Quantitative Ethnobotany or Quantification in Ethnobotany?

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Editorial

It has become increasingly common among ethnobotanists to apply rigorous scientific methodologies in examining ethnobotanical questions. The fact that ethnobotany is a relatively new discipline, dating from near the end of the 19th century has been cited as a justification for its slow progress in accumulating systematic knowledge and generating theories and hypotheses, but ethnobotany has been advancing towards becoming a more experimental science for at least fifteen years, particularly in response to self-criticisms and reflections on what directions the field should be taking (Phillips & Gentry 1993a,b, Reyes-García *et al*. 2007).

Ethnobotany draws from many different disciplines and perspectives, which adds to its complexity but does not impose any special limits to its development as an experimental science - and the fact that ethnobotany can be seen as a field where various spheres of knowledge overlap should not in itself raise any doubts about its epistemological autonomy. A given discipline attains epistemological autonomy when it develops its own questions and techniques, even if it borrows explanatory models from other scientific traditions. Ecology was the target of similar criticisms for a certain time based on the view that it was an immature or "weak" science, especially due to the fact that it had yet to present questions oriented by hypotheses (Peters 1991).

If we accept Peters' (1991) criticism for our discipline, ethnobotany does not appear to have advanced in its conceptual form as quickly as the volume of its publications, especially when considering just those works that were directed by testable hypotheses. Whether defending the idea of ethnobotany being a new discipline in a phase of transformation, or fending off criticism about being a "weak science" (and therefore incapable of moving beyond the accumulation of diverse and unconnected information), this current moment of self-examination will surely present an opportunity to benefit and improve our scientific practices. One of the first explicit responses to the "weak science" criticism (due to the largely descriptive nature of much of the published research) can be found in Phillips and Gentry (1993a,b). The term quantitative ethnobotany is defined in these works "as the application of quantitative techniques to direct analysis of contemporary plant use data". The term quantitative ethnobotany appears for the first time in Balée (1987) in an article published in a Brazilian journal, and was mentioned in that same year in an interesting paper by Prance and collaborators (1987) that had William Balée as one of the coauthors. Since then, the term "quantitative ethnobotany" has been increasing used by other workers in the field. According to the "Web of Science" data base, this phrase has appeared in approximately 87 publications, and with the references cited in the paper by Phillips & Gentry comes to a total of 142 citations.

Quantitative ethnobotany (in the sense of Phillips & Gentry 1993a,b) arose as a response to the perceived "subjectivity" of descriptive approaches, and includes studies ranging from those that associate ethnobotanical in-

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formation with floristic and phytosociological inventories (see Balée 1987, DeWalt *et al*. 1999, Prance *et al*. 1987) that sometimes followed the same direction as Phillips and Gentry (1993a) (see Cunha & Albuquerque 2006), to works designed to quantify local botanical knowledge using popular indices of relative or cultural importance (Monteiro *et al*., 2006, Reyes-García *et al*. 2007).

While quantitative ethnobotany grew as a response to academic criticism, I believe a parallel error was concomitantly installed at this time: the idea that "quantitative ethnobotany" somehow meant that we were now producing a more rigorous and "scientific" brand of ethnobotanical knowledge. In evaluating the work of Phillips and Gentry (1993a,b), I sense that the intention of these authors was to use quantitative ethnobotany as a way to stimulate studies directed towards testing hypotheses. Phillips and Gentry (1993a) commented on the criticism of ethnobotany as "lack(ing) methodological rigor in much ethnobotany research (...) and a frequent unwillingness to define falsifiable hypotheses" (Gentry 1993a:15). These authors' use of the term falsifiable hypotheses clearly indicates its relationship with the hypothetical-deductive method (see Popper 2002). An alternative approach now widely infused within quantitative ethnobotany is the application of quantitative methodologies. DeWalt *et al*. (1999), for example, argued that "quantitative ethnobotanical studies are one method to document and compare the knowledge of plants held by native and non native groups (...) provide information on the number of species, number of individuals, and guilds of plants used by those groups" (Dewalt *et al*. 1999:237). Associated with this idea is the belief that numbers lend more rigor to scientific work, although this obviously is not always true. I have heard young researchers ask with astonishing frequency: "which indices or quantitative methods should I use to analyze the data in my dissertation/thesis to make it more scientific?"

The concept of quantification in science is not new, but it only began to gain momentum at the end of the 19th century in the natural sciences - most notably to minimize the "viewer's perspective" when observing natural phenomenon. Porter (1995), for example, has a number of controversial views in relation to the use of quantification in some areas of science, arguing that the use of statistical methodologies has become practically obligatory in fields such as medical research, and goes on to say that quantification and objectivity can imply superficiality and weakness (most notably in the spheres of government and business by the replacement of personal judgment). Although this view can be debated and relativized, quantification has strong and unquestionable virtues. Numbers are neutral, and any significance that they possess must be demonstrated through the questions we have asked. A quantitatively well-laid out study will never substitute for well-formulated questions and precise research objectives. We have observed, for example, a growing tendency to use multivariate methods in many fields, especially ecology and ethnobotany - although in many cases these techniques are used equivocally, generating interpretations that are not well supported by the data.

The ideas of Phillips and Gentry (1993a,b) concerning quantitative ethnobotany were directed towards associating ethnobotany with hypothetical-deductive methods (HDM). Ayala (1994), for example, argued that the experimental approach to formulating and testing hypotheses distinguishes western science from other forms of knowledge, and many view the hypothetical-deductive method as the highest form of science (Popper 2002). Quite often, however, we assume that through "true science" or "paradigm-based" science (according to the view of Kuhn 1996), the research community clearly understands the internal mechanisms of producing scientific knowledge - but if that were true we would not see these fierce and polarized debates about the value of qualitative and quantitative approaches. Scientists in the former camp are often required to defend their techniques as legitimate, while the defenders of the quantitative approach often take on the role of the sole heirs to the "true scientific tradition" (perhaps in Popper's sense of the expression). This view may have given rise to the idea that all that was needed to participate in "superior science" was to quantify your data. In truth, the concept of quantification in ethnobotany came about in an attempt to break away from older practices and ideas (the same happened to the ecology) - but this "rupture" was not absolute (nor could it be), because distinct practices, dilemmas and controversies still coexist (see Nudler 2002). I have used the term quantitative ethnobotany in diverse manners on different occasions, and defend here a more parsimonious vision, proposing, for example to use the term "quantitative ethnobotany" in the same way as many ecologists use the term "quantitative ecology" (or "numerical ecology"), as the use of multivariate methods to address ethnobotanical questions.

It is not my intention to criticize past or present studies that have been considered as quantitative ethnobotanical approaches. I have attempted here to reflect on the progress of the concept of "quantitative ethnobotany" that first appeared in the 1990s. This new field stimulated a wide range of studies and research projects and produced many methodological advances. I argue then that we must abandon the "label" of "quantitative ethnobotany" (as a synonym for quantification) in favor of an ethnobotanical science directed towards a systematic comprehension of the relationships between humans and plants (whether by qualitative or quantitative methods, or a combination of both) - but neither am I defending the idea that by abandoning labels we will suddenly free ourselves of problems, or that we will be able to resolve the philosophical conflicts arising between qualitative and quantitative approaches. For Nudler (2002), controversies can be important from an epistemological point of view, even if they do not result in final agreements. But, in truth, I defend the idea presented by Phillips and Gentry (1993a) in their seminal

article - the concept of ethnobotany being oriented by testing hypotheses.

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