
**Taxonomic hierarchies in the Gújjolaay Eegimaa
ethnobotany: How useful are Berlin's universal
criteria?**

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Taxonomic hierarchies in the Gújjolaay Eegimaa ethnobotany: how helpful are Berlin's universal criteria

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1 INTRODUCTION

Studies on ethnobiological classification systems have argued that taxonomic relations expressed by the formula *X is a kind of Y*, reflect universal principles by which humans organise their knowledge of biological organisms. The major findings from these studies show that there are no more than six universal levels or ranks of groupings of those organisms 'definable in terms of linguistic and taxonomic criteria' (Berlin, Breedlove, & Raven, 1973: 214). While these claims have been confirmed by subsequent research, sometimes proposing further tests to better uncover the relations of inclusion (e.g. Wierzbicka, 1992, 1996), other studies have cast doubts on the universality of these putative taxonomic organisations (see Dwyer, 2005; Si, 2012 for further discussions).

This paper has two main goals. First, it is a progress report of an ongoing documentation of the ethnobotanical knowledge of speakers of Gújjolaay Eegimaa (Eegimaa hereafter), a Jóola language of the Atlantic family of the Niger-Congo Phylum spoken in Southern Senegal. The documentation aims at capturing both the theoretical and practical knowledge speakers have of their botanical species in their environment. This includes the knowledge they have about these organisms and how they view them on the one hand, and the way they interact with those entities on the other hand. Such interactions include the use of plants for consumption, medical purposes, making artifacts and in rituals.

The second and main goal, and the focus of this paper is to examine the taxonomic organisation of the Eegimaa folk botanical knowledge, by analysing 209 plant names collected during over 18 months of fieldwork during which various aspects of Eegimaa people's language and culture were documented². This paper begins with a discussion of the documentation methods which were used to capture Eegimaa people's ethnobotanical knowledge in Section 2 below. Section 3

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² My documentation of Eegimaa includes a record of folk zoological, ornithological and piscatological knowledge as well as a record of cultural and religious practices such as ritual and funerals.

discusses the tests used to investigate the relations of inclusion in the Eegimaa folk botanical taxonomy. Section 4 examines the different levels of the groupings of plants using the criteria and tests proposed in Berlin (1992) and Wierzbicka (1992, 1996). I conclude the discussion in Section 5. Overall this paper argues that there are two main classification systems in the Eegimaa folk botany. On the one hand there is a taxonomic classification which generally coincides with Berlin, Breedlove and Raven's (1973) universals. This is the one investigated here in some detail. The other classification is a grammatical classification of plant names in the Eegimaa noun class system, which, as argued in Sagna (2011, 2012), reflects a semantic categorisation of plants based on shape and culture-bound criteria. For reasons of space, this second classification is not explored in this paper.

2 DOCUMENTATION METHODS

In the field of language documentation where the focus is on providing “a lasting multipurpose record of a language” (Himmelman, 2006: 1), there is a growing interest on including information on ethnobiological knowledge in documentations. However, aside from the general recommendations that the recorded data should come from a variety of text genres, there very few guides on what exact information should be included in a documentation of ethnobiological knowledge. Bouquiaux & Thomas (1992) is one of the rare linguistic fieldwork manuals which include some detailed recommendations on aspects of folk biology that should be investigated. Some of those recommendations have been applied in my documentation of ethnobotanical knowledge in Eegimaa.

The Eegimaa speaking area (Mof-Ávvi) where the research presented here was undertaken is composed of ten villages of which four are situated in forests, while the remaining six include one peninsular and five other villages located in the mangrove swamps. Most of my research took place in the villages of the forest where the floral diversity is much greater than in the mangrove swamps. The data presented here was collected both in the dry season and the rainy season. This is crucial especially for elicitations on-site, and for the observations of the physical characteristics of plants in the season during which they grow, or when they are exploited. For example, plants like lily plants tend to only grow during the rainy season, while trees like palm trees are used mainly in the dry season.

My documentation of the Eegimaa ethnobotanical knowledge included a combination of various techniques, starting from native speaker introspection prior to fieldwork, through which I compiled a number of plants I was previously familiar with. This was followed by collaborative work with a native speaker botanist with whom I discussed my initial list and from whom I elicited more plant names. He also made his raw data on Eegimaa plants available, including their scientific and most popular names in the languages of wider communication of Senegal (Wolof and French), as well as their use for medical purposes³. During my fieldwork, I

³ Berlin (1992: xiii) points out that ‘ethnobiological research is by definition collaborative research’. The importance of collaborative research between linguists and ethnobiologists is discussed in detail

also conducted elicitation on-site with consultants describing plants physical properties, their habitat and, the way they are grown or protected; and further information on the parts that are exploited by humans for various purposes.

I also collected traditional knowledge of plants through participant observation in situations where the parts of specific plants are used in religious rituals e.g. funerals and healing, and recorded traditional trials where the ownership of certain trees (palm trees) was at stake. Last but not least, I conducted interviews not only about the rules of ownership of plants, but also about the restriction of their utilization.

In summary, varying the data collection methods was paramount to allow recording various aspects of the knowledge speakers have of their flora as well as the way they interact with those plants. Such information, along with the list of the relevant plant names, was crucial for understanding Eegimaa speaker's conceptualisation of botanical species. The rest of this paper focuses on the folk botanical taxonomic classification which, as will become clear below, differs from the semantic categorisation of plants as captured by the noun class system.

3 TESTS FOR IDENTIFYING TAXONOMIC CATEGORIES

Berlin, Breedlove and Raven (1973) proposed universal hierarchical levels of groupings are the *unique beginner*, the *life form*, the *intermediate*, the *generic* level, the *specific* and the *varietal* levels. Due to space limitations, this paper will only examine four levels of the hierarchy using Eegimaa data, namely the unique beginner, the life form, the generic and the specific levels. The main methods used in this paper to identify the relations of inclusion in the Eegimaa taxonomic structure include questions such as *what is an X? Is X a kind of Y?* (called 'direct classificatory questions' following Wierzbicka (1996: 354)); the analysis of the morphological structure of linguistic labels; and the polytypicity of taxa i.e. whether groupings include other kinds of organisms. Wierzbicka argues that direct classificatory questions are not always illuminating and proposes other additional linguistic tests which include 'ways of referring' like '*look at that X over there!*' or '*how many Xs do you see?*' If the plant referred to is not a kind of X, that way of referring to it should not be acceptable to speakers. Another important test proposed by Wierzbicka is the test involving coordination. Taxa which belong to different levels in the taxonomic hierarchy produce odd coordinations as in **animals and dogs*. The final main test consists of using non-verbal predicative clauses and their negation as in **'it is not a dog it's an animal'* (Wierzbicka, 1996: 365). As with the coordination test, equating taxa from different taxonomic levels in non-verbal clauses produces odd sentences. The next section discusses the main characteristics

in Si (2011). Practically conducting fieldwork with e.g. a biologist may not always be feasible due to time or other types of constraints. In the documentation of Eegimaa, the collaboration was done by sharing and discussing data we collected during our individual fieldworks or on-site whenever possible. I have also produced plant photographs and vouchers under the request of my collaborator and made the orthography I created for Eegimaa available for the notation of plant names in his laboratory.

of each level of Berlin's universal taxonomy and investigates the relations of inclusion of botanical species in Eegimaa.

4 TAXONOMIC HIERARCHIES IN EEGIMAA

4.1 *The unique beginner*

Of the six levels of Berlin, Breedlove and Raven (1973) proposed universal taxonomic hierarchy, the *unique beginner* is the highest rank and the most inclusive of all, because it includes all the taxa found in the lower ranks of the hierarchy. This is illustrated in the English term *plant* which includes the *tree* and *grass* groupings. In Eegimaa, the noun *CL-nunuh*⁴ is generally given as the equivalent of 'plant' in elicitation. Like most nouns in the language, the nominal root *-nunuh* must combine with a singular, a plural or a collective noun class marker. The singular noun class markers which combine with it are *bu-*, *ga-* and *ju-*, as illustrated in (1) below, indicating a difference in size between plants⁵.

- (1) *Dóuru bu-/ga-/ju-nunuh leti ga-fos*
 that CL5-/CL9-/CL11-tree/plant not.be CL9-grass
 'This is a tree (small/big) not a grass plant.'

Example (1) suggests that the label *CL-nunuh* is not used as a general term for all organisms in the flora. Tests based on ways of referring indicate as in (1) above, that entities in the *CL-fos* 'grass' grouping are not conceptualised as kinds of *CL-nunuh* 'tree/plant' (see 4.2 below for further discussions). The coordination test in (2) below further indicates that the label *CL-nunuh* 'tree/plant' and *CL-fos* 'grass' belong to the same rank in the Eegimaa folk botanical classification.

- (2) *ni-mug-e bu-/ga-/ju-nunuh ni ga-fos*
 1SG-kill-CPL CL5-/CL9-/CL11-tree/plant and CL9-grass
 'I killed a (small/big) plant/tree and a grass plant.'

Tests involving ways of referring and coordination show that there is no unique beginner label in Eegimaa because no taxon is general enough to include all other taxa in of the flora. Note that the lack of a linguistically recognised label for the unique beginner does not mean that speakers cannot differentiate plants from other organisms. It is possible to refer to all entities in the flora by combining labels from the lower levels of the hierarchy, using coordination as in example (2) above. Notice that, the cross-linguistic investigations of nomenclature systems have shown that not all languages have a label for the unique beginner. However, whenever it is

⁴ The abbreviation CL refers to the morphological class marker on the noun, traditionally called its noun class marker.

⁵ For the complexity of the prefix alternations in the context of number expressions and derivations in Eegimaa see Sagna (2008).

Abbreviations: * = Ungrammatical or odd; CL = class marker; CPL = completive; MED = medial demonstrative; NEG = negative; PL = plural; SG = singular.

found, it tends to be a single term (Berlin, 1992; Berlin et al., 1973; D'Andrade, 1995).

4.2 *The life forms*

The life form level is the rank immediately below the unique beginner. English examples include *tree* and *bush* which are kinds of plants. The criteria by which taxa (groupings) in the life form are recognised include their paucity in number (five to ten according to Berlin et al. (1973)) and their polytypicity, that is, the fact that they generally include other subcategories of entities. Life forms are identifiable based on the morphological shape of a plant; in Berlin's terms, the *stem habit* (Berlin, 1992). Linguistically, the labels used for the taxa in the life forms are primary lexemes. An examination of the Eegimaa plant nomenclature based on properties ascribed to taxa in the life form reveals that only two taxa can be described as life forms in the current database on plant names. These are *CL-fos* 'grass' and *CL-nunuh* 'plant/tree' exemplified in (1) and (2) above. These two taxa are polytypic as will be shown in the analysis of the generic level in Section 4.3 below, are few in number, and their labels are primary lexemes as expected for taxa of the life form rank. The taxon *CL-nunuh* 'plant/tree' is strongly associated with woody plants of different sizes as revealed by the use of different prefixes, whereas *CL-fos* 'grass' describes non-woody plants. Example (1) above and (4) below are an answer and a comment to the classificatory question in (3). In all these cases, it is clear from the answers that a distinction is made between the two kinds of groupings denoted by these nouns.

(3) *Dóuru* *ga-fos* *bu?*
 that CL9-grass how
 'What kind of grass plant is this?' (ss20130923_FIR)

(4) *ga-fos* *leti* *ju-nunuh*
 CL9-grass not.be CL11-tree/plant
 'A grass plant is not a small tree/plant.' (ss20130923_FIR)

Notice that example (2) above in which the coordination test is used, further confirms that these two labels refer to different taxa from the same taxonomic rank since they are compatible in coordination. I have argued in Section 4.1 above that the nominal root *-nunuh* 'tree/plant' combines with three noun class prefixes which only distinguish their referents in terms of their size, but do not indicate the taxonomic rank in which they are included. Most nouns denoting trees combine with the prefix *bu-*, and *bu-nunuh* 'tree/plant' is the label which refers to the grouping of trees including the biggest trees. The prefix *ga-* on the other hand, in addition to combining with nouns of various semantic fields, is also used to derive augmentative meaning. Thus *ga-nunuh* 'big tree/plant' can describe either a very big tree or a plant having a medium size, especially when compared to a smaller woody plant. Finally, the prefix *ju-* which generally attaches to nouns denoting small entities is used as in *ju-nunuh* 'small tree/plant' to indicate that the plant referred to is either a tree in the very early stages of its development, or simply a woody plant of small size. The discussion above has shown that Eegimaa has two

labels which clearly exhibit properties generally associated with taxa of the life form rank. The next section examines the rank below the life form.

4.3 The generic level

Berlin, Breedlove and Raven (1973) argue that in typical folk biological taxonomic systems, the generic level constitutes the core of the taxonomy. One of the characteristics that differentiate the generic level from all other ranks in the hierarchy is that it is the rank where the most numerous number of taxa are found. Taxa in this rank can include up to 500 members. The current Eegimaa database of 209 plant names includes 169 taxa from the generic level which corroborates the claim that the most populated level of the taxonomy is the generic level. Furthermore, 89% of the taxa in the generic level are monotypic i.e. they do not include other kinds as lower level taxa. This is also in accordance with Berlin's claim that the majority of taxa in the folk generic rank are typically monotypic. As has been reported across taxonomic systems, polytypic generic taxa like the Eegimaa taxa *bu-mangu* 'mango tree' and *ga-mmano* 'rice plant' refer to organisms of great cultural importance (see the discussion in Section 4.4 below).

A further characteristic of taxa at the generic level is that they are generally affiliated to a life form taxon. This is true for all taxa in the Eegimaa folk generic rank except for *yaj sú-vvu* 'mushroom' (literally: 'house for flies'), which as shown in example (5) below, is not conceptualised as a grass plant, and is also not included in the life form for woody plants discussed in 4.2 above.

(5)	<i>y-aj.súvvu</i>	<i>leti</i>	<i>ga-fos</i>
	CL3-mushroom	not.be	CL9-grass

'A mushroom is not a grass plant.' (ss20130923_FIR)

The use of primary lexemes is said to be one of the characteristic criteria for labels of taxa at the generic level, but this is a criterion they share with taxa from the life form rank. Note however, that these criteria distinguish taxa from the generic levels from those of the specific levels, which are generally binomial. Incidentally, 13 of the 169 taxa of the generic level like *e-vvul e-ñaru* 'Anthocleista nobilis' (literally: monkey's palm tree'), are also binomial i.e. they are labelled using secondary lexemes rather than the expected primary lexemes. These secondary lexemes differ from those found at the specific level in that they do not occur in contrast sets as argued in 4.4 below.

There is an interesting challenge in the affiliation of rice plants using the criteria discussed above. This is exemplified in (6) to (9) below. Direct classificatory questions do not always produce the same answers as coordination tests or ways of referring tests. In example (6) below rice plant is classified as grass based on a direct classificatory question. However, if one points at a rice plant saying *can you see that grass plant?* as in (7), the answer is that the entity pointed at is not a grass plant, but a rice plant as shown in (8).

- (6) *ga-mmano* *ga-fos*
 CL9-rice CL9-grass
 ‘A rice plant is a grass plant.’ (ss20130923_Hil)
- (7) *nu-jug-e* *ga-fos* *gougu*
 2SG-see-CPL CL9-grass CL9.DEM.MED
 ‘Can you see that grass plant?’ (ss20130923_Hil)
- (8) *dóuru* *ga-mmano* *leti* *ga-fos*
 that CL9-rice not.be CL9-grass
 ‘This is a plant of rice not grass.’ (ss20130923_Hil)

The test involving coordination in (9) shows that the noun rice can be perfectly coordinated with the term for ‘grass’ which has been analysed as a life form label, but also with a noun denoting a plant from the generic level like *ga-rarah* ‘Ipomea asarifolia’. Note however that the latter cannot be coordinated without producing an odd sentence as in (10) below, because the Ipomea asarifolia plant is a kind of grass.

- (9) *na-ñag-e* *u-mmano* *ni* *u-rarah/u-fos*
 CL1.3SG-pull-CPL CL6-rice and CL6-*Ipomea.A*/CL6-grass
 ‘S/he pulled rice plants and Ipomea Asarifolias/grass plants.’
 (ss20130923_Hil)
- (10) **na-ñag-e* *u-rarah* *ni* *u-fos*
 CL1.3SG-pull-CPL CL6-*Ipomea.A* and CL6-grass
 ‘S/he pulled Ipomea Asarifolia plants and grass plants.’
 (ss20130923_Hil)

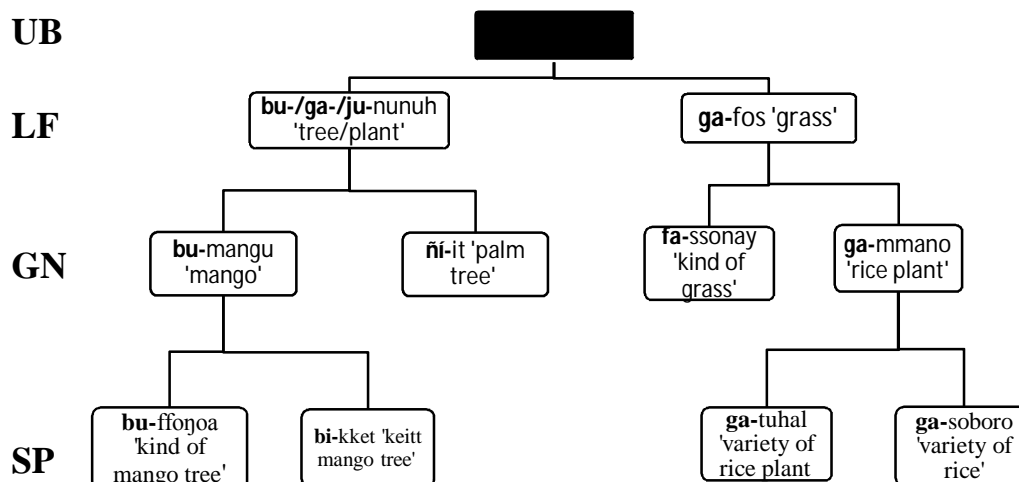
Rice is a central element of the livelihood of Eegimaa people, and wet rice cultivation is the main agricultural activity among Jóola people. The high significance of rice could explain that there are two competing classifications of rice. One of these classifications would be a natural classification based on the morphology of rice plants which are non-woody, and may even be confused with grass plants from a distance, whereas a second classification may be functional or utilitarian classification, which distinguishes rice plants from other non-woody plants, in that rice is cultivated and protected for food production.

There are additional properties associated with groupings of the generic level. Folk genera are said to be most commonly referred to in everyday life, are easier to elicit, are psychologically salient and are more likely to be learnt earlier by children. These criteria are controversial because of the difficulty to apply tests related to them. They have not been used in the analysis proposed here.

To summarise this section, I have shown that polytypicity is a criterion that applies to all taxa of the life form rank, but this is a criterion which also applies to some taxa of the generic level like rice which are of great cultural significance. Whether these taxa should be treated as part of a subgeneric level as proposed by Wierzbicka (1996: 365) is left for future research. I have also argued that the use of primary and secondary lexemes as labels does not distinguish all taxa of the generic level from those of the specific level, though it does so for most of them.

prefix can be found at different level of the hierarchy, though there is a strong tendency for taxa of the specific level to use the same noun class prefix as that of their generic superordinate. I argue that the grammatical classification indicated by prefixes on nouns is a reflection of cognitive categorisation strategies which are based on physical properties such as shape and culture-specific criteria (see Sagna, 2008, 2011; 2012 for detailed discussions).

Figure 1: The Eegimaa folk botanical taxonomic hierarchy



5 CONCLUSION

A number of ethnobiological studies have argued following Berlin, Breedlove and Raven (1973), that traditional nomenclatures mirror taxonomic organisations of folk biological knowledge. The claims that the organisation of folk biological classifications is universal have been challenged by authors, including within the field of language documentation (cf. Si 2011, 2012). This paper investigated the folk botanical classification in Eegimaa using criteria proposed especially in Berlin (1992) and Berlin et al. (1973) and in work in Wierzbicka (1992, 1996). I showed that the Eegimaa organisation of plant knowledge mostly fits to Berlin's predictions. The analysis of the Eegimaa nomenclature shows that there is no label for the unique beginner level of the taxonomic hierarchy, and that only two taxa clearly correspond to the life form ranks. Generic taxa are mostly monotypic in Eegimaa as expected but a few, especially those with great cultural significance are polytypic. I also showed that specific taxa also exhibit most patterns predicted by Berlin's taxonomy. An important observation resulting from the analysis of the Eegimaa folk botanical nomenclature is that there are two kinds of classifications. On the one hand there is a grammatical nominal classification system, which as pointed out in Section 4.5 above, reflects a cognitive semantic categorisation of entities including plants. The second kind of classification which is examined in

this paper is the taxonomic classification of plants. As shown in the discussion above, the classification of Eegimaa plant names generally corroborate Berlin, Breedlove and Raven's (1973) predictions.

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