Wild Collection and Cultivation of Native Species in Iceland

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A full description of the following survey was published in Human Ecology in 2012 with the title *A Survey of Wild Collection and Cultivation of Indigenous Species in Iceland*.

Abstract

This paper outlines a survey of Icelanders who use native species of plants, lichen, fungi, and marine algae. It was found that some of the species (e.g. Angelica *spp. and* Betula *spp.) were very important. However, potential exists for a more diverse harvest and for sustainable management (e.g. Organic certification). It was also found that potential exists for the spreading of knowledge and the inherent associated conservation culture of native species use. The data also suggests that cultural conservation should focus on food, which appears to be paramount for increasing the cultural importance of a species.*

Introduction

Icelanders live in a fragile ecosystem still disturbed from the settlement period (*landnám*), which took place over 1,000 years ago. Icelanders have historically had a challenging relationship with their surrounding natural resources well documented in the sagas *Íslendingabókar* and *Landnámabók* (Benediktsson 1968). Forest resources were an essential part of life at *landnám*, for food and firewood to provide light, warmth, and the ability to cook and work metal. During *landnám* Vikings cut many of the forests and subsequent regeneration was largely impossible due to the rooting and grazing of livestock. This process of land-use change from forests to grazing lands has continued since *landnám* and, in many cases, has lead to serious soil degradation contributing to the spreading of basalt deserts (Arnalds *et al*. 2000). However, some conservation minded Icelanders are seeking new strategies for a healthy relationship with nature through sustainable use of native species.

Material & Methods

This work is based on surveys with this select group of Icelandic people (e.g. chefs, Organic farmers, gardeners, and herbalists) who use native species of plants, lichen, fungi and marine algae. Information was obtained through 67 in-depth interviews, participant observation (Prance et al. 1987; Kremen et al. 1998; Reyes-Garcia et al. 2006), walk-in-the-woods (Phillips and Gentry 1993a; 1993b), freelisting (Quinlan 2005), and a semi-structured questionnaire, in the summer of 2010. Key informants were sought through botanical and horticultural organizations[4]; other networks were also sought around the country[5]. The survey sought to determine the extent, composition and function of uses of plants, as well as fungi and marine algae, in the region.

The Study Area

Iceland is a mountainous, volcanic country of 103,300 square kilometers in the North Atlantic just south of the Arctic Circle. It has a sub-polar oceanic climate near the coast and tundra inland in the highlands, with a mild coastal climate. The island is of volcanic origin and makes up part of the North Atlantic basalt area, with nutrient poor, thin and easily eroded soils; three quarters of Iceland is covered by black basalt desert. This small island nation is located in the Arctic province of the Circumboreal Region within tundra in the north and boreal region in the south; it is mostly treeless with grass, sedge and moss dominating habitable areas. There are approximately 500 native species of terrestrial plants in Iceland including 69 invasives, 1500 species of fungi and 500 species of marine algae.

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Results

The survey found 109 species from 79 genera, with 91 species of terrestrial plants, (including 11 species of trees, shrubs, herbs, and forbs), 10 species of fungi, 7 species of marine algae, and 1 species of lichen. All respondents collected some wild species, and nearly half grew native species in homegardens or commercially. Some of the respondents had Organic certification, horticultural society endorsement, or were part of a collective of growers.

Quantitative Indices

The Cultural Importance index (CI) (Tardio and Pardo-de-Santayana 2008) was used to account for the number of respondents and the diversity of uses per species (Table 1). CI index[6] indicates the sum of the proportion of informants that have an active use for the species. According to this measure the 21 most culturally significant species in the entire study area include ten species of terrestrial plants (including two tree species), one species of algae (*Ascophyllum nodosum* (L.) Le Jol.), one species of fungi (*Leccinum scabrum* Bull. ex Fr.), and one species of lichen (*Cetraria islandica* (L.) Ach.).

The species *Empetrum nigrum* L., known locally as *kraekiber*, was the most frequently cited species and was used almost exclusively for food (CI *E. nigrum*=0.667). The species *B. pubescens*, known locally as *birka*, was the most versatile species (CI *B. pubescens*=0.803). The young leaves are commonly collected in spring for tea; trees are often used for privacy and shade and on farms for shelterbelts and wind protection. The species mentioned by the most informants for the greatest number of uses was *Angelica archangelica* L., known locally as *ætihvönn* (CI *A. archangelica*=1.0). The seeds of *Angelica* spp. (including *A. archangelica* and *A. sylvestris*) are commonly used as a tea, as a spice, and as a medicine for bladder control; young leaves are often used in soups and salads. Some of these species were also certified by the local Organic certifier Vottunarstofan Tún and available for sale through local producers such as the Egilsstaðir Organic Farm.

Discussion & Conclusions

The respondents identified for this survey are unique in Iceland in their use of living natural resources in a landscape with greatly diminished biodiversity. Some of these useful species are of outstanding recognition such as *Angelica* spp., *Betula* spp., which could serve as cultural keystone species to aid in conservation efforts. Increasing the use of these native plants, fungi and marine algae could also help to raise awareness of Icelandic ecology and support conservation efforts.

This survey found that edibility and nutrition are paramount for cultural significance in Iceland. It also found a conservation mentality in the culture of native plant collection and use, which was apparent throughout the interviews. Respondents who use more native species also demonstrated an appreciation for, and conservation attitude toward, Icelandic biodiversity, this manifests as action *in situ* and politically. They take action in the field to remove problematic and invasive species and to promote useful species. They are aware of the impact of the collection and adjust their use according to the habitat where they are collecting (i.e. fewer species are taken from slow growing nutrient poor hillsides while harvesting is heavier near the more abundant stream and river areas). Furthermore, the use of native species gives rise to movements in Iceland such as Organic, Slow Food, and the New Nordic Kitchen, leading to conservation efforts by chefs, farmers and food enthusiasts around the region to both conserve and utilize native species for traditional and innovative uses. These may create new opportunities for the inclusion of lessons about native plant use and conservation in Icelandic school curricula. These social efforts contrast heavily with the dominant conservation activities in Iceland, which tend to be large scale and *ex situ* based (e.g. gene banks of the Iceland Forest Service and Nordic Council of Ministers).

[6] the maximum CI index score is equal to the 11 categories of use (Whitney et. al. 2012)

Table 1: Highest Ranking Species by the Cultural Importance Index (CI)

Botanical Name	CI index
Angelica archangelica L.	1
Betula pubescens Ehrh.	0.8
Empetrum nigrum L.	0.67
Thymus praecox Opiz subsp. *arcticus* (Durand) Jalas	0.62
Vaccinium uliginosum L.	0.56
Cetraria islandica (L.) Ach.	0.52
Vaccinium myrtillus L.	0.44
Achillea millefolium L.	0.41
Taraxacum officinale F.H. Wigg	0.35
Rumex acetosa L.	0.33
Angelica sylvestris L.	0.32
Betula nana L.	0.32
Rumex longifolius DC.	0.27
Filipendula ulmaria (L.) Maxim	0.21
Leccinum scabrum Bull. ex Fr.	0.2
Trifolium repens L.	0.2
Fragaria vesca L.	0.17
Ascophyllum nodosum (L.) Le Jol.	0.15
Juniperus communis L.	0.15
Oxycoccus microcarpus Turcz. ex Rupr.	0.15
Silene acaulis L. Jacq.	0.15

More research is necessary to determine the socio-economic and influences on CI index scores as well as the exact biodiversity implications of native species uses. Through analysis of the ecological distribution of utilized species as well as time and volume of harvest, quantitative methods could provide a clearer picture of the role that Icelandic people play in the conservation of native species and the role that local food and conservation movements can play in promoting this.

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