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Research Paper

The importance of cultural factors in the distribution of medicinal plant knowledge: A case study in four Basque regions

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ABSTRACT

Ethnobotanical relevance: Previous research suggests that the use of medicinal plants by a given group is mainly driven by biological variables such as the chemical composition or the ecological distribution of plants. However, other studies highlight the importance of cultural aspects such as the curative meaning given to a plant, beliefs, religion or the historical context. Such aspects could play an important role in the use, diffusion or even in the effectiveness of a plant remedy.

Materials and methods: Fieldwork consisted of 233 orally consented semi-structured interviews with 178 informants about medicinal uses of plants. Interviews were conducted in four historically and geographically delimited regions of Alava and Biscay with similar environmental conditions but different sociolinguistic backgrounds: two regions were Basque- and two Spanish-speaking. Data were structured in use-reports. A Between Class Analysis was conducted to assess the intercultural and intracultural variability of medicinal plants knowledge.

Results: The results show the existence of four clearly different medicinal ethnofloras. While the four ethnofloras share remedies widely distributed through the territory, each of them also includes remedies that are only shared among closely related communities. The ecological availability and chemical composition of the plants may explain why there are widely used plant remedies. On the contrary, the distribution of the locally shared remedies matches up with the cultural heterogeneity of the territory, so cultural factors, such as, language, social networks or the meaning response of the plants seem to explain the use of many traditional plant remedies. In Addition, we also found that Basque speaking territories show higher knowledge levels than Spanish speaking territories. In this sense, the development and reinforcement of Basque identity by Basque nationalism seems to have contributed to maintain the traditional knowledge in the Basque speaking regions.

Conclusions: Despite the fact that pharmacological effectiveness and ecological availability are usually considered as the main variables that shape the traditional use of medicinal plants, our results suggest that cultural factors can be at least as important as ecological and chemical factors. In fact, differences in language, in the cultural meaning of the plants, in the context related to cultural identities, and in social networks seem to play a fundamental role in the use and diffusion and maintenance or erosion of traditional knowledge about medicinal plants in the study area.

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1. Introduction

Ethnobotanical research has mainly focused on recording traditional ecological knowledge (TEK) in a specific place (e.g., De Almeida et al., 2012; Quiroga et al., 2012; Mattalia et al., 2013; Kidane et al., 2014; Zlatković et al., 2014), although a number of studies also compare species traditionally used in different regions or countries

(e.g., Madaleno, 2010; Bradacs et al., 2011; Ellena et al., 2012; Ghorbani et al., 2012; Söukand et al., 2013). Cross-cultural studies usually focus on explaining how different human groups select and use plants. Some of them try to analyze how TEK changes over space and time and which variables explain such patterns (Leporatti and Ivancheva, 2003; Hadjichambis et al., 2008; Leporatti and Ghedira, 2009; Łuczaj, 2010; Pieroni et al., 2011).

One of the variables generally considered when explaining the traditional use of plants is their ecological availability. According to the “ecological apparency” hypothesis, the more apparent or salient a species is, the more likely that it will be used (Lucena et al., 2007).

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This theory assumes that the visibility or apparency of the plant determine herbivores' choices. Although this theory was originally described for understanding plant–herbivores relations, it has been also applied to medicinal plant selection among humans (Johns et al., 1990). However, ethnobotanical studies that measure the ecological salience of useful plants have yielded ambiguous conclusions. While some studies seem to validate the hypothesis (Lucena et al., 2007; Thomas et al., 2009) others not (Silva and Albuquerque, 2005; Pardo-de-Santayana et al., 2007; Molina, 2014). Furthermore, a recent study shows that depending on the category of use, both statements can be true (Guèze et al., 2014).

Another variable considered essential in the use of healing plants is their pharmacological activity. In fact, many cross-cultural studies aiming to find new drugs and bioactive compounds (e.g., Saslis-Lagoudakis et al., 2011) have been conducted under the assumption that when a medicinal plant is similarly used in different cultures the presence of bioactive compounds likely explains its traditional use (Heinrich et al., 1998; Leporatti and Ivancheva, 2003; Jain, 2004; Leporatti and Ghedira, 2009). Despite the assumption, ethnopharmacological studies also reveal that some species traditionally used for medicinal purposes do not show the expected pharmacological activity (Martínez et al., 1996; Perumal Samy et al., 1998; Sokmen et al., 1999; Ali et al., 2001; Gertsch, 2012). Consequently, other factors seem to play a role in explaining the use of plants as medicines.

Indeed, ethnobotanical knowledge arises from a complex interaction between human beings and their natural resources (Sökand and Kalle, 2010). So, besides ecological and chemical factors, a number of researchers have shown that cultural variables are essential in explaining the use of given plants by human communities (Maffi, 2005). Those cultural factors might include the local classification systems (Ellen, 2009) that are mediated through language (Maffi, 2005; Saslis-Lagoudakis et al., 2014), human cognition and cultural history (Leonti and Casu, 2013), beliefs and religion (Pieroni and Quave 2005; Pieroni et al. 2011; Rexhepi et al., 2013), or social networks and access to information (Bandiera and Rasul, 2006; Van den Broeck and Dercon, 2011; Labeyrie et al., 2014).

The mismatch between traditional medicinal use and pharmacological activity has been explained because the curative process is not only driven by the chemical composition of the remedies (Gertsch, 2012). Many studies aim to understand the mechanisms of the so called placebo response (Benedetti et al., 2005; Benedetti and Amanzio, 2011; Jakovljevic, 2014), later redefined as the meaning response (Moerman and Jonas, 2002; Moerman, 2007). As referred by these authors, the effectiveness of a medicinal remedy might – totally or partially – lay on its cultural meaning, or what Moerman calls “meaning response”, a concept that argues that the psychological context can induce neurobiological mechanisms having a healing effect (De La Fuente-Fernandez et al., 2001; Wager et al., 2004; Benedetti et al., 2005; Bingel et al., 2011). This kind of symbolic effectiveness (Levi-Strauss, 1980) indicates that besides bioactive principles there are “cultural active principles”. Unlike chemical principles, the cultural active principles are culturally constructed. Therefore, their effectiveness depends on the cultural context and cannot be considered as universal properties of the plants.

Consequently, the effectiveness of a medicine consists of at least two components (cultural and chemical) and the relevance of each component might vary significantly in each medicine (Moerman, 2007). There are many remedies where the chemical composition of the plant is essential, while in others the plant plays basically a symbolic role of a highly ritualized medical process.

Hence, patterns of medicinal plant knowledge could be determined by both biological (ecological availability and chemical composition) and cultural variables. Here, we try to assess the role of cultural factors in plant remedy use and selection, analyzing the differences between the composition and richness of regional ethnofloras. Among the cultural factors analyzed, we paid special attention to linguistic

differences, social networks, the symbolic component of folk remedies, socio-cultural identities and the political context. As different cultures often occupy different environments, an important setback to address this issue has been to tear apart the effect of environment from the effect of culture. To overcome such problem, in this research we selected four regions in an area of relatively homogeneous environmental characteristics, but where different sociolinguistic communities coexist as a result of complex historical drift.

Therefore, the main aim of this study is to analyse the distribution of the traditional medicinal plant knowledge in four different sociolinguistic regions in the Northwest of the Basque Country. The specific aims are to compare the composition and richness of medicinal ethnofloras among the four regions and explore the factors that explain the variations. The null hypothesis is that, given a homogeneous ecological area offering similar plant species with similar chemical composition, we would find a homogeneous distribution and richness of plant uses among the four regions.

2. Materials and methods

2.1. Historical, cultural and political context of the Basque Country

The Basque Country is situated in the western Pyrenees and includes territories in northeastern Spain and southwestern France with a total population of 2,900,000 inhabitants and an area of 20,531 km² (Barandiaran and Manterola 2004). About 15% of the current population of Basque territories (more than 400,000 people) primarily speaks Basque or Euskara, 27% are bilingual, and the rest speaking only Spanish or a minority French (Gobierno Vasco, 2011). Euskara native speakers dominate over Spanish and French in the provinces of Gipuzkoa, eastern Biscay, northern part of Navarre, Lower Navarre, and Zuberoa (Fig. 1). Until the first half of the last century, rural population in Basque speaking areas only spoke Basque, while nowadays most people understand, and many can also communicate in Spanish or French. Given the great isolation among valleys (Zuazo, 2008), Basque is a highly dialectalized language, although at the end of 1960s, a standard Basque called *euskara batua* was created (Euskaltzaindia, 1969). The Basque speaking area has been continuously decreasing since the Middle Ages. However, throughout last three decades Basque Autonomous Governments have implemented several measures to normalize the use of the Basque language and the decreasing trend has been mitigated in some areas.

The Basque Country shows a complex historical and political trajectory that has deeply shaped local identities (McNeill, 2000; Pérez-Agote, 2008; Montaruli et al., 2011). It has been a disputed territory among different kingdoms, especially Castille and Navarre since Middle Ages (Martínez-Gárate, 2010; Navarro, 2010). At the end of 19th century modern Basque nationalism was founded by Sabino Arana and since then a continuous separatist tension has been recurrent against the Spanish and French states. At the beginning, the nationalist discourse was constructed around racial and folklorist arguments. Basque language and the idealization of traditional Basque-peasant way of life were considered the essence of the Basque “purity” (Azcona, 1984; McNeill, 2000). During the 20th century, however, racialist theories were rejected by all the nationalist parties, although the language and the image of traditional Basque culture and peasants (*baserritarrak*) remained as central aspects of Basque cultural identity (Azcona 1984; Conversi, 1997; McNeill, 2000; Ruiz-Urrestarazu and Galdos, 2005).

2.2. Study area

As shown in Fig. 1, the study area consists of four geographically and culturally well differentiated regions within the Basque

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