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Ethnobotanical survey of traditionally used plants in human therapy of east, north and north-east Bosnia and Herzegovina

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ABSTRACT

Aim of the study: : The study aims to provide a systematical revision of the traditional use of wild and cultivated plants in north-eastern Bosnia and Herzegovina (Western Balkan Peninsula; Southeast Europe). Thereby, it will extend and complement a recent previous study carried out in middle, southern and western Bosnia and Herzegovina.

Material and methods: : Information was collected by performing so called open ethnobotanical interviews. The following data were recorded and systematically assembled in a database: name, age and occupation of the interviewed person; the geographic locality and date of the interview; the name of the used plant; plant parts used; prescription background and preparation procedure as well as indication. Plants mentioned to be used by the informants were collected during field trips done together with the informants and taxonomically determined. The corresponding material was finally deposited in the herbarium of the Department of Pharmacognosy of the University of Vienna for the purpose of documentation.

Results: : In total, 45 places including villages and mountain areas were visited and 84 persons questioned. 254 wild and cultivated species and 1655 different preparations for the use in traditional human therapy were recorded. The most frequently mentioned indications were disorders of the gastrointestinal tract, respiratory system, urogenital tract, skin, blood system, cardiovascular system, nervous system as well as rheumatism. Infusions were the most frequently prepared formulation. Other applied preparations mentioned with decreasing frequency were decocts, sirups, tinctures, collars, direct application of plants without prior preparation, ointments, freshly pressed juices, oils, powders, fluid unctions, macerations and finally suppositories. Special preparations, typical only for the area of Bosnia and Herzegovina were "mehlems" and some kind of sirup called "đulbe šećer" (eng. đulbe sugar). While "mehlems" were already recognized and accordingly discussed for the central, southern and western parts of Bosnia and Herzegovina, "đulbe šećer" seems to be known in north-eastern region only. The main compounds of this preparation are sugar or honey, lemon and flowers of one particular species of *Rosa* (with very small flowers), in Bosnia called "đulbe" rose or "sugar" rose. Prescriptions were verbally delivered for up to more than six generations, traditionally from mother to daughter. For the objective of further analyses and comparisons, the recorded data were inserted in the "VOLKSMED" data base of Austrian prescriptions.

Conclusions: : The study showed that there exist considerable similarities in medicinal plant use including indications and type of preparations between the different regions and ethnicities of Bosnia and Herzegovina. Interestingly, there were also only little differences in frequencies of medicinal plant use, indications and preparations between middle, western and southern part Bosnia and Herzegovina on one hand and the eastern, northern and north-eastern part of this county on the other hand. The results also demonstrated the high importance of medicinal plants for the physical health of Bosnian people. 70 of the species reported by Bosnian people were also used in official pharmacy. In addition, a variety of less known plants has been used since ages in traditional therapy of this country and hence may be potential sources for new therapies. Therefore, further pharmaceutical research into this particular and scientifically still underexplored proportion of Bosnian plant biodiversity appears promising and is recommended by the authors.

Abbreviations: CS, cultivated species; WS, wild species; P, used plant part(s); B, beneficial for all ailments; ap, aerial parts; bd, buds; bk, bark; bl, bulb; fl, flowers; fr, fruits; lf, leaves; lg, legumes; nd, needles; pc, pericarp; pcl, pedicels; rs, resin; rt, roots; sd, seeds; sty, stylus; trt, taproots; wh, whole plant (lichen); M, mixture; SC, single component; GIT, gastrointestinal tract; RT, respiratory tract; UGT, urogenital tract.

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1. Introduction

A large portion of the world population, especially in developing countries, depends on traditional medicine for the treatment of diseases and injuries. Hundreds of plant genera, to mention the most important natural resource of indigenous medicine, are used for that purpose, mainly as herbal preparations, including very potent and powerful drugs which have stood the test of time and could not be replaced by modern medical preparations (Ahmad, 1998). The World Health Organisation reported that 80% of the world population rely chiefly on indigenous medicine and that the majority of traditional therapies involve the use of plant extracts or of their active constituents (WHO, 1993, 2002).

However, the potential use of plants as a source of new drugs is poorly explored yet. Out of the – as a conservative estimation – reported 265,000 species of seed plants (Stevens, 2001), merely a small fraction has been investigated phytochemically and only a subsample of it has been properly studied in terms of their pharmacological properties. In most cases, only a pharmacological screening or preliminary studies have been carried out. It is estimated, that so far 5000 plant species have been scientifically tested for their medical value (Payne et al., 1991). In order to save knowledge on pharmaceutical and medicinal usability of plants from loss, some kind of affordable and effective survey strategy is needed. The ethnobotanical approach is one such method which meets this requirement and can be applied to select plants for pharmacological studies (e.g., Camejo-Rodrigues et al., 2003; Redžić, 2007; Šarić-Kundalić et al., 2010).

With about 6340 vascular plant species reported, the Balkans (Turrill, 1929), compared to 10,500 species accepted in the Flora Europaea, is one of the most important biodiversity centers of Europe. Within its 51,129 km^2, Bosnia and Herzegovina (Western Balkan Peninsula; Southeast Europe) hosts about 3600 species of vascular plants. Despite the high floristic diversity of this country, information about plant usage in traditional medicine is scarce. Except for one "systematical study", concerning the whole country area (Redžić, 2007), and a previous paper on middle, west and south of Bosnia and Herzegovina (Šarić-Kundalić et al., 2010), there exist no other systematical survey of traditionally used plants in this country so far. In particular the wars of the last century, which politically isolated the Balkans and depleted the resources of its countries (especially the territory of former Yugoslavia), hindered the progress of ethnobotanical and field-orientated research.

The aim of this study is the systematic collection of information about the usage of wild and cultivated plants in human therapy from Bosnia and Herzegovina. In particular, we will (i) complement our current knowledge by focusing on east, north and east-north Bosnia and Herzegovina following the same research strategy applied in a previous study on southern, western and central parts of the country (Šarić-Kundalić et al., 2010); (ii) solidify and expand the respective data basis of this area by particularly selecting villages and places not studied before and by including members of all native ethnicities. Thereby, we will (iii) for the first time fully meet ethnobotanical standards (i.e. rigorous documentation of the used plants). For this purpose, we will gather verbally delivered prescriptions, their historical background, and the procedure applied to prepare the used plant. The relevant information will be mainly obtained from interviews of people known by the inhabitants of the investigated places as "traditional healers". Based on this data and from the results presented in Šarić-Kundalić et al. (2010), finally, a detailed survey of cultivated and wild plants used in traditional medicine of Bosnia and Herzegovina will be provided. By this study, we further aim to secure valuable traditional knowledge from getting lost.

2. Materials and methods

Regarding the area under investigation, we refer to Šarić-Kundalić (Šarić-Kundalić et al., 2010) where details on the geography, landscape, climate and phytogeography of the studied country of Bosnia and Herzegovina are given.

2.1. Localities studied and population

The study was carried out in east and north Bosnia and Herzegovina in the years 2006–2009. The presented investigation complements the survey of Šarić-Kundalić et al. (2010) carried out in southern, central and western parts of the country. Like in the preceding study, so called open ethno-botanical interviews were performed to systematically collect data and information as follows:

- name, age and occupation of the interviewed person
- geographic locality
- date of interview
- name of the used plant
- part of the plant being used
- prescription background
- preparation procedure
- indication

The interviews were informal conversations with people known by the inhabitants of the investigated places as "traditional healers". The final aim was to assemble a list of wild and cultivated medicinal plants used and/or known by the informants. In total, 84 persons (71 women and 13 men) were questioned. The interviewed people belonged to all ethnical groups and minorities constituting the people of Bosnia and Herzegovina: Bosniaks (mainly Bosnian Muslims), Serbs (Bosnian Orthodox), Croats (Bosnian Catholics) and the minorities including Jews and Protestants. Their average age was 68 years. The interviews were taken in Bosnian language. Prescriptions were verbally delivered among the local people in the past, traditionally from mother to daughter, in some cases for more than six generations.

The investigated villages were selected based on the criteria that traditional medicine is still practised, to cover all ethnicities present in the country, and that these places (except for Husino near Tuzla) have not been investigated before. Thereby we aimed to solidify our knowledge on the ethnobotanical uses of the study area. The selection, however, was constrained by the presence of mines and areas of restricted access (e.g., mass graves) in several localities, which enabled their inclusion. Investigations were finally carried out in the following 45 places (Fig. 1):

- eastern part of Bosnia and Herzegovina: 1 Ahmovići (3 informants, Goražde);
- northern part: 2 Behrami (2 informants, Srebrnik), 3 Blatnica (1 informant, Teslić), 4 Miričina (3 informants, Gračanica), 5 Novo selo (1 informant, Tešanj), 6 Odžak (4 informants), 7 Orašje (1 informant);
- north-eastern part: 8 Bukinje (1 informant), 9 Crnjevo (1 informant), 10 Čelić (1 informant), 11 Dobrnja (1 informant), 12 Dokanj (2 informants), 13 Gornja Tuzla (1 informant), 14 Grabovica Donja (1 informant), 15 Grabovica Gornja (1 informant), 16 Husino (2 infomants), 17 Ilinčica (2 informants), 18 Kiseljak (3 informants), 19 Lipnica (1 informant), 20 Ljubače (1 informant), 21 Simin Han (2 informants), 22 Suha (1 informant), 23 Ši Selo (3 informants), 24 Šićki brod (1 informant), 25 Majevica Mountains (1 informant, Tuzla), 26 Kalesija (1 informant), 27 Teočak (2 infromants), 28 Bistarac Donji (3 informants), 29 Puračić (2 informants), 30 Vijenac (3 informants, Lukavac), 31