



# *Defining 'ethnobotanical convergence'*

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## 1 **Defining ‘ethnobotanical convergence’**

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10 In a recent forum article published in this journal, Garnatje et al [1] propose a new term,  
11 ‘ethnobotanical convergence’, to describe “similar uses for plants included in the same node of a  
12 phylogeny”. Drawing a parallel between cultural and organismal evolution, Garnatje et al [1] suggest  
13 “some plants have similar morphological characteristics because they have close phylogenetic  
14 placement, a phenomenon termed ‘evolutionary convergence’”. Evolutionary biologists do not  
15 interpret the morphological characteristics shared by related species as convergence, but as  
16 homology. Applying phylogenetic methods to test hypotheses of homology, convergent traits are  
17 those with independent origins in unrelated species [2]. The definition of ‘ethnobotanical  
18 convergence’ Garnatje et al [1] propose is fraught with problems because it overlooks the accepted  
19 meaning of the term convergence, and also the challenges of identifying independent origin of  
20 traditional knowledge. We argue that the term ‘ethnobotanical convergence’ should be limited to  
21 cases where there is clear evidence to support a hypothesis of independent discovery.

22

23 Whether plant use is the result of independent discovery may be important when designing  
24 bioprospecting strategies. Several authors have suggested that independent discovery of plant  
25 properties by people of different cultures is strongly suggestive of plants’ bioactivity [3-5]. Plant use  
26 that is found in more than one culture could be the result of independent discovery, shared ancestry  
27 or cross-cultural transmission of knowledge (see for example, [6,7]). Evolutionary anthropologists  
28 have adopted phylogenetic methods to discriminate between these alternative explanations for  
29 cultural similarity [8]. Using a phylogenetic framework derived from linguistic data, traits are  
30 mapped onto the phylogeny. A rigorous definition of ‘ethnobotanical convergence’ would depend  
31 on these approaches to identify multiple independent origins of plant use.

32

33 Here we outline two scenarios that could result in the shared use of closely related plants, using the  
34 terms horizontal (transmission of knowledge between cultures) and vertical (from one generation to  
35 the next, and from ancestral to descendent cultures) to describe modes of transmission of  
36 knowledge. In our first scenario, closely related peoples use closely related plants. This is not in itself  
37 indicative of independent discovery, since the knowledge could be “ancestral”, the result of vertical

38 transmission of knowledge. Shared use by closely related people is not especially informative in a  
39 bioprospecting context. In our second scenario, distantly related peoples use closely related plants.  
40 In this case shared use could be interpreted as independent discovery of the plant's use. However, it  
41 would be important to consider the spatial distribution of the people, since horizontal transmission  
42 is possible between cultures newly in proximity, perhaps following migration or trade (see [9] for an  
43 example of cross-cultural adoption of plant use following migration). So far, for bioprospecting,  
44 independent discovery of the uses of plants has been inferred or implied, without recourse to  
45 linguistic phylogeny. For example, Saslis-Lagoudakis et al [10] compared medicinal floras of  
46 linguistically unrelated and geographically separated peoples so that shared use could be attributed  
47 to independent discovery. In contrast, Garnatje et al [1] cite the use of congeneric oregano species  
48 as ethnobotanical convergence. The cultures cited by Garnatje et al [1] as using oregano species  
49 have had significant historical opportunity for knowledge transmission, making it difficult to  
50 attribute similar use to independent discovery. In such cases, linguistic relationships between the  
51 compared societies to account for cultural relatedness (Galton's problem), evidence from written  
52 records, and comparison of cognate or loaned plant names may discriminate between shared  
53 ancestral knowledge, knowledge transmission and true ethnobotanical convergence.

54

55 That closely related plants are chemically similar drives the rational use of phylogenies of plants in  
56 bioprospecting [10]. Plants included in the same clade of a phylogeny might be expected to have  
57 similar therapeutic applications across cultures because they have similar bioactivity. Lineages rich in  
58 species used medicinally, termed "hot nodes" [11], encompass the "similar uses for plants included  
59 in the same node of a phylogeny" referred to by Garnatje et al [1]. Phylogenetically-informed  
60 bioprospecting of medicinal plants depends on interdisciplinary approaches that combine plant  
61 phylogenies, cultural phylogenies and ethnobotanical data. Introducing confused terminology at the  
62 outset will hinder the interdisciplinary conversations required.

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