



Research Paper

Tradition of use on medicinal species in Valfurva (Sondrio, Italy)

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ABSTRACT

Ethnopharmacological relevance: In the past Alpine populations were isolated from comforts of industrial and technological development present in large cities and, therefore, they were obliged to find in nature a source of sustenance and care. Traditional use of plant is a wealth of local knowledge that is likely to be lost. This work, carried out during 2012, aims to collect, analyze and process information on the species used for medicinal, veterinary, cosmetic, domestic, ritual and religious purposes by the inhabitants of Valfurva, in the Province of Sondrio (Italy). Furthermore it is a means for the preservation of local traditions regarding such uses and increases the ethnobotanical data from Northern Italy, till now poorly documented.

Methods: Our survey was conducted by semi-structured interviews. We interviewed 92 people, aged from 23 to 97 y.o., born or resident in Valfurva. All information collected and concerning their use of plants, were analyzed using ethnobotanical indices such as Relative Frequency of Citation (RFC), Relative Importance (RI) and Factor Informant Consensus (FIC).

Results: Our study stated that people living in Valfurva use 126 species belonging to 48 families. Findings revealed that the most cited species is *Achillea moschata* Wulfen, with values of RFC and RI equal to 1.00 and 1.12 respectively. Furthermore, 95 species were collected in the wild and 31 were cultivated. The most commonly used part plants were leaves, flowers, fruits, roots and complete aerial parts. The most frequent preparation methods were infusion, decoction and poultice. Among the recorded species, 91 of them are used for medicinal purposes, 72 for cooking, 19 for veterinary purposes, 10 for animal feed, 12 for cosmetic practices, 7 for religious or ritual purposes and 45 for domestic and various uses. The validity of the species use emerged in our survey is confirmed by scientific literature and research conducted on the same topics.

Conclusions: This study increases ethnobotanical data coming from Italian Alps, whose regions have been so far hardly investigated. Our study confirms the interest in species already mentioned in previous surveys and placings. It also provides evidences which could be usefully exploited by new investigations aimed at knowing the active metabolites found responsible for plants use in traditional medicine.

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1. Introduction

In the Alpine regions several causes are gradually leading to the loss of local traditions, handed down mostly orally, including those linked to so-called "family pharmacy". Among them, the exodus of the Alpine populations, the development of tourism-related activities, with the consequent abandonment of the ancient farming

activities by the younger generation, and changes of rhythms and lifestyle habits. In northern Italy and especially in the Alps the ethnobotanical research has been neglected: only a few works, mostly developed over the past five years, document ethnobotanical studies of the Italian Alpine regions (Coassini Lokar and Poldini, 1988; Grabherr, 2009; Pieroni and Giusti, 2009; Vitalini et al., 2009, 2013). The alpine environment is a rich source of plant biodiversity and cultural biodiversity in general; the aim of this work was to collect, analyze and process data related to species exploited by the inhabitants of Valfurva, Sondrio (Lombardy, Italy) for medicinal purposes, as well as for food, cosmetic, veterinary, domestic, ritual and religious uses, and as a tool for preserving and promoting local traditions.

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2. Material and methods

2.1. Study area

Valfurva is an Italian town of 2703 inhabitants (ISTAT, 2012) located on the edge of the North-East Province of Sondrio in Lombardy (north Italy). Its municipality is the second for territorial extension in Lombardy, with 215 km². The economy of the valley in the past was based on frequent trades and traditional craft activities developed and maintained long-isolated from external influences. These, from the end of the nineteenth century, were joined by the first tourist activities related to mountaineering and spa treatments, practice, the latter, which has now gone lost.

Valfurva's profile is typical of a glacial valley, with wide bottom and steep sides.

The lithology of the area mainly consists of metamorphic rocks, crystal clear and markedly schistose, crumbly, crossed by elongated lenses of ancient marbles. The only exception is the ridge that dominates the right side in the initial part of the valley, consisting of calcareous and dolomitic sediments. The valley is clearly defined by a large chain of mountains arranged in a large semicircle. In Valfurva, in addition to Valfurva itself, four other secondary valleys can be distinguished: Zebrù valley, Cedèc valley, Forni valley and Gavia valley. Many creeks flow tributaries of the river Frodolfo are present in the area; there are also many glacial excavation lakes.

The climate of Valfurva presents two different situations. The lower part of the valley is characterized by low rainfall and strong continentality, whereas the top has a typical alpine climate. Across the valley, rainfall is still concentrated in the summer.

The different microclimate and lithological aspects of such a large area cause great differences in the local vegetation. The limestone cliffs areas are suitable for potential vegetation series typical of these soils, while large areas mostly occupied by phyllites are colonized by series which prefer high degree of silica.

Mountain hay meadows are characterized by the presence of *Salvia pratensis* L., *Heracleum sphondylium* L., *Bromus erectus* Huds. and *Festuca pratensis* Huds. During spring they are colored in many shades given, among others, by *Campanula scheuchzeri* Vill., *Silene vulgaris* (Moench) Garcke and *Ranunculus acris* L. In Valfurva xerothermophilic bushes of *Elaeagnus rhamnoides* (L.) A.Nelson, *Prunus spinosa* L. and *Berberis vulgaris* L. have been found. The special climatic characteristics of the area foster an unusual altitudinal extension of the coniferous forests, mainly represented by *Picea excelsa* (Lam.) Link and *Pinus cembra* L. In the initial part of the dale, it happens to see a sparse forest of *Pinus sylvestris* L. that sometimes, in the valley, is replaced by “park formations” of *Larix decidua* Mill. Where the limestone outcrops, a very well represented conifer in the valley is *Pinus mugo* Turra.

In the undergrowth, depending on the type of terrain and climate, it is possible to observe in different proportions some *Rhododendron ferrugineum* L., *Erica carnea* L., *Arctostaphylos uva-ursi* (L.) Sprengel, *Rubus idaeus* L., *Ribes petraeum* Wulf., *Juniperus communis* L. and *Vaccinium myrtillus* L. Beyond the limit of the forest, gradually appear alpine meadows, dotted, in summer, with the colors given by local spontaneous flowers such as *Gentiana acaulis* L., *Soldanella alpina* L. and different species of *Primula*.

Windy areas are dominated by dwarf and twisted shrubberies such as *Loiseleuria* and *Empetrum*; areas which are strongly subject to winter avalanches have undergone the formation of gullies which are ruled by the *Alnus alnobetula* (Ehrh.) K.Koch.

Almost the whole municipal area of Valfurva belongs to the Stelvio National Park, which carefully regulates the collection of plant species with laws and disciplines that depend on the “Regional Law of March 31, 2008 – No. 10” with additional specifications described in the “Decree No. 7/12 of 15 June 2012” of the park itself.

2.2. Ethnobotanical methodology

The survey was conducted in Valfurva during 2012 and it was characterized by the direct presence of the researcher within the local culture.

As we aimed to investigate the use of plant species in different traditional use categories, we interviewed local people using semi-structured interviews. In this way, we reached different goals: identifying the plants known by locals and how they are used, the purposes and methods of plants uses and preparation, the vernacular name, the place and the period they used to collect each plant.

Before interviewing local people, we conducted a literature survey on the local flora, mainly on the ground of wide consultation texts (Massara, 1834; Pignatti, 1982; Dalla Fior, 1985; Ferranti, 2005) and we created a first partial list of plant species accompanied by pictures and photographs.

We interviewed 92 people (64 women and 28 men), from 23 to 97 years old (17% under the age of 40, 21% over the age of 80, 5% of whom were above 90 years old). Most respondents are pensioners (46%), housewives, hoteliers and restaurateurs, orders, factory workers and farmers. Most of them (84%) were born, grew up and live on site; 46% have a primary school education, 22% a middle school education, 28% received the high school diploma, while only 4% have a university degree.

Most interviewees were audio-recorded, so that the interviews were more fluent and their re-elaboration easier. Furthermore, the recordings document in detail the local language with all its dialectal inflexions, which are stronger and more marked than those, “more contaminated”, of the surrounding valleys. Although the elderly still exclusively speak the *furič*, the local dialect, the spoken language in Valfurva is Italian.

In conclusion, for each species, we have set up a photographic archive and herbarium specimens which are currently stored in the Department of Biosciences of the University of Milan.

2.3. Ethnobotanical data analysis

We analyzed, evaluated and compared both the collected information and the local value of the documented plant species by using three ethnobotanical indices: the Relative Frequency of Citation (RFC), the Relative Importance (RI) and the Factor Informant Consensus (FIC).

The Relative Frequency of Citation (RFC) (Tardío and Pardo-de-Santayana, 2008) shows the local importance of each species and it is given by the following formula $RFC = FC/N$, where FC is the number of informants mentioning the use of the species and N is the total number of informants participating in the survey.

Regardless of the number of informants citing the species, Relative Importance (RI) (Albuquerque et al., 2006) describes the versatility of each species and follows the formula $RI = NUC + NT$, where NUC is the number of use-categories of a given species divided by the total number of use-categories of the most versatile species and NT is the number of types of uses attributed to a given species divided by the total number of types of uses attributed to the most important taxon.

The Factor Informant Consensus (FIC) (Trotter and Logan, 1986) indicates the agreement among the informants (higher when closer to 1) about the use of plants to treat the diseases of different organ systems (respiratory, digestive, tegumentary, circulatory, muscular/skeletal, endocrine, sensory, nervous and urogenital). It is calculated by the following formula: $FIC = (nur - nt) / (nur - 1)$, where *nur* is the number of used citations in each category and *nt* is the number of used taxa.

It was not possible to calculate indices such as Ethnophytonomic Index (EPI) and Ethnobotanicity Index (EI), because they

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