

Moro Noun Class Morphology

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1. Introduction

Moro, like other Kordofanian languages, has an extensive system of noun classes. Examples are shown in (1). As in other Niger-Congo languages, noun class is indicated by prefixation on the noun, distinguishing singular and plural forms:

(1)	<i>Singular</i>	<i>Plural</i>	
a.	ləbú	ŋəbú	‘well’
b.	lá:wá	já:wá	‘mosquito’
c.	ðaba	raba	‘cloud’
d.	ðára	járá	‘rope’
e.	ugi	lugi	‘tree, flower’
f.	ebamba	nəbamba	‘drum’
g.	əðú	iðú	‘breast’

We provide a description and classification of all the noun classes in Moro, identifying class prefixes and concord consonants, and semantic connotations of classes when such are present. The major challenge posed by noun classes in Moro concerns the status of vowel-initial nouns. Noun class prefixes normally consist of a single consonant as in (1a-d), but vowel-initial nouns do occur (1e-g). It is not obvious whether an initial vowel constitutes a prefix, or whether the vowel is part of the root, and there is no noun class prefix. We claim that in fact both patterns exist. We will argue that the singular classes in (1e-f) have historically lost an initial velar class prefix which is still evident in the concord patterns; the initial vowels here are root vowels. Even though these vowels do not always appear in the plural, there is independent evidence for vowel reduction and deletion in Moro. In contrast, the class pair in (1g) has vowel prefixes in both singular and plural.

2. Overview of Moro noun class system

Moro is spoken in the Nuba Mountains of central Sudan, and belongs to the Western group of West-Central Heiban Kordofanian languages (Schadeberg 1981). Data presented here are from the Thtogovela dialect of Moro, based on elicitation primarily with Elyasir Julima of the town of Karakaray. Drawing on a database of approximately 300 nouns, we identified eight main noun class singular/plural pairings, five unpaired classes (mass nouns, verbal nouns), and five minor categories. The major class pairings with examples are given in (2), along with the number of examples of each in our database. In (3), the unpaired classes are presented, and in (4), the minor categories.

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(2) **Table of the main class pairings**

<i>Class</i>	<i>Initial segment</i>	<i>Concord segment</i>	<i>Singular</i>	<i>Initial segment</i>	<i>Concord segment</i>	<i>Plural</i>	<i>Gloss</i>	#
g/l	V	g-/k	evaja uðs	l-	l-	ləvaja ləð ^w s	‘poor person’ ‘worm’	33
g/n	V	g-/k-	oŋ:a emərtá	n-	n-	nəŋ:a nəmərtá	‘milk pot’ ‘horse’	64
j/j	low V-	j-, k-, s-	ajén aðúní	higher V-	j-, s-	ején iðúní	‘mountain’ ‘hearthstone’	30
l/ŋ	l-/ɾ-	l-	lavəra ləbú	ŋ-	ŋ-	ŋavəra ŋəbú	‘stick’ ‘well’	27
l/ɲ	l-/ɾ-	l-	laŋwaɬa lá:wá	ɲ-	ɲ-	ŋaŋwaɬa já:wá	‘water cup’ ‘mosquito’	24
ŋ/ɲ	ŋ-	ŋ-	ŋerá ɲusí	ɲ-	ɲ-	nerá ɲusí	‘girl’ ‘chick’	12
ð/r	ð-	ð-	ðaba ðáp:á	r-	r-	raba ráp:á	‘cloud’ ‘friend’	12
ð/j	ð-	ð-	ðamala ðárá	j-/front V-	j-	jamala járá	‘camel’ ‘rope’	13

(3) **Table of the main unpaired classes**

<i>Class</i>	<i>Initial segment</i>	<i>Concord segment</i>	<i>Singular</i>	<i>Initial segment</i>	<i>Concord segment</i>	<i>Plural</i>	<i>Gloss</i>	#
g	V	g-/k-	evéa áhálá	*	*	*	‘sand’ ‘haze’	15
j	V-/s	j-, k-, s-	ibəg ^w á aveja	*	*	*	‘fog’ ‘liver’	11
ŋ	ŋ-	ŋ-	ŋágá ŋgára	*	*	*	‘sap’ ‘salt’	24
ð	b/p, m, ð	ð-	məgwátá ðəbára	*	*	*	‘peanut’ ‘cotton’	15
ð	ð-	ð-	ðəwáɾəŋ ðəvələðəŋ	*	*	*	‘to write’ ‘to pull’

(4) **Table of the minor categories**

<i>Class</i>	<i>Initial segment</i>	<i>Concord segment</i>	<i>Example</i>	<i>Initial segment</i>	<i>Concord segment</i>	<i>Example</i>	<i>Gloss</i>	#
j/ŋ	V	j-, k-	úlóðí	ŋ-	ŋ-	ŋúlóðí	‘termite’	1
l/j	l-	l-	ləŋáθ	front V-	j-, s-	eŋáθ	‘tooth’	1
r/j	r-	r-	rlo	front V-	j-, s-	ego	‘f. goat’	4
ð/g	ð-	ð-	ðərlíə	round V	k/g-	urlíə	‘root’	5
l	l-	l-	lá:já	*	*		‘honey’	1

These classes are highly similar to the noun classes identified by Black & Black (1971) and Guest (1997) in their study of the Umm Dorein dialect of Moro. In both dialects, apart from a handful of irregular nouns, consonant-initial nouns have one of a limited set of class prefixes: /l-, ð-, ŋ-, ɲ-, n-, r-, l-, j-/. Class concord markers are the same set of prefixes and additionally /g-/, which is used with many vowel-initial nouns as well as a few g-initial irregular nouns.¹ Categories using these class concord markers are some but not all tense-aspect-mood forms of verbs, adjectives, numerals and other quantifiers, demonstratives, possessives and the instrumental case suffix. The sentences in (5) illustrate

¹ The segment /g/ is normally voiceless utterance-initially, but voiced in sandhi; still it contrasts with /k/ which does not alternate.

concord marking. The possessive and demonstrative markers for j- and g- are the allomorphs [s-] and [k-] respectively², as shown for the demonstratives in (5b) and (5d).

(5) *Noun class concord*

a.	ɲ-ə́ní-ɲí CL-dog-CL.DEM	ɲ-e-t-á CL-REL-small-ADJ	ɲ-obəð-ó CL-run-PRFV	(ɲ/ɲ class pair)
	‘This small dog ran away.’			
b.	uɕí-kí CL-dog-CL.DEM	g-e-t-á CL-REL-small-ADJ	g-obəð-ó CL-run-PRFV	(g/l class pair)
	‘This small man ran away.’			
c.	ð-amalá-ðí CL-camel-CL.DEM	ð-e-t-á CL-REL-small-ADJ	ð-obəð-ó CL-run-PRFV	(ð/j class pair)
	‘This small camel ran away.’			
d.	j-amalá-sí CL-camel-CL.DEM	j-e-t-á CL-REL-small-ADJ	j-obəð-ó CL-run-PRFV	(ð/j class pair)
	‘These small camels ran away.’			

Stevenson (1956-7) proposed a Bantu-like system of numeral labels for noun classes for the Kordofanian system as a whole. Our classes do not correspond one-to-one with Stevenson’s, entailing gaps and additions to accommodate our data. Instead, we will refer to the patterns of paired noun classes (‘genders’) by their concord segments, so that for example the first pattern given in (2), vowel-initial singular nouns with l-initial plurals, belong to the class pairing g/l. This allows us to abstract away from the problem of the initial segment on the nouns themselves.

A summary of the major concord consonant class pairings is shown in (6). Class marking does not necessarily unambiguously identify whether a form is singular or plural: class markers l-, ɲ- and j- (~s-) are common for both singulars and plurals. There is also a minor class with singular r- and one with plural g~k-, not shown in (6). Hence only ð- is exclusively singular and only n- and ɲ- are exclusively plural. This formal overlap is a feature of other Kordofanian languages as well (Norton 2000:25-26).

(6)	<i>Singular</i>		<i>Plural</i>
	g~k	—————	l
		—————	n
	l	—————	ɲ
		—————	ɲ
	ɲ	—————	ɲ
		—————	r
	ð	—————	r
		—————	j~s
	j~s	—————	j~s

Vowel-initial nouns (both singular and plural) are divided between concord classes g~k and j~s. Their behavior is illustrated in (7) with examples of three nominal forms; the consonant-initial form *nándámé* ‘fleas’ is shown for comparison. As mentioned, the allomorphs [k] and [s] of concord markers g- and j- are used in a subset of concord environments, including demonstratives.

² In the Umm Dorein dialect (Black & Black 1971), the l- class has the allomorph [ld] in these environments (demonstrative *ildi* ‘that/those’), while the g-class has *igi* ‘that/those’

(7)	<i>C-initial</i>	<i>V-initial g/l (or g/n class)</i>	<i>V-initial j/j class - singular</i>	<i>V-initial j/j class - plural</i>
	‘fleas’	‘flea’	‘mountain’	‘mountains’
a. Instrumental	nándómé- n á	ándómé- g á	ajén- j á	ején- j á
b. Demonstrative	nándómé- n í	ándómé- k i	ajén- s í	ején- s í
c. Locative (‘inside’)	é-nándómé	é k -ándómé	é k -ajén	és-ején

Locative forms (7c) present a complication. The locative case marker is usually a vowel prefix *é-*, as in the form *é-nándómé* ‘in the fleas’; however vowel-initial nouns have an additional consonant, either [k] or [s]: *ék-ándómé* ‘in the flea’. The [k] is used in the g/l and g/n classes, and the [s] is used in the plural of the j/j class, matching the concord consonants in the demonstrative. However, singular vowel-initial nouns in the j/j/ class use [k], which does not appear anywhere else as a concord marker for these words. For this reason, it may be best to treat the inserted consonant in locatives as something other than class concord.

3. Semantics

Previous research on Kordofanian noun classes (Stevenson 1956-7, Schadeberg 1981, Guest 1997, Norton 2000) identified a number of different classes, many of which occur in Moro. In the chart in (8) we compare our classification with Guest’s for Umm Dorein Moro, and Stevenson’s (1956-57) for the Koalib-Moro group (equivalent to the Schadeberg’s Heiban group). The semantic properties listed may apply to some members of each class. Some classes include a range of nouns with no clear semantic connection.

(8) Comparison table of noun classifications

<i>Concord segments</i>			<i>Semantic properties</i>		
Gibbard et al.	Guest	Stevenson	Gibbard et al.	Guest	Stevenson
g/l	g/l	1. kw(u)-, gw(u)- 2. l(i)-	people	people	people
<i>unattested</i>	<i>unattested</i>	3. kw(u)-, gw(u)- 4. c-, j-, y-	<i>n/a</i>	<i>n/a</i>	nature
l/ŋ	l, lɾ, ɾ, ŋ	5. l(i)- 6. ŋw(u)-	round, long things, fruit	long, hollow, deep, round	unit/mass
<i>see g/n</i>	<i>see g/n</i>	7. k- 8. j-, y-	<i>n/a</i>	<i>n/a</i>	
ð/r	ð/r	9. t-, d- 10. d-, r-	some animals, long things	long things	long things
ð/j	ð/j	11. t-, d- 12. c-, j-, y-	?	harmful, large	harmful, large
g/n	g/n	13. k-, g- 14. ny-, n-	?	common things	hollow, deep
ŋ/p	ŋ/p	15. ŋ- 16. ny-	small animals	small animals	small animals
<i>unattested</i>	<i>unattested</i>	15a. t-, tr-	<i>n/a</i>	<i>n/a</i>	diminutive
<i>unattested</i>	<i>unattested</i>	17. ŋ-	<i>n/a</i>	<i>n/a</i>	augmentative

Comparison table of noun classifications (cont.)

<i>Concord segments</i>			<i>Semantic properties</i>		
Gibbard et al.	Guest	Stevenson	Gibbard et al.	Guest	Stevenson
ð	ð	19. t(i)-, ð(i)-	infinitive, abstract, nature	abstract nouns, emotions	infinitive
ŋ	ŋ	20. ŋ-	liquids, mass nouns	liquids, abstract nouns	liquids, abstract nouns
r/j	r/j	21. ŋ- 22. y-, j-	goat, etc.	goat, etc.	goat, etc.
l/j	<i>unattested</i>	23. l- 24. y-, j-	tooth	<i>n/a</i>	eye, etc.
j/j	j/j	25. vowel 26. y-, j-, i-	?	foreign words	miscellaneous
l/ɲ	l/ɲ	<i>unattested</i>	animals, body parts, objects	animals and body parts	<i>n/a</i>
ð/g	ð/g	<i>unattested</i>	derivatives of trees	trees, parts of trees	<i>n/a</i>

3.1. Semantic cohesion

Though members of a class may share semantic properties, class membership does not guarantee semantic relatedness to other members of the class. For example, although the class g/l is the human class, it also contains nonhumans like *uri* ‘rat’. In addition, semantically related words may appear in different classes, so among humans, *ŋerá* ‘girl/child’ is in the ŋ/ɲ “small animals” class and *ləŋgáp* ‘(my) mother’ is in the l/ɲ “animals-and-body-parts” class.

3.2. Phonological impact on class membership

Nouns with an initial consonant that is not one of the noun class prefixes typically use the concord consonant that is phonologically most similar; some examples are given in (9). Note that the word *səwéja* is assigned to the j-class, as this class employs s- as a concord consonant in some forms such as the demonstrative.

- (9)
- | | <i>Word</i> | <i>Class</i> | <i>Meaning</i> |
|----|-------------|--------------|---|
| a. | səwéja | j- | ‘a kind of dance’ (cf. demonstrative <i>isí</i>) |
| b. | ʃəgwánda | j- | ‘axe’ |
| c. | ʔ(ə)rəmbíli | ð- | ‘automobile’ (Arabic < English) |

Labial-initial nouns (10a-b) use ð- as the concord consonant, and lack distinct plural forms, even if semantically one might expect them to be countable nouns, and they do appear with numerals. While there is no apparent phonological reason for this pattern, it is probably relevant that Moro has no labial class markers. This suggests that where other factors fail, ð- is used as the default concord consonant. This appears supported by (10c), which has a velar-initial segment, but for our consultant has ð-concord in order to distinguish it from a homophonous personal name (which uses concord g- as should be expected both phonologically and semantically).

- (10)
- | | <i>Word</i> | <i>Class</i> | <i>Meaning</i> |
|----|-------------|--------------|--|
| a. | bəʔiə | ð- | ‘clarified butter’ (cf. Asheron <i>bəʔi</i> – Norton 2000) |
| b. | məgwáta | ð- | ‘peanut’ |
| c. | kúɾa | ð- | ‘ball’ (< Arabic) |
| d. | máʃó | g- | ‘guy/man’ |

The word in (10d) *mátfó* ‘guy/man’ is our only example of a labial-initial noun that has g- concord instead of ð-. However, *mátfó* ‘guy/man’ is our only example of a labial-initial noun with human reference; assignment to the g- concord class makes sense if we regard ð- as default for non-humans and g-/l- as default for humans. For all the examples in (10), semantics would determine class membership when phonological factors fail to do so.

4. Vowel-initial nouns

Recall that class concord is always marked with a consonant, but nouns themselves can be vowel-initial. The main analytical problem posed by the vowel-initial forms is whether the vowel is a noun class prefix or part of the root. Vowel prefixes are not common in Kordofanian languages, attested with certainty only in the closely related language Tira (Stevenson 1942, 1956-7). There are a few unclear cases reported in other languages: Otoro a-/ɔ̄- reported in Stevenson (1943), but not confirmed by Schadeberg (1981), and Warnang a-/c- reported in Schadeberg (1981).

We will now examine each of the Moro vowel-initial classes in turn, describing their characteristics and determining the status of the initial vowel, using Moro phonological patterning and historical evidence. The vowel-initial nouns occur in three main class pairings and two non-paired classes, repeated from (2).

(11)

Class	Initial segment	Concord segment	Singular	Initial segment	Concord segment	Plural	Gloss	#
j/j	low V	j- s- (-k-)	ajén	higher V	j-, s-	ején	‘mountain’	30
ð/j	ð-	ð-	ðamala	j-/front V-	j-	jamala	‘camel’	13
g/n	V	g- -k-	oŋʔa	n-	n-	nəŋʔa	‘milk pot’	64
g/l	V	g- -k-	evaja	l-	l-	ləvaja	‘poor person’	33
j	V/s	j- -s- (-k-)	ibəg ^w á	*	*	*	‘fog’	11
g	V	g- -k-	evéa	*	*	*	‘sand’	15

4.1. The j/j and ðj classes

In Stevenson’s chart of Koalib-Moro classes (1957:152), the j/j class is listed with an initial vowel in the singular in Stevenson’s Koalib-Moro chart, but with a front vowel, glide or palatal stop for the plural. In Thtogovela Moro, the j/j class is characterized by a central vowel (either [a] or [ʌ]) in the singular and by a front vowel (either [e] or [i]) in the plural. The choice of vowel in each number category is determined by vowel harmony: in Moro vowel harmony, vowels of the lower, recessive harmony set /a e o/ raise to their higher counterparts [ʌ i u] (Gibbard 2006). Examples are shown in (12):

(12)

	Singular	Plural	
Low vowel root (a, e, o)	ajén	ején	‘mountain’
	árómá	érómá	‘black biting ant’
High vowel root (ʌ, i, u)	ʌbulúkriə	ibulúkriə	‘dove’
	ʌtúmí	itúmí	‘onion’

This class contains a number of borrowings, particularly from Arabic, which treat the definite article *al* as part of the stem, converting it to *el* in the plural: ex. *aləŋgréma* (sg.) *eləŋgréma* (pl.) ‘bed’ < Sudanese Arabic /al-ʕangare:b/. However, not all words in the j/j class are borrowed. A prefix analysis of these forms is straightforward: prefixes are /a-/ in the singular and /e-/ in the plural; allomorphs [ʌ] and [i] are created by vowel harmony. If the vowels were not prefixes, we might posit a vowel fronting process deriving the plural from the singular, but there is no independent evidence for such fronting, and the derivational relationship singular → plural would be an unprecedented

analytical step. Furthermore, there would be no explanation for why the initial vowel of the singular is restricted to being /a/. We conclude that the /j/ class is characterized by prefixes, a- in the singular and e- in the plural.

The δ/j class, as well as the minor r/j and l/j classes, are similar to the j/j class in that the plural form has a vowel-initial prefix, ex. $\delta rmb\acute{e}gwa$ (sg) $ermb\acute{e}gwa$ (pl) ‘lyre’ or $\delta r\delta i\acute{e}$ (sg) $ir\delta i\acute{e}$ (pl) ‘type of water rat’. However if the root is vowel-initial, the prefix is realized as [j], ex. $\delta\acute{s}^wli$ (sg) / $j\acute{u}li$ (pl) ‘giraffe’ or $\delta amala$ (sg) / $jamala$ (pl) ‘camel’. Whether the prefix is underlyingly a vowel (/e-/) or a glide (/j-/) is unclear, but it is at least vocalic.

4.2. The g/n class

The g/n class is a large class characterized by one of the six vowels /a e o ʌ i u/ in the initial position of the singular noun, and by a prefix /n-/ in the plural. The initial vowel may be present in the plural (13a), not present (13b-c), or replaced with [ə] (13d-e). Furthermore, when the initial vowel is round, but absent in the plural, labialization of a root consonant in the plural may occur (13c,e).

(13)	<i>Singular</i>	<i>Plural</i>	
a.	áḍámá	náḍámá	‘book’
b.	édéə	ńdéə	‘dileb tree’
c.	orəpá	ndrɔp ^w á	‘hollow in tree’
d.	ebamba	nəbamba	‘drum’
e.	oṭámba	nəṭám ^w a	‘ostrich’

In order to sort out these different patterns, we examine groups of nouns classified according to the quality of the initial vowel in the singular.

With central vowels a/ʌ, there is no modification of the initial vowel in the plural, as the examples in (14) illustrate. From these examples, it appears that the singular has no prefix and the plural has the prefix n-, which would explain the presence of the vowel in both forms.

(14)	<i>Singular</i>	<i>Plural</i>	
a.	abəg ^w ala	nabəg ^w ala	‘paper’
b.	ándómé	nándómé	‘flea’
c.	álíŋ	nálíŋ	‘promiscuous person (m/f)’
d.	ʌnəŋiə	nʌnəŋiə	‘ear’

In contrast, when the singular has an initial front vowel, the front vowel does not appear in the plural. There may be no vowel between the prefix /n-/ and the next consonant (15a-e), or a vowel [ə] follows the prefix (15f-i):

(15)	<i>Singular</i>	<i>Plural</i>	
a.	édéə	ńdéə	‘dileb tree’
b.	erél	ndrél	‘side of face’
c.	eréθ	ndréθ	‘clothing’
d.	etám	ntám	‘neck’
e.	iṭəlí	ɲṭəlí	‘year’
f.	ebamba	nəbamba	‘drum’
g.	eləŋe	nələŋe	‘king, leader’
h.	emərṭá	nəmərṭá	‘horse’
i.	eʋəla	nəʋəla	‘wild cat’

Unlike the forms beginning with central vowels, these forms suggest a prefix analysis of the initial vowel, since this is present in the singular but absent in the plural. The [ə] could be explained as epenthesis. However, such a hypothesis fails to unify the two sets of nouns, requiring both a prefix and a root analysis depending on the initial vowel, despite the same concord segments. We propose instead that the root analysis of this class pairing is correct, but that the front vowels are prone to reduction and deletion. Our proposal is that the front vowel is deleted between the prefix *n-* and a following coronal from the set [t t̪ d n r/r] (15a-e), thus creating a nasal-consonant cluster. Note that the *n+r* combination results in [ndr], where the [d] is a transitional segment. The front vowel is not deleted but reduced to [ə] when it appears before [l] or a labial [b m v] (15f-i). Loss of the front vowel would result in an unacceptable non-homorganic cluster: *nə̀la, so reduction occurs.

As supporting evidence for this proposal, it is the case that front vowels are commonly reduced to [ə] in Moro, particularly following prefixation. The locative ‘inside’ prefix is *é-*, with the allomorphs [ék-] and [és-] preceding vowels. The addition of this prefix triggers reduction of the front vowel in the singular:

(16)		<i>Singular</i>	<i>Plural</i>	<i>Locative singular</i>	
	Labial or l	ebamba	nə̀bamba	ékə́bámá	‘drum’
		elə̀ɲe	nələ̀ɲe	ékələ́ɲ	‘king, leader’
	Coronal	etám	ntám	égətám ³	‘neck’
		iróɲ	ndróɲ	íkəróɲ	‘name’

Complete loss of the initial front vowel in the locative singular of the coronal forms is not possible, as it would create an unacceptable cluster: *égtám.

Reduction in locatives does not occur when the initial vowel is a central vowel [a] or [ʌ]:

(17)		<i>Singular</i>	<i>Plural</i>	<i>Locative</i>	
	a.	ʌnə̀ɲiə	nʌnə̀ɲiə	íkʌnóɲ	‘ear’
	b.	ándóme	nándóme	ékándóme	‘flea’

This parallels the behavior with the noun class prefix *n-*, which did not cause reduction with central vowels. The reduction occurs in other noun classes, too, so *ajén* ‘mountain’ (class j/j) has the locative *ékajén*, but the plural *ején* ‘mountains’ has the locative form *ésajén*, with reduction to [ə].

Additional support that the front vowels are reduced to [ə] in this class comes from the behavior of the forms whose first consonant is [l], such as *nələ̀ɲe* ‘king’. A general phonological property of Moro is that /n + l/ combinations are avoided. For example, with the different locative prefix *n-* ‘on’ ([nə̀] before most consonant-initial words) the prefix is not realized before words beginning with [l], as the following forms illustrate:

(18)	<i>Noun</i>	<i>Locative ‘on’</i>		<i>Noun</i>	<i>Locative ‘on’</i>			
	a.	ádámá	n-ádámá	‘book’	e.	ðamala	nə̀-ðamala	‘camel’
	b.	ome	n-ome	‘fish’	f.	nəmər̥tá	nə̀-nəmər̥tá	‘horse’
	c.	rða	n-drða	‘meat’	g.	loandra	loandra	‘stone’
	d.	ebamba	n-ebamba	‘drum’	h.	lə̀me	lə̀me	‘fish (pl.)’

If words like *elə̀ɲe* ‘king’ were analyzed as having a prefix *e-* in the singular and a prefix *n-* in the plural, then the base form would be *lə̀ɲe*. Following the pattern of other *n-* prefixes in the language, we would expect no attachment of the plural *n-* prefix. As the prefix *n-* is attached, it indicates that there is an initial vowel: *n+elə̀ɲe* which then undergoes vowel reduction to *nələ̀ɲe* ‘kings’. The constraint

³ There is a third allomorph [eg-] which precedes voiceless consonants in the stem, due to voicing dissimilation.

against n-l sequences also helps explain why the nouns with the first root consonant /l/ pattern differently than other coronal forms in not allowing deletion of the vowel. To do so would create an inadmissible sequence. Therefore, reduction to [ə] is favored.⁴

A single recalcitrant form with a front vowel that shows no reduction and no deletion of the initial vowel is *egⁱe* ‘house’ (plural *negⁱe* ‘houses’). The [g] derives historically from *ɽ, but this does not explain the lack of reduction/deletion.

Our final subgroup within the g/n class have initial back round vowels [o] and [u]. They exhibit variable behavior. Those with first coronal consonants [d nd r ð] as well as [g] have no vowel in the plural. These [g] derive historically from *ɽ, a coronal consonant; in the plural the alveolar [d] appears after the nasal prefix. The lack of the initial vowel before coronal consonants is parallel to the pattern of front vowels in (15a-e). In addition to the lack of the initial round vowel, some plural nouns have labialization of a root consonant (19f-h).

(19)	<i>Singular</i>	<i>Plural</i>	
a.	oɖəlónjá	nɖəlónjá	‘fox’
b.	ogó:má	ndá:má	‘thief’
c.	ogəvélá	ndəvélá	‘monkey’
d.	onɖəðjé	nɖəðjé	‘lice’
e.	uríθ	ndríθ	‘chain’
f.	oɖəga:la	nɖəg ^w a:la	‘turtle’
g.	orəpá	ndrp ^w á	‘nest hole’
h.	oða	nɖ ^w a	‘kind of deer’ ⁵

The appearance of labialization lends credence to the root analysis. The labialization can be analyzed as an exponent of the round vowel, recuperated on a neighboring consonant. This explains why labialization only occurs in the plural. If the round vowel were a prefix in the singular, there would be no explanation for the labialization in the plural. Whether labialization appears or not is variable, as there are potential hosts in forms like *ndá:má*, but *ndá:m^wá* is not attested.

The second group are those that have reduction of the round vowel to schwa. Almost all of these forms show labialization. However, many of them have alternative forms with no reduction, and also no labialization, ex. *nomá:gá* is attested as well as *nəm^wá:gá* (20f):

(20)	<i>Singular</i>	<i>Plural</i>	
a.	oɽ:a	nəɽ:a	‘milk pot’
b.	oɽe:liə	nəɽ ^w e:liə	‘spider’
c.	oɽəmba	nəɽəmb ^w a	‘ostrich’
d.	uməní	nəm ^w əní	‘type of tree’
e.	oməɽjádá	nəm ^w əɽjádá	‘afterbirth’
f.	omá:gá	nəm ^w á:gá	‘snail’
g.	ombəɽeə	nəmb ^w əɽeə	‘back of shoulder’
h.	uβ ^w :ʌ	nəβ ^w :ʌ	‘moon/month’

There are a small group of nouns that have no deletion or reduction, and no labialization. We treat the glide [w] as a vocalic element – note that it appears in the plural as [o].

⁴ The innovation ɽ > g in this dialect is not mentioned in published work on Moro. Stevenson (undated fieldnotes) records it for the Karam dialect, a name we have not been able to identify.

⁵ This word was also given as *oðea* with plural *nəðea*.

(21)	<i>Singular</i>	<i>Plural</i>	
a.	umədí	numədí	‘small biting ant’
b.	úmáðní	númáðní	‘silo for grain/beans’
c.	wárá	noárá	‘animal pen’

Round vowels appear to be less prone to reduction than front vowels, as can be seen with the locative forms in (22). Here, rounded vowels do not reduce, even if there is reduction following the plural prefix:

(22)	<i>Singular</i>	<i>Plural</i>	<i>Locative</i>	
a.	omá:ga	nəm ^w á:gá	ékomá:k	‘snail’
b.	umədí	numədí	íkúmədí	‘small biting ant’
c.	oðeə	nəðeə	ékóðéə	‘kind of deer’
d.	oʃɔmba	nəʃɔmb ^w a	égoʃɔmba	‘ostrich’
e.	oɖəlónǵá	nɖəlónǵá	ékóɖəlónǵ	‘fox’
f.	uríθ	ndríθ	íkuríθ	‘chain’

The evidence points to a root analysis for the initial vowel in this g/n class. This corresponds to class pairs 13/14 and 7/8 in Stevenson’s classification, which have a consonant prefix k- or g- for the singular. It appears that Moro lost the initial velar in the singular nouns, but retained velar consonants as concord. The following cognates for ‘ear’ show that related languages retain the velar prefix on nouns:

(23)	<i>Moro</i>	<i>Heiban</i>	<i>Otoro</i>	
	ʌnəŋiə/ nʌnəŋiə	g-öni / ny-öni	g-öni / n-öni	‘ear’

Furthermore, there are a few members of this class in Moro that retain the initial g-: *gí / ní* ‘field’, *gálá* (or *álá*) / *nálá* ‘bead’ and *gəla / nəla* ‘dish’. Although the historical evidence also lends support to a root analysis of the initial vowel, it does not mean that the current language could not have reanalyzed initial vowels as prefixes. Nevertheless, the phonological vowel reduction and deletion patterns entailed by the root analysis are consistent with the general behavior of vowels in Moro, and there is no clear evidence for reanalysis of the root vowel as a prefix in this class.

In conclusion, the g/n class does not have a noun class prefix in the singular noun. This analysis explains why a range of six vowels are attested in the root-initial position, and it maintains a unified analysis of the class pairing. The root vowel is deleted or reduced following the plural prefix n- depending on the type of vowel and the following consonant. Central vowels do not reduce; front vowels (and some back vowels) delete between the n- prefix and a following coronal; otherwise front vowels reduce to [ə]. Back round vowels variably reduce, and if they do, labialization often appears on a neighboring consonant.

4.3. The g/l class

The g/l class is similar to the g/n class in having a consonantal prefix in the plural and vowel-initial forms in the singular. There are some differences, though, with respect to vowel reduction and the behavior of the labio-velar glide [w].

Central vowels, as in the other classes, do not show reduction or deletion of the initial vowel. There are no forms with an initial [a]. Instead, [w] precedes the vowel [a], and is not present in the plural.

(24)		<i>Singular</i>	<i>Plural</i>	
	a.	Λδόνιə	Λδόνιə	‘young woman with 2/3 kids’
	b.	Λγιə	Λγιə	‘person with mental illness’
	c.	wájá	lájá	‘fly/bee’
	d.	wárá	lárá	‘chicken’

Front vowels exhibit the familiar reduction to [ə]. All these forms have a following labial consonant. There are no cases of deletion.

(25)		<i>Singular</i>	<i>Plural</i>	
	a.	evaja	ləvaja	‘poor person’
	b.	ibín	ləbín(anda)	‘sister/brother-in-law’
	c.	imΛgəniə	ləmΛgəniə	‘excrement, filth’

Back round vowels show reduction to [ə], some also with labialization (26f-j). There are no cases of deletion, presumably due to the poor initial sequence that [l] plus another consonant would create.

(26)		<i>Singular</i>	<i>Plural</i>	
	a.	ome	ləme	‘fish’
	b.	ómóná	lámóná	‘tiger’
	c.	oβ ^w :á	ləβ ^w :á	‘woman’
	d.	uɕjí	ləɕjí	‘person’
	e.	umiə	ləmiə	‘boy/child’
	f.	op:á	ləp: ^w á	‘grandmother’
	g.	uðə	ləð ^w ə	‘worm’
	h.	úɖÁrén	ləɖ ^w Árén	‘uncle’
	i.	umərtín	ləm ^w ərtín	‘co-wife’
	j.	úɖÁdíə	ləɖ ^w Ádíə	‘grandfather, elder’

There are two forms that show no reduction or deletion.

(27)		<i>Singular</i>	<i>Plural</i>	
	a.	ugi	lugi	‘type of tree’
	b.	orəwa	lorəwa	‘brother’

In parallel with the analysis for the g/n class, the g/l class also is best analyzed with a root vowel. There is only one slight complication with the initial wa... forms in (24c-d). The g/l class corresponds to class 1/2 gwu- / li- class in Stevenson's (1956-57) Koalib-Moro group (Schadeberg's (1981) Heiban group). This suggests that the initial velar was deleted in Moro, and that the [w] was deleted before all vowels except [a]. This means that the forms wájá and wárá have an initial w- noun class prefix.

4.4. Unpaired class forms

There are two unpaired class forms with initial vowels. Like the paired class forms, they are divided between the j- and g- concord classes:

(28)

Class	Initial segment	Concord segment	Singular	Initial segment	Concord Segment	Plural	Gloss	#
j	V/s	j- s- (k-)	ibəg ^w á aveja	*	*	*	‘fog’ ‘liver’	11
g	V	g- k-	evéa áñálá	*	*	*	‘sand’ ‘haze’	15

All the initial vowels in the j-class are central or front. Those words beginning with a central vowel (such as *aveja* ‘liver’) have a locative form with [k] like the singulars of the j/j class pairing (*ékávějá*). Those words beginning with a front vowel (such as *ibəg^wá* ‘fog’) have a locative form with [s] like the plurals of the j/j class (*ísibəg^wá*). Based on these similarities, the j-class listed in (28) may actually be two separate classes, the two classes that make up the j/j class pairing. Determining whether these forms have prefixes or root vowels is complicated by the fact that there is no plural pairing; a prefix analysis can only be hypothesized based on the analysis given to the j/j class pairing. By similar reasoning, the g-class is parallel to the singular of the g/l and g/n classes, and the initial vowel should therefore be treated as a root vowel. Indeed, there are a range of initial vowels attested in the unpaired g-class, just as in the paired g classes. Based on these similarities, we conclude that the unpaired class forms are best treated as subsets of the j/j and g/n or g/l class pairings.

5. Conclusion

In conclusion, Moro has a pervasive noun class system with eight major class pairings and five unpaired classes, along with five minor classes. Semantic cohesiveness is evident only in some classes, and then not for all members. Vowel-initial nouns fall into two groups, those that have vowel prefixes (the j/j class pairing) and those in which vowels are part of the root, though they may delete or reduce following the plural prefix. This latter type is found in the g/l and g/n classes. For the unpaired classes, although it is hard to be certain as there are no alternations, we unify these with paired classes by again positing both a root vowel analysis and a prefix analysis. This study has contributed to our understanding of noun classes in Kordofanian languages, and shown that while Moro can use both consonant and vowel prefixes to signal class membership, not all initial vowels should be analyzed as prefixes.

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