

## ETHNOBOTANY AND EXPLOITATION POTENTIAL OF *OREGANUM VULGARE* L. IN THE RHODOPE, BULGARIA

Mincheva, I.<sup>1</sup>; Kozuharova, E.<sup>1\*</sup>; Rastrelli, L.<sup>2</sup>

<sup>1</sup>Medical University-Sofia, Faculty of Pharmacy, Department of Pharmacognosy, Dunav 2 sr. Sofia 1000, Bulgaria

<sup>2</sup>Department of Pharmacy University of Salerno – Italy, Via Giovanni Paolo II, 84084 Fisciano (SA), Italy

[\\*ina\\_kozuharova@yahoo.co.uk](mailto:ina_kozuharova@yahoo.co.uk)

### Abstract

Both *Origanum vulgare* L. subsp. *vulgare* and *O. vulgare* subsp. *hirtum* (Link) letsw. occur in the Rhodopes in different habitats. Collection of *O. v.* subsp. *hirtum* is forbidden for trade purposes in Bulgaria by law. The aim of this study is to trace the traditional use and collection of both subspecies in the Rhodopes therefore ethnobotanical survey was carried out. *O. vulgare* was one of the most frequently reported plants, used to prepare herbal tea with health preventive properties by people of Central Rhodopes. Although people were aware of health beneficial effects of Oregano only few reports for given medicinal use were recorded. The typical subspecies is actively collected both for personal use and trade purposes. The rare *O. vulgare* subsp. *hirtum* is collected from wild for a culinary spice in East Rhodopes. Seldom collecting from wild populations for trade purposes despite of law restriction was detected. Our observation is that there is practically no traditional culture of growing aromatic plants in the Rhodopes when they occur wild in the vicinity. It is necessary to perform a campaign for cultivation of *Origanum vulgare* subsp. *hirtum* in the area of its native occurrence instead of wild collection. This will contribute not only to the conservation of the taxon but also to the development of rural areas of East Rhodopes.

**Key words:** *Origanum vulgare* subsp. *vulgare* *Origanum vulgare* subsp. *hirtum* Rhodopes, traditional use, conservation, biodiversity

## Introduction

*Origanum vulgare* L. is a perennial herb 20–80 cm tall, with ovate opposite leaves 1–4 cm long. The inflorescence is many-flowered, with flowers grouped into short dense lateral or terminal spikes. *Origanum vulgare* L. subsp. *vulgare* has pink flowers, purple bracts 4–6 mm long and is widely distributed. *Origanum vulgare* subsp. *hirtum* (Link) Letsw. has white flowers, green bracts 2–4 mm and is restricted to Western Mediterranean [1]. The composition of the essential oils of the two subspecies differs and they smell differently [2, 3]. In Bulgaria *O. vulgare* subsp. *hirtum* occurs in few habitats only – on the slopes of Eastern Rhodope Mountains, Belasica Mountains and Struma valley [1]. Both *O. vulgare* subsp. *vulgare* and *O. vulgare* subsp. *hirtum* occur in the Rhodopes Mts. in different habitats. They do not take same ecological niches even in the areas where their ranges cover. Oregano is growing in a pH range between 6.0 (mildly acidic) and 9.0 (strongly alkaline), with a preferred range between 6.0 and 8.0. *O. v.* subsp. *hirtum* is forbidden for collection for trade purposes in Bulgaria according to the Medicinal Plants Act 2000 [4]. Oregano is important medicinal and aromatic plant with long history of human utilization. It is highly valued as decorative and melliferous plant, too. The medicinal use of Oregano is recorded in the earliest natural histories mentioned by Theophrastus, Dioscorides and Galen. Gerard recommended *Origanum vulgare* for cold, stomachache, toothache. Aristotle claims *Origanum vulgare* could cure snakebites if drunk with wine [5]. In a comparative ethnobotanical study Ivancheva and Lepporati present data for traditional use of Oregano subspecies in Bulgaria. *Origanum vulgare* ssp. *vulgare* is used as antitussive and in case of low gastric secretion. For *O. v.* ssp. *hirtum* authors report similar usage as well as choleric and cholagogue [6]. In Italy (Dolomity Lucane territory) flowering tops of *O. vulgare* ssp. *hirtum* are smoked for toothache [7]. In Turkey *O. vulgare* ssp. *vulgare* is used in colds as a decoction of aerial parts and *O. vulgare* ssp. *hirtum* is reported for the same conditions along with the use for abdominal pain, kidney stones and stomach diseases [8]. Chemical composition of Oregano species is widely investigated. The main constituents comprise of essential oils, flavonoids, phenolic acids, triterpenic acids [9]. *Origanum vulgare* ssp. *vulgare* has high essential oil content with carvacrol or thymol as principal component, while *O. v.* ssp. *hirtum* possesses very low essential oil amount. Its major constituent is sabinene, while phenols thymol and

carvacrol are absent [2]. Silva suggests carvacrol could favor the healing process in gastric ulcers [10]. Oregano exhibit strong antibacterial properties along as antioxidative ones, due to the high phenolic and flavonoid content [9]. The potential of Oregano as medicinal plant is still to be fully revealed in the future. Genus *Origanum* as a whole consists of potent medicinal plants. *Origanum majorana* Linn. is famous as a spice. The plant has been used in the treatment of diseases related to the nervous system as an antiepileptic and sedative drug in traditional medicines. Pharmacological tests confirmed anticonvulsant and sedative activities for different extracts of aerial parts (leaves and stems) of *O. majorana* [11].

According to Nanova and Slavova a single collection from natural sources should not exceed 60–70% of population and the repeated must take place after two or three years [12]. The authors present protocol for micropropagation of *Origanum vulgare* subsp. *hirtum* (Link) Letsw. as a source of plant material with certain phenotypic characteristics. The aim of this study is to trace the traditional use and collection of both subspecies of Oregano in the Rhodopes. The emphasis is due to the conservation status of *O. vulgare* subsp. *hirtum* which is restricted to South East of the Rhodopes and thus we aim to contribute to the biodiversity conservation.

## Methods

### Study sites.

The present study is part of a larger ethnobotanical survey carried out in different localities of Rhodopes Mountains during June 2014 and September 2015. Here we present preliminary results concerning use of *Origanum vulgare* L. We mapped the locations of *O. vulgare* subsp. *hirtum* (Figure 1) according to herbarium material of Sofia University (SO), IBER, BAS (SOM) and Agricultural University of Plovdiv (SOA). We selected 30 study sites both in Central and East Rhodopes (Figure 2).

### Ethnobotanical evaluation.

Semi-structured interviews were held among 98 people (76 women and 22 men, of age average age of 60, Figs. 3) in the area of Central and Eastern Rhodopes. Participants were asked: 1) to point which plants they collected from nature for personal use 2) the exact local name(s) 3) to present information about ethnobotanical use(s) and mode of preparation. Voucher specimen and data about cultivation of mentioned plants were collected also when possible.

### Data analysis.

Ethnobotanical data were analyzed and summarized by using Microsoft excel and statistics to determine relative frequencies of citations. Data from the audio records of the interviews were transformed in Microsoft excel tables. Descriptive statistics was used to analyze the data obtained.

## Results

### Ethnobotanical evaluation.

*Origanum vulgare* L. was one of the most frequently reported plants. 97% of the informants reported that they use Oregano. Even those who answered at first that they do not care much about medicinal plants appeared to use Oregano. If they could not collect the plant themselves, their friends and neighbors did that for them. Our results from the Rhodopes differ from what was found in other regions of Bulgaria. According to this study the most popular Granny's cure plants were *Hypericum perforatum*, *Cotinus coggigria*, *Plantago major* and *Sempervivum sp. div.*; *Calendula officinalis*, *Melissa officinalis*, *Aesculus hippocastanum*, *Matricaria chamomilla* etc. Oregano was not often mentioned [13].

### Central Rhodopes

Oregano *Origanum vulgare* subsp. *vulgare* is used to prepare herbal tea with health preventive properties by people of Central Rhodopes consumed both during winter and summer. This is the only Oregano subspecies used in the Central Rhodopes. Hot water infusion of aerial parts was the type of preparation reported by 100% of the informants (Table 1). Although people were aware of health beneficial effects of Oregano (cited as "it treats many illnesses", "it is good for health") only few reports for given medicinal use were recorded: immune enhancer (3%), respiratory problems (2%), stomach ache (2%), and nerve system ailments (2%). The typical subspecies is actively collected both for personal use and trade purposes. Collection is predominantly for personal use. Only 6% reported collection for trade purposes (Figure 4). Additionally to the collection from the wild, only few cases of cultivation of *Origanum vulgare* subsp. *vulgare* were registered during our field study in the Central Rhodopes. These were 5% of the informants.

### East Rhodopes

*Origanum vulgare* subsp. *hirtum* was the subspecies of Oregano used by the people of the East Rhodopes. The locals used the names "Rigan"

and "Bjal rigan" equally to marc *O. vulgare* subsp. *hirtum* as we identified it (Figure 5). *O. vulgare* subsp. *hirtum* was reported by 100% of the informants as a spice for preparation of typical meat balls. This spice is replaced in other parts of Bulgaria by *Stutureja hortensis* L. (*Lamiaceae*). Few informants (7%) reported that beside culinary application they use Oregano to prepare herbal tea (Table 1). Only 2% of the informants reported collection and use of both *O. vulgare* subsp. *hirtum* and *O. vulgare* subsp. *vulgare*. Additionally to the culinary application few reports for given medicinal use were recorded (6% of the informants). These were as follows: toothache (2%), stomach ache (2%), nerve system ailments (2%). All informants (100%) reported that they collected Oregano namely *O. vulgare* subsp. *hirtum* from the wild populations. Additionally to the collection from the wild populations few cases of cultivation of *Origanum vulgare* subsp. *hirtum* were registered during our field study (Figure 6). These were 8% of the informants. Despite of the law restrictions 3% of the informants reported collection from the wild for trade purposes.

## Discussion

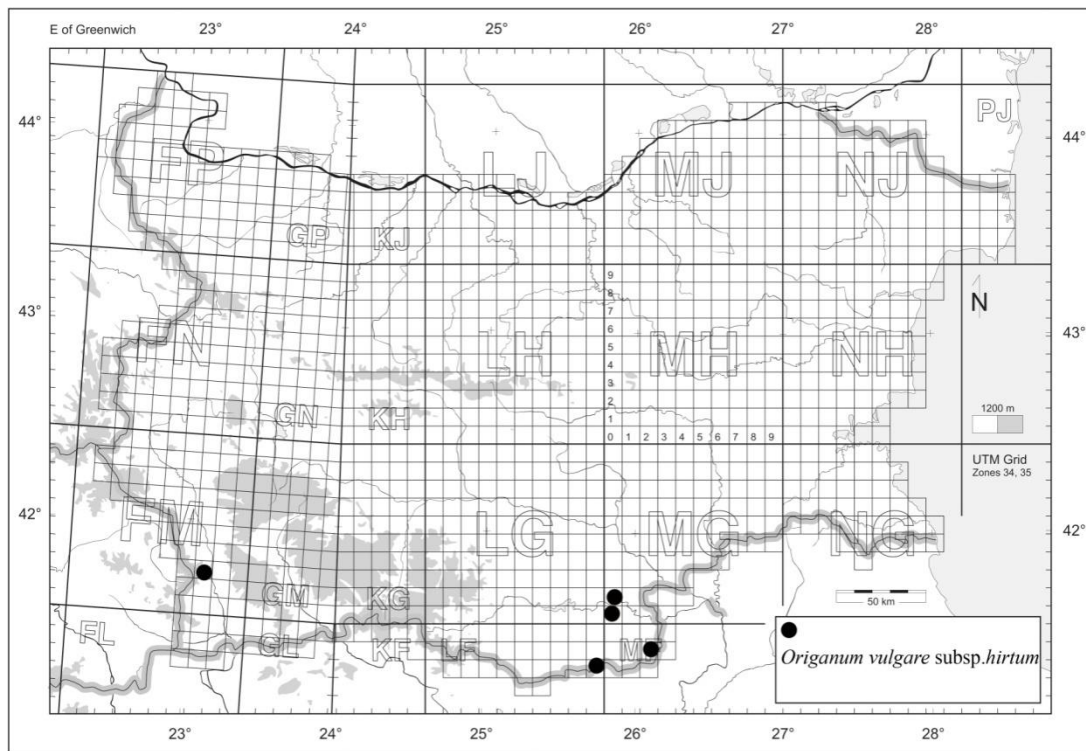
The results of the semi structured interviews revealed strong tradition of Oregano use in the Rhodopes. At the same time it showed that the locals do not have a tradition to grow in their kitchen gardens plants which can be collected wild. We detected only home use and practically no commercial activity concerning *Origanum vulgare* subsp. *hirtum*. Although there is a strong tradition of gathering *Origanum vulgare* subsp. *hirtum* for centuries we assess that nowadays the pressure on the wild populations is reduced considering the tendency of depopulation in these villages. Depopulation is well documented [14, 15]. The practices of cultivation are highly recommended since the protocol for cultivation of *Origanum vulgare* subsp. *hirtum* exists [12]. This will contribute not only to the conservation of the taxon but also to the development of the rural areas of East Rhodopes. This can be part of the approaches for preserving local knowledge and plant diversity through implementation of long forgotten rural practices in tourism and entrepreneurship innovations proposed by Haydutov and team [16]. There is a hazard in the case of cultivation and extensive commercial activity concerning *Origanum vulgare* subsp. *hirtum*, that beside the cultivated plant substance the collection of the wild populations may be expanded. This will require strong control on the commercial process

## Acknowledgments

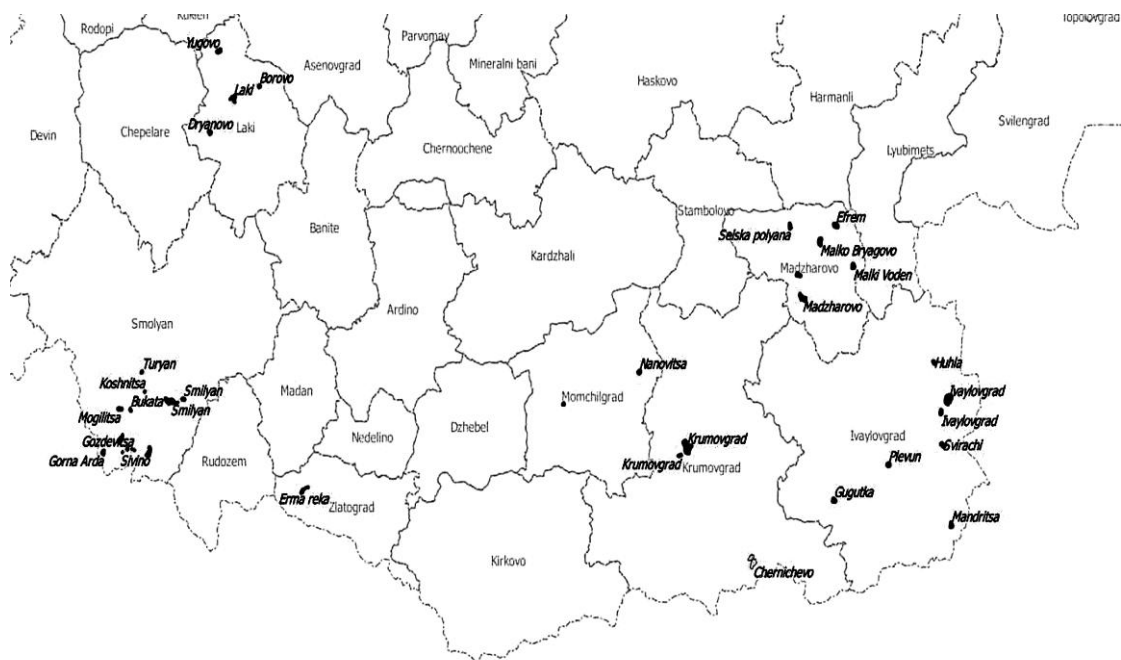
We are grateful to Dr L. Evstatieva and to the anonymous reviewers for the useful comments

## References

1. Anchev, M.: *Origanum* L. —in: Jordanov, D. (ed.), Flora Republicae Popularis Bulgaricae.vol. IX — Sofia. 1989:286-288 (in Bulgarian)
2. Konakchiev, A., Genova, E., & Couladis, M. Chemical composition of the essential oil of *Origanum vulgare* ssp. *hirtum* (Link) Letswaart in Bulgaria.Comptes Rendus de l'Academie Bulgare des Sciences, 2004: 57(11): 49.
3. Euro+Med PlantBase 2011 <http://ww2.bgbm.org/euroPlusMed/PTaxonDetail.asp?NameCache=Origanum%20vulgare&PTRefK=8000000>
4. Medicinal Plants Act 2000, State Gazette. <http://susherbssbg.eu/wp-content/uploads/ebook/files/page/42.swf>
5. Oregano and Marjoram: An Herb Society of America Guide to the Genus *Origanum*. The Herb Society of America, 2005. [retrieved on 1.08.2014 from <http://www.herbsociety.org/factsheets/>]
6. Leporatti, M.L. and Ivancheva, S. Preliminary comparative analysis of medicinal plants used in the traditional medicine of Bulgaria and Italy. J Ethnopharmacol 2003: 87(2): 123-142.
7. Pieroni, A., Quave, C.L. and Santoro, R.F. Folk pharmaceutical knowledge in the territory of the Dolomiti Lucane, inland southern Italy. J Ethnopharmacol 2004: 95(2): 373-384.
8. Kültür, Ş. Medicinal plants used in Kirklareli province (Turkey). J Ethnopharmacol 2007: 111(2): 341-364.
9. Antal, S.D., Citu, C., Ardelean, F., Dehelean, C., Vlaia, L., Soica, C.O.D.R.U.T.A., Vlaia, V., Biris, M. and Sas, I., Metalome of *Origanum vulgare*: the unknown side of a medicinal and aromatic plant used worldwide. Farmacia, 2015: 63(4):534-538.
10. Silva, F.V., Guimarães, A.G., Silva, E.R., Sousa-Neto, B.P., Machado, F.D., Quintans-Júnior, L.J., Arcanjo, D.D., Oliveira, F.A. Oliveira, R.C., Anti-inflammatory and anti-ulcer activities of carvacrol, a monoterpene present in the essential oil of oregano. J Medicinal Food, 2012: 15(11): 984-991
11. Deshmane, D. N., Gadgoli, C. H., & Halade, G. V. Anticonvulsant effect of *Origanum majorana* L. Pharmacologyonline, 2007: 1: 64-78.
12. Nanova, Z., Slavova, Y. Mass vegetative propagation of winter marjoram (*Origanum vulgare* ssp. *hirtum* (Link) Jetswaart). Bulgarian J Agric Sci 2006: 12(4): 531-536.
13. Kozuharova E., H. Lebanova, I. Getov, N. Benbassat, J. Napier. Descriptive study of contemporary status of the traditional knowledge on medicinal plants in Bulgaria. Afr J Pharm Pharmacol. 2013;(5):185-198
14. Mladenov, C., Ilieva, M. (). The depopulation of the Bulgarian villages. Bul Geo Socio-Economic Series, 2012: 17(17): 99-107.
15. Tsekov, N. Regional policy for rural settlements in Bulgaria. Tijdschrift voor economische en sociale geografie, 1992: 83(5), 402-408.
16. Haydutov, L., Bosseva, Y., Ivanova, T., & Dimitrova, D. Traditional plant-based products from Bulgarian mountain regions. Regional Studies Program, 2015: 129. International Scientific Conference Proceedings 14-16 May 2015, Borovets, Bulgaria



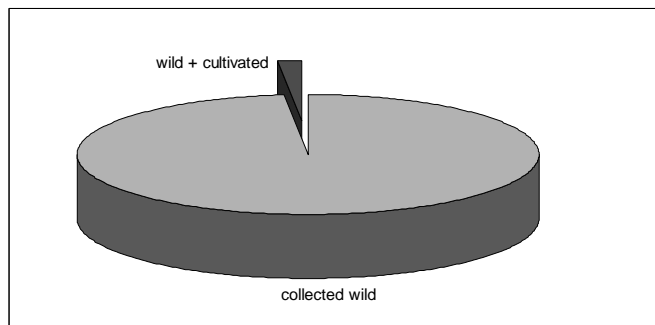
**Figure 1.** Distribution of *O. vulgare* subsp. *hirtum* according to herbarium material of SO, SOM and SOA.



**Figure 2.** Study sites

	<i>O. vulgare</i> subsp. <i>vulgare</i>		<i>O. vulgare</i> subsp. <i>hirtum</i>
	Central Rdodopes Mts.	East Rdodopes Mts.	Percent of reports East Rdodopes Mts.
Herbal tea with health preventive properties	100 %	2 %	7 %
Immune enhancer	3 %		
Respiratory system	2 %		
Nerve system ailments	2 %		2 %
Toothache			2 %
Stomach ache	2 %		2 %
Culinary			100%

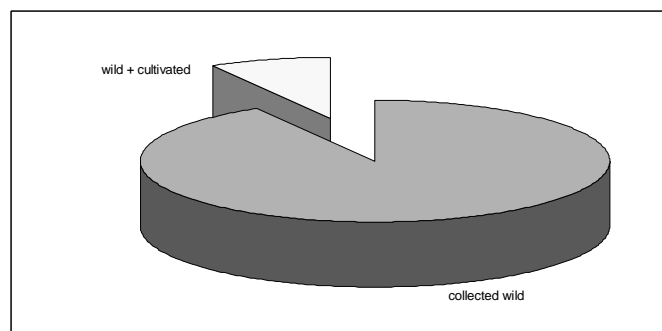
**Table 1.** Application mentioned by informants for both subspecies



**Figure 4.** Collection modes in Central Rhodopes [%]



**Figure 5.** *Origanum vulgare* subsp. *hirtum* collected in East Rhodopes



**Figure 6.** Collection modes in East Rhodopes [%]