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Journal of Ethnopharmacology

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Maya phytomedicine in Guatemala – Can cooperative research change ethnopharmacological paradigms?



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ARTICLE INFO

Article history:

Received 20 October 2015

Received in revised form

14 March 2016

Accepted 15 March 2016

Available online 21 March 2016

Keywords:

Guatemala

Traditional medicine

Culture change

Comparative research

Participative research

Transdisciplinary research

ABSTRACT

Ethnopharmacological relevance: This paper presents one of the first large-scale collaborative research projects in ethnopharmacology, to bring together indigenous stakeholders and scientists both in project design and execution. This approach has often been recommended but rarely put into practice. The study was carried out in two key indigenous areas of Guatemala, for which very little ethnopharmacological fieldwork has been published.

Aim of the study: To document and characterize the ethno-pharmacopoeias of the Kaqchikel (highlands) and Q'eqchi' (lowlands) Maya in a transdisciplinary collaboration with the two groups Councils of Elders. **Materials and methods:** The project is embedded in a larger collaboration with five Councils of Elders representing important indigenous groups in Guatemala, two of which participated in this study. These suggested healing experts reputed for their phytotherapeutic knowledge and skills. Ethnobotanical fieldwork was carried out over 20 months, accompanied by a joint steering process and validation workshops. The field data were complemented by literature research and were aggregated using a modified version of the International Classification of Diseases (ICD-10) and Trotter & Logan's consensus index.

Results: Similar numbers of species were collected in the two areas, with a combined total of 530 species. This total does not represent all of the species used for medicinal purposes. Remedies for the digestive system, the central nervous system & behavioral syndromes, and general tissue problems & infections were most frequent in both areas. Furthermore, remedies for the blood, immune & endocrine system are frequent in the Kaqchikel area, and remedies for the reproductive system are frequent in the Q'eqchi' area. Consensus factors are however low. The Kaqchikel, in contrast to the Q'eqchi', report more remedies for non-communicable illnesses. They also rely heavily on introduced species.

Discussion and conclusions: The transdisciplinary research design facilitated scientifically rigorous and societally relevant large-scale fieldwork, which is clearly beneficial to indigenous collaborators. It provided access and built trust as prerequisites for assembling the largest comparative ethnopharmacological collection, vastly extending knowledge on Maya phytotherapy. The collection represents knowledge of the two groups' most reputed herbalists and is a representative selection of the Guatemalan medicinal flora.

ICD-10 proved useful for making broad comparisons between the groups, but more refined approaches would be necessary for other research objectives. Knowledge in the two areas is highly diverse and seems fragmented. New approaches are required to assess how coherent Maya phytotherapy is. The documented 'traditional' ethno-pharmacopoeias demonstrate dynamic change and acculturation, reflecting the two linguistic groups' sociocultural history and context. This highlights the adaptive potential of phytotherapeutic knowledge and calls the equation of local indigenous pharmacopoeias with 'traditional' medicine into question. We suggest using the term 'local' pharmacopoeias, and reserving the term 'traditional' for the study of indigenous pharmacopoeias with a clear delineation of ancient knowledge.

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1. Introduction

Ever since the Spanish conquest of Central America, local phytotherapy has captured the attention of western and, more rarely, native scholars. Individual investigations and systematic efforts of various Mexican institutions in all parts of México resulted in rich anthropological descriptions and inventories of medicinal flora containing several thousand species (Bye et al., 1995). Traditional medicine in the post-classic Mayan states in Guatemala received less attention, partly, because investigations were hampered by weak national institutions and a civil war. International efforts have focused upon pharmacological tests of selected species (Gridling et al., 2009; Madlener et al., 2009), local pharmacopoeias (Kufer et al., 2005; Pöll et al., 1995), or treatments of particular diseases or systems (Cáceres et al., 1995; Michel et al., 2007). A host of grey or unpublished literature of diverse quality also exists. However, only two systematic editions of Guatemalan pharmacopoeia have been compiled (Cáceres, 2009; Roque, 1941), listing about 100 and 40 medicinal plants, respectively. Of these, many are naturalized, cultivated or commercially available species likely to be derived from Mestizo concepts and knowledge. In contrast, systematic knowledge on medicinal flora and Mayan phytotherapy in Guatemala remains largely inaccessible.

'Transdisciplinarity' (TD) has been suggested as one avenue for strengthening ethnopharmacology. Very often TD has been defined as methodology that integrates the perspectives, objectives and tools of diverse disciplines (Etkin and Elisabetsky, 2005). It is thus conceptualized as a research collaboration in which knowledge production and decision making power remain *unilaterally within academia*. Based on the perspectives of collaborative research (Arnstein, 1969; Krütli et al., 2010; Stauffacher et al., 2008) this has to be considered *information* and *consultation* based approaches. In contrast, *collaboration* and *empowerment* aim at facilitating mutual learning and knowledge co-production by integrating non-academic stakeholders into the research process (Pohl et al. 2010). Such participatory collaborations involving local and indigenous institutions in all phases of research have been promoted to respect the Nagoya Protocol on Access and Benefit Sharing (Convention on Biological Diversity, 2015), to improve comprehension of cultural constructions and social transactions (Etkin and Elisabetsky, 2005) and to contribute to the survival of indigenous cultures (Martin et al., 2010). The International Co-operative Biodiversity Project project in Mexico was one pioneering example (Berlin and Berlin, 2004). At smaller scale, similar concepts were implemented in Belize (Balick and Arvigo, 2015; Pesek et al., 2010). While previous efforts certainly worked

towards such goals, there has, however, been no attempt to integrate cooperative approaches systematically from study design to completion, and most remain conducted in a conventional fashion.

The TD approach taken in this study aimed to strengthen collaboration by:

- 1) Studying problems that are formulated and structured jointly or in close contact with (in this case indigenous) practitioners and those concerned.
- 2) Teams formed with disciplinary experts, but also with practitioners and other stakeholders.
- 3) Conducting research as a collaborative effort, involving close contact between researchers and practitioners.
- 4) Disseminating results among the wider public (Häberli and Grossenbacher-Mansuy, 1998 in Pohl and Hirsch Hadorn (2007)).

We focused at the following research question: What characterizes the regional ethno-pharmacopoeias of two linguistic Maya groups in Guatemala? The results are discussed with emphasis on three aspects:

- 1) The TD design in the light of the representativeness, completeness and comprehensiveness of the gathered information,
- 2) The use of the International Classification of Diseases (ICD-10) in intercultural comparative research, and
- 3) The two region's ethno-pharmacopoeias in the light of their divergent societal contexts and sociocultural histories.

2. Background

2.1. The study area and its sociocultural history

Guatemala is a medium-sized country in the outer tropics (109,000 km²) with a population of some 15 million people, located on the Central American isthmus (CIA, 2015; Fig. 1a). It comprises two major geological zones. As part of the Pacific ring of fire, its western and southwestern stretches along the Pacific coast are formed by volcanic highlands ("Altiplano") at altitudes between 1500 and 3000 m, with the highest peaks reaching beyond 4000 m. The eastern and north-eastern stretches are wide, plain to hilly limestone lowlands ("Petén"), mostly between 200 and 700 m. The transitional zone towards the highlands in the west ("Verapaces") is also built on limestone. The region has one of the

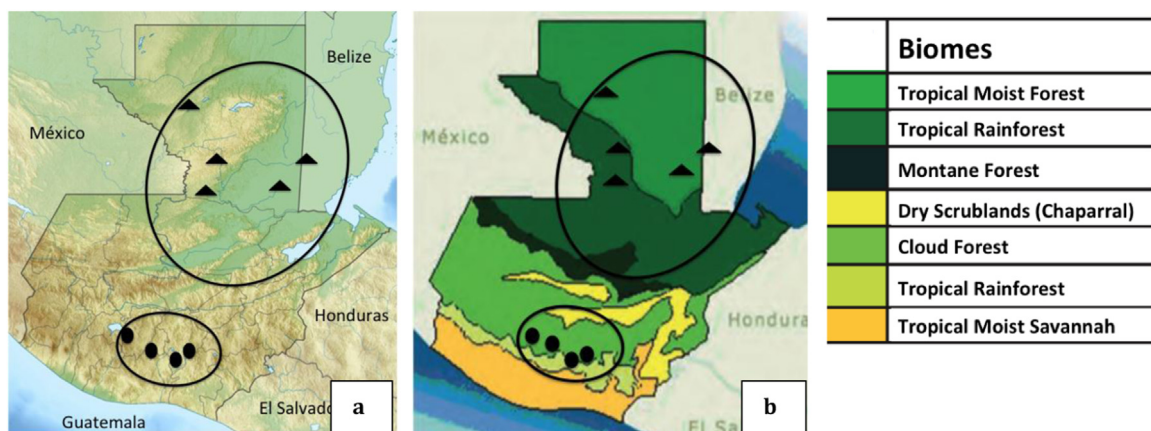


Fig. 1. a: Physio-geographic map of Guatemala. Highlands in the west and southwest alongside the Pacific, lowlands in the north and north-east towards the Caribbean. 1b: Bio-geographic zonation of major biomes according to (Castañeda, 2008; CONAP, 1999; Villar-Anleu, 1998). Locations of healer's villages approximated with dots (Kaqchikel) and triangles (Q'eqchi'). Linguistic areas approximated with circles.

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