



Surveys

From famine foods to delicatessen: Interpreting trends in the use of wild edible plants through cultural ecosystem services



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ABSTRACT

The Millennium Ecosystem Assessment found a general decline in the consumption and gathering of wild edible plants, but some studies also observe a localized increase. Using information from interviews ($n = 1133$) in seven sites in the Iberian Peninsula and one in the Balearic Islands, we 1) identify current trends in the consumption and gathering of wild edible plants ($n = 56$ plant-uses) and 2) analyze how cultural ecosystem services relate to such trends. Our data show a generalized decrease in the consumption and gathering of wild edible plants, although the trend changes significantly across plant-uses. Specifically, we found that –despite the overall decreasing trend– uses of wild edible plants that simultaneously relate to foods with high cultural appreciation and the recreational function of gathering remain popular. Our results signal that cultural services and values associated to the gathering and consumption of some wild edible plants are important factors explaining divergent trends across plant species. This finding reinforces the notion that cultural ecosystem services are deeply intertwined with other categories of services which can combine in complex, non-linear ways producing a variety of interdependent benefits.

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1. Introduction

Wild edible plants are defined as plant species collected in the wild to be consumed as food or drink. Wild edible plants have been an integral part of human diet throughout history and around the world (Behre, 2008; Hummer, 2013; Leonti et al., 2006; Schulp et al., 2014). Although the Millennium Ecosystem Assessment found a general decline in their consumption and gathering (MA, 2005), wild edible plants continue to be consumed in many parts of the world, not only in subsistence-oriented economies but often also in rural and even urban areas in developed countries (Bharucha and Pretty, 2010; Certomà and Tornaghi, 2015; Schulp et al., 2014). Because of their

importance to income (Angelsen et al., 2014; Łukasz et al., 2013; Shumsky et al., 2014), nutrition (Mavengahama et al., 2013; Toledo et al., 2003), and food security (Bharucha and Pretty, 2010; Nolan and Pieroni, 2014; Redzić, 2010; Vinceti et al., 2013), wild edible plants are included in all major ecosystem service classifications as a type of provisioning service (see e.g., de Groot et al., 2002; Haines-Young and Potschin, 2013; MA, 2005; TEEB, 2010).

Research suggests that, while wild edible plants were an important provisioning service in Europe until the 20th century (Kangas and Markkanen, 2001; Łukasz et al., 2013), in recent decades their gathering and consumption have decreased both in terms of quantity and diversity (Bharucha and Pretty, 2010; MA, 2005; Tardío et al., 2005). The decrease in this provisioning service is concomitant with urbanization and associated rural exodus, modernization of lifestyles, industrialization of food production, or loss of natural habitats, among others (Abbet et al., 2014; Bharucha and Pretty, 2010; Kalle and Soukand, 2013; Łukasz et al., 2013; Turner and Turner, 2008).

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URL: <http://icta.uab.cat/Etnoecologia/> (V. Reyes-García).

Decreasing consumption and gathering trends, however, seem not to be affecting all areas and all wild edible plants with the same intensity. For example, a recent research in Cantabria, north of the Iberian Peninsula, found that local people assign a high value to wild fruits, but not so much to wild vegetables, and that the consumption of some wild edibles (i.e., the fruits of *Quercus robur* and *Quercus ilex*) is culturally stigmatized (Menendez-Baceta et al., 2012). The opposite trend is reported for other wild species, like the sprouts of *Asparagus acutifolius* which are increasingly harvested to be sold (Molina et al., 2012), or other wild edible plants that have become local delicatessens and markers of cultural identity (see e.g. Aceituno-Mata, 2010; Kalle and Soukand, 2013). Some researchers have also highlighted the importance of the gathering of wild edible plants as a recreational activity (Kangas and Markkanen, 2001; Schulp et al., 2014). In other words, explanations on divergent trends in the use of wild edible plants in Europe seem to revolve around the cultural services they provide, where cultural services are defined as “non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience” (MA, 2005: 894) or as “ecosystems’ contributions to the non-material benefits (e.g., capabilities and experiences) that arise from human–ecosystem relationships” (Chan et al., 2012: 9).

The argumentative line of this paper is that cultural ecosystem services and values associated to the consumption and gathering of wild edible plants might help interpreting divergent trends in the use of these plants. Using information from seven sites in the Iberian Peninsula and one in the Balearic Islands, we first identify current trends in the consumption and gathering of wild edible plants and then analyze how different cultural ecosystem services relate to such trends. Our expectation is that the consumption and gathering of species associated to cultural services and values would be more prevalent than the consumption and gathering of species lacking such association.

2. Methods

Data were sampled in seven sites of the Iberian Peninsula and one of the Balearic Islands, a region with a long tradition in the consumption of wild edible species (Leonti et al., 2006; Tardío et al., 2006). Sampling was conducted in two phases. In the first phase, we compiled an inventory of wild edible plants consumed in each area. In the second phase, we conducted a systematic survey on past and present consumption and gathering of selected species. For the purpose of in this work, we define wild edible plants as plant species that are collected in the wild to be consumed as food or drink. Our definition includes native species growing in their natural habitat as well as naturalized species (i.e., species planted in the past, no longer managed but still harvested).

2.1. Site Selection

The site selection was based on several criteria. First, we focused on areas where local people traditionally gathered wild edible plants. Second, we aimed to cover some of the ecological and cultural diversity of Spain, although we are aware of the impossibility of being exhaustive in such criterion. Third, we selected sites where wild plants could be collected near people’s homes, e.g. from crop fields, wild areas or hedgerows (González et al., 2011; Stryamets et al., 2012). Fourth, in none of the sites legal restrictions affected the gathering of the selected species. About 50% of one of the sites, Doñana, is protected (Gómez-Baggethun et al., 2010), but survey data were collected in villages with non-protected surroundings. Last, we selected sites where members of the team had either conducted previous ethnobotanical work or had contacts that facilitated the realization of such work.

We worked in a total of eight sites; six in mountain regions and two other. The six sites in mountain regions include: *Alta Vall del Ter*, a valley on the southern flanks of the eastern Pyrenees mountain range; *Alt Empordà*, the easternmost region of the north of Catalonia, where the

Pyrenees descend through a plain to meet the Mediterranean Sea; *Gorbeialdea*, a mountainous region of southern Biscay in the Basque Country; *Sierra Morena Extremeña*, an area in the low and middle height mountain regions of southern Extremadura; *Sierra Norte de Madrid*, in the Central range that crosses the north of Madrid province, 70 km north of Madrid city; and *east-central Asturias*, an Atlantic valley on the northern slopes of the Cantabrian range. One site was conducted in a plain territory: *Doñana*, marshlands, dunes, and pine forest area in south-western Andalusia touching the Atlantic Ocean. Finally, one site was settled in *eastern Mallorca*, the largest island in the Mediterranean Balearic archipelago, east of the Iberian Peninsula. With the exception of east-central Asturias and Gorbeialdea, which belong to the Euro-Siberian region, all sites are placed in the Mediterranean biogeographical basin (Fig. 1).

2.2. Phase 1: Inventory

In each study area, we started by compiling an inventory of wild edible plants. For *Alta Vall del Ter* (Rigat et al., 2009), *Alt Empordà* (Parada et al., 2011), *Gorbeialdea* (Menendez-Baceta et al., 2012), *Sierra Norte de Madrid* (Aceituno-Mata, 2010), and *east-central Asturias* (San Miguel López, 2004) we used data from previous fieldwork. For *Sierra Morena Extremeña*, *Doñana*, and *eastern Mallorca*, we conducted fieldwork to elaborate the inventory and interviewed people locally recognized as knowledgeable about wild edible plants (Davis and Wagner, 2003). We asked them to list all the wild edible plants in the area and, for each plant listed, to provide all relevant information regarding its gathering and consumption: past and present use, mode of consumption, processing techniques, symbolic attachment, and the like.

Based on Tardío et al. (2006), information regarding edible uses of wild plants was categorized as 1) fruit (when the fresh or dry fruit is eaten, raw or cooked), 2) vegetable (when any of the vegetative parts is consumed, raw or cooked), 3) beverage (when any part of the species is used to prepare liquor or infusions), and 4) seasoning (when any part of the plant is used for food seasoning).

2.3. Phase 2: Survey

Between 2012 and 2013, we conducted a survey. As many wild edible plants have more than one edible use (for example, the fruits of *Rubus ulmifolius* are consumed raw or cooked in marmalade, but they are also used to elaborate liqueurs), we selected only the most popular use. Thus, in our survey we only asked for the most popular use of each wild edible plant (plant-use).

2.3.1. Plant-use Selection

Since we worked in eight areas with marked cultural and ecological differences, we could not use the same survey in all the areas, but rather performed site-specific selections. To ensure comparability, we used the same criteria to select plant-uses in each site. To narrow the selection, we first identified species with a prominent edible use (versus other uses, such as medicinal or ornamental) and not locally gathered for large-scale commercialization, but rather mostly for self-consumption or exchange. In each site-specific survey, we included the four categories of use (fruit, vegetable, beverage, and seasoning). To keep the length of the survey at around 40 min/informant, we limited the survey to seven plant-uses, so –in total– we asked about 56 plant-uses (7 plant-uses * 8 areas = 56; considering the same plant-use in different areas as different observations). The final list of plant-uses is given in Table 1, where we also report the scientific name of the species with taxa authorities, growth form, and voucher number.

2.3.2. Sample Selection

We collected survey data from 1133 informants (between 100 and 180 per site) mostly recruited in villages or small towns. After approaching a person, we first explained our goals and requested consent

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