Title
Morphological Evidence for the Coherence of East Sudanic

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abstract/ East Sudanic is the largest and most complex branch of Nilo-Saharan. First
mooted by Greenberg in 1950, who included seven branches, it was expanded in
his 1963 publication to include Ama (Nyimang) and Temein and also Kuliak, not
now considered part of East Sudanic. However, demonstrating the coherence of
East Sudanic and justifying an internal structure for it have remained
problematic. The only significant monograph on this topic is Bender's The East
Sudanic Languages, which uses largely lexical evidence. Bender proposed a
subdivision into Ek and En languages, based on pronouns. Most subsequent
scholars have accepted his Ek cluster, consisting of Nubian, Nara, Ama, and
Taman, but the En cluster (Surmic, E. Jebel, Temein, Daju, Nilotic) is harder to
substantiate. Rilly has put forward strong arguments for the inclusion of the
extinct Meroitic language as coordinate with Nubian. In the light of these
difficulties, the paper explores the potential for morphology to provide evidence
for the coherence of East Sudanic. The paper reviews its characteristic tripartite
number-marking system, consisting of singulative, plurative, and an unmarked
middle term. These are associated with specific segments, the singulative in t- and
plurative in k- as well as a small set of other segments, characterized by complex
allomorphy. These are well preserved in some branches, fragmentary in others,
and seem to have vanished completely in the Ama group, leaving only traces now
fossilized in Dinik stems. The paper concludes that East Sudanic does have a
common morphological system, despite its internal lexical diversity. However, this
data does not provide any evidence for the unity of the En languages, and it is
therefore suggested that East Sudanic be analyzed as consisting of a core of four

demonstrably related languages, and five parallel branches which have no internal hierarchy.

1. Introduction

The East (formerly "Eastern") Sudanic languages, spread between Chad and Northern Tanzania, constitute a branch of Nilo-Saharan with a proposed membership of nine families, including Nilotic, the largest and most complex group. We owe the original concept of East Sudanic to Greenberg who attributed seven branches to it,[1] shown in **Table 1**, together with their modern names. Families unknown to Greenberg are added in the "Current" column.

Greenberg (1950)	Current
Nubian	Nubian + Meroitic
Beir-Didinga	Surmic
Barea	Nara
Tabi	Eastern Jebel
Merarit	Taman
Dagu	Daju
Southern	Nilotic
	Nyima
	Temein

Table 1. Greenberg's original concept of East Sudanic

Greenberg was not aware of Nyimang and Temein, and these were added later in Greenberg together with Kuliak,[2] now considered by Bender to be a separate branch of Nilo-Saharan.[3] Greenberg claimed East Sudanic was part of "Chari-Nile," a group which included Central Sudanic, Kunama, and Bertha.[4] Chari-Nile is also now not thought to be valid.[5] Somewhat confusingly, Tucker had earlier published a book entitled *The Eastern Sudanic Languages* but it is largely about

Central Sudanic, Ubangian, and Nilotic languages.[6] Prior to Greenberg, many individual languages or small groups had been described in Tucker & Bryan, but they were not combined into a larger unit.[7] Greenberg makes a large number of proposals for grammatical and lexical isomorphs, which more recent scholars have not followed up in detail.[8]

East Sudanic languages are by far the most well-known branch of Nilo-Saharan, with Nilotic and Nubian the main focal points. This is undoubtedly a reflection of the cultural prominence of the speakers and their relative accessibility. However, rather like Bantu, Nilotic represents a recent expansion and is only a fragment of the internal diversity of Eastern Sudanic. Nubian has attracted researchers because of its old manuscript attestations and epigraphic tradition. It has long been suspected that the extinct Meroitic language is part of East Sudanic,[9] but the small number of unambiguously identified lexemes made this argument difficult to sustain. However, with the work of Rilly and Rilly & De Voogt this argument can be considered secure.[10] Rilly places Meroitic as coordinate with proto-Nubian as part of his "Northern East Sudanic" family. **Map 1** shows their approximate distribution in recent times.

Map 1. The East Sudanic languages

The nine branches remain the accepted listing with some relatively minor reassignments. There have been few attempts to synthesise data on East Sudanic, the unpublished MSc thesis of Ross,[11] who was a student of Bender, and Bender's own studies and monograph.[12] The study by Starostin of Nubian–Nara–Tama is part of a project to re-evaluate East Sudanic as a whole from the point of view of

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lexicostatistics.[13] Bender gives basic phonologies representative of each branch, as well as an argument for the coherence of East Sudanic based principally on lexical evidence. This latter was locally printed in Carbondale and is best described as problematic to read for those who are not strongly motivated to penetrate its forest of acronyms and compressed citations. It has therefore had a very limited impact on Nilo-Saharan studies. However, it is full of interesting suggestions for isoglosses and presents an elaborate table of sound correspondences, so it undoubtedly merits close study. Unlike Bender's Omotic compendium,[14] it does not include original lexical forms systematically, and hence each entry needs to be rechecked against original and more current source data. It is safe to say Bender's publications did not have a resounding impact on the scholarly community.

Despite its previous acceptance, the published arguments for the coherence of East Sudanic remain weak. No unambiguous innovations, lexical or phonological, mark all branches as members. Some researchers have expressed scepticism about its unity. However, studies of East Sudanic by Dimmendaal broadly accept the classification of Bender,[15] although using very different criteria for accepting its coherence. However, Güldemann remains sceptical, arguing that internal typological differences may be evidence for convergence rather than genetic affiliation.[16] The *www/*Glottolog takes a far more extreme position, treating all branches as distinct families.

2. Lexical evidence

2.1. East Sudanic as a Unity

Claims for the reality of East Sudanic are largely based on lexical evidence. Bender proposes the most significant set of proposals in this area,[17] but Greenberg's original argument also includes some suggestions. Assuming the coherence of East Sudanic, the proposals for an internal structure are tenuous. Bender has argued in various places that East Sudanic has two main subdivisions, which he notates Ek and En, on the basis of the first person independent pronoun (**Table 2**).[18]

Ek	Branch	En	Branch
E1	Nubian	E2	Surmic
E3	Nara	E4	Eastern Jebel
E5	Nyima	E6	Temein(?)
E7	Taman	E8	Daju
		E9	Nilotic

Table 2. Bender's subclassification of East Sudanic

The first person singular subject pronoun in East Sudanic, first set out by Greenberg and later supplemented by Bender, forms a distinctive set (**Table 3**):

Branch	Language(s)	Form
Nubian	Nobiin	*ay*
Nara	Nara	*ag*
Nyima	Ama	*a(i)*
Taman	All	*wa, wo*
Surmic	Didinga	*a*
Surmic	Kwegu	*aan*
Eastern Jebel	Gaahmg	*aan*
Temein	Ronge	*nan*
Daju	Nyala	*aaga*
West Nilotic	Dinka	*an*
East Nilotic	Masai, Turkana, Nandi, Teso	*nanu*
South Nilotic	Pokot	*anii*

Table 3. First person singular subject pronoun in East Sudani[19]

Even this dataset does not entirely support Bender's division, since Daju appears to fall in the Ek group. The forms with a nasal largely correspond to Bender's En, while those without nasals correspond to Ek. However, on this evidence, the presence of a velar cannot be said to characterise all Ek languages.

2.2. The Ek Languages

Bender, Ehret, Rilly, and Starostin agree that at least Nubian, Nara, Tama, and perhaps Nyimang form a subgroup (Ehret's "Astaboran").[20] The lexical tables below provide a summary version of the compilations of Rilly sometimes with updated citations. **Table 4** shows the Ek forms for "drink" which seem to refer to a protoform *dii.*

Subgroup	Language	Attestation
Nara		*líí*
Nubian	Dilling	*di*
Nubian	Midob	*tìì*
Nyima	Ama	*lì*
Taman	Proto-Taman	*li(y)-*

Table 4. Ek lexical isogloss, "drink," *dii*[21]

Table 5 shows a common form for "house," assuming Nubian preserves a velar lost in the other languages. The vowel is not entirely clear, but I provisionally reconstruct a mid central vowel.

Subgroup	Language	Attestation
Nubian	Midob	*kàr*
Nubian	Nyala	*aare*
Nara		*wǒl*
Nyima	Ama	*wel*
Taman	Tama	*wal*

Table 5. Ek lexical isogloss, "house," *kəl*[22]

Table 6 shows a lexical isogloss for "mouth," *aŋəl.* However, the Eastern Jebel language Gaamhg also appears to be either cognate or else a loan, so this constitutes slightly imperfect evidence.

Subgroup	Language	Attestation
Nubian	Andaandi	*agil*
Nara		*aùlò*
Nyima	Ama	*ŋàl*
Taman	Abu Sharib	*awl*
E Jebel	Gaahmg	*ag*

Table 6. Ek lexical isogloss, "mouth," *aŋəl*[23]

Table 7 presents the evidence for the lexical isogloss, "two," perhaps *wari(m)* if the *-m* in Nyima is to be included.

Subgroup	Language	Attestation
Nubian	Haraza	*auri-yah*
Nubian	Old Nubian	*uwo*
Nubian	Karko	*ārè*
Nara		*ari-ga*
Nyima	Proto-Nyima	*arm-*
Taman	Proto-Taman	*wari*

Table 7. Ek lexical isogloss, "two," *wari(m)*[24]

2.3. The En Languages

Though the En languages share overlapping isoglosses, they do not share enough common material to be conclusively considered a genetic unity. Bender recognizes that the arguments for membership of Temein in his En group are sketchy. **Table 8** presents one of Bender's better common glosses.

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Subgroup	Language	Attestation
Surmic	Murle	***ɓɔ****lɔ́ɔ́k*
E Jebel	Aka	***bəəb****a*
Temein	Temein	***pɔ̀p****átɪ̀ʈ*
Daju	Liguri	ku****ɓu****du
E Nilotic	Lopit	a.**bob**.io
E Nilotic	Maa	a.**bob**.oki

Table 8. En lexical isogloss, "bark n.," *-bob-

3. Morphological Evidence

In the light of these problems with the lexicon, it may be that a better case for East Sudanic can be made on the basis of morphology. Bryan had already noted the existence of a "t-k substratum" in a variety of languages across East-Central Africa.[25] These elements are affixes on nominals associated with number marking. Her argument is somewhat confused, as this feature is unlikely to be a substrate feature of some lost phylum. Most plausibly, it is a feature of Nilo-Saharan which has been borrowed *into* Afroasiatic (since it is definitely not a widespread feature of Afroasiatic). Bryan identifies the following morphological elements:

> › Singulative -*t*
> › Plural -*k*
> › Plural -*N*

The majority of languages she uses to exemplify this principle would now be classified as East Sudanic. Greenberg calls moveable *k-* a "stage III article"[26] while Ehret calls it both an "adjective suffix" and a "noun particularizing prefix."[27] Bender, who considers it a "noun-class formative remnant,"[28] notes that it is widespread but not universal in Nilo-Saharan. Also included are some Cushitic languages, but the extension of the "substratum" is somewhat strained. The T-affix in Afroasiatic is a widespread marker of feminine gender and a deep level connection with Nilo-Saharan through semantic shift is not impossible. Bender also discusses N-affixes in Nilo-Saharan,[29] reprising observations by Tucker &

Bryan.[30] Storch also takes up the issue of N/K and T/K alternations in relation to Nilotic noun morphology.[31]

These affixes are certainly present in East Sudanic languages along with others. Many languages also permit gemination or consonant doubling. The origins of gemination in suffixes remains in doubt, but may arise from resuffixing, just as long consonants in Niger-Congo can arise from reprefixing in noun class languages. Moreover, nominals in East Sudanic can allow "affix-stacking," the addition in sequence of one or more affixes as part of historical stratification.

The paper considers each branch of East Sudanic in turn, and briefly lays out the evidence for the affix system, as well as the presence of gemination and stacking. Discussion of the membership of individual branches, and their structure is not given here, but can be consulted in standard references.[32]

4. Individual Branches

4.1. Nubian and Meroitic

Nubian demonstrates strong evidence for tripartite number marking in nouns. Jakobi & Hamdan describe Karko, which has a restricted system of suffixed singulatives, where -Vt and -$ɖ$ are allomorphs (**Table 9**).

Gloss	SG	PL
sorghum	wèê-t	wèè
hair	ʈēʈ-ét	tèèl
bulrush millet	ènɖ-ét	ènɖ
tooth	jíl-ɖ	jīīl
breast	āl-ɖ	ɔ̄ɔ̄l

Table 9. Karko singulatives[33]

However, the majority of suffixes denote plurals (**Table 10**). The majority seem to be allomorphs of the singulative suffix, thus $ɖ$ ~ Vl ~ Vr, with a distinct second set, $Vɲ$ ~ $Vŋ$. The suffix -Vnd may be a composite of the nasal and alveo-dental suffixes.

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Gloss	SG	PL
body	îl	īl-ḍ
heart	áàl	āl-ḍ
star	ōnḍ	ōnḍ-ôl
milk	éèj	ēj-ēl
chicken	kòk	kōk-ôr
cat	bùt	bùt-ùr
blood	ōg	ōg-ōnd
fire	úk	ūk-ūnd
river	ìr	īr-ỉɲ
rope	àr	ār-ɔ̀ɲ
shield	kàr	kàr-ɔ̀ŋ
ostrich	ṭùlḍ	ṭùlḍ-ùŋ

Table 10. Karko plural marking[34]

Proto-Nubian may have had a fully functional tripartite system, which has now eroded leaving both singulatives and plurals, but not simultaneously. Once allomorphy is taken into account, the available affixes are very restricted. A language such as Midob has a still more reduced system, with only the alveo-dental *t ~ di* (**Table 11**).

Gloss	SG	PL
thing	sáar	sàartì
house	àd	àttì
child	úccí	ùccédí
woman	íddí	ìddédí
cow	tɔ̀ə	tɔ̀yítì

Table 11. Midob nominal plurals[35]

The restricted corpus for Meroitic and the absence of reliable grammatical information makes it problematic to know the nature of its affix system.

However, a couple of glosses which are considered reliable almost certainly show singulatives comparable to other Nubian languages:

Gloss	Transliteration	Approx. pronunciation
sister	*kdise, kdite*	/kaɖiɕ, kaɖit/
life	*pwrite*	/bawarit/

Table 12. Meroitic glosses showing singulative marking[36]

4.2. Nara

Nominal plurals in Nara are created through suffixing and sporadic gemination of the final consonant. The six plural classes are shown in **Table 13**. There are weak correlations with semantics and these are given only as indicative:

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Suffix		Gloss	SG	PL	Semantics
-ka	-K	fox	kerfe	kerefka	animals
		animal	oof	oofka	
-ta	-T	heart	asma	asimta	body parts
		meat	nooti	noota	
-a	-V	ear	tus	tusa	animals and plants
		thorn	keer	keera	
-tta	-T	blood	kito	kitotta	collectives(?)
		grass	sum	sumitta	
-CCa	-I	bride	solobi	solobba	people, animals
		goat	bele	bella	
-ʤʤa	-S	gland	foʤi	foʤʤaa	internal secretions
		milk course	ngiʤi	ngiʤʤaa	

Table 13. Nara number marking in nouns[37]

The plurals in last three classes which involve consonant doubling and change the final vowel to -*a* may simply be allomorphs of an underlying -*a* suffix. These may derive from a single rule and thus not exemplify the characteristic East Sudanic suffixes.

4.3. Nyima

Nyima covers two related languages, Nyimang and Afitti, now usually known as Ama and Dinik respectively. Both languages have retained only traces of the complex noun morphology characteristic of other East Sudanic branches. Ama nouns have a single plural-marking suffix, -*ŋi* (or -*gi* after a liquid). Even this is

dropped when number can be inferred from either a numeral or a quantifier. There are a small number of suppletives for persons:

Gloss	SG	PL
person, PL people	wodáŋ	wàá
child	wodéŋ	ɗúriŋ

Table 14. Suppletive plural forms in Ama

Reduplication can be used to express collectives, e.g., ɗàmì "egg"; ɗàɗàmì "all the eggs."

Otherwise the loss of most plural marking is very marked in comparison with related branches. For Dinik, De Voogt notes number marking briefly, which he states is only applied consistently to animates. Dinik has three plural markers, -gòr, -ná, and -é.[38] A comparison of the lexicon of Dinik yields some possible evidence for fossil affixes. Dinik in particular has a wide range of nominals with -Vk suffixes (**Table 14**).

Gloss	Attestation
river	kwələk
dura sorghum	mənək
scorpion	ŋwunək
grave	tirik
lightning	arsək
salt	ərdik
spear	mətsək

Table 15. The fossil affix -Vk in Dinik[39]

Despite their lexical affinity to the Ek branch, Nyima languages have all but lost their indicative noun morphology. However, as Norton observes,[40] the characteristic t/k alternations are well preserved in the verbal system in the distinction between factative and progressive. **Table 16** exemplifies this alternation.

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Gloss	Factative	Progressive
build	t̪-ùg-è	k-ūg
dig	t̪-īw-ò	k-íw
light (fire)	t̪-ūɕ-ē	k-úɕ-ín
build	tugɛ̀	kwò
chop	tàiɔ̀	kaì
dig	tìwò	kìù

Table 16. T/K marking on Ama verb stems[41]

Norton has a lengthy argument about how the nominal alternation became attached to verbs, which he summarises as follows:

> I therefore propose that this class of verbs attests the Nyima cognate of the wider Nilo-Saharan T/K alternation. This entails a chain of events in which the T/K alternation first moved from the noun (singular/plural) to the verb (singulactional/pluractional), and then shifted in meaning from verbal number to verbal aspect (factative/progressive) [...]. Seen in this light, the significance of moving T/K morphology onto verbs in the Nyima branch is that it renewed an existing system of irregular singulactional/pluractional alternations.[42]

This shift from the nominal to the verbal system suggests that Nyima need no longer be treated as the missing piece in the puzzle of East Sudanic morphology.

4.4. Taman

Descriptions of the morphology of Taman languages are very limited. Kellermann provides a summary of number marking in nouns, based on the manuscript material of Stevenson (**Table 17**):

Affix	SG	Affix	PL	Gloss
-t	mèya-t	-k	mèya-k	blacksmith
-t	wìgɪ-t	-ɛ	wìgɪ-ɛ	bird
-V	áunyɒ̀	-(V)k	áunyɒ̀-k	elbow
-Ø	gaan	-(V)k	gaan-ɪk	tree
-Ø	wal	-V	wal-u	house
-k	taɽ-ak	-V	taɽ-o	chief
-X	iɲ-o	-(V)n	iɲ-iɲ	pot
-Ø	áwór	-(V)ŋ	áwór-oŋ	knee

Table 17. Tama nominal number-marking[43]

As with other East Sudanic languages, once allomorphy is taken into account, number-marking affixes are quite reduced. Tama has -t, -k, -(V)N, and an underspecified vowel. No examples of synchronic tripartite number marking are given, but the use of -t in the singulative and the "moveable" -k all point to this as formerly operative. The underspecified *V* in -*VC* suffixes suggests compounding, as in other East Sudanic languages.

4.5. Surmic

Surmic displays abundant evidence for three-term number marking. **Table 18** shows its operation in Laarim:

Gloss	SG	Generic	PL
gazelle	boronit	boron-	boronua
nail	gurmalotʃ	gurmal-	gurmaleeta

Table 18. Tripartite number marking in Laarim[44]

Yigezu & Dimmendaal focus on Baale and **Table 19** shows its number marking system and identifiable affixes. The variability in Baale is extremely high with many minor differences, so the analysis is not always certain. For example, "stomach" might represent an original -*NV* affix, eroded by the subsequent addition of the -*TV*.

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Gloss	Affix	SG	Affix	PL
arm, hand	-Ø	ayí	-NV	ayinná
moon	-Ø	ɲʊló	-KV	ɲɔlɔgέ
man, person	-Ø	éé	-TV	eeṭá
goat	-Ø	έέs	-TV	έέta
head	-A	ɔwá	-TV	ooti
face, forehead	-A	ŋʊmmá	-TV	ŋuundí
stomach	-A	kɛŋɲá	-TV	keendi
ear	-NV	ɪtááni	-NV	ɪnná
rope	-S	mɔssájí	-N	mɔɔssén

Table 19. Baale number marking and affixes[45]

From this evidence, Baale has singulars in *-(N)A, -S,* and *-NV* and plurals with *-KV, -TV,* and *-N.*

4.6. Eastern Jebel

To judge by the data in Bender,[46] Aka has a richer system of number marking than Gaahmg. Extracting the affixes from the system of number-marking, the following (at least) occur (**Table 20**):

Gloss	Affix	SG	Affix	PL
tongue	-Ø	kala	-A, -T	kala.ati
knee	-Ø	kʊsu	-N	kʊsuu.ŋi
belly	-Ø	ɛllɛ	-T	ɛllɛ.ti
ear	-Ø	sigii	-T	sigii.de
fish	-Ø	ʔʊʊgu	-T	ʔʊʊgu.ði
dog	-Ø	kɛle	-V	kɛle.i
bone	-K	gamoo.ka	-N	gamoo.ŋi
egg	-K	ʔʊmuu.ke	-T	ʊʊmʊ.ti
horn	-K	kɔsʊl.ge	-V	kɔsʊʊl.i
cloud	-V	aabuga	-T	aabug.adi

Table 20. Examples of Aka number marking on nouns[47]

As with Gaamhg, nouns can have zero marking, singulatives a velar or underspecified vowel, with plural affixes *-Ti, -Ni,* or a single vowel. Some plural suffixes, such as *-aTi,* probably combine two affixes, a pattern found elsewhere in East Sudanic.

4.7. Temein

Temein consists of three languages, Temein, Keiga Jirru, and These.[48] Surface forms for number marking in Temein are highly diverse and not easy to predict, even though the basic elements are relatively few. Temein languages operate a three-way system of number-marking with an unmarked form plus singulatives and pluratives, also known as "replacive."[49] However, the erosion of this system has meant that nouns where three terms occur synchronically are relatively rare. **Table 21** shows some examples of these:

Language	Gloss	SG	Unmarked	PL
Temein	dura	*mórɪŋɪnʈɛʈ* (one grain)	*mórɪŋɪs* (head of grain)	*mórɪŋ* (dura plant)
Keiga Jirru	meat	*bɪlanɖàk* (one piece)	*ɪnɖàk*	*kɪnɖaɖìk*
Keiga Jirru	medicine	*móreɖàk*		*komórò* (roots)
These	fat (n.)	*nányéɖɔ̀k*	*nányàʔ*	*kɪnányàʔ*

Table 21. Tripartite number marking in the Temein cluster

Number marking in Temein displays typical Nilo-Saharan characteristics, although these are combined in ways that are difficult to predict for individual nouns. The most common elements are:

› "Moveable k-" (with an underspecified vowel), prefixed, suffixed or both, where prefixed *kV-* is a typical strategy for Arabic loanwords
› Addition of final *–NI*
› Addition of final *–a[ʔ]*
› Singulative marking with *–Iʈ, -Is*
› Vowel lengthening and unpredictable changes in vowel quality
› Changes in ATR quality of the vowel
› Suppletion is present although not always easy to identify due to vowel changes and shortening

4.7.1. Prefix *k-*

In the Temein cluster *k-* is strongly associated with plurals and can occur before, after, and at both ends of a word. The underspecified vowel often results in a copy of the stem vowel, though not in every case. The vowel can disappear when the stem begins with an approximant. *Table 22* shows surface forms in Temein:

Gloss	Unmarked	PL
belly	óòm	kómɪk
big	m̋bù	kɪmbɪk
hill, stone	kúrɛʈ	kukúrɛʈ
shield	wór	kwòráʔ

Table 22. Temein -*Vk, kV*- nominal affixes

This affix has an allomorph –*Vk* that can mark singulative as in These (**Table 23**):

Gloss	SG	Unmarked
firewood	márɛnyɪk	márɛŋ
ear	ŋwánɪk	kwɛɛŋ
eye	náánɪk	kɛnyɪŋ
fish	kɛlɛɖak	káála

Table 23. These -*Vk* singulative affix

In the case of the singulative for "fish," it appears that it has already been marked once as a singulative with –*ʈ* and the –*Vk* has been subsequently affixed.

4.7.2. Final –*NI*

Less common is –*NI* or -*IN* in final position. Temein examples are shown in **Table 24**:

Gloss	Unmarked	PL
friend	wórɪnyà	kórɪnyànì
hanging frame	sɛsɪlàŋ	sɛsɪlàŋì
moon	kóù	kikówɪn

Table 24. Temein -IN, -NI plural affix

The following affixes can thus be attributed to Temein, -*T, -K, -N, -S, -V*. Temein shows no evidence for consonant gemination.

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4.8. Daju

Daju languages also show evidence for the characteristic three-way number-marking contrast of Nilo-Saharan, albeit realised in a fragmentary way in many languages. Stevenson describes the three-way contrast in Shatt Tebeldia:

> Many nouns have three forms, representing mass or collective / unit / units. [...] The suffix is then replaced by another, or a further suffix is added, to denote the plural of the unit. [...][50]

This is shown for two glosses in **Table 25**:

Gloss	SG	Unmarked	PL (countable)
egg	*gilis-ic*	*gilis*	*gilis-u*
worm	*ox-uic*	*ox*	*ox-uij-iny*

Shatt and Laggori at least have considerable diversity of surface affixes marking number, either singulative or plural with suffixes as well as *replacing word endings.[51] Boyeldieu describes the number marking in Shatt Damman in some detail (**Table 26**).

Category	SG	PL
SG/pl. alternation	-V	-u
	-x	-ɲ
	-c	-ɲ, -ic/-iɲ, -d(d)ic/-d(d)iɲ
	-ic	-u
	-(ɨ)c	-ta/-d(d)a
PL only		-iɲ
		-u
		-ta/-d(d)a
		-ti/-d(d)i
		-tiɲ
		-dɨk
SG only	-ic	
	-tic/-d(d)ic	
	-c	
	-sinic/-zinic	

Table 26. Number-marking suffixes in Shatt Damman[52]

Boyeldieu also lists a significant number of irregular forms. There are three classes of noun, those with alternation, and those with singulatives and those with plurals. It appears there are now no examples of three-way contrast. Despite the surface variety, allomorphy suggests there are five underlying affixes, *-N, -T, -K, -y,* and *-V* where *V* is a high back vowel. In addition, the *-x* suffix may an allophone of an underlying fricative, i.e., *-S* (*s* ~ *z*), which would give Daju a complete set of East Sudanic affixes. Some singulative suffixes, such as *-zinic,* illustrate multiple compounding. There are, however, no examples of gemination.

The alternating nominal suffixes of Dar Daju described by Aviles present a far simpler set.[53] Every noun has one of four singular suffixes. Aviles calls these "classificatory" although they have no obvious semantic association. These alternate with four plural suffixes, although these all appear to be allomorphs of *-ge* (**Table 27**).

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Class	Gloss	SG
1	elder	*jam-ne*
2	liver	*cacaw-ce*
3	mouth	*uk-e*
4	car	*watir-i*

Table 27. Singulative suffixes in Dar Daju[54]

The singulative suffixes -*NV*, -*ʧV*, and -*V* (where *V* is a front vowel) can be attributed to Dar Daju.

4.9. Nilotic

4.9.1. West Nilotic

The principal overview of noun morphology in West Nilotic is presented by Storch. Western Nilotic also has an emergent classifier system, described in some detail in Storch but omitted here. **Table 28** summarizes the affixes of West Nilotic:

Semantics	Mayak	Mabaan	Jumjum	Dinka	Nuer
general	-*(V)k*	-*k(ã̰)*	-*kV*	-*k, -V*	
general	-*(V)n*	-*Ciņ*	-*ni*	-*N, -V*	-*ní, -V̰*
round, mass, small		-*ăņ*			
body		-*kù*			-*c*
space					(*-N?*)
unspecified		-*λ*			-*y*
unspecified	-*iṭ*	-*ṭăn*		-*ṭ*	-*ṭ*
abstract	-*d̰ín*				

Semantics	Anywa	Päri	Shilluk	Lüwo	Thuri
general	-k, -Ci, Cè	-ki, -ke	*-k	-kλ	-k
general	-Ci?, -Cè?	-Neʔ	-V(N)	-V, -ɛ, -NVɛ́	-Ni, -in, -Nɛ́, -ɛ́n
round, mass, small	-i	-e	(.̀), (ʔ)	-ɛ́	-ɛ́
body	-Ci	-ì		-ì	-ì
space					
unspecified			[.̀]		
unspecified	-t, -Cè	-rí, -te	-Vdi	-t̪	-d̪i
abstract					

Semantics	Belanda Bor	S. Lwoo	Labwor
general		-k(V), -ke	-gV
general		-ni, -n(í)n, -ne	-ni, -né
round, mass, small		-e	-é, -i
body		-i	-i
space			
unspecified			
unspecified		*-ti, -(t)àʔ	-(C)áʔ
abstract			

Table 28. Number marking affixes in West Nilotic[55]

If we presume the same processes of allomorphy as elsewhere in East Sudanic, the number marking affixes of Proto-West Nilotic can be summarized more briefly:

› Underlying affixes: -KV, -TV, -NV, -V
› Compound affixes: -TVN, -VTV, -VNV

4.9.2. East Nilotic

The only survey of East Nilotic lexicon remains Voßen's,[56] and this can provide an impression of number marking morphology, although descriptions of individual languages provide more detail. For example, Kuku has unmarked nominals, with singulatives in some cases, and plurals, both suffixed. **Table 29** shows examples of the main number-marking strategies in Kuku.

Gloss	Affix	SG	Affix	PL
cattle tick	-T(T)	mísír.itít	-Ø	másêr
black ant	-T	múkúɲ.êt	-Ø	múkûn
Bari	-N + -T	bari.nít	-Ø	barɪ
hippo	-Ø	yáró	-S + -N	yáró.ɟɪn
school	-Ø	sukúlu	-K	sukúlu.kíʔ
nose	-Ø	kʊmé	-S	kʊmé.sɪʔ
cheek	-Ø	ŋébí	-T	ŋébí.at
speck	-Ø	bérɛt	-N	bérɛt.án
hedgehog	-Ø	leɲipúdut	-T + -M	leɲipúdu(t)lín
knife	-Ø	wálí	-V	wálí.a

Table 29. Kuku singulatives and plural markers[57]

The underlying logic of the singulatives is evident; nouns that are considered inherently plural are unmarked, with individuals marked by suffix. Thus "Bari" is a nation and the singulative applies to a Bari person. The suffixes are all allomorphs of a basic -VT form, except for the additional nasal, which is either a person marker or the nasal also occurring in the plural. Plural suffixes can be reduced to a dental, a velar, a nasal and an underspecified vowel. The only unusual feature is the -sɪʔ suffix, which may be innovative.

4.9.3. South Nilotic

There are two published reconstructions of South Nilotic.[58] Rottland includes a substantial comparative wordlist as well as discussions of number marking. Tucker & Bryan discuss number marking with respect to Pokot and Nandi-Kipsigis. Based on their illustration of Pokot, **Table 30** extracts a sample of

singular/plural pairings in Pokot, which illustrate singulatives in *-V(V)N* and *-tV* and plural in *-kV.-V(V)* suffixes are also common, but it is unclear how many are allomorphs and how many are distinct roots.

Gloss	Affix	SG	Affix	PL
the calf	*-Tv*	*mɔ̀ɔ̀y.tâ*	*-V*	*mɔ̀óy.eeʔ*
the duiker	*-Tv*	*cèptĭrkìc.tá*	*-kV*	*cèptĭrkìc.kâ*
the flea	*-VN + -Tv*	*kɔ̀mɔ̀tyàán.téɛ́*	*-kV*	*kɔmɔ́t.kâ*
the spear	*-Tv*	*ŋɔ̀t.ɔ́t*	*-V, -V(V)*	*ŋät.w.éè*
the lover	*-VN + -Tv*	*càmíín.téè*	*-V*	**càm.í*
the barred door	*-V*	*màràn.èéʔ*	*-kV*	*màrân.kâ*

Table 30. Examples of Pokot number marking[59]

Pokot shows evidence for an original singulative *-V(V)N,* which has been resuffixed with *-tV(V).*

The number system of Endo, another language of the Markweeta (Marakwet) group, is described by Zwarts. Endo has a wide range of singulative suffixes shown in **Table 31**, although once allomorphy is considered, they can probably be reduced to a rather simpler set. Zwarts argues that plurals constitute the unmarked set.

Gloss	Affix	SG	PL
cloud	*-tV*	*pool.ta*	*pool*
woman	*-ka*	*kāār.kā*	*kāār*
grasshopper	*-wa*	*taalim.wa*	*taalim*
cedar	*-wa*	*tārāāk.wā*	*taraak*
patch of grass	*-wa + -Vn*	*sīūs.wāān*	*sūūs*
medicine	*-wa + -Vn*	*saakit.yaan*	*saakit*
European	*-Vn*	*chūmp.īīn*	*chumpa*
shoe	*-V*	*kwēēr.ā*	*kwēēr*

Table 31. Endo singulative suffixes[60]

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Underlyingly, therefore. Endo has the singulatives *-V(V)N, -tV, -V, -kV,* and an unmarked plural. Despite the surface differences, the West Nilotic system in these two examples is broadly similar.

4.10. Synthesis

A feature of East Sudanic, and indeed Nilo-Saharan more generally, is extensive allomorphy. Each affix appears under several guises, often reflecting the stem to which is suffixed. **Table 32** shows the typical allomorphs of East Sudanic nominal affixes:

Affix	Interpretation	Typical allomorphs
-T	dentals	/t/, /ʈ/, /d/, /ɖ/
-K	velars	/k/, /g/
-N	nasals	/n/, /ŋ/, /ɲ/
-S	fricatives	/s/, /ʃ/, /dʒ/
-V	non-central vowels	/i/, /u/
-A	central vowels	/a/

Table 32: Allomorphs of East Sudanic nominal affixes

Table 33 shows the presence or absence of individual affixes in each branch, together with affix-stacking and gemination, as well as the table which supports this analysis.

Branch	-T	-K	-N	-V	-S	Aff. st.	Gem.	Ref.
Nubian	+	–	+	–	–	+	–	T. 9, 10
Nara	+	+	–	+	+	–	+	T. 13
Nyima	–	?	–	–	–	–	–	T. 15, 16
Taman	+	+	+	+	–	–	–	T. 17
Surmic	+	+	+	+	+	–	–	T. 19
E Jebel	+	+	+	+	–	+	–	T. 20
Temein	+	+	+	+	+	+	–	T. 22, 23, 24
Daju	+	+	+	+	+	+	–	T. 26, 27
W Nilotic	+	+	+	+	–	+	–	T. 28
E Nilotic	+	+	+	+	+	+	+	T. 29
S Nilotic	+	+	+	+	–	+	–	T. 30, 31

Table 33. East Sudanic nominal affixes and associated

The resultant pattern is not perfect but still indicative for the structure of East Sudanic. The number-marking suffixes form complete sets in En languages, with -S attested only in Nara. This implies that all five affixes were present in proto-East Sudanic but were preferentially lost in the Ek languages. Affix-stacking, though present in Nubian, is otherwise absent in Ek languages but is likely to be a retention from proto-East Sudanic. Gemination is too sparsely distributed to draw any conclusions, but is plausibly an independent development of no classificatory significance.

5. Internal Structure of East Sudanic

The evidence presented points to a common inheritance in East Sudanic number marking strategies. The distribution of affix-stacking and complete affix sets suggest that apart from common lexemes, Ek languages are characterized by a common loss of these characters. In the light of this, **Figure 1** presents a revised

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internal classification of East Sudanic, grouping together the Ek languages as Northern East Sudanic, but leaving the others as independent branches.
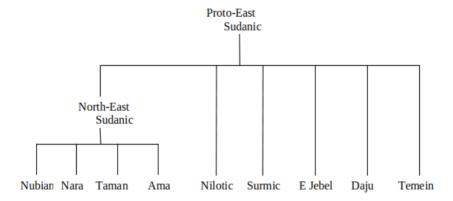
Figure 1. Proposed internal structure of East Sudanic[61]

It seems plausible that further results should be attainable from a deeper examination of the lexicon, since the effect of affix accretion and reanalysis obscures cognacy of roots.

6. East Sudanic within Nilo-Saharan

The attentive reader will have observed that many of the affixes identified in this paper have been attested outside the proposed East Sudanic. Indeed, the "t-k substratum" proposed by Tucker & Bryan is far more widespread. Particular candidates are Kuliak and Kadu, a subgroup sometimes excluded from Nilo-Saharan altogether. This section considers briefly the morphology of these two groups in relation to our understanding of East Sudanic.

I have explored this morphology in the Kadu languages while Gilley has looked into number-marking in Katcha in some detail.[62] Typically, Kadu languages have a three-term system with a singulative in *-t* and plural in *-k* and *-N*. They also have case-marking, which is only sporadically attested in East Sudanic languages and cannot be reconstructed, as well as sex-gender, which is entirely absent. This suggests that the *-T, -K,* and *-N* affixes can be reconstructed further back in Nilo-Saharan, but the *-V* and *-S* are distinctive to East Sudanic. The gemination found in Nara and East Nilotic is not recorded in Kadu, but may not be reconstructible to proto-East Sudanic.

The Kuliak languages, a small group in northeast Uganda which includes Ik, So, and Nyangi, were originally included by Greenberg within East Sudanic, but have long been treated as an independent branch of Nilo-Saharan. However, their lexicon has been heavily impacted both by their immediate neighbors, the Karimojong, but also by Southern Nilotic in some past era. Moreover, Lamberti has noted striking resemblances to the East Cushitic languages.[63] Heine presents an overview and reconstruction of Kuliak as it was known at the period.[64] More recently, Carlin and Schrock have provided extensive documentation of Soo and Ik (Icétôd).[65] Kuliak languages have three-term number marking, with singulative in *-T* and plurative in *-K, -N,* as well as allowing affix-stacking, but also have a striking nominal case-marking system not present in East Sudanic. There is no evidence for gemination.

In conclusion, East Sudanic is characterized by a series of affixes, which have developed out of a smaller set which are also present in related branches of Nilo-Saharan. Unlike Kadu, there is no trace of gender and the case marking. Case marking is also characteristic of Kuliak languages, which only have a reduced affix set. These suggest that there is a higher node within Nilo-Saharan which included these three branches, but that the East Sudanic language developed specific morphological features (or perhaps lost them at the level of the proto-language). It is striking that the lexical unity of East Sudanic is not more apparent, given the conservatism of the number-marking system.

7. Abbreviations

› A: any central vowel ±ATR;
› C: any consonant;
› I: any high front vowel ±ATR;
› K: velar consonant;
› N: any nasal consonant;
› PL: plural;
› S: any fricative consonant;
› SG: singular;
› T: any dental consonant;
› V: any vowel;
› X: any phoneme.

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18. Ibid.; Bender, *The Nilo-Saharan Languages.* ↵

19. Data from Bender, "The Genetic Position of Nilotic *i*" and Bender, *The East Sudanic Languages,* supplemented with more recent sources. ↵

20. Bender, *The Nilo-Saharan Languages*; Bender, *The East Sudanic Languages*; Ehret, *A Historical-Comparative Reconstruction of Nilo-Saharan*; Rilly, *Le méroïtique et sa famille linguistique*, and Starostin, "Lexicostatistical Studies in East Sudanic I." ↵

21. Nara and Ama data from Rilly, *Le méroïtique et sa famille linguistique*; Dilling, Midob, and proto-Taman data from Starostin, "Lexicostatistical Studies in East Sudanic I." ↵

22. Midob data from Werner, *Tìdn-áal*; Nyala data from Thelwall, "A Birgid Vocabulary List and Its Links with Daju"; Nara data from Hayward, "Observations on Tone in the Higir Dialect of Nara"; Ama data from Bender, "Roland Stevenson's Nyimang and Dinik Lexicon"; Tama data from Edgar, "First Steps toward Proto-Tama." ↵

23. Andaandi, Nara, and Abu Sharib data from Rilly, *Le méroïtique et sa famille linguistique*; Ama data from Bender, "Roland Stevenson's Nyimang and Dinik Lexicon"; Gaahmg data from Stirtz, *A Grammar of Gaahmg.* ↩

24. Haraza data from Bell, "Documentary Evidence on the Ḥarāza Nubian," 84; Old Nubian data from Browne, *Old Nubian Dictionary,* 138; Karko data from Jakobi & Hamdan, "Number Marking on Karko Nouns"; Nara data from Hayward, "Observations on Tone in the Higir Dialect of Nara"; Proto-Nyima data from Bender, "Roland Stevenson's Nyimang and Dinik Lexicon"; Proto-Taman data from Edgar, "First Steps toward Proto-Tama." ↩

25. Bryan, "The T–K Languages." ↩

26. Greenberg, "Nilo-Saharan Moveable-*k* as a Stage III Article." ↩

27. Ehret, *A Historical-Comparative Reconstruction of Nilo-Saharan,* pp. 176, 181. ↩

28. Bender, *The Nilo-Saharan Languages,* p. 75. ↩

29. Ibid. ↩

30. Tucker & Bryan, *Linguistic Analyses,* pp. 22–24. ↩

31. Storch, *The Noun Morphology of Western Nilotic,* p. 46. ↩

32. See Bender, *The Nilo-Saharan Languages* and the 2020 edition of *www/Ethnologue.* ↩

33. Data from Jakobi & Hamdan, "Number Marking on Karko Nouns." ↩

34. Data from Jakobi & Hamdan, "Number Marking on Karko Nouns." ↩

35. Data from Werner, *Tìdn-áal.* ↩

36. Data from Rilly, *Le méroïtique et sa famille linguistique* ↩

37. Data from Dawd & Hayward, "Nara." ↩

38. De Voogt, "Dual Marking and Kinship Terms in Afitti." ↩

39. Data from Bender, "Roland Stevenson's Nyimang and Dinik Lexicon." ↩

40. Norton, "Number in Ama Verbs"; *article/*Norton, this issue. ↩

41. Data from *article*/Norton, this issue ↵

42. *article*/Norton, this issue ↵

43. Data from Kellermann, *Eine grammatische Skizze des Tama auf der Basis der Daten von R.C. Stevenson.* ↵

44. Data from Joseph et al., *Laarim Grammar Book.* ↵

45. Data from Yigezu & Dimmendaal, "Notes on Baale." ↵

46. Bender, "The Eastern Jebel Languages of Sudan I"; Bender, "The Eastern Jebel Languages of Sudan II." ↵

47. Data from Bender, "Proto-Koman Phonology and Lexicon." ↵

48. Blench, "Introduction to the Temein Languages." ↵

49. See, e.g., Dimmendaal, "Number Marking and Noun Categorization in Nilo-Saharan Languages," or Blench, "Introduction to the Temein Languages." ↵

50. Stevenson, "A Survey of the Phonetics and Grammatical Structures of the Nuba Mountain Languages," 96. ↵

51. Boyeldieu, *La qualification dans les langues africaines*; Alamin Mubarak, "An Initial Description of Laggori Noun Morphology and Noun Phrase." ↵

52. Data from Boyeldieu, *La qualification dans les langues africaines.* ↵

53. Aviles, *The Phonology and Morphology of the Dar Daju Daju Language.* ↵

54. Data from Aviles, *The Phonology and Morphology of the Dar Daju Daju Language.* ↵

55. Data from Storch, *The Noun Morphology of Western Nilotic,* 385. ↵

56. Voßen, *The Eastern Nilotes.* ↵

57. Data from Cohen, *Aspects of the Grammar of Kukú.* ↵

58. Ehret, *Southern Nilotic History*; Rottland, *Die südnilotischen Sprachen.* ↵

59. Data from Tucker & Bryan, *Noun Classification in Kalenjin: Päkot*; Tucker & Bryan, *Noun Classification in Kalenjin: Nandi-Kipsigis.* ↵

60. Data adapted from Zwarts, "Number in Endo-Marakwet." ↵

61. Cf. Rilly, *Le méroïtique et sa famille linguistique,* 208. ↵

62. Blench, "The Kadu Languages and Their Affiliation"; Gilley, "Katcha Noun Morphology." ↵

63. Lamberti, *Kuliak and Cushitic.* ↵

64. Heine, *The Kuliak Languages of Eastern Uganda.* ↵

65. Carlin, *The So language*; Schrock, *The Ik Language.* ↵