

Historical phonology of Proto-Northern Jê*

This is the first paper in a planned series on the historical phonology of Macro-Jê languages. The Jê languages constitute the largest and the most diverse family within the Macro-Jê stock; for this reason, all comparative Macro-Jê studies depend heavily on Jê data. However, the only attempt at a systematic reconstruction of Proto-Jê phonology and lexicon (Davis 1966) has been severely criticized in subsequent works (Ribeiro and Voort 2010, Nikulin 2015b). In this paper, I propose a reconstruction of the proto-language of Northern Jê, the largest branch of the family.

Keywords: Jê languages, Macro-Jê languages, language reconstruction, comparative method.

1. Jê family

The Jê family¹ comprises ten extant languages, all of which are spoken in Brazil, and approximately four extinct, poorly attested languages (one of which was spoken in the Misiones province of Argentina and in the extreme east of Paraguay). Preliminary lexicostatistical calculations and the distribution of sound changes, lexical and morphological innovations point to the following phylogenetic structure of the family:

Cerrado²

Northern Jê

Panará³ (PAN)

Core Northern Jê

AMT: **Apinayé** (Apinajé, API), **Kayapó** (Mêbêngôkre, KAY), **Timbira** (TIM)

Tapayúna (TAP), **Suyá** (Kîsêdjê, SUY)

Central Jê: **Xavánte** (XAV), **Xerénte** (XER), Acroá (†), Xakriabá (†)

Southern Jê

Ingain (†)

Kaingáng (KGG), **Xokléng** (XOK)

(?) Jeikó (†)

* I am grateful to CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) for providing a scholarship to carry out the present study.

¹ Traditionally the term ‘family’ is used in South American linguistics to refer to low-level phyla (roughly equivalent to the term ‘group’ in European linguistics), while deeper phyla are commonly referred to as ‘stocks’ (roughly equivalent to ‘families’ in European linguistics).

² This phylum has been previously called *Amazonian Jê* (Ribeiro and Voort 2010: 549) and *Northern Jê* (Ramirez, Vegini and França 2015: 261); the latter source inappropriately treats what we call Northern Jê as if it were a dialect continuum of a sole language (“Proper Jê”). The choice of the term *Amazonian Jê* is infelicitous, since the geographical distribution of these languages corresponds much better to the region of Cerrado than to the Amazon.

³ Called Southern Kayapó in older sources.

Of these, Timbira is actually a dialect continuum with at least six divergent dialects: **Pykobjê**, **Ramkokamekrá**, **Krahô**, **Apãniêkrá**, **Pará Gavião** (Parkatêjê), **Krikati**. Kaingáng is subdivided into five dialects: Paraná, Central, South-Western, South-Eastern and São Paulo (the latter is considered an independent language in some sources). Minor dialectal differences have also been described for Kayapó as spoken by the Kayapó and Xikrín ethnic groups.

A comprehensive overview of the state of affairs in comparative and synchronic studies in Jê is offered by Rodrigues (2012).

All data are cited using UTS (Unified Transcription System), based on the IPA with minor differences and currently used as the default standard for the Global Lexicostatistical Database (<http://starling.rinet.ru/new100>)⁴. Broad phonetic transcription is preferred over phonemic representation or practical orthography with the exception of Timbira, for which a normalized supradialectal phonemic representation (Nikulin 2016b) is used. The data used in this paper are extracted from the following sources:

Panará:	Dourado 2001, Bardagil-Mas et al. 2016, Lapierre et al. 2016a
Apinayé:	Oliveira 2005, Ham et al. 1979
Kayapó:	Costa 2015, Jefferson 1989, Stout and Thomson 1974, Salanova 2001, Salanova p.c.
Pykobjê:	Sá 1999, Amado 2004
Ramkokamekrá:	Popjes and Popjes 1971
Krahô:	Miranda 2014
Apãniêkrá:	Alves 2004
Parkatêjê:	Araújo 2016, Ferreira 2003
Tapayúna:	Camargo 2010, Rodrigues and Ferreira-Silva 2011
Suyá:	Santos 1997, Nonato 2014, Guedes 1993

Old (late XVIII–early XX century) sources cover some Southern Kayapó, Kayapó, Timbira and Xavánte dialects which are now extinct. The most remarkable of them are:

- the dialect of Southern Kayapó once spoken in Paranaíba and Triângulo Mineiro, unique in that it retained **r* (**r > y* before back vowels in the dialect of Vila Boa, which apparently evolved into Panará) (Vasconcelos 2014);
- the variety of Xavánte recorded by Ehrenreich (1895), peculiar in that it had undergone the sound changes **c > θ*, **kw- > -ŋw-* and **r > y, w, θ, r* (Nikulin 2015a: 27–29);
- Timbira varieties called “Menren” and “Krao” and the Kayapó variety called “Gorotiré” by Loukotka (1963), where *r* is found in place of earlier **t̥* (in modern Timbira *h* is found, whereas in Kayapó it yielded *ʔ* or disappeared) (Nikulin 2015a: 25–27).

Akroá-Mirim, Xakriabá, Ingain and Jeikó data are limited to low-quality wordlists. They might eventually turn out to be important for further comparative Jê studies (at least Xakriabá and Ingain show some interesting phonological retentions); however, their data are not taken into account in the present series.

⁴ Since back and central unrounded vowels do not contrast in any Jê language, back unrounded vowels *ɨ, ʊ, u*, are written here as *ɜ, ɔ, i* in order to facilitate the reading.

2. Overview

The first and only work dedicated to the reconstruction of Proto-Jê phonology is (Davis 1966). Davis considers data from five languages (Apinayé, Timbira, Suyá, Xavánte and Kaingáng) and proposes a reconstruction of the Proto-Jê phonological system. Even though he recognizes that Kaingáng and Xoklém are the most divergent members of the family, he does not attempt to postulate any phonological differences between Proto-Jê, Proto-Cerrado and Proto-Northern Jê. He reconstructs a system of 11 consonant phonemes, 9 oral and 6 nasal vowel phonemes. He also reconstructs 112 lexical items, whose distribution varies from Northern Jê to Jê (in my terminology). Davis' reconstruction relies on false cognates, especially when it comes to Kaingáng (cf. 35, 55, 59, 86, 100) and fails to account for many sound correspondences, treating many developments as unexplained splits. Other shortcomings in Davis' work include listing multiple unrelated roots under one etymology (cf. 49) and absence of systematic treatment of Jê morphophonology (e.g. relational prefixes, long verb forms, utterance-internal allomorphs in Xavánte). The correspondences postulated by Davis are presented below as Tab. 1–2 (the notation is modified for Apinayé, Timbira, Xavánte and Kaingáng to match UTS).

Table 1. Proto-Jê consonants according to Davis (1966).

PJ	API	TIM	SUY	XAV	KGG
*p	p	p	w ~ hw ~ p, h before r	p ~ b / m ~ w	p
*t	t	t	t, t ^h , r, n	t ~ d / n, ∅ before w	t, ⁿ d / n, r
*c	č, ∅ before w	c-, -y	t, y, n	c ~ ʒ ~ y, ? before w	y, d ⁿ in coda
*k	k	k ~ k ^h	k ~ k ^h	ʔ, h (_ə), sometimes u, w (#_a), ∅ (C_C)	k, ⁿ g, ∅ word- finally
*m	m / ⁿ b	m / p	m	p ~ b / m	ⁿ b / m, p, -g ⁿ / -ŋ, -d ⁿ
*n	n / ⁿ d	n / t	n	t ~ d / n	ⁿ d / n, t
*ɲ	ɲ / ⁿ d ⁿ	c, h, -n	n, ɲ	c, ʒ / ɲ, -y	y, n, -ŋ
*ŋ	ŋ / ⁿ g	ŋ / k	ŋ	ʔ	ŋ / ⁿ g, k
*w	w	w	w	w, ∅	∅, -ŋ
*r	r	r, n	r	r, ∅ (C_ə)	r, -n
*z	ʔ, y, ɲ	h, y	s, y	c, ʒ / ɲ, h, ∅ word- finally	ɸ, y, h, ∅ (C_), n (_C)

Table 2. Proto-Jê vowels according to Davis (1966).

PJ	API	TIM	SUY	XAV	KGG
*a	a	a	a	a	a, ẽ
*ə	ɜ, e, a	ə, o	ĩ, a, ə	ɛ, ə, a	a, ă
*ĩ	ĩ	ĩ	ĩ	ə	ĩ, ỹ, i, e
*ɔ	ɔ	ɔ	ɔ	ɔ	ẽ
*o	o	o	o	u	?
*u	u	u	u	u	u
*ɛ	ɛ	ɛ	ɛ	e	ɛ
*e	e, ɛ	e	e, ɛ	e, ɛ, i	e
*i	i	i	i	i	i

PJ	API	TIM	SUY	XAV	KGG
*ã	ã	ẽ	ẽ	ã	ẽ
*ĩ	ĩ	ã		ã	ĩ
*õ	õ	õ	õ	õ	ũ, ă
*ũ	ũ	ũ	ũ	ũ	ũ
*ẽ	ẽ	ẽ	ẽ, e, ɛ	ẽ	ẽ
*ĩ	ĩ	ĩ	ĩ	ĩ	ĩ

The reconstruction by Davis has been heavily criticized, notably by Ribeiro and Voort (2010) and Nikulin (2016a). However, an alternative detailed description of Proto-Jê phonology has never been proposed to date.

Many stems in Cerrado languages have two allomorphs: one is used when the word immediately follows its syntactic dependant, another is found in non-contiguous position. The difference between these allomorphs usually affects the initial consonant or the initial syllable. In synchronic descriptions it is practically useful to treat these alternating segments as independent morphemes ('relational prefixes', as described by Rodrigues (1952, 1953, 2010 [1981])). In comparative work, however, it is more appropriate to consider entire stems for the following reasons: (a) bare (prefix-less) roots do not occur; (b) the shape of the prefixes is very diverse in individual languages and this diversity can be traced back to PNJ and further; (c) in some instances the prefixes are fossilized and no longer segmentable. Henceforth the stems containing relational prefixes will be notated as follows: "*non-contiguous allomorph / = contiguous allomorph*".

All verbs in Jê languages can be nominalized (so-called 'long form'). Since the allomorphy of the nominalization suffix is lexically determined, I systematically provide both the finite ('short') and the nominalized forms of the verbs when this information is available. This is notated as follows: "*short form(-nominalization suffix)*". Whenever the addition of the suffix causes alternations to the stem, both forms are written separately: "*short form / long form*".

Finally, in most Jê languages words may surface differently in utterance-final position. In Northern Jê languages the differences are restricted to the presence of echo vowels and are not written out. In Central Jê the differences are sometimes very noticeable (cf. XAV *tu // nãmõ* 'belly') and not entirely predictable; both allomorphs will be systematically written out separated by a double slash. In Southern Jê languages the vowels of certain roots are affected. I have shown that this phenomenon was present in PSJ and involved lowering of oral close-mid and open-mid vowels in final open syllables with an optional continuant coda (Nikulin 2015b). In the daughter languages (Kaingáng and Xoklég) this process was obscured by a number of sound changes. PSJ syllables containing low, high or nasal vowels, as well as syllables with a nasal coda, were not affected. For roots that match said conditions, I systematically mark whether they were subject (#) or prone (?) to this phenomenon.

3. Proto-Northern Jê

3.1. Syllable structure and echo vowels.

The maximal syllable structure of most Northern Jê languages is CRVC, where R is a liquid or a glide. An interesting phenomenon found to a varying extent in all Core Northern Jê languages is the existence of so-called *echo vowels*. Echo vowels (EV) occur after the coda consonants of final (stressed) closed syllables, mostly in utterance-final position. Their quality depends on the vowel in the syllable nucleus (V_1) and on the syllable coda:

Apinayé:	EV = V_1 (<i>i</i> after palatal -č; <i>i</i> in finite verb forms only after -ar; suppressed in non-finite verb forms)	Oliveira 2005: 78–79: 191
Kayapó:	EV = V_1 (<i>i</i> if $V_1 = e$; <i>o</i> ~ <i>u</i> if $V_1 = o$; <i>i</i> after d^n , d_ϕ^n ; <i>i</i> if $V_1 = a$; <i>i</i> after -č if V_1 is not rounded)	Stout and Thomson 1974
	EV = V_1 (<i>i</i> if $V_1 = a$, ɜ , ɔ in non-finite verb forms, <i>a</i> in nouns), only if the coda is r	Salanova 2001

Ramkokamekrá:	EV = V ₁ (<i>i</i> if V ₁ = <i>a</i>)	Popjes and Popjes 1971
Krahô:	EV = V ₁ , only if the coda is <i>r</i>	Miranda 2014
Tapayúna:	EV = V ₁	Camargo 2010: 100–101
Suyá:	EV = V ₁ (<i>i</i> / <i>ĩ</i> if V ₁ = <i>a</i> or after <i>m</i> , <i>n</i> , <i>y</i> if V ₁ is oral; <i>ĩ</i> in some words following <i>ẽn</i> ; <i>i</i> occurs after coronals and <i>ĩ</i> elsewhere)	Nonato 2014: 129

Echo vowels are sometimes manifested as a final *i* in Panará, but Core Northern Jê languages appear to be much more conservative in this respect. Apparently word-final echo vowels were present in all PNJ stems ending in a consonant, except for non-finite verb forms (hence different outcomes in Apinayé and Kayapó and a different correspondence in Central Jê, see below). Thus the presence of echo-vowels was marginally phonemic or quasi-phonemic in PNJ. It should be noted that they may have been suppressed in utterance-internal position for prosodic reasons. In most cases, its quality must have been identical to the quality of the syllable nucleus vowel. The dissimilation with *a* was apparently operative already in PNJ and persisted in Apinayé, Kayapó, Ramkokamekrá and Suyá; *i* must have surfaced after palatals and voiced post-nasalized codas.

Several rhymes may be optionally analyzed as a sequence of a vowel and a glide (followed by an echo vowel) or a sequence of two vowels. These will be treated in the Vowels section.

Syllable-initial clusters involving a liquid (CR) always have a labial or a velar onset in all Northern Jê languages (except for Tapayúna and Suyá, where *hr*, *hl* < **pr*). It is practically useful to treat them as independent onsets for our purposes.

Syllable-initial clusters involving a glide (Cw, Cy; in some languages *y* yielded a fricative) have a much more restricted distribution: Cw sequences occur mostly before *a* or *ɔ* (Pykobjê *ĩ*, Suyá *ɔ*, Panará *ɔ*, *ĩ*), whereas Cy sequences are relatively frequent only before *e* (Pykobjê *ĩ*). For this reason, the glides are better analyzed as parts of raising diphthongs (like Chinese medials). Note that the glides still *do* interact with the syllable onsets in some cases (while plain vowels do not).

In Core Northern Jê languages final syllables are stressed, except certain suffixes (which might be better analyzed as clitics for this reason). This stress pattern can be securely traced back to PNJ.

3.2. Onset.

Many voiced consonant phonemes had two allophonic realizations: one surfaced in oral syllables, another in nasal syllables (the syllable nasality was, and still is, governed by the nucleus vowel). This system is maintained in Apinayé and Kayapó, Tapayúna and Suyá with minimal changes. The following pairs of PNJ consonants occurred in complementary distribution: **m* ~ **m̃*, **n* ~ **ñ*, **ɲ* ~ **ɲ̃*. In addition, **ɲ* did not contrast with any other voiced palatal (**y*, **ɲ̃* and **ɲ̃*⁵). Since the allophony in question undeniably existed in PNJ (it is paralleled by very similar phenomena in other Jê languages as well as in related Maxakalían, Krenák and Jabutí language families), I chose to represent these allophones in my reconstructions. See Tab. 3 for the summary.

Major differences between Davis' reconstruction of PJ onsets and my reconstruction of PNJ onsets include the reconstruction of a voiced stop series and of a richer set of palatal consonants (four phonemes, five allophones).

⁵ Except for one very specific environment (namely, before a secondarily nasalized vowel), in which a minimal pair involving **ɲ̃* and **ɲ* is attested, see 3.3.

Table 3. Onset consonants in Northern Jê languages.

PNJ	PNR	API	KAY	TIM	TAP	SUY
*p	p	p	p	p	h ^w , h [†]	hw, h [†]
*pr	py, pr [‡]	pr	pr	pr	hr	hl
*t	t	t (*ty > č)	t (*ty > č)	t (*ty > c)	t (*ti > či, *ty > č)	t ^h (*ti > či, *ty > s)
*t̥	s	ʔ, Ø	ʔ, Ø	h (*t̥w > w)	t	s
*k	k (*ka > n̄, =r̄ ~ a, *ku > ī)	k	k	k ^h , k [§]	k (*ky > č, *uka > *ua)	k ^(h)
*kr	ky, kr [‡]	kr	kr	k ^h r, kr [§]	kχ	k ^(h) ɹ, k [‡]
*b	p	p	b	p	w (oral), m (nasal)	p, w [§]
*d̥	s (*d̥i > ti)	č	č̣	c	t	t
*g			g	k		k
*m	m	m	m	m	m	m
*mr		mr	mr	mr	r	
*n	n-, =r-	n	n	n	n	n
*ɲ	y	ɲ	ɲ	y	ɲ	ɲ
*ŋ	k	ŋ	ŋ	ŋ ~ ⁿ g	ŋ	ŋ
*ŋr	y	ŋr	ŋr	r	ŋr	ⁿ gɹ
* ⁿ b	ⁿ p	ⁿ b	m	[m]p	ⁿ b ~ m (* ⁿ by > ⁿ ẓ ~ y)	ⁿ b (* ⁿ by > my ~ m̄ẓ)
* ⁿ br	ⁿ py, ⁿ pr [‡]	ⁿ br	mr	[m]pr	nr	ⁿ bl
* ⁿ d	ⁿ t	ⁿ d	n	[n]t	ⁿ d ~ n	ⁿ d
* ⁿ d̥	ⁿ s	ⁿ č̣	ɲ	[n]c	ⁿ t (~ ⁿ d)	ⁿ t (~ ⁿ d)
* ⁿ g	ⁿ k	ⁿ g	ŋ	[ŋ]k	ⁿ g	ⁿ g
* ⁿ gr	ⁿ ky, ⁿ kr [‡]	ⁿ gr	ŋr	[ŋ]kr	ⁿ gɹ	ⁿ gɹ
*y	y	ž	y	y	ⁿ ẓ ~ y	ⁿ y ~ y ~ ẓ̌
*r	y, r [†]	r	r	r	r	r
*w		v	w	w	w	w

Notes: † Before rounded vowels. ‡ Before front vowels. § In unstressed syllables.

Major differences between Davis' reconstruction of PJ onsets and my reconstruction of PNJ onsets include the reconstruction of a voiced stop series and of a richer set of palatal consonants (four phonemes, five allophones).

3.2.1. Panará. Non-trivial developments in Panará include:

- *r > y before back vowels (did not affect the southernmost dialects of Southern Kayapó):
 PNJ *ka=ⁿgrɔ 'warm' > PNR =r̄ẓ=kyɔ;
 PNJ *r̄ẓ 'flower' > PNR iȳẓ;
 PNJ *kr̄ẓ 'head' > PNR ikȳẓ;
 PNJ *č̣ip=kra / *ɲ̄ip=kra 'hand' > PNR si=kya / ȳi=kya;
 PNJ *kr̄i 'cold' > PNR kȳi;
 PNJ *cara / *yara 'wing, feather' > PNR saya 'flight feather';
 PNJ *kaⁿbro 'blood' > PNR =r̄ẓpyu;

- PNJ **kukritĩ* ‘tapir’ > PNR *kyiti*;
 PNJ **rɔ* ‘anaconda’ > PNR *yɔ-ti*;
 PNJ **prɔ(-r)* ‘to cover’ > PNR *pyo-rĩ*;
 PNJ **bro-ti* ‘*Genipa americana*’ > PNR *pyu-ti*, etc.

This change did not take place before front vowels:

- PNJ **krẽ(-r)* ‘to eat’ > PNR *krẽ*;
 PNJ **=krɛ* ‘house’ > PNR *ku=krɛ*;
 PNJ **krĩ* ‘short (of height), child’ > PNR *ku=krĩ*, etc.

- There are reasons to suspect that PNJ (and Proto-Cerrado) **k* in unstressed syllables was phonetically voiced, at least before **a* (this is still the situation in Apinayé and Tapayúna; the reflexes are distinct in Central Jê). Panará seems to corroborate this hypothesis:
 - **ka* [ga] > *ñ* in unstressed syllables before prenasalized consonants with subsequent flapping of *n* in intervocalic position:
 - PNJ **kaⁿgrɔ* ‘warm’ > PNR *ñⁿ=ⁿkyɔ / =r̃ⁿ=ⁿkyɔ*;
 - PNJ **kaⁿbro* ‘blood’ > PNR *ñⁿ=ⁿpyu / =r̃ⁿ=ⁿpyu*;
 - PNJ **kaη̃* ‘blood’ > **kaⁿg̃* > PNR *ñk̃*;
 - PNJ **tu=kaⁿga* ‘lazy’ > PNR *s=waⁿka*, etc.;
 - **ka* [ga] > *a* in unstressed syllables before voiceless consonants:
 - PNJ **kaɖ̃t̃* ‘cotton’ > PNR *asatĩ* ‘cord’;
 - PNJ **kaɖ̃wa* ~ **kaɖ̃wa* ‘mortar’ > PNR *asuã* ‘pestle’;
 - PNJ **kaprĩ* ‘sad’ > PNR *aprĩ-pɛ*;
 - PNJ **kapr̃t̃* ‘turtle’ > PNR *apỹn*, etc.;
 - **ku* > *i* in unstressed syllables before voiceless consonants:
 - PNJ **kuɖ̃* ‘fire’ > PNR *isĩ*;
 - PNJ **kukritĩ* ‘tapir’ > PNR *ikyiti*;
 - PNJ **kubẽ* ‘barbarian’ > PNR *ipẽ*;
 - PNJ **kũmtĩm̃* ‘capybara’ > PNR *intĩη*, etc.
- Voiced stops (both plain and prenasalized) underwent devoicing. Intervocalic prenasalized stops seem to have nasalized preceding vowels. In case of monosyllabic roots *ĩ* was added word-initially (probably for prosodic reasons, as proposed by Lapierre et al. 2016b):
 - PNJ **ba* ‘liver’ > PNR *ĩⁿpa*;
 - PNJ **bĩtĩ* ‘sun’ > PNR *ĩⁿpĩtĩ*;
 - PNJ **dɔ* ‘eye’ > PNR *ĩⁿtɔ*, etc.
- Since CCC onsets are not allowed in Panará, such PNJ clusters were simplified:
 - PNJ **grwã* ~ **gruwa* ‘moriche palm’ > PNR *ĩⁿkwa* ~ *kwa-*.
- A sole example of PNJ **ηr* is available, in which *η* disappears:
 - PNJ **ηr̃C̃* ‘toucan’ > PNR *ỹ-kwekwe*, *ỹ-sa*.

It is unclear whether the phonemes *g* and *w* existed in Proto-Northern Jê or whether they emerged in Proto-Core Jê after the split of Panará.

3.2.2. Apinayé, Kayapó and Timbira. These languages are relatively conservative phonologically.

- PNJ * t yielded ʔ or disappeared in Apinayé and Kayapó (the distribution is not clear); the Timbira reflex is h (\emptyset before w):
 PNJ * $\text{t}i$ ‘seed’ > API $i \sim \text{ʔ}i$, KAY $\text{ʔ}i$, TIM hi ;
 PNJ * $\text{t}o$ ‘leaf, bodily hair’ > API o , KAY $\text{ʔ}o$, TIM ho ;
 PNJ * $\text{ku}\text{t}i$ ‘fire’ > API $kuvi$, KAY $kuwi$, TIM $kuhi$;
 PNJ * $\text{t}wa / *=\text{d}wa$ ‘tooth’ > API $wa / =\check{c}wa$, KAY $wa / =\check{z}wa$, TIM $wa / =cwa$;
 PNJ * $\text{ka}\text{t}uw\check{a} \sim *ka\text{t}wa$ ‘mortar’ > API $kau\text{v}\check{a} \sim ka\text{ʔ}u \sim kaur\check{u}$, KAY $ka\text{wa}$, TIM $ka\text{hu}\check{a}$, etc.
- Another development that affected all these languages is the affricatization of PNJ * ty (API, KAY \check{c} , TIM c), though only one example is currently known:
 PNJ * $\text{tyet}\check{e}$ ‘to burn’ > API $\check{c}et\check{e}$, KAY $\check{c}et / \check{c}er\check{e}$, TIM cet .
- The voiced stop series remains unchanged in Kayapó; in Apinayé and Timbira all of them were devoiced (which is probably why Davis does not reconstruct it for PJ):
 PNJ * $\text{bit}\check{i}$ ‘only’ > API $pi\check{c}$, KAY bit , TIM pit ;
 PNJ * $\text{b}\text{ʔ}$ ‘forest’ > API $p\text{ə}$, KAY $b\text{ʔ}$;
 PNJ * $\text{bo}\text{t}\check{i}$ ‘to arrive’ > API poy , KAY $boy\check{c}$, TIM poy ;
 PNJ * $\text{ka}\text{d}\text{ʔ}\text{ʔ}\text{t}\check{z}$ ‘cotton’ > API $ka\check{c}\text{at}\check{a}$, KAY $ka\check{z}\text{ʔ}t$, TIM $kac\text{ʔ}t$;
 PNJ * $\text{t}wa / *=\text{d}wa$ ‘tooth’ > API $wa / =\check{c}wa$, KAY $wa / =\check{z}wa$, TIM $wa / =cwa$;
 PNJ * ga ‘thou’ > API ka , KAY ga , TIM ka ;
 PNJ * $\text{ga} / *t\text{ʔ}\text{-r} / *d\text{ʔ}\text{-r}$ ‘to fry’ > API $=ka / =\text{ʔ}r \sim =\text{a}r$, KAY $=ga / \check{z}\text{ʔ}\text{-r}\check{z}$, TIM $ka / h\text{ʔ}\text{-r}\check{z} / c\text{ʔ}\text{-r}\check{z}$.
- In Kayapó voiced prenasalized consonants became fully nasal. This has no consequences for the phonologic representation, since nasal and prenasalized consonants were allophones already in PNJ (as well as in PJ and probably in PMJ). However, in some exceptional cases the nasality propagated to the following vowel:
 PNJ * $\text{bra}(-r)$ ‘to walk’ > KAY $mr\check{a}(-y\text{ʔ})$;
 PNJ * ka^nbro ‘blood’ > KAY $kamr\check{o}$ ‘blood’, $kamro$ ‘spleen’;
 PNJ * $\text{da}(-r)$ ‘to bite’ > KAY $na(-y\text{ʔ})$.

One case of nasality assimilation is attested:

PNJ * $\text{yud}\text{d}^n\check{i}$ ‘hummingbird’ > KAY $nyud\text{d}^n$ (instead of expected * yuydd^n).

- After prefixes ending in $-m$ (< * m , * p) in Kayapó *(d) d > y :
 PNJ * $\text{am}=\text{d}o$ ‘rat’ > KAY $am=y\text{o}$;
 PNJ * $\text{am}=\text{d}i$ ‘bumblebee’ > KAY $am=y\text{i}$;
 PNJ * $\text{m}=\text{d}\text{a}(-r)$ ‘to chew, to gnaw’ > KAY $=m=y\check{a} / =m=y\check{a}\text{-}\text{ʔ}$, etc.
 PNJ * d sometimes yield my through analogy:
 PNJ * $\text{dop}^n\text{dop}\check{o}$ ‘itchiness’ > KAY $myomy\text{op}$ (analogy with the next syllable);
 Proto-Core Jê * $\text{pi}=\text{d}uw\check{a} / *pi=\text{d}w\text{ʔ}\text{-r}$ ‘to put vertically.PL’ > KAY $pi=myuw\check{a} / pi=my\text{ʔ}\text{-r}\check{a}$
 (analogy with $\text{ʔ}u=m=yuw\check{a} / \text{ʔ}u=m=y\text{ʔ}\text{-r}\check{a} < *t\text{u}=\text{m}=\text{d}uw\check{a} / *t\text{u}=\text{m}=\text{d}w\text{ʔ}\text{-r}$).
- All instances of * rw were subject to metathesis in Apinayé and Timbira; interconsonantal w was removed in Timbira. In some cases the metathesis was blocked in Timbira via vowel epenthesis:

Table 4. Velar *k* and *k^h* in Timbira lects. Cases with variation or unexpected reflexes are shadowed.

PNJ	Common TIM	Krahô	Ramkokamekrá	Pykobjê
* ⁿ go ‘water’	/ko/	ko	ko	ku
* ⁿ gra ‘paca’	/kra/	kra	kla	kra:
* ⁿ grwa ~ * ⁿ gruwă ‘moriche log’	/krwă/	krw ~ k ^h rw	klowă	krw
* ⁿ gɜ ‘yard’	/kɜ/	kɛ	kɜ	k ^h ə: (irreg.)
* ⁿ grɜ ‘dry’	/krɜ/	krɛ ~ k ^h re	k ^h ɜɜ (irreg.)	krə
*ka ⁿ grɔ ‘warm’	/kagrɔ/	kagrɔ ~ kak ^h ɔ	—	kakro
* ⁿ grɛ ‘sing’	/krɛ/	krɛ ~ k ^h re	klɛ	kre
* ⁿ gro ‘pig’	/kro/	kro	k ^h lo (irreg.)	krɜ: ~ k ^h ru:
* ⁿ gokôn (PAMT) ‘squash’	/koʔk ^h ɔn/	kuʔk ^h ɔn ~ kuʔkɔn	—	kuʔk ^h ɔn
*ga ‘thou’	/ka/	ka	ka	ka
*kɜ ‘skin’	/k ^h ɜ/	k ^h ɛ	k ^h ɜ	k ^h ə
*kra ‘offspring’	/k ^h ra/	k ^h ra ~ kra	k ^h la	k ^h ra
*krɛ ‘hole’	/k ^h re/	k ^h re ~ kre	k ^h le	k ^h re
*kɛnɛ ‘stone’	/k ^h ɛn/	k ^h ɛn	k ^h ɛn	k ^h en

PNJ *ruwă / *rwɔ-k ‘to descend’ > API vrɔ / vrɛ, TIM wrɔ / wrɔ-k;

PNJ *ⁿgrwă ~ *ⁿgruwa ‘moriche palm’ > API ⁿgrwa, TIM krwă ‘moriche log’;

PNJ *krwɔtɔ ‘beak’ > API kwrɔtɔ, TIM k^hɔtɔ;

PNJ *rwɔ-tɔ ‘rib’ > API vrɛ-tɔ, TIM wrɔ-tɔ.

- PNJ **ɲr* is preserved in Apinayé and Timbira; for Timbira, only two examples are available, in which *ɲ* disappears (note that no cognates outside Core Jê have been identified for any other words containing **ɲr* in Proto-Core Jê):
 PNJ **ɲrɔCɔ̃* ‘toucan’ > API *ɲrɔɲɲ*, KAY *ɲrɔt*, TIM *rɔ̃*;
 PAMT **tɲrɔtɔ̃* ‘sprout’ > API *ɲrɔtɔ̃*, TIM *hirɔt*.
- Voiced prenasalized stops were devoiced in Timbira; the prenasalization was lost except at morpheme boundaries. Lapiere et al. (2016b) took this as evidence to group Timbira and Panará against other Northern Jê languages; however, the innovations shared by Core Northern Jê and not shared by Panará clearly outnumber the number of features common to Timbira and Panará.
- In most Timbira varieties there are two contrasting voiceless velars: *k* and *k^h* (Sá 1999: 52–53, Popjes and Popjes 1971: 9, Miranda 2014: 30). This opposition is not rendered consistently in the transcriptions, which points to a considerable degree of variation already in Proto-Timbira. Apparently this opposition survives mainly in Pykobjê and Ramkokamekrá, whereas it is obsolescent in Krahô and non-existent in Apãniêkrá and Parkatêjê. Timbira *k^h* goes back to PNJ **k* in stressed syllables, while Timbira *k* goes back to PNJ **g*, **g* and **k* in unstressed syllables. A non-exhaustive list of Timbira etymologies illustrating this situation is provided in Tab. 4.

3.2.3. Tapayúna and Suyá. These two share some important innovations that suggest that these languages are very closely related (Rodrigues and Ferreira-Silva 2011):

- debuccalization of *p (TAP *h^w*, SUY *hw*) and further delabialization in complex onsets:
PNJ *pa ‘arm’ > TAP *h^wa*, SUY *hwa*⁶;
PNJ *purǔ ‘field’ > TAP, SUY *hu.lǔ*;
PNJ *prǔ ‘wife’ > TAP *hrǔ*, SUY *hlǔ*;
PNJ *pri ‘road’ > TAP *hri*, SUY *hli*, etc.
- affricatization and optional prenasalization of PNJ *y (non-phonemic):
Proto-Core Jê *y_{9tǔ} ~ *y_{3tǔ} ‘sweet potato’ > TAP *yarǔ* ~ *ǰarǔ* ~ *ǰarǔ*, SUY *y_{3rǔ}* ~ *y_{3rǔ}* ~ *ǰ_{3rǔ}*, etc.
- alveolarization of PNJ *d̥ and *ⁿd̥ (TAP *t* and ⁿ*t* ~ ⁿ*d*, SUY *t* and ⁿ*t* ~ ⁿ*d*):
Proto-Core Jê *t̥ud̥e / *ⁿd̥ud̥e ‘bow’ > TAP *tute*, SUY *sute* / =*tute*;
PNJ *a=d̥₃ / *d̥_{3-r3} / *t̥_{3-r3} ‘to enter’ > SUY *a=t₃* / *t_{3-l3}* / *s_{3-l3}*;
PNJ *=d̥_a / *d̥ⁿ_{a-m} / *t̥ⁿ_{a-m} ‘to stand’ > SUY =*ta* / *tā-m* / *sā-m*;
PNJ *kad̥wa ‘salt’ > TAP *kat^wa*, SUY *k^hatwa*;
PNJ *=d̥_{wa} / *t̥ⁿ_{w9-r} / *d̥ⁿ_{w9-r} ‘to bathe’ > SUY *t^hw9* ~ *tw9*;
PNJ *kaⁿd̥e ‘star’ > TAP *kaⁿte-či* ~ *kaⁿde-či*, SUY *kāte-či*;
PNJ *ⁿd̥i ‘mother’ > TAP *ⁿti-re*;
PNJ *ⁿd̥_a / *ⁿd̥_{a-r} ‘to bite’ > TAP *kū=ta*, SUY *ⁿta*;
PNJ *ⁿd̥_o / *ⁿd̥_{o-r} ‘to hang’ > SUY *ⁿto* / *ⁿto-lǔ*;
PNJ *ⁿd̥epě ‘bat’ > TAP *ⁿtewě*, SUY *ⁿdewě*;
PNJ *ⁿd̥om̥d̥opǔ ‘itchiness’ > TAP *ⁿdoⁿdowǔ*, etc.
- affricatization of PNJ *t before *t (TAP *či*, SUY *či*):
PNJ *akati ‘day’ > TAP *agači*, SUY *akači*;
PNJ *=ti ‘augmentative’ > TAP =*či*, SUY =*či*, etc.

Individual straightforward developments in Tapayúna and Suyá include:

- PNJ *t > TAP *t̥*, SUY *t^h*:
PNJ *tɛpě ‘fish’ > TAP *t̥ɛwě*, SUY *t^hɛwě*;
PNJ *katɔ / *katɔ-r ‘to leave / to be born’ > TAP *kaɔ*, SUY *kat^hɔ* / *kat^hɔ-lǔ*;
PNJ *tikǔ ‘belly’ > SUY *t^hikǔ*, etc.

In one case, one can suspect Kayapó or Suyá influence in Tapayúna:

PNJ *tikǔ ‘black’ > TAP *tigǔ*, SUY *t^hikǔ*.

- PNJ *t̥ > TAP *t*, SUY *s*:
PNJ *t̥i ‘seed’ > TAP *tí*, SUY *sí*;
PNJ *t̥wakǔ ‘coati’ > TAP *toakǔ*, SUY *swakǔ*;
PNJ *kut̥i ‘fire’ > TAP *kuti*, SUY *kwisí*;
PNJ *t̥_{3kǔ} ‘hawk, bird’ > TAP *t_{3gǔ}*, SUY *s_{3kǔ}*, etc.
- PNJ *b > TAP *w/m* (per nasality), SUY *p*, *w* (in unstressed syllables?):
PNJ *bǔ ‘grass’ > TAP *mǔ*, SUY *pǔ*;
Proto-Core Jê *b₃ ‘forest’ > TAP *w₃*, SUY *p₃* ‘grass, bush’;
PNJ *b_{3-t̥i} ~ *bǔ-t̥i ‘corn’ > TAP *w_{3-ti}* ~ *mǔ-ti*, SUY *w_{3-si}*;
PNJ *boǔt̥i ‘to arrive’ > SUY *pəyí* / *porǔ*;

⁶ Note that Guedes (1993) systematically writes *γ* and *γw* where other authors write *hr* and *hw*.

- PNJ **=bĩ* / **bĩ-r* ‘to kill’ > SUY *pĩ* / *pĩ-lĩ*;
 PNJ **ba* ‘1SG.NOM, 1INCL.ABS’ > TAP *wa*, SUY *pa* ~ *wa*;
 PNJ **bɜr-tĩ* ‘pepper (tree-seed)’ > TAP *wɜy-tĩ*;
 PNJ **bi* / *bi-r* ‘to ascend’ > SUY *pi*;
 PNJ **bĩ* / *bĩ-r* ‘to take’ > TAP *wĩ*, SUY *pi*;
 PNJ **bãmä* ‘father’ > TAP *mãmã*, SUY *pãmã*, etc.

The suggested distribution is violated in PNJ **bitĩ* ‘only’ > SUY *wirĩ* ‘always’, if the comparison is correct. In isolated cases TAP, SUY *w* is found as an irregular reflex of other PNJ stops:

- PNJ **(a=)kaⁿbɜtɜ* ‘night’ > TAP *a=gawərɜ*, but SUY *(a=)kaⁿbɜ.lɜ*;
 PNJ **ⁿbɛdⁿĩ* ‘honey’ > TAP *wɛy*, but TAP *ⁿbɛy-tĩ* ‘bee’, SUY *ⁿbɛnĩ*;
 PNJ **pid^ɸi* ‘one’ > TAP, SUY *witi*;
 PNJ **pĩ-* ‘verbal prefix with unclear meaning’ > SUY *wĩ-*.
- PNJ **mɾ* > TAP *r*; PNJ **ⁿbɾ* > TAP *nɾ*, SUY *ⁿb.l*; PNJ **kɾ* > TAP *kχ*, SUY *k^(h).i*; PNJ **ɲɾ* > TAP *ɲɾ*, SUY *ⁿg.i*; PNJ **ⁿgɾ* > TAP *ⁿgɸ*, SUY *ⁿg.i*;
 PNJ **mɾũmũ* ‘ant’ > TAP *rũwũ* / *rũm-*;
 Proto-Core Jê **ⁿbɾi* ‘animal, game’ > TAP *nɾi*, SUY *ⁿb.lĩ*;
 PNJ **ⁿbro-ti* ‘*Genipa americana*’ > TAP *nro-či*;
 PNJ **kaⁿbri* ‘heron’ > TAP *kanri*;
 PNJ **kra* ‘offspring’ > TAP *kχa*, SUY *k^h.ia*;
 PNJ **kukritĩ* ‘tapir’ > TAP *kukχirĩ*, SUY *kuk^(h).iirĩ*;
 PNJ **ɲɾɜɲɾɜ* ~ **ɲɾɜ* ‘green’ > TAP *ɲɾɛɲɾɛ* ~ *ɲɾɛ* ‘blue, green, yellow’, SUY *ⁿg.iaⁿg.ia-nĩ* ‘yellow’;
 PNJ **ⁿgɾɛ* ‘egg’ > TAP *ⁿgɸɛ*, SUY *ⁿg.ɛ*;
 PNJ **ⁿgrotō* ‘Pleiades’ > SUY *ⁿg.ɔɾō*;
 PNJ **ⁿgɾɔ* ‘to warm up’ > TAP *ka=ⁿgɸɔ* ‘warm’, SUY *ⁿg.ɔ*, etc.
 - PNJ *ⁿb* > TAP *ⁿb* ~ *m*, PNJ *ⁿd* > TAP *ⁿd* ~ *n*;
 PNJ **ⁿba* ‘liver’ > TAP *ⁿba* ~ *ma*;
 PNJ **ⁿbĩtĩ* ‘sun’ > TAP *ⁿbĩrĩ* ~ *mĩrĩ*;
 PNJ **ⁿde* ‘giant otter’ > TAP *ⁿde* ~ *ne*;
 PNJ **ⁿda* ‘rain’ > TAP *ⁿda* ~ *na*;
 PNJ **ⁿdɔ* ‘eye’ > TAP *ⁿdɔ* ~ *nɔ*, etc.
 - PNJ *Cw* > TAP *C^w*;
 PNJ **kad^ɸwa* ‘salt’ > TAP *kat^wa*;
 PNJ **kwɔɾɜ* ‘manioc’ > TAP *k^wərɜ*;
 PNJ **t^wwa* ‘sour’ > TAP *t^wa-či*, etc.
 - PNJ **ky* > TAP *č*, PNJ **ty* > TAP *č*, SUY *s*, PNJ **ⁿby* > TAP *y* ~ *ž* ~ *ⁿž*, SUY *mž*;
 PNJ **kyɛ* ‘thigh’ > TAP *čɛ*;
 PNJ **tyetě* ‘to burn’ > TAP *čerě*, SUY *serě*;
 PNJ **ⁿbyedⁿĩ* ‘husband’ > TAP *yerě* ~ *žerě* ~ *ⁿžerě*, SUY *mženi*, etc.
 - In two words PNJ **k* disappears in Tapayúna; in both cases, the root is preceded by the same prefix (TAP *tu-* < PNJ **t^wu*):
 PNJ **t^wu=kaⁿdɛ* ‘medicine’ > TAP *tu=anɛ*, SUY *su=kaⁿdɛ*;
 PNJ **t^wu=kaⁿga* ‘lazy’ > TAP *tu=ɛnga*.

- According to Nonato (2014), t^h and k^h contrast with t and k in Suyá. This contrast is not recognized by Santos (1997) and Guedes (1993). Even throughout Nonato's recordings the contrast is inconsistent (e.g. $i=t^h\tilde{e}-m\tilde{e} \sim i=t\tilde{e}-m\tilde{e}$ 'my going'). As demonstrated above, SUY t^h more often goes back to PNJ $*t$, whereas SUY t usually goes back to PNJ $*d$. I was not able to find any similar correlations for SUY k^h and k :
PNJ $*kuked\eta^i$ 'agouti' > SUY kuk^heni ;
PNJ $*\text{ɬ}wak\tilde{o}$ 'coati' > SUY $swak\tilde{o}$, etc.

Note that TAP k is realized as [g] in unstressed syllables (this is reflected in my transcription) and is aspirated before back vowels (this is not reflected in my transcription). This is likely to be a retention from PNJ. However, this does not seem to be related to the aspiration contrast in Suyá. Further studies are needed to determine the status of the contrast in question in Suyá as well as its origins.

- PNJ $*g$ > SUY k (might have also happened in Tapayúna but the words in question are not attested in available sources on that language):
PNJ $*ga$ '2SG.NOM' > SUY ka ;
PNJ $*ga / *ɬ_{3-r} / *d_{3-r}$ 'to fry' > SUY ka ;
PNJ $*gu$ '1INCL.NOM' > SUY ku , etc.
- In several isolated words, PNJ $*kr$ > TAP, SUY k (Guedes: \check{c}) before front vowels:
PNJ $*kr\tilde{i}$ 'village' > SUY $k\tilde{i}$ (Guedes: $\check{c}\tilde{i}$);
PNJ $*kriti$ 'pet' > TAP, SUY $kiri$;
PNJ $*kr\tilde{e}$ 'parakeet' > TAP $k\chi\tilde{e}$, SUY $k\tilde{e}$ (Guedes: $\check{c}\tilde{e}$);
PNJ $*kriti$ 'grasshopper, cricket' > TAP $k\chi it-\check{c}\tilde{i} \sim kit-\check{c}\tilde{i}$.

Given that this irregular process affected different words in Tapayúna and Suyá, it must have taken place after their split. Note that in other words satisfying these conditions PNJ $*kr$ developed normally:

- PNJ $*kr\tilde{e}$ 'hole' > TAP $k\chi\tilde{e}$, SUY $k\tilde{e}$;
PNJ $*kr\tilde{i}$ (/ $*kr\tilde{i}-r$?) 'to sit.PL' > SUY $k\tilde{i}$, etc.
- Apparently rw -like clusters are not tolerated in Tapayúna:
PNJ $*ngrwa \sim *ngruw\check{a}$ 'moriche palm' > TAP $ngbuw\check{a}$;
PNJ $*krw\eta y\check{s}$ 'Amazon parrot' > TAP $k\chi_{3tk}\chi_{3}$;
PNJ $*akrw\eta t\check{s}$ 'cashew' > TAP $ak\chi_{\eta y}-t\check{s}$.

3.3. Nucleus.

Northern Jê languages typically have large vowel inventories and little to no vowel allophony. I assume that PNJ vowels have been most faithfully preserved in Kayapó and Common Timbira. The correspondences are summarized in Tab. 5. Of these, $*\tilde{u}$ and $*\tilde{a}$ were not phonemic, and $*\eta$ and $*\tilde{i}$ were very rare. $*ye$ and $*iy\check{a}$, as well as $*wa$ and $*uw\check{a}$, were frequently in variation, whose nature is yet to be discovered.

- $*\tilde{u}$ ($\sim *i$) and $*\tilde{a}$ were allophones of PNJ $*u$, $*i$ and $*a$ before nasal codas:⁷
PNJ $*d\tilde{u}m\check{u}$ 'father (vocative)' > PNR $s\tilde{u}$, KAY $\check{z}\tilde{u}n$, TIM $c\tilde{u}m \sim c\tilde{u}$, TAP $tu-re$;
PNJ $*t\tilde{u}m\check{u}$ 'old' > PNR $=t\tilde{u}$, API $t\tilde{u}m\check{u}$, KAY $t\tilde{u}m$, TIM $t\tilde{u}m$, TAP $\check{f}\tilde{u}m\check{u}$, SUY $t\tilde{u}m\check{u}$;

⁷ The marginal status of these phonemes in Kayapó has already been noted by Salanova (2001: 24).

Table 5. Vowels in Northern Jê languages.

PNJ	PNR	API	KAY	TIM	TAP	SUY
*a	a	a	a	a	a	a
*ɔ	ɔ	ɔ	ɔ	ɔ	ɔ	ɔ
*ɛ	ɛ	ɛ	ɛ	ɛ	ɛ	ɛ
*ɜ	ɜ	ɜ, ə	ɜ	ɜ	ɜ	ɜ
*o	o	o	o	o	o, ɔ [†] (ɔ)	o, wɔ (ɔ)
*e	e	e	e	e	e	e
*ɐ	ɜ	ɐ	ɐ	ɐ	ə	ɐ
*u	u	u	u	u	u	u
*i	i	i	i	i	i	i
*ĩ	ĩ	ĩ	ĩ	ĩ	ĩ	ĩ
*wa	wa	wa	wa	wa	a [†]	wa
*uwa		uə ~ urĩ	uwa	uwa	uwa	
*wɔ	wɜ, wĩ, u	wɔ	wɔ	wɔ	ɔ ^l	wɔ
*ye	i, yɜ (?)	že, e [‡]	ye, e [‡]	ye, e [‡]	e [‡]	e [‡]
*iyã		iə ~ ža ~ irĩ	iyã	iyã		iyã
*ã	ã ~ a:ŋ	ã ~ ə	ã	a	a ~ ẽ	ã
*õ	õ	õ	õ	õ	õ	õ
*ē	ē	ē	ē	ē	ē	ē
*ẽ	ẽ	ẽ	ẽ	ẽ	ẽ	ẽ
*ĩ	ĩ	ĩ	ĩ	ĩ	ĩ	ĩ
*ũ	ũ	ũ	ũ	ũ	ũ	ũ
*ĩ	ĩ ~ i:ŋ	ĩ	ĩ	ĩ	ĩ	ĩ

Note: † The onset becomes labialized. ‡ The onset becomes palatalized (see 3.2.).

PNJ *kũmtũm ũ ~ *kũmtĩmĩ ‘capybara’ > PNR *intĩŋ*, KAY *kunũm*, TIM *kũmtũm*, TAP *koŋũn ũ ~ koŋũwũ*, SUY *kutũmũ*;

PNJ *kũmũ ‘smoke’ > API *kũmũ*, KAY *kũm*, TIM *kũm*, SUY *kusi=kũmũ*;

PNJ *mɾũmũ ‘ant’ > API *mɾũmũ*, KAY *mɾũm*, TIM *prũm*, TAP *rũwũ*;

PNJ *ŋũmũ ~ *ŋĩmĩ ‘who’ > API *ŋãmã* (older speakers), *ŋamã* (younger speakers) ‘another’, KAY *ŋũm* (Xikrín), *ŋibⁿ* (Kayapó), TIM *yũm*, TAP *ŋĩmũ*, SUY *ŋũmũ*;

PNJ *bãmã ‘other person’s father’ > API *pãmã*, KAY *bãm*, TIM *a=pam*, TAP *mẽmẽ*, SUY *pãmẽ*;

PNJ *=d̥a / *d̥ã-m / *t̥ã-m ‘to stand’ > PNR *sã ~ sa:ŋ*, API *ča / čã-m ~ ča-r*, KAY *ža / žã-m / ã-m*, TIM *ca / ca-m / ha-m*, SUY =*ta / tã-mã / sã-mã*;

PNJ *t̥ãmã / *ŋãmã ‘chin’ > API *ŋəmã*, KAY *ama*, TIM *hama*;

PNJ *t̥ãmã-ɬo / *ŋãmã-ɬo ‘beard’ > API *ŋãmã*, KAY *ama-ʔo*, TIM *hama-ho*, TAP *tam-to*.

- Examples of PNJ *ɐ (outside the diphthong *wɐ):

PNJ *tɐĩ ‘hard’ > PNR *tətĩ*, API *təyč / təyt*, KAY *təyč*, TIM *təy*, SUY *turũ (təř ?)*;

PNJ *tɐ / *d̥ɐ ‘bitter’ > API *ɐ / ɐ yd̥ⁿ* / čɐ, KAY *ɐ*, TIM *hɐ / cɐ*, TAP *tə*;

PNJ *ⁿbɐwã / *ⁿbɐ-r ‘to cry’ > API ⁿ*bɐ-r ~ ⁿbɐũ* / ⁿ*bɐ-r*, KAY *muã / mɐ-rɐ*, SUY ⁿ*bɐ-lɐ*;

PNJ *kuɔɐ ‘bad smell’ > KAY *kužɐ*, TIM *kučɐ*, TAP *kutə*;

PNJ *kurɐ ‘smooth’ > API, TIM *kurɐ*.

The same correspondence is attested in a number of roots whose distribution is limited to Apinayé, Kayapó and Timbira:

- PAMT *ⁿb₉ / *ⁿb₉-dⁿ ~ *ⁿb₉-r ‘to carry’ > API ⁿb₉ / ⁿb₉-y^d ~ ⁿb₉-r, KAY =m₉ / m₉-y^d ‘to grab’,
TIM p₉ / p₉-dⁿ (may be related to PNR iⁿp_i-rⁱ ‘id.’);
PAMT *^tap_r / *^yap_r ‘to insult, to dishonor’ > API ap_r / yap_r, KAY ap_r / yap_r, TIM ap_r /
yap_r ‘to name’;
PAMT *p_r ‘corn husk’ > API p_r ‘feather’, KAY p_r, TIM p_r ‘corn husk / feather’;
PAMT *^tub₉bⁿ ‘deep’ > API up₉m⁹, KAY ub₉bⁿ;
PAMT *k₉ ‘bad smell, fish smell’ > API, TIM k₉, KAY k₉, etc.

In one case the daughter languages disagree on the exact quality of Proto-Core Jê vowel: KAY y₃t, TIM y₃t, SUY y₃r₃ ~ ⁿy₃r₃ ~ ž₃r₃ ‘sweet potato’ point to Proto-Core Jê *y₃t₃, whereas API ž₉t₉ and TAP y₉r₉ ~ ž₉r₉ ~ ⁿž₉r₉ ‘id.’ reflect PNJ *y₉t₉.

- The sole reliable example of PNJ *ⁱ is:
PNJ *^tĩ / *^tĩ-r / *ⁿĩ / *ⁿĩ-r ‘to sit.SG’ > PNR si:ŋ ~ sĩ / nĩ, API nĩ / nĩ-r, KAY nĩ / nĩ-r^t, TIM hĩ / hĩ-r /
yĩ / yĩ-r, SUY =nĩ / sĩ / nĩ-^tĩ.
- The alternation between *^ye and *ⁱy^ä can be exemplified by the following etymologies (note that the sequence *^ry is regularly simplified to *^y):
PNJ *^kriy^ä / *^kye-r ‘to raise’ > PNR ky₃-ri (?), KAY kriy^ä / kye-r^ě.
PNJ *^kukiy^ä / *^kukye-r ‘to ask’ > PNR iⁿky₃-ri (?), API kukža / kukže-r, TIM kuk^hiy^ä ‘to search’,
SUY kuk^hiy^ä;
PNJ *^kokiy^ä / *^kokye-r ‘to split’ > PNR kye-y ‘to cut’ (?), API kokže ‘to pick, to lift’ (?), KAY kokye
~ kokiy^ä / kokye-r^ě (Xikrín: -ɔ-), TIM kok^hye / kok^hye-dⁿ;
Proto-Core Jê *^a=kiy^ä / *^a=kye-r ‘to yell, to argue’ > API a=^kirⁱ / ža=^kže-r, KAY a=^kiy^ä ~ a=^kya /
ž₃=^kye-r^ě, TIM a=^kh^hye / a=^kh^hye-r, a=^kh^hiy^ä ~ k^hiy^ä ‘angry’, SUY a=^kh^hiy^ä;
Proto-Core Jê *ⁿgiy^ä / *ⁿgye-dⁿ ‘to enter.PL, to put into a deep container.PL’ > API ⁿgye /
ⁿgye-y^d, a=ⁿgye / ya=ⁿgye, KAY =ⁿiy^ä / =ⁿye-y^d, a=ⁿye-y, TIM a=^kye-y, SUY a=ⁿye / ⁿye-^tě;
Proto-Core Jê *⁼riy^ä ~ *⁼yet^ě / *^yet ‘to hang.PL’ > API a=^yet^ě / yet, KAY a=^riy^ä, SUY =^yer^ě / a=^yet,
sariy^ä / yariy^ä.

In some other cases no such alternation is attested:

- PNJ *^kye / *^kye-dⁿ ‘to drag’ > PNR kr₃-ri (?), API kže / kže-dⁿ, KAY kye / kye-dⁿ, TIM k^hye / k^hye-dⁿ;
Proto-Core Jê *^kkaye / *^kkaye-dⁿ ‘to scratch’ > API kakže, TIM kak^hye / kak^hye-dⁿ, SUY kak^(h)e-nĩ;
PAMT *^takye / *^yakye / *^takye-dⁿ ‘to look for water’ > API akže / žakže / akže-dⁿ ‘to open a hole’,
TIM hak^hye / yak^hye / yak^hye-dⁿ ‘to fetch water’;
Proto-Core Jê *^kiy^ä ‘fire pit’ > API kirⁱ ~ ki^ä, TIM k^hiy^ä;
PNJ *^kye ‘thigh’ > API kže, KAY kye, TIM k^hye, TAP če;
PNJ *ⁿbyedⁿ ‘husband’ > API ⁿbžey^d, KAY myedⁿ, TIM pyedⁿ, TAP ⁿžer^ě, SUY mženĩ;
PNJ *^tyet^ě ‘to burn’ > PNR titi, API čet^ě, KAY čet / čer^ě, TIM cet, TAP čer^ě, SUY ser^ě.

The distribution, if it ever existed, must have been obscured by numerous paradigmatic analogies (which seem to have operated to a lesser extent in Kayapó). *ⁱy^ä is restricted to open syllables, *^ye is found both in open and closed syllables. It is possible that originally *^ye was found exclusively in closed syllables.

- The alternation between **wa*, **wə* and **uwa* can be illustrated with the following examples:
Proto-Core Jê **kruwa* ~ **krwa* ‘arrow’ > API *kruə*, KAY *kruwə*, TIM *kruwə*, SUY *kwa*;
PNJ **ngrwa* ~ **ngruwa* ‘moriche palm’ > PNR *iŋkwa* ~ *kwa-*, API *ngvra*, KAY *ŋrwa*, TIM *krəwə*
‘moriche log’, TAP *ngbuwə*, SUY *ŋkwa*;
PNJ **kaɬuwə* ~ **kaɬwa* ‘mortar’ > PNR *asuə* ‘pestle’, API *kauwə* ~ *kaʔu* ~ *kauri*, KAY *kawa*,
TIM *kahuwə*;
Proto-Core Jê **ruwə* / **ruwə-k* ‘to descend’ > API *vri* / *vri*, KAY *ruwə* ~ *ruwə* / *ruwə-k*, TIM *wri* / *wri-*
k, SUY *lwə* / *lwə-kə*;
PNJ **ɖwa* / **ɖwə-r* / **ɖwə-r* ‘to bathe’ > PNR *swə-ri*, API *čwa* / *wə-r*, KAY *ʒuwə* / *wə-r* / *ʒwə-r*,
TIM *cwa* / *wə-r* / *cwə-r*, SUY *twə* ~ *t^hwə*, etc.

The medial *-w-* was (and still is) prohibited in syllables with labial onset. The following examples should be understood as result of elision of **w* in the aforementioned environment:

- PNJ **nbuwa* / **nbə-r* ‘to cry’ > API *nbu-r* ~ *nbuə* / *nbə-rə*, KAY *muə* / *mə-rə*, SUY *nbə-rə*;
Proto-Core Jê **pi=nduwa* / **pi=ndwə-r* ‘to put vertically.PL’ > API *=ŋwə* / *=ŋwə-ydⁿ*, KAY *pi=m=yuwa* / *pi=m=yə-rə*, TIM *pi=cwə* / *pi=cwə-r* / *=m=cə* / *=m=cə-r*, SUY *wi=ntwə* / *wi=ntwə-lə*.

Once again, the original distribution of these nuclei is obscure. **uwa* and **wa* are restricted to open syllables, whereas **wə* is found both in open and closed syllable. I assume that originally **wə* was restricted to closed syllables; in open syllable, **uwa* and **wa* would have occurred in free variation. This is corroborated by other cases of alternation in individual languages, such as TIM *kwa* / *kwə-r* ‘to take.PL’.

- Since Proto-Northern Jê vowel inventory was very rich (no less than 15 monophthongs and 2 diphthongs were phonemic), there was little space for allophony. That is why in most cases the reflexes of PNJ vowels in modern languages are quite straightforward (major shifts have occurred in some Timbira varieties after the split of Proto-Timbira, see (Nikulin 2016b)). However, several poorly understood splits have taken place in individual languages, notably PNJ **ɜ* > API *ɜ*, *ə* (Nikulin 2015a: 13):
PNJ **aⁿbɜdⁿi* ‘piranha’ > API *aⁿbɜnɜ*;
PNJ **=ɬɜ* ‘basket’ > API *ka=və*;
PNJ **kɜ* ‘skin; breast’ > API *kə*;
PNJ **kɜrɜ* ‘to whistle’ > API *kəɜ* / *kɜr*;
PNJ **pɜtɜ* ‘southern tamandua’ > API *pəɜ*, *pɜt-rə*, *pɜt-ti*, etc.

Their phonemic status is demonstrated by Oliveira (2005: 66–67). In most cases, *ə* is found in phonetically open syllables, while *ɜ* is usually found in phonetically closed syllables (including long verb forms, in which echo vowels are typically absent). The issue is further complicated by the fact that Apinayé *ɜ* may be realized as any of these in free variation: [*ɜ*, *ə*, *ə*].

- Irregular nasalization in Kayapó has been treated in 3.2.2.
- The reflexes of PNJ **wə* in Panará are uncertain. *wɜ* is found in verbs (e.g. PNJ **ɖwə-r* / **ɖwə-r* ‘to bathe.NMLZ’ > PNR *swə-ri*) but is not attested in nouns:
PNJ **kwəɜ* ‘manioc’ > PNR *kwi*;
PNJ **ndwəɜⁿi* ‘snail’ > PNR *pari=ⁿtu*;
PNJ **twəbⁿi* ‘fat’ > PNR *tūmā*, etc.

- I have already discussed possible irregular vowel splits (especially **ɔ* > *ɔ* ~ *ə*; **i* > *i* ~ *ɨ*) in Suyá (Nikulin 2015a: 12–14). However, the analysis in question was based on Guedes's data. Once Santos's and Nonato's recordings are taken into account, the problems discussed in the cited work are no longer valid: these authors consistently record *ɔ* where Guedes writes *ɔ* ~ *ə* and *i* where Guedes writes *i* ~ *ɨ*.
- In the proto-language of Tapayúna and Suyá, PNJ **o* > *(*w*)*ə* before *y*:
PNJ **boʔi* 'to arrive' > SUY *pəyĩ* / *porõ*;
PNJ **kukoyĩ* 'monkey' > TAP *kuk^wəy*, SUY *kukwəyĩ*.
- In extremely rare cases the medial *-w-* is found before front vowels. These words have no known cognates outside Core Jê (like the words having *w* in the onset position):
Proto-Core Jê **kwed_ɸ* 'bird, feather' > API *kveyd_ɸ* 'bird', KAY *kweyd_ɸ* 'bird', TIM *kuwedⁿ* 'bird',
TAP *tɜ=gwey* 'feather', etc.

3.4. Coda.

Except for syllables whose rhymes go back to PNJ **iyã* or **uwã* in PNJ, the codas of modern Northern Jê languages reflect PNJ codas. The reflexes sometimes differ phonetically depending on whether the coda was followed by an echo vowel (in utterance-internal position) or not (in utterance-final position, long verb forms in any position). These differences are noted here for Tapayúna and Suyá, where they are absolutely regular and systematic. For other languages they are written out as long as they are phonemic. See Tab. 6–7.

Basic correspondences can be illustrated with the following examples:

- PNJ **tepě* 'fish' > PNR *ʔepĩ*, API *tepě*, KAY, TIM *tep*, TAP *ʔewě*, SUY *t^hewě*;
 PNJ **bitĩ* 'sun' > PNR *ĩⁿpitĩ*, API *bitĩ*, KAY *mit*, TIM *pit*, TAP *birĩ ~ mirĩ*, SUY *birĩ*;
 PNJ **təʔĩ* 'hard' > PNR *tatĩ*, API *təyč* / *təyt*, KAY *təyč*, TIM *təy*, SUY *turũ* (*təř* ?);
 PNJ **bətĩ* 'good' > PNR *ĩⁿpɛ*, API *bɛč*, KAY *mɛč*, TIM *pɛy*, TAP *bey- ~ mɛy-*, SUY *bɛrĩ*;
 PNJ **ʔɜkɜ* 'hawk, bird' > PNR *sə*, API *ɜk-ti*, KAY *ɜk*, TIM *hɜk*, TAP *tɜgɜ*, SUY *sɜkɜ*;
 PNJ **tobⁿ* 'flour, powder' > API *čobⁿ* // *čomõ*, KAY *obⁿ* / *ʔobⁿ*, TIM *hobⁿ* / *čobⁿ*;
 PNJ **tɜbⁿ* 'raw' > API *tɜbⁿ* // *tɜmɜ*, TIM *tɜbⁿ*, SUY *t^hɜmɜ*;
 PNJ **bɛdⁿ* 'husband' > API *bžeydⁿ*, KAY *myedⁿ*, TIM *pyedⁿ*, TAP *žerě*, SUY *mženĩ*;
 Proto-Core Jê **todⁿ* 'armadillo' > API *todⁿ* // *tonõ*, KAY, TIM *todⁿ*, TAP *torõ*, SUY *mženĩ*;
 PNJ **bɛdⁿ* 'honey' > PNR *nã=pɛyɨŋ*, API *beydⁿ*, KAY *mɛydⁿ*, TIM *pɛdⁿ*, TAP *wɛy*, *bey-ti* 'bee', SUY *bɛnĩ*;
 PNJ **kukoyĩ* 'monkey' > PNR *ĩko*; API *kukoy*, KAY *kukoŋ*, TIM *kuk^hoy*, TAP *kuk^wəy*, SUY *kukwəyĩ*;
 PNJ **purũ* 'field' > PNR *pu*; API *pur*, KAY *purũ*, TIM *pur*, TAP *hurũ*, SUY *hu.lũ*;
 PNJ **dɨwĩ* 'field' > PNR *ĩⁿtuĩ*, API *dɨvĩ*, KAY *ni*, TIM *[n]tuwã*, TAP, SUY *dɨwĩ*.

Cf. also PNJ, Proto-Core Jê or PAMT **kopõ* 'fly (insect)', **ʔip=kɔpõ* / **ɨip=kɔpõ* 'claw, nail', **nɛpɛ* 'bat', **rɔpõ* 'jaguar', **tyetě* 'to burn', **kɔtõ* 'cicada', **kukritĩ* 'tapir', **kubitĩ* 'howler monkey', **butũ* 'neck', **ketě* 'not', **kadɜtɜ* 'cotton', **wetě* 'lizard', **pɜtɜ* 'southern tamandua', **yɨtõ* 'sweet potato', **tutũ* 'pigeon', **kaⁿbɜtɜ* 'night', **ʔɜ=kotõ* / **ɨɜ=kotõ* 'chest', **grotõ* 'Pleiades', **boʔi* 'to arrive', **boʔi* 'courbaril', **ʔetĩ* / **dɛtĩ* 'to deceive', **peĩ* 'to make', **kakĩ* 'cough', **tikĩ* 'black', **kudɛkě* 'vein', **tikĩ* 'stomach', **kaⁿbrekě* 'red', **pokõ* 'to ignite', **kokõ* 'wind', **atikĩ* 'forest surrounding the village', **pe-k* 'to fart', **ti-k* 'to die', **ʔaⁿba-k* / **yaⁿba-k* 'to listen', **rɔw-k* 'to descend', **bakĩ* 'scorpion', **twəbⁿ* 'fat', **bɜdⁿ* 'macaw', **aⁿbɜdⁿ* 'piranha', **ʔɜdⁿ* / **dɜdⁿ* 'sweet', **yudⁿ* 'hummingbird', **kwedⁿ* 'bird, feather', **kukedⁿ* 'agouti', **rɔdⁿ* 'grugru palm', **bayĩ* 'snake sp.', **dɜzyĩ* 'woodpecker', **rorõ* 'termite', **bɜrɜ* 'tree', **kwɔr* 'manioc', **parĩ* 'foot', **terě* 'Euterpe sp.', **atɔrõ* 'tinamou', **kaⁿberě* 'Turu palm', etc.

Table 6. Coda consonants in Northern Jê languages after non-nasal vowels.

PNJ	PNR	API	KAY	TIM	TAP (internal [†])	TAP (final [†])	SUY (internal [†])	SUY (final [†])
*p	pĩ	p	p	p	p	wV	p	wV
*t	tĩ	t, yč [‡] §	t, yč [‡]	t	t	rV	t	rV, rĩ [‡]
*t̥	tĩ	yč, t [#]	č	y	y	y	y, t [#]	y, rV [#]
*k	∅	k	k	k	k	gV	k	kV, kĩ [‡]
*b ⁿ		b ⁿ	b ⁿ	b ⁿ			m	mĩ
*d ⁿ		d ⁿ , yd ⁿ	d ⁿ	d ⁿ		rV	n	nĩ
*d̥ ⁿ	ŋ	yd ⁿ	ɲ	d ⁿ	y	y	n	nĩ
*y	:	y	ɲ	y	y	y	y	yĩ
*r	ː, rĩ [#] ¶	r	rV, rĩ [§]	r	y	rV, y [‡]	lV, y [‡]	lV, yĩ [‡]
*w	ĩ	w	∅	wã		wV	p	wV

Notes: † Internal = in the middle of an intonational phrase, final = immediately preceding a pause. ‡ After *a*. § After *i*. # In long verb forms. ¶ After *ɜ*. § After *a*, in long verb forms also after *ɜ* or *ɔ*.

Table 7. Coda consonants in Northern Jê languages after nasal vowels.

PNJ	PNR	API	KAY	TIM	TAP (internal [†])	TAP (final [†])	SUY (internal [†])	SUY (final [†])
*t		ⁿ t	ⁿ t	t			n	nV
*t̥		ⁿ č	ⁿ č	y			n	nV
*k		ⁿ k	ⁿ k	k	k			
*m	∅	m	m	m	m	mV, wV	m	mV
*n		n	n	n		nV, rV	n	nV
*ɲ		ɲ, n	ɲ	n			n	nĩ
*y		y	∅	∅	y	y		
*r		r	r, n [‡]	r			lV	lV

Notes: † Internal = in the middle of an intonational phrase, final = immediately preceding a pause. ‡ After *ẽ*, *ĩ*.

Except in long verb forms, where much variation with *ɲ and *r is attested, the examples are not very numerous. No secure etymologies with a nasal nucleus followed by *p are known, though this syllable pattern might have existed, cf. KAY *õp* / *ɲõp* ‘elbow’ of unknown origin. The most reliable etymologies are:

Proto-Core Jê **prõtõ* ‘to run’ > API *prõtõ*, KAY *prõtõ*, SUY *h.lõnõ*;

Proto-Core Jê **tõtĩ* ‘sister’ > API *tõtĩ*, KAY *tõtĩ* ‘brother’, TIM *tõtĩ*, SUY *tõtĩ*;

PNJ **katõkõ* ‘firearm’ > PNR *atõ*, API *katõtõ*, KAY *katõtõ*, TIM *katõk*;

Proto-Core Jê **kõkõ* ‘lizard’ > API *kõtõkõ*, KAY *kõtõk*, TIM *kõtõk*, TAP *kõk-či*;

PNJ **kẽnẽ* ‘stone’ > PNR *kĩẽy* (?), API *kẽnẽ*, KAY *kẽn*, TIM *kĩẽn*, TAP *kẽnẽ*, TAP *kĩẽnẽ*;

PNJ **tĩnĩ* / **ɲĩnĩ* ‘faeces’ > PNR *sĩ* / *yĩ*, API *tĩnĩ* / *ɲĩnĩ*, KAY *ĩn* / *ɲĩn*, TIM *hĩn* / *yĩn*, TAP *tĩrĩ*;

Proto-Core Jê **kõnõ* ‘articulation, knee’ > API *kõtõnõ*, KAY *kõtõn*, TIM *kõtõn*, TAP *kõtõ*, SUY *kõtõnõ*;

PNJ **kaprõnõ* ‘turtle’ > PNR *apyõn*, API *kaprõtõnõ*, KAY *kaprõn*, TIM *kaprõn*, TAP *kahrẽm-či*, SUY *kah.lõ-či*;

PNJ **kutõyĩ* ‘worm, blind snake’ > API *kutõy*, KAY *kutõ*, TIM *kutõ*, TAP *kuřõy*;

PNJ **rõtõ* ‘*Attalea speciosa* coconut’ > API *rõtõ*, KAY *rõtõn*, TIM *rõtõ*;

Proto-Core Jê **tĩrĩ* ‘alive’ > API *tĩrĩ*, KAY *tĩn*, TIM *tĩr*, SUY *tĩrĩ*.

3.4.1. Notes on echo vowels.

1. The syllables containing the nucleus **a* must have contained a high unrounded echo vowel. This is still the case in some Kayapó and Timbira varieties as well as in and Suyá (Stout and Thomson 1974, Popjes and Popjes 1971, Nonato 2014: 129). This vowel must have triggered palatalization of **t* (in Apinayé and Kayapó) and of **r* (in Tapayúna and Suyá):

PNJ **kratĩ* ‘base, stem, lower part of the body’ > API *kratã* ‘waist, leg, beginning, medial part of a long object’ ~ *krayč* ‘wall, stem, stalk’, KAY *krayč* ‘trunk, stump, pelvis’ (cf. SUY *k^harĩ*);

PNJ **parĩ* ‘foot’ > TAP *h^way*, SUY *hwayĩ* (cf. KAY *parĩ*);

PNJ **ⁿba* / **ⁿba-r* ‘to know’ > **ⁿba* / **ⁿba-rĩ* > SUY *ⁿba* / *ⁿba-yĩ* (cf. KAY *ma-rĩ*);

PNJ **kapa* / **kapa-r* ‘to pull out’ > **kapa* / **kapa-rĩ* > SUY *kapa-yĩ*.

Note that the same echo vowel must have existed in syllables with the vowel **i*, but in this case it triggered palatalization only in Apinayé:

PNJ **bitĩ* ‘only’ > API *pič*, but KAY *bit* (cf. TIM *pit*, maybe SUY *wirĩ* ‘always’);

PNJ **kritĩ* ‘pet’ > API *kritĩ* ~ *krič*, but KAY *krit* (cf. TAP, SUY *kirĩ*);

PNJ **=d̥i* / **t̥i-ri* / **d̥i-ri* ‘to put’ > SUY *=ti* / *si-li* / *ti-li* (cf. KAY *=ži* / *ži-rĩ*), etc.

This does not necessarily suggest that the echo vowels of these two groups of words were phonetically distinct: it is common for palatalization to be blocked when the consonant is both preceded and followed by palatalizing vowels (this is precisely what happens in languages like Paresí (Brandão 2014: 46)).

2. There are numerous reasons to believe that PNJ long verb forms did not contain echo vowels, as it happens today in Apinayé (Oliveira 2005: 191). They are listed below.

- Although echo vowels **are** present in Kayapó long verb forms, they are chosen in a special way for syllables whose underlying rhyme is *ɜr* or *ɔr*. While in nouns with these rhyme the echo vowel is [i] (*bɜrĩ* ‘tree, horn’), in long verb forms it copies the nucleus (*akɜ-rɜ̃* / *yakɜ-rɜ̃* ‘to cut’). This suggests that these words did not rhyme at an earlier stage.
- The correspondences in Central Jê languages are different for nouns and long verb forms ending in PNJ **r*. Compare the following pairs:
PNJ **pa* / **pa-r* ‘to finish, to kill’, Xavánte *pa* / *pa-ri* ‘to finish, to erase’;
PNJ **parĩ* ‘foot’, Xavánte *para* ‘id.’.

What matters here is not the quality of PNJ echo vowel but its presence or absence. The Proto-Cerrado forms of these words would have been **pa* / **pa-r* ‘to finish’ and **parã* ‘foot’ (the dissimilation seems to have occurred in the independent history of PNJ).

- Some Suyá alternations are explainable if we assume that the echo vowels were suppressed in PNJ long verb forms:
SUY *pəyĩ* / *pot* ‘to arrive’ < **boṭĩ* / **bot* < **boṭĩ* / **boṭ*;
SUY *=yerẽ* / *a=yet* ‘to hang.PL’ < **=yetẽ* / **yet*, etc.

The depalatalization of PNJ **t̥* through suppression of an echo vowel is attested in API *təyč* / *təyt* ‘hard’.

It is uncertain whether this phenomenon affected PNJ long verb form suffixes other than **r*. As a preliminary solution, I reconstruct forms like PNJ **tẽ-m* ‘to go.SG’, **kõ-m* ‘to drink’, **pe-k* ‘to fart’, **ti-k* ‘to die’, **taⁿba-k* / **ya=ba-k* ‘to listen’, **rw9-k* ‘to descend’ (with the unproductive suffixes **-m* and **-k* also found in a handful of other verbs). However, it has not been proven conclusively that these particular suffixes occurred without an echo vowel. The same applies to the productive suffix **-ŋ*.

4. Conclusion

For the first time, a phonological reconstruction of Proto-Northern Jê has been proposed. Some issues still remain to be clarified, including:

- the emergence of long vowels in Timbira;
- the status and sources of syllable-final glottal stops in Timbira and preaspiration in Apinayé (Oliveira 2005: 78);
- the status and sources of the *k* / *k^h* opposition in Suyá;
- the status of stem-initial alternations of palatal consonants and **g* (**ŋ* in nasal syllables), first observed by A. P. Salanova (p.c.);
- the status and sources of word-initial unstressed syllables without an onset.

Now that a reconstruction of PNJ is available, we are in position to proceed to the reconstruction of Proto-Cerrado and, subsequently, Proto-Jê and Proto-Macro-Jê. The importance of such intermediate-level reconstructions as demonstrated, e.g., by S. Starostin (1999), cannot be underestimated; ignoring this stage has led to absence of reliable reconstructions of Proto-Jê, which in turn makes further comparative studies in Macro-Jê impossible.

I am planning to propose a reconstruction of Proto-Jê in a forthcoming article.

References

- Alves, Flávia de Castro. 2004. *O Timbira falado pelos Canela Apãniekrá: uma contribuição aos estudos da morfossintaxe de uma língua Jê*. PhD. Campinas: Universidade Estadual de Campinas.
- Amado, Rosane de Sá. 2004. *Aspectos morfofonológicos do Gavião-Pykobjê*. PhD. São Paulo: Universidade de São Paulo.
- Araújo, Leopoldina. 2016. *Dicionário Parkatêjê-Português*. Belém.
- Bardagil-Mas, Bernat, Myriam Lapierre, Perankô Panará, Andrés Salanova. 2016. A Digital Dictionary of Panará. *Symposium on American Indian Languages*. Rochester: Rochester Institute of Technology.
- Brandão, Ana Paula Barros. 2014. *A reference grammar of Paresi-Haliti (Arawak)*. PhD. Austin: The University of Texas at Austin.
- Camargo, Nayara da Silva. 2010. *Língua Tapayúna: aspectos sociolingüísticos e uma análise fonológica preliminar*. MA thesis. Campinas: Universidade Estadual de Campinas.
- Costa, Lucivaldo Silva da. 2015. *Uma descrição gramatical da língua Xikrín do Cateté (família Jê, tronco Macro-Jê)*. PhD. Brasília: Universidade de Brasília.
- Davis, Irvine. 1966. Comparative Jê phonology. *Estudos Lingüísticos: Revista Brasileira de Lingüística Teórica e Aplicada* 1(2): 20–24.
- Dourado, Luciana Gonçalves. 2001. *Aspectos morfofossintáticos da língua Panará (Jê)*. PhD. Campinas: Universidade Estadual de Campinas.
- Ehrenreich, Paul. 1895. Materialien zur Sprachenkunde Brasiliens: III. Die Sprache der Akuä oder Chavantes und Cherentes (Goyaz). *Zeitschrift für Ethnologie* 27: 149–162.
- Ferreira, Marília de Nazaré de Oliveira. 2003. *Estudo morfofossintático da língua Parkatêjê*. PhD. Campinas: Universidade Estadual de Campinas.

- Guedes, Marymárcia. 1993. *Siwǎ Mēkapēra. Suyá: a língua da gente: um estudo fonológico e gramatical*. PhD. Campinas: Universidade Estadual de Campinas.
- Ham, Patricia, Helen Waller, Linda Koopman. 1979. *Aspectos da língua Apinayé*. Cuiabá: Sociedade Internacional de Linguística.
- Jefferson, Kathleen. 1989. *Gramática Pedagógica Kayapó*. Anápolis: Associação Internacional de Linguística, SIL – Brasil.
- Lapierre, Myriam, Bernat Bardagil-Mas, Andrés Salanova. 2016a. The nasal consonants of Panará. WSCLA. Montréal: Université du Québec à Montréal.
- Lapierre, Myriam, Andrés Salanova, Bernat Bardagil-Mas. 2016b. A reconstruction of Proto-Northern Jê phonemics. *Amazônicas VI. Coloquio Internacional AMAZÓNICAS* (“La estructura de las lenguas amazónicas”). Leticia/Tabatinga: Universidad Nacional de Colombia; Universidade do Estado do Amazonas; Instituto Caro y Cuervo: 110–111.
- Loukotka, Čestmír. 1963. Documents et vocabulaires inédits de langues et de dialectes sud-américains. *Journal de la Société des Américanistes* 52: 7–60.
- Miranda, Maxwell Gomes. 2014. *Morfologia e morfossintaxe da língua Krahô (família Jê, tronco Macro-Jê)*. PhD. Brasília: Universidade de Brasília.
- Nikulin, Andrey. 2015a. *Verifikaciya gipotezy o zhe-tupi-karibskom rodstve [On the genetic unity of Jê-Tupí-Karib]*. MA thesis. Moscow: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova.
- Nikulin, Andrey. 2015b. Apofonia e sistema vocálico do Proto-Jê Meridional: contribuição para estudos comparativos das línguas Jê. *Revista Brasileira de Linguística Antropológica* 7(2): 275–306.
- Nikulin, Andrey. 2016a. Proto-Jê revisited: phonology, morphophonology and language contact. *Amazônicas VI. Coloquio Internacional AMAZÓNICAS* (“La estructura de las lenguas amazónicas”). Leticia/Tabatinga: Universidad Nacional de Colombia; Universidade do Estado do Amazonas; Instituto Caro y Cuervo: 108–109.
- Nikulin, Andrey. 2016b. *Fonologia segmental do conjunto dialetal Timbira (Jê Setentrional) m.s.* Brasília.
- Nonato, Rafael. 2014. *Clause Chaining, Switch Reference and Coordination*. PhD. Cambridge: Massachusetts Institute of Technology.
- Oliveira, Christiane Cunha de. 2005. *The language of the Apinajé people of Central Brazil*. PhD. University of Oregon.
- Popjes, Jack, Josephine Popjes. 1971. *Phonemic statement of Canela. Preliminary version*. Anápolis: Associação Internacional de Linguística (SIL Brasil).
- Ramirez, Henri, Valdir Vegini, Maria Cristina Victorino de França. 2015. Koropó, puri, kamakã e outras línguas do Leste brasileiro: revisão e proposta de nova classificação. *Línguas Indígenas Americanas* 15(2): 223–277.
- Ribeiro, Eduardo Rivail, Hein van der Voort. 2010. Nimuendajú was right: The inclusion of the Jabutí language family in the Macro-Jê stock. *International Journal of American Linguistics* 76: 517–570.
- Rodrigues, Aryon Dall’Igna. 1981 [2010]. Estrutura do Tupinambá. In: Cabral et al. (eds.). *Línguas e Culturas Tupi II*. Brasília: LALI/UnB, Campinas: Curt Nimuendajú: 12–42.
- Rodrigues, Aryon Dall’Igna. 2012. Para o estudo histórico-comparativo das línguas Jê. *Revista Brasileira de Linguística Antropológica* 4(2): 279–288.
- Rodrigues, Aryon Dall’Igna. 1952. Análise morfológica de um texto Tupi. *Logos* 15: 56–77.
- Rodrigues, Aryon Dall’Igna. 1953. Morfologia do verbo Tupi. *Letras* 1: 121–152.
- Rodrigues, Cíntia Karla Coelho, Marília de Nazaré Ferreira-Silva. 2011. Comparando as consoantes das línguas Tapajúna e Suyá. *Alfa*: 601–611.
- Sá, Rosane Muñoz de. 1999. *Análise fonológica preliminar do Pykobjê*. MA thesis. São Paulo: Universidade de São Paulo.
- Salanova, Andrés Pablo. 2001. *A nasalidade em Mebengokre e Apinayé: o limite do vozeamento soante*. MA thesis. Campinas: Universidade Estadual de Campinas.
- Santos, Ludoviko Carnasciali dos. 1997. *Descrição de aspectos morfossintáticos da língua Suyá (Kĩsêdjê), família Jê*. PhD. Florianópolis: Universidade Federal de Santa Catarina.
- Starostin, Sergey Anatol’evich. 1999. O dokazatel’stve yazykovogo rodstva. In: Ya.G. Testelec, E.V. Rakhilina (eds.). *Tipologiya i teoriya yazyka: ot opisaniya k ob’yasneniyu (k 60-letiyu A.E. Kibrika)*: 57–69. Moskva: Yazyki russkoy kul’tury.
- Stout, Mickey, Ruth Thomson. 1974. Fonêmica Txukuhamei (Kayapó). *Série lingüística* 3. Summer Institute of Linguistics: 153–176.
- Vasconcelos, Eduardo Alves. 2014. Panará, Cayapó do Sul e a família Jê: primeiro caminho de análise. *Lengua y Literatura Latinoamericana* 16: 113–130.

А. В. Никулин. Историческая фонетика северной ветви семьи же.

Статья является первой в планируемой автором серии публикаций по исторической фонологии языков южноамериканской макросемьи макро-же. Поскольку в рамках этой макросемьи самой большой и разнообразной семьей являются собственно языки же, сравнительные исследования по макро-же в первую очередь зависят от степени исторической обработанности данных по семье же; при этом единственная известная на сегодня попытка системной реконструкции фонологической системы и лексического инвентаря пра-же (Davis 1966) подверглась обстоятельной критике в целом ряде работ (Ribeiro and Voort 2010, Nikulin 2015b). В настоящей статье предлагается промежуточная реконструкция для прасеверного же, представляющего крупнейшую из ветвей семьи же.

Ключевые слова: языки же, языки макро-же, языковая реконструкция, сравнительно-исторический метод.

