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Higher-order categories in Kakataibo (Pano) ethnobiological classification: complexity and simplicity in the taxonomic system of an Amazonian ethnic group¹

ABSTRACT: This paper offers the first characterization of the ethnobiological taxonomic system used by the Kakataibo people (Pano, Peru) to classify and organize their knowledge about nature. The study follows the six ranks proposed for folk taxonomies (see Berlin et al. 1973; Berlin 1992), but the data suggest that the Kakataibo taxonomic system exhibits an extra taxonomic level in association with culturally and perceptually more salient categories, producing highly complex classifications (non-salient categories exhibit much simpler internal organizations). This paper also demonstrates the existence of overlapping plant classifications, which seem to be relevant for the understanding of the whole Kakataibo taxonomic system.

KEYWORDS: Kakataibo; Pano; Ethnobiology; Taxonomy; Nomenclature.

RESUMEN: Este artículo ofrece la primera caracterización del sistema taxonómico utilizado por el pueblo Kakataibo (Pano, Perú) para clasificar y organizar sus conocimientos sobre la naturaleza. El estudio sigue los seis rangos propuestos para las taxonomías populares (Berlin et al. 1973; Berlin 1992), pero los datos analizados sugieren que el sistema taxonómico del Kakataibo exhibe un nivel taxonómico adicional en las categorías más prominentes cultural y perceptivamente. Esto produce clasificaciones altamente complejas, aunque las categorías no prominentes exhiben estructuras internas bastante más simples. Este estudio también demuestra la existencia de clasificaciones superpuestas (principalmente en relación a plantas), que parecen ser relevantes para la comprensión de todo el sistema taxonómico de la lengua.

PALABRAS CLAVE: Kakataibo; Etnobiología; Taxonomía; Nomenclatura.

1. Introduction

The present paper is one of the results of a documentation project on the ethnobiological knowledge of the Kakataibo people² and presents some insights into the

¹ I would like to thank the Kakataibo speakers who helped with the elaboration of the lexical database used in this paper (Emilio Estrella, Ricardo Odicio, Salomón Estrella, Magaly Estrella, Karen Estrella, Irma Odicio, Ricardo Pereira and Alfredo Estrella) and David Fleck and William Aranda, members of the research team that worked with me in the systematization of the data. I also thank Gabriel Martínez for proof-reading a previous version of this paper, and the anonymous reviewers and the editors of Liames for their relevant and useful comments to a previous version of this paper.

² Project 70242.2024: “Etno-biología de los cashibo-cakataibo: una aproximación al saber sobre la naturaleza de un pueblo amazónico peruano”, funded by the Pontificia Universidad Católica del Perú, through its Dirección de Gestión de la Investigación.

ethnobiological taxonomic system known and used by these indigenous people from Peru to refer to and talk about the animals and the plants that are part of their environment.

The discussions in this paper belong to the field of ethnobiology, which can be defined as “the study of the biological knowledge of particular ethnic groups about plants and animals and their relationships” (Anderson 2011: 1). As a scientific field, ethnobiology is interdisciplinary by definition, covering “a broad range of approaches, from strictly cultural and linguistic studies to strictly biological ones”. This paper is most directly related to the field of linguistic ethnobiology, which primarily deals with the naming of animals and plants by different ethnic groups. The scientific relevance of ethnobiological systems for naming animals and plants used by traditional societies was first noted by Lévi-Strauss (1966: 153-154), who highlights the large number of lexemes that peoples from these societies are able to remember. Linguistic ethnobiology studies how plant and animal names reveal a taxonomy in which different species are organized and classified in ethnobiological categories or taxa (see, for instance, Berlin’s 1992 seminal book; or Hunn and Brown 2011: 332-333). The present paper centers its discussion on some of the characteristics of the taxonomic system revealed by Kakataibo names of plants and animals, paying special attention to the internal organization of its higher-order taxa. This discussion is based upon the taxonomic ranks proposed in Berlin et al. (1973) and, more recently, Berlin (1992: 13-20), which are briefly summarized in §3. Previously, in §2, I offer some basic information about the Kakataibo language and their speakers and in §4 I describe the methodology used in this study. In §5, I present the most salient characteristics of the Kakataibo ethnobiological taxonomic system and, particularly, its higher-order categories: I first discuss the psychological reality of unique beginners, based on the results of the empirical sessions conducted in the field (§5.1); then, I present a discussion of life-forms in Kakataibo (§5.2); and I offer some comments on ethnozoological intermediates (§5.3), as well as a brief note on generic and subgeneric taxa (§5.4). Some areas of the taxonomic system to be described in this paper reveal a highly complex taxonomic hierarchy, which might contradict the generalization that ‘folk taxonomies are very shallow’ (Berlin 1992: 34; see also Hunn and Brown 2011). In fact, the data reveal two clearly different categorization patterns that are crucial for the understanding of the whole Kakataibo taxonomic system. These patterns suggest the existence of a strong relationship between the cultural and perceptual properties of species and the internal structure of the taxonomic categories they belong to. This issue is also commented on in §6, where I offer some conclusions.

2. The Kakataibo people and their language

The Kakataibo³ people (also known as “Cashibo”, “Cacataibo” and “Uni”, among other denominations) speak a Panoan language (see Fleck 2013), and live in the Peruvian

³ The etymology of the name *cashibo* is straightforward: *kashi* ‘bat’ + *-bu* ‘collective’. The Kakataibo people say that *cacatai* means ‘the best men’ and this meaning is also given by Shell (1987: 28) in her vocabulary (see Zariquiey 2013 for a detailed discussion of this etymology).

Regions of Huánuco and Ucayali, along the Aguaytía, Shamboyacu, San Alejandro, Sungaroyacu (and, more recently, Pisqui) rivers (see Figure 1, where the most important Kakataibo communities are presented). According to the most recent Census of Indigenous Communities of the Peruvian Amazon (INEI: 2007), the Kakataibo people number about 1879. However, the Kakataibo's political organization (FENACOCA) estimated the population at around 3,000 in 2007 (Fernando Estrella, personal communication).

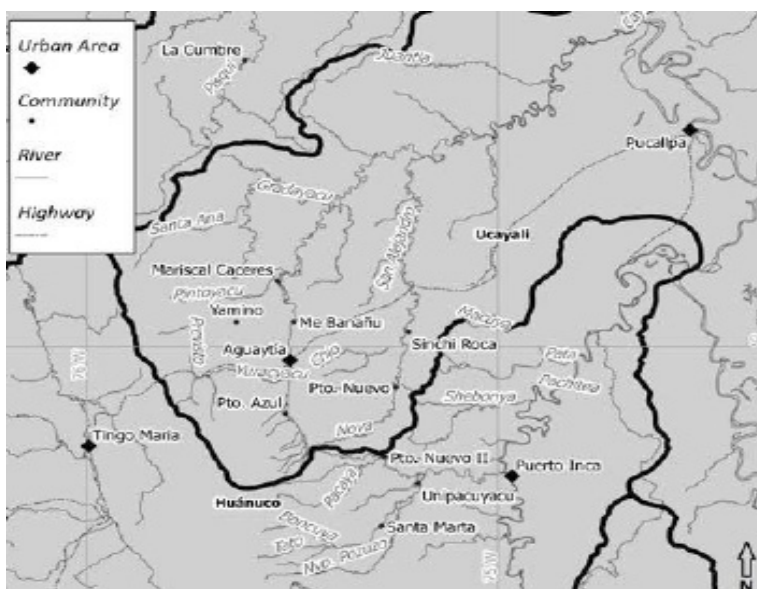


Figure 1: Location of Kakataibo communities (Zariquiey 2013)

The Kakataibo language exhibits (at least) four extant different dialects (Lower Aguaytía, Upper Aguaytía, San Alejandro and Sungaroyacu), plus a probably extinct one that Günter Tessmann (1930) described under the name *Nokamán* (a detailed discussion of Kakataibo dialectology is offered in Zariquiey 2011b). The data this paper is based on comes from the dialect from the Lower Aguaytía River (see Zariquiey 2011a, for a reference grammar of this dialect; Zariquiey and Fleck 2014, and Zariquiey et al. 2017, for published dictionaries; and Zariquiey and Odicio 2017, for a story book).

The prehistoric ancestors of the Kakataibo people were hunters, fishermen and gatherers, and those economic activities are still important for the Kakataibo people today. In addition, the Kakataibo people exhibit a long tradition of raising wild animals as pets (Dienst and Fleck 2009) and it is still possible to see some of these animals living with them in their villages. Currently, shotguns are used for hunting, and most people fish with casting, fishhooks and gil nets. Gathering of wild plant products is now infrequent and for specific reasons, such as collecting canes to prepare arrows (which are elaborated strictly for commercial purposes), or preparing natural medicine when someone is sick. Agricultural practices were added relatively recently to their way of live. However, currently agriculture has become the most important source of subsistence for most

Kakataibo people. The products planted by them include plantain, manioc, corn, rice, peanuts, pineapple, coconut, papaya and cacao, among many others. In recent years, the Kakataibo people have also started to put considerable effort into manufacturing their traditional handicrafts for sale. In order to do this, women are reintroducing some wild forest products used by their ancestors in the elaboration of these artefacts.

The Kakataibo people are nowadays rooted deeply in the non-indigenous culture, and have changed their life radically. At least three Kakataibo villages have built communal houses in the city of Aguaytía, and those houses are usually full of Kakataibo people who may spend long periods in that city. There, they work in different types of jobs, earn some money and look after their sons and daughters, many of whom are studying at local high schools. Nowadays, the Kakataibo people live within the market economy and they use money not only outside but also within their communities. Regardless of all these recent cultural changes, the knowledge about animals and plants that adult Kakataibo people have is remarkable. This is also true regarding some young Kakataibo people as well. However, significant differences are found between them and their parents: according to our estimates, the latter know approximately 30% more plant and animal names.

3. Folk taxonomy

After Lévi-Strauss (1966) noted the large size of the ethnobiological systems managed by people from traditional societies, ethnobiologists have proposed that such inventories of plant and animal names should not be stored in the memory as simple lexical lists. Instead, according to them: “biological data is organized in the heads of people as a taxonomic hierarchy grounded in perceived relations of overall similarity and difference” (Hunn and Brown 2011: 325).

While biological scientific classification “deals with all living things in the world” (Hunn and Brown 2011: 326) and is based on a complex hierarchical structure, taxonomies of local groups (or folk taxonomies) tend to be very shallow (but see section §5.2, where the complexity of some areas of the Kakataibo ethnobiological taxonomic system is discussed). According to Hunn and Brown (2011: 326), “a folk taxonomic structure is a set of categories or taxa arranged so that every taxon is included within one and only one higher order class, up to the unique beginner or kingdom category, designated respectively by *plant* and *animal* in English folk-taxonomies.” Some general principles of ethnobiological classification and nomenclature have been proposed by Berlin; Breedlove; Rave (1973) and refined by Berlin (1992). Among the principles proposed by Berlin (1992), there is one that stipulates that ethnobiological taxa “are further grouped into a small number of classes referred to as taxonomic ethnobiological categories similar in many respects to the taxonomic ranks of Western zoology and botany” (Berlin 1992: 15). According to Berlin, the number of categories or taxa in folk taxonomies is no larger than five or six. These include: unique beginner, life form, intermediate, generic, specific and varietal (see §5 for an illustration of these taxonomic categories in Kakataibo).

These ranks were considered universal, nevertheless the category intermediate “was proposed cautiously and tentatively, its validity to be determined only by future research” (Berlin 1992: 15). Figure 2 from Berlin et al. (1973) has been widely quoted

(Berlin 1992: 16; and Hunn and Brown 2011: 326, among others) and it constitutes a standard representation of the schematic relationship of five of the six proposed universal ethnobiological ranks, excluding intermediates (see Berlin 1992: chapter 1). In Figure 2, what we find is a tree representation of the proposed ethnobiological ranks and their relationships. Tree diagrams have been criticized (see Berlin 1992: 35-51 for a summary of this criticism) and different alternative representations, most of them based on Venn diagrams, have been proposed in the literature. However, as Berlin (1992: 43) highlights, tree diagrams have been widely used (even by their most important critics) and are also used in this paper.

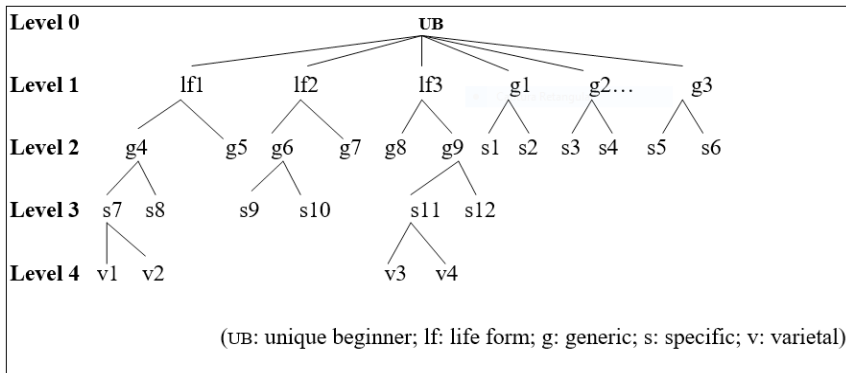


Figure 1: Schematic representation of five of the six ethnobiological ranks in an idealized model, as proposed by Berlin et al. (1973)

4. Data collection methods

Contemporary ethnobiology constitutes a dynamic research field, which has led to interesting debates about the scientific character of local biology (e.g. González 2001; Anderson 2000) and the importance of developing collective methodologies, involving local participation (see Hardison and Bannister 2011; Gilmore and Eshbaugh 2011), among many other issues. One of the objectives of the documentation project this paper is based on was to develop a collaborative fieldwork situation, where Kakataibo speakers were incorporated as local researchers and not as experimental subjects. Taking this into consideration, the project has promoted the development of a local research team, composed of 8 members of the community of Yamino (5 men and 3 women), who have participated in different ways in the activities included in our project: group walks into the forest, preparation of a multi-authored ethnobiological dictionary, biological identification of species, recording of cultural information and mythology about plants and animals, and so on. Members of this collaborative team have recently co-authored a traditional story book (Zariquiey and Odicio 2017) and a pedagogical ethnobiological dictionary (Zariquiey et al. 2017). The present paper is based on the lexical database made available in that dictionary. In §4.1-§4.2, I describe how we produced that database.

4.1. Species identifications

Our research team followed methods suggested by Fleck (2007) for obtaining scientific designations for plant and animal names in a research language when it is not possible to collect biological samples. Initially, lists of animal and plant names were compiled by the author and the Kakataibo local team, and augmented with plant and animal names that appeared in recorded texts or overheard during the author's fieldwork in Yamino. Subsequently, these names were associated with biological species (or higher-level biological taxa) and new names were elicited using drawings or photographs in field identification guides. David W. Fleck, who has conducted zoological and botanical inventory work and ethnobiological research with the Matses (also Panoan) in Amazonian Peru, worked together with me and the Kakataibo team in Lima to associate the collected names with scientific designations. Only species expected to be in the area (according to the range map or range description in these field identification guides) were used in this type of group research. The total time of collaborative research in Yamino and Lima was 5 months during 2013 and 2014.

These methods were useful for collecting a near complete inventory of Kakataibo plant and animal names, both in the field and in work sessions conducted in Lima, with the participation of four members of our local team. The scientific designations produced using these methods are necessarily tentative; however, for the larger and distinctive species, as well as for species in monotypic taxa (i.e. taxa without further subdivisions), there is little room for doubt.

4.2. Higher-order groupings

Higher-order groupings are based on a total of 24 hours (in eight sessions of three hours each) of group discussion about the relationship among different animals and plants and their organization. These sessions of group discussion were led by me and always included the participation of at least four people (mostly members of our local Kakataibo team, but also itinerant participants who occasionally volunteered to participate in a session). Men and women preferred to work separately due to cultural preferences.

The methodology of these group sessions consisted in giving the participants a number of topics to discuss as a group (fish, parrots, monkeys, palms and so on). They were asked to construct an agreed-upon organization of the category under discussion based on the names proposed by them and the ones that we have previously documented. I took notes on A2 sized pieces of papers, using markers of different colors. I mostly used tree figures on these notes to represent the conclusion offered by the Kakataibo team. On average, each topic took one hour of discussion, so we were able to discuss three topics per session. From the eight sessions, four were recorded on audio and two were partially recorded on video. This methodology allowed us to offer a first characterization of the internal structure of a considerable number of higher-order taxa, from unique beginners to generics.

5. Ethnobiological taxonomy in Kakataibo⁴

In this section, I offer a general characterization of the organization of the Kakataibo taxonomic system (see also Winstrand de Robinson 1984, and Zariquiey 2014). The following discussion is based on the taxonomic ranks proposed by Berlin et al. (1973) and Berlin (1992) (see §3). In general, the empirical research conducted in collaboration with the Kakataibo people strongly suggests that the five major categories in Figure 2 are relevant for the taxonomic system under study: in Kakataibo, we can recognize with solid empirical evidence the existence of unique beginners, life forms, generics, specifics and varieties. However, the data also reveal the existence of ethnozoological intermediates (see (§5.3)). Notice that not all these taxonomic categories are always named in Kakataibo. On the contrary, as we will see in the following subsections, covert categories (i.e. cognitive categories that lack a term) are not inexistent in Kakataibo and the psychological reality of a number of these unnamed categories is supported by empirical research conducted in the field (for more on covert categories, see Berlin 1974).

5.1. Unique beginners (kingdoms)

The psychological reality of two unique beginners, with meanings equivalent to ‘plant’ and ‘animal’, in the taxonomic system under study seems to have solid evidence. During the group discussions briefly described §4.2, all the participants agreed in that there are ‘plants’ and ‘animals’ in their natural world, and classify different species accordingly. They also agreed in that those taxa do not have names in Kakataibo and systematically used the Spanish terms *planta* ‘plant’ and *animal* ‘animal’ in order to refer to them (even while talking in their mother language). This is exemplified in the following transcription of a fragment of a group discussion, which included four male speakers of Kakataibo, all of them members of our local research team:⁵

- (1) EE: *ënëx ka 'ikën ñuinakama // 'imainun 'isá.* (pointing mammals and bird pictures)
ënë=x ka 'ikën ñuina=kama // 'imainun 'isá
 this=S NAR:3 COP animal=PL and passerine
 ‘these are animals and passerines’

RZ: *aishbi ka // uisa kara ënëx?* (pointing some tree pictures)

aishbi ka // uisa ka=ra ënë=x?
 but NAR:3 how NAR:3=INT this=s
 ‘but what is this?’

⁴ The orthographic conventions followed in this paper are: *a, e, ê [i], i, o, u, p, t, k [k], kw [kʷ], b [β, w], r [r], m, n, ñ [ɲ], s [s, z], sh [ʃ], x [ç], ts [tʃ], ch [tʃ] and ' [ʔ]*.

⁵ Abbreviations of the names of the participants are systematically used in all the text examples offered in this paper. The symbol “//” is used to indicate pauses longer than one second. Some notes about the context: the participants were presented to some pictures of birds, snakes, mammals, trees, shrubs, palms and vines and were asked to classify them in groups if possible.

EE: ənëx ka 'ikën bētsi.

ənë=x ka 'ikën bētsi
 this=s NAR:3 COP another
 'these are others.'

AE: ənëx ka 'ikën i 'imainun bētsi bētsi...

ənë=x ka 'ikën i 'imainun // bētsi bētsi
 this=s NAR:3 COP tree and another another
 'these are trees and others...'

RZ: aishbi ka // 'ən kana 'unantisatanin // anu kara achushi banaishi para kamabi

aishbi ka // 'ë=n kana 'unan-tisa-tan-i-n //
 but NAR:3 1SG=A NAR:1 know-IRR-AND-IMPF-1/2
 anu ka=ra achushi bana=ishi para kamabi
 there NAR3=INT one word=only for all
 'but I want to know if there is only one word to name them.'

AE: **planta** ain anë castellanonën // nunribi kananuna plantaishi kain kamabi ənëx.

planta ain anë castellano=nën // nu=n=ribi
 plant 3:GEN name Spanish=INST 1PL=A=also
 kananuna **planta**ishi kain kamabi ənëx

'**planta** is their name in Spanish we also call all these just **planta**.'

RO: o sea nosotros también decimos planta nomás.

'that means that we only say planta'

EE: usa.

usa
 like.that
 'that's right'

RZ: aishbi ka **planta** ax ka castellanonën bana 'ikën.

aishbi ka **planta** a=x ka castellano=nën bana 'ikën
 but NAR:3 plant that=s NAR:3 Spanish=GEN word COP
 'but **planta** is a Spanish word.'

EE: castellano ax ka 'ikën.

castellano a=x ka 'ikën.
 Spanish that=s NAR:3 COP
 'that is Spanish'

RZ: usa 'aish, uisa kara Kakataibonën bana **planta** kiax?

usa 'aish uisa kara Kakataibo=nën bana **planta** kiax?
 like.that being how NAR:3=INT Kakataibo=GEN word plant saying
 'then, how do you say **planta** in Kakataibo?'

RO: Kakataibonën bana ka 'ainma // nux...

Kakataibo=nën bana ka 'ainma // nu=x...

Kakataibo=GEN word NAR:3 not.being 1PL=S

'There is no Kakataibo word us...'

EE: // ënëx sapi ka 'ikën ro.

ënëx sapi ka 'ikën ro.

this=S DUB NAR:3 COP medicinal.plant

'I think this is ro.'

RO: ama // ro ax ka 'ikën bëtsi // **planta medicinal** ka kia.

a=ma // ro ax ka 'ikën bëtsi
that=NEG medicinal.plant that=S NAR:3 COP another

// **planta medicinal** ka ki-a.

plant medicinal NAR:3 say-NOMLZ

'It is not // ro is another (thing) // it means **medicinal plant**.'

EE: usa / ro ax ka bëtsi 'ik

usa / ro ax ka bëtsi 'ik
like.that medicinal.plant that=S NAR:3 another COP

'That's right / ro is another (thing).'

RZ: y ënëx kara 'ikën **plantaribi**? (pointing the same mammals and bird pictures as in the beginning)

y ënë=x ka=ra 'ikën **planta=ribi**?
and this=S NAR:3=INT COP plant=also

and are these also **planta**?

(All laugh)

EE: no!

No!

RO: no, Profe,⁶ ënëkamax ka 'ikën **ñuina**

no, Profe,⁷ ënëkamax ka 'ikën **ñuina**

no Profe this=PL=S NAR:3 COP animal

'No, Profe, there are **ñuina** (a generic name for some animals, see §5.2)

RZ: ñuina ënëx? (pointing the same bird pictures)

ñuina ënëx?

animal this=S

Are these **nuiña**?

⁶ The vocative *profe* is the diminutive of teacher in Peruvian Spanish and the familiar vocative with which people in Yamino call the author of this paper.

⁷ The vocative *profe* is the diminutive of teacher in Peruvian Spanish and the familiar vocative with which people in Yamino call the author of this paper.

RO: ah... / no // no, 'isá / ěněx ka 'ikěn 'isá
 ah... / no // no, 'isá / ěně=x ka 'ikěn 'isá
 ah no no passerine this=s NAR:3 COP passerine
 oh... / no // no, 'isá / these are 'isá.

RZ: pero kamabi?
 pero kamabi?
 but all
 but all of them?

RO: ah ya // **animal**ishi / castellanosa.
 ah ya // **animal**ishi / castellano=s
 oh OK animal=just castellano=COMP
 oh OK // just **animal** / like in Spanish

EE: usa
 usa
 like.that
 That's right.

I have double checked the use of the Spanish loans *animal* and *planta* illustrated in the fragment above to refer to two unique beginners with similar results. Speakers of different sexes and ages identify these two categories. If we only look at the Kakataibo lexicon, these two taxa would constitute unnamed (covert) categories, which are systematically identified by Kakataibo speakers. However, the situation is not free of analytical problems: it is difficult to determine if the recognition of taxa of this rank is a consequence of a long contact with Spanish speakers, who use the terms *animal* and *planta* very often; or if the categories existed previously in Kakataibo and then the speakers started to use the corresponding Spanish terms for covert categories in their own ethnobiological taxonomic system. Indeed, it is also possible that the semantic content of these covert unique beginners in Kakataibo, if they truly existed previously to this contact, did not exactly correspond to the semantic content of the words *planta* and *animal* in Spanish (which is equivalent to 'plant' and 'animal', respectively, in English). Furthermore, Tournon (1991: 132) and Valenzuela (2000: 27) have argued that the Shipibo-Konibo people (another Panoan group) "do not recognize a conceptual distinction between plant and animal kingdoms" (Valenzuela 2000: 27). The empirical facts that the collaborative research on Kakataibo revealed are that, according to the people who participated in the group discussions described in §4, (1) there are two unique beginners; and (2) they (more and less) correspond to *planta* and *animal* in Spanish and can be referred to by the same Spanish names. This, as previously mentioned, might be a consequence of the long contact with Spanish speakers.

Thus, the situation in Kakataibo satisfies Berlin's principle according to which "the taxon marking the rank of kingdom in ethnobotanical as well as ethnozoological systems of classification is comprised of a single member" (Berlin 1992: 34). In addition, if we exclude Spanish loans from this discussion, the situation in Kakataibo will give support to

the general principle of nomenclature according to which, taxa of the rank of kingdom are generally not named (Berlin 1992: 34).

Kakataibo speakers were also asked about the situation of insects, fishes and the only category of fungus that they identify and the results were also systematic: insects and fishes belong to the category of *animal* and fungus to the category of *planta*. This makes the referents of the unique beginners presented in this section similar to their folk Spanish correlates. However, there are crucial differences between the Spanish and the Kakataibo folk taxonomic systems regarding life forms.

5.2. Life forms

In this section, I discuss life forms, associated with both animals and plants. It is shown here that life form taxa in Kakataibo is crucially different from life forms in Spanish.

5.2.1. Animal life forms

Life forms correspond to the taxa immediately under unique beginners, in the etnobiological taxonomic rank. In this section, I argue that, in their ethnozoological system, the Kakataibo people recognize (at least) two named life forms.

Differently from unique beginners, Kakataibo life forms do not correspond to life forms in Western taxonomies. The two ethnozoological life forms systematically recognized and named by the Kakataibo speakers are *ñuina* and *'isá*. The first one, *ñuina*, is morphologically derived: it includes the derivative suffix *-ina* 'generic' (see Zariquiey 2011a: 291-293: *ñuina* = *ñu* 'thing' + *-ina* 'generic'). It includes all animals which live in the forests, in the water, on and under the ground and on trees. This named category includes mammals, reptiles, amphibians and large birds. The second category, *'isá*, only includes small birds and passerines, mostly non-edible.

The examples in (2) and (3) illustrate the use of the term *ñuina*. Notice that in the narrative example in (2), we find the form *pëchiñu* 'which have wings' as a modifier of *ñuina*. This indicates that, as proposed here, this category also includes large (edible) birds. In turn, the first use of *ñuina* in (3) is very general. At some point of this study, I believed that *ñuina* was an equivalent of animal. However, as it is evident from the remaining of the fragment presented in (3), it became clear that this was not the case. I found solid evidence that *ñuina* does not include the other category presented here (*'isá*).

- (2) SE: 'ainbi ka / nukën raran piakëxa chunabi rubi // ñobi // ñuina pëchiñu // kamabi
 'ainbi ka nukën rara=n pi-akë-x-a
 but NAR:3 1PL:GEN ancestor=ERG cat-REM.PST-3-NON.PROX
 chuna=bi ru=bi ñobi ñuina
 spider.monkey=same howler.monkey=same peccary=same animal
 pëchi=ñu kamabi

wing=PROP all

But our ancestors ate the same spider monkeys, howler monkeys, peccaries and all the animals with wings.

- (3) SE: nukën chaitinën kaisa kamabi ñuina 'ainëakëxa
 nukën chaiti=nën ka=is=a kamabi
 1 PL:GEN ancestor=ERG NAR=REP=3 all
 ñuina 'ainëakëxa
 animal kill-DUR-REM.PST-3-NON.PROX
 'It is said that our ancestors killed animals for a long time there a long time ago.'

RZ: uisa kara ñuina 'ik? // 'isáribi kara ñuina 'ik?
 uisa kara ñuina 'ik
 how NAR:3:INT animal COP
 'isá=ribi kara ñuina 'ik
 passerine=also NAR:3:INT animal COP
 'what is ñuina? // 'isá is also ñuina?'

SE: ama // ax ka 'ikën bëtsi
 ama a=x ka 'ikën bëtsi
 no that=s NAR:3 COP other
 no // it is another (thing)

RZ: ah ya
 OK

Notice that while the semantic content of *ñuina* is very general, what we find regarding *'isá* is different. In this case, we find a life form term with a much more unitary semantic content that only applies to a number of birds that share the properties of being small (a perceptual property) and, in most cases, non-edible (a cultural property). Interestingly, *'isá* is a non-derived term: this form is a simple primary label (§5.3).

5.2.2. Plant life forms: overlapping classifications

In our collective discussions, Kakataibo people usually seemed to classify plants into plants with medical or magical properties = 'powerful' (*ro*) and other plants. The psychological reality of an unnamed category that groups 'other plants', however, is unclear, in the sense that, while all the participants can recognize, enumerate, talk about and group plants that belong to the class of *ro*, this is not necessarily the case regarding plants that belong to the other category. In other words, during our group discussions, participants were able to say which plants were not *ro*, but this did not necessarily mean for them that these plants belonged to the same category. While I believe that the existence of the category *ro*, which groups 'powerful' plants, is beyond doubt, the existence of a contrastive category, which groups other plants, does not find support in the data. Plants

that do not belong to the category *ro* do not constitute a single category and were grouped according to different principles by different members of our local team. The following example illustrates the use of the term *ro* in a narrative; I do not have equivalent evidence for the contrasting category in my corpus. In example (4), the speaker presents a list of medical plants and he ends up this enumeration claiming that all the plants that he has listed belong to the category of *ro*.

(4) AE: anu ka 'ikën shipibo / 'imainun nun kakë ka 'ikën buains // 'imainun rapuáti //

	'imainun tuaxkan				
anu	ka	'ikën	shipibo		
there	NAR:3	COP	Shipibo		
'imainun	nu=n	ka=kë	ka	'ikën	buains
and	1PL=GEN	say=NOMLZ	NAR:3	COP	buains
'imainun	rapuáti	'imainun	tuaxkan		
and	rapuáti	and	tuaxkan		

There is what the Shipibo people and us call buains and rapuati and tuaxkan

'imainun	kamabi	ñu
'imainun	kamabi	ñu
and	all	things

and everything

kamabiribi ka anu 'ikën.
 kamabi=ribi ka anu 'ikën
 all=also NAR there COP
 There is everything

'Imainun baka ñushinan 'akë xëtan ro. [...]
 'Imainun baka ñushin=an 'a-kë xëta=n ro
 and river devil=ERG do-NOMLZ tooth=INST medicine
 And there is **medicine** [that we use] when the river devils harm us

Akamax	ka	ro	'ikën.
A=kama=x	ka	ro	'ikën.
that=PL=S	NAR:3	medicine	COP

All those are **ro**.

Kakataibo people also referred to categories such as *i* 'tree'; *'itsi* 'vine'; *imaxu* 'shrub' and *basi* 'grass', while classifying plants and such distinctions also appeared during our group discussions. The Kakataibo people also distinguish between: *i* 'tree', *'itsi* vine, liana', *imaxu* 'shrub' and *basa* 'grass'. In addition, 'canes' and 'palms' are systematically recognized as well-established categories, although the language does not have a name to refer to them. From our collective discussions, it was clear that these distinctions represent an overlapping classification, which operates independently from the category of *ro*, just described. The participants of our group discussions used both classifications while talking

about how to organize plants and, sometimes, they contrasted both approaches, without being able to tell which one was “more traditional” or “older”. A distinction between wild and cultivated versions of some plants also appeared in the sessions, but this distinction was used less systematically than the other two and only applies to some specific cases (cf. *'okanan puchá* ‘wild papaya’ vs. *non puchá* ‘cultivated papaya’). The interaction between these different taxonomies of botanic taxa requires further research.

5.3. Ethnozoological intermediates

So far, we have argued that in the Kakataibo ethnobiological taxonomic system it is possible to recognize taxa associated with the ranks of kingdoms and life forms: the evidence suggests that the Kakataibo people classify animals and plants based on a hierarchical system which includes two unique beginners (unnamed in Kakataibo, but referred to by Spanish words in spontaneous discourse). These unique beginners, in turn, include named and unnamed taxa that belong to the immediately following hierarchical level (i.e. life forms). I have also argued that, in the case of plants, it is possible to propose the existence of two productive overlapping classifications, plus another one used less systematically. Overlapping classifications, of course, may exist regarding animals as well, but they were not revealed in the data this paper is based upon and people used systematically the distinction between *ñuina* and *'isá* as creating the two major ethnozoological life forms categories.

In this section, I explore how these life-forms are subdivided into more specific categories, arguing that in Kakataibo we need to postulate the existence of ethnozoological intermediate taxa. I do not have evidence for ethnobotanic intermediates and, therefore, they are not discussed here. According to Berlin (1992: 15), intermediates are the less universal category among the six taxa that he proposes as relevant for the understanding to ethnobiological taxonomic systems. However, the fact that in some domains of the Kakataibo taxonomic classification we identify a rank(s) between life-forms and generics suggests that we require intermediates to satisfactorily describe Kakataibo’s taxonomic system.

The life form category *ñuina* (see §5.2.1) is highly complex and does not exhibit a “shallow hierarchic structure” (Berlin 1992: 34). It requires us to postulate two ranks between the life-form rank and the generic taxa. The categories included in these two levels operate at the same time and do not constitute two overlapping classifications. In terms of the semantic content of the category *ñuina*, this word closely corresponds to the meaning of animal in English. However, as discussed in §5.2.1, this category does not cover the semantic domain of *'isá* ‘small (non-edible) birds and passerines’. For Kakataibo speakers, *'isá* are not *ñuina*. According to the Kakataibo members of our documentation team, the taxon *ñuina* covers three major categories, all of them referred to by complex nominal expressions that include a nominalization: *nimu 'ikē ñuina* ‘animals that live in the forest’; *bakanu 'ikē ñuina* ‘animals that live in the waters’ (~ *bakena*); and *ëman ikē ñuina* or *xabanu 'ikē ñuina* ‘animals that live outside (the forest)’. As previously mentioned, each of these categories has an extra level of internal classification, making *ñuina* an extremely complex zoological category. The category *bakanu 'ikē ñuina* ‘animals that live in the waters’ includes one named taxon meaning ‘fish (and crayfish)’, *kweokanki*, plus other unnamed ones. In turn, the internal classification of the category *ëman 'ikē ñuina* ~ *xabanu*

'ikē ñuina 'animals that live outside (the forest)' includes two categories: *kaniokē ñuina* 'raised wild animals' and another unnamed one which covers all farm animals introduced by their contact with Western populations (chickens, pigs, turkeys, among others). Finally, the category *ninu 'ikē ñuina* 'animals that live in the forest' comprises five categories: *me nirikē ñuina* 'animals that crawls on the ground', which includes snakes and reptiles that do not live on trees; *kininu 'ikē ñuina* 'animals that live in holes' (~ *mena*); *me nikē ñuina* 'animals that stand up on the ground', which includes big mammals, but also non-aquatic turtles and frogs; *manan nikē ñuina* 'animals that stand up on trees', which include monkeys, but also 'tree reptiles'; and, finally, *pēchiñu ñuina* 'animals with feathers' (also called *manan nuankē ñuina* 'animals that can fly' by two Kakataibo speakers), which include birds that do not belong to the category *'isá*.

It is important to mention that animals belonging to the category *kaniokē ñuina* 'animals that are raised' include some animals of the category *ninu 'ikē ñuina* 'animals that live in the wild'. These raised and wild animals are in Western biological terms the same but, culturally, the Kakataibo people considered them as different. For instance, some of these raised animals received pet vocatives (i.e. a set of special names use to call and refer to them; see Dienst and Fleck 2009), which cannot be applied to the same animals when they are wild. This produces a highly complex taxonomic structure which can be seen in Figure 3 below. It is important to mention that comparable degrees of complexity have been described for the ethno-taxonomic of Shipibo-Konibo, another Panoan language. Valenzuela (2000) describes Shipibo-konibo ethnobiological taxonomy as also displaying a robust level of ethno-zoological intermediates.

5.4. Generic taxa

In previous sections I have presented some basic information about how Kakataibo people organize the higher taxa of their ethnobiological classification system. In this section, I explore how this ethnobiological system organizes taxa of the generic rank, based on the discussion of some examples. Continuing with what was presented in §5.3, all the examples to be presented in this section come from the animal kingdom.

As predicted by Berlin (1992), in Kakataibo the generic rank is the most numerous one. Although specific taxa subdivide generic taxa, the former are fewer in absolute number (and this follows Berlin's prediction; 1992: 34). One important fact is that, although most of the members of this rank are monotypic, a large number of generic taxa can be internally very complex and may include a dozen or more identified specific taxa. There is a straightforward relationship between the presence of polytypic generic taxa (i.e. taxa with further subdivisions) and their cultural and/or perceptual saliency, as we will see in this section.

5.4.1. The internal complexity of *ñuina* and the internal simplicity of *'isá*

The life-form taxon *ñuina* is perhaps the internally most complex one among the taxonomic categories used by the Kakataibo people to classify and talk about the plant and

animals they live with. As it was proposed in §5.3, it contains two levels of classification between the life-form rank and the generic taxa, which has been interpreted here as revealing the existence of two intermediate ranks. This produces a highly complex system with seven ranks (including the levels associated with subgeneric taxa, briefly illustrated in §5.4.3). In addition, under the life form *ñuina*, we find a large number of generic taxa, from which a considerable number are polytypic. This is a property of the Kakataibo ethnobiological taxonomic system that might be relevant for comparative ethnobiological surveys that attempt to find cross-linguistic systematic patterns of variation (Berlin 1992: 201-203): according to Berlin, generic taxa tend to be monotypic and this tendency is not as strong as expected in the Kakataibo category of *ñuina*.

The category *'isá* does not exhibit taxa of the intermediate rank. This life-form category is immediately subdivided by several generic taxa, mostly monotypic, which cannot be classified as part of any intermediate taxon. This is different from what we have found regarding the category *ñuina*.

The crucial differences in the internal organization of these two categories may have to do with their cultural and perceptual properties: while most animals (including birds) that belong to the category of *ñuina* are large, edible or, sometimes, dangerous; members of the category *'isá* are birds that one “only hear and rarely see”. They are neither hunted nor feared. In addition, many of the animals that belong to the category *ñuina* are characters of traditional narratives, are raised as pets and are associated with ceremonies that were traditionally very important for the Kakataibo people.

The situation found in Kakataibo is an extremely useful example of the difficulties of isolating cultural and perceptual properties while determining the relevant factors in the structuring of some ethnobiological taxonomic systems. We find two life-forms categories in the animal kingdom which exhibit extreme differences with each other regarding both their cultural and perceptual saliency and their internal complexity: while one (*ñuina*) can be analyzed as exhibiting two intermediate ranks and more polytypic generics, the other (*'isá*) is clearly much simpler and do not exhibit either intermediates or polytypic generics.

In fact, for some of the Kakataibo speakers I worked with, some of the alleged polytypic generics under the category *'isá* where in fact members of the category *ñuina*. It would be of scientific interest to determine which specific factors are more relevant in the explanation of these differences in the complexity of *ñuina* and *'isá* (see Berlin 1992: 118-122 for a discussion of this issue in association with the different tendencies towards monotypic and polytypic generic taxa; and Hunn's 1976 on the relevance of perceptual properties in the configuration of ethnobiological taxonomic systems). It may be the case that both cultural and perceptual factor play a role in the development of polytypic/ internally complex taxa in Kakataibo ethnobiology.

5.4.2. Insects and their non-inclusion in taxa of life-form rank

I have found no evidence to postulate a life-form taxon that groups insects. Speakers I worked with did not propose grouping insects together and treated the generic categories associated with them as independent from each other. In other words, Kakataibo speakers did not find any reason to group ants and bees, for instance. This represents a salient

particularity of how Kakataibo people classify animals, since, according to Berlin (1992: 34), it is expected that generics “with notable exceptions, are included in taxa of life-form rank.” Therefore, as far as I understand, all the generic categories associated with insects, non-water mollusks, spiders and similar species are directly dependent of the covert unique beginner for ‘animal’.

Figure 3 summarizes some of the main points discussed so far. Note that the category *chunu* has been included as an example of a potential polytypic category under the life-form ‘*isá*’, but for some Kakataibo people it was not a member of this category, but of *ñuina*, under the intermediate *péchiñu ñuina* ‘animals with wings’. Some generic taxa associated with the intermediate *kininu ikê ñuina* ‘animals that life in holes’ are provided as an illustration of this rank (but note that the Figure is not exhaustive by any means).

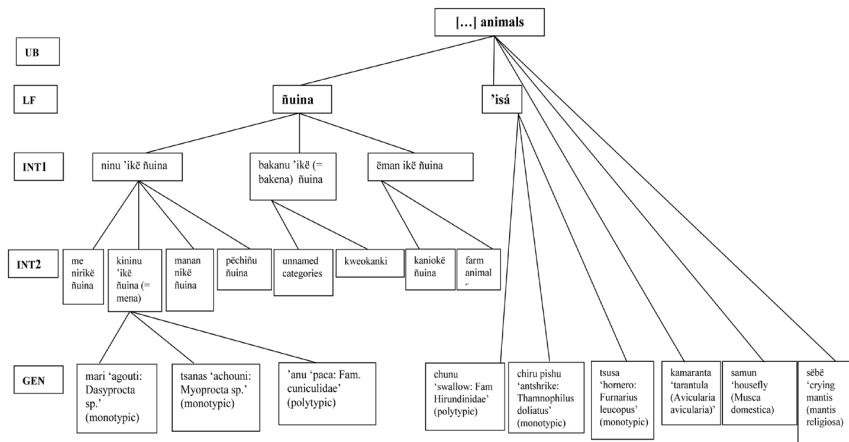


Figure 3: Internal structure of the unnamed category animal in Kakataibo with some generics for insects and spiders

5.4.3. A short illustration of subgeneric taxa

As I have already explained, in the Kakataibo ethnozoological system, subgeneric (specific / varietal) taxa are mostly found under the category of *ñuina*. Generic taxa under this life-form category can exhibit several species that subdivide them producing highly complex categories. Table 1 illustrates one internally complex generic category: ‘*ó* ‘tapir (Fam. Tapiridae), which belongs to the intermediate *me nirikê ñuina* ‘animals that stand on the ground’ from Figure 3 (see Zariquiey 2014 for further details):

Table 1: Species of tapir (Fam. Tapiridae) identified by the Kakataibo people

Kakataibo	English	Scientific
’ó (1)	Tapir in general	<i>Tapirus terrestris</i> (generic)
’ó (2)	tapir subtype (prototype)	<i>Tapirus terrestris</i> (subtype)

chuna 'ó	tapir subtype (lit. 'spider monkey tapir')	<i>Tapirus terrestris</i> (subtype)
kuru 'ó	tapir subtype (lit. 'gray tapir')	<i>Tapirus terrestris</i> (subtype)
uxu 'ó	tapir subtype (lit. 'white tapir')	<i>Tapirus terrestris</i> (subtype)
pinu 'ó	tapir subtype (lit. 'hummingbird tapir')	<i>Tapirus terrestris</i> (subtype)
kana 'ó	tapir subtype (lit. 'macaw tapir')	<i>Tapirus terrestris</i> (subtype)

In table 1, we find that the Kakataibo people identify (at least) six specific taxa in association with the generic 'ó 'tapir'. It is not difficult to find other generic categories with the same or a higher degree of internal complexity under the life-form *ñuina*, but an equal degree of complexity is not frequent at all among generics that belong to the life-form 'isa (for a discussion of subgeneric taxa in other Panoan languages, see Valenzuela 2002, Tournon 1994 and Tournon and Cauper, for Shipibo-Konibo, and Fleck and Harder 2000, Fleck and Voss 2006, Fleck and Voss and Simmons 2002, and Voss and Fleck 2011 for Matsigenka). Perhaps the most internally complex one would be *chunu* 'swallow', with five species; but, as it was previously mentioned, its position within the Kakataibo ethnobiological taxonomic system is still to be more precisely determined. Interestingly, some insect generics may also be polytypic as it is the case of *buna* 'bee' and *bina* 'wasp', for instance (see Zariquiey et al. 2017).

6. Final remarks

This paper has attempted to offer a first description of the Kakataibo ethnobiological taxonomic system, paying particular attention to its high-level categories and providing relevant examples, taken from both narratives and group discussions. This paper has also attempted to highlight the importance of cultural and perceptual factors for the internal structure of the taxonomic categories described here.

Another topic addressed here has to do with the existence of more than one taxonomic system in the way in which Kakataibo people classify plants. Our data confirms that the Kakataibo people use multiple taxonomic systems to classify plants. Kakataibo people establish a distinction between 'powerful' and other plants, but at the same time they exhibit at least two other types of plant taxonomy, one based on the distinction between tree, shrub, vine, grass and so on, and the other on the distinction between cultivated and wild plants. These various taxonomic systems interact in intricate ways that require more research.

I have claimed that the radical differences between the internal structure of two life forms categories under the animal kingdom (*ñuina*, which is extremely complex, and 'isá, which is very shallow) may have to do with their different cultural and perceptual properties. However, a more detailed study providing evidence for which properties are really determinant for this difference in complexity is still to be done. The category *ñuina* include animals that are perceptually salient, that are culturally and economically important, that were part of important social ceremonies, and that were traditionally raised

as pets. In turn, the category *'isá* include small birds or passerines that people do not hunt and do not regularly see (they just hear them and associate names with their calls). This situation may explain why the category *ñuina* seems to present a very complex inventory of intermediate categories that have been argued to belong to two different ranks; and is plenty of polytypic generic taxa, with several different associated species. In turn, so far, I have not found enough evidence for the existence of intermediate categories under the life form *'isa* and their generic taxa are mostly monotypic.

The relevance of culture and perception for the structuring of the Kakataibo taxonomic system seems to have many other manifestations. For Berlin (1992:34), the correspondence between ethnobiological taxa and taxa recognized by Western biology is higher at the generic level. However, the Kakataibo data suggests that cultural and perceptual factor might also play a role in this: (1) Kakataibo ethnobiological taxa which hyper-differentiates Western biological generic taxa is usually culturally and perceptually salient; and (2) Kakataibo ethnobiological taxa which hypo-differentiates Western biological generic taxa is usually poorly salient both culturally and perceptually. Thus, Kakataibo life-form category *ñuina* is hyper-differentiating (see Table 1 in §5.4.3, where we find six different types of tapir). In turn, the categories of the life-form *'isá* tend to be hypo-differentiating. For instance, there is a taxonomic category, *buntish*, under the life-form *'isa*, whose semantic content is simply 'any small bird with black wings and red chest'. Interestingly, this name was applied by Kakataibo people to birds that are distinguished in Western biology at the levels of family and order.

There are, of course, other issues that require further research: Why a perceptually and culturally non-salient category, such as *'isá*, was named after all? What is the cognitive difference between non-edible small birds and passerines on the one hand and insects and similar biological classes on the other, according to only the former were grouped under a life-form category and that the latter tend to exhibit polytypic generic categories with more frequency? These questions require more research. Studying the ethnobiological knowledge of indigenous populations, such as the Kakataibo people, is crucial for understanding the interactions between cognition, culture and language. I encourage other scholars to incorporate ethnobiological research as a main task in their language documentation projects.

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Recebido: 7/8/2018

Versão revista e corrigida: 12/11/2018

Aceito: 19/11/2018.

LIAMES 18(2): 316-337 - Campinas, Jul./Dez. - 2018