

The Development of Proto-Oceanic *R in Kaiwa (Iwal)

Trey Lackey
University of Georgia

Abstract In a seminal text in the diachronic study of Oceanic languages, Malcolm Ross (1988: 141, 147) reports the sound change Proto-Oceanic *R > lk/_# in the language Kaiwa. A few lexical witnesses of this sound change are reported in that text, but otherwise it is not discussed in detail. Subsequent works that have mentioned Kaiwa have tended to implicitly reject the accuracy of this original claim or be ambivalent to it, but have continued to not address it in detail. This paper re-examines the literature discussing Kaiwa lexicon and phonology, provides some more apparent witnesses of this sound change, and ultimately concludes in favor of its historical veracity. The sound change is also discussed in the context of the wider history of Proto-Oceanic liquid phonemes in the Kaiwa lexicon, and we provide phonological motivation for the changes represented in this history.

Kaiwa, also known as Iwal, is an Oceanic language in the Southern Huon Gulf (SHG) subgroup (Ross 1988: 154–155) spoken by about 1,900 people in the Huon Gulf region of Papua New Guinea (Bradshaw 2001: 51). Unsurprisingly, being a language with such a small speaker base, located in such a region of the world, relatively little has been said about this language. However, what has been said presents many puzzles about the language’s historical structure; in particular, some aspects of the historical phonology are fairly obscure. Malcolm Ross was perhaps the first person to discuss this issue in his seminal text on Oceanic historical phonology more generally, the 1988 book *Proto-Oceanic and the Austronesian Languages of Western Melanesia*. Here he introduces Kaiwa among several other Oceanic languages spoken in the same region, and provides a summary of the correspondences from POc to these modern languages (Ross 1988: 132–133, 136–143). Among these correspondences, one stands out in particular as somewhat unusual: POc *R¹ to Kaiwa lk/_#, or to Kaiwa k/u_# (Ross 1988: 141). Later works however have been more ambivalent; when Kaiwa is mentioned this correspondence is implicitly rejected for some forms. For instance, while Ross initially claims that

¹Unless otherwise specified, all phonemes/forms preceded by a star are reconstructed Proto-Oceanic (POc) lexical items.

Kaiwa *tavulk* reflects a POc form *tapuRi ‘triton shell’ (Ross 1988: 147), the reflexes of this form listed in the *Proto Oceanic Lexicon Vol. 1* do not contain the Kaiwa form at all (Ross et al. 1998: 106–107), and in Vol. 4 the reconstruction *tapuRi for this lexical item has been revised to *tapuRiq, with Kaiwa still lacking presence (Ross et al. 2011: 183–184). Another volume of the Proto-Oceanic lexicon lists a lexical item for which the correspondence turns out to be affirmed, which we will discuss later on. *The Austronesian Comparative Dictionary* associates the Kaiwa form with the same POc *tapuRiq, but also presents a ‘doublet’ in POC *tapuRi (Blust & Trussel 2018). If the change reported in Ross 1988 is legitimate, then the form is under-determined: it could reflect either part of the doublet. Since the change is fairly notable it is worth discussing explicitly whether the data available today is in fact indicative that the final cluster -lk in Kaiwa, or the coda consonant -k, does indeed reflect POc *R in directly inherited vocabulary (because of the large number of different languages nearby, the effect of borrowing should not be ignored). This paper will provide more lexical data, as well as a closer examination of the lexical data in previously published work, to provide evidence for this sound change.²

One difficulty of identifying this correspondence is that there are a number of other historical processes evident in Kaiwa that remove *R from final position, produce reflexes that appear to be secondary, or delete the phoneme entirely. The result of this is that given a single environment for *R within a word in the proto-language, the actual reflex in the modern language could be one of several different things. The main cause of this variance is evidently the way that Proto-Oceanic prosody has developed in Kaiwa.

1 Proto-Oceanic prosody and ‘canonical’ word shapes in Kaiwa

The prosodic structure of Proto-Oceanic should be best understood in the context of Lynch’s 2000 article ‘Reconstructing Proto-Oceanic Stress’. As Lynch describes it, POc stress was determined by moraic structure: if the final syllable was heavy, it would receive stress; otherwise, stress occurred on the penultimate syllable (2001: 53). Being phonologically determined, this stress system would not be bound to a word stem, and so if a suffix is added, it may shift. On the way to Kaiwa,

²All lexical data, unless otherwise stated, comes from Bradshaw 2001, Ross 1988, or any of the five currently published volumes of the *Proto-Oceanic lexicon*, by Ross, Pawley, & Osmond (1998, 2007, 2008, 2011, 2016).

this mora-determined system seemed to have regularized into general penultimate stress, since vowels in final syllables are lost even when they would be heavy in POc, and thus stressed, for example in words like *mank* ‘bird’ < POc *manuk. Such a process lacks motivation unless these syllables had become unstressed at some point. In addition, pre-tonic unstressed syllables also lose their vowels, although this appears to be blocked if the syllable was the first in the word (this can be understood as initial cluster avoidance). Thus, given a word in POc of the ‘canonical’ form CVCV(C), we may see a few different word shapes in the modern language depending on the part of speech this word is, as it would have taken different morphology, and thus different syllables in the word would have been assigned stress in various forms.

The vast majority of the morphology on verbs explicitly indicating voice and transitivity, causatives, etc. appear to have been lost, but there is evidence that the most common transitivity suffix *-i has been retained as a fossilized element of some constructions. It also appears to have been inherited as part of some verb stems. The most obvious sign of the transitivity suffix is that when a transitive verb has a pronominal object, we occasionally find an intervening -i- between the verb stem and the object suffix (Bradshaw 2001: 59). Otherwise there is no obvious sign of it, but this shouldn’t be surprising since it would be unstressed. However, if we take a more careful look at the data, there are some indirect signs that it was inherited as a fossilized suffix on at least some verbs.

The first is when we have unexpected loss or lenition of certain consonants. The dorsal stops *k and *q are lost due to lenition in the vast majority of words, but this does not occur if they were word-final. Compare *qapuR ‘lime’ > *ap*, *kapuna ‘dog’ > *uvun*, *quma ‘garden’ > *um*, etc. to *nanaq ‘mucus’ > *nank*, *ñamuk ‘mosquito’ > *namk*, *mimiq ‘urinate’ > *miemk*. However, some verbs which are clearly transitive semantically and have final dorsal stops reflect them as null in the modern language, and sometimes show signs of stress shift. For instance, Kaiwa has the verb *vro* meaning ‘to plant’, and it is possible to reconstruct a POc verb of the form *pasok for the same meaning. If we assume it was inherited with the transitive suffix *-i, *pasoki > *vro* is actually a perfectly sound correspondence given what we know about the phonological history of the language. We also have a couple examples with coda *q: *punuq ‘hit’ > *vunu* ‘kill’³, *taRaqi ‘chop with an adze’ > *tle* ‘cut (down), e.g. a tree’. This example also shows a process of umlaut,

³We would expect initial vowel loss here, but it does not occur. The likely explanation for this is that *vunu* has lost its status as an inflected verb, and exists as a kind of ‘resultative’ particle in

with a shift *a > e in the environment of *i. In general, whenever we see a verb stem with an initial cluster, we should expect a reconstruction that is trisyllabic for the stem, so that the initial vowel is lost due to being unstressed. Since the vast majority of stems are basically disyllabic, this means that a verb with a complex onset was morphologically complex when it was inherited. For transitive verbs this would imply the presence of the *-i suffix.

Many nouns are also problematic for assessing Kaiwa, because if a noun was inalienably possessed, then it would obligatorily receive a suffix encoding the person of its possessor. These suffixes all had an initial consonant, which consequently eliminated the final consonant of the noun stem. Thus, for a noun like POc *nipon ‘tooth’, what we see in Kaiwa is a stem of the form *nivo-*, with no sign of the final consonant remaining. Thus, any inalienably possessed noun would also be unhelpful for evaluating the outcome of final *R in Kaiwa, since it would be regularly lost due to a more general process.

All in all, our best bet for identifying reflexes of final *R in Kaiwa will be nouns, excluding those that are inalienably possessed. This still leaves us the majority of the grammatical category, so fortunately these restrictions we have elaborated on so far are not so strict that we are unable to make any conclusions.

2 Interpreting the data

Despite these difficulties, words that have final *R or come to have final *R at some stage in the history of Kaiwa include some that are a part of fairly basic vocabulary, and because of this are often pretty well attested. The two that Ross identifies as diagnostic of the correspondence we are discussing are *tapuRi ‘triton shell, trumpet’, and *boR ‘pig’ (1988: 147). The latter word normally is reconstructed as *boRok, but the reflexes in the Huon Gulf area seem to indicate a monosyllabic, *R final form. For these lexical items we see *tavulk* and *bwelk* in Kaiwa, clearly indicating the idiosyncratic change of concern. We also have a lexical item not discussed by Malcolm Ross in that text, but seems to be a clear witness for the correspondence: Joel Bradshaw lists *luelk* ‘ant’, which is an obvious reflex of POc *loRo ‘large stinging red ant’ (cf. Ross et al. 2011: 391–392). This has a convenient parallelism with *boR, but more importantly, there is absolutely no evidence of a final consonant for this item, unlike the two earlier discussed. Even disregarding

constructions like *-as* NP *vunu* ‘to kill NP’. See Bradshaw (2001: 60) for more details. In any case, it still was evidently marked by *-i at some point, otherwise we would expect *vunk.

*tapuRi(q) for having multiple competing forms and *boR for being a unique development within the Huon Gulf subfamily, we still have at least one example of the correspondence with no formal or semantic issues.

There are other examples that allude to the veracity of this correspondence but do not represent it outright. As mentioned in the introduction, Ross also identifies a conditioned result *R > k/u_# for Kaiwa. Evidently he had correspondences like POc *niuR ‘coconut’ > Kaiwa *niuk* in mind. The problems with this claim are first of all that it does not produce the proper outcome for *tapuRi, and secondly that if we look at some other forms we can make a more general conclusion that explains this seemingly arbitrary conditioning in terms of a wider historical trend in the language. Kaiwa has words like *laik* ‘sail’ < POc *layaR and *ralk* ‘flooring’ < PMP *saleR⁴ that reflect *R as *-k* after a sonorant consonant, and *niuk* can be fit into this pattern if we understand the /u/ here as rather being /w/ (actually, it suffices to assume that this was the phonological structure of this and other words with vowel sequences just at the point when cluster reduction was applied). Then it can be explained by saying that Kaiwa has a constraint against codas of more than two consonants, and the middle consonant simply was either deleted or never formed as separate from the stop coda.

This corresponds closely with the other facts of Kaiwa’s phonotactics and the way that other words have resolved the problem of complex codas after unstressed vowels were lost. Indeed, the possible final clusters in the language seem quite restricted: the only ones possible are nasal followed by a corresponding voiced stop (i.e. /mp/, /nd/, and /ŋg/)⁵, or any of the sonorant consonants /w j l r m n ŋ/ followed by /k/ (Bradshaw 2001: 52). This is a far cry from the number of clusters that theoretically would have been available upon the loss of unstressed vowels. Correspondingly, we find a variety of different solutions to phonotactically unacceptable final clusters. For instance, if an expected final cluster would begin with an obstruent, the second consonant seems to simply be lost: *qabit ‘hold’ > *amb*, *qapuR ‘lime’ > *ap*. Similarly, clusters of multiple sonorants with each other

⁴This form can be found listed in the online *Austronesian Comparative Dictionary*, compiled by Robert Blust and Stephen Trussel (2018). *saleR has not been claimed to have any other Oceanic representatives, so no POc reconstruction is attempted, but formally and semantically this etymology is without issue.

⁵In Proto-Oceanic, voiced stops were categorically prenasalized; however, Kaiwa seems to lack prenasalization for a number of voiced stops, perhaps due to a shift like that of its neighbor Numbami (cf. Bradshaw 1978). This means that although synchronically they may be complex codas, this should not be taken as a development of increasing complexity, but rather a retention.

appear to have lost the second consonant as well: *qusan ‘rain’ > *ur*, *kuron ‘pot’ > *ul*, *kiRam ‘adze, axe’ > *il*. The correspondence *suRuq ‘soup’ > *ro-ruk* also appears to display consonant loss, in the opposite direction.⁶ Consonant clusters that are of the form sonorant+a stop other than /k/ are actually reflected with the stop shifted to the velar position: *malip ‘laugh’ is reflected as *malk*, and *qenop is reflected as (*y*)*engk* with the shift p > k (and apparently assimilation in the nasal consonant in the latter word). Note that /p/ by itself is an acceptable coda, e.g. in the word *lalip* ‘Canarium almond’, so this shift seems to be motivated by the context of a cluster. More lexical data will surely provide more information on these trends, but for now we can say that the evidence sufficiently points to a clear explanation for the form of *niuk*. In summary we have pretty good justification for accepting that *R > lk is in fact a real correspondence for Kaiwa, but there are some related issues that are worth discussing, such as how the behavior of other liquids in Kaiwa compares, and some phonological motivation for this rather strange and highly specific correspondence.

3 Did *r also undergo this change?

If we want to demonstrate that the history of *R in Kaiwa is distinctly interesting we need to demonstrate that this proto-phoneme was in fact preserved as distinct from other phonemes on the way to Kaiwa. The *Proto-Oceanic Lexicon Vol. 2* (Ross et al. 2007: 44) contains the claim that the Kaiwa word *gielk* ‘sea’ could derive from a POC *bwiker ‘beach, esp. sandy beach’. If this were the case then we would have a good example of final *r merging with *R towards the final -lk cluster. However, the data cited cannot demonstrate that the final consonant in this word should be reconstructed as *r rather than *R. See Table 1 for a reproduction of the data presented.

The Micronesian forms are the least helpful, because Micronesian regularly loses final consonants in general (Jackson 1983: 133). Even when *R is preserved, it sometimes merges with *r (ibid. p.316). Kwamera preserves most final consonants, but merges *R and *r: POC *ma-wiRi > *mour* ‘left (hand)’, *irip > *eri-eri* ‘to fan’

⁶Apparently reduplicated, although an alternate analysis is that clustering was simply avoided and there was some kind of assimilatory effect between /r/ from *s and the reflex of *R (the expected reflex is /l/ in a medial context). In either case this word is notable because it is counterevidence to the claim that *tavulk* and *bwelk* can be explained as the result of a pre-existing dorsal stop coda, because the reflexes don’t match up.

	POc	<i>*b^(w)iker</i>	‘beach, esp. sandy beach’
MM:	Bali	<i>bikere</i>	‘beach’
MM:	Bulu	<i>bike</i>	‘beach’
SV:	Kwamera	<i>nə-pəkər</i>	‘sand, sandy beach’
Mic:	Kiribati	<i>bike</i>	‘beach, sand, sand bank, sandy soil’
Mic:	Mortlockese	<i>ppɛ</i>	‘beach, sand’
Mic:	Puluwatese	<i>ppi</i>	‘sand, sand beach, sand spit’
Mic:	Ponopean	<i>pik</i>	‘sand’
		<i>pika-pik</i>	‘sandy’
Mic:	Woleaian	<i>pix(a)</i>	‘small island, islet’
	cf. also the following Huon Gulf terms:		
NNG:	Adzera	<i>ŋiʔ</i>	‘salt’
NNG:	Dangal	<i>ʔgik</i>	‘salt’
NNG:	Yabem	<i>g^weʔ</i>	‘sea’
NNG:	Kaiwa	<i>gielk</i>	‘sea’
NNG:	Hote (Misim)	<i>yek</i>	‘sea’
NNG:	Vehes	<i>yek</i>	‘sea’
NNG:	Patep	<i>yek</i>	‘sea’

Table 1 Table 1: reflexes of **bwiker* reported in Ross et al. (2007: 44).

[reduplicated] (Lynch 2001: 46). Finally, the Bali and Bulu forms are no more informative, since they are part of the Meso-Melanesian cluster, which apparently merged *r and *R before the break-up of individual languages (Ross 1988: 265).

There is also negative evidence for the merger, in that most languages of the SHG group would keep *R and *r distinct word finally, with the former becoming a dorsal stop (or in the case of Kaiwa, sometimes a cluster), and the latter maintaining its alveolar liquid quality. Bradshaw (2001: 55) contains a Kaiwa word *mankaruel* ‘cassowary’, an obvious reflex of **kasuari* (Ross et al. 2008: 288), with the *mank-* prefix being a ‘classifier’ for some bird names. We also have POC **muri* > *mul* ‘back of s.t.’ (Ross et al. 2007: 261). For other SHG languages, we have POC **[ni]nir* > Mapos (*i-nɛl* (ibid. p.84); POC **kori* > Mumeng (Patep) *kwel* ‘scrape’. These items clearly demonstrate that the normal reflex of *r is not velar in typical SHG languages. In conclusion, if the problems with the initial consonant can be set aside, **bwiker* cannot be the reconstruction for the attested forms, and we should rather reconstruct **bwikeR*.

4 Reflexes of liquids in other phonological environments

Contrary to what was outlined above, in non-final position we see a three-way merger between the liquids. *l simply remains the same regardless of position: *lapuka ‘breadfruit, Artocarpus’ > *lavuk*, *ŋalu(n) ‘waves’ > *ngal*, *liu ‘turn around’ + *mule ‘return’ > *lumol* ‘come back’. *r appears to merge with *l unconditionally: *rua ‘two’ > (ai)lu⁷, *muri ‘back of something’ > *mul*. *R also merges with both as /l/ everywhere except finally: *Rabia ‘sago’ > *labi*, *taRaq-i ‘cut (down)’ > *tle*, *waRisa ‘the day before yesterday’ > *walirik* ‘past’ (-ik is a deictic suffix appearing on many words with temporal reference, cf. Bradshaw 2001: 58). Note that the phoneme /r/ in Kaiwa is not a reflex of any of the POc liquids; it derives from *s, as in examples like POc *qusan > *ur*, POc *susu > *ruru-* (Bradshaw 2001: 52).

This three way merger in non-final position is notable because for Kaiwa’s closest relatives this is not the situation we see. These languages show dorsal reflexes for *R in all positions: a stop finally, and a voiced fricative elsewhere. Sometimes the fricative is fronted, depending on the following vowel, and seems to mostly be lost in Hote, but it is distinguished from *r pretty clearly: *ruRi ‘thorn’ > Mapos Buang *ru-ruk* (reduplicated), *Rumaq ‘house’ > Mapos Buang *humq*, Hote *uñak*; *Rabia ‘sago’ > Hote *yabi*. Kaiwa’s aberrant reflexes of *R and *r in word-final position indicate that it must have kept them separate for quite some time, and the question then is: why did they merge in almost every environment? The answer likely has to do with contact influence: although the linguistic history of Kaiwa places it closest to the Buang languages and Hote in the SHG group, Kaiwa speakers were evidently in close contact with Numbami speakers for quite some time, followed by relatively recent contact with the Northern Huon Gulf (NHG) languages, which has continued until today and has an element of stratification to it: Yabem, one of the NHG languages, was the language of missionaries in the area from 1907 onward (Bradshaw 2001: 51). This would obviously provide Yabem with a level of prestige in the Huon Gulf area. Both Numbami and the NHG languages do show general mergers of all of the POc liquids towards /l/, so given their close contact with Kaiwa and the prestige of the languages in the latter group, we would expect some degree of shift. Indeed, as Bradshaw reports in a footnote, some Kaiwa speakers in the 20th century regarded the (secondary) distinction between /l/ and /r/ in their own language as a defective mode of speech

⁷ *ai-* is a numeral prefix, cf. *aitol* ‘three’, *aivat* ‘four’.

in comparison to Yabem, which lacks the distinction.⁸ The history of liquids in Kaiwa would then be classified by a situation in which one of the rhotics shifted to a dorsal position, and then this dissimilarity between the liquids in the language was then reverted to a situation in which they were much more similar and then identical to each other. It would be a great asset if we had (relatively) early data for Kaiwa that would be before this merger occurred.

Earlier documentation does provide data to support this hypothesis. In the early 70s, probably partly in the late 60s as well, wordlists were created for a number of languages in the Morobe province of Papua New Guinea, including Kaiwa and all of its close relatives. Although when the vocabulary for these lists was gathered, there was no standard process for transcribing sounds (Hooley 1971: 108), the transcriber's phonetic intentions were fairly clear when they chose to use particular symbols rather than others. Thus, when we have a word containing <ɾ> or some variation of this symbol, we can assume that the person who wrote it probably meant to indicate that they heard a rhotic sound, such as a trill or flap. The Kaiwa wordlist has <mbweɾk> for the meaning 'pig', which appears to be an earlier form of the *buelk* we find in more contemporary sources, so the word-final reflex of *R had not shifted its sonorant component to a lateral in the early 70s. However, in this wordlist we have <nolik> for 'yesterday', which exactly matches the form in more contemporary sources, and can be traced back to *ñoRap 'yesterday' + ik, the suffix that we saw before on walirik. This means that in medial position the *R > l shift had evidently already occurred, at least for some lexical items. This provides us with some relatively precise information about the timeline of this shift. It must have been occurring during the middle of the 20th century, exactly when we would have predicted it to happen if it was due to contact influence from NHG languages like Yabem, and the shift was still not complete during the latter half of the 20th century, although less than two decades later in 1988 it had apparently completed for the lexical items we have identified as containing an etymological *R.

⁸Today there is a translation of the New Testament into Kaiwa, removing some degree of prestige from Yabem in a church context, but given the perception of the /ɾ/ vs. // distinction in Kaiwa as a defect one might ask whether an even further merger had occurred for any lexical items. No examples of this are known, but since the Bible is now translated into Kaiwa it is unlikely that this secondary merger will occur due to contact any time soon.

5 A phonological explanation for the correspondence

Another fact revealed by these earlier forms is that *R > lk/_# was not a singular change: thus far we have been referring to it as a correspondence to emphasize a more rigorously agnostic position on the actual history. To say something is an attested change is to say that in a productive way it is identifiable as a singular phonetic/phonological event, but for *R > lk/_# we can clearly see that this is not the case, and that a preceding shift *R > rk/_# must have occurred. But this is still somewhat unusual as a change, because it increases the complexity of the coda in a language that has other processes which clearly indicate constraints against complex codas. We may explain it as a combination of two phonological processes, one of which is very basic and commonly discussed, and one which is somewhat less discussed but is still important.

The first of these is ASSIMILATION, and more specifically word-final devoicing. Word-final devoicing is a very common process, attested in many different areas and language families, and the larger category of assimilation includes the majority of all sound changes. *R > rk/_# can be regarded as a case of partial assimilation. Given the reasonable assumption that at some point in Kaiwa's history before it was robustly attested in the literature it also had a dorsal fricative reflex of *R much like its relatives (say, *ʁ, like modern French or German's reflexes of their respective earlier rhotics), final devoicing would have produced a fricative like /χ/. The modern forms then predict that this becomes an obstruent coda.

The other process is what is referred to as UNPACKING, the process by which a single segment splits into a sequence of two segments that each have some of the features of the original (Crowley & Bower 2010: 35). The shift of the rhotic towards a dorsal position here would probably result in an obstruent pronunciation often enough, but it is still entirely reasonable that the speakers of Kaiwa would have still recognize the phonetically changed segment as being phonologically a liquid. The devoicing discussed earlier could possibly render the segment phonetically heterogeneous if it was incomplete (i.e., if not the entire pronunciation of the dorsal phone was unvoiced, we would already have a perceivable phonetic 'contour'), encouraging an interpretation of it as a sequence rather than a single segment, and thus the devoiced portion of the phoneme could be reinterpreted as a velar stop. With the liquid portion of the coda sufficiently separated, it would be free to shift further away from the dorsal position due to the aforementioned contact relationships.

Besides these two phonological processes, we cannot ignore that since so many different initial states had already resulted in an -lk coda, that this was recognized as a common coda for words, and so a medial state like the <rk> in the wordlist would easily shift towards this very similar and recognizable pattern. For whatever reason several changes in the history of Kaiwa conspired to make this cluster a frequent and noticeable aspect of the phonology, and this seems to show itself in places where we wouldn't expect it; the reflex of POc *tuqa 'bone' in Kaiwa is *tulkwa-*, with an intrusive /l/ before the /k/. It is difficult not to suspect the insertion of an /l/ in this form is connected to the visibility of /lk/ clusters elsewhere in the language.

6 Conclusion

Other than the data we have discussed so far, there are a couple other words that appear to reflect *R but are not well-behaved in that they show other phonological issues or the actual reflex is unexpected. Two of these are probably loans: Kaiwa *vaku* 'new' probably derives ultimately from POc *paqoRu, but has a zero reflex of *R; Yabem has a nearly identical form for the same meaning. There is also *(ih)tangir*⁹ 'Spanish mackerel', a clear reflex of POc *tajiRi, but it has a rhotic reflex, which is unexpected, but occurs in the same word as expected for several nearby languages. The other word that appears to reflect *R, but has an unexpected reflex, is the verb stem *mdil* 'arise', which appears to be a reflex of *madriRi 'stand up'; however, *mdilk is expected. If this verb were transitive there would be nothing to explain, but 'stand' is not a transitive verb. Perhaps there is fossilized morphology involved with intransitive verbs, or some form of analogy has occurred to eliminate the expected form with the stopped coda. Lastly, the appearance of words in the contemporary language such as *twerk* 'blood', having /rk/ codas when these should have become /lk/ codas if they were inherited, is difficult to understand. Attempting to derive this word from the POc word of the same meaning, *draRaq, runs into several problems, the least of which is the mismatch in voicing of the onset. Since the shift from /rk/ to /lk/ was still in progress in the latter half of the 20th century, and the sociolinguistic factors conditioning it are no longer significantly present, forms with this coda cluster may simply be explained as forms that were not exposed to the change before it was stopped. The data is not large enough to determine this with any certainty though.

⁹*ih-* is a prefix occurring on the names of many fish species.

In all probability further data and further study on this language will explain some of these irregularities and give more clarity to the demonstrated, regular processes involved. Regardless, what is available now is an example of a fairly unusual evolution in the system of liquids of a language, and when investigated further we see that its results have depended on a variety of intersecting linguistic and social factors.

Appendix: Etymologies of Kaiwa words reflecting *R

The purpose of this appendix is to simply provide in a list all of the words attested in the literature on Kaiwa that have a plausible etymology in *R, along with this etymology. Etymologies already proposed in the previous literature will be marked with a following dagger (†). Note that the reconstruction of *bwiker has been changed to *bwikeR per the earlier discussion of formal issues with this word.

*boR	‘pig’	>	<i>buelk</i> †	
*bwikeR	‘beach, esp. sandy beach’	>	<i>gielk</i>	‘sea’†
*kaRat(-i)	‘bite’	>	<i>lat, alas</i>	‘itchy’†
*kiRam	‘adze’	>	<i>il</i> †	
*layaR	‘sail’	>	<i>laik</i>	
*loRo	‘large red stinging ant’	>	<i>luelk</i>	‘ant’
*madriRi	‘stand up’	>	<i>mdil</i>	‘arise’
*niuR	‘coconut’	>	<i>niuk</i> †	
*ñoRap	‘yesterday’	>	<i>nolik</i> †	
*qapuR	‘lime’	>	<i>ap</i>	
*Rabia	‘sago’	>	<i>labi</i> †	
*saleR (PMP)	‘floor’	>	<i>ralk</i>	
*suRuq	‘sap, soup’	>	<i>ro-ruk</i>	‘soup’†
			<i>(avo)rulu-</i>	‘saliva’†
*tañiRi	‘Spanish mackerel’	>	<i>ihtangir</i>	
*tapuRi	‘triton shell, trumpet’	>	<i>tavulk</i> †	
*taRaq(-i)	‘to chop with an adze’	>	<i>tle</i>	‘to cut (down)’
*waRisa	‘the day before yesterday’	>	<i>walirik</i>	‘past’

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