

## Nasal harmony in consonants in Chiquitano and its origins

This article deals with the origins of the so-called consonant nasal harmony in Chiquitano (Bolivia/Brazil, Macro-Jê family), in which the consonants /β ɾ ʃ w/ change to /m n ɲ ɳ/, usually when a nasal segment is present elsewhere in the word. The exact rules vary from dialect to dialect and are not fully described in the literature. Based on published works and my own field recordings, I provide a description of nasal harmony in contemporary varieties of Chiquitano. I argue that nasal harmony had vowels as its primary targets in Proto-Chiquitano, whereas consonants were indirectly affected by the process due to tautosyllabic assimilation. I also provide evidence that nasal harmony in consonants arose when nasal vowels underwent massive denasalization, thus phonologizing the erstwhile nasal and non-nasal allophones of the sonorant series. The present hypothesis explains why morphemes without a single nasal segment can have a floating feature [+nasal] in the contemporary Chiquitano varieties under examination and accounts for the phonological adaptation of certain loanwords from Spanish and Guaraní.

**Keywords:** Chiquitano language; Macro-Jê languages; nasal harmony; consonant harmony.

In Chiquitano (< Macro-Jê; Bolivia, Brazil), consonants assimilate in nasality under certain circumstances, whereas intervening vowels do not necessarily nasalize. This phenomenon is known as NASAL HARMONY, and it is already noted in the earliest surviving descriptions of Chiquitano (1).

- (1) 18th-century Javeriano Chiquitano (Anonymous n/d *apud* Adam & Henry 1880: 3)

- a.    ⟨obobos⟩           ⟨omomoma⟩  
/o-βoβó-ʂi/    → /o-momó-ma/  
NHA-toad-x    NHA-toad-DIM  
‘toad’           ‘little toad’

- 18<sup>th</sup> century Santiagueño Chiquitano (Pellejà n/d: 3)

- b.    ⟨turus⟩           ⟨tunumaâ⟩  
/turu-ʂi/        → /tunú-ma?ã/  
door-x           door-DIM  
‘door’           ‘little door’

Similar facts are reported and discussed for all known Chiquitano varieties, including Bésiro (Sans 2011), the San Rafael subdialect of Eastern Chiquitano (Girard 2014), the Ignaciano subdialect of Eastern Chiquitano (Ciucci & Maconó Tomichá 2017: 38–39), and Migueleño (Nikulin 2020a: 4–7).

While nasal harmony targeting vowels is cross-linguistically well-attested (Botma 2024), Chiquitano is unusual in showing a kind of nasal harmony where consonants are the main targets of the process. A textbook example of nasal harmony in consonants is Hyman’s (1995) account of KiYaka (< Bantu < Niger–Congo; Democratic Republic of Congo). It has been argued that consonant harmony is fundamentally different from vowel harmony in that it involves featural agreement as opposed to spreading (Hansson 2001; Rose & Walker 2001, among others), though this has been contested (Jurgec 2011). In any case, nasal harmony re-

stricted to consonants is entirely unattested in South American languages other than Chiquitano, in stark contrast with nasal harmony in vowels. The latter phenomenon is widely attested in geographically adjacent languages, such as Gwarayu (< Tupi–Guaranian < Tupian; Bolivia; Danielsen 2019), Eastern Bolivian Guaraní (< Tupi–Guaranian < Tupian; Bolivia, Argentina, Paraguay; Dietrich 1986: 60–63), Ayoreo (< Core Zamucoan < Zamucoan; Bolivia, Paraguay),<sup>1</sup> and Mosetén (Mosetenan; Bolivia; Sakel 2004: 40–41), as well as in the genetically related language Maxakalí (< Maxakalian < Macro-Jê; Brazil; Silva 2020: 139–145). In languages that show nasal harmony in vowels, consonants are also often affected by the process, but they are not the primary target. Therefore, Chiquitano is typologically and areally salient regarding its nasal harmony pattern.

The goal of this article is twofold. After a brief presentation of the dialectal diversity of Chiquitano (Section 1), I make an attempt at elucidating the synchronic workings of the nasal harmony in the attested Chiquitano varieties (Section 2). I show that there are at least two processes involved, with different directionalities and different domains. I also identify a phonotactic tendency and a loanword adaptation pattern that provide a clue to the diachronic origins of the nasal harmony in consonants. In Section 3, I propose that Chiquitano at an earlier stage displayed a classic nasal harmony, whereby nasality spread bidirectionally from nasal vowels. At that stage, nasal consonants occurred as allophones of approximants due to local assimilation. Later, vowels underwent denasalization in most environments, and nasal consonants became phonemic. Section 4 concludes the paper.

## 1. Chiquitano and its dialects

Chiquitano is a macrolanguage in the sense that it is usually referred to as a single language but is in fact a dialect continuum consisting of varieties perhaps best viewed as distinct languages by the criterion of mutual intelligibility. It is spoken in the Chiquitanía (locally *Chiquitanía*) region, spanning eastern Santa Cruz (Bolivia) and southwestern Mato Grosso (Brazil). A significant part of the respective ethnic group identifies as *Monkóxi* (often spelt *Monkox*), pluralized as *Monkóka*, and refers to their language as *Bésiro*. These endonyms are, however, not accepted in parts of the Chiquitanía. In this article, the term *Bésiro* refers to a specific Chiquitano variety (see 1.1 below).

The 2012 Bolivian census reports a total of 148,736 individuals nationwide to have declared themselves to be ethnically Chiquitano, Monkox, or (speakers of) *Bésiro*. However, in the same census, only 6,709 respondents aged 4 or above declared Chiquitano/*Bésiro* as their L1, and only 2,401 individuals aged 6 or above claimed Chiquitano/*Bésiro* to be the language they speak the best (INE 2015). The 2022 Brazilian census reports a total of 197 Indigenous residents in the Portal do Encantado Indigenous Land that falls within the Mato Grosso portion of the Chiquitanía region described above, as opposed to 1,046 in the 2010 Census (IBGE 2023: 139). No demographic statistics are currently available on the ethnic Chiquitano or Camba (Kamba) population in communities of Mato Grosso that lie outside Portal do Encantado, such as Vila Nova Barbecho, and within the urban limits of towns such as Porto Esperidião, Cáceres, Pontes e Lacerda, Vila Bela da Santíssima Trindade, Várzea Grande, or Corumbá (Pacini 2012: 276; Silva 2009). In any case, the Chiquitano language in Brazil is se-

<sup>1</sup> Nasal harmony in Ayoreo is described as affecting consonants in published works (e.g. Bertinetto 2009: 11–2), but Pier Marco Bertinetto (p. c., 2023) and Luca Ciucci (p. c., 2023) confirm that unstressed vowels are also weakly nasalized under nasal spread.

verely endangered; Santana (2014: 27) reported as few as 4 or 5 speakers, though revitalization efforts are underway (Santana 2014; Rupé 2022). In total, Chiquitano is spoken by fewer than 7,000 individuals (probably around 2,000 if only fluent speakers are considered) out of an estimated ethnic population of 150,000.

Chiquitano is classified as a divergent member of the Macro-Jê family (Adelaar 2008). Historically, the Chiquitanía was a multilingual region, with Chiquitano spoken alongside an undetermined number of Chapacuran, Arawakan, Tupian, Bororoan, and Zamucoan languages. From the 16<sup>th</sup> century onward, Spanish and Portuguese were added to this list. In the late 17<sup>th</sup> and 18<sup>th</sup> centuries, however, Jesuit missionaries imposed Chiquitano as the *lingua franca* of the Jesuit missions, resulting in a massive language shift to Chiquitano from other indigenous languages; of these, only the Arawakan language Paunaka survives to this day in use in areas corresponding to the old mission towns. The mid-20<sup>th</sup> century saw another language shift from Chiquitano to Eastern Bolivian Spanish in Bolivia and to Brazilian Portuguese in Brazil. The linguistic effects of these situations of language contact are discussed in Nikulin (2019).

### 1.1. Dialectology

Regarding the internal dialectal diversity of Chiquitano, at least three dialect zones, or maybe three languages, can be identified. I refer to these as **Bésiro**, **Eastern Chiquitano**, and **Migueleno**.

The **Bésiro** variety, currently the most vital, is recognized as one of the official languages of the Plurinational State of Bolivia. It is the only Chiquitano variety that has a codified orthographic norm (Parapaino Castro 2008). It is spoken in the Lomerío area and in the town of Concepción, in the province of Ñuflo de Chávez (Santa Cruz department, Bolivia), by descendants of refugees who fled from the Jesuit missions. Tomichá Chuvé (2023) is the most recent sociolinguistic study on Bésiro. The Bésiro forms in this article come from Galeote Tormo (1993), Parapaino Castro (2008), and Sans (2010).

**Eastern Chiquitano** is a provisional umbrella term for the varieties spoken in northern, northeastern, and southeastern Chiquitanía, which are notable for using the root *sosiji-* ‘rainbow’ as opposed to *iqi-*, found in other dialects. Subdialects include Ignaciano (spoken in and around the town of San Ignacio de Velasco, in the province of José Miguel de Velasco, Santa Cruz, Bolivia), Brazilian (remembered by some elders in the villages of Acorizal, Fazendinha, and Vila Nova Barbecho, in the Brazilian state of Mato Grosso), Santiagueño (spoken in Santiago de Chiquitos, in the province of Chiquitos, Santa Cruz, Bolivia), and possibly others.

The **Migueleno** variety is spoken by no more than 30 individuals in the province of San Miguel de Velasco (Santa Cruz, Bolivia). This is the variety that I have most first-hand experience with. I studied it in six fieldwork trips to the village of San Juan de Lomerío and the town of San Miguel de Velasco between 2017 and 2023.

An unresolved issue in Chiquitano dialectology is how to classify the Javeriano variety, spoken in San Javier de Chiquitos (Ñuflo de Chávez province, Santa Cruz, Bolivia). Galeote Tormo (2014: 269) offers a very limited amount of data, representative of a transitional variety combining both Migueleno and Eastern Chiquitano features, which is quite unexpected given the location of San Javier de Chiquitos. The descriptions of Anonymous (1718) and Anonymous (n/d), which are also most likely based on the variety spoken in San Javier three centuries ago (henceforth **18<sup>th</sup>-century Javeriano Chiquitano**), represent a lect that differs significantly from all known contemporary varieties of Chiquitano. Given the complex sociolinguistic situation of the Chiquitanía and the high incidence of migrations between different mis-

sions, it appears unlikely that 18th century Javeriano Chiquitano is a direct ancestor of modern Javeriano, or of any other modern Chiquitano lect.

## 1.2. Phonology

This subsection provides a pandialectal outline of Chiquitano phonology. The preferred syllable structures in Chiquitano are CV and V; consonant clusters or codas are rarely tolerated. Nevertheless, they may occur as a result of vowel elision or in loanwords.

Table 1 lists the consonants that have phonemic status in at least one Chiquitano variety. Chiquitano shows progressive palatalization of consonants, and the palatalized consonants (analyzed either as allophones of plain consonants or as independent phonemes, depending on the variety and on each author's analytical decision) are indicated below the respective phonemes in Table 1 without the slash marks.

/p/ p <sup>j</sup> ~ c	/t/ t <sup>j</sup>	(/ts/)	/tʃ/	/k/ k <sup>j</sup> ~ c	/ɾ/
	/ʂ/ q	/s/		(/x/) q	(/h/)
/β/ β <sup>j</sup> ~ j		/ç/	/j/	(/w/)	
/m/ m <sup>j</sup> ~ n		/n/	/ɲ/	(/ŋ/)	

Table 1. Chiquitano consonants

The phoneme /ts/ is present in all varieties except Bésiro, where it has merged with /s/ (2). The phoneme /x/ is present only in Migueleño, which shows a chain shift /ç/ (before a consonant) > /ʂ/ > /x/ (3). The phoneme /h/ occurs marginally in all varieties except Bésiro (4). The marginal phonemes /w/ and /ŋ/ occur in all dialects except Bésiro, which has /β/ and /m/ instead (5). The aforementioned progressive palatalization process operates in slightly different ways depending on the specific variety. For example, Bésiro palatalizes /p β m t ʂ k/ to [p<sup>j</sup> β<sup>j</sup> m<sup>j</sup> t<sup>j</sup> q<sup>j</sup> k<sup>j</sup>], respectively, whereas Migueleño palatalizes /p β m t x k/ to [c<sup>j</sup> n<sup>j</sup> t<sup>j</sup> q c] (6).

- (2) Bésiro *n-o-sokoré-s* ~ Migueleño *o-tsokoré-s* 'seriema bird.♂'
- (3) Bésiro *ʂáñj-ç* ~ Migueleño *xaɻí-ç* 'faeces'
- (4) Bésiro *aémo* ~ Migueleño *haémo* 'for you'
- (5) Bésiro *n-o-iβó-ʂ* ~ Migueleño *o-iwó-x* 'deer.♂'
- (6) Bésiro */n-i-po-ʂi/* *nip'óʂ* ~ Migueleño */i-poó-ʂi/* *coóx* 'her house'

Table 2 shows the vowel inventory of the Chiquitano varieties. In this article, I follow the mainstream practice of representing the non-high front vowels as /e/ and /ɛ/, though I find their most typical realizations to be closer to [ɛ] and [ɛ̄], respectively. The status of vowel length as a distinguishing feature is disputed (cf. Ciucci & Macoñó Tomichá 2017: 40).

/i/ (/í/)	/i/ (/í/)	/u/ (/ú/)
/e/ (/ɛ/)	/a/ (/ã/)	/o/ (/õ/)

Table 2. Chiquitano vowels

Nasal vowels are present in all varieties, though their status is contested in Bésiro (cf. Sans 2010: 90–1). In varieties other than Bésiro, they almost always occur next to another vowel, possibly separated by a glottal stop (7).<sup>2</sup> In other environments, nasal vowel phonemes arguably surface as [VN] or [VN] sequences (8), though it remains debatable whether the segments resulting in these sequences are in fact underlying nasal vowels or /VN/ sequences. [VN] and [VN] sequences are rare in native vocabulary (8a–d), though they are common in borrowings from Spanish (8e–f). The vowel in such sequences is audibly nasal before palatal or velar consonants (8a, c–d), but less so before labial or dental/veolar ones (8b, e–f).

- (7) a. Bésiro *a-taitʃomé-ka* ~ Migueleño *a-taɪʃomé-ka* ‘you squeeze out’
  - b. Bésiro *kimúint̪a* ~ Migueleño *cimóint̪a?* ‘in the middle’
  - c. Bésiro *qaéŋ-s* ~ *quéŋ-s* ~ Migueleño *qaʔé-s* ‘pampa field’
  - d. Bésiro *káŋ-ʂ* ~ Migueleño *káʔã-x* ‘stone’
  - e. Bésiro *n-u-táu-ma* ~ Migueleño *u-táɪ-ma?* ‘bird.♂’
- (8) a. Migueleño *í-ca-ti* [íŋcati] ‘I go away’
  - b. Migueleño *tátó-x* [tan'tox] ‘güembé vine’
  - c. Migueleño *úka* ['úŋka] ‘who.♀’
  - d. Migueleño *íkamá?a* [íŋka'ma?a] ‘there’
  - e. Migueleño *kápo-x* [kampox] ‘space’ (< Spanish *campo*)
  - f. Migueleño *βéta-x* [βentax] ‘shop’ (< Spanish *venta*)

Stress is contrastive and mobile (Nikulin 2022), and is indicated by means of an acute accent in this article. The circumflex accent symbolizes the so-called “strong stress”, which lengthens the vowel and removes floating accents to its right (Nikulin 2022: 15–18).

More detailed phonological descriptions are available for the Bésiro (Krüsi & Krüsi 1978; Sans 2010) and Migueleño (Nikulin 2020a, 2021) varieties.

## 2. Nasal harmony: a synchronic view

This section identifies several nasality-related facts that hold synchronically in Chiquitano. **2.1** discusses a regressive nasal harmony process. **2.2** and **2.3** state important static restrictions regarding the occurrence of oral and nasal sonorants as well as nasal vowels. **2.4** provides an interim summary of the section.

### 2.1. Regressive nasal harmony

Regressive nasal harmony in Chiquitano is a process whereby nasality spreads from a nasal segment (any of /m n ŋ ŋ̪ ñ ñ̪ ñ̪̪ ñ̪̪̪ ñ̪̪̪̪ ñ̪̪̪̪̪/) leftwards. In 9–11, the sonorants /β ɾ ʃ w/ are nasalized to /m n ŋ ŋ̪/. (We will later see that that the high vowels /i ɪ u/ may also be targeted by this process, at least in the Migueleño variety.) The triggers are given in boldface. The domain of this process includes the root with all inflectional and derivational prefixes, as well as certain suffixes. No segments are known to block the leftward nasal spread.

<sup>2</sup> In 7c–d, Bésiro [ŋ] is clearly not phonemic, since that variety lacks the phoneme /ŋ/. Krüsi and Krüsi (1978: 60–1) analyze it as a transition between a nasal vowel and a velar stop or sibilant. Similarly, Sans (2010: 94) identifies [ŋs], [ŋʂ], [ŋʃ], and [ŋk] as allophones of /s/, /ʂ/, and /k/ after nasal vowels. Those authors that do not recognize the existence of underlying nasal vowels apparently consider [ŋ] to be an allophone of /n/.

## (9) Migueleño

a. /kijará-xi/	→ /kijaná- <b>ma?</b> a/
fox-x	fox-DIM
‘fox (♀)’	‘little fox (♀)’
b. /kuruβasí-xi/	→ /kunumasí- <b>ma?</b> a/
chicken-x	chicken-DIM
‘chicken (♀)’	‘little chicken (♀)’
c. /kurusí-xi/	→ /Ø- <b>ç</b> unusi- <b>ná</b> -ta/
cross-x	INV-cross-CAUS-F.3SGP
‘cross’	‘she is blessing her’
d. /tʃáβ-o/	→ /ma-tʃám- <b>an</b> -a/
drink-F.3	ANTP-drink-CAUS-F.3
‘she drinks’	‘she offers a drink’
e. /táriβ-o/	→ /ma-taním- <b>an</b> -a/
break-F.3	ANTP-break-CAUS-F.3
‘it is broken’	‘she breaks’

## (10) Eastern Chiquitano, Rafeleño subdialect (Girard 2014)

a. /osewó-ṣi/	→ /osenjó- <b>ma?</b> /
maize-x	maize-DIM
‘maize’	‘little maize’
b. /jo:rip <sup>j</sup> aki?ó-ṣi/	→ /no:nip <sup>j</sup> aki?ó- <b>ma?</b> /
courbaril-x	courbaril-DIM
‘courbaril tree’	‘little courbaril tree’
c. /Ø-βa-topí-k <sup>j</sup> a/	→ /Ø-ma-topi- <b>ṇ</b> aká-ka/
1+2-ANTP-bathe-F.N3	1+2-ANTP-bathe-CAUS-F.N3
‘we bathe’	‘we bathe something’
d. /u-βá-ka/	→ /u-ma-t-é?/
1+2-eat-F.N3	1+2-eat-F.3SGP-OBLINV
‘we (incl.) eat’	‘we (incl.) eat it’
e. /jo-/	→ /no-toki?á:-ṣi/
3PL-	3PL-navel-x
‘their’	‘their navels’

(11) 18th-century Javeriano Chiquitano (Anonymous n/d *apud* Adam & Henry 1880: 3)

a. <ibobica>	<imomicoê>
/i-βoβí-ka/	→ /i-momi-k-o?é/
1SG-invite-F.N3	1SG-invite-F.3SGP-OBLINV
‘I invite’	‘I invite her’
b. <yaçaborica>	<ñacamoniteê>
/j-asaβorí-ka/	→ /j- <b>ñ</b> asamoni-t-e?é/
1SG-look-F.N3	1SG-look-F.3SGP-OBLINV
‘I look’	‘I look at it’
c. <izíborica>	<iquìmonimacaca>
/i-tsíβorí-ka/	→ /Ø-i-kimoni- <b>mak</b> á-ka/
1SG-spank-F.N3	1SG-INV-spank-CAUS-F.N3
‘I get spanked’	‘I spank’

d. <obobos>	<omomoma>
/o-βoβó-ṣi/	→ /o-momó- <b>ma</b> /
NHA-toad-X	NHA-toad-DIM
‘toad’	little toad’

The leftward nasal spread is productive in Chiquitano, and applies to older borrowings from Spanish (in Nikulin’s 2019 classification, all those that belong to stratum A and some of those that belong to stratum B), as shown in 12a–b. However, newer borrowings (12c–d) are not affected by nasal harmony, and constitute lexical exceptions. (12d shows an effect of rightward nasal spreading, on which see 2.2.)

(12) Migueleño

a. /içpinit'ú- <b>ma?</b> a/	<	older Spanish <i>espíritu</i> [es'piritu] + DIM
hummingbird-DIM		spirit
‘hummingbird’		‘spirit’
b. /motôni-ṣi/	<	older Spanish <i>botón</i> [bo'ton] + x
button-x		button
‘button (clothing)’		‘button’
c. /ariβiróne/ <sup>3</sup>	<	older Spanish <i>almidón</i> [almi'don]
starch		starch
‘starch’		‘starch’
d. /rominú-xi/	<	older Spanish <i>lomillo</i> [lo'miʎo] + x
saddle-x		saddle
‘saddle’		‘saddle’

Furthermore, some suffixes lie outside the nasal spreading domain. In 13, nasality does not spread from the suffixes /-jñiñi/ and /-iño/; forms such as \*/op-i-t<sup>j</sup>asun-ó-jñiñi/ or \*/ma?-iño/ are, therefore, unattested.

(13) Migueleño

a. /op-i-t <sup>j</sup> asur-ó-jñiñi/	b. /βa?-íño/
3PL-INV-call-F.3-1SG <sub>P</sub>	DEM.PL-PL
‘they call me’	‘these (♀)’

A handful of so-called Trojan morphemes, which carry a floating [+nasal] feature, exist in Chiquitano. These trigger nasal spreading despite lacking any of /m n ñ ñ ì ù ñ ë ð ã/. In 14–16, the Trojan morphemes are given in boldface.

(14) Migueleño /ij-/ 1SG.Ø

a. /j-Ø-á-ka/	b. /j-ápa/	c. /j-ót <u>u</u> /
1SG.Ø-ANTP-put-F.N3	1SG.Ø-louse	1SG.Ø-tongue
‘I put (Ø)’	‘my lice (Ø)’	‘my tongue (Ø)’

(15) Eastern Chiquitano, Rafealeño subdialect /aβ-/ 2PL (Girard 2014)

a. /am- <b>asi</b> -ká-ti/	b. /am- <b>ó?</b> o/	c. /am- <b>ót</b> u/
2PL-look-F.N3-CTPT	2PL-tooth	2PL-tongue
‘you (pl.) look’	‘your (pl.) teeth’	‘your (pl.) tongues’

<sup>3</sup> In this example, Spanish [m] is unexpectedly adapted as Migueleño /β/. I surmise this is due to the necessity to preserve the oral quality of /t/ (< Spanish [θ]), which would otherwise nasalize to /n/ as per the progressive nasal harmony process (2.2).

(16) 18th-century Javeriano Chiquitano (Anonymous n/d *apud* Adam & Henry 1880: 3)

‘yebabaca’	→	‘iñemamacaca’
/j-eβaβá-ka/		/∅-iŋ-emama-ká-ka/
1SG-move_closer-F.N3		1SG-INV-move_closer-CAUS-F.N3

‘I move closer’ ‘I move it closer’

Finally, at least in the Migueleño variety, high vowels are also targeted by nasal spread, but only when preceded by another vowel (possibly with an intervening glottal stop), as shown in 17a’-e’.

## (17) Migueleño

a. /tsoi-tʃokó-ka/	a’. /tsoi-tʃimó-ka/
1+3-dance-F.N3	1+3-sit-F.N3
‘we (excl.) dance’	‘we (excl.) sit’
b. /∅-a-ij-axúβi/	b’. /∅-a-ĩ-t̪á?ã/
NF-2SG-INV-wash	NF-2SG-INV-bring
‘for you to wash it’	‘for you to bring it’
c. /ja?í-xi/	c’. /ja?í-ma?á/
young_man-x	young_man-DIM
‘young man’	‘boy’
d. /taβaí-xi/	d’. /tamaí-ma?á/
chicha-x	chicha-DIM
‘chicha’	‘chicha (dim.)’
e. /a-u-tʃá?á/	e’. /á-ũ-timo/
NF-3PL-drink	NF-3PL-sit
‘for them to drink’	‘for them to sit’

## 2.2. Progressive nasal harmony

Sans (2011) posits a rightward nasal spread process for Bésiro based on negative evidence. Indeed, there is a static restriction in all Chiquitano varieties, whereby /mV/, /nV/, /ŋV/, and nasal vowels may not be immediately followed by any of /β ɾ j w/. By contrast, sequences of syllables with nasal onsets are common in the lexicon of Chiquitano (18).

## (18) Migueleño

a. /anené-si/	b. /rominú-xi/	c. /momené-si/
day-x	saddle-x	comb-x

‘day’

‘saddle’

‘comb’

Examples such as 18b (borrowed from Spanish *lomillo* [lo'miʎo]) are particularly revealing. Since Spanish /ʎ/ is normally adapted as Chiquitano /ɾ/ or /j/ in borrowings (Nikulin 2019: 12), one could expect the resulting form to be \*/romirú-xi/, which is, however, unattested. The illicit sequence \*/mir/ is instead replaced with /min/.

Another piece of evidence supporting the rightward nasal spread is the distribution of stem-final consonants in verbs. In general, verbal roots commonly end with /β/, /ɾ/, rarely with /j/, /w/ (19a-e). However, roots that include a nasal segment can only end with one of those segments if a voiceless consonant intervenes (as in 19b-c). Otherwise, the root-final consonant of the stem can only be /m/ or /n/ (rarely /ŋ/), as shown in 19f-h. All examples in 19 contain the F.3 suffix /-o/ (or /-a/, as per vowel harmony); in addition, 19c-d and 19g contain the antipas-sive prefix /βa-/ (or /ma-/), as per regressive nasal harmony).

## (19) Migueleño

- |                    |               |                    |                |
|--------------------|---------------|--------------------|----------------|
| a. /tʃáβ-o/        | b. /aétsor-o/ | c. /ma-kátar-a/    | d. /βá-tʃej-o/ |
| drink-F.3          | lose-F.3      | ANTP-sing-F.3      | ANTP-give-F.3  |
| ‘she drinks’       | ‘she is lost’ | ‘she sings’        | ‘she gives’    |
| e. /síuŋ-o/        | f. /mánom-o/  | g. /ma-kitjónon-o/ | h. /tomóen-o/  |
| be_dry-F.3         | sleep-F.3     | ANTP-snore-F.3     | tie-F.3        |
| ‘it (wood) is dry’ | ‘she sleeps’  | ‘she snores’       | ‘it is tied’   |

Rightward nasal spread is clearly blocked by voiceless consonants (Sans 2011). Any voiceless segment that intervenes between a potential trigger (underlying nasal segment) and a potential target (oral sonorant) results in the failure of the sonorant to nasalize (20–21).

## (20) Migueleño

- |  |                                 |
|--|---------------------------------|
| a. /aétsor-o/ (*/aétsón-o/)                  | b. /ma-kátar-a/ (*/ma-kátan-a/) |
| lose-F.3                                     | ANTP-sing-F.3                   |
| ‘she is lost’                                | ‘she sings’                     |
| c. /kátaβó-xi/ (*/kátamó-xi/)                | d. /matorí-xi/ (*/matoní-xi/)   |
| lock-x                                       | parrot-x                        |
| ‘lock’                                       | ‘parrot (♀)’                    |
| e. /materá-xi/ (*/matená-xi/)                | f. /omenetíβo/ (*/omenetímo/)   |
| flag-x                                       | how_many                        |
| ‘flag’                                       | ‘how many’                      |
| g. /maiçtíru/ (*/maiçtinu/)                  | h. /ma-káṣar-a/ (*/ma-káṣar-a/) |
| teacher                                      | ANTP-have_rest-F.3              |
| ‘teacher (♀)’                                | ‘she has a rest’                |
| i. /ma-ematakúrcuts-o/ (*/ma-ematakúnuts-o/) |                                 |
| ANTP-wait-F.3                                |                                 |
| ‘she waits’                                  |                                 |

## (21) Bésiro

- |   |   |
|---|---|
| a. <i>naykiré-s</i> (* <i>naykiné-s</i> )         | b. <i>n-o-tiykirí-ɸ</i> (* <i>n-o-tiykiní-ɸ</i> ) |
| dragonfly-x                                       | L-NHA-rufous_hornero-x                            |
| ‘dragonfly’                                       | ‘rufous hornero bird’                             |
| c. <i>n-u-manturé-s</i> (* <i>n-u-mantuné-s</i> ) | d. <i>metíura</i> (* <i>metíuna</i> )             |
| L-NHA-crab_eating_fox-x                           | Ventura   |
| ‘crab-eating fox’                                 | ‘Ventura (♀)’                                     |

One exception to the rightward nasal spread rule is the Bésiro linking consonant *n*-, which is added to noun forms that would otherwise be word-initial and does not trigger nasal spread, as in *n-aró-s* (\**n-anó-s*) ‘rice’. In other Chiquitano varieties, the cognate prefix has the form /t/- (unless regressive nasal harmony applies), as in Migueleño /t-aró-xi/ ‘rice’, suggesting that its form in Bésiro is the result of a recent sound change \**t* > *n* in the word-initial position, which counterfeeds the progressive nasal harmony.

Some loanwords from Spanish are also exempt from progressive nasal harmony (22), though others — such as the example in 18b — do undergo it.

## (22) Migueleño

- |                               |   |
|-------------------------------|---|
| a. /saŋorá-xi/ (*/saŋoná-xi/) | b. /miêrkuri-ɸi/ (*/miênkuni-ɸi/)         |
| lady-x                        | Wednesday-x                               |
| ‘lady’                        | ‘Wednesday’ (< Spanish <i>miércoles</i> ) |

### 2.3. Static restrictions on nasal vowels

An important fact about the nasal vowels in Chiquitano varieties other than Bésiro is that they are frequent only as part of /VV/ and /V?V/ sequences in native vocabulary (that is, only when they are adjacent to another vowel, possibly with an intervening glottal stop), as briefly discussed in 1.2 (examples 7–8). Additional examples are given in 23 (the /VV/ and /V?V/ sequences are in boldface).

(23) Migueleño

- |                                  |                            |                        |
|----------------------------------|----------------------------|------------------------|
| a. /cō̄to?o/                     | b. /i-tʃóki?ã/             | c. /má-íki-?o/         |
| soon                             | 1SG-navel                  | ANTP-ask-F.3           |
| ‘soon’                           | ‘my navel’                 | ‘she asks, she greets’ |
| d. /ma-úxókon-o/                 | e. /a-í-cá-?i/             | f. /poñōetó-xi/       |
| ANTP-be_ill-F.3                  | 2SG-INV-bring-IMP          | belt-x                 |
| ‘she is ill’                     | ‘bring it!’                | ‘belt’                 |
| g. /Ø-t̪okí-?okó-ta/             | h. /Ø-caká?ã-xi/           | i. /ç-ó?ó-k-ó?i/       |
| INV-nude-CAUS-F.3SG <sub>P</sub> | 3SG-liver-x                | 1SG.♀-listen-F.N3-PSTV |
| ‘she is undressing her’          | ‘her liver’                | ‘I listen (♀)’         |
| j. /páí-xi/                      | k. /ma-ětoními-?o/         |                        |
| month-x                          | ANTP-wash_hands-F.3        |                        |
| ‘month’                          | ‘she is washing her hands’ |                        |

The Bésiro cognates of these forms contain VN sequences, which are variably analyzed as underlying nasal vowels or as bisegmental /VN/ sequences: *kόnto* 'soon', *ma-uŋsókon-o* 'she is ill', *poŋoentó-s* 'belt'.

In other environments, nasal vowels are rare in native vocabulary (24), and at least in the Migueleño variety they are pronounced with a clearly audible consonantal phase, raising doubts on whether they should be really analyzed as underlying nasal vowels (cf. Nikulin 2021: 24–26) or as bisegmental sequences. Most occurrences of nasal vowels (or maybe bisegmental sequences) in this environment are found in transparent loans from Spanish (25).

(24) Migueleño

- |                  |                |                  |             |
|------------------|----------------|------------------|-------------|
| a. /tātō-xi/     | [tan'tox]      | b. /í-ca-ti/     | [ícati]     |
| güembé-x         |                | 1SG.go-F.N3-CTFG |             |
| ‘güembé vine’    |                | ‘I go’           |             |
| c. /sākijoré-si/ | [san'kijo'res] | d. /íkamá?a/     | [íŋka'ma?a] |
| blackbird-x      |                | there            |             |
| ‘blackbird (♀)’  |                | ‘there’          |             |

(25) Migueleño

- |   |   |
|---|---|
| a. /tom̩i̩co/ [to'mi̩n̩co]<br>Sunday<br>'Sunday' (< Spanish <i>domingo</i> )    | b. /ma-p̩esaɾ-a/ [ma'p̩eñsaɾa]<br>ANTP-think-F.3<br>'she thinks' (< Spanish <i>pensar</i> ) |
| c. /t̩ʃopa-xi/ ['t̩ʃompax]<br>sweater-x<br>'sweater' (< Spanish <i>chompa</i> ) | d. /t̩uβ̩et̩e-si/ [t̩uwen'tes]<br>duende-x<br>'duende'                                      |

## 2.4. Interim summary

So far, we have seen that Chiquitano exhibits two kinds of nasal spread with differing directionalities: the regressive (right-to-left) type of spread (2.1) is not blocked by any segments, whereas the progressive (left-to-right) type of spread (2.2) is blocked by voiceless segments. Both processes target the sonorants /β ɾ j w/ and the high vowels /i ɨ u/ (the latter are only affected when they occur in the environment  $V(?)_$ ), with the outcomes being, respectively, /m n ɲ ɳ/ and /i ɨ ɯ/. The usual triggers are the nasal segments /m n ɲ ɳ i ɨ ɯ e ə ə̄/̄/, but nasal spread is also triggered by Trojan morphemes, i.e. lexically specified morphemes that do not contain any of the normally expected segments. Loanwords are often, but not always, exempt from nasal spread. An additional important fact is that nasal vowels are frequent only in /VV/ and /V?V/ sequences in native vocabulary, except in the Bésiro variety, whereas sequences of the type /CVC/ are mostly found in recent loans.

## 3. A diachronic account

I propose that nasal harmony in Chiquitano originally involved vowels and not consonants. This is plausible from a typological point of view: nasal harmony processes are common in Eastern South America, and mostly affect vowels (in addition to triggering allophony in sonorant segments), as proposed by Picanço (2010) for the Mundurukuan branch of the Tupian language family and by Silva (2020) for the Macro-Jê language Maxakalí.

I reconstruct bidirectional nasal spread for Proto-Chiquitano. It was triggered by underlying nasal vowels (/i ɨ ɯ e ə ə̄/) and targeted vowels rather than consonants. The right-to-left nasal spread was not blocked by any segment, whereas the left-to-right nasal spread was blocked by voiceless segments. In my proposal, Proto-Chiquitano lacked the nasal phonemes \*/m n ɳ ɲ/. Instead, I reconstruct the sonorants \*/β ɾ j w/, which surfaced as \*[m n ɳ ɲ] before nasal(ized) vowels, as proposed by Sans (2011) for the Bésiro variety. I further propose that all nasal vowels were **denasalized** in the contemporary Chiquitano varieties, except when they were part of /VV/ or /V?V/ sequences. The segments \*[m n ɳ ɲ] — originally positionally conditioned allophones of \*/β ɾ j w/ — have thus acquired phonemic status, as shown in 26.

(26) Proto-Chiquitano	Migueleno	
a. */tákōr̥é-si/ [tákō'n̥esi]	/takoné-si/ [tako'nes]	'sugarcane'
b. */ãr̥er̥é-si/ [ãn̥e'n̥esi]	/anené-si/ [ane'n̥es]	'day'
c. */ðβ-étsor-o/ [ð'm̥etsoro]	/om-étsor-o/ [o'm̥etsoro]	'they are lost'
d. */β̥áɾ̥ðβ̥-ð/ [m̥an̥om̥o]	/mánom-o/ [manom̥o]	'she sleeps'

The erstwhile nasal harmony in vowels then gave rise to a long-distance (consonantal) nasal harmony (27).

(27) Proto-Chiquitano	Migueleno	
a. */kijará-si/	/kijará-xi/	'fox'
a'. */kijárá-βã?ã/	/kijaná-ma?ã/	'little fox'
b. */tʃáβ̥-o/	/tʃáβ̥-o/	'she drinks'
b'. */βã-tʃáβ̥-ãr-ã/	/ma-tʃám-an-a/	'she offers a drink'

This hypothesis handily accounts for the existence of Trojan morphemes in contemporary varieties of Chiquitano, tracing them back to morphemes with an erstwhile nasal vowel that is not part of a /VV/ or /V?V/ sequence (28).

(28)	Proto-Chiquitano	Migueleno
a.	*-/ótu/ [-ótu]	/-ót[u]/ [-ót[u]] 'tongue'
a'.	*/ij-/ + *-/ótu/ → */ij-ótu/ [i̯nótu]	/j-ót[u]/ [jót[u]] 'my tongue (♂)'
b.	*-/ápa/ [-ápa] ~ *-/ápā/ [-ápā]	/-áp[u]/ [-áp[u]] 'louse, lice'
b'.	*/ij-/ + *-/ápa/ ~ *-/ápā/ → *-/íj-ápa/ [i̯nápa] ~ *-/íj-ápā/ [i̯nápā]	/j-áp[u]/ [jáp[u]] 'my lice (♂)'

This scenario is corroborated by comparative evidence. The Chiquitano root for 'tongue' (28a-a) has Macro-Jê cognates with a nasal vowel in the initial syllable (Adelaar 2008: 24), and the respective Proto-Macro-Jê etymon is reconstructed as \*-ñū<sub>1</sub>ctōk (Nikulin 2020b: 386).

Further support comes from the adaptation patterns of loanwords from Spanish. In the early colonial period, Spanish /mV/, /nV/, /nV/ were borrowed as Chiquitano /β̄V/ [m̄V], /f̄V/ [n̄V], /j̄V/ [n̄V], whereas Spanish /VNC/ sequences were borrowed as /VC/, since underlying codas were not allowed (29). Example 29c shows that at this point only progressive harmony applied, whereas the regressive was already largely inactive.

- (29) a. Spanish *ventana* /bentána/ 'window' → Chiquitano \*/β̄tarā-/ + progressive harmony → \*/β̄tarā-/ \*[m̄tanā-] > Migueleno /metaná-xi/ 'window'  
 b. Spanish *bandera* /bandéra/ 'flag' → Chiquitano \*/β̄átera-/ \*[m̄átera-] > Migueleno /materá-xi/ 'flag'  
 c. Spanish *lomillo* /lomílo/ 'saddle' → Chiquitano \*/coβ̄ru-/ + progressive harmony → \*/coβ̄ru-/ \*[comínū-] > Migueleno /cominú-xi/ 'saddle'  
 d. Spanish *Ventura* /bentúra/ 'Ventura' → Chiquitano \*/β̄etúra/ \*[m̄e'tu:ra] > Bésiro /metúra/ 'Ventura (♀)'

Loans from Guaraní (which has nasal spread) preserve nasal(ized) vowels as such in earlier Chiquitano (30).

- (30) Guaraní /takʷar-e?ẽ/ [tákʷáre?ẽ] 'sugarcane' → Chiquitano /tákōrẽ-/ [tákōnẽ-] > Migueleno /takoné-si/ 'sugarcane'

In /VV/ and /V?V/ sequences, denasalization did not take place, and nasality was preserved in all varieties except Bésiro, on which see below (31).

- (31) a. Proto-Chiquitano \*/∅-ó?ópakí-ši/ \*[ó?ópa'kiši] ~ \*/∅-ó?ópákí-ši/ \*[ó?ópá'kiši] > Migueleno /∅-ó?ópakí-xi/ 'her shoulder'  
 b. Proto-Chiquitano \*/íšo?é-si/ \*[íšo?ési] > Migueleno /šo?é-si/ 'pampa field'  
 c. Proto-Chiquitano \*/ká?á-ši/ \*[ká?áši] > Migueleno /ká?á-xi/ 'stone'  
 d. Proto-Chiquitano \*/já?í-βá?á/ \*[já?ímá?á] > Migueleno /ja?í-ma?á/ 'boy'  
 e. Proto-Chiquitano \*/á-í-tá?á/ \*[á-ítá?á] > Migueleno /a-í-tá?á/ 'for you to bring'  
 f. Proto-Chiquitano \*/tsóí-tʃíβó-ka/ \*[tsóítʃímōka] > Migueleno /tsoí-tjímó-ka/ 'we (excl.) sit'  
 g. Proto-Chiquitano \*/á-ú-tíβó/ \*[á-útímō] > Migueleno /á-ú-timo/ 'for you (pl.) or them to sit'  
 h. Proto-Chiquitano \*/á-í-tá?á/ \*[á-ítá?á] > Migueleno /a-í-tá?á/ 'for you to bring'  
 i. Proto-Chiquitano \*/táβáí-βá?á/ \*[támáímá?á] > Migueleno /tamaí-ma?á/ 'chicha.DIM'

At least in the Migueleno variety, nasality is not always clearly audible on vowels immediately following nasal consonants, as in [tama?á] 'one', [maa'tax] 'fishhook', [naa'kiç] 'peanut'. The respective phonological representations are perhaps /tamā?á/, /m-á(?)á-tá-xi/, /ná(?)ákí-qi/ (from Proto-Chiquitano \*/táβáí-βá?á/, \*/βá?átá-ši/, \*/rá?ákí-ši/).

In the Bésiro variety, \*/V?V/ sequences yielded VVN (if the vowels are different) or VN (if the vowels are identical), where N is realized as [m] before /p/ (32a), [n] before /t tʃ/ (32b),

[ŋ] before /k s ʂ/ as well as word-finally in the numeral ‘one’ (32c–g), and zero before /m n ɲ/ or word-finally in most instances (32h).

- (32) a. Proto-Chiquitano \*/∅-õ?õpakí-ʂi/ \*[õ?õpa'kiʂi] ~ \*/∅-õ?õpákí-ʂi/ \*[õ?õpã'kiʂi] > Bésiro *n-ompakí-ʂ* ‘her shoulder’  
b. Proto-Chiquitano \*/ü-βã?ãturué-ʂi/ \*[ümã?ãtu'resi] > Bésiro *n-u-manturé-s* ‘crab-eating fox’  
c. Proto-Chiquitano \*/rã?ãkí-ʂi/ \*[nã?ã'kiçi] ~ \*/rã?ãkí-ʂi/ \*[nã?ã'kiçi] > Bésiro *naŋkí-ç* ‘peanut’  
d. Proto-Chiquitano \*/βã?ãká-ʂi/ \*[mã?ã'kaʂi] ~ \*/βã?ãká-ʂi/ \*[mã?ã'kaʂi] > Bésiro *maŋká-ʂ* ‘south wind’  
e. Proto-Chiquitano \*/išõ?é-ʂi/ \*[içõ?ési] > Bésiro *çœéŋ-s* ‘pampa field’  
f. Proto-Chiquitano \*/kã?ã-ʂi/ \*[kã?ãʂi] > Bésiro *káŋ-ʂ* ‘stone’  
g. Proto-Chiquitano \*/tãβã?á/ \*[tãmã?á] > Bésiro *tamáŋ* ‘one’  
h. Proto-Chiquitano \*/jã?i-βã?ã/ \*[jã?i'mã?ã] > Bésiro *jaŋima* ‘boy’

Word-finally, reconstructed \*/V?V/ sequences do not show traces of nasalization in Bésiro, at least according to the published sources. The Bésiro reflexes in 33 are from Parapaino Castro (2008).

- (33) a. Proto-Chiquitano \*/ã-ĩ-sãβũ-ts-é?ẽ/ \*[ãsãmã'tsẽ?ẽ] > Bésiro *a-i-samu-sé?e* ‘make it!’  
(compare Migueleño /a-ĩ-samu-ts-é?ẽ/)  
b. Proto-Chiquitano \*/kãiβã?á/ \*[kãimã?á] > Bésiro *kaimá* ‘now’  
(compare Migueleño /kaĩma?á/)  
c. Proto-Chiquitano \*/ã-ĩ-tõβõ?ẽ/ \*[ãtõ'õmõ?ẽ] > Bésiro *a-i-tõomõ?e* ‘for you to tie it’  
(compare Migueleño /a-ĩ-tõomõ?ẽ/)

As a result of differentiated evolution of \*/V(?)V/ sequences (which did not denasalize completely) and simplex nasal vowels (which did denasalize), contemporary Chiquitano varieties display synchronically active alternations between oral and nasal segments. In Migueleño, for example, one finds multiple morphemes where morpheme-final /V?V/ sequences alternate with short oral vowels before certain affixes (34). These mostly go back to Proto-Chiquitano alternations between \*/V/ and \*/V?V/ (cf. Nikulin 2020a: 5, fn. 6). In Bésiro, alternations between V and VN are common (35), which go back to \*/V?V/ sequences word-finally or before an obstruent, respectively.

- |                          |                           |                 |
|--------------------------|---------------------------|-----------------|
| (34) a. Proto-Chiquitano | */ü-βã-ãřítá-ka/          | *[ümã:nít̪áka]  |
| Migueleño                | /∅-ma-nit̪á-ka/           |                 |
|                          | 1+2-ANTP-speak-F.N3       |                 |
|                          | ‘we (incl.) speak’        |                 |
| a'. Proto-Chiquitano     | */h-ü-βã-ãřítá?ã/         | *[hümã:nít̪á?ã] |
| Migueleño                | /∅-∅-ma-nit̪á?ã/          |                 |
|                          | NF-1+2-ANTP-speak-F.N3    |                 |
|                          | ‘for us (incl.) to speak’ |                 |
| b. Proto-Chiquitano      | */i-ká-ta/                | *[i'k̪áta]      |
| Migueleño                | /∅-çá-ta/                 |                 |
|                          | INV-carry-F.3SGP          |                 |
|                          | ‘she carries it’          |                 |
| b'. Proto-Chiquitano     | */h-ãp-ã-ká?ã/            | *[hãpã'ká?ã]    |
| Migueleño                | /(h)-ap-a-ká?ã/           |                 |
|                          | NF-2PL-ANTP-carry         |                 |
|                          | ‘for you guys to carry’   |                 |

(35) a. Proto-Chiquitano Bésiro	*/tsi <sup>ñ</sup> βā?á-βā?á/	*[tsi <sup>ñ</sup> m <sup>j</sup> á?ámā?á]
	<i>tʃim<sup>j</sup>áma</i>	
	small-DIM	
	‘it is small’	
a'. Proto-Chiquitano Bésiro	*/tsi <sup>ñ</sup> βā?á-βā?á=tai/	*[tsi <sup>ñ</sup> m <sup>j</sup> á?ámā?áta <sup>j</sup> ]
	<i>tʃim<sup>j</sup>ámantai</i>	
	small-DIM=just	
	‘it is just small’	
b. Proto-Chiquitano Bésiro	*/á-í-tōβō?é/	*[áit <sup>j</sup> ómō?é]
	<i>ait<sup>j</sup>omó?</i>	
	2SG-INV-tie	
	‘tie it?’	
b'. Proto-Chiquitano Bésiro	*/á-í-tōβō?é-ta/	*[áit <sup>j</sup> ómō?éta]
	<i>ait<sup>j</sup>omoénta</i>	
	2SG-INV-tie-F.3SG <sub>P</sub>	
	‘you tie it’	

The scenario proposed in this section accounts for a range of facts. First of all, it derives a cross-linguistically unusual consonant harmony pattern from a typologically plausible vowel harmony pattern (26–27). Second, it provides a diachronic explanation for the existence of Trojan morphemes (28). Third, it accounts for the adaptation patterns of a handful of early loanwords from Spanish and Guaraní (29–30). It also accounts for the reflexes and alternations found in daughter varieties (31–35).

Under this proposal, the consonantal inventory of Proto-Chiquitano can be reduced to 12 contrastive segments (as opposed to 21 phonemic consonants in Migueleño), as shown in Table 3. The allophones \*[p<sup>j</sup> β<sup>j</sup> m<sup>j</sup> t<sup>j</sup> ç k<sup>j</sup>] must have existed in Proto-Chiquitano in palatalizing environments (\*/i\_V/, \*/í\_V/, where V ≠ /i ɪ/, except for /s/, which palatalizes even when the following vowel is one of /i ɪ/). The allophones \*[m m<sup>j</sup> n n̄ n̄] must have occurred in the protolanguage preceding nasal or nasalized vowels. The consonants [w̄ n̄] are not mapped to any phoneme; instead, they are considered here to be inserted automatically in the environments \*/i\_V/, \*/í\_V/, respectively (cf. Nikulin 2021:20–1).

*/p/ *[p p <sup>j</sup> ]	*/t/ *[t t <sup>j</sup> ]	*/ts/ *[ts]	*/tʃ/ *[tʃ]	*/k/ *[k k <sup>j</sup> ]	*/?/
	*/s/ *[s ç]	*/s/ *[s]			*/h/ *[h]
*/β/ *[β β <sup>j</sup> m m <sup>j</sup> ]		*/r/ *[r n]	*/j/ *[j n̄]	epenthetic *[w̄ n̄]	

Table 3. Proto-Chiquitano consonants

The vowel inventory of Proto-Chiquitano is shown in Table 4.

/i ɿ/	/í ɿ/	/u ɿ/
/e ē/	/a ă/	/o ǒ/

Table 4. Proto-Chiquitano vowels

#### 4. Conclusion

In this article, a diachronic explanation was proposed for the existence of an unusual nasal harmony pattern in Chiquitano, whereby consonants, rather than vowels, are the main targets of the process. In my account, nasal consonants \*[m n ñ] and sonorants \*[β ɾ ʃ] were allophones of one single series of phonemes in Proto-Chiquitano, with the choice determined by the nasalinity of the following vowel (\*[ŋ] and \*[w] were epenthetic segments and probably were not phonemic at all). Nasality spread from all underlying nasal vowels leftwards (with no blocking segments) and rightwards (blocked by voiceless segments), in a way quite similar to the neighboring Tupi–Guaranian languages. Contemporary Chiquitano varieties mostly substituted oral vowels for their nasal counterparts through extensive denasalization, except where nasals were found in \*/VV/ or \*/V2V/ sequences. Early loans from Spanish and Guaraní entered the language before the denasalization phase took place. When denasalization was complete, nasal consonants became phonemic, and nasal harmony started to be associated mostly with consonants.

The reconstruction proposed in this article is compatible with external data from other Macro-Jê languages. The Proto-Macro-Jê etyma of Proto-Chiquitano forms with a nasal vowel are also reconstructed with a nasal vowel: compare Proto-Chiquitano \*/-á?ã/ ‘feces’, \*/-ó?õ/ ‘food’, \*/-ótu/ ‘tongue’, \*/-βá̚rõβ-/ ‘to sleep’, \*/-x̚i̚jã/ ‘nose’, \*/-é?ẽ/ ‘hand’, \*/-ajẽ-/ ‘meat’ and Proto-Macro-Jê \*-ñ̚Vt° ‘feces’, \*-ñ̚u<sub>2</sub>(C) ‘food’, \*-ñ̚u<sub>1</sub>ctôk ‘tongue’, \*-ñ̚u<sub>2</sub>p ‘to lie (down)’, \*-ñ̚i̚ja ‘nose’, \*-ñ̚m° ‘hand’, \*-ñ̚it ‘meat’.

Nasality in contemporary Chiquitano varieties has not yet been studied instrumentally. Future research will need to address the degree to which phonetic nasalization persists in environments such as /C\_C/, /\_ʔ\_/, as well as next to nasal consonants.

#### Abbreviations

1/2/3	first/second/third person	NF	nonfinite
ANTP	antipassive	NHA	non-human animate gender
CAUS	causative	N3	non-third person
CTFG	centrifugal	OBLINV	oblique inverse voice
CTPT	centripetal	P	patient
DEM	demonstrative	PL	plural
DIM	diminutive	PSTV	postverb
F	finite	SG	singular
INV	inverse voice	X	singular, non-diminutive, with no referential possessor
L	linking consonant	♂	male speech
M	masculine gender	♀	female speech

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*А. В. Никulin. К вопросу о происхождении консонантной гармонии по назальности в языке чикитано*

В статье рассматривается происхождение так называемой консонантной гармонии по назальности в чикитано (Боливия/Бразилия, семья макро-же) — процесса, в рамках которого согласные /β ɾ j ʃ/ ассимилируются в /m n ŋ/, как правило, при наличии носового сегмента в том же слове. Точное правило варьируется от диалекта к диалекту, причём в литературе оно описано недостаточно полно. В статье предлагается описание гармонии по назальности в современных диалектах чикитано на материале опубликованных данных, а также полевых данных автора. Предполагается, что в прачикитано основными объектами гармонии по назальности были гласные, тогда как согласные затрагивались этим процессом опосредованно, в результате внутрислоговой ассимиляции. Консонантная гармония по назальности возникла как следствие массовой деназализации носовых гласных, приведшей к фонологизации бывших носовых и неносовых alloфонов сонорных согласных. Представляемая гипотеза позволяет объяснить, почему некоторые морфемы без единого носового сегмента имеют плавающий признак назальности в современных диалектах чикитано, а также описать фонологическую адаптацию заимствований из испанского и гуарани.

**Ключевые слова:** чикитано язык; макро-же языки; гармония по назальности; консонантная гармония.