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A phonological reconstruction of Proto-Dâw–Hup

In this paper, I examine the sound correspondences between Dâw, Yuhup, and Hup, which constitute a clade within the Naduhup language family of South America, and propose a phonological reconstruction of the ancestral language of this clade. The most common shape of morphemes in Proto-Dâw–Hup is */CVC/, but some */CV/-shaped morphemes are reconstructed as well, in addition to a few sesquisyllabic and disyllabic morphemes. I reconstruct 22 consonants for Proto-Dâw–Hup, including voiceless stops, glottalic stops, plain and glottalized glides, fricatives, nasals, and voiced stops. As for the vowels, I identify 45 nuclei, with contrastive length and nasality; some of these nuclei may have been diphthongs rather than monophthongs. Long vowels in Proto-Dâw–Hup presented a tonal distinction between rising and falling tones, though the opposition in question is not relevant with most voiceless codas.

Keywords: Naduhup languages; comparative method; phonological reconstruction.

This paper is concerned with the phonological reconstruction of Proto-Dâw–Hup, the ancestral language of Dâw, Yuhup, and Hup. These languages are spoken in northwestern Amazonia, in the Brazilian state of Amazonas and in the Colombian departments of Vaupés and Amazonas. They are universally recognized to constitute a clade within the Naduhup language family to the exclusion of a fourth Naduhup language, Nadëb (Martins 2005: 326; Epps & Bolaños 2017: 481). Yuhup and Hup likewise constitute a clade to the exclusion of Dâw. It has been hypothesized that the Naduhup languages are further related to the Kakua–Nɨkak language family and to the Puinave language, all spoken in Colombia (Martins 2005: 1), though this putative relationship has been contested (Epps & Bolaños 2017). Earlier labels for the Naduhup language family, now dispreferred, include “Eastern Maku” (derived from a local pejorative term for peoples who traditionally live in forest areas rather than along big rivers) and “Nadahup(an)” (a portmanteau that has been criticized by the speakers of these languages because of its associations with the Portuguese and Spanish word ‹nada› ‘nothing’).

Comparative work on the Naduhup languages is scarse. Martins (2005) is a pioneering attempt at the reconstruction of Proto-Naduhup phonology and lexicon, but it has been argued to present

> “[…] methodological deviations from the Comparative Method; for example, Martins reconstructs words to “Proto-Eastern-Maku” that are attested only in closely related languages or even dialects of a single language (rather than across primary branches), including loanwords; proposes various uneconomical forms; and does not take into account the relevance of subgrouping and language contact in evaluating processes of change” (Epps & Bolaños 2017: 475, fn. 11).

Epps & Bolaños (2017) also include several dozen reconstructed Proto-Naduhup forms, with the proviso that their preliminary reconstructions “must be understood as extremely tentative and subject to revision in future work”. To the best of my knowledge, no published works deal specifically with the historical phonology of the Dâw–Hup branch (Barboza’s 2016 contribution is unpublished).

This paper is structured as follows. **1** presents some basic facts about Dâw, Yuhup, and Hup. **2** deals with the reconstruction of Proto-Dâw–Hup (PDH) root structure, where a dis-

tinction is introduced between monosyllabic, sesquisyllabic, and disyllabic roots. In **3**, a proposal is made regarding the reconstruction of PDH consonants, whereas **4** considers the vowels. **5** is dedicated to the reconstruction of the tonal oppositions and the vowel length. In **6**, I discuss some additional etymologies. **7** concludes the paper.

1. Dâw, Yuhup, and Hup

All three languages considered in this paper have similar typological profiles. For the purposes of this paper, it suffices to mention their preference for CVC-shaped morphemes (see **2**); presence of contrastive glottalization in consonants (see **3.2**, **3.4**); presence of contour oral–nasal segments after oral vowels in the coda position (see **3.6**); rectangular vowel inventories with three contrastive heights, with a series of front unrounded vowels, back rounded vowels, and back/central unrounded vowels (see **4**); lack of mid (close-mid) nasal vowels despite the existence of high and low (low-mid) nasal vowels (see **4**); existence of tones (see **5**). The languages in question are also typologically unusual for making more phonological distinctions among consonants in the morpheme-final position than morpheme-initially.

The **Dâw** [dɤw] language (Glottocode [daww1239], ISO 639-3 [kwa]) is spoken by the homonymous people. The Dâw people live in the Waruá community, situated on the right margin of the Rio Negro, just opposite the town of São Gabriel da Cachoeira (Amazonas state, Brazil). As of 2022, there were 142 speakers of the language (see Obert & Santos 2022 for details on the history and the sociolinguistic situation of the Dâw people). The oldest speakers of Dâw still have some proficiency in the Rio Negro dialect of Nheengatu (a Tupian *lingua franca* of the Upper Rio Negro region; Finbow 2020), but younger speakers rather speak Brazilian Portuguese as their second language. Martins (2004) analyzes the consonants of Dâw as /p b m mˀ w wˀ t d n nˀ l lˀ c ɟ ɲ ɲˀ j jˀ k g x ŋ ʔ h/. Orthographically, these are spelt ‹p b m m’ w w’ t d n n’ l l’ ç j nh nh’ y y’ k g x ng ’ r›, respectively. Barboza (2017) adds /ŋˀ/ ‹ng’›. The stops /c k/ are articulated as ejective stops in the onset position. Glottalized sonorants are preglottalized in the onset position, and postglottalized in the coda position. Nasal codas are preoralized when they follow oral vowels. The vowel system has three contrastive heights: /i ĩ e ɛ ɛ̃ ɯ ɯ̃ ɤ a ã u ũ o ɔ ɔ̃/ (orthographically ‹i ĩ ê e ẽ ɯ ɯ̃ â a ã u ũ ô o õ›, respectively). Note that the nasal series includes only high and low vowels, but not mid vowels. There is a triple opposition between short vowels, long vowels with rising tone, and long vowels with falling tone, though only syllables with voiced codas allow for all three possibities (voiceless codas are incompatible with the falling tone, and open syllable obligatorily carry falling tone). Orthographically, tones are not represented, whereas long vowels are spelt as double vowels without repeating the diacritics (e.g., ‹ɯ̃ɯ› *ɯ̃ː*, ‹êe› *eː*).

The **Yuhup** [jùhúp] language (Glottocode [yuhu1238], ISO 639-3 [yab]) is spoken by the Yuhupdeh people. Their traditional territory spans from the middle and lower course of Tiquié River (Amazonas state, Brazil) to the lower course of the Apapóris River (Vaupés and Amazonas departments, Colombia). Their ethnic population was estimated to total 754 individuals in Brazil, as of 2010, and ca. 250 individuals in Colombia, as of 2000 (Silva & Silva 2012: 53). Many Yuhupdeh speak Tukano (Tukanoan) as a second language. A number of phonological analyses have been proposed for Yuhup. Here I largely follow Silva & Silva’s (2012) analysis. The consonants are /p m mˀ w wˀ t n nˀ c cˀ ç ɲ ɲˀ j jˀ k kˀ ŋ ŋˀ ʔ h/, represented orthographically as ‹p m/b m(’)/b w w(’) t/r n/d/r n(’)/d/r s s ç j j y y(’) k k g g’ ’ h›. Of these, /ç ɲ ɲˀ ŋ ŋˀ/ are only used morpheme-finally. Note that the underlying nasals have fully oral allophones preceding oral vowels (of these, [b] and [d] have dedicated graphemes in the orthography), and preoral-

ized allophones following oral vowels (for these, the "nasal" graphemes ‹m n› are used). Glottalized segments are spelt with an apostrophe morpheme-finally, but morpheme-initially the grapheme representing the vowel is duplicated instead, since the [+constricted glottis] feature surfaces as a creaky voice on a rearticulated vowel, as in ‹koop› /k'ɔp/ (phonetically [kɔ̰ɔ̰p]). The grapheme ‹r› represents flapped allophones of denti-alveolars. The vowel system has three contrastive heights: /i ĩ e æ æ̃ ɨ ɨ̃ ə ɑ ɑ̃ u ũ o ɔ ɔ̃/ (orthographically ‹i ĩ ë e ẽ ɨ ɨ̃ ä a ã u ũ ö o õ›, respectively). Note that the nasal series includes only high and low vowels, but not mid vowels. The tilde is not used when a nasal vowel follows ‹m› or ‹n›, as in ‹móh› /mɔ̃h/; the sequences /m(ˀ)V/ and /n(ˀ)V/ are distinguished in spelling by using the graphemes ‹b d›, as in ‹bón› /mɔ̃n/ (phonetically [bɔ̃dn]). There are four tones, of which two (rising and falling) are used in lexical morphemes; the falling tone is represented orthographically by means of an acute accent.

Finally, the **Hup** [húp] language (Glottocode [hupd1244], ISO 639-3 [jup]) is spoken by the Hupd'äh people in an area located between the Papuri and Tiquié Rivers, reaching the Vaupés River in the east. Epps & Obert (2022) estimate the speaker population at ca. 2500. Almost all Hupd'äh are bilingual in Hup and Tukano (Tukanoan). Epps (2005: 40) analyzes the consonants of Hup as /p b b' (p') w w' t d d' c ɟ ɟ' ç j j' k g g' ʔ h/ (orthographically ‹p m/b m'/b' p' w w' t/r n/d/r n'/d'/r' s j s'/j' ç y y' k g k'/g' ' h›), of which /ɟ g ç/ occur morpheme-finally only. /p'/ is found in only one loanword, and is restricted to the Tat-Dëh and Barreira dialects. The palatal series are articulated as denti-alveolar (/c ɟ ɟ' j j'/) or glottal (/ç/) with a palatal offglide and/or onglide. The nasals [m n ɲn ŋ] are analyzed by Epps (2005: 52–53) as allophones of the voiced obstruents /b d ɟ g/ that occur in nasal morphemes (the former two allophones have dedicated graphemes, ‹m n›). In oral morphemes, Epps' /b d ɟ g/ surface as postnasalized morpheme-finally ([bm dn jdn gŋ]), and as prenasalized morpheme-initially ([mb nd]; /ɟ g/ do not occur in that position); these are spelt using the "oral" graphemes (‹b d›). As for the glottalized consonants /b' d' ɟ' g'/, these surface morpheme-initially as [mb nd (t)ʃ k] in oral morphemes (‹b' d' s' k'›), and as [m n (t)ʃ k] in nasal morphemes (‹m' n' s' k'›), with laryngealization on the nucleus. Morpheme-finally, they surface as [pˀ tˀ jtˀ kˀ] in oral morphemes (‹b' d' j' g'›), and as [mpˀ ntˀ ɲtˀ ŋˀ] in nasal morphemes (‹m' n' j' g'›). The graphemes ‹r r'› represent flapped allophones of denti-alveolars. The vowel system and its orthographic representation are identical to those of Yuhup, with three provisos. First, Epps (2005) does not posit nasal vowels as segments, but rather attributes their occurrence to a suprasegmental [+nasal] feature which is anchored to entire syllables or even morphemes (as also proposed for Yuhup by authors such as Ospina Bozzi 2002). Second, the low vowels of Hup are typically described as central rather than back (hence /a ã/ rather than /ɑ ɑ̃/ in Silva & Silva's treatment of Yuhup). Third, the tilde in nasal vowels is omitted in the orthography not only after ‹m n›, but also in morphemes that include the graphemes ‹m n› in **any** position, as in ‹pán› [pɔ̃̂n] (compare Yuhup ‹pãn› [pɔ̃̌n]). There are two contrastive tones (rising and falling/high), which are only distinguished in stressed syllables; the falling/high tone has a high allotone preceding voiceless codas, and a falling allotone elsewhere. The rising tone is represented orthographically by means of a grave accent, and the falling tone is represented with an acute accent.

Linguistic data is given in two representations in this paper. The orthographic one, enclosed in chevrons (‹›), is cited after Epps *et al.* (2018) for Dâw, Silva & Silva (2012) for Yuhup, and Ramirez (2005) for Hup. In italics, I give the respective broad transcriptions in the International Phonetic Alphabet. In these transcriptions, I represent major allophony patterns, such as preoralization of nasal codas and the allotones of the falling/high ton in Hup, but omit details such as the non-audible release diacritic. I do not use the symbols [ɑ] or [ɑ̃] for Yuhup and replace them with [a], [ã], since the distinction is questionable (authors such as Ospina Bozzi 2002 use [a], [ã]), and because the italic versions of the respective glyphs are difficult to distinguish.

2. Root structure

The Dâw–Hup languages have a strong preference for monosyllabic roots (Martins 2004: 13–14; Epps 2005: 36, 69), though there are some disyllabic roots in all three languages, typically with identical vowels in both syllables (Martins 2004: 62, 70–71; Silva & Silva 2012: 85; Epps 2005: 70–71). Longer roots are vanishingly rare (see Epps 2005: 70 for some examples of onomatopoetic words in Hup). CVC is the most common root type in the Dâw–Hup languages; CV is less frequent; CVCVC and CVCV are accordingly even less frequent. Roots must start with a consonant in all Dâw–Hup languages, but onsetless suffixes of the shape VC are allowed.

For the most part, cognate sets involve matching root structures in Dâw, Yuhup, and Hup, as shown below for CVC (1), CV (2), and CVCVC (3) roots.

(1) PDH **pû:g* ‘porcupine’ > Dâw ‹puug› *pû:g* || Yuhup ‹púg› *pûgŋ* || Hup ‹pùg› *pŭgŋ*
(2) PDH **c’ɔ̂:* ‘flower’ > Dâw ‹çoo› *c’ô:* || Yuhup ‹soo› *tʃo̱ŏ̱* || Hup ‹s’ó› *tʃo̱:*
(3) PDH **cɐwə̆$_1$:h* ‘thrush’ > Dâw ‹sâwâar› *ʃɤwə̆:h* || Yuhup ‹säwäh› *ʃəwəh*[1] || Hup ‹säwə̀̂h› *ʃəwə̆h*

However, in a number of etymologies Hup shows an additional word-initial syllable without any correspondence in Dâw or Yuhup. Two diachronic interpretations are conceivable. One could claim that Hup has historically fossilized erstwhile prefixes (or first elements of compounds), as contended by Epps (2005: 94–95) regarding the putative semantically opaque morpheme /cV-/. Alternatively, one could argue that Hup preserves an element lost in Dâw and Yuhup. The latter possibility is supported by comparative evidence from Nadëb, where one finds ‹sawiim› *ʃawi:m* ‘*abacaba* palm’ (Barbosa 2005: 25), ‹jaw’ääj› *jawɻ:j* ‘capuchin monkey’, ‹jawyk› *jawɨk* ‘heavy’, ‹majyyw› *mãjɨ:w* ‘blood’ (Martins 2005: 234, 279, 301). Since the quality of the word-initial consonant in Hup matches that of Nadëb, I conclude that Hup is in fact conservative in preserving a sesquisyllabic element lost elsewhere. In my reconstructions, given in 4–14, I use a period to separate the sesquisyllable from the stressed syllable, and do not specify a vowel that might have occurred in the sesquisyllables.[2]

(4) PDH **c.ɓə̆:k* ‘blowgun’ > Dâw ‹baak› *bə̆:k* || Yuhup ‹baák› *bɑ̨ɑ̂k* || Hup ‹sab’àk› *tʃabɑ̨̆k*
(5) PDH **c.ɓut* ‘electric eel’ > Dâw ‹but› *but* || Yuhup ‹buut› *bu̱ŭ̱t* || Hup ‹sub’út› *tʃubú̱t*
(6) PDH **c.wĭ$_2$m* ‘*abacaba* fruit (*Oenocarpus bacaba*)’ > Dâw ‹wiim› *wĭ:bm* || Yuhup ‹wím› *wîbm* || Hup ‹siwìb› *tʃiwĭbm*
(7) PDH **c.wŭ:k* ‘kapok cotton’ > Dâw ‹wuuk› *wŭ:k* || Yuhup ‹wúk› *wûk* || Hup ‹suwùk› *tʃuwŭk*
(8) PDH **j.wə̆:ç* ‘capuchin monkey’ > Dâw ‹waas› *wə̆:ʃ* || Yuhup ‹wáç› *wâç* || Hup ‹yawàç› *djawə̆jh*
(9) PDH **j.wak* ‘*japurá* fruit’ > Dâw ‹wak› *wak* || Yuhup ‹wak› *wăk* || Hup ‹yawák› *djawák*
(10) PDH **j.wi$_2$k ~ *j.wi:k ~ *j.wɨ$_2$:k* ‘heavy’ > Yuhup ‹wik› *wĭk* || Hup ‹yiwík› *djiwík*
(11) PDH **k.jə̆:k* ‘manioc’ > Dâw ‹yaak› *jə̆:k* || Yuhup ‹yak-› *jak-* (in compounds) || Hup ‹kayàk› *kajə̆k*[3]
(12) PDH **k.u̯ŏ:ʔ* ‘to squeeze’ > Dâw ‹’wôo’› *ʔwŏ:ʔ* || Hup ‹köw’ő’› *kowo̱ʔ*
(13) PDH **m.jɨ̂$_2$:w* ‘blood’ > Dâw ‹y~~uu~~w› *jû:w* || Yuhup ‹yíw› *jîw* || Hup ‹biyìw› *mbijĭw*[4]

[1] The expected falling tone is not attested in this form by Silva & Silva (2012).

[2] In Hup, the vowel of the sesquisyllable is usually the same as that of the main syllable (Epps 2005: 70), though in the Umari Norte dialect area the vowel [i] is sometimes found instead (Epps 2005: 88), as in *kijə̆k* ‘manioc’.

[3] The form ‹kehek-› *kæhæk-* is documented along the Vaupés and Japu Rivers (Epps 2005: 88).

[4] The form ‹bihìw› *mbihĭw* is documented along the Vaupés and Japu Rivers (Epps 2005: 88).

(14) PDH *m.jɔʔ ‘spider’ > Dâw ‹yo’› *jɔʔ* || Yuhup ‹yo’› *jɔ̌ʔ* || Hup ‹boyó’› *mbɔjɔ́ʔ*

There are two situations when Yuhup patterns with Hup in preserving the sesquisyllable, however. This is the case in reduplicated forms (15–19), as well as in forms whose main syllable has a fricative onset (PDH *h or *x > Yuhup and Hup *h*; 20–28). Note that PDH *p and *m often yield Yuhup *w* in sesquisyllables (21, 27), though not always (23–26); the reason for this is unclear.

(15) PDH *k.kɔ̃j ‘crooked’ > Dâw ‹xõy’› *xɔ̃jˀ* || Hup ‹kõkőy’› *kɔ̃kɔ́jˀ*
(16) PDH *n.nă:p ‘cockroach’ > Dâw ‹naap› *nă:p* || Yuhup ‹dadáp› *dadâp* || Hup ‹daràp› *ndarăp*
(17) PDH *n.nud ‘tadpole’ > Dâw ‹nud› *nud* || Yuhup ‹dudun› *dudŭdn* || Hup ‹durùd› *ndurŭdn*[5]
(18) PDH *n.nũt ‘moth’ > Dâw ‹nũt› *nũt* || Yuhup ‹nunut› *nũnŭ̌t* || Hup ‹nunút› *nũnű́t* ‘sphinx moth’
(19) PDH *x.xŭ:j ‘firefly’ > Dâw ‹xuuy› *xŭ:j* || Yuhup ‹huhúy› *huhûj* ‘cicada’ || Hup ‹huhùy› *huhŭj*
(20) PDH *j.hũm ‘avocado’ > Dâw ‹rũm› *hũm* || Yuhup ‹yũhum› *jũhŭ̌m* || Hup ‹yuhúm› *njũhű̂m*
(21) PDH *m.hŏ:t ‘wind’ > Dâw ‹rôot› *hŏ:t* || Yuhup ‹wöhőt› *wohôt* || Hup ‹böhòt› *mbohŏt*
(22) PDH *m.huh ‘Amazon grape (*Pourouma cecropiaefolia*)’[6] > Dâw ‹rur› *huh* || Yuhup ‹puhu› *puhŭ* || Hup ‹buhúh› *mbuhúh*
(23) PDH *m.hũʔ ‘to play’ > Dâw ‹rũ’› *hũʔ* || Yuhup ‹muhu’› *mũhŭ̌ʔ* || Hup ‹muhú’› *mũhű̂ʔ*
(24) PDH *p.hãj[7] ‘*sorva* fruit (*Couma guianensis*)’ > Dâw ‹rãy› *hãj* || Yuhup ‹pãhay› *pãhăj* ‘fruit sp.’ || Hup ‹pãhấy› *pãhậj*
(25) PDH *p.hŭ̌:t ‘to blow’ > Dâw ‹rũut› *hŭ̌:t* || Yuhup ‹pũhut› *pũhŭ̌t* || Hup ‹pũhű́t› *pũhű̂t*
(26) PDH *p.xɔ̂:k ‘gray hair’ > Dâw ‹xook› *xɔ̂:k* || Yuhup ‹pohok› *pɔhɔ̆k* || Hup ‹pohòk› *pɔhɔ̆k*
(27) PDH *p.xɔt ‘*aracu* fish’ > Dâw ‹xot› *xɔt* || Yuhup ‹wohot› *wɔhɔ̆t* || Hup ‹pohót› *pɔhɔ́t*
(28) PDH *w.hɘn ‘old man’[8] > Dâw ‹rân› *hɤdn* || Hup ‹wähấd› *wəhậdn*

I am aware of two etymologies, shown in 29–30, that suggest the reconstruction of the sequence *j.ʔ. However, one of these reconstructions must be wrong, since Dâw shows different onsets in each cognate set: *ʔ* and *ˀj*, respectively.

(29) (?) PDH *j.ʔaw̰ ‘to chew’ > Dâw ‹aw’› *ʔawˀ* || Hup ‹ya’áw’› *djaʔâwˀ*
(30) (?) PDH *j.ʔãm ‘jaguar’ > Dâw ‹’yãm› *ˀjãm* ‘dog’ || Yuhup ‹yãam› *jã̰ã̰m* || Hup ‹ya’ám› *njãʔậm*

The diachronic loss of initial syllables, which may have had sesquisyllables as an intermediate stage, has resulted in synchronic alternations in Dâw, such as those seen in ‹ãr› *ʔãh* ‘I’ → ‹rã’› *h-ãʔ* ‘I (focused form)’, ‹tuk› *tuk* ‘to want’ → ‹kẽr› *k-ɛ̃h* (also ‹tukẽr› *tuk-ɛ̃h*) ‘not to want’, ‹rãm› *hãm* ‘to go’ → ‹mõr› *m-ɔ̃h* ‘go!’ (Martins 2004: 106–111).

[5] The rising tone, attested for Hup in Ramirez (2005: 67) and Epps (2005: 38), is unexpected.

[6] The Yuhup form, if related, is irregular. The expected reflex in Yuhup would rather be *‹wuhuh› or *‹buhuh›.

[7] This is an opaque derivative of a Proto-Naduhup term preserved in Nadëb as ‹pah› *pah* ‘*sorva* fruit’ (Weir 1984: 173).

[8] This is an opaque derivative of PDH *wă:h ‘old’ > Dâw ‹waar› *wă:h*, Yuhup ‹wáh› *wâh*.

3. Consonants

I reconstruct 22 consonants for PDH, listed in Table 1.

	labial	denti-alveolar	palatal	velar	glottal
voiceless stops	*p	*t	*c	*k	*ʔ
voiced stops	*b	*d	*ɟ	*g	
glottalic stops	*ɓ	*ɗ	*c’	*k’	
nasals	*m	*n			
fricatives			*ç	*x	*h
glides	*w		*j		
glottalized glides	*w̰		*j̰		

Table 1. PDH consonantal inventory

3.1. Voiceless stops

Five voiceless obstruents are reconstructed for PDH: **p*, **t*, **c*, **k*, and **ʔ*. They are largely preserved in Yuhup and Hup, except that **t* may undergo intervocalic flapping in Yuhup and, dialectally, in Hup (Lopes 1995: 73–75; Ospina Bozzi 2002: 111–112; Epps 2005: 44–45); for the development **p* > Yuhup *w* in sesquisyllables, see section **2**. Even though the consonant /c/ is preserved as a phonemic unit in Yuhup and Hup, in both languages it shows a remarkable difference between the allophones that occur in onsets and codas, which are represented in my broad transcriptions in this paper. As for Dâw, the voiceless stops of PDH are preserved morpheme-finally, whereas morpheme-initially **c* and **k* are lenited to *ʃ* and *x*, respectively.[9] This is summarized in Table 2.

PDH	Dâw	Yuhup	Hup
**p*	‹p› *p*	‹p› *p*, ‹w› *w*[A]	‹p› *p*
**t*	‹t› *t*	‹t› *t*, ‹r› *ɾ*[B]	‹t› *t*, ‹r› *ɾ*[C]
**c*	‹s› *ʃ*, ‹ç› *c*[D]	‹s› *tʃ*, *c*[D][10]	‹s› *tʃ*, *jt*[D]
**k*	‹x› *x*, ‹k› *k*[D]	‹k› *k*	‹k› *k*
**ʔ*	‹’› *ʔ*[E]	‹’› *ʔ*[E]	‹’› *ʔ*[E]

[A] = in some sesquisyllables; [B] = between vowels, possibly with an intervening glottal; [C] = between vowels in the Tat-Dëh and Umari Norte dialect areas; [D] = morpheme-finally; [E] = not represented orthographically in the word-initial position

Table 2. PDH voiceless stops and their reflexes

[9] Since most Naduhup morphemes are monosyllabic, the morpheme-initial and morpheme-final positions typically coincide with the onset and coda positions in uninflected words, but this does not hold true when one considers words with vowel-initial suffixes. Notoriously, allophony in Naduhup is largely conditioned by the position of a segment within a morpheme rather than within a syllable (see Epps 2005: 41 for Hup). In this paper, I do not discuss allophony patterns found at morpheme boundaries.

[10] The phonetic realizations of this phoneme in the onset position have been described as a palatal stop [c] (Ospina Bozzi 2002: 108), a postalveolar stop or fricative [ʃ] ~ [tʃ] (Silva & Silva 2012: 88), an alveopalatal affricate [tɕ] (Lopes 1995: 10), or an alveolar affricate [ts] varying with the fricatives [s], [ʃ], and [ʂ] (Fernandes 2017: 69). In this paper I use *tʃ* as an invariant representation. Its realizations in the coda position have been documented as [cˀ] (Silva & Silva 2012: 88) or [jt] (Lopes 1995); I use *c* as the invariant representation in this paper.

Some examples follow in 31–51.

(31) PDH **pă:ç* ‘stone’ > Dâw ‹paas› *pă:ʃ* || Yuhup ‹páç› *pâç* || Hup ‹pàç› *păjh*
(32) PDH **pæ̂$_2$:* ‘to go upriver’ > Dâw ‹pee› *pê:* || Yuhup ‹pe› *pæ̆* || Hup ‹pé› *pæ̂:*
(33) PDH **pũp* ‘insect sp.’ > Dâw ‹pũp› *pũp* || Hup ‹pṹp› *pṹp* ‘a kind of tick found in hammocks’
(34) PDH **hŏ:p* ‘to dive’ > Dâw ‹rôop› *hŏ:p* || Yuhup ‹höp› *hŏp* || Hup ‹hṓp› *hóp*
(35) PDH **tô:w* ‘club’ > Dâw ‹toow› *tô:w* || Yuhup ‹tów› *tô̆w* || Hup ‹tòw› *tŏ̆w*
(36) PDH **tæ̃w* ‘to hit with a stick’ > Dâw ‹tãaw› *tæ̃:w* ‘to beat to extract liquid’ || Yuhup ‹tãw› *tæ̃w* || Hup ‹tæ̃w› *tæ̂̃w*
(37) PDH **xæ̆$_1$:t* ‘alligator’ > Dâw ‹xeet› *xɛ̆:t* || Yuhup ‹hát› *hât* || Hup ‹hàt› *hăt*
(38) PDH **mæ̆:t* ‘agouti’ > Dâw ‹mẽet› *mɛ̃̆:t* || Yuhup ‹mét› *mæ̂̆t* || Hup ‹mèt› *mæ̆t*
(39) PDH **că:k* ‘to climb’ > Dâw ‹saak› *ʃã:k* || Yuhup ‹sak› *tʃăk* || Hup ‹sák› *tʃák*
(40) PDH **côːb* ‘finger’ > Dâw ‹sôob› *ʃôːb* ‘hand’ || Yuhup ‹söm› *tʃõbm* ‘to point with finger’ || Hup ‹sȍb› *tʃõbm* ‘finger’, ‹sṓb› *tʃôbm* ‘to point with finger’
(41) PDH **cŭ̆:h* ‘non-venomous spider sp.’ > Dâw ‹sũuh› *ʃŭ̆:h* || Yuhup ‹sṹh› *tʃû̆h* || Hup ‹sȕh› *tʃŭ̆h*
(42) PDH **dŭ̆:c* ‘parrot sp.’ > Dâw ‹duuç› *dŭ̆:c* || Yuhup ‹duús› *dụ̆ụ̂c* ‘orange-cheeked parrot’ || Hup ‹d’ùs› *ndŭ̆jt* ‘blue-headed parrot’
(43) PDH **ke$_1$c* ‘to rip or peel with one’s teeth’ > Dâw ‹xêç› *xec* || Yuhup ‹käs› *kăc* || Hup ‹kắs› *kájt*
(44) PDH **kub* ‘hungry’ > Dâw ‹xub› *xub* || Hup ‹kúb› *kûbm*
(45) PDH **kaj̰* ‘to hug’ > Dâw ‹xay’› *xajˀ* || Yuhup ‹kay’› *kăjˀ* || Hup ‹káy’› *kâjˀ* ‘to hug with one arm’
(46) PDH **tuk* ‘to want’ > Dâw ‹tuk› *tuk* || Yuhup ‹tuk› *tŭk* || Hup ‹túk› *túk*
(47) PDH **hɔ̃k* ‘to saw’ > Dâw ‹rõk› *hɔ̃k* || Yuhup ‹hõk› *hɔ̃̆k* || Hup ‹hṓk› *hɔ́k*
(48) PDH **ʔû:m* ‘to hit’ > Dâw ‹ũum› *ʔû:m* ‘to hit, to shoot’ || Yuhup ‹ũm› *ʔŭ̆m* ‘to hit, to kill, to hunt’
(49) PDH **ʔəg* ‘to drink’, **ʔă$_1$:g* ‘*caxiri* beverage’ > Dâw ‹âg› *ʔɤg*, ‹âag› *ʔɤ̆:g* || Yuhup ‹äg› *ʔăgŋ*, ‹ắg› *ʔâgŋ* || Hup ‹ắg› *ʔâgŋ*, ‹ằg› *ʔăgŋ*
(50) PDH **ɓuʔ* ‘termite’ > Dâw ‹bu’› *buʔ* || Yuhup ‹buu’› *bụ̆ʔ* || Hup ‹b’ú’› *mbû̆ʔ*
(51) PDH **c’æ̆$_2$:ʔ* ‘ray (fish)’ > Dâw ‹çee’› *c’ɛ̆:ʔ* || Yuhup ‹seé’› *tʃæ̨æ̨̆ʔ* || Hup ‹s’è’› *tʃæ̨̆ʔ*

In Yuhup, some instances of morpheme-final stops have been documented as voiced by Ospina Bozzi (2002: 109), as in [hɛ̆bˀ] ‘sweep!’, [údˀ] ‘thorn’, [mbǫ̆ɟˀ] ‘dragonfly’, [wə̆gˀ] ‘leafcutter ant sp.’. Ospina Bozzi (2002) posits an opposition between /p t k/ and /b d g/ in that environment (however, /ɟ/ is not reported to contrast with /c/). Martins (2005: 80–81, 83) likewise documents these segments as voiced, as in [ʔúdˀ] ‘thorn’, [wə̆gˀ] ‘leafcutter ant sp.’, and posits an opposition between /p t c k/ and /bˀ dˀ cˀ kˀ/.[11] Other sources on Yuhup, however, do not report voiced stops in the morpheme-final position (e.g., [ʔuːtˀ] ‘thorn’ in Lopes 1995: 102), and Ospina Bozzi’s voiced stops generally correspond to voiceless stops in Dâw and Hup in that environment. Given the very limited evidence for the opposition in question in Yuhup, in this paper I follow Silva & Silva (2012) in representing such consonants as voiceless, and accordingly reconstruct voiceless stops in PDH, as shown in 52–54.

(52) PDH **xæ̆$_2$:p* ‘to sweep’ > Dâw ‹xeep› *xɛ̆:p* || Yuhup ‹hep› *hæ̆p* || Hup ‹hép› *hæ̆p*

[11] Martins’ (2005) /c/ corresponds to Lopes’ (1995) and Ospina Bozzi’s (2002) /jh/ and Silva & Silva’s (2002) and Fernandes’ (2017) /ç/.

(53) PDH *ʔŭ:t ‘thorn’ > Dâw ‹uut› *ʔŭ:t* || Yuhup ‹út› *ʔût* || Hup ‹ùt› *ʔŭ:t*
(54) PDH *wɘk ‘leafcutter ant sp.’ > Dâw ‹wâk› *wɤk* || Yuhup ‹wäk› *wə̆k* || Hup ‹wǎ́k› *wák*

Given that Ospina Bozzi (2002) has worked only with speakers from the lower course of the Apaporis River (Colombia), whereas other works on Yuhup phonology are based on research carried out with speakers from Brazil, it is conceivable that the difference in voicing may turn out to be restricted to the southwestern fringe of the Yuhup-speaking area. Alternatively, it could be a mistranscription on Ospina Bozzi’s (2002) part. The status and origins of the putative voicing opposition in the morpheme-final position in Yuhup remain to be established.

A group of cognate sets shows a discrepancy between the presence of a final glottal stop in Dâw and its absence in Hup, or vice versa. These etymologies are also suspect for other reasons. In 55–56, Yuhup does show the expected glottal stop, but 55 fails to show laryngealization on the vowel; moreover, 56 is likely a Tukanoan loan (Ye’pâ-masa ‹yoó› ‘to carry in one’s hand or claws’; Ramirez 2019 [1997]). 57 shows a rare vowel correspondence (see **4.2**). In 58, the Dâw verb is documented with rising tone, stated to be impossible in CV-shaped morphemes in Martins (2004: 69). In 59, Dâw points to a long vowel in PDH, whereas Yuhup and Hup point to a short vowel.

(55) (?) PDH *k’ɨ̆₁:ʔ ~ *k’ɨ̂₁: ‘hot’ > Dâw ‹kɯɯ’› *k’ŭ:ʔ* ‘to heat (liquid)’ || Yuhup ‹ki’› *kɨ̆ʔ* || Hup ‹k’ɨ́› *k’ɨ̂:*
(56) (?) PDH *jô:ʔ ~ *jô: ‘to carry in one’s hands’ > Dâw ‹yôo’› *jô:ʔ* || Yuhup ‹yö’› *jŏʔ* || Hup ‹yő́› *djô:*
(57) (?) PDH *ɓA~ʔ ~ *ɓA~ ‘cold’ > Dâw ‹ba’› *baʔ* || Hup ‹m’é› *mə̂̃*
(58) (?) PDH *tă:ʔ ‘to meet’ > Dâw ‹taa› *tă:* || Yuhup ‹ta’› *tăʔ* ‘to block’, ‹mih ta’› *mĩh-tăʔ* ‘to meet’ || Hup ‹tá’› *táʔ* ‘to block’, ‹hitá’› *hi-táʔ* ‘to meet’
(59) (?) PDH *nô: ~ *noʔ ‘child’ > Dâw ‹nôo› *nô:* || Yuhup ‹dö’› *dŏʔ* || Hup ‹dő́’› *ndóʔ*

3.2. Glottalic stops

PDH also had a series of glottalic stops, which I reconstruct as *ɓ, *ɗ, *c’, and *k’. The representation of the labial and denti-alveolar obstruents as implosives and of the palatal and velar ones as ejectives conforms to one’s typological expectations (Javkin 1977), and accounts neatly for the reflexes in the daughter languages.

I start by considering the reflexes of the glottalic stops in the morpheme-initial position. In Dâw, *c’ and *k’ are preserved as ejectives (Martins 2004: 26, 29). Note that [c’] and [k’] are synchronically analyzed as allophones of /c/ and /k/ in Dâw, since the language lacks plain [c] and [k] in onsets; recall that PDH *c and *k are reflected as fricatives in Dâw morpheme-initially. As for the implosives, Dâw reflects them as *b* and *d* before oral vowels (thus losing glottalization), and as *ʔm* and *ʔn* before nasal vowels. In Yuhup and Hup, the reflexes of *ɓ, *ɗ, *c’, and *k’ are articulated much like those of *m, *n, *c, and *k, but the following vowel surfaces with laryngealization, or creaky voice (see Epps 2005: 55–63; Ospina Bozzi 2002: 117–118). In Yuhup, but not Hup, the laryngealized vowel is often described as rearticulated ([V̰V̰] in Silva & Silva 2012: 85; [V̰ʔV̰] in Lopes 1995: 91; [VʔV] ~ [Ṽ] in Epps 2005: 68). Epps (2005: 66–67) convincingly argues, based on distributional evidence, that Hup has no underlying laryngealized vowels; instead, the [+constricted glottis] feature is associated with the consonantal segments. Epps (2005) represents the glottalic stops of Hup as /b’ d’ ɟ’ g’/ (in addition to /p’/, found dialectally in one loanword), but acknowledges that /ɟ’ g’/ surface as voiceless stops in onsets. This is summarized in Table 3.

PDH	Dâw	Yuhup	Hup
*ɓ	‹b› *b*, ‹'m› *ˀmᴬ*	‹bVV› *b͡*, ‹mVV› *m͡ᴬ*	‹b'› *mb͡*, ‹m'› *m͡ᴬ*
*ɗ	‹d› *d*, ‹'n› *ˀnᴬ*	‹dVV› *d͡*, ‹nVV› *n͡ᴬ*	‹d'› *nd͡*, ‹n'› *n͡ᴬ*
*c'	‹ç› *c'*	‹sVV› *tʃ͡*	‹s'› *tʃ͡*
*k'	‹k› *k'*[12]	‹kVV› *k͡*	‹k'› *k͡*

ᴬ = before nasal vowels / in nasal morphemes

Table 3. PDH glottalic stops and their reflexes (morpheme-initial position)

Some examples follow in 60–71.

(60) PDH **ɓux* 'to burst' > Dâw ‹bux› *bux* || Yuhup ‹buuh› *bu̯ŭh*
(61) PDH **ɓæʔ* 'hard' > Dâw ‹be'› *bɛʔ* || Yuhup ‹(ta-)baa'› *(ta-)bą̆ą̆ʔ* || Hup ‹tab'á'› *tapbą́ʔ*[13]
(62) PDH **ɓəɻːw* 'tree sp.' > Dâw ‹bâaw› *bɤːw* || Hup ‹b'ăw› *mbə̆w* '*escorrega-macaco* tree (*Peltogyne paniculata*)'
(63) PDH **ɓũʔ* 'earthworm' > Dâw ‹'mʉ̃'› *ˀmʉ̃ʔ* || Yuhup ‹mɨɨ'› *mɨ̆ɨ̆ʔ* '*daracubi* worm' || Hup ‹m'ɨ́'› *mɨ́ʔ*
(64) PDH **ɓæ̆ːh* 'star' > Dâw ‹'mẽer› *ˀmɛ̆ːh* || Yuhup ‹wero-meéh› *wærɔ́-mą̆ą̆h* || Hup ‹wero-m'èh› *wærɔ-mą̆̀h*
(65) PDH **ɗɔx* 'rotten' > Dâw ‹dox› *dɔx* || Yuhup ‹dooh› *dɔ̆ɔ̆h* || Hup ‹d'óh› *ndɔ̆h*
(66) PDH **ɗum* 'tail' > Dâw ‹dum› *dubm* || Yuhup ‹duum› *du̯ŭbm* || Hup ‹d'úb› *ndu̯ŭ̂bm*
(67) PDH **ɗæ̆k* 'cross-eyed' or 'monocular-visioned' > Dâw ‹'nãak› *ˀnæ̆ːk* 'cross-eyed' || Yuhup ‹naak› *nąą̆k* 'monocular-visioned'
(68) PDH **c'âː* 'black; bitter'[14] > Dâw ‹çaa› *c'âː* || Yuhup ‹saa› *tʃą̆ą̆* || Hup ‹s'á› *tʃą̂ː*
(69) PDH **c'ɔ̃k* 'eastern lowland olingo' > Dâw ‹çõk› *c'ɔ̃k* || Hup ‹wõhsők› *wɔ̃htʃɔ̃́k*
(70) PDH **k'ɘw* 'cylindrical chunk; poisonous arthropod sp.'[15] > Dâw ‹kâw› *k'ɤw* 'cylindrical chunk; centipede' || Yuhup ‹kääw› *kə̆ə̆w* 'cylindrical chunk' || Hup ‹k'ắw› *kə̂w* 'cylindrical chunk; scorpion'
(71) PDH **k'ɨ̂ːm* 'to flood' > Dâw ‹kʉ̃ʉ̃m› *k'ʉ̂ːm* || Hup ‹k'ɨ́m› *kɨ̂́m*

Morpheme-finally, examples of glottalic stops are less abundant. In Dâw, one typically finds glottalized nasals, except that the palatal glottalic stop is reflected as *ɟ* after oral vowels (note that no *bona fide* examples are known for **ɗ* and **k'* after oral vowels). In Yuhup and Hup, one typically finds underlying glottalized segments, which surface as stops with no audible release (voiced in Yuhup, voiceless in Hup) word-finally; when preceded by nasal vowels, they are accompanied by a nasal transition, except that in Hup the palatal and the velar ones surface as [jn], [ŋ]. In Hup, the distinction between the reflexes of voiceless (**p*, **t*, **c*, **k*) and glottalic (**ɓ*, **ɗ*, **c'*, **k'*) stops is in fact neutralized after oral vowels word-finally, but is visible before vowel-initial suffixes (Epps 2005: 57–58). In Yuhup, a handful of words show

[12] I have considered positing a sound change **k'* > Dâw *c'* before the vowel **i* so as to account for the sound correspondence seen in Dâw ‹çii› *c'î:* 'sour' ~ Yuhup ‹kii› *kɨ̆ɨ̆*, Hup ‹k'í› *kɨ̂ː* 'sour'. However, no palatalization is seen in PDH **k'i₂ʔ* 'to split' > Dâw ‹ki'› *k'iʔ*, Yuhup ‹kii'› *kɨ̆ɨ̆ʔ*. It is therefore likely that the Dâw term for 'sour' is not after all cognate with the Yuhup and Hup material.

[13] See Epps (2005: 94–95) on the ambisyllabic relatization of intervocalic consonants in Hup.

[14] We are probably dealing with two homophonous roots here rather than with a true instance of polysemy. The homophony is found in all daughter languages.

[15] We are probably dealing with two homophonous roots here rather than with a true instance of polysemy. The homophony is found in Dâw and Hup. Yuhup ‹k'äw› *k'ə̆w* means only 'cylindrical chunk'.

unexpected creaky voice on the vowel; this could be regular in nasal vowels before **ɓ* (as in 76 and 87), and in oral vowels before **c'* (as in 79). This is summarized in Table 4.

PDH	Dâw	Yuhup	Hup
**ɓ*	‹m'› *mˀ*	‹m'› *b*, ‹VVm'› *‿mb*^{A}	‹b'› *p*, ‹m'› *mp*^{A}
**ɗ*	‹n'› *nˀ*^{A}	‹n'› *d*^{B}, *nd*^{A}	‹d'› *t*^{B}, ‹n'› *nt*^{A}
**c'*	‹j› *ɟ*, ‹nh'› *ɲˀ*^{A}	‹VVj'› *‿ɟ*, ‹j'› *ɲɟ*^{A}	‹j'› *jt*, ‹j'› *jn*^{A}
**k'*	‹gn'› *ŋˀ*^{A}	‹g'› *g*^{B}, *ŋg*^{AB}	‹g'› *k*^{B}, ‹g'› *ŋ*^{A}

^{A} = after nasal vowels / in nasal morphemes; ^{B} = hypothetical reflex predicted based on systemic considerations

Table 4. PDH glottalic stops and their reflexes (morpheme-final position)

Some examples follow in 72–82.

(72) PDH **hĕ$_2$ːɓ* 'to fan', **hê$_2$ːɓ* 'fan' > Dâw ‹hêem'› *hĕːmˀ*, ‹hêem'› *hêːmˀ* || Yuhup ‹hëm'› *hĕb*, ‹hḗm'› *hêb* || Hup ‹hḗb'› *hép*, ‹hèb'› *hĕp*

(73) PDH **pɘɓ* 'mushroom' > Dâw ‹pâm'› *pɤmˀ* || Yuhup ‹päm'› *pə̆b* || Hup ‹pa̋b'› *páp* 'mushroom sp. (white, edible, grows on wood)'

(74) PDH **mă̆ːɓ* 'brother, companion'[16] > Dâw ‹maam'› *mă̆ːmˀ* || Yuhup ‹bám'› *bâb* || Hup ‹báb'› *mbáp*[17]

(75) PDH **di$_2$ɓ* 'to close' > Dâw ‹dim'› *dimˀ* || Yuhup ‹diim'› *di̯i̯b* 'to crumple', ‹didiim'› *didi̯i̯b* 'curly' || Hup ‹d'id'íb'› *di̯di̯p* 'curly'

(76) (?) PDH **mæ̆ɓ ~ *mæ̆ːɓ* 'to grip'[18] > Dâw ‹mẽm'› *mẽmˀ* 'to grip under one's arms' || Yuhup ‹meem'› *mæ̰̆mb* || Hup ‹mém'› *mæ̰̂mp*

(77) PDH **cæ̆ːɗ* 'horn' > Dâw ‹sãan'› *ʃæ̆ːnˀ* || Yuhup ‹sá̰n'› *tʃæ̰̂nd* || Hup ‹sàn'› *tʃæ̰̆nt*

(78) PDH **wac'* 'amphibian sp.' > Dâw ‹waj› *waɟ* 'toad sp.' || Hup ‹wáj'› *wájt* 'frog sp. (lives in holes in trees)'

(79) PDH **cîːc'* 'mottle-faced tamarin' > Dâw ‹siij› *ʃîːɟ* || Yuhup ‹noh-siíj'› *nɔ̃h-tʃi̯îɟ* 'black monkey sp.' || (?) Hup ‹yom'oy-sìy'› *njɔ̃mj̃-tʃíjˀ*[19]

(80) PDH **ɓæ̆ːc'* 'mud' > Dâw ‹'mãanh'› *ˀmæ̆ːɲˀ* || Hup ‹m'àj'› *mæ̰̆jn* 'earth, clay'

(81) PDH **tû̯c'* 'to shrivel' > Dâw ‹tũunh'› *tũ̯ɲˀ* || Yuhup ‹tũj'› *tũɲɟ*

(82) PDH **ʔɔ̆ːk'* 'throat' > Dâw ‹õogn'› *ʔɔ̆ːŋˀ* || Hup ‹ő̰g'› *ʔɔ̰̂ŋ* 'Adam's apple'

In a handful of examples, Dâw and Hup/Yuhup show irregular correspondences involving reflexes of glottalic stops in one language and reflexes of other consonants in other languages. Such etymologies are, therefore, suspect and may result from horizontal transmission or chance. In 83, Dâw points to a voiceless stop and Hup to a glottalic stop. In 84, Dâw points to a glottalic stop and Hup to a nasal. In 85, Dâw points to a nasal and Hup to a glottalic stop.

[16] This etymon is known to be a Tukanoan loanword (compare Ye'pâ-masa ‹ba'pa› 'companion'; Ramirez 2019 [1997]), but it must have been present already in PDH given the existence of reflexes in all daughter languages which show regular correspondences (except for the tonal discrepancy commented on in footnote 17).

[17] The high tone, attested for Hup in Ramirez (2005: 43) and Epps (2005: 59), is unexpected.

[18] Dâw *ɛ̃* does not regularly correspond to Yuhup and Hup *æ̃*, but rather to *ã*; Yuhup and Hup *æ̃* are expected to correspond to Dâw *ɛ̃ː* instead. This is why I reconstruct two variants, **mæ̆ɓ* (which accounts for the Dâw reflex) and **mæ̆ːɓ* (which accounts for the Yuhup and Hup reflexes). Note the long vowel in the Dâw verb ‹mẽem› *mɛ̃̂ːm* 'to carry under one's arm', which could be etymologically related.

[19] The Hup reflex is entirely irregular. One would expect **‹yom'oy-sìj'› *njɔ̃mj̃-tʃíjt*. The PDH form is reconstructed based on the reflexes in Dâw and Yuhup.

In 86, Yuhup points to a voiced stop, Hup to a glottalic stop, and Dâw is ambiguous. In 87, Dâw points to a voiced stop, whereas Yuhup and Hup both point to a glottalic stop. In 88–89, Dâw points to a glottalic stop, and Hup points to a voiced stop or nasal. Furthermore, in a handful of etymologies a glottalic stop is clearly reconstructible based on evidence from Dâw and Hup, but Yuhup lacks the expected laryngealization (see 55, 165, 179, 259, 326).

(83) (?) PDH **cɨ̃ːp ~ *c'ɨ̃ːp* 'to tie' > Dâw ‹sũup› *ʃũːp* 'to tie an *aturá* basket' || Hup ‹s'ɨ́p› *tʃɨ́p* 'to tie (e.g. a canoe, a pole)'
(84) (?) PDH **di₂~k ~ *ni₂~k* 'asymmetrical' > Dâw ‹tum-dik› *tɯm-dik* 'monocular-visioned' || Hup ‹ník› *nɨ́k* 'crooked (arm, hand, bird leg)'
(85) (?) PDH **t.xɔm ~ *t.xɔɓ* '*piquiá* fruit (*Caryocar villosum*)' > Dâw ‹xom› *xɔm* || Hup ‹tohób'› *tɔhɔ́p*
(86) (?) PDH **dɨ̂ːɻ ~ *dɨ̂ːc* 'to mash, to crush' > Dâw ‹diij› *dɨ̂ːɻ* 'to smash' || Yuhup ‹diij› *dɨ̰ɻ̰ɲ* 'to crush pepper' || Hup ‹d'íj'› *díjt* 'to mash, to crush (food)'
(87) (?) PDH **cɨ̂ː~ɓ ~ *cɨ̂ː~ɓ* 'to pinch, to dig one's claws into' > Dâw ‹siib› *ʃɨːb* || Yuhup ‹sĩim'› *tʃɨ̰ḭ̃mb* || Hup ‹sím'› *tʃɨ̂mp*
(88) (?) PDH **pɨ̀ɗ ~ *pɨ̀d ~ *pɨ̀n* 'to have been used to' > Dâw ‹pun'› *pɯnˀ* || Hup ‹pɨ́d› *pɨ̂dn*
(89) (?) PDH **hŏːɓ ~ *hŏːb ~ *hŏːm* '*abiu* fruit (*Pouteria caimito*)' > Dâw ‹rôom'› *hŏːmˀ* || Hup ‹hõ̀b› *hŏːbm* 'plant similar to *abiu* with edible fruit'

3.3. Plain glides

The glides **w* and **j* are straightforwardly reflected as /w/ and /j/ in all daughter languages, except for Ospina Bozzi's (2002) analysis of Yuhup, which treats morpheme-initial instances of [ɻ] (before oral vowels) and [ɲ] (before nasal vowels) as allophones of the phoneme /ɻ/. Other authors represent the respective sounds of Yuhup as [j] and [ɲ] (Fernandes 2017) or as [j] in oral and nasal environments alike (Lopes 1995; Silva & Silva 2012). The latter analysis is adopted in the broad transcriptions in this paper. Fortition of **j* to [ɻ] and [ɲ] may turn out to be an innovation restricted to the southwestern fringe of the Yuhup-speaking area. In Hup, morpheme-initial instances of /j/ unpack to [dj] before oral vowels and to [nj̃] before nasal vowels (in this paper, I use *dj* and *nj* in my broad transcriptions). This is summarized in Table 5.

PDH	Dâw	Yuhup	Hup
*w	‹w› *w*	‹w› *w*	‹w› *w*
*j	‹y› *j*	‹y› *j*	‹y› *dj*, *nj*[A], *j*[B]

[A] = before nasal vowels / in nasal morphemes; [B] = morpheme-finally

Table 5. PDH plain glides and their reflexes

Some examples follow in 90–98.

(90) PDH **wɔ̆ːh* 'speaker of a Tukanoan language' > Dâw ‹woor› *wɔ̆ːh* || Yuhup ‹wóh› *wɔ̂h* || Hup ‹wòh› *wɔ̆h*
(91) PDH **wɐ̂ːn* 'machete' > Dâw ‹wãan› *wɐ̂ːn* || Yuhup ‹wãn› *wɐ̆̃n*[20] || Hup ‹wàn› *wɐ̆̃n*
(92) PDH **wɨ̆₂ːw* 'bullet ant' > Dâw ‹wuuw› *wɯ̆ːw* || Yuhup ‹wíw› *wɨ̂w* || Hup ‹wìw› *wɨ̆w*
(93) PDH **wãw* 'crooked (of wood)' > Dâw ‹wãw› *wãw* || Yuhup ‹wãw› *wɐ̆̃w*

[20] The rising tone in the Yuhup reflex, attested both in Silva & Silva (2012: 302) and Ospina Bozzi (2002: 204), is quite unexpected; based on the Dâw and Hup cognates, one would expect falling tone in Yuhup.

(94) PDH *jæ̆$_2$ːʔ ‘to defecate’ > Dâw ‹yee’› *jɛ̆ːʔ* || Yuhup ‹ye’› *jæ̆ʔ* || Hup ‹yé’› *djǽʔ*
(95) PDH *jŭ̆ːm ‘to plant; cultivated plant’ > Dâw ‹yũum› *jŭ̆ːm* || Yuhup ‹yũm› *jŭ̆m* ‘to plant’; ‹yű̃m› *jû̃m* ‘cultivated plant’ || Hup ‹yúm› *njû̃m* ‘to plant’; ‹yùm› *njŭ̆m* ‘cultivated plant’
(96) PDH *jɔ̂ːj ‘pineapple sp.’ > Dâw ‹yooy› *jɔ̂ːj* || Yuhup ‹yóy› *jɔ̂j* || Hup ‹yòy› *djɔ̆j*
(97) PDH *ʔɤ̂$_2$ːj ‘to call’ > Dâw ‹âay› *ʔɤ̂ːj* || Yuhup ‹ëy› *ʔɤ̆j* || Hup ‹ɤ́y› *ʔɤ̂j*
(98) PDH *mɜ̂̃ːj ‘house’ > Dâw ‹mãay› *mɜ̂̃ːj* || Yuhup ‹móy› *mɜ̃̂j* || Hup ‹mòy› *mɜ̃̆j*

3.4. Glottalized glides

Two glottalized glides can be reconstructed for PDH, *w̰ and *j̰. In Dâw, their reflexes are articulated as preglottalized in onsets and postglottalized in codas (Martins 2004: 52–53). Postglottalization is also documented in their reflexes in the morpheme-final position in Yuhup and Hup. As for the morpheme-initial position in Yuhup and Hup, the reflexes of *w̰ and *j̰ are articulated much like those of *w and *j, respectively, but the following vowel surfaces with laryngealization, or creaky voice (see Epps 2005: 55–58, 64–65; Ospina Bozzi 2002: 117–118). In Yuhup, but not Hup, the laryngealized vowel is often described as rearticulated ([V̰V̰V̰] in Silva & Silva 2012: 85; [V̰ʔV̰] in Lopes 1995: 91; [VʔV] ~ [Ṽ] in Epps 2005: 68). As shown by Epps (2005: 66–67) for Hup, the laryngealization in such cases is best attributed to a [+constricted glottis] feature associated with the consonant in the morpheme-initial position (thus, underlying glottalized glides /w’/ and /j’/ are posited for Hup and, by some authors, for Yuhup). It is noteworthy that in some Hup words morpheme-initial *djV̰V̰* (/j’V/ in Epps’ analysis) varies with *tʃV̰V̰* (/ɟ’/ in Epps’ analysis), as documented in Ramirez (2005). This variation is in all likelihood dialectal. Note that there are no reliable examples featuring *j̰ in a nasal morpheme. These reflexes are summarized in Table 6.

PDH	Dâw	Yuhup	Hup
*w̰	‹’w› *ʔw*, ‹w’› *w*ʔ[A]	‹wVV› *w͡*, ‹w’› *w*ʔ[A]	‹w’› *w͡*, ‹w’› *w*ʔ[A]
*j̰	‹’y› *ʔj*, ‹y’› *j*ʔ[A]	‹yVV› *j͡*, ‹j’› *j*ʔ[A]	‹y’› *dj͡* ~ ‹s’› *tʃ͡*[B], ‹y’› *j*ʔ[A]

[A] = morpheme-finally; [B] = the variation is possibly dialectal

Table 6. PDH glottalized glides and their reflexes

Some examples follow in 99–106.

(99) PDH *w̰ɘt ‘long’ > Dâw ‹’wât› *ʔwɤt* || Yuhup ‹wäät› *wo̰ə̆t* || Hup ‹w’ät› *wo̰t*
(100) PDH *w̰ôːb ‘to put onto’[21] > Dâw ‹’wôob› *ʔwôːb* || Yuhup ‹wööm› *wo̰ə̆bm* || Hup ‹w’ő̆b› *wo̰bm*
(101) PDH *dɛ̆̃ːw̰ ‘to squeeze’ > Dâw ‹’nũ̆ŭw’› *ʔnuɛ̃ːwʔ* ‘to mash’ || Yuhup ‹nɨ̆ɨw’› *nɨ̃ɨ̃̆wʔ* ‘to squeeze one’s skin’
(102) PDH *j̰æw̰ ‘to be crushed’, *j̰æ$_1$ːw̰ ‘to crush’[22] > Dâw ‹’yew’› *ʔjɛwʔ*, ‹’yeew’› *ʔjɛ̆ːwʔ* || Yuhup ‹yaw’› *jăwʔ* ‘to crush with one’s hand’ || Hup ‹y’áw’› *djo̰wʔ* ~ ‹y’a’áw’› *djo̰ʔâwʔ* ‘to crush with one’s hand’

[21] This is an opaque causative of PDH *wôːb ‘to be on or over something’ > Dâw ‹wôob› *wôːb*, Yuhup ‹wöm› *wŏbm*, Hup ‹wő̆b› *wôbm* (cf. Epps 2005: 68 on this and other pairs with a similar alternation).

[22] This cognate set presents several difficulties. Semantically, it is tempting to include Dâw ‹’yêw’› *ʔjewʔ* ‘to mash (manioc), to knead’ here, but Dâw /e/ is not known to correspond to Yuhup and Hup /a/. As for the phonological issues, *j̰ shows an unexpected loss of glottalization in Yuhup, whereas in Hup the unexpected disyllabic

(103) PDH *$j\underset{\sim}{u}$ʔ ‘soft’ > Dâw ‹’yu’› *ʔjuʔ* || Yuhup ‹yuu’› *j$\underset{\sim}{u}\breve{u}$ʔ* || Hup ‹y’ú’› *dj$\underset{\sim}{u}$ʔ* ~ ‹s’ú’› *tʃ$\underset{\sim}{u}$ʔ*

(104) PDH *$j\underset{\sim}{\hat{o}}$ːʔ ‘to stretch’ > Dâw ‹’yoo’› *ʔjôːʔ* || Yuhup ‹yoo’› *j$\underset{\sim}{o}\underset{\sim}{o}$ʔ* || Hup ‹y’ó’› *dj$\underset{\sim}{o}$ʔ* ~ ‹s’ó’› *tʃ$\underset{\sim}{o}$ʔ*

(105) PDH *$ka\underset{\sim}{j}$ ‘to grab, to hug’ > Dâw ‹xay’› *xajʔ* ‘to grab with arms’ || Yuhup ‹kay’› *kăjʔ* ‘to hug’ || Hup ‹káy’› *kâjʔ* ‘to hug (with one’s hand on another person’s shoulder)’

(106) PDH *$j\breve{o}ː\underset{\sim}{j}$ ‘to sway, to shake’ > Dâw ‹yôoy’› *jŏːjʔ* || Yuhup ‹yöy’› *jŏjʔ* || Hup ‹yőy’› *djôjʔ*

In a handful of examples, Dâw and Hup/Yuhup show irregular correspondences involving reflexes of glottalized glides in one language and reflexes of other consonants in other languages. Such etymologies are, therefore, suspect and may result from horizontal transmission or chance. In 107–113, Dâw points to a glottalized glide, whereas Yuhup and Hup point to a plain glide. In 111, there is an additional mismatch between vowel length: Dâw points to a long vowel, whereas Yuhup and Hup point to a short vowel. 112 has further irregular variants in Yuhup (‹yukuy› *jukŭj*) and Hup (‹kukúç› *kukújh*), and is likely to be a Wanderwort, since similar-sounding terms for monkeys are found in other languages (cf. Nikulin & Carvalho 2018: 557), including Proto-Goyaz (< Macro-Jê) **kŭkôj* ‘monkey’; Yanomam (< Yanomaman) ‹kuukuumoxi› *kuːkuː-moʃi* ‘three-striped night monkey’ (Emiri 1987: 41);[23] Yanomamɨ (< Yanomaman) ‹kuukuumɨ› *kuːkuː-mɨ* ~ ‹kukumɨ› *kuku-mɨ* ‘three-striped night monkey’ (Mattei-Müller & Serowë 2007); and Venezuelan Spanish ‹cocuí› *kǫ'kwi* ‘three-striped night monkey’ (Aguilar 2004: 3, 5), whose etymology I have been unable to verify.

(107) (?) PDH *$\underset{\sim}{w}\breve{o}ːk$ ~ *$w\breve{o}ːk$ ‘vine sp.’ > Dâw ‹’wâak› *ʔwŏːk* || Yuhup ‹wők› *wêk* ‘*uambé* vine’ || Hup ‹wèk› *wĕk* ‘vine related to *uambé* (children use it to play)’

(108) (?) PDH *$pɔ\underset{\sim}{w}$ ~ *$pɔw$ ‘to float’ > Dâw ‹pow’› *pɔwʔ* || Yuhup ‹pow› *pŏw*

(109) (?) PDH *$d.de_2\underset{\sim}{w}$ ~ *$d.de_2w$ ‘knot’ > Dâw ‹lêw’› *lewʔ* ‘knot (on a thick rope or vine)’ || Yuhup ‹dëdëw› *dedĕw* ~ *derĕw* || Hup ‹söb dërẽw› *tʃobm-nderêw* ‘interphalangeal joint’

(110) (?) PDH *$j\underset{\sim}{\breve{o}}$ːʔ ~ *$j\breve{o}$ːʔ ‘wasp’ > Dâw ‹’yoo’› *ʔjŏːʔ* || Yuhup ‹yó’› *jôʔ* || Hup ‹yò’› *djŏʔ*

(111) (?) PDH *$j\underset{\sim}{\breve{o}}$ːk ~ *$j\breve{o}k$ ‘neotropical otter, giant otter’ > Dâw ‹’yook› *ʔjŏːk* || Yuhup ‹yok› *jŏk* || Hup ‹yók› *djôk*

(112) (?) PDH *$k.ku\underset{\sim}{j}$ ~ *$k.kuj$ ‘howler monkey’ > Dâw ‹xuy’› *xujʔ* || Yuhup ‹kukuy› *kukŭj* ~ ‹yukuy› *jukŭj* || Hup ‹kukúy› *kukûj* ~ ‹kukúç› *kukújh*

(113) (?) PDH *$mÃ\underset{\sim}{j}$ ~ *$mÃj$ ‘payment’ > Dâw ‹mãy’› *mãjʔ* || Yuhup ‹mey› *mæ̆j* ‘to avenge’, ‹méy› *mæ̂j* ‘payment’[24] || Hup ‹mey› *mæj* ‘payment, price’, ‹méy› *mæ̂j* ‘to pay, to threaten’

A different kind of irregularity is seen in 114, where a plain glide in Dâw corresponds to a glottalized one in Yuhup and Hup. In 115, Dâw points to a glottalized glide, whereas Yuhup and Hup support the reconstruction of a voiced stop or a nasal. In 116, Dâw points to a glottalized glide, whereas Yuhup and Hup point to a glottalic stop. In 117, a reflex of a glottalized glide in Hup corresponds to zero in Dâw, which can go back to zero or to **h*. In 118, both Dâw and Hup support the reconstruction of **ʔ*, but Yuhup rather points to **$\underset{\sim}{w}$*. Finally, in 119, Dâw points to **ʔ*, Yuhup to **k*’, and Hup to **$\underset{\sim}{w}$*.

variant ‹y’a’áw’› *dj$\underset{\sim}{a}$ʔâwʔ* is attested instead of the expected variant *‹s’áw’› *tʃ$\underset{\sim}{a}$wʔ*. Compare the semantically comparable Hup verb ‹y’á’› *dj$\underset{\sim}{a}$ʔ* ~ ‹s’á’› *tʃ$\underset{\sim}{a}$ʔ* ‘to mash (e.g., pepper)’.

[23] This form is from the Wakathau thëripë dialect. In the Maraxiu thëripë (Papiú) dialect, this is attested as ‹kukumoxi› (Perri Ferreira 2017: 119); note that the status of vowel length in Yanomam is unclear.

[24] The Yuhup noun ‹méy› *mæ̂j* is probably not a direct reflex of PDH *$mÃ\underset{\sim}{j}$ ~ *$mÃj$ (otherwise a rising tone would be expected), but rather a back-formation from the verb ‘to avenge’, where the falling tone is a nominalizer described in Silva & Silva (2012: 101).

(114) (?) PDH **c'ɔj ~ *c'ɔj̰* 'Amazon parrot' > Dâw ‹çoy› *c'ɔj* || Yuhup ‹sooy› *tʃo̰ʒ̰jˀ* || Hup ‹s'óy› *tʃ̰jˀ*
(115) (?) PDH **poɯ̰ ~ *pob ~ *pom* 'to split wood' > Dâw ‹pôw'› *powˀ* || Yuhup ‹pöm› *pŏbm* || Hup ‹pŏ́b› *pôbm*
(116) (?) PDH **c.ɯ̰æ~j ~ *c.ɓæ~j* 'Large American opossum' > Dâw ‹'wey› *ʔwɛj* || Yuhup ‹maay› *mą̰ą̆j* || Hup ‹sam'áy› *tʃ̃ąm̰ą̰̂j*
(117) (?) PDH **p.xɔ̂ː(h) ~ *p.xɔ̂ːwˀ* 'to swell' > Dâw ‹xoo› *xɔ̂ː* 'a bit swollen; abscess, tumor' || Hup ‹pohów'› *pɔhɔ̂wˀ*
(118) (?) PDH **cɔ̃ʔ ~ *cɔ̃ɯ̰* '*matapi* fishing trap' > Dâw ‹sõ'› *ʃɔ̃ʔ* || Yuhup ‹sõw'› *tʃŏ̰wˀ* || Hup ‹sŏ́› *tʃ̰̂ʔ*
(119) (?) PDH **nĩ₁ʔ ~ *nĩ₁kˀ ~ *nĩ₁ɯ̰* 'bait' > Dâw ‹nĩ'› *nĩʔ* || Yuhup ‹nɨg'› *nɨ̆ŋg* || Hup ‹nɨ́w'› *nɨ̂̆wˀ*

Advanced etymological research is needed in order to establish whether the etymologies in 114–119 involve actual cognates.

3.5. Fricatives

Three voiceless fricatives are reconstructed for PDH: **ç*, **x*, and **h*. Of these, **ç* appears in the morpheme-final position only, whereas **x* and **h* appear in any position. The fricatives are subject to the following innovations. In Dâw, **ç* yields *ʃ* (120–125), and **x* remains as *x* (126–131); therefore, morpheme-initially these segments merge with **c* and **k*, respectively. The glottal fricative **h* is lost morpheme-finally in falling-toned morphemes (138–139); in rising-toned and toneless morphemes, it is preserved (134–137), giving rise to alternations between *h* and zero in Dâw (cf. Martins 2004: 41). In Yuhup and Hup, **ç* remains as /ç/ (120–122), except that it yields *h* after **i*, **ĩ*, **ɘ₂* (123–125).[25] Note that in Hup /ç/ surfaces as [jh]. In Yuhup, /ç/ is documented as [ç] by Silva & Silva (2012) and Fernandes (2017), whereas Lopes (1995) and Ospina Bozzi (2002) document only [jh] (which is a phonemic sequence /jh/ in their analysis). The velar fricative **x* merges with the glottal fricative **h* as /h/ both in Yuhup and Hup (126–131). The aforementioned reflexes are summarized in Table 7.

PDH	Dâw	Yuhup	Hup
**ç*	‹s› *ʃ*	‹ç› *ç*, ‹h› *h* [A]	‹ç› *jh*
**x*	‹x› *x*	‹h› *h*	‹h› *h*
**h*	‹h› *r*, ‹∅› ∅ [B]	‹h› *h*	‹h› *h*

[A] = after the vowels **i*, **ĩ*, **ɘ ̨* [B] = morpheme-finally in falling-toned morphemes

Table 7. PDH voiceless fricatives and their reflexes

Some examples follow in 120–139.

(120) PDH **kˀɘç* 'to bite' > Dâw ‹kâs› *kˀɤʃ* || Yuhup ‹kääç› *kǫ̰ǫ̆ç* || Hup ‹k'ą́ç› *kǫ́jh*
(121) PDH **cˀɔ̆ːç* 'to spit' > Dâw ‹çoos› *cˀɔ̆ːʃ* || Yuhup ‹sooç› *tʃo̰ʒ̰ç* || Hup ‹s'óç› *tʃ̰́jh*
(122) PDH **jêˀːç* 'guan' > Dâw ‹yêes› *jêːʃ* || Yuhup ‹yę́ç› *jêç* || Hup ‹yę̀ç› *djĕjh*

[25] I have contemplated the possibility to reconstruct PDH **x* for the correspondence Dâw *ʃ* ~ Yuhup/Hup *h*; in this case, Dâw would have undergone progressive palatalization of a velar, otherwise seen in **mĩŋ* > *mĩŋ* 'crazy'. However, no palatalization is seen in PDH **nɘ̆₂ːx* 'water' > Dâw ‹nâax› *nɤ̆ːx*, ruling out the reconstruction of **x* in PDH **ɓɘ̆₂ːç* 'to cross' > Dâw ‹bâas› *bɤ̆ːʃ*.

(123) PDH **bə̌₂ːç* ‘to cross’ > Dâw ‹bâas› *bə̌ːʃ* || Yuhup ‹bëëh› *bə̰ə̰̌h* || Hup ‹b’éh› *mbə̰̂h*
(124) PDH **tǐːç* ‘root’ > Dâw ‹tiis› *tǐːʃ* || Yuhup ‹tíh› *tîh* || Hup ‹tìh› *tǐh*
(125) PDH **mǐːç* ‘turtle’ > Dâw ‹mĩis› *mǐːʃ* || Yuhup ‹míh› *mîh* || Hup ‹mìh› *mǐh*
(126) PDH **xə̌ːt* ‘name’ > Dâw ‹xaat› *xə̌ːt* || Yuhup ‹hát› *hât* || Hup ‹hàt› *hə̌t*
(127) PDH **xâːj* ‘forest, outside’ > Dâw ‹xaay› *xâːj* || Yuhup ‹háy› *hâj* ‘forest’, ‹hay-› *háj-* ‘outside’[26] || Hup ‹hày› *hə̌j* ‘forest’, ‹háy’ah› *hâj-ʔah* ‘outside’
(128) PDH **xî₂ː* ‘to descend, to go downriver’ > Dâw ‹x~~uu~~› *xûːˑ* || Yuhup ‹hi› *hǐ* || Hup ‹hí› *hîː*
(129) PDH **tə̌ːx* ‘tapir’ > Dâw ‹taax› *tə̌ːx* || Yuhup ‹táh› *tâh* || Hup ‹tàh› *tə̌h*
(130) PDH **cŏːx* ‘to walk with a walking stick’ > Dâw ‹sôox› *ʃõːx* || Yuhup ‹söh põm› *tʃoh-pə̌̆m* ‘to squat’ || Hup ‹sȍh› *tʃõh* ‘walking stick’
(131) PDH **nɔ̃x* ‘to fall’ > Dâw ‹nõx› *nɔ̃x* || Yuhup ‹noh› *nɔ̰̌h* ‘to bump’ || Hup ‹nóh› *nɔ̃́h*
(132) PDH **hə̌₁ːk* ‘to drown’ > Dâw ‹râak› *hə̌ːk* || Hup ‹hák› *hə́k*
(133) PDH **hɜ̃ːp* ‘fish’ > Dâw ‹rãap› *hɜ̰̌ːp* || Yuhup ‹hőp› *hɔ̰̂p* || Hup ‹hȍp› *hɜ̰̌p*
(134) PDH **wǐːh* ‘hawk’ > Dâw ‹wiir› *wǐːh* || Yuhup ‹wíh› *wîh* || Hup ‹wìh› *wǐh*
(135) PDH **jɔ̰̌ːh* ‘medicine’ > Dâw ‹yõor› *jɔ̰̌ːh* || Yuhup ‹yőh› *jɔ̰̂h* || Hup ‹yȍh› *njɔ̰̌h*
(136) PDH **ʔoh* ‘common woolly monkey’ > Dâw ‹ôr› *ʔoh* || Yuhup ‹öh› *ʔŏh* || Hup ‹ő́h› *ʔóh*
(137) PDH **nũh* ‘head’ > Dâw ‹nũr› *nũh* || Yuhup ‹nuh› *nṵ̆h* || Hup ‹núh› *nű́h*
(138) PDH **xɔ̂ːh* ‘canoe’ > Dâw ‹xoo› *xɔ̂ːˑ* || Yuhup ‹hóh› *hɔ̂h* || Hup ‹hòh› *hɔ̆h*
(139) PDH **mɨ̂ːh* ‘*ucuqui* fruit (*Pouteria ucuqui*)’ > Dâw ‹m~~ɨ̃u~~› *mɨ̰̂ːˑ* || Yuhup ‹mɨ́h› *mɨ̂h* || Hup ‹mɨ̀h› *mɨ̌h*

3.6. Nasals and voiced stops

PDH had both nasals (**m*, **n*, **ŋ*) and voiced stops (**b*, **d*, **ɟ*, **g*), an opposition still present in Dâw. However, the contrast in question is robust only in the morpheme-final position. Morpheme-initially, by contrast, only **m*, **n*, and **d* are reconstructed. In Yuhup and Hup, nasals no longer contrast with voiced stops; in these languages, nasality is not a feature of individual segments, but rather of syllables due to Tukano influence (Epps 2005: 75).[27] Authors such as Martins (2005: 81–82) and Epps (2005: 52–53) analyze the nasal consonants of Yuhup and Hup, respectively, as allophones of voiced stops /b d ɟ g/. In the same vein, they treat the nasal–oral contour segments, such as [mb], as prenasalized stops, whereas the oral–nasal contour segments, such as [bm], are considered postnasalized stops in their analyses. However, there is evidence that all these segments are in fact realizations of underlying nasals /m n ɲ ŋ/. In Yuhup, the fact that we are dealing with /m n ɲ ŋ/ rather than /b d ɟ g/ is seen in inflected forms where vowel-initial suffixes attach to oral roots ending in [bm], [dn], [ɟɲ], [gŋ]: in such forms, the vowel assimilates the nasality of the root-final consonant: ‹tami› [tɑ́ˈbmɨ́ːˑ] /tám-í/ ‘tying’, ‹tamap› [tɑ́ˈbmə̰̌ːpˈ] /tám-V̰p/ ‘tying’ (Silva & Silva 2012: 84, 86). As for Hup, the language has circumoralized contours (as in ‹ə́gə́y› [ʔə̂gŋ.ŋgə́j] ‘drinking’; Epps 2005: 41), which are shown by Wetzels & Nevins (2018) to be possible only in languages with underlying nasals. Therefore, in Wetzels & Nevins’ (2018) terms, Yuhup and Hup have nasal shielding rather than nasal venting.

[26] This term must receive a suffix indicating the distance.

[27] In fact, both Ospina Bozzi (2002) and Epps (2005) consider that nasality is a property of entire morphemes rather than syllables, but at least in Hup there are several morphemes that combine oral and nasal syllables (Epps 2005: 74), even though they are exceedingly rare in the lexicon.

I start by considering the reflexes of PDH **m*, **n*, and **d* in the morpheme-initial position. In Dâw, the former two are preserved as nasals, whereas **d* lenites to *l*.[28] Recall that synchronically Dâw does have morpheme-initial voiced stops, but these come from erstwhile glottalic stops, as shown in **3.2**. In Yuhup and Hup, **m*, **n*, and **d* have oralized ([b], [d]) or postoralized ([mb], [nd]) reflexes in oral syllables, and fully nasal reflexes ([m], [n]) in nasal syllables; note that **n* and **d* merge in these languages at least in oral environments (no examples of **d* are reconstructed in nasal environments). The nasal phase in [mb] and [nd] is attested in Hup word-initially by all authors; in Yuhup, it is documented in Lopes (1995) and Ospina Bozzi (2002), but not in Martins (2005), Silva & Silva (2012), or Fernandes (2017). In my broad transcriptions, I use *b* and *d* for Yuhup, but *mb* and *nd* for Hup. In Yuhup and, dialectally, in Hup, the reflexes of **n* and **d* may undergo intervocalic flapping. This is summarized in Table 8.

PDH	Dâw	Yuhup	Hup
**m*	‹m› *m*	‹b› *b*, ‹m› m^{A}	‹b› *mb*, ‹m› m^{A}
**n*	‹n› *n*	‹d› *d*, ‹n› n^{A}, ‹r› $ɾ^{B}$	‹d› *nd*, ‹n› n^{A}, ‹r› $ɾ^{C}$
**d*	‹l› *l*	‹d› *d*, ‹n› n^{AD}, ‹r› $ɾ^{B}$	‹d› *nd*, ‹n› n^{AD}, ‹r› $ɾ^{C}$

[A] = before nasal vowels; [B] = between vowels, possibly with an intervening glottal; [C] = between vowels in the Tat-Dëh and Umari Norte dialect areas; [D] = hypothetical reflex predicted based on systemic considerations

Table 8. PDH nasals and voiced stop and their reflexes (morpheme-initial position)

Some examples follow in 140–149.

(140) PDH **muj* ‘cold season’ > Dâw ‹muy› *muj* || Yuhup ‹buy› *bŭj* || Hup ‹búy› *mbûj*
(141) PDH **mɘn* ‘maripa palm fruit’ > Dâw ‹mân› *mɤn* || Yuhup ‹bän› *bän*
(142) PDH **mɔ̃ːh* ‘tinamou’ > Dâw ‹mõo› *mɔ̃ː* || Yuhup ‹móh› *mɔ̃h* || Hup ‹mòh› *mɔ̃̌h*
(143) PDH **mɔ̃ːj* ‘Humboldt’s white-fronted capuchin’ > Dâw ‹mõoy› *mɔ̃ːj* || Yuhup ‹móy› *mɔ̃j*
(144) PDH **nɨd* ‘tree stump’ > Dâw ‹bee nɯd› *bêː-nɯd* || Yuhup ‹dɨn› *dɨ̆dn* || Hup ‹dɨ́d› *ndɨ̂dn*
(145) PDH **nə̆$_2$ːx* ‘water’ > Dâw ‹nâax› *nə̆ːx* || Yuhup ‹dɛ́h› *dêh* || Hup ‹dɛ̀h› *ndɛ̆h*
(146) PDH **nɜ̃ː* ‘to say’ > Dâw ‹nãa› *nɜ̃ː* || Yuhup ‹no› *nɔ̆* || Hup ‹nó› *nɔ̃ː*
(147) PDH **næ̃ːm* ‘louse’ > Dâw ‹nẽem› *nɛ̃ːm* || Yuhup ‹ném› *næ̃m* || Hup ‹nèm› *næ̆m*
(148) PDH **dɑ̂ːɻ* ‘fishhook’ > Dâw ‹laay’› *lɑ̂ːjˀ* || Yuhup ‹dáy’› *dɑ̂jˀ*
(149) PDH **doj* ‘to crouch’ > Dâw ‹lôy› *loj* || Yuhup ‹döy› *dŏj* ‘to crawl, to creep’ || Hup ‹dǒy› *ndôj* ‘to crouch, to crawl, to creep’

Morpheme-finally, all nasals and voiced stops are preserved in Dâw. Note that nasal codas following oral vowels surface with preoralization, thus instantiating the phenomenon of nasal shielding (Wetzels & Nevins 2018). In Yuhup and Hup, the nasal series merges with that of the voiced stops. Their reflexes are articulated as preoralized nasals after oral vowels (i.e., with nasal shielding), and as full nasals after nasal vowels. I believe that the nasal shielding phenomenon was already present in PDH, but I do not represent it in my reconstructions due to its subphonemic nature. The consonant **b* is not known to have occurred after nasal vowels.

[28] A reviewer suggests that “[a]nother possible option would be to reconstruct **l* instead of morpheme-initial **d*, with the typologically trivial change **l* > *n* in Yuhup and Hup”, which “would remove the major asymmetry between **d* and other voiced stops”. Such a possibility is rendered unlikely by the fact that a series of voiced stops, including **d*, is unequivocally reconstructed morpheme-finally (Table 9 and examples 160–163).

The velar nasal **ŋ* palatalizes after front high vowels. The relevant correspondences are summarized in Table 9.

PDH	Dâw	Yuhup	Hup
**m*	‹m› *bm*, m^{A}	‹m› *bm*, m^{A}	‹b› *bm*, ‹m› m^{A}
**b*	‹b› *b*	‹m› *bm*, m^{AB}	‹b› *bm*, ‹m› m^{AB}
**n*	‹n› *dn*, n^{A}	‹n› *dn*, n^{A}	‹d› *dn*, ‹n› n^{A}
**d*	‹d› *d*	‹n› *dn*, n^{A}	‹d› *dn*, ‹n› n^{A}
**ɟ*	‹j› *ɟ*	‹j› *ɟɲ*, $ɲ^{A}$	‹j› *jdn*, jn^{A}
**ŋ*	‹gn› *gŋ*, $ŋ^{AB}$, ‹nh› *ɟɲ*^{BC}, $ɲ^{AC}$	‹g› *gŋ*, $ŋ^{AB}$	‹g› *gŋ*, $ŋ^{AB}$
**g*	‹g› *g*	‹g› *gŋ*, $ŋ^{A}$	‹g› *gŋ*, $ŋ^{A}$

[A] = before nasal vowels / in nasal morphemes; [B] = hypothetical reflex predicted based on systemic considerations; [C] = after front high vowels

Table 9. PDH nasals and voiced stop and their reflexes (morpheme-final position)

Some examples follow in 150–173.

(150) PDH **c'ɨ̂₂:m* ‘foot’ > Dâw ‹çuum› *c'ûː bm* || Yuhup ‹siím› *tʃi̯ûbm* || Hup ‹s'ìb› *tʃi̯bm*

(151) PDH **jum* ‘vine’ > Dâw ‹yum› *jubm* || Yuhup ‹yum› *jŭbm* || Hup ‹yúb› *djûbm*

(152) PDH **hə̃̂ːm ~ *hə̃m* ‘to go’ > Dâw ‹rãam› *hə̃̂ːm* ~ ‹rãm› *hə̃m* || Yuhup ‹hãm› *hə̆̃m* || Hup ‹hám› *hə̂̃m*

(153) PDH **tɔ̃m* ‘tree sp.’ > Dâw ‹tõm› *tɔ̃m* ‘*embaúba* tree (*Cecropia spp*.)’ || Hup ‹tóm› *tɔ̃̂m* ‘kind of *macucu* tree found in the caatinga’

(154) PDH **dâːb* ‘to weave’ > Dâw ‹daab› *dâːb* ‘to weave (palm leaves)’ || Hup ‹d'áb› *dą̂bm* ‘to weave (hammock)’

(155) PDH **ɓob* ‘loincloth; plant whose bast is used for making loincloths’ > Dâw ‹bôb› *bob* || Yuhup ‹bööm› *bo̯ŏ̯bm* || Hup ‹b'ŏb› *mbô̯bm* ‘loincloth; tropical chestnut’

(156) PDH **pun* ‘to suck breast’, **pûːn* ‘breast’ > Dâw ‹pun› *pun*, ‹puun› *pûːn* || Yuhup ‹pun› *pŭdn*, ‹pún› *pûdn* || Hup ‹púd› *pûdn*, ‹pùn› *pŭdn*

(157) PDH **m.han* ‘to appear’ > Dâw ‹ran› *hadn* || Yuhup ‹wahan› *wahădn* || Hup ‹bahád› *mbahâdn*

(158) PDH **cɔ̃n* ‘to prick one’s foot on a stump’ > Dâw ‹sõn› *ʃɔ̃n* || Yuhup ‹sõn› *tʃɔ̃̆n* ‘to step on a stump or in a puddle’ || Hup ‹són› *tʃɔ̃̂n* ‘to prick oneself’

(159) PDH **m.hə̃̂ːn* ‘kinkajou’ > Dâw ‹rẽen› *hə̃̂ːn* || Yuhup ‹wẽhén› *wə̃hə̃̆n* || Hup ‹mehèn› *mə̃hə̃̆n*

(160) PDH **dâːd* ‘to paint with genipap’ > Dâw ‹daad› *dâːd* ‘to write, to study, to paint one’s body’ || Yuhup ‹daan› *dą̆ą̆dn* || Hup ‹d'ád› *ndą̂dn*

(161) PDH **kɘd* ‘to pass’ > Dâw ‹xâd› *xɤd* || Yuhup ‹kän› *kădn* || Hup ‹kắd› *kâdn*

(162) PDH **nə̃̂ːd* ‘to come’ > Dâw ‹nẽed› *nə̃̂ːd* || Yuhup ‹nen› *nə̆̃n* || Hup ‹nén› *nə̃̂n*

(163) PDH **mə̃̂ːd* ‘downriver’ > Dâw ‹mẽed› *mə̃̂ːd* || Yuhup ‹mer-› *mə̆̃r-* ~ ‹men-› *mə̃̂n-* ~ *mə̆̃n-*[29] || Hup ‹mèr'ah› *mə̆̃r-ʔah* ~ ‹mér'ah› *mə̃̂r-ʔah*[30]

[29] This term must receive a suffix indicating the distance. Silva & Silva (2012: 216) document the root-final consonant as lenited to ‹r› *ɾ*; while Ospina Bozzi (2002: 237) attests ‹n› *n*. The variation between the rising and falling tones, attested in Ospina Bozzi (2002: 128, 131, 236–238, 437, 448–449, 465), is unclear.

[30] The variant ‹mír'ah› *mî̆r-ʔah*, documented in Ramirez (2005), shows a sound change attested elsewhere in the Umari Norte dialect area (Epps 2005: 88), and may thus be representative of that variety. The variation between the rising and falling tones, attested in Epps (2005: 157, 302, 391, 440, 771), is unclear.

(164) PDH **k'aɟ* 'green acouchi' > Dâw ‹kaj› *k'aɟ* || Yuhup ‹kaaj› *kąą̆ɟn* || Hup ‹k'áj› *kə̂jdn*
(165) PDH **doɟ* 'to rain' > Dâw ‹dôj› *doɟ* || Yuhup ‹döj› *dŏɟn*[31] || Hup ‹d'ő́j› *ndə̂jdn*
(166) PDH **k'ɔ̃ɟ* 'snail' > Dâw ‹kõj› *k'ɔ̃ɟ* || Yuhup ‹kõoj-tön› *kə̃ə̃n-tŏdn* 'flute made of snail shell' || Hup ‹k'ő́j› *kə̂jn* 'snail sp. (not edible, mid-sized)'
(167) (?) PDH **w.wɔ̂ːɟ ~ *w.wɔ̃ɟ* 'whirlpool'[32] > Dâw ‹wõoj› *wɔ̂ːɟ* || Yuhup ‹wõwoç› *wɔ̃wɔ̆̌ç* 'to produce a whirlpool' || Hup ‹wõwő́j› *wɔ̃wɔ̂jn*
(168) PDH **mɨŋ* 'giant anteater' > Dâw ‹mɯgn› *mɯgŋ* 'nickname for giant anteaters' || Yuhup ‹bɨg› *bɨ̆gŋ* || Hup ‹bɨ́g› *mbɨ̂gŋ*
(169) PDH **mĩ$_2$ŋ* 'crazy' > Dâw ‹mĩnh› *mĩŋ* || Yuhup ‹mig› *mĭ̆ŋ* || Hup ‹míg› *mî̆ŋ*
(170) PDH **tə̂$_2$ːg* 'firewood; tree (of a given species)' > Dâw ‹tâag› *tɤ̂ːg* || Yuhup ‹tə́́g› *tə̂gŋ* || Hup ‹tə̀̀g› *tə̆gŋ* 'firewood', ‹-tëg› *-tegŋ* 'tree (of a given species)'
(171) PDH **jæg* 'hammock' > Dâw ‹yeg› *jɛg* || Yuhup ‹yag› *jăgŋ* || Hup ‹yág› *djâgŋ*
(172) PDH **cɔ̂ːg* 'Brazilian tinamou' > Dâw ‹sõog› *ʃɔ̂ːg* || Yuhup ‹sə́́g› *tʃɔ̂ːŋ* || Hup ‹sə̀̀g› *tʃɔ̆̌ːŋ*
(173) PDH **næ̂ːg* 'honey' > Dâw ‹nẽeg› *nɛ̂ːg* || Yuhup ‹nég› *næ̂ŋ* || Hup ‹nèg› *næ̆̌ŋ*

4. Vowels

The reconstruction of PDH vowels is associated with significant complexities. Although Dâw, Yuhup, and Hup have isomorphic vowel inventories, composed of nine oral vowels and six nasal vowels (in addition to their long counterparts), as shown in Table 10, the correspondences among them are not always straightforward. The proposal in this paper is preliminary and subject to improvements.

oral	front unrounded	non-front unrounded	non-front rounded
high	*i*	D. *ɯ*, Y./H. *ɨ*	*u*
mid	*e*	D. *ɤ*, Y./H. *ə*	*o*
low	D. *ɛ*, Y./H. *æ*	*a*	*ɔ*

nasal	front unrounded	non-front unrounded	non-front rounded
high	*ĩ*	D. *ɯ̃*, Y./H. *ɨ̃*	*ũ*
mid			
low	D. *ɛ̃*, Y./H. *æ̃*	*ã*	*ɔ̃*

Table 10. Synchronic vowel inventories of Dâw, Yuhup, and Hup

4.1. Correspondences with matching nasality values

Let us start by examining the correspondences with matching nasality values (that is, those involving oral vowels in Dâw, Yuhup, and Hup, or nasal vowels in Dâw, Yuhup, and Hup), and let us ignore the vowel length for the time being. There are 26 such correspondences with no obvious complementary distribution patterns. Roundedness and height are obviously stable features in the Dâw–Hup languages: 25 out of 26 correspondences have matching roundedness values, and 24 out of 26 involve vowels of the same height in all daughter languages

[31] The absence of laryngealization in the Yuhup reflex, as attested in Silva & Silva (2012: 167), is unexpected. The expected form with laryngealization is, however, documented in Ospina Bozzi (2002: 403–404, 444).

[32] This etymology is dubious because of two irregularities. First, the final consonant in the Yuhup reflex actually points to **ç* rather than **ɟ*. Second, the falling tone in Dâw does not match the falling tone in Hup; Dâw points to a long vowel with falling tone, whereas Hup points to a short (toneless) vowel. The Yuhup cognate is a verb and is consequently useless for reconstructing the tone.

(if /æ/, /ɛ/, /a/, and /ɔ/ are all considered low). Backness is a less stable feature, however: only 18 out of 26 correspondences show matching backness values (if central and back vowels are lumped together). Table 11 lists the correspondences in question, and indicates whether each correspondence occurs in morphemes with short and long vowels.

Dâw	Yuhup/Hup	short	long	Dâw	Yuhup/Hup	short	long
i	ɨ	+	−	ĩ	ɨ̃	(+)	−
i	i	+	+	ĩ	ĩ	+	+
ɯ	ɨ	+	+	ɯ̃	ɨ̃	+	+
ɯ	i	−	+				
u	u	+	+	ũ	ũ	+	+
e	ə	+	+				
e	e	+	+				
ɤ	ə	+	+				
ɤ	e	−	+				
o	o	+	+				
ɛ	a	+	+	ɛ̃	ã	+	−
ɛ	æ	−	+	ɛ̃	æ̃	−	+
a	a	+	+	ã	ã	+	+
				ã	æ̃	(+)	+
ɔ	ɔ	+	+	ɔ̃	ɔ̃	+	+
ɔ	o	+	+				
e	æ	+	+				
				ã	ɔ̃	+	+

(+) = correspondence is attested only in cognate sets with additional irregularities

Table 11. Vowel correspondences between Dâw and Yuhup/Hup (matching nasality values only)

It can be seen from Table 11 that the rounded vowels of Dâw and Yuhup/Hup correspond neatly to each other; it is straightforward to posit the vowels **u*, **o*, **ɔ*, **ũ*, **ɔ̃* for PDH, all of which occur as short and long, with unchanged reflexes in the daughter languages, as exemplified in 174–188. These five vowels usually have trivial correspondences in Nadëb, as in ‹bung› *buŋ* 'horsefly', ‹-doo› *-do:* (non-indicative ‹-do› *-do*) 'to take away (sg.)', ‹-sóóp› *-ʃɔ:p* (plural ‹-s'óóp› *-ʃ̰ɔ:p*) 'to go up (away from the river)', ‹hũũt› *hũ:t* 'tobacco', ‹-nooh› *-nɔ̃:h* 'mouth' (Weir 1984: 25, 141, 170; Barbosa 2005: 36, 37).

(174) PDH **ɓux* 'horsefly' > Dâw ‹bux› *bux* | | Yuhup ‹buuh› *bṵ̌h* | | Hup ‹b'úh› *mbṵ́h*
(175) PDH **tû:g* 'howler monkey' > Dâw ‹tuug› *tû:g* | | Yuhup ‹túg› *tûgŋ* | | Hup ‹tùg› *tǔgŋ*
(176) PDH **pǔ:p* '*paxiúba* palm (*Socratea exorrhiza*)' > Dâw ‹puup› *pǔ:p* | | Yuhup ‹púp› *pûp* | | Hup ‹pùp› *pǔp*

(177) PDH **ɗob* ‘to do gown (towards the river)’ > Dâw ‹dôb› *dob* || Yuhup ‹dööm› *dǫ̆ǫ̆bm* || Hup ‹d’ŏb› *ndǫ̆bm*
(178) PDH **nô:* ‘red, ripe’ > Dâw ‹dôo› *nô:* || Hup ‹dŏ› *ndô:*
(179) PDH **dŏ:ʔ* ‘to take out, to take away’ > Dâw ‹dôo’› *dŏ:ʔ* || Yuhup ‹dö’› *dŏʔ*[33] || Hup ‹d’ŏ’› *ndǫ̆ʔ*
(180) PDH **c’ɔʔ* ‘to untie’ > Dâw ‹ço’› *c’ɔʔ* || Yuhup ‹soo’› *tʃǫ̆ǫ̆ʔ* || Hup ‹s’ó’› *tʃǫ̆ʔ*
(181) PDH **cŏ:p* ‘to go up (away from the river)’ > Dâw ‹soop› *ʃõ:p* ‘to rise’ || Yuhup ‹sop› *tʃõp* || Hup ‹sóp› *tʃóp*
(182) PDH **dŏ:k* ‘to go out, to be extinguished’ > Dâw ‹dook› *dŏ:k* || Yuhup ‹dook› *dǫ̆ǫ̆k* || Hup ‹d’ók› *dǫ̆k*
(183) PDH **hũʔ* ‘to end’ > Dâw ‹rũ’› *hũʔ* || Yuhup ‹hũ’› *hŭ̃ʔ* || Hup ‹hŭ́’› *hŭ́ʔ*
(184) PDH **hŭ̃:t* ‘tobacco’ > Dâw ‹rũut› *hŭ̃:t* || Yuhup ‹hŭ́t› *hŭ̂t* || Hup ‹hùt› *hŭ̃t*
(185) PDH **nŭ̃:h* ‘manioc starch’ > Dâw ‹nũur› *nŭ̃:h* || Yuhup ‹núh› *nŭ̂h* || Hup ‹nùh› *nŭ̃h*
(186) PDH **nɔ̃h* ‘mouth’ > Dâw ‹nõr› *nɔ̃h* || Yuhup ‹noh-köŏn› *nɔ̃h-kǫ̆ǫ̆dn* || Hup ‹noh-k’ŏ̀d› *nɔ̃h-kǫ̆dn*
(187) PDH **hɔ̃k* ‘to saw’ > Dâw ‹rõk› *hɔ̃k* || Yuhup ‹hõk› *hɔ̃̆k* || Hup ‹hŏ́k› *hɔ̆́k*
(188) PDH **hɔ̂:* ‘to burn (intr.)’ > Dâw ‹rõo› *hɔ̂:* || Yuhup ‹hõ› *hɔ̃̆* || Hup ‹hŏ́› *hɔ̂́:*

The only complications involving rounded vowels are the sound correspondence between Dâw *ɔ(:)* and Yuhup/Hup *o*, found in two cognate sets only (189–190), and the correspondence between Dâw *ã(:)* and Yuhup/Hup *ɔ̃*, documented in at least seven cognate sets (e.g., 191–194). In the Roçado dialect of Nadëb, one finds the close-mid rounded vowel *o* in the former case (‹poh› *poh* ‘sky’; Martins 2005: 288), and the high unrounded vowel *ɨ̃* in the latter case (‹-’ỹỹh› *-ʔɨ̃ɨ̃h*, non-indicative ‹-’ỹh› *-ʔɨ̃h* ‘to sleep’, ‹myym› *mɨ̃ɨ̃m* ‘ax’; Weir 1984: 31, 161). For the former correspondence, I use an *ad hoc* character **O(:)*, which, judging by the evidence from Nadëb, may turn out to stand for plain **o(:)* with an irregular reflex in Dâw. Regarding the latter correspondence, I reconstruct an unrounded vowel **ɜ̃(:)*, which must have been lowered in Dâw and rounded in Yuhup/Hup.

(189) PDH **pOx* ‘up, above’ > Dâw ‹pox› *pɔx* (compare ‹poox› *pŏ:x* ‘sky’) || Yuhup ‹pöh› *pŏh* ‘tall’ (compare ‹pö› *pŏ* ‘up, above’) || Hup ‹pŏ́h› *póh* ‘up, above, sky’
(190) PDH **kÔ:ɟ* ‘to scratch’ > Dâw ‹xooj› *xɔ̂:ɟ*[34] || Hup ‹kŏ́j› *kôjdn*
(191) PDH **ʔɜ̃̂:h* ‘to sleep’ > Dâw ‹ãa› *ʔã̂:* || Yuhup ‹õh› *ʔɔ̃̆h* || Hup ‹ŏ́h› *ʔɔ̆́h*
(192) PDH **ʔɜ̃̂:m* ‘to be afraid’ > Dâw ‹ãam› *ʔã̂:m* || Yuhup ‹õm› *ʔɔ̃̆m* || Hup ‹óm› *ʔɔ̂m*
(193) PDH **mɜ̃̂:m* ‘ax’ > Dâw ‹mãam› *mã̂:m* ‘stone ax’ || Yuhup ‹móm› *mɔ̂m* ‘ax, metal’ || Hup ‹mòm› *mɔ̆̀m* ‘metal, iron, metal ax’
(194) PDH **cɜ̃h* ‘left (side)’ > Dâw ‹sôob sãr› *ʃô:b ʃãh* ‘left hand’ || Yuhup ‹sõh-› *tʃɔ̃̀h-*[35] || Hup ‹sɔ̃̀h› *tʃɔ̃̆̀h*[36]

Let us now consider the correspondences between unrounded vowels only. There are 19 such correspondences, of which 18 involve vowels of equal height in all daughter languages. The greatest complication here is the fact that the correspondences between non-front and

[33] The absence of laryngealization in the Yuhup reflex, as attested in Silva & Silva (2012: 165) and Ospina Bozzi (2002: 348), is unexpected.

[34] Martins (2005: 248) documents this as ‹xôoj› *xô:ɟ* instead. If the form with a low vowel, attested in Epps *et al.* (2018), is revealed to be a typo, one can simply reconstruct PDH **kô:ɟ*.

[35] This term must receive a suffix indicating the distance.

[36] The rising tone documented in the Hup reflex is unexpected.

front vowels are quite chaotic.[37] All four combinations exist. Dâw non-front vowels may correspond to non-front or front vowels of the same height in Yuhup/Hup. Similarly, Dâw front vowels may correspond to non-front or front vowels of the same height in Yuhup/Hup. In fact, only two combinations are not known to exist: Dâw *a(:)* is not known to correspond to Yuhup/Hup *æ*, and Dâw *ɯ̃(:)* is not known to correspond to Yuhup/Hup *ĩ*. This raises the question of how to interpret these correspondences diachronically so as to avoid positing an implausibly large inventory of monophthongs. Did perhaps the vowel system of PDH include a typologically rare opposition between three degrees of backness in unrounded vowels? Or should we reconstruct an inventory of diphthongs for PDH? Or could the complexity result from splits conditioned by the consonantal environment, possibly including features such as velarization or palatalization lost in the contemporary languages?[38]

Nadëb sheds little light on this complex issue. In most cases, oral high unrounded vowels of Dâw, Yuhup, and Hup, regardless of whether they are front or not, correspond to Nadëb *ɨ* (as in ‹yb› *ʔɨb* ‘father’, ‹tyb› *tɨb* ‘egg’, ‹tym› *tɨm* ‘seed’; Weir 1984: 54, 71; Martins 2005: 339), and mid unrounded vowels of all three languages correspond to Nadëb *ə* (as in ‹-sët› *-ʃət* ‘to carry’, ‹atsëm› *ʔac’əbm* ‘at night’, ‹-gëët› *-k’ə:t* ‘to stand (sg.)’, ‹tëg› *təg* ‘tooth’; Weir 1984: 100, 141, 164; Barbosa 2005: 38). Compare the examples in 195–201.

(195) PDH **ʔĭ:p* ‘father’ > Dâw ‹iip› *ʔĭ:p* || Yuhup ‹íp› *ʔîp* || Hup ‹íp› *ʔíp*[39]
(196) PDH **tɨ̆₂:p* ‘egg’ > Dâw ‹tuup› *tŭ:p* || Yuhup ‹típ› *tîp* || Hup ‹tìp› *tĭp*
(197) PDH **tɨm* ‘seed’ > Dâw ‹tum› *tum* || Hup ‹tɨ́b› *tɨ̂bm* ‘penis’
(198) PDH **cə̆₂:t* ‘to carry on one’s back’ > Dâw ‹sêet› *ʃĕ:t* || Yuhup ‹sët› *tʃĕt* || Hup ‹sə́t› *tʃét*
(199) PDH **c’e₁m* ‘night’ > Dâw ‹çêm› *c’em* || Yuhup ‹sääm› *tʃə̨̆bm* || Hup ‹s’ə̆b› *tʃə̂bm*
(200) PDH **k’ə̆₂:t* ‘to stand’ > Dâw ‹kâat› *k’ɤ̆:t* || Yuhup ‹këët› *kə̨̆t* || Hup ‹k’ə́t› *kə́t*
(201) PDH **təg* ‘tooth’ > Dâw ‹tâg› *tɤg* || Yuhup ‹täg› *tăgŋ* || Hup ‹tə́g› *tə̂gŋ*

As for the oral low unrounded vowels of Dâw, Yuhup, and Hup, there are two possible correspondences in Nadëb: *ʌ* and *a*. The former is found when Dâw *a(:)* corresponds to Yuhup/Dâw *a*, as in ‹tsäng› *c’ʌŋ* ‘clay’ (Barbosa 2005: 39), ‹wäng› *wʌŋ* ‘*patauá* fruit’ (Weir 1984: 230). The latter is found when Dâw *ɛ(:)* (rarely *e(:)*) corresponds to Yuhup/Hup *æ* or *a*, as in ‹nag’aad› *nãk’ə̨̆:d* ‘tongue’, ‹ag› *ʔag* ‘fruit’, ‹-yat› *-jat* (non-indicative ‹-yad› *-jad*) ‘to lie on the ground (sg.)’ (Barbosa 2005: 55; Weir 1984: 66, 129, 141). Compare the examples in 202–206. The fact that Dâw patterns with Nadëb in distinguishing the vowels found in 202–203 and 205 suggests that Yuhup and Hup have merged at least some pairs of vowels, possibly by centralizing erstwhile front vowels.

(202) PDH **c’ax* ‘earth’ > Dâw ‹çax› *c’ax* || Yuhup ‹saah› *tʃə̨̆h* || Hup ‹s’áh› *tʃə́h*
(203) PDH **wax* ‘*patauá* fruit (*Oenocarpus bataua*)’ > Dâw ‹wax› *wax* || Yuhup ‹wah› *wăh* || Hup ‹wáh› *wáh*

[37] I use the term “non-front” to refer to back and central vowels, since the distinction is not contrastive in any Naduhup language. Note that the non-front unrounded vowels of Dâw are usually described as back (/ɯ/, /ɯ̃/, /ɤ/) except for the low vowels, for which Martins (2004) uses the symbols /a/, /ã/ rather than /ɑ/, /ɑ̃/. By contrast, in Yuhup and Hup the respective vowels are usually described as central (/ɨ/, /ɨ̃/, /ə/, /a/, /ã/), except that Silva & Silva (2012) use the symbols /ɑ/, /ɑ̃/ for Yuhup. Martins (2005) uses the symbols /ɯ/, /ɯ̃/, /ɤ/, /a/, /ã/ for all Naduhup languages.

[38] Martins (2005) attributes some of the sound correspondences considered here to vowel assimilation (umlaut), and reconstructs a plethora of disyllabic morphemes. While umlaut-like developments are known to have given rise to rich vowel inventories in multiple language groups (Permic, Khanty, Mansi, Germanic), the Dâw–Hup languages retain no traces of the putative second-syllable vowels, and their closest relatives (Nadëb, and possibly Kakua, Nɨkak, and Puinave) also show a clear preference for CVC-shaped morphemes, suggesting that the template in question must be quite old.

[39] The high tone documented in the Hup reflex (Epps 2005: 200) is unexpected.

(204) PDH **nɔ̃h-k'æ̂₂ːd* 'tongue' > Dâw ‹nõr keed› *nɔ̃h-k'ɛ̂ːd* || Yuhup ‹noh-keén› *nɔ̃h-kǣ̰dn* || Hup ‹noh-k'èd› *nɔ̃h-kæ̰̆dn*

(205) PDH **ʔæg* 'fruit' > Dâw ‹bee eg› *bɛ̂ː ʔɛg* || Yuhup ‹ag› *ʔagŋ* || Hup ‹ág› *ʔâgŋ*

(206) PDH **jæɻ̥t* 'to lie on the ground' > Dâw ‹yêt› *jet* || Yuhup ‹yet› *jæ̆t* || Hup ‹yét› *djǽt*

There is another piece of evidence suggesting that Yuhup and Hup are less conservative than Dâw with regard to vowel backness. Recall from Table 11 that some correspondences are restricted to etyma with long vowels (for vowel length in PDH, see **5**). These include Dâw *ɛ̃ː* ~ Yuhup/Hup *æ̃*, Dâw *ɯː* ~ Yuhup/Hup *i*, Dâw *ɤː* ~ Yuhup/Hup *e*,[40] Dâw *ɛː* ~ Yuhup/Hup *æ*, and possibly Dâw *eː* ~ Yuhup/Hup *e* (if 232 is shown to be a wrong etymology). Note that all these correspondences show a front vowel in Yuhup and Hup. In the case of *ɛ̃ː* ~ *æ̃*, one can simply reconstruct PDH **æ̃ː* (207–208), whose short counterpart (PDH **æ̃*) must have given rise to the correspondence *ɛ̃* ~ *ã* (209). The remaining correspondences (*ɯː* ~ *i*, *ɤː* ~ *e*, *ɛː* ~ *æ*, *eː* ~ *e*) do have competing correspondences with a central vowel in Yuhup/Hup (*ɯː* ~ *ɨ*, *ɤː* ~ *ə*, *ɛː* ~ *a*, *eː* ~ *ə*), but the fact that they lack short counterparts suggests that they may go back to erstwhile diphthongs (possibly **[ɨi̯]*, **[ɘi̯]*, **[æi̯]*, **[ei̯]*), which would account both for vowel length in Dâw and for the fronting effect in Yuhup and Hup.[41] In this paper, I notate the respective PDH vowels with a subscript ₂, as in **ɨ₂ːˑ*, **ɘ₂ːˑ*, **æ₂ːˑ*, **e₂ːˑ* (210–217). These contrast with **ɨ₁ːˑ*, **ɘ₁ːˑ*, **æ₁ːˑ*, **e₁ːˑ*, which have centralized reflexes in Yuhup and Hup (218–225).

(207) PDH **ɓæ̆ːh* 'star' > Dâw ‹'mẽer› *ʔmɛ̃̆ːh* || Yuhup ‹wero-meéh› *wærɔ́-mǣ̰h* || Hup ‹wer(h)o-m'èh› *wær(h)ɔ-mæ̰̆h*[42]

(208) PDH **jæ̃̆ː* 'non-venomous snake' > Dâw ‹yẽe› *ɲɛ̃̆ː* 'boa' || Yuhup ‹yẽ› *ɲæ̆* || Hup ‹yé́› *njæ̃̆ː*

(209) PDH **næ̃g* 'fat, oil' > Dâw ‹nẽg› *nɛ̃g* || Yuhup ‹nag› *nãŋ* || Hup ‹nág› *nãñŋ*

(210) PDH **tɬ̥̂₂ːw* 'path' > Dâw ‹t~~uuu~~w› *tûːw* || Yuhup ‹tíw› *tîw* || Hup ‹tìw› *tĭw*

(211) PDH **pɬ̥̂₂ːɻ* '*cabari* plant (*Clathrotropis macrocarpa*)' > Dâw ‹p~~uu~~j› *pûːɻ* || Yuhup ‹píj› *pîɻɲ* || Hup ‹pìj› *pĭjdn*

(212) PDH **cʼɘ̆₂ːk* 'to steal' > Dâw ‹câak› *cʼɤ̆ːk* || Hup ‹s'éḱ› *tʃɛ̰́k*

(213) PDH **jə̂₂ː* 'to enter' > Dâw ‹yâa› *jɤ̂ː* 'to come back' || Yuhup ‹yë› *jĕ* || Hup ‹yé́› *djếː*

(214) PDH **wæ̂₂ːd* 'to eat', **wæ̆₂ːd* 'food' > Dâw ‹weed› *wɛ̂ːd*, ‹weed› *wɛ̆ːd* || Yuhup ‹wen› *wæ̆dn*, ‹wén› *wæ̂dn* || Hup ‹wéd› *wæ̂dn*, ‹wèd› *wæ̆dn*

(215) PDH **kʼæ̂₂ːg* 'bone; to choke on a fishbone' > Dâw ‹keeg› *kʼɛ̂ːg* 'bone; to choke' || Yuhup ‹keeg› *kǣ̰gŋ* 'to choke on a fishbone' || Hup ‹k'èg› *kæ̰̆gŋ* 'bone'; ‹k'ég› *kæ̰̂gŋ* 'to choke'

(216) PDH **kə̂₂ː* 'feather, wing' > Dâw ‹xêe› *xêː* || Yuhup ‹kë› *kĕ* || Hup ‹ké́› *kêː* 'wing'

(217) PDH **cɘ̆₂ːm* 'tick' > Dâw ‹sêem› *ʃɛ̆ːbm*[43] || Yuhup ‹táh-sém› *tâh-tʃêbm* 'large tick sp.' || Hup ‹tah-sèb› *tah-tʃɛ̆bm*

[40] In just one cognate set, Dâw *ɤ* (rather than *ɤː*) corresponds to Yuhup/Hup *e*: Dâw ‹jâw› *jɤw* 'nine-banded armadillo' ~ Yuhup ‹yéw› *jêw* 'greater long-nosed armadillo', Hup ‹yèw› *djĕw* 'greater long-nosed armadillo, nine-banded armadillo'. However, the falling tone in Yuhup and the rising tone in Hup both support the reconstruction of a long vowel in PDH. I reconstruct PDH **jɘ₂ːw* (with an unknown tonal value) and posit irregular shortening in Dâw.

[41] It is possible that the putative diphthongs are marginally preserved in some varieties of Yuhup. For example, Ospina Bozzi (2002: 104) documents the Yuhup reflex of **tə̂₂ːg* 'firewood; tree (of a given species)' as [têjgŋ]. However, other sources on the language attest just ‹tég› [têgŋ].

[42] The loss of *h* is typical of the Western and Eastern dialect areas (Epps 2005: 87). The form ‹wirom'eh-téh› *wirɔ-mæ̃h-tǽh* is documented in the Umari Norte dialect area (Epps 2005: 297).

[43] In Epps *et al.* (2018), this is attested as ‹seem› *ʃɛ̃ːbm*, which must be a typo (cf. Martins 2004: 17; Martins 2005: 333).

(218) PDH *kɨ̆$_1$:t ‘to cut’ > Dâw ‹xu̶u̶t› *xŭ:t* ‘to cut, to tear’ || Hup ‹kɨ́t› *kɨ́t* ‘to cut (with an ax, a machete, etc.)’

(219) PDH *wɨ̂$_1$:d ‘to arrive, to reach’ > Dâw ‹wu̶u̶d› *wûː:d* || Yuhup ‹wɨ̶n› *wɨ̆dn* ‘to appear (of fish during spawning season)’, ‹yãh wɨ̶n› *jãh-wɨ̆dn* ‘to reach’, ‹wɨt-› *wɨ̆t-* ‘to arrive (in serial constructions)’ || Hup ‹wɨ́d› *wɨ̂dn* ‘to appear (of fish during spawning season); to arrive, to reach (in serial constructions)’

(220) PDH *cə̆$_1$:k ‘butt, buttocks’ > Dâw ‹sâak› *ʃə̆ː:k* || Hup ‹sə̀̆k› *tʃə̆k*

(221) PDH *ɓə̂$_1$:h ‘to spill (liquid)’ > Dâw ‹bâa› *bə̂ː* || Yuhup ‹bääh› *bg̱g̱h* || Hup ‹b’ə́̆h› *mbǵ̱h*

(222) PDH *c’æ̆$_1$:p ‘to break by pulling (intr.)’ > Dâw ‹çeep› *c’ɛ̆:p* || Hup ‹s’áp› *tʃǵ̱p*

(223) PDH *cæ̆$_1$:ʔ ‘to carry on one’s hip’ > Dâw ‹see’› *ʃɛ̆:ʔ* || Yuhup ‹sa’› *tʃə̃ʔ* || Hup ‹sá’› *tʃáʔ*

(224) PDH *jê$_1$:n ‘to hide’ > Dâw ‹yêen› *jê:dn* || Yuhup ‹yän› *jə̆dn* || Hup ‹yə́̆d› *djə̂dn*

(225) PDH *tɨ̆$_1$:ç ‘to cut (with an ax, a machete, etc.)’ > Dâw ‹têes› *tɨ̆:ʃ* || Yuhup ‹tə́̆ç› *tə̆ç*

I extend the notation $_1$ and $_2$ to other pairs of correspondence sets where Dâw shows identical reflexes, whereas Yuhup and Hup show different vowels of the same height (central vowels in $_1$-correspondences, and front vowels in $_2$-correspondences). Therefore, I reconstruct PDH *i_1 for Dâw *i* ~ Yuhup/Hup *ɨ* (226–227); *i_2 for Dâw *i* ~ Yuhup/Hup *i* (228–229); *e_1 for Dâw *e* ~ Yuhup/Hup *ə* (230–231); and *e_2 for Dâw *e* ~ Yuhup/Hup *e* (232).

(226) PDH *bi$_1$ɲ ‘common squirrel monkey’ > Dâw ‹bij› *biɲ* || Hup ‹b’ɨ́j› *mbɨ̂jdn*

(227) PDH *ti$_1$t ‘rope, cord’ > Dâw ‹tit› *tit* || Yuhup ‹tɨ̶t› *tɨ̆t* ‘cord-like, vine’ || Hup ‹tɨ́t› *tɨ́t* ‘cord-like, vine’

(228) PDH *c’i$_2$d ‘to wash’ > Dâw ‹çid› *c’id* || Yuhup ‹siin› *tʃɨ̱̆dn* ‘to wash, to clean’ || Hup ‹s’íd› *tʃɨ̱́dn*

(229) PDH *wi$_2$d ‘to hug’ > Dâw ‹wid› *wid* ‘to hug strongly’ || (?) Yuhup ‹win› *wɨ̆dn* ‘to wind (a thread, a fishing line)’ *wɨ̆dn* || Hup ‹wíd› *wɨ̂dn*

(230) PDH *te$_1$n ‘to fish with *timbó*’ > Dâw ‹tên› *tedn* || Yuhup ‹tän› *tə̆dn* || Hup ‹tə́̆d› *tə̂n*

(231) PDH *c’e$_1$m ‘night’ > Dâw ‹çêm› *c’em* || Yuhup ‹sääm› *tʃg̱g̱bm* || Hup ‹s’ə́̆b› *tʃə̂bm*

(232) PDH *d.de$_2$m, *n.ne$_2$m, or *n.ne$_2$b ‘round’ > Dâw ‹lêm› *lebm* ‘round and small (e.g., eye, turtle, mic head)’, ‹nêm› *nebm* ‘spherical (e.g., shell, pan, head, *açaí* fruit stone)’, or ‹nêb› *neb* ‘round and small (e.g., seeds, fruit)’ || Hup ‹dërə́̆b› *ndərə̂bm*

I also use a subscript digit in PDH *ĩ$_2$ (Dâw *ĩ* ~ Yuhup/Hup *ĩ*), as in 169, but note that evidence for reconstructing *ĩ$_1$ (Dâw *ĩ* ~ Yuhup/Hup *ɨ̃*) is extremely weak, since the only known example of the latter correspondence (119) presents further irregularities. If the etymology in 119 is shown to be wrong, one can rewrite *ĩ$_2$ as *ĩ.

The remaining vowel correspondences involving vowels of matching height and nasality can be straightforwardly reconstructed as PDH *ɨ̃ (Dâw *ɯ̃* ~ Yuhup/Hup *ɨ̃*), *ɨ̃̆ (Dâw *ɯ̃̆* ~ Yuhup/Hup *ɨ̃̆*), *ɨ̃̆ː (Dâw *ɯ̃̆ː* ~ Yuhup/Hup *ɨ̃̆*), *ɘ̃ (Dâw *ɤ̃* ~ Yuhup/Hup *ə̃*), *ã (Dâw *ã* ~ Yuhup/Hup *ã*), *ãː (Dâw *ãː* ~ Yuhup/Hup *ãː*), *ə̃̆ (Dâw *ã̆* ~ Yuhup/Hup *ə̃̆*), *ə̃̆ː (Dâw *ã̆* ~ Yuhup/Hup *ə̃̆*), *æ̃ (Dâw *ɛ̃* ~ Yuhup/Hup *ã*), *ĩː (Dâw *ĩː* ~ Yuhup/Hup *ĩ*), *ɨ̃̆ː (Dâw *ĩ̆ː* ~ Yuhup/Hup *ɨ̃̆*). No subscript digits are needed for these vowels, since Yuhup and Hup lack competing correspondences with a differing backness value (except for Dâw *ã* ~ Yuhup/Hup *æ̃*, on which see below). Some examples follow in 233–255.

(233) PDH *p.xɨ̶t ‘wild banana’ > Dâw ‹xu̶t› *xut* || Yuhup ‹wɨ̶hɨ̶t› *wɨ̶hɨ̆t* || Hup ‹pɨ̶hɨ́t› *pɨ̶hɨ̂t*

(234) PDH *c.ɓɨ̶x ‘bat’ > Dâw ‹bu̶x› *bux* || Hup ‹sɨ̶b’ɨ̶h› *tʃɨ̶bɨ̱́h*

(235) PDH *hɨ̃p ‘to grate’ > Dâw ‹rɯ̃p› *hɯ̃p* || Yuhup ‹hɨ̃p› *hɨ̆̃p* || Hup ‹hɨ́̃p› *hɨ́̃p*

(236) PDH *pɨ̃n ‘thick (of liquid)’ > Dâw ‹pɯ̶̃n› *pɯ̃n* || Hup ‹pɨ́n› *pɨ̂̃n*

(237) PDH **k'ɨ̂ːm* 'to flood' > Dâw ‹kŭŭm› *k'ûːm* || Hup ‹k'ím› *kɨ̂m*
(238) PDH **mɨ̂ːh* '*ucuqui* fruit (*Pouteria ucuqui*)' > Dâw ‹mŭŭ› *mûː* || Yuhup ‹míh› *mɨ̂h* || Hup ‹mɨ̀h› *mɨ̌h*
(239) PDH **k'ɘɻ* 'to remove with one's fingernail' > Dâw ‹kâj› *k'ɤɻ* || Yuhup ‹kääj› *kɑ̨ɑ̨ɻɲ* || Hup ‹k'ǎj› *kɑ̨jdn*
(240) PDH **cɘg* 'leftovers' > Dâw ‹sâg› *ʃɤg* || Hup ‹sǎg› *tʃə̂gŋ*
(241) PDH **wab* '*jirau* platform' > Dâw ‹wab› *wab* || Yuhup ‹wam› *wăbm* || Hup ‹wáb› *wâbm*
(242) PDH **paj* 'thing' > Dâw ‹pay› *paj* || Hup ‹páy› *pâj* 'belongings, goods'
(243) PDH **dăːk* 'to hang (intr.)' > Dâw ‹daak› *dăːk* (compare ‹dak› *dak* 'to hang (tr.)') || Yuhup ‹daak› *dɑ̨ɑ̨k* || Hup ‹d'ák› *dɑ̨́k*
(244) PDH **tâː* 'to be cooked (ready), spicy' > Dâw ‹taa› *tâː*[44] 'to be half-cooked, spicy' || Yuhup ‹ta› *tă* || Hup ‹tá› *tâː* 'to be cooked (ready)'
(245) PDH **câːj* 'poisonous arthropod sp.' > Dâw ‹saay› *ʃâːj* 'scorpion; bee sp.' || Yuhup ‹sáy› *tʃâj* 'centipede' || Hup ‹sày› *tʃǎj* 'centipede'
(246) PDH **ʔãh* 'I' > Dâw ‹ãr› *ʔãh* || Yuhup ‹ãh› *ʔǎ̃h* || Hup ‹ấh› *ʔẫh*
(247) PDH **ʔãm* 'you (sg.)' > Dâw ‹ãm› *ʔãm* || Yuhup ‹ãm› *ʔǎ̃m* || Hup ‹ám› *ʔẫm*
(248) PDH **cǎ̃ːh* ~ **cãh* 'to think, to feel' > Dâw ‹sãar› *ʃǎ̃ːh* 'to feel, to think', ‹sãr› *ʃãh* 'to think, to suppose, to teach' || Hup ‹sấh› *tʃấh* 'to accuse'
(249) PDH **nǎ̃ːm* '*curare* poison for arrows' > Dâw ‹nãam› *nǎ̃ːm* || Hup ‹nàm› *nǎ̃m*
(250) PDH **xæp* 'to scrape' > Dâw ‹xep› *xɛp* 'to peel, to scrape' || Hup ‹háp› *háp* 'to scrape (e.g., *curare*)'
(251) PDH **dæp* 'meat' > Dâw ‹dep› *dɛp* || Yuhup ‹daap› *dɑ̨ɑ̨́p* || Hup ‹d'áp› *ndɑ̨́p*
(252) PDH **cɨ̌ːʔ* 'to urinate' > Dâw ‹sii'› *ʃɨ̌ːʔ* || Yuhup ‹si'› *tʃɨ̂ʔ* || Hup ‹sí'› *tʃɨ̂ʔ*
(253) PDH **ʔɨ̌ːp* 'father' > Dâw ‹iip› *ʔɨ̌ːp* || Yuhup ‹íp› *ʔîp* || Hup ‹ip› *ʔip*
(254) PDH **mɨ̂ːn* '*ingá* fruit (*Inga spp.*)' > Dâw ‹mĩin› *mɨ̂ːn* || Yuhup ‹mín› *mɨ̂n* || Hup ‹mìn› *mɨ̌n*
(255) PDH **-mɨ̂ː* 'branch' > Dâw ‹bee mĩi› *bêː-mɨ̂* || Yuhup ‹-mi› *-mɨ̌* 'water course' || Hup ‹-mi› *-mɨ̂ː* 'water course'

Two residual correspondences with matching nasality values remain unassigned to any PDH vowel. Dâw *e(ː)* ~ Yuhup/Hup *æ* is a rare example of a correspondence with unmatching height values, occurring in two verbal roots and their causatives (256–257). I reconstruct the diphthong **æ(ː)i̯* to account for it. The correspondence between Dâw *ã(ː)* and Yuhup/Hup *æ̃* is supported by just one unproblematic cognate set (258), in addition to a dubious etymology with an irregular correspondence in its final consonant (113); I use the *ad hoc* symbol **Ã(ː)* for the respective PDH vowel. It is technically possible to reconstruct a distinction between **ã$_1$(ː)* (> Dâw *ã(ː)*, Yuhup/Hup *ã*) and **ã$_2$(ː)* (> Dâw *ã(ː)*, Yuhup/Hup *æ̃*), but I do not adopt such notation here, since there is otherwise no evidence for positing an opposition between two kinds of low non-front vowels (**a$_1$*/**a$_2$*, **a$_1$ː*/**a$_2$ː*), and because there is a similar correspondence between Dâw *a* and Yuhup/Hup *æ̃*, on which see below.

(256) PDH **jæi̯t* 'to lie on the ground', **j̨æːi̯t* 'to lay on the ground' > Dâw ‹yêt› *jet*, ‹'yêet› *ʔjĕːt* || Yuhup ‹yet› *jăt*, ‹yeet› *jɑ̨ɑ̨̆t* || Hup ‹yét› *djǽt*, ‹y'ét› *djɑ̨́t*
(257) PDH **pæi̯t* 'to break (intr.)', **pæːi̯t* 'to break (tr.)' > Dâw ‹pêt› *pet*, ‹pêet› *pĕːt* 'to break (e.g., a bone or a stick)' || Hup ‹pét› *pǽt* 'to cut with one's teeth or mandibles'

[44] Epps *et al.* (2018) document this verb with a rising tone, but this is likely a typo, since CV-shaped roots are reported to obligatorily carry falling tone by Martins (2004: 91), who documents the root in question as ‹taa› *tâː*.

(258) PDH **ʔÂ̂ːm* ‘wife’ > Dâw ‹ãam› *ʔâ̂ːm* || Yuhup ‹ém› *ʔæ̂m* || Hup ‹te’ém› *tæ̃-ʔæ̂m* ‘daughter-in-law’ (literally ‘son’s wife’)

Table 12 lists the full inventory of PDH vowels reconstructed in this subsection, and Table 13 summarizes their reflexes in the daughter languages.

Dâw	front unrounded		back unrounded		back rounded		front unrounded		back unrounded		back rounded
Yuhup/Hup	central	front	central	front			central	front	central/back	front	
high	*i_1 —	*i_2 *iː	*ɨ *$ɨ_1$ː	— *$ɨ_2$ː	*u *uː		(*$ĩ_1$) —	*$ĩ_2$ *ĩː	*ɨ̃ *ɨ̃ː	— —	*ũ *ũː
high-mid	*e_1 *e_1ː	*e_2 *e_2ː	*ɘ *$ɘ_1$ː	— *$ɘ_2$ː	*o *oː						
low-mid	*æ *$æ_1$ː	— *$æ_2$ː			*ɔ *ɔː		*æ̃ —	— *æ̃ː	*ɜ̃ *ɜ̃ː	— —	*ɔ̃ *ɔ̃ː
low			*a *aː						*ã *ãː		
unclear		*æi̯ *æːi̯			*O *Oː					(*Ã) *Ãː	

( ) = correspondence is attested only in cognate sets with additional irregularities

Table 12. PDH vocalic inventory

4.2. Unexpected nasality in Yuhup and Hup

In a couple dozen etymologies, Dâw oral vowels correspond to nasal vowels in Yuhup and Hup. Nadëb cognates show oral vowels in such cases, suggesting that the nasality in Yuhup and Hup is secondary: ‹-gä› *-k’ʌ* (non-indicative ‹-gää› *-k’ʌː*) ‘to lie in a hammock (sg.)’, ‹yón› *jɔdn* ‘anteater’ (Weir 1984: 245; Barbosa 2005: 45). I have been unable to identify an environment that might have conditioned such a sound change. In my reconstructions, I represent the putative source of nasality in Yuhup and Hup by means of a tilde after the vowel, as in 259–276.

(259) PDH **k’a~ʔ* ‘to lie in a hammock’ > Dâw ‹ka’› *k’aʔ* || Yuhup ‹kã’› *kã̆ʔ* ‘to lie in a hammock, to hang’ || Hup ‹k’ã́’› *kã́ʔ* ‘to lie in a hammock, to hang’

(260) PDH **ja~h* ‘*uacu* fruit (*Monopteryx uaucu*)’ > Dâw ‹yar› *jah* || Yuhup ‹yãh› *jã̆h* || Hup ‹yã́h› *njã́h*

(261) PDH **pă̆ː~h* ‘to hear, to understand’ > Dâw ‹paar› *pă̆ːh* || Yuhup ‹pãh› *pã̆h* ‘to hear, to understand’ || Hup ‹hipã́h› *hi-pã́h*

(262) PDH **pa~t* ‘hair’ > Dâw ‹pat› *pat* || Yuhup ‹pãt› *pã̆t* ~ ‹pãhat› *pãhã̆t*[45] || Hup ‹pã́t› *pã́t* ‘hair, feather’

(263) PDH **ca~n* ‘pubic hair’ > Dâw ‹san› *ʃadn* || Yuhup ‹sãn› *tʃã̆n* || Hup ‹sán› *tʃã̂n*

(264) PDH **wa~ʔ* ‘vulture’ > Dâw ‹wa’› *waʔ* || Yuhup ‹wã’› *wã̆ʔ* || Hup ‹wã́’› *wã̱́ʔ* ‘black vulture’

(265) PDH **nɨ~g* ‘you (pl.)’ > Dâw ‹nɨg› *nɨg* || Yuhup ‹nɨg› *nɨ̆ŋ* || Hup ‹nɨ́g› *nɨ̂ŋ*

(266) PDH **k.mîː~n* ‘to hug’ > Dâw ‹mɨɨn› *mûːdn* || Yuhup ‹yãh mɨn› *jãh-mɨ̆n* ‘to grab in one’s arms’ || Hup ‹kɨmɨ́n› *kɨ̃mɨ̂n* ‘to hug with both arms’

(267) PDH **ʔɨ̂ː~h* ‘fire ant’ > Dâw ‹ɨɨ› *ʔûː* || Yuhup ‹ɨ́h› *ʔɨ̂h* || Hup ‹ɨ̀h› *ʔɨ̆h*

[45] The variant ‹pãhat› *pãhã̆t*, attested in Yuhup by Silva & Silva (2012: 240), is of unclear origin.

PDH	Dâw	Yuhup and Hup	PDH	Dâw	Yuhup and Hup
*a, *aː	a, aː	a	*ã, *ãː	ã, ãː	ã
			*ɜ̃, *ɜ̃ː	ã, ãː	ɔ̃
*ɘ, *ɘ$_1$ː	ɤ, ɤː	ə			
*ɘ$_2$ː	ɤː	e			
*ɨ, *ɨ$_1$ː	ɯ, ɯː	ɨ	*ɨ̃, *ɨ̃ː	ɯ̃, ɯ̃ː	ɨ̃
*ɨ$_2$ː	ɯː	i			
*ɔ, *ɔː	ɔ, ɔː	ɔ	*ɔ̃, *ɔ̃ː	ɔ̃, ɔ̃ː	ɔ̃
*o, *oː	o, oː	o			
*u, *uː	u, uː	u	*ũ, *ũː	ũ, ũː	ũ
*æ, *æ$_1$ː	ɛ, ɛː	a	*æ̃, *æ̃ː	ɛ̃, ɛ̃ː	ã, æ̃
*æ$_2$ː	ɛː	æ			
*æi̯, *æːi̯	e, eː	æ			
*e$_1$, *e$_1$ː	e, eː	ə			
*e$_2$, *e$_2$ː	e, eː	e			
*i$_1$	i	ɨ	(*ĩ$_1$)	(ĩ)	(ɨ̃)
*i$_2$, iː	i, iː	i	*ĩ$_2$, *ĩː	ĩ, ĩː	ĩ
*O, *Oː	ɔ, ɔː	o			
			(*Ã), *Ãː	(ã), ãː	(æ̃), æ̃ː

( ) = correspondence is attested only in cognate sets with additional irregularities

Table 13. PDH vowels and their reflexes

(268) PDH **c'ɔ~m* 'to bathe' > Dâw ‹çom› *c'ɔbm* | | Yuhup ‹sõom› *tʃɔ̰̃ɔ̰̌m* | | Hup ‹s'óm› *tʃɔ̰̂m*
(269) PDH **jɔ~n* 'anteater sp.' > Dâw ‹yon› *jɔdn* 'giant anteater' | | Yuhup ‹yõn› *jɔ̃̌n* 'collared anteater' | | Hup ‹yón› *njɔ̃̂n* 'anteater sp. (brown, no collar, lives side-by-side with collared anteater)'
(270) PDH **tɔ~h* 'white-lipped peccary', **tɔ~h-mɛ̃̆ːt* 'collared peccary' > Dâw ‹tor› *tɔh*, ‹tor mẽt› *tɔh-mɛ̃t* | | Yuhup ‹tõh› *tɔ̃̌h*, ‹tõh-mét› *tɔ̃h-mæ̃̂t* | | Hup ‹tőh› *tɔ̃̋h* 'white-lipped peccary'
(271) PDH **dɔ̃ː~n* 'to lick' > Dâw ‹doon› *dɔ̂ːn* | | Yuhup ‹noon› *nɔ̰̃ɔ̰̌n*
(272) PDH **m.xu~p* 'right (side)' > Dâw ‹sôob xup› *ʃɔ̂ːb xup* 'right hand'[46] | | Yuhup ‹muhuk-› *mũ̀hṹk-*[47] | | Hup ‹muhùp› *mũhũ̌p*
(273) PDH **pæ~n* 'sloth' > Dâw ‹pen› *pɛdn* | | Yuhup ‹pãn› *pæ̃̌n* 'Linnaeus's two-toed sloth' | | Hup ‹pán› *pæ̃̂n*
(274) PDH **dæ~n* 'chigoe flea' > Dâw ‹den› *dɛdn* | | Yuhup ‹naan› *næ̰̃æ̰̌n* 'chigoe flea; flea'

[46] The form ‹xup› *xup* is attested in Martins (2005: 277) and Obert (2019: 96). Elsewhere, one finds the unexpected reflex ‹xub› *xub* (Epps *et al.* 2018; Obert 2019: 109).

[47] This term must receive a suffix indicating the distance. The root-final velar consonant is irregular; it may have emerged due to the influence of ‹muhúk› *mũhũ̂k* 'chief'.

(275) PDH **pə̂ː~m* ‘to sit’ > Dâw ‹peem› *pêːbm* || Yuhup ‹pẽm› *pə̃́m* || Hup ‹pém› *pə̃́m*
(276) PDH **cɨ̌ː~p* ‘oriole sp. (*Icterus chrysocephalus*)’ > Dâw ‹siip› *ʃɨ̌ːp* || Yuhup ‹sɨ́p› *tʃɨ̌p* ‘oriole’s song’

In a handful of cognate sets, one finds correspondences that cannot be equated with any oral vowels reconstructed in subsection **4.1**, but that have close parallels among the nasal vowels. One such correspondence is Dâw *aː* ~ Yuhup and Hup *ɔ̃*, similar to the one derived from PDH **ɜ̃ː*, but with an oral reflex in Dâw (277–280). Another correspondence is Dâw *a(ː)* ~ Yuhup and Hup *ə̃*, similar to the one derived from PDH **Ã(ː)*, but likewise with an oral reflex in Dâw (281–283). In this paper, I reconstruct **ɜː~* and **A(ː)~*, respectively, even though no **ɜː* or **A(ː)* can be reconstructed. If such vowels were present in PDH, they must have merged with other vowels (possibly **a*) in all daughter languages. Example 280 instantiates what looks like a non-productive alternation in Yuhup.

(277) PDH **wɜ̂ː~m* ‘red squirrel sp.’ > Dâw ‹waam› *wâːbm* || Yuhup ‹wɔ́m› *wɔ̃́m* ‘southern Amazon red squirrel’ || Hup ‹wòm› *wɔ̃̌m* ‘northern Amazon red squirrel’
(278) PDH **c.xɜ̂ː~m* ‘crab’ > Dâw ‹xaam› *xâːbm* || Yuhup ‹sõhóm› *tʃɔ̃hɔ̃́m* || Hup ‹sohòm› *tʃɔ̃hɔ̃̌m*
(279) PDH **wɜ̂ː~n* ‘to chase, to follow’ > Dâw ‹waan› *wâːdn* (compare ‹wan› *wadn* ‘to expel’) || Yuhup ‹wõn› *wɔ̃́n* || Hup ‹wón› *wɔ̃́n*
(280) PDH **xɜ̂ː~n* ‘to vomit’ > Dâw ‹xaan› *xâːdn* || Yuhup ‹hõn› *hɔ̃̌n* ‘to vomit’ (cf. ‹han› *hădn* ‘to regurgitate, to vomit an entire thing’) || Hup ‹hɔ́n› *hɔ̃́n*
(281) PDH **jA~ʔ ~ *jĂː~ʔ* ‘to roast’ > Dâw ‹ya’› *jaʔ* ~ ‹yaa’› *jăːʔ* || Yuhup ‹yẽ’› *jə̃́ʔ* || Hup ‹yḗ’› *njə̃́ʔ*
(282) PDH **kăː~ʔ* ‘to bury’ > Dâw ‹xaa’› *xăːʔ* || Yuhup ‹kẽ’› *kə̃́ʔ*[48] || Hup ‹kḗ’› *kə̃́ʔ*
(283) (?) PDH **ɓA~ʔ ~ *ɓA~* ‘cold’ > Dâw ‹ba’› *baʔ* || Hup ‹m’é› *mə̨̃́*

In 284, Yuhup agrees with Dâw in showing an oral vowel, suggesting that Hup must have acquired nasality in an independent, irregular development.

(284) PDH **kə̂ːn* ‘to toast’ > Dâw ‹xeen› *xêːdn* || Yuhup ‹ken› *kə̆dn* || Hup ‹kén› *kə̃́n*

4.3. Unexpected nasality in Dâw

A few cognate sets show a nasal vowel in Dâw and oral vowels in Yuhup and Hup (285–289). Once again, whenever a Nadëb cognate is available, it also shows an oral vowel, as in ‹-óót› *-ʔɔːt* (non-indicative ‹-ód› *-ʔɔd*) ‘to cry’ (Weir 1984: 83, 102). I believe that these words have irregularly acquired nasality in Dâw, but for the time being I give alternative reconstructions with an oral vowel and a nasal vowel until more conclusive evidence is identified.

(285) (?) PDH **hɔt ~ *hɔ̃t* ‘far’ > Dâw ‹rõt› *hɔ̃t* || Yuhup ‹hot› *hɔ̆t* || Hup ‹hót› *hɔ́t* ‘at some distance (neither near nor far)’
(286) (?) PDH **ʔɔ̆ːt ~ *ʔɔ̃̆ːt* ‘to cry’ > Dâw ‹õot› *ʔɔ̃̆ːt* || Yuhup ‹ot› *ʔɔ̆t* || Hup ‹ót› *ʔɔ́t*
(287) (?) PDH **ɔ̆ːk ~ *ɔ̃̆ːk* ‘giant armadillo’ > Dâw ‹õok› *ʔɔ̃̆ːk* || Hup ‹òk› *ʔɔ̀k*
(288) (?) PDH **k’i₁ŋ ~ *k’ĩ₁ŋ* ‘to shoot with an arrow’ > Dâw ‹kĩnh› *k’ĩ̭ŋ* || Yuhup ‹kiig› *kɨ̰̆gŋ* || Hup ‹k’íg› *kɨ̰̂gŋ*
(289) (?) PDH **c’ɨp ~ *c’ɨ̃p* ‘*tucum* palm (*Astrocaryum vulgare*)’ > Dâw ‹çũp› *c’ṷ̃p* || Yuhup ‹sɨ̰̆p› *tʃɨ̰̆p*

[48] The absence of laryngealization in the Yuhup reflex, as attested in Silva & Silva (2012: 167) and Ospina Bozzi (2002: 363), is unexpected.

5. Tones and vowel length

Dâw, Yuhup, and Hup are tonal languages. In Dâw, only long vowels carry tone (either rising or falling), whereas short vowels are toneless; in fact, Martins (2004: 55–56) posits a triple opposition between toneless, rising-toned and falling-toned syllables, where vowel length is considered allophonic. In Yuhup and Hup, lexical morphemes typically carry falling or rising tone on their stressed (final) syllable; in Hup, the falling tone has a high allotone preceding voiceless codas (cf. Epps 2005: 81–82, who considers that the high tone is the underlying one and the falling tone is an allotone). Syllables with a contour tone are automatically lengthened in Yuhup (a fact not represented in my broad transcriptions). In Hup, open stressed syllables are lengthened, too (in this case, I opted to represent the lengthening in my transcriptions).

There is evidence suggesting that Proto-Yuhup–Hup may not necessarily have been tonal, since the tones of Yuhup and Hup do not correspond to Dâw tones, but rather to Dâw vowel length. Furthermore, the tonal opposition found in Dâw is also suspect, since, as shown by Martins (2004: 83), in most cases rising tone is associated with voiceless codas, and falling tone with voiced codas in Dâw. However, there are words with voiced codas and rising tone in Dâw. In this paper, I follow Martins (2004: 78–79) in positing a tonal distinction for Dâw and, consequently, for PDH, however low its functional load may turn out to be.

The basic correspondence pattern, shown in Table 14, is clearly seen in nouns and other lexical morphemes other than verbs. In this paper, I assume that Dâw is conservative regarding vowel length and tones, since the tones of Yuhup and Hup can be predicted based on those of the Dâw cognate.

	PDH	Dâw	Proto-Yuhup–Hup	Yuhup	Hup
*CVC	short (toneless)	short (toneless)	short (toneless)	long, rising	short, falling/high
*CV̌:C	long, rising tone	long, rising tone	long (toneless)	long, falling	short, rising
*CV̂:C	long, falling tone	long, falling tone			
*CV̂:	long, falling tone	long, falling tone	short (toneless)	long, rising	long, falling

Table 14. Tones

The absence of tone/vowel length in Dâw corresponds to rising tone in Yuhup, and falling (before voiced codas) or high (before voiceless codas) tone in Hup (Barboza 2016), as shown in 290–303.

(290) PDH **kɔw* ‘pepper’ > Dâw ‹xow› *xɔw* || Yuhup ‹kow› *kɔ̌w* || Hup ‹ków› *kɔ̂w*

(291) PDH **ɗom* ‘*acará* fish’ > Dâw ‹dôm› *dobm* || Yuhup ‹dööm› *do̰ŏ̰bm* || Hup ‹d’ö́b› *ndô̰bm*

(292) PDH **cug* ‘hummingbird’ > Dâw ‹sug› *ʃug* || Yuhup ‹sug› *tʃŭgŋ* || Hup ‹súg› *tʃûgŋ*

(293) PDH **xuj* ‘fish sp.’ > Dâw ‹xuy› *xuj* || Yuhup ‹huy› ‘*piaba* fish sp.’ || Hup ‹húy› *hûj* ‘*piaba* fish sp.’

(294) PDH **c’ɔp* ‘fly’ > Dâw ‹çop› *c’ɔp* || Yuhup ‹soop› *tʃɔ̰ɔ̰̌p* ‘maggot’ || Hup ‹s’óp› *tʃɔ̰́p* ‘fruit fly sp. (big and green)’

(295) PDH **tɘ*$_1$*t* ‘reptile or amphibian sp.’ > Dâw ‹tât› *tɤt* ‘salamander’ || (?) Yuhup ‹tät› *tə̆t* ‘grasshopper sp.’ || Hup ‹tä́t› *tə́t* ‘lizard sp. (*Bachia spp.*); (?) insect sp. (similar to a bed bug)’

(296) PDH **k'ɔt* 'uncle, father-in-law' > Dâw ‹kot› *k'ɔt* || Yuhup ‹koot› *kn̰ɔ̰t* 'maternal uncle, father-in-law' || Hup ‹k'ót› *kn̰ót* 'maternal uncle, father-in-law'

(297) PDH **ɓɔk* 'skin, bark, shell (of a turtle); pan' > Dâw ‹bok› *bɔk* 'shell, cover; pan' || Yuhup ‹book› *bn̰ɔ̰k* 'skin, bark; pan' || Hup ‹b'ók› *mbn̰ók*

(298) PDH **ɗɔk* 'fish sp.' > Dâw ‹dok› *dɔk* 'fish sp. (found in creeks)' || Yuhup ‹dook› *dn̰ɔ̰k* || Hup ‹d'ók› *ndn̰ók* '*acarapuru* fish (*Erythrinus erythrinus*)'

(299) PDH **jə₁x* 'frog sp.' > Dâw ‹yâx› *jɤ̂x* || Yuhup ‹yäh› *jə̈h* || Hup ‹yấh› *djə́h* 'frog sp. (large, edible, lives on river banks and on dry land)'

(300) PDH **kɔx* 'courbaril' > Dâw ‹xox› *xɔx* || Yuhup ‹koh› *kɔ̆h* || Hup ‹kóh› *kɔ́h*

(301) PDH **ɗuʔ* 'afternoon' > Dâw ‹du'› *duʔ* 'afternoon, sunset' || Hup ‹d'ú'› *ndu̱ʔ*

(302) PDH **woh* 'frog sp.' > Dâw ‹wôr› *woh* || Yuhup ‹wöh› *wə̆h* 'toad sp.' || Hup ‹wő́h› *wóh* 'frog sp. (small, terrestrial, and edible)'

(303) PDH **ɗuh* 'stick' > Dâw ‹bee dur› *bêː-duh* || Yuhup ‹tëg-duuh› *tegŋ-du̱ŭh* ~ ‹tëguh› *teg-ŭh*[49] 'tree' || Hup ‹tëg-d'úh› *tegŋ-ndú̱h* 'tree'

In CVC-shaped morphemes, the falling tone in Dâw corresponds to falling tone in Yuhup, and rising tone in Hup (Barboza 2016). In Dâw, all such morphemes have voiced codas, since voiceless codas are incompatible with falling tone in that language, with very few exceptions (Martins 2004: 83–84). In my reconstruction, falling tone was compatible with the voiceless coda **h* in PDH, which is lost in Dâw. Some examples follow in 304–318.

(304) PDH **xôːb* 'woodpecker' > Dâw ‹xôob› *xôːb* || Yuhup ‹hőm› *hôbm* || Hup ‹hȍb› *hŏbm*

(305) PDH **pôːd* '*cunuri* fruit (*Micrandra spruceana*)' > Dâw ‹pâad› *pɤ̂ːd* || Yuhup ‹pến› *pêdn* || Hup ‹pȅd› *pĕdn*

(306) PDH **pæ̂ːɻ* '*umari* fruit (*Poraqueiba spp.*)' > Dâw ‹peej› *pêːɻ* || Yuhup ‹péj› *pæɻn* || Hup ‹pèj› *pæjdn*

(307) PDH **tôːɻ* 'nose' > Dâw ‹tôoj› *tôːɻ* || Yuhup ‹tőj› *tôɻn* || Hup ‹tȍj› *tŏjdn*

(308) PDH **nôːg* '*uirapixuna*/*vapixuna*/*iuapixuna* fruit (*Protium spp.*)' > Dâw ‹nôog› *nôːg* || Yuhup ‹dőg› *dôgŋ* || Hup ‹dȍg› *ndŏgŋ*

(309) PDH **kʼôːg* 'collared titi monkey' > Dâw ‹kôog› *kʼôːg* || Yuhup ‹köőg› *kn̰ôgŋ* || Hup ‹kʼȍg› *kn̰ŏgŋ*

(310) PDH **cʼɨ̂₁ːw* 'peach palm fruit' > Dâw ‹çɯɯw› *cʼɯ̂ːw* || Yuhup ‹sɨ́ɨ́w› *tʃɨ̱̂ɨ̱̂w* || Hup ‹sʼɨ̀w› *tʃɨ̱̆w*

(311) PDH **pɤ̆ːj* 'catfish' > Dâw ‹pooy› *pɤ̆ːj* || Yuhup ‹hőp-póy› *hɔ̃̂p-pôj* || Hup ‹hõp-pòy› *hɔ̃p-pɤ̆j*

(312) PDH **ɓôːj* '*traíra* fish (*Hoplias spp.*)' > Dâw ‹bôoy› *bôːj* || Yuhup ‹böőy› *bn̰ôj* || Hup ‹bʼȍy› *mbn̰ŏj*

(313) PDH **pæ̂ːj* 'thunder' > Dâw ‹pẽey› *pɛ̃ːj* || Yuhup ‹pẽy› *pæ̃j* || Hup ‹pé̃y› *pæ̃j*

(314) PDH **jûːn* 'clothes' > Dâw ‹yuun› *jûːdn* || Yuhup ‹yún› *jûdn* || Hup ‹yùd› *djŭdn*

(315) PDH **j.xûːn* 'giant anteater'[50] > Dâw ‹xuun› *xûːdn*

(316) PDH **ɓæ̂ːh* 'tree'[51] > Dâw ‹bee› *bêː*

[49] The variant ‹tëguh› *teg-ŭh*, attested in Yuhup by Silva & Silva (2012: 284), is an irregular reduced form of ‹tëg-duuh› *tegŋ-du̱ŭh*.

[50] No cognates in Yuhup or Hup are known, but compare Nadëb ‹yahuun› *jahuːdn* 'giant anteater' (Barbosa 2005: 39).

[51] The consonant *h* resurfaces in Dâw when the tone of the noun is changed: ‹tɯm beer› *tŭm bɛ̆ːh* 'two trees'. No cognates in Yuhup or Hup are known, but compare Nadëb ‹baah› *baːh*, pl. ‹b'aah› *ba̱ːh* 'tree' (Epps & Obert 2021: 258).

(317) PDH **c.ɓə̂ːh* ‘tayra’ > Dâw ‹’mõo› *ʔmə̂ː* || Yuhup ‹moóh› *mə̰̀ə̰̂h* || Hup ‹som’òh› *tʃəmə̰̀h*
(318) PDH **n.wə̂ːh ~ *d.wə̂ːh* ‘cheek’ > Dâw ‹woo› *wə̂ː* || Yuhup ‹now-wóh› *nə̃w-wə̂h* || Hup ‹dowòh› *ndɔwə̀h*

The rising tone, found in CVC-shaped morphemes only, also corresponds to falling tone in Yuhup, and rising tone in Hup (Barboza 2016). In PDH, like in Dâw, such morphemes may have voiceless or voiced codas. Some examples follow in 319–337.

(319) PDH **wə̆ːp* ‘tumor’ > Dâw ‹woop› *wə̆ːp* || Yuhup ‹wóp› *wə̂p* ‘hernia in the groin or testicles’ || Hup ‹wòp› *wə̀p* ‘a kind of cyst’
(320) PDH **jə̆ːp* ‘*anujá* fish (*Trachycorystes galeatus*)’ > Dâw ‹yoop› *yə̆ːp* || Yuhup ‹yóp› *jə̂p* || Hup ‹yòp› *djə̀p* ‘fish sp. (~ 20 cm long; similar to the *daquiru* fish)’
(321) PDH **k’ə̆ːt* ‘leaf’ > Dâw ‹bee keet› *bə̂ː-k’ə̂ːt* || Yuhup ‹su’-keét› *tʃuʔ-kə̰̆ə̰̂t* || Hup ‹suk’èt› *tʃukə̰̀t*, ‹k’èt› *kə̰̀t* ~ ‹k’ét› *kə̰́t*[52]
(322) PDH **wə̆̀ˌːt* ‘bird’ > Dâw ‹tâwâat› *tɤ̆-wɤ̆̂ːt* || Yuhup ‹wə́t› *wə̂t* || Hup ‹wə̀t› *wə̆t* ‘plain-breasted ground dove’[53]
(323) PDH **ɓə̆ːk* ‘bunch, cluster’ > Dâw ‹baak› *bə̆ːk* || Yuhup ‹baák› *bə̰̆ə̰̂k* || Hup ‹b’àk› *mbə̰̀k*
(324) PDH **tə̆ːk* ‘resin, sap’ > Dâw ‹taak› *tə̆ːk* ‘rubber’ || Yuhup ‹ták› *tə̂k* || Hup ‹tàk› *tə̆k*
(325) PDH **wə̆́ˌːk* ‘*caatinga* (place with semi-arid vegetation)’ > Dâw ‹wâak› *wɤ̆̂ːk* || Yuhup ‹wə́k› *wə̂k* || Hup ‹wə̀k› *wə̆k*
(326) PDH **k’ŭːk* ‘bundle, beam’ > Dâw ‹kuuk› *k’ŭːk* || Yuhup ‹kúk› *kûk*[54] || Hup ‹k’uk› *kṵk*[55]
(327) PDH **ɓə̆ːʔ* ‘cassava bread’ > Dâw ‹baa’› *bə̆ːʔ* || Hup ‹b’à’› *mbə̰̆ʔ*
(328) PDH **ɓŏːʔ* ‘peacock bass’[56] > Dâw ‹bôo’› *bŏːʔ* || Yuhup ‹bö́’› *bô̰ʔ* || Hup ‹b’ö̀’› *mbò̰ʔ*
(329) PDH **hŏːh* ‘white-throated tinamou’ > Dâw ‹hôoh› *hŏːh* || Hup ‹moh-hồh› *mə̃h-hŏh*
(330) PDH **dŭːç* ‘*timbó* vine’ > Dâw ‹duus› *dŭːʃ*[57] || Yuhup ‹duúç› *dṵ̂ç* || Hup ‹d’ùç› *ndṵ̀jh*
(331) PDH **ʔə̆́ːç* ‘golden-backed uakari’ > Dâw ‹ẽes› *ʔɛ̆̃ːʃ* || Yuhup ‹ə́ç› *ʔə̰̆́ç* || Hup ‹ə̃ç› *ʔə̰̆́jh*
(332) PDH **tə̆̃ːh* ‘larva’ > Dâw ‹tõor› *tə̆̃ːh* ‘maggot’ || Yuhup ‹mín-tə́h› *mḭ̃n-tə̰̂h* ‘caterpillar sp. (edible)’, ‹saak-tə́h› *tʃə̰̆ə̰̀k-tə̰̂h* ‘caterpillar sp.’ || Hup ‹tə̀h› *tə̰̆̀h* ‘edible caterpillar’
(333) PDH **hŏːh* ‘white-throated tinamou’ > Dâw ‹rôor› *hŏːh* || Hup ‹moh-hồh› *mə̃h-hŏh*
(334) PDH **pŭːh* ‘king vulture’ > Dâw ‹puur› *pŭːh* || Hup ‹wã’-pùh› *wə̃ʔ-pŭh*
(335) PDH **wə̆́ˌːd* ‘food’ > Dâw ‹weed› *wɛ̆ːd* || Yuhup ‹wén› *wə̂dn* || Hup ‹wèd› *wə̆dn*
(336) PDH **ʔɤ̆̀ˌːg* ‘*caxiri* beverage’ > Dâw ‹âag› *ʔɤ̆̂ːg* || Yuhup ‹ə́g› *ʔə̂gŋ* || Hup ‹ə̀g› *ʔə̆gŋ*
(337) PDH **nə̆̃ːm* ‘*curare* poison for arrows’ > Dâw ‹nãam› *nə̆̃ːm* || Hup ‹nàm› *nə̆̃m*

At least in Dâw and Hup, inherited CV-shaped morphemes do not show length or tonal contrasts: in Dâw, they are long and receive falling tone (Martins 2004: 83); in Hup, they are invariably lengthened and take falling tone (Epps 2005: 81), though loanwords may take rising

[52] Quite unexpectedly, Epps (2005: 210) documents a high tone in this noun: ‹tɨh k’ét› *tɨ́h=kə̰́t* ‘its leaf’. The expected rising tone is documented in Ramirez (2005: 99, 171).

[53] In Hup, an unclear variant ‹wồt› *wŏt* has also been documented (Ramirez 2005: 204).

[54] The absence of laryngealization in the Yuhup reflex, as attested in Silva & Silva (2012: 509), is unexpected.

[55] This noun is only ever attested in the unstressed position (see examples in Ramirez 2005: 109; Epps 2005: 610), hence its underlying tone is unknown. I predict that it has a rising tone when stressed (i.e., when preceded by a third-person singular possessor *tɨ́h=* or a numeral).

[56] This etymon is known to be a Tukanoan loanword (compare Ye’pâ-masa ‹bu’ú› ‘peacock bass’; Ramirez 2019 [1997]), but it must have been present already in PDH given the existence of reflexes in all daughter languages which show regular correspondences).

[57] This form is documented in Martins (2004: 40). Epps *et al.* (2018) unexpectedly attest this noun with falling tone, which is otherwise claimed to be impossible in native vocabulary before a voiceless stop (Martins 2004: 83).

tone. Their Yuhup cognates typically show rising tone. In other words, in Dâw such morphemes behave like other morphemes with falling tone, whereas in Yuhup and Hup they behave like the toneless morphemes of PDH (except for the automatic vowel length in Hup). I believe that Dâw is more conservative in this regard, because some CV-shaped morphemes display vowel correspondences that lack a short version (e.g., 32, 128, 213). Some examples follow in 338–343.

(338) PDH **c'ɔ̂ː* 'flower' > Dâw ‹çoo› *c'ɔ̂ː* || Yuhup ‹soo› *tʃo̲ɔ̆* || Hup ‹s'ó› *tʃo̲ː*
(339) PDH **cûː* 'coati' > Dâw ‹suu› *ʃûː* || Yuhup ‹su› *tʃũ* || Hup ‹su› *tʃûː*
(340) PDH **tûː* 'below, on the ground' > Dâw ‹tuu› *tûː* || Yuhup ‹tu› *tŭ* || Hup ‹tú› *tûː*
(341) PDH **hm̂̊ː* 'game animal' > Dâw ‹rũu› *hm̂̊ː*[58] || Yuhup ‹hũ› *hm̆̊* || Hup ‹hḿ̊› *hm̂̊ː*
(342) PDH **jæ̂̃ː* 'non-venomous snake' > Dâw ‹yẽe› *ɲæ̂̃ː* 'boa' || Yuhup ‹yẽ› *ɲæ̆̃* || Hup ‹yḗ› *njæ̂̃ː*
(343) PDH **kêˀ₂ː* 'feather, wing' > Dâw ‹xêe› *xêː* || Yuhup ‹kë› *kĕ* || Hup ‹kḗ› *kêː* 'wing'

In verbs, only Dâw shows length/tonal distinctions, whereas in Yuhup and Hup have largely lost them, since tone in verbs almost always conveys grammatical information. One exception is the apprehensive mood in Hup, where verbs do show lexical tonal distinctions (Epps 2005: 84–85), but I have been unsuccessful to derive these distinctions from PDH, and at any rate only a small number of verbs are attested in the apprehensive mood in Hup. In this paper, verbal roots (including stative verbal roots, glossed in English as adjectives) are always given with rising tone in Yuhup and with falling/high tone in Hup.

In 344–350, I give examples of CVC-shaped toneless verb roots in PDH.

(344) PDH **cɘ₁k* 'to peel, to whittle' > Dâw ‹sâk› *ʃɤk* 'to peel' || Yuhup ‹säk› *tʃə̃k* 'to peel, to weed, to whittle' || Hup ‹sák› *tʃə́k* 'to whittle'
(345) PDH **c'ɘ₁k* 'to jump' > Dâw ‹çâk› *c'ɤk* || Yuhup ‹sääk› *tʃo̲ə̆k* || Hup ‹s'ák› *tʃo̲k*
(346) PDH **kɨʔ* 'sticky, to stick' > Dâw ‹xʉ'› *xuɨʔ* 'to stick' || Hup ‹kɨ́'› *kɨ́ʔ*
(347) PDH **t.ʔɔx* 'to run' > Dâw ‹ox› *ʔɔx* || Yuhup ‹tooh› *to̲ɔ̆h* || Hup ‹to'óh› *tɔʔɔ́h*
(348) PDH **tok* 'to pound' > Dâw ‹tôk› *tok* || Yuhup ‹tök› *tŏk* || Hup ‹tők› *tók*
(349) PDH **pog* 'big' > Dâw ‹pôg› *pog* || Yuhup ‹pög› *pŏgŋ* || Hup ‹pőg› *pôgŋ*
(350) PDH **poʔ* 'open, to open' > Dâw ‹pô'› *poʔ* 'to open' || Yuhup ‹pö'› *pŏʔ* 'open' || Hup ‹pő'› *póʔ* 'to open'

In 351–355, I give examples of CVC-shaped verb roots in PDH with falling tone. All of them have a voiced coda or **h*.

(351) PDH **jɔ̂ːɻ* 'to peel' > Dâw ‹yooj› *jɔ̂ːɻ* 'to skin' || Yuhup ‹yoj› *jŏɻŋ* || Hup ‹yój› *djɔ̂jdn*
(352) PDH **tə̂₁ːw* 'angry' > Dâw ‹tâaw› *tɤ̂ːw* || Yuhup ‹täw› *tə̆w* || Hup ‹tắw› *tə̂w*
(353) PDH **tɔ̂ːw* 'to carry in one's arms' > Dâw ‹toow› *tɔ̂ːw* || Yuhup ‹tow kã'› *tɔw-kə̃ʔ* || Hup ‹tów› *tɔ̂w* 'to carry on a stick distributed between two people's shoulders'
(354) PDH **k'ûːn* 'to weave (a basket)' > Dâw ‹kuun› *k'ûːn* 'to weave (*aturá* basket)' || Yuhup ‹kuun› *ku̲ŭdn* 'to make baskets (from vine)' || Hup ‹k'úd› *kû̲dn* 'to weave (a basket)'
(355) PDH **bə̂₁ːh* 'to spill (liquid)' > Dâw ‹bâa› *bɤ̂ː* || Yuhup ‹bääh› *bo̲ə̆h* || Hup ‹b'ắh› *mbó̲h*

In 356–365, I give examples of CVC-shaped verb roots in PDH with rising tone. These typically have voiceless codas, but some examples with voiced codas are also known.

[58] This form is documented in Martins (2005: 232). Epps *et al.* (2018) unexpectedly attest this noun with rising tone, which is otherwise claimed to be impossible in CV-shaped morphemes by Martins (2004: 69).

(356) PDH **c'ǣ̆:n* 'to caress, to hug affectionately' > Dâw ‹çẽen› *c'ɛ̃̌:n* 'to caress, to please' || Hup ‹s'én› *sǣ̆n* 'to hug affectionately'
(357) PDH **tǒ:j̰* 'to carry on one's head or neck' > Dâw ‹tôoy'› *tǒ:jˀ* 'to carry on one's neck' (compare ‹tôoy'› *tô:j* 'to carry on one's shoulder or head') || Yuhup ‹töy'› *tǒjˀ* 'to heap' || Hup ‹hitőy'› *hi-tôjˀ* 'to carry on one's head'
(358) PDH **cə̌₁:p* 'thin' > Dâw ‹sâap› *ʃɤ̌:p* || Hup ‹sắp› *tʃə́p*
(359) PDH **c'ǔ:k* 'to itch' > Dâw ‹çuuk› *c'ǔ:k* || Yuhup ‹suuk› *tʃṵ̌k* || Hup ‹s'úk› *tʃṵ́k*
(360) PDH **kə̌₁:k* 'to pull' > Dâw ‹xâak› *xɤ̌:k* || Yuhup ‹käk› *kə̌k* || Hup ‹kắk› *kə́k*
(361) PDH **wə̌₁:ʔ* 'to hear' > Dâw ‹wâa'› *wɤ̌:ʔ* || Hup ‹wắ'› *wə́ʔ*
(362) PDH **tə̌₁:ʔ* 'to make fire, to put on fire' > Dâw ‹tâa'› *tɤ̌:ʔ* || Yuhup ‹tä'› *tə̌ʔ* 'to rekindle' || Hup ‹tắ'› *tə́ʔ*
(363) PDH **nɔ̃̌:ʔ* 'to give' > Dâw ‹nõo'› *nɔ̃̌:ʔ* || Yuhup ‹no'› *nɔ̃̌ʔ* 'to give, to sell' || Hup ‹nó'› *nɔ̃́ʔ*
(364) PDH **jǔ:ʔ* 'hot' > Dâw ‹yuu'› *yǔ:ʔ* 'hot; year' || Hup ‹yú'› *djúʔ* 'to burn (paper, litter)'
(365) PDH **wǎ:h* 'unripe, semi-ripe' > Dâw ‹waar› *wǎ:h* 'unripe' || Hup ‹wàh› *wǎ:h* 'semi-ripe'

In 366–368, I give examples of CV-shaped verb roots in PDH. These invariably have vowel length and falling tone in Dâw, and I assume this was already the case in PDH.

(366) PDH **tɔ̂:* 'dry (of wood)' > Dâw ‹too› *tɔ̂:* || Yuhup ‹to› *tɔ̌* 'to dry or to get burnt (in the sun)' || Hup ‹tó› *tɔ̂:*
(367) PDH **cô:* 'happy' > Dâw ‹sôo› *ʃô:* || Yuhup ‹sö› *tʃő* 'to have a rest' || Hup ‹hisöső› *hi-tʃo-tʃô:*
(368) PDH **pû:* 'to get wet'[59] > Dâw ‹puu› *pû:* 'to soak (e.g., flour, rice, beans)' || Hup ‹pú› *pû:*

Tonal suprafixes are used to derive nouns from verbs in all Dâw–Hup languages. Dâw employs the rising tone for this purpose (Martins 2004: 516), Yuhup uses the falling tone (Silva & Silva 2012: 101), whereas Hup uses the rising tone (Epps 2005: 86), though exceptions do exist. In addition, Dâw uses tonal suprafixes for changing valency, and deriving verbs from nouns, processes that must have been present already in PDH. For this reason, some apparent irregular correspondences between tones can be plausibly ascribed to the derivational history of individual nouns. Consider the data in 369–372. The Yuhup noun for 'shaman' has an unexpected talling tone, which does not match the evidence from Dâw or Hup, revealing its deverbal origin. Similarly, the Yuhup and Hup noun for 'achiote' point to a long vowel in PDH, suggesting that they may have in fact been derived from the verb **hə̌₁:w*.

(369) PDH **cɘw* 'shaman' > Dâw ‹sâw› *ʃɤw* || Hup ‹sắw› *tʃə̂w*
(370) PDH **cɘw* 'to be a shaman, to practise shamanism' > Dâw ‹sâw› *ʃɤw* || Yuhup ‹säw› *tʃə̂w* 'to practise shamanism' → ‹sắw› *tʃə̂w* 'shaman' || Hup ‹sắw› *tʃə̂w*
(371) PDH **hɘw* 'achiote' > Dâw ‹râw› *hɤw*
(372) PDH **hə̌₁:w* 'to be painted with achiote' > Dâw ‹râaw› *hɤ̌:w* 'to be red' || Yuhup ‹häw› *hə̌w* 'to paint oneself with achiote' → ‹hắw› *hə̂w* 'achiote' || Hup ‹hắw› *hə̂w* 'to be painted with achiote' → ‹hằw› *hə̌w* 'achiote'

Some exceptions to the general rule remain that cannot be plausibly attributed to tonal suprafixes. In a handful of etymologies, Dâw points to a short vowel in PDH, whereas Yuhup

[59] This etymon is known to be a Tukanoan loanword (compare Ye'pâ-masa ‹puû› 'to get wet'; Ramirez 2019 [1997]), but it must have been present already in PDH given the existence of reflexes in Dâw and Hup which show regular correspondences.

and Hup point to a long vowel, as shown in 373–378. At least in 378, the vowel length must have been irregularly lost in Dâw, since the vowel correspondence in question is not normally found in morphemes with short vowels.

(373) (?) PDH **c'um ~ *c'u:m* 'euphonia sp.' > Dâw ‹çum› *c'ubm* || Yuhup ‹suúm› *tʃu̱ûbm* 'short-tailed pygmy tyrant' || Hup ‹s'ùb› *tʃŭ̱bm*
(374) (?) PDH **ɓɔʔ ~ *ɓɔ̆ːʔ* 'gourd bowl' > Dâw ‹bo'› *bɔʔ* || Yuhup ‹boó'› *bɔ̱ɔ̱ʔ* || Hup ‹b'ò'› *mbɔ̱̆ʔ*
(375) (?) PDH **tɔç ~ *tɔːç* 'fart' > Dâw ‹tos› *tɔʃ* || Yuhup ‹tóç› *tɔ̂ç* || Hup ‹tóç› *tɔ́jh* 'to fart'
(376) (?) PDH **k'ɔh ~ *k'ɔːh* 'insect egg, maggot' > Dâw ‹kor› *k'ɔh* 'egg of a bee or a wasp' || Hup ‹k'òh› *kɔ̱̆h* 'maggot'
(377) (?) PDH **pux ~ *pŭːx* 'foam' > Dâw ‹pux› *pux* || Yuhup ‹púh› *pûh* || Hup ‹pùh› *pŭh*
(378) PDH **jə$_2$ːw* 'nine-banded armadillo' > Dâw ‹jâw› *jɤw* 'nine-banded armadillo' || Yuhup ‹yếw› *jêw* 'greater long-nosed armadillo' || Hup ‹yề̆w› *djĕ̆w* 'greater long-nosed armadillo, nine-banded armadillo'

In several other etymologies, by contrast, Dâw points to a long vowel in PDH, whereas Yuhup and Hup point to a short vowel. This is exemplified in 379–382.

(379) (?) PDH **p.pĭːn ~ *p.pi$_1$n* 'great kiskadee' > Dâw ‹piin› *pĭːdn* || Yuhup ‹pipin› *pipĭdn*
(380) (?) PDH **ɓâːw ~ *ɓaw* 'venomous snake sp.' > Dâw ‹baaw› *bâːw* 'rattlesnake' || Yuhup ‹baaw› *bɑ̱ɑ̱̆w* || Hup ‹b'áw› *mbɑ̱̂w* 'pit viper (*Bothrops spp.*)'
(381) (?) PDH **ʔâːj ~ *ʔãj* 'woman' > Dâw ‹ãay› *ʔâːj* || Yuhup ‹ãy› *ʔãj* || Hup ‹ấy› *ʔẫj*
(382) (?) PDH **mɔ̃ːh ~ *mɔ̃h* 'lake, stagnant water' > Dâw ‹mõo› *mɔ̃ː* 'lake' || Yuhup ‹moh› *mɔ̃̆h* 'lake (away from the river bed)' || Hup ‹móh› *mɔ̃́h*

In 383–384, Yuhup, but not Hup, agrees with Dâw, pointing to a PDH long vowel. Hup, however, shows falling/high tone. Note that these two nouns form a semantic field.

(383) PDH **tôːg* 'daughter' > Dâw ‹tôog› *tôːg* || Yuhup ‹tố̆g› *tôgŋ* || Hup ‹tố̆g› *tôgŋ*[60]
(384) PDH **tæ̂ːʔh* 'son' > Dâw ‹tee› *têː* || Yuhup ‹tếh› *tæ̂̆h* || Hup ‹tếh› *tǽh* 'son, fraternal nephew, offspring'[61]

In 385–388, Hup agrees with Dâw, pointing to a PDH long vowel. Yuhup, however, unexpectedly shows rising tone, according to Silva & Silva's (2012) attestations. Possible explanations include borrowing from Hup, incorrect transcriptions, or true irregular change.

(385) PDH **dõːp* 'oropendola, cacique' > Dâw ‹dôop› *dŏːp* || Yuhup ‹döö̆p› *dɔ̱̆ɔ̱̆p* || Hup ‹d'ò̆p› *dɔ̱̆p*
(386) PDH **tŭːn* 'nocturnal curassow' > Dâw ‹tuun› *tŭːdn* 'curassow sp.' || Yuhup ‹moytun› *mɔ̃j-tŭdn* || Hup ‹moytùd› *mɔ̃j-tŭdn*
(387) PDH **jŭːh* 'frog sp.' > Dâw ‹yuur› *jŭːh* || Yuhup ‹yuh› *jŭh* || Hup ‹yùh› *djûh* 'frog (large, gray, lives in lakes or on land, edible)'
(388) PDH **ɓŭːk* 'vine sp.' > Dâw ‹buuk› *bŭːk* || (?) Yuhup ‹buuk› *bu̱ŭ̱k* 'fruit sp.' || Hup ‹b'ùk› *mbŭ̱k* '*apuí* vine (*Clusia spp.*)'

Only a few etymologies involve exceptional tonal development, however. The correspondence patterns identified in this section are quite robust. An important question for compara-

[60] The expected rising tone in this noun is in fact attested once in Epps (2005: 202), but elsewhere Epps (2005) documents the same noun with falling tone.

[61] A possible explanation for the divergent tone in Hup is that it could be back-derived from the homonymous verb 'to be pregnant (of animals)' (Epps 2005: 181).

tive Naduhup studies is whether tone existed in Proto-Dâw–Hup at all, given that no tonal contrasts are reconstructed in CV-shaped morphemes as well as in morphemes with a voiceless coda (except **h*). In fact, Barboza (2016) posits a binary opposition between high-toned morphemes (my short vowels) and rising-toned morphemes (my long vowels), and claims that the tonal distinction found in Dâw is secondary. Considering that a contrast is reconstructed in morphemes with voiced codas, one is tempted to assume that it may have originally existed in morphemes with voiceless codas as well, but the combination of the falling tone and a voiceless coda must have been eliminated in some way (either by altering the tone or by voicing the coda). For the time being, the issue remains open.

6. Additional etymologies

In this section, I present some additional etymologies that were not discussed in **2–5**. I start by presenting cognate sets that lack known reflexes either in Dâw or in Yuhup–Hup, but that must have existed in Proto-Dâw–Hup, since cognates have been identified in Nadëb.

The etymologies in 389–404 are only represented in Yuhup and/or Hup, but not in Dâw. They are securely reconstructed to PDH because there are external cognates in Nadëb. In 403, Yuhup points a long vowel, and Hup to a short one, just like in 383–384.

(389) PDH **ʋa(:)t* ‘to visit, to walk’ > Yuhup ‹wat› *wăt* ‘to visit’ || Hup ‹wát› *wát* ~ Nadëb ‹-wät› *-wʌt* (non-indicative ‹-wäd› *-wʌd*) ‘to move’ (Weir 1984: 165)

(390) PDH **k’ap* ‘fish sp.’ > Hup ‹k’áp› *k’áp* ‘*piaba* fish sp. (~ 5 cm long)’ ~ Nadëb ‹gäb› *k’ʌb* ‘cardinal tetra’ (Weir 1984: 190)

(391) PDH **k’ɘh ~ *k’ɘ̆₁:h ~ *ke₁(:)h* ‘sweet’ > Yuhup ‹kääh› *kg̰g̰h* || Hup ‹k’ấh› *kg̰h* ~ Nadëb ‹-gëëh› *-k’ə:h* (Weir 1984: 66)

(392) PDH **kɘ̆₁:ʔ ~ *kĕ₁:ʔ* ‘bone, leg’ > Yuhup ‹kấ’› *kâʔ* ~ Nadëb ‹k’ëë› *kg̰:* ‘stem (of manioc)’ (Weir 1984: 154), ‘bone’ (Martins 2005: 278)

(393) PDH **w.hɘ̆₁:h ~ *w.he₁:h* ‘old woman’ > Yuhup ‹wähấh› *wəhâh*, ‹wähäh› *wəhăh* ‘to become old (of women)’ ~ Nadëb ‹wahëh› *wahəh* ‘old (pl.)’ (Weir 1984: 152)

(394) PDH **cɔ:w* ‘to shoot with a blowgun’ > Yuhup ‹sow› *tʃɔ̆w* || Hup ‹sów› *tʃɔ̂w* ~ Nadëb ‹-sóóm› *-ʃɔ:bm* (non-indicative ‹-sóów› *-ʃɔ:w*) ‘to shoot with a blowgun’ (Weir 1984: 240, 310)

(395) PDH **ʔɔ:j* ‘pulp-like, ashes’ > (?) Yuhup ‹oy› *ʔɔ̆j* ‘to chew’ || Hup ‹óy› *ʔɔ̂j* ‘peach palm fruit pulp, grated manioc’, ‹tëg-óy› *tegŋ-ʔɔ̂j* ‘ashes’ ~ Nadëb ‹ooj› *ʔo:j* (Roçado dialect), ‹óój› *ʔɔ:j* (Rio Negro dialect) ‘ashes’ (Martins 2005: 321)

(396) PDH **xɔ̂: ~ *hɔ̂:* ‘liver’ > Yuhup ‹ho› *hɔ̆* || Hup ‹hó› *hɔ̂:* ~ Nadëb ‹hooh› *ho:h* ‘liver’ (Barbosa 2005: 27)

(397) PDH **nɔ̃h-cug* ‘beard’ > Yuhup ‹noh-sug› *nɔ̃h-tʃŭgŋ* ‘stalk of a fruit or a leaf’ || Hup ‹noh-súg› *nɔ̃h-fûgŋ* ~ Nadëb ‹nasuuk› *nãʃu:k* ‘beard’ (Barbosa 2005: 44)

(398) PDH **ɓu(:)j(-tɔk)* ‘ear’ > Yuhup ‹buy-tok› *bujtɔ̆k* ~ ‹buy-rok› *bujɾɔ̆k* || Hup ‹b’otók› *mbg̰tɔ́k* ~ ‹b’orók› *mbg̰ɾɔ́k* ~ Nadëb ‹nabuuj› *nãbu:j* ‘ear’ (Barbosa 2005: 26)

(399) PDH **xæ₂:g ~ *hæ₂:g* ‘Southern American bushmaster’ > Yuhup ‹hég› *hæ̂gŋ* || Hup ‹hèg› *hæ̂gŋ* ~ Nadëb ‹haak› *ha:k* ‘Southern American bushmaster’ (Barbosa 2005: 38)

(400) PDH **k’î₂: ~ *k’î₂:* ‘mosquito’ > Yuhup ‹kii› *kg̰ɨ̰* || Hup ‹k’í› *kĝ̰:* ~ Nadëb ‹gɨɨj› *k’ɨɨj* ‘mosquito’ (Weir 1984: 81)

(401) PDH **tuʔ* ‘to be in water’ > Yuhup ‹tu’› *tŭʔ* || Hup ‹tú’› *túʔ* ~ Nadëb ‹-tu› *-tu* ‘to be in water (sg.)’ (Weir 1984: 141)

(402) PDH **jɨ$_2$ʔ ~ *jiːʔ* ‘man, male’ > Yuhup ‹yí’› *jĭʔ* || Hup ‹tiyì’› *ti-jĭʔ* ~ Nadëb ‹aj’yy› *ʔajɨ̲ː* (pl. ‹ajyy› *ʔajɨ̲ː*) ‘man’ (Epps & Obert 2021: 258)

(403) PDH **ʔĩːn* ‘mother’ > Yuhup ‹ín› *ʔı̂n* || Hup ‹ín› *ʔı̂n* ~ Nadëb ‹-’ÿỹn› *ʔɨ̃ːn* ‘mother’ (Weir 1984: 151)

(404) PDH **c’.c’ɨb ~ *c’.c’i$_1$b* ‘insect sp.’ > Yuhup ‹sisiim’› *tʃɨtʃɨ̲ɨ̲b* ‘mosquito sp.’ || Hup ‹s’is’ɨ̀b’› *tʃɨ̲tʃɨ̲p* ‘fly sp. (tiny, with red head)’ ~ Nadëb ‹watsyb› *wac’ɨb* ‘biting midge’ (Barbosa 2005: 35)

The etymologies in 405–409 are only represented in Dâw, but not in Yuhup or Hup. They are securely reconstructed to PDH because there are external cognates in Nadëb.

(405) PDH **k’âːw* ‘to fell trees; cultivated field’ > Dâw ‹kaaw› *k’âːw* ~ Nadëb ‹-gääm› *-k’ʌːbm* (non-indicative ‹-gääw› *-k’ʌːw*) ‘to fell trees’, ‹-gääw› *-k’ʌːw* ‘cultivated field’ (Weir 1984: 40)

(406) PDH **c’âːj* ‘frog sp.’ > Dâw ‹çaay› *c’âːj* ~ Nadëb ‹ts’ääj› *c’ɻ̲ːj* ‘frog sp.’ (Martins 2005: 230)

(407) PDH **tɨm* ‘eye’ > Dâw ‹tɯm› *tɯbm* ~ Nadëb ‹matym› *mãtɨbm* (incorporated ‹ty› *tɨ*) ‘eye’ (Weir 1984: 298)

(408) PDH **kɔm* ‘buttress root’ > Dâw ‹xom› *xɔm* ~ Nadëb ‹kóm› *kɔbm* ‘root’ (Martins 2005: 315)

(409) PDH **coʔ* ‘to take out’ > Dâw ‹sô’› *ʃoʔ* ~ Nadëb ‹-sok› *-ʃok* ‘to take out (pl.)’ (Weir 1984: 289)

Some etymologies present irregularities of kinds not considered above, such as correspondences between a stop and a nasal (410), between a fricative and a stop (411), between unrounded and rounded vowels (412), between glottal and palatal fricatives in addition to an irregular vowel correspondence (413), between plain and glottalic/glottalized consonants in different positions (414), ot involve multiple irregularities (415–416). They may involve irregular change, horizontal transmission, or simply turn out to be flawed comparisons. Note that 414 is similar to forms found in some Tupian languages of the upper basins of the Madeira and Tapajós Rivers, which do not show regular correspondences among themselves, and cannot be of Tupian origin: Sakurabiat ‹siokweet› *tsiokʷɛːt* ‘toucan’ (Costa 2020: 135), Akuntsu *jõkʷɛt* ‘toucan’ (Aragon 2008: 35), Kawaiwete ‹sokwet› *sɔkʷɛt* ‘toucan’ (Weiss 2005: 101).

(410) (?) PDH **dĩ$_1$p ~ *dĩ$_1$m* ‘to disappear’ > Dâw ‹’nũp› *ˀnũp* || Yuhup ‹niim› *nɨ̲ĩ̲m*

(411) (?) PDH **bi$_2$ç ~ *bi$_2$c* ‘bird sp.’ > Dâw ‹bis› || Yuhup ‹biis› *bɨ̲ĭ̲c* ‘silver-beaked tanager’ || Hup ‹b’ís› *bı̂jt* ‘tanager’

(412) (?) PDH **mı̃ːn ~ *mũːn* ‘*caatinga* (place with semi-arid vegetation)’ > Dâw ‹mũun› *mũːn* || Hup ‹mùn› *mŭn* (cf. also ‹mumún› *mũmũ̆n* ‘id.’)

(413) (?) PDH **wãh ~ *wÃh ~ *wÃç* ‘pigeon’ > Dâw ‹wẽr› *wẽh* || Yuhup ‹wẽh› *wẵh* || Hup ‹wẽ́ç› *wẵjh*

(414) (?) PDH **c’okwe$_1$t ~ *cɔke$_1$t ~ *cɔk’e$_1$t ~ *cɔkɯ̲e$_1$t* ‘toucan’ > Dâw ‹çôkwêt› *c’okwet* || Yuhup ‹sokät› *tʃɔkɔ̆t* || Hup ‹säk’ät› *tʃəkɻ̲t* ~ ‹sokw’ät› *tʃɔkwɻ̲t*

(415) (?) PDH **côːŋ ~ *j.jôːgŋ ~ *mu-c’ôːŋ ~ *mu-jôːŋ* ‘elbow’ > Dâw ‹sôogn› *ʃôːgŋ* || Yuhup ‹yöyŏg› *jojôgŋ* || Hup ‹bus’àg› *mbutʃɻ̲gŋ* ~ ‹bus’òg› *mbutʃɻ̲gŋ* ~ ‹bös’òg› *mbotʃɻ̲gŋ* ~ ‹buyòg› *mbujɻ̲gŋ*

(416) (?) PDH **c’ĭ̆ːc’ ~ *c’ĭ̆ːd ~ *c’ĭ̆ːn ~ *c’ĭ̆ːɻ* ‘beetle sp.’ > Dâw ‹çĭinh’› *c’ĭ̆ːŋˀ* ‘*abacaba* palm beetle’ || Yuhup ‹siín› *tʃɨ̲ĭ̲dn* ‘scarab beetle’ || Hup ‹s’ìj› *tʃɨ̲ĭ̲jdn* ‘dung beetle’

7. Conclusion

In this paper, I have made an attempt at reconstructing the phonology and lexicon of Proto-Dâw–Hup, thus contributing to comparative studies of the Naduhup languages. I acknowledge that some decisions of mine need further reworking. In particular, a system of 45 nuclei is typologically surprising, and it is probable that future research will show that some of the vowel correspondences considered here are in complementary distribution, thus helping reduce the inventory; the optimal diachronic interpretation of what I symbolize by subscript digits and capital letters remains to be established. Another issue that requires further attention are the cases where Yuhup and Hup show nasality without any apparent source in PDH (the symbol ~ in my reconstruction is, of course, an *ad hoc* notation of a phenomenon whose nature is unclear). Finally, the fact that the tonal opposition of Dâw (and PDH) is only fully seen in morphemes with voiced codas and **h* is suspect. It remains to be determined whether the tones represent an innovation with regard to Proto-Nadahup (cf. Barboza 2016), or whether the tonal opposition had once been more robust.

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А. В. Никулин. Фонологическая реконструкция праязыка дыу–хупской группы

В статье рассматриваются звуковые соответствия между языками дыу, юхуп и хуп, составляющими группу надухупской языковой семьи (Южная Америка), и предлагается фонологическая реконструкция праязыка этой группы. Морфемы в прадыу–хупском чаще всего имеют форму */CVC/, но восстанавливаются и морфемы структуры */CV/, а также некоторое количество полутора- сложных и двусложных морфем. Прадыу–хупский консонантизм насчитывает 22 согласных, среди которых глухие и глоттализованные смычные, обычные и глоттализованные глайды, фрикативные, носовые, а также звонкие смычные. Что касается вокализма, обнаружено 45 рядов соответствий, противопоставленных в том числе по таким признакам, как долгота и назальность; некоторые из реконструированных гласных, возможно, были дифтонгами, а не монофтонгами. Для долгих гласных восстанавливается тональная оппозиция между восходящим и падающим тонами, однако оппозиция нейтрализуется перед большинством глухих финалей.

Ключевые слова: надухупские языки; сравнительно-исторический метод; фонологическая реконструкция.