Sometimes it can crawl higher into the crowns of taller trees. The stems are green, internodes long, and prickles stout, curved or hooked.

The Latin name (*canis* = dog) has been derived out of belief that the root could be used as a cure for the bite of a mad dog (Howard, 1987). The origin of its name may be also related to the hooked prickles on the stem which have resemblance to a dog's canines.

The fruit of dog rose (rosehip) begins to form after successful pollination of flowers in spring or early summer, and ripen in late summer through autumn. Rosehip is globose or ellipsoid, glabrous, and red-colored. It has a long tradition of culinary and medicinal use world-

wide. Rosehip is a natural source of vitamin C. It is well-known for its high level of vitamin C and it is used to make syrups, jams, and marmalades. Rosehips are commonly used as herbal tea.

Beside vitamin C, other ingredients found in the rosehip may be beneficial for a variety of health conditions. According to Сарић (1989), *Cynosbati fructus* or *Rosae caninae fructus* is antiscorbutic, tonic, cholagogue, while according to Тасић, Љавкин-Фодуловић and Менковић (2004) it is astringent and diuretic. Medicinal interest in rosehips has been increased as a consequence of research that has explored the potential application of rosehips for the treatment of several diseases including arthritis, diabetes, diarrhea, hepatotoxicity, inflammatory disorders, renal disturbances, and skin disorders (Mármol, Sánchez-de-Diego, Jiménez-Moreno, Ancín-Azpilicueta & Rodríguez-Yoldi, 2017). The same authors mentioned that residue products from rosehips have been used as animal fodder, but now are being explored and gaining an important role in cosmetics, pharmacology and food applications as they contain oil with a high degree of unsaturated lipids. According to Marković et al. (2010), the compounds found in rosehips are vitamins, pectins, tannins, glycosides, and organic acids. The study of Lattanzio et al. (2011) showed that gastric damage was lower in rat stomachs that had been pretreated by the rosehip extract and chemical analysis revealed that the extract contributed to have anti-inflammatory effects. Rose is among the top ten medieval practical drugs, according to the Genizah documents (Jarić et al., 2014), which state that it was most frequently used for treating migraines, liver ailments, lice, poor eyesight, and eye diseases, for cleaning and treating teeth, for invalid diets, as a purgative, as medical chewing gum, for treating eye diseases, umbilical hernias and fevers. According to the same authors, *Rosa canina* had a highly significant use in the treatment of a whole variety of ailments such as stomach pains particularly in the liver region, fatigue due to diarrhea, headaches caused by high temperatures, and ulcerous changes on the gums, as well as an antipyretic, antidiarrheic, and antiemetic.

Dog rose (*Rosa canina* L.) is a protected species in Serbia (Правилник о проглашењу и заштити строго заштићених и заштићених дивљих врста биљака, животиња и гљива. Службени гласник Републике Србије [Official Gazette of the Republic of Serbia] no. 5/2010,

47/2011, 32/2016, 98/2016) and special care is necessary in determining contingents for collection from nature. The rational exploitation of its fruits in Pirot County is during August, September and October (Marković et al., 2010; Марковић, Ракоњац и Николић, 2020). Dog rose is widespread in the brush-woods and thermophilous forests of the County (Marković et al., 2010). According to Marković, Pavlović-Muratspahić, Matović, Marković and Stankov-Jovanović (2009) on the Vidlič Mountain *R. canina* is noticed with two subspecies *R. canina* L. subsp. *lutetiana* (Lém.) Hay and *R. canina* L. subsp. *dumalis* Baker. It is widespread in the three types of forest associations: Ass. *Querco-Carpinetum serbicum* Rudski 1949, Ass. *Quercetum montanum* Černj. et Jov. 1950 and Ass. *Quercetum farnetto-cerris serbicum* Rudski 1949 (Марковић, Матовић и Ракоњац, 2019).

This study aimed to collect and analyze the traditional knowledge about *Rosa canina* in Pirot County and its use in medicinal purposes and to compare our results with similar ethnobotanical studies in Serbia.



Figure 1 The flowering stage of dog rose (*Rosa canina* L.)

Слика 1 Стадијум цветања дивље руже (*Rosa canina* L.)



Figure 2 The fruits of dog rose (*Rosa canina* L.)

Слика 2 Плодови дивље руже (*Rosa canina* L.)

METHODOLOGY

Research on the prior knowledge and use of medicinal plants in the Pirot County was carried out during 2017. in the form of a population survey. The questionnaire about knowledge and use of herbs included 631 inhabitants of 144 villages in four municipalities: Pirot, Babušnica, Bela Palanka, and Dimitrovgrad (Stankov-Jovanović, Šmelcerović, Smiljić, Ilić, Marković, 2018; Marković, 2019). The results were systematized using Microsoft Excel and presented in tabular manner according to the alphabetical order of the villages in the four municipalities. In the columns, the following data was entered: municipality, village, gender, age of respondent, nationality, part of the plant that is used, and form of application.

RESULTS AND DISCUSSION

Rosa (*Rosa canina* L.) is also known as „šipak“ or „šipurak“, to the local population of Pirot County. A total of 132 (20.91%) respondents mentioned the dog rose and its medicinal usage (Table 1), 109 of them

were of Serbian nationality, 19 were of Bulgarian nationality and 4 were Roma. Among the respondents, a total of 77 were male, and 55 were female. In Pirot municipality, *Rosa canina* was known to 58 respondents, in municipality Babušnica 30, in municipality Bela Palanka 30 and municipality Dimitrovgrad 14 interviewed people. Gender of respondents who mentioned rose was 16 to 85 age.

The majority of interviewed persons mentioned the use of the fruit of the dog rose in the form of tea in the treatment of common cold (68 respondents), as a source of vitamin C (36 respondents) and against influenza (7 respondents). In the disease prevention, instead of coffee, dog rose were mentioned by 5 respondents, 3 respondents were familiar with its application against high blood pressure, and 3 respondents against cough. In the treatment against diarrhea rose were mentioned by 2 persons, and the same number of people were familiar with its effect for improving the immune system. One respondent mentioned the usage of rose fruit in the form of tea for the stomach, one against gastric and duodenal ulcer, one for digestion, and one against stomach troubles. One respondent mentioned the usage of dog rose flowers for myocardium and heart valves. The most common form of usage was tea for oral application. One person mentioned a dog rose but did not know its use. The number of reports for each category of use in the four investigated municipalities is presented in Table 2.

Table 2 Number of reports for the use of dog rose (*Rosa canina* L.) in the treatment of various indications in ethnomedicine of Pirot County

Табела 2 Број извештаја о коришћењу дивље руже у лечењу различитих индикација у етномедицини Пиротског округа

Indication	Pirot	Babušnica	Bela Palanka	Dimitrovgrad	Total
Cold	25	17	15	11	68
Source of vitamin C	21	6	9	0	36
Influenza	2	2	3	0	7
Disease prevention, instead of coffee	2	2	0	1	5
Cough	3	0	0	0	3
High blood pressure	1	1	0	1	3
Diarrhea	1	0	1	0	2
Improving the immune system	1	1	0	0	2
Other	2	1	2	1	6

More recent research has shown that rose is still extensively used as a medicine across the whole of the Western Balkans, including Serbia, particularly in the treatment of respiratory complaints (Jarić et al., 2014). Jarić et al. (2007) did a similar ethnobotanical study about the usage of wild medicinal plants of Kopaonik Mountain (central area of the Republic of Serbia). They mentioned that the species *Rosa canina* was and still is one of the most frequently used traditional medicines of Kopaonik Mt. with the following effects: an astringent, tonic, rich in vitamin A, B, C, and K, as well as for colds and influenza. Pieroni, Giusti and Quave (2011) studied the usage of plants on Pešter plateau. They mentioned the following effects of *Rosa canina*: against nausea, vomiting fever, sore throat, cough, and cold. Šavikin et al. (2013) studied the traditional use of medicinal plants in the Zlatibor district, and they mentioned the use of rose against cold and as a source of vitamin C. Zlatković and Bogosavljević (2014a) studied the taxonomic and pharmacological valorization of medicinal plants of the Svrliški Timok gorge in eastern Serbia. They emphasized the following effects of *Rosa canina*: astringent, tonic, mild diuretic, colds, vitamin C deficiency. Zlatković, Bogosavljević, Radivojević and Pavlović (2014b) analyzed the traditional use of plant resources of Mt Rtanj. They mentioned the dog rose as a stimulant. In addition, Janačković, Gavrilović, Savić, Marin and Dajić-Stevanović (2019) in the ethnobotanical study for eastern Serbia, in the Negotin Krajina, noted the use of *Rosa canina* against stomach problems, immune system strengthening, elimination of excess fluid and inflammation of the urinary tract based on a survey of the local population. Our results about the application of *Rosa canina* are similar to other ethnobotanical surveys in Serbia.

CONCLUSION

Ethnobotanical studies provide available data that could lead to the development of new medicines. Based on the results of interviews of the local population in Pirot County done in this study, it can be concluded that rose (*Rosa canina*) is well known to people living in the rural areas and that it is used for the treatment of various medical indications. Fruit of the plant is frequently used in the form of tea for the treatment of cold, cough and as a source of vitamin C, and rarely in disease preven-

tion, instead of coffee, against cough and high blood pressure, against diarrhea, improving the immune system, for the stomach, gastric and duodenal ulcers, and for stomach troubles. Some scarcely reported rose uses have been detected in our studies, such as the use of flowers for myocardium and heart valves.

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РЕЗИМЕ

Rosa canina - дивља ружа (шипак, шипурак) је листопадни жбуна на чијем стаблу и гранама се налазе повијене бодље односно трнови. Познато је да се корен дивље руже користи у народној медицини још у 18. и 19. веку против угриза бесних паса, па отуда потиче латински назив врсте (lat. canis = пас). Плод дивље руже сазрева крајем лета или почетком јесени. У Пиротском округу бере се у току августа, септембра и октобра месеца. Спада у заштићене врсте према Правилнику о проглашењу и заштити строго заштићених и заштићених дивљих врста биљака, животиња и гљива у Србији. Користи се за спровођање сирупа, цема и мармеладе. Најчешће се употребљава у виду чаја.

Сеоско становништво у четири општине Пиротског округа анкетирано је о познавању и примени дивље руже у етномедицини, а добијени резултати су упоређени са етноботаничким истраживањима у осталим деловима Србије. 132 особе од укупног броја од 631-ог испитаника, односно 20,91% испитаника поменуло је употребу дивље руже у етномедицини Пиротског округа, од чега је 58 испитаника било у општини Пирот, по 30 испитаника у општинама Бабушница и Бела Паланка и 14 испитаника у општини Димитровград.

Највећи број испитаника поменуо је употребу плода дивље руже против прехода (68 испитаника) и као извор витамина Ц (36 испитаника), против грипа (7 испитаника), као превентиву против болести, односно уместо кафе (5 испитаника). По три испитаника поменуло је употребу плода против кашља и високог крвног притиска, а по два испитаника против пролива и за јачање имунитета. По један испитаник поменуо је употребу плода за желудац, чир на желуцу и дванаестопалачном цреву, за пробаву и против стомачних тегоба. Један испитаник поменуо је употребу цвета дивље руже у виду чаја за миокард и срчане залиске.

APPENDIX

Table 1 Overview of the survey results in the Pirot County population about the application of rose (*Rosa canina* L.) in ethnomedicine

Табела 1 Преглед резултата анкетирања становништва Пиротског округа о употреби дивље руже (*Rosa canina* L.) у етномедоцини

Municipality	Village	Gender	Age	Nationality	Part of plant	Application
Pirot	Barje Čiflik	M	38	Serbian	fructus	Source of vitamin C
Pirot	Bazovik	Ž	63	Serbian	fructus	Source of vitamin C
Pirot	Blato	M	59	Serbian	fructus	High blood pressure
Pirot	Blato	Ž	58	Serbian	fructus	Cough
Pirot	Blato	Ž	58	Serbian	fructus	Source of vitamin C
Pirot	Velika Lukanka	M	62	Serbian	fructus	Cold
Pirot	Veliki Jovanovac	M	41	Serbian	fructus	Source of vitamin C
Pirot	Veliki Jovanovac	M	72	Serbian	fructus	Disease prevention, instead of coffee
Pirot	Veliki Suvodol	Ž	57	Serbian	fructus	Diarrhea
Pirot	Visočka Ržana	M	56	Serbian	fructus	Source of vitamin C
Pirot	Vlasi	Ž	42	Serbian	fructus	Source of vitamin C
Pirot	Vlasi	M	42	Serbian	fructus	Source of vitamin C
Pirot	Vojnegovac	M	81	Serbian	fructus	Cold
Pirot	Vojnegovac	Ž	52	Serbian	fructus	Cold
Pirot	Gostuša	M	52	Serbian	fructus	Cold
Pirot	Gostuša	M	59	Serbian	fructus	Improving the immune system
Pirot	Gostuša	M	53	Serbian	fructus	Cold
Pirot	Dojkinci	Ž	46	Serbian	fructus	Disease prevention, instead of coffee
Pirot	Držina	M	65	Serbian	fructus	Cold
Pirot	Držina	Ž	67	Serbian	fructus	Cold
Pirot	Držina	Ž	67	Serbian	fructus	Cough
Pirot	Zaskovci	M	79	Serbian	fructus	Cough
Pirot	Izvor	Ž	64	Serbian	fructus	Source of vitamin C

Pirot	Jalbotina	M	43	Serbian	fructus	Source of vitamin C
Pirot	Jelovica	Ž	64	Serbian	fructus	Source of vitamin C
Pirot	Kopriv-štica	M	40	Serbian	fructus	Cold
Pirot	Krupac	Ž	65	Serbian	fructus	Cold
Pirot	Mali Jovanovac	Ž	49	Serbian	fructus	Source of vitamin C
Pirot	Novi Zavoj	Ž	34	Serbian	fructus	Source of vitamin C
Pirot	Obrenovac	Ž	25	Serbian	fructus	Cold
Pirot	Orlja	M	67	Serbian	fructus	Source of vitamin C
Pirot	Orlja	M	65	Serbian	fructus	Cold
Pirot	Osmakovo	Ž	65	Serbian	fructus	Source of vitamin C
Pirot	Pakleštica	M	44	Serbian	fructus	Source of vitamin C
Pirot	Pakleštica	M	72	Serbian	fructus	Influenza
Pirot	Pokrevenik	M	16	Serbian	fructus	Cold
Pirot	Pokrevenik	Ž	65	Serbian	fructus	Cold
Pirot	Pokrevenik	Ž	52	Serbian	fructus	Cold
Pirot	Pokrevenik	Ž	34	Serbian	fructus	Cold
Pirot	Poljska Ržana	M	68	Serbian	fructus	Influenza
Pirot	Poljska Ržana	M	30	Serbian	fructus	Cold
Pirot	Prisjan	Ž	42	Serbian	fructus	Source of vitamin C
Pirot	Prisjan	M	47	Serbian	fructus	Cold
Pirot	Ragodeš	M	75	Serbian	fructus	Source of vitamin C
Pirot	Slavinja	M	65	Bulga-rian	fructus	Source of vitamin C
Pirot	Slavinja	Ž	36	Bulga-rian	fructus	Source of vitamin C
Pirot	Slavinja	M	60	Bulga-rian	fructus	Cold
Pirot	Sopot	M	64	Serbian	fructus	Cold
Pirot	Staničenje	M	59	Serbian	fructus	Source of vitamin C
Pirot	Staničenje	Ž	24	Serbian	fructus	Cold
Pirot	Staničenje	M	33	Serbian	fructus	Cold
Pirot	Sukovo	Ž	54	Serbian	flos	Miocardium and heart valves

Pirot	Sukovo	Ž	53	Serbian	fructus	Cold
Pirot	Sukovo	Ž	59	Serbian	fructus	Cold
Pirot	Sukovo	M	35	Serbian	fructus	Digestion
Pirot	Trnjana	Ž	52	Serbian	fructus	Cold
Pirot	Cerova	M	76	Serbian	fructus	Source of vitamin C
Pirot	Činiglavci	M	44	Serbian	fructus	Cold
Babušnica	Vrelo	Ž	24	Serbian	fructus	Influenza
Babušnica	Vrelo	Ž	51	Serbian	fructus	Cold
Babušnica	Vuči Del	M	59	Bulgarian	fructus	Source of vitamin C
Babušnica	Gornji Striževac	Ž	28	Serbian	fructus	Cold
Babušnica	Gorčinci	Ž	62	Serbian	fructus	Cold
Babušnica	Dol	M	62	Serbian	fructus	Cold
Babušnica	Donje Krnjino	M	54	Roma	fructus	Cold
Babušnica	Donje Krnjino	M	65	Serbian	fructus	Cold
Babušnica	Donje Krnjino	Ž	77	Serbian	fructus	Cold
Babušnica	Donje Krnjino	M	42	Serbian	fructus	Source of vitamin C
Babušnica	Donje Krnjino	M	47	Serbian	fructus	Cold
Babušnica	Izvor	M	72	Serbian	fructus	Cold
Babušnica	Izvor	M	72	Serbian	fructus	Improving the immune system
Babušnica	Izvor	Ž	62	Serbian	fructus	Source of vitamin C
Babušnica	Kaluđe-revo	Ž	20	Serbian	fructus	Influenza
Babušnica	Kaluđe-revo	M	50	Serbian	fructus	Cold
Babušnica	Kaluđe-revo	M	76	Serbian	fructus	Cold
Babušnica	Kaluđe-revo	M	76	Serbian	fructus	Source of vitamin C
Babušnica	Kambelevac	Ž	44	Serbian	fructus	Cold

Babušnica	Kambelevac	M	72	Serbian	fructus	Disease prevention, instead of coffee
Babušnica	Kambelevac	M	28	Serbian	fructus	Cold
Babušnica	Ljubeđa	M	70	Serbian	fructus	Cold
Babušnica	Ljubeđa	M	25	Serbian	fructus	Cold
Babušnica	Masurovci	M	85	Serbian	fructus	Disease prevention, instead of coffee
Babušnica	Radoševac	M	59	Serbian	fructus	Cold
Babušnica	Radoševac	Ž	43	Serbian	fructus	Source of vitamin C
Babušnica	Rakita	Ž	56	Bulgarian	fructus	Source of vitamin C
Babušnica	Resnik	M	78	Serbian	fructus	For stomach
Babušnica	Resnik	M	72	Serbian	fructus	Cold
Babušnica	Crvena Jabuka	M	67	Serbian	fructus	High blood pressure
Bela Palanka	Vitanovac	Ž	73	Serbian	fructus	Source of vitamin C
Bela Palanka	Vrandol	M	17	Roma	fructus	Cold
Bela Palanka	Vrgudinac	M	68	Serbian	fructus	Cold
Bela Palanka	Vrgudinac	Ž	60	Serbian	fructus	Source of vitamin C
Bela Palanka	Vrgudinac	Ž	60	Serbian	fructus	Diarrhea
Bela Palanka	Vrgudinac	M	82	Serbian	fructus	Source of vitamin C
Bela Palanka	Glogovac	M	62	Serbian	fructus	Source of vitamin C
Bela Palanka	Gornja Koritnica	Ž	70	Serbian	fructus	Uniknown use
Bela Palanka	Divljana	M	58	Serbian	fructus	Cold
Bela Palanka	Donja Koritnica	Ž	55	Serbian	fructus	Cold

Bela Palanka	Donja Koritnica	Ž	75	Serbian	fructus	Source of vitamin C
Bela Palanka	Donji Rinj	M	73	Serbian	fructus	Cold
Bela Palanka	Kosmo-vac	M	53	Serbian	fructus	Cold
Bela Palanka	Kosmo-vac	M	53	Serbian	fructus	Gastric and duodenal ulcer
Bela Palanka	Krupac	M	56	Serbian	fructus	Cold
Bela Palanka	Krupac	M	64	Serbian	fructus	Cold
Bela Palanka	Ljubato-vica	Ž	62	Serbian	fructus	Cold
Bela Palanka	Ljubato-vica	Ž	62	Serbian	fructus	Source of vitamin C
Bela Palanka	Moklište	M	34	Serbian	fructus	Cold
Bela Palanka	Moklište	M	60	Serbian	fructus	Cold
Bela Palanka	Mokra	Ž	54	Serbian	fructus	Source of vitamin C
Bela Palanka	Novo Selo	Ž	46	Serbian	fructus	Cold
Bela Palanka	Novo Selo	M	75	Roma	fructus	Cold
Bela Palanka	Novo Selo	M	75	Roma	fructus	Influenza
Bela Palanka	Oreovac	Ž	46	Serbian	fructus	Source of vitamin C
Bela Palanka	Crvena Reka	M	36	Serbian	fructus	Cold
Bela Palanka	Crveni Breg	Ž	50	Serbian	fructus	Source of vitamin C
Bela Palanka	Crnče	Ž	66	Serbian	fructus	Cold
Bela Palanka	Šljivovik	M	35	Serbian	fructus	Influenza
Bela Palanka	Špaj	M	53	Serbian	fructus	Influenza
Dimitrovgrad	Vlkovija	M	20	Bulgarian	fructus	Cold

Dimitrov-grad	Dragovita	M	50	Bulga-rian	fructus	High blood pressure
Dimitrov-grad	Dragovita	M	50	Bulga-rian	fructus	Cold
Dimitrov-grad	Željuša	Ž	49	Bulga-rian	fructus	Cold
Dimitrov-grad	Kamenica	Ž	36	Bulga-rian	fructus	Cold
Dimitrov-grad	Petrlaš	M	37	Bulga-rian	fructus	Cold
Dimitrov-grad	Planinica	Ž	35	Bulga-rian	fructus	Stomach troubles
Dimitrov-grad	Poganovo	M	32	Bulga-rian	fructus	Disease prevention, instead of coffee
Dimitrov-grad	Poganovo	Ž	47	Bulga-rian	fructus	Cold
Dimitrov-grad	Poganovo	Ž	25	Bulga-rian	fructus	Cold
Dimitrov-grad	Radejna	M	35	Bulga-rian	fructus	Cold
Dimitrov-grad	Trnski Odorovci	Ž	63	Bulga-rian	fructus	Cold
Dimitrov-grad	Trnski Odorovci	M	34	Bulga-rian	fructus	Cold
Dimitrov-grad	Trnski Odorovci	M	61	Bulga-rian	fructus	Cold

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