

Ethnobotanical convergence or knowledge transmission: a phylogenetic perspective

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Understanding when and why distant societies converge in the use of plants is necessary to uncover undervalued species of high medicinal or nutritive potential. Food and medicinal plants exist in a continuum ranging from those consumed in large quantities to meet nutritional needs, to those used in smaller doses for therapeutic and preventive purposes^[4]. We aim to understand the phylogenetic diversity behind this continuum among three regions that have had some cultural, political and commercial relations through history.

Methods

- 📍 **Study area:** Three Eurasian geographically and environmentally distinct regions (Fig 1).
- 📍 **Data sources:** Ethnobotanical information from previous publications^[2,3,4,5,6,7], classified in the **use categories:** food, food additives and medicines. Floristic information (native and introduced) from POWO (2023).
- 📍 **Descriptive analyses:** χ^2 of the introduced and native species and Venn diagrams of the shared native species among regions.
- 📍 **Phylogenetic analyses:** Identification of shared hotnodes with R package V.PhyloMaker (2019).

Results

- 📍 **Flora:** 16,281 different species in all three regions (8.3% introduced).
- 📍 **Used:** 3,206 species in at least one of the use categories (10.2% introduced).
- 📍 **Introduced species:** are used significantly more in eight of the cases, specially in food uses (Table 1).

- 📍 **Shared species:** Depending on the use category, regions use and share more or less species (Fig 2). In proportion more food species are shared.
- 📍 **Hotnodes:** A continuum can be observed through the use of Lamiales as medicines and food additives. A group within apiaceae family is the only hotnode used as food and food additive.

Table 1. Nº of species per region. χ^2 analysis of introduced species with regard to the total number of species. Introduced species are used more than expected when in bold.

Use cat.	R.	Nº spp native	Nº spp intr	χ^2	p-value
Uses	C	1109	86	9.323	0.002
	I	1439	200	1.832	0.176
	W	951	116	25.899	3.6e⁻⁰⁷
Food	C	116	61	17.805	2.5e⁻⁰⁵
	I	447	95	22.497	2.1e⁻⁰⁶
	W	388	72	52.126	5.2e⁻¹³
Food additives	C	162	17	5.403	0.020
	I	327	68	14.305	0.001
	W	60	10	4.285	0.038
Medicines	C	834	72	13.329	0.001
	I	1317	181	1.233	0.267
	W	821	90	11.160	0.001

- Values → nº of species
- Color → matches regions in Fig 1.
- Overlap → shared species



Fig 2. Venn diagrams of shared flora and used species (native).

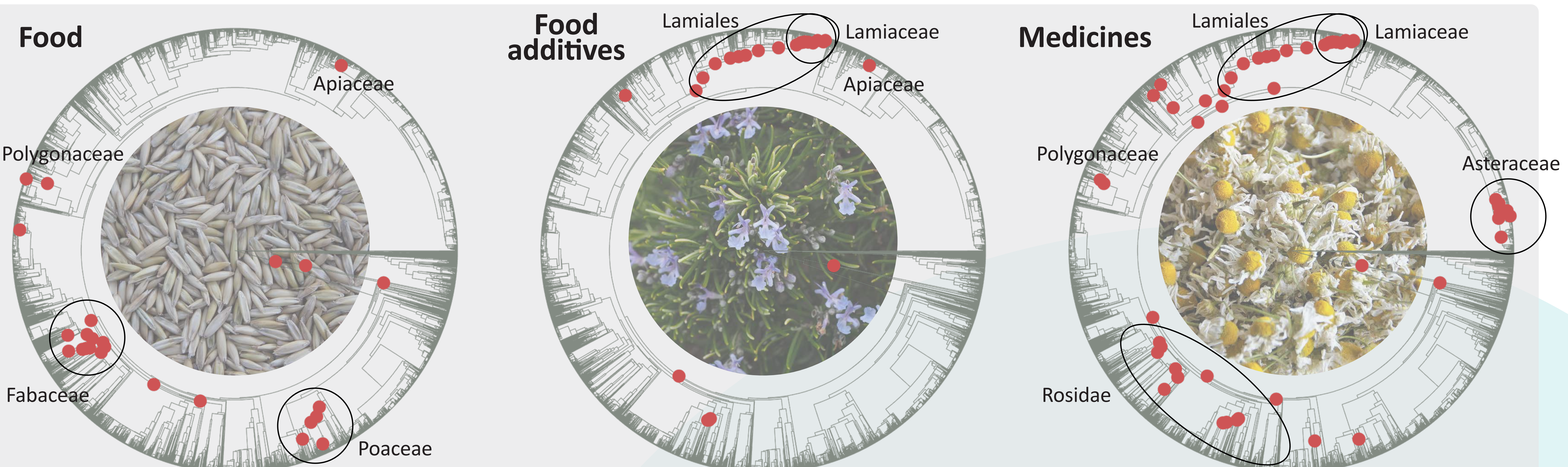


Fig 3. Shared hotnodes of native plants among the three regions for each of the use categories (signif > 0.95)

Discussion & conclusion

Introduced species have often been purposely added to ethnofloras from regions where they were already used as a result of cross-cultural knowledge and material exchange. Food uses are more shared across regions than other uses given the central role of food for survival^[7].

Poaceae and Fabaceae are families rich in carbohydrates and proteins, essential for diet and food security. Other phyla like Asteraceae are specifically selected as medicines. The continuum from food to medicines is apparent at global scale through key phylogenetic clades with double use (e.g., inner nodes of Lamiaceae as medicines and food additives, of Polygonaceae as food and medicine, and of Apiaceae as food and food additives).

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Fig 1. Map of studied regions

