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Evidence for the Identification of Carabayo, the Language of an Uncontacted People of the Colombian Amazon, as Belonging to the Tikuna-Yurí Linguistic Family

Frank Seifart1*, Juan Alvaro Echeverri2
1 Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany, 2 Universidad Nacional de Colombia, Amazonia Campus, Leticia, Colombia

Abstract
This paper provides evidence for the identification of the language of the uncontacted indigenous group called Carabayo, who live in voluntary isolation in the Colombian Amazon region. The only linguistic data available from this group is a set of around 50 words, most of them without reliable translations, that were collected in 1969 during a brief encounter with one Carabayo family. We compare this material with various languages (once) spoken in the region, showing that four attested Carabayo forms (a first person singular prefix and words for 'warm', 'father', and 'boy') display striking similarities with Yurí and at least 13 Carabayo forms display clear correspondences with contemporary Tikuna. Tikuna and Yurí are the only two known members of the Tikuna-Yurí linguistic family. Yurí was documented in the 19th century but has been thought to have become extinct since. We conclude that the Carabayo – directly or indirectly – descend from the Yurí people whose language and customs were described by explorers in the 19th century, before they took up voluntary isolation, escaping atrocities during the rubber boom in the early 20th century.

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Introduction
There are still around 100 uncontacted indigenous groups around the world, and a few dozen of them in the Amazonian rainforest, according to the NGO Survival International (http://www.survivalinternational.org/tribes). Most of these groups are known to be closely related linguistically and culturally to groups already contacted. However, not much more than their mere existence is known about some of them. This is the case for the Carabayo people who live in the remote upper River Puré and River Bernardo region in the Colombian Amazon rainforest. The name Carabayo derives from the (mock) name “Bernardo Caraballo”, which was given to a Carabayo man by local people during a brief encounter in the Colombian town La Pedrera (Bernardo Caraballo was the name of a Colombian boxing champion). Subsequently the Carabayo people and their language have been referred to as Caraballo [1,2]. The 2013 Ethnologue language catalogue [3] introduced Carabayo as an English version of the language name, and assigned the ISO 639-3 code cby to it.

In the current study, we analyze the only linguistic data available from this group, around 50 words that were overheard and noted down during a brief encounter with one Carabayo family in 1969, showing that the Carabayo most likely speak a language closely related to Yurí (also spelled Juri) as well as to Tikuna, which have previously been shown to be related to each other [2,4–7]. The Yurí language was documented in four wordlists in the 19th century but had been presumed to have become extinct since. Tikuna is still spoken by about 40,000 speakers, mostly along the Amazon River in Peru, Colombia, and Brazil. If Carabayo is relatively closely related to both of these languages, as we suggest here, one possibility would be that it may be part of a former dialect continuum circumscribed by the Tikuna and Yurí languages.

Our study substantiates previous claims of a link between Carabayo and Yurí that were either based on limited data and non-rigorous methods [8] or did not substantiate this claim with linguistic data at all [9,10]. We also substantiate the existence of similarities between Carabayo and Tikuna that were noted by Goulard & Montes Rodriguez [2] based on incomplete Carabayo materials which they considered to be too poor to draw any further conclusions. Our identification is based on a comparison of all available Carabayo data (from three different sources) with, firstly, four Yurí wordlists collected in the early to mid-19th century, one of which has only recently become accessible [11]; Natterer’s Yurí wordlist was thought to have been destroyed in a fire in Vienna in 1848, until it was discovered in the late 1970s by Ferdinand Anders in the University Library of Basle. The handwritten manuscript has recently been transcriptions by Helène B. Brijnen at Leiden University. Incidentally, the Carabayo wordlist [12] was also not accessible [13] until recently, because the Capuchin missionary publication Amanecer Amazonico, in which it was published, was not distributed widely. Additionally, the issue of Amanecer Amazonico that contains the Yurí wordlist is missing in both the Capuchin missionary archive in Leticia and in the
national library of Colombia, the Biblioteca Luis Ángel Arango in Bogotá. It was eventually located by the first author in the Archivo Provincial dels Capucins de Catalunya in Sarrià, Barcelona.) Secondly, we compare Carabayo with contemporary Tikuna data provided by a native speaker of Tikuna. Our identification of the relationship of Carabayo with Yuri and Tikuna also implies that Tikuna should no longer be considered a language isolate with no living relatives [3].

The nature and scarcity of the available Carabayo data implies that standard methods for identifying languages – e.g. by frequent sequences of sounds or letters [14] – or for establishing genealogical relations between languages – e.g. by regular sound changes in sets of cognate words [15] – cannot be applied straightforwardly. Our analysis of the available Carabayo data thus draws on a variety of methods to derive evidence for the likelihood of an identification of Carabayo. These include phoneme frequency counts, semantic extensions of words, taking into account the context in which Carabayo words occurred, morphological composition of words, and the relative borrowability of different sections of vocabulary.

The Carabayo material investigated here was collected in 1969 from people who live in the upper River Purí/upper River Bernardo area, between the Putumayo and Caquétá rivers in the Colombian Amazon region [16]. In early 1969, a local Colombian and a local Miraña Indian undertook an expedition to the Carabayo’s territory. When they did not return, a military commission that was sent to rescue them made violent contact with the Carabayo people and took one family hostage. This family, consisting of an adult couple and three children, was then held in the boarding school of the Capuchin mission in the Colombian town La Pedrera for a few weeks before they were ‘repatriated’. During this encounter, the Carabayo data analyzed here were collected. Since then, Carabayo people and traces of them have been sighted on various occasions, primarily by members of the cocaine mafia and guerrilla fighters [16]. The most recent evidence of the Carabayo’s persistence are aerial photographs of their roundhouses taken in 2010 [16].

We strongly disapprove of the circumstances under which Carabayo data were collected. We hope that our study of the Carabayo material that was published in reports of these dire events contributes to the protection of the Carabayo people, in line with, for example, Survival International’s policy of making knowledge about uncontacted peoples public in order to raise awareness of the threats they are facing. In 2002, the Río Pure’ of the threats they are facing. In 2002, the Río Pure’

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parentheses in Tables 2–3). Therefore, it is doubtful whether geminates, aspirated consonants, and long vowels really exist in Carabayo. Note that the absence of s is confirmed by Juan Berchmans de Felanix's [17] observation that the Carabayo man pronounced Spanish very well, except for s, which he pronounced as ʃ. Despite the scarcity of the data, Tables 2 and 3 represent what might be a perfectly plausible and also typically Amazonian phoneme system, suggesting that a comparative analysis can reasonably be carried out with these data.

Can we tell from this material whether the Carabayo language is related in any way to any other known language? One hypothesis would be that they speak a closely related variant of a living language. This appears to be the case in neighboring Peru, where most uncontacted groups are linguistically related to groups already contacted, which allows one to have some degree of

<table>
<thead>
<tr>
<th>Carabayo</th>
<th>gloss, explanation, or context</th>
<th>source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 tabako</td>
<td>‘tobacco’</td>
<td>[20]</td>
</tr>
<tr>
<td>2 hako</td>
<td>at being frightened by dogs; ‘bite’ according to Juan Berchmans de Felanix [17]</td>
<td>[17, 20]</td>
</tr>
<tr>
<td>3 ʃa kariba, ʃa irobe</td>
<td>shouted at white people by an old woman during the occupation of her house. Castro Caycedo [30] reports that Carabayo contacted on a path shouted kariba, kariba ne</td>
<td>[20]</td>
</tr>
<tr>
<td>4 ʃa</td>
<td>‘no’</td>
<td>[17, 21]</td>
</tr>
<tr>
<td>5 kariba</td>
<td>‘white man’</td>
<td>[17, 21, 30]</td>
</tr>
<tr>
<td>6 uro, uro</td>
<td>when meeting a white man in the bush, pointing at direction opposite to where he came from</td>
<td>[20]</td>
</tr>
<tr>
<td>7 ʃa-nauxé</td>
<td>‘give me, show me’</td>
<td>[17]</td>
</tr>
<tr>
<td>8 gudda</td>
<td>‘wait’</td>
<td>[17]</td>
</tr>
<tr>
<td>9 agó</td>
<td>‘bring’</td>
<td>[17]</td>
</tr>
<tr>
<td>10 amá</td>
<td>‘come’ (Spanish siga)</td>
<td>[17]</td>
</tr>
<tr>
<td>11 ao</td>
<td>how the children call their father</td>
<td>[17]</td>
</tr>
<tr>
<td>12 aua</td>
<td>calling a child</td>
<td>[17]</td>
</tr>
<tr>
<td>13 gu</td>
<td>‘yes’</td>
<td>[17]</td>
</tr>
<tr>
<td>14 hono</td>
<td>‘boy’</td>
<td>[17]</td>
</tr>
<tr>
<td>15 ʃa</td>
<td>‘out’, maybe based on item 03</td>
<td>[17]</td>
</tr>
<tr>
<td>16 pama</td>
<td>‘there, look!’</td>
<td>[17]</td>
</tr>
<tr>
<td>17 pingo</td>
<td>‘shrimp/prawn’</td>
<td>[17]</td>
</tr>
<tr>
<td>18 pingo-go</td>
<td>‘bring shrimp/prawn’ (see items 09, 17)</td>
<td>[17]</td>
</tr>
<tr>
<td>19 tʃaunæni</td>
<td>‘good, well, like’</td>
<td>[17]</td>
</tr>
<tr>
<td>20 tʃaunøle</td>
<td>‘warm me!’ (the speaker ordered a child to warm his hands with fire and apply them to his body)</td>
<td>[17]</td>
</tr>
<tr>
<td>21 tʃama</td>
<td>‘enough!’</td>
<td>[17]</td>
</tr>
<tr>
<td>22 alo</td>
<td>‘come!’</td>
<td>[17]</td>
</tr>
<tr>
<td>23 tupana</td>
<td>‘God’</td>
<td>[21]</td>
</tr>
<tr>
<td>24 jakoma</td>
<td>boy’s name; according to Bergès [26] the autodenomination of the Carabayo is yacumo.</td>
<td>[21]</td>
</tr>
<tr>
<td>25 jakomanate</td>
<td>man’s name</td>
<td>[21]</td>
</tr>
<tr>
<td>26 ʃego</td>
<td>‘child(ren)’, used by Carabayo woman addressing (two of) her children</td>
<td>[21]</td>
</tr>
<tr>
<td>27 oro kami karajilayo to comes</td>
<td>‘give me meat, Carabayo wants to eat’</td>
<td>[21]</td>
</tr>
<tr>
<td>28 kariba dimene</td>
<td>(during forced walk through jungle), dimene means ‘kill’ according to Juan Berchmans de Felanix [17]</td>
<td>[17, 20]</td>
</tr>
<tr>
<td>29 ané ui koræ</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>30 ané uikaræ</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>31 ʃi tʃe o neko</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>32 bajaneku</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>33 ekoneko</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>34 ʃi ʃe ʃi piku</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>35 ʃe ʃe anne anæ</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>36 etamenita</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>37 ʃadajareu</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>38 jua nekoræ</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>39 nenerigæ</td>
<td>/</td>
<td>[17]</td>
</tr>
<tr>
<td>40 tʃaulæ tʃuutaiba</td>
<td>/</td>
<td>[17]</td>
</tr>
</tbody>
</table>

do:10.1371/journal.pone.0094814.t001
Table 2. Carabayo consonants.

<table>
<thead>
<tr>
<th></th>
<th>bilabial</th>
<th>alveolar</th>
<th>palatal</th>
<th>velar</th>
<th>glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>plosive</td>
<td>b&lt;sub&gt;6&lt;/sub&gt;</td>
<td>p&lt;sub&gt;6&lt;/sub&gt;</td>
<td>(d&lt;sub&gt;1&lt;/sub&gt;)</td>
<td>t&lt;sub&gt;6&lt;/sub&gt;</td>
<td>g&lt;sub&gt;6&lt;/sub&gt;</td>
</tr>
<tr>
<td>(plosive geminate)</td>
<td>(dd&lt;sub&gt;1&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(plosive aspirated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(kh&lt;sub&gt;1&lt;/sub&gt;)</td>
</tr>
<tr>
<td>fricative</td>
<td>(f&lt;sub&gt;6&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td>j&lt;sub&gt;5&lt;/sub&gt;</td>
<td>(k&lt;sub&gt;1&lt;/sub&gt;)</td>
</tr>
<tr>
<td>affricate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>approximant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nasal</td>
<td>m&lt;sub&gt;9&lt;/sub&gt;</td>
<td>n&lt;sub&gt;32&lt;/sub&gt;</td>
<td>n&lt;sub&gt;6&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nasal geminate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flap</td>
<td>r&lt;sub&gt;1&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(liquid)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subscript numbers represent frequency of occurrence of the phoneme in the corpus (phonemes in parentheses occur only once or twice).

Table 3. Carabayo vowels.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i&lt;sub&gt;5&lt;/sub&gt;</td>
<td>e&lt;sub&gt;36&lt;/sub&gt;</td>
<td>a&lt;sub&gt;32&lt;/sub&gt;</td>
</tr>
<tr>
<td>u&lt;sub&gt;1&lt;/sub&gt;/&lt;(uu&lt;sub&gt;1&lt;/sub&gt;)</td>
<td>o&lt;sub&gt;3&lt;/sub&gt;/&lt;(co&lt;sub&gt;3&lt;/sub&gt;)</td>
<td>a&lt;sub&gt;3&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Subscript numbers represent frequency of occurrence of the phoneme in the corpus (phonemes in parentheses occur only once or twice). doi:10.1371/journal.pone.0094814.t003

previous knowledge of their language. However, in the case of the Carabayo, this is unlikely because, while the Carabayo family was held at La Pedrera, speakers of the following languages were asked to try to communicate with them, without success [8,20] (language names are given in standard spelling and with genealogical affiliation and ISO 639-3 codes: Andoke (isolate, ano), Muinane (Witotoan; mu), Mura, Passeé, Uainuma (both Arawakan; mura, Murui huu; Nu¨pode hux), Miran˜as and Boras (Boran; both boa), Witoto (Witotoan; three varieties: Maffetone, Mura, Passeé). The wordlists were collected in 1819 and 1820 by the German botanists Carl Friedrich Philipp von Martius (Coretu, Mura, Passeé, Uainuma) and Johann Baptist von Spix (Passeé). The Yuri and Uaimuna wordlists combine words collected by Martius and by Spix as well as words collected by Alfred Russell Wallace around 1850, which Wallace himself also published in an appendix to Wallace [19]. The Austrian naturalist Johann Natterer collected an additional wordlist on Yuri in 1833 [11]. These wordlists cover basic vocabulary and local fauna and flora terms. Finally, it is also possible that the Carabayo speak a language that has never been documented. In this context it is noteworthy that a number of languages of the area were documented for the first time as late as the early 20th century, among them Ocaína, Nonuya, and Resigaro, showing that some languages remained unnoticed for a long time after the region had begun to be explored. However, during the 1930s, the indigenous groups of the Caquetá-Putumayo area of the Colombian Amazon region were surveyed in great detail by Capuchin missionaries, including the Ocaínas, Nonuiyas, and Resigara [22,23]. Based on information from these surveys, Marcelino de Castellvi and Espinosa Pérez [23] suggest that Yuri speakers persist in locations very close to where the Carabayo were sighted in 1969, without, however, giving linguistic data as evidence.

Results and Discussion

Our comparison of the Carabayo data with Coeruna, Coretú, Mura, Passeé, Uaimuna, and Yuri revealed that a number of Carabayo forms match corresponding Yuri elements, but none match forms of the other languages. Among the Carabayo-Yuri correspondences is one that Vidal y Pinell [8] had identified, Carabayo ao ‘father’, as we discuss below. The two other Carabayo-Yuri correspondences given by Vidal y Pinell [8] do not hold up to scrutiny: He suggests that Carabayo ao‘ ancestor’, which according to Juan Berchmans de Felnix [17] might mean ‘child’, corresponds to Wallace’s Yuri oseiy ‘son’. This correspondence seems far-fetched and cannot be confirmed by other Yuri forms such as o nne ‘son’, o in ‘child’, ta tina ‘boy’ (Natterer), ana ‘son’, ahé ‘child’ (Martius), or suuné (Spix). Incidentally, Wallace’s oseiy ‘son’ probably means ‘daughter’, rather than ‘son’, as the forms for ‘daughter’ given by the three other sources for Yuri suggest: zo abá (Natterer), tsohiçu (Martius), suabue (Spix). The first syllable in these three is the first person possessor marker.) Furthermore Vidal y
Table 4. Candidate languages for the identification of Carabayo.

<table>
<thead>
<tr>
<th>Language</th>
<th>Affiliation</th>
<th>Evidence for affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coeruna</td>
<td>possibly Witotoan</td>
<td>Coch-Grünberg [31], Loukotka [32]</td>
</tr>
<tr>
<td>Coretú</td>
<td>Tucanoan</td>
<td>Loukotka [32]</td>
</tr>
<tr>
<td>Muru</td>
<td>Mura-(Pirahá)</td>
<td>Campbell &amp; Grondona [33]</td>
</tr>
<tr>
<td>Passé</td>
<td>Arawakan</td>
<td>Ramirez [24]</td>
</tr>
<tr>
<td>Ulaimuna</td>
<td>Arawakan</td>
<td>Ramirez [24]</td>
</tr>
<tr>
<td>Yuri</td>
<td>Tikuna-Yuri</td>
<td>Carvalho [7], Goulard &amp; Montes Rodriguez [2]</td>
</tr>
</tbody>
</table>

Pinell [8] suggests that the Carabayo form nê, reported to mean ‘no’, corresponds to Wallace’s Yurí eeh ‘bad’. Again, this seems far-fetched and cannot be confirmed by other Yurí forms for ‘no’: ka (Natterer), ticuí (Martius), ghainà (Spix).

There are a number of other forms, however, that display intriguing correspondences between Carabayo and Yurí and that were not detected by Vidal y Pinell [8], partially because he did not have access to Martius’, Spix’s, and Natterer’s Yurí data. The relevant Carabayo and Yurí data are presented in Table 5.

Item 1 in Table 5 contains a complex form in which both elements correspond. The first element, tfau- is well attested in Yurí as a first person subject and possessor prefix. It appears in various spellings in Yurí data, e.g. tschau-, tschu- (Martius), su- (Spix), and tcho- (Wallace). The apparent mismatch between first person subject form and second person reference in item 1 could easily have arisen due to the lack of a common language in the situation in which the form was noted by Juan Berchmans de Felanix [17]: It is common even in professional fieldwork situations that, for example, in response to a field worker asking for a translation of “I sit”, an informant provides a form meaning “you sit”, referring to the field worker. Alternatively, tfau- in item 1 may be an object pronoun followed by a prefixless imperative verb form in item 1. The second element, nofê ‘warm’ matches well with Wallace’s Yurí nore ‘warm’. It matches less well with Natterer’s form for ‘warm’, but within this form are is shared. Item 2 in Table 5 is a less clear case, but it might be argued that a first person singular form is likely to occur in a form translated as ‘like’. The correspondences involving Carabayo tfau-, tfu-, and tfə proposed in items 3–5 in Table 5 are more hypothetical since no information on their meaning in Carabayo is available. However, they might contain further instances of the word-initial first person singular prefix. In Yurí, variants of tfau-, probably conditioned by the stem to which it is prefixed, are attested, primarily tfu-, e.g. tschu-baakhi ‘my elbow’ (Martius). The Carabayo words beginning with tfau-, tfu-, and tfə given in items 3–5 might thus well be nouns with a first person singular possessor prefix or verbs with a first person singular subject prefix that Juan Berchmans de Felanix [17] overheard from the conversations among the Carabayo. Note that the occurrence of tfau-, tfu- is also responsible for the high frequency of tf in both Carabayo and Yurí, which Vidal y Pinell [8] noted.

Item 6 in Table 5, hono ‘boy’, constitutes a reasonably certain correspondence in terms of a sequence of a back rounded vowel (o or u) followed by a and possibly another, unidentified vowel, and is attested as such five times in the Yurí data, including attestations from three different sources. Item 7, Carabayo ao ‘father’, also matches reasonably well with Yurí data, as already noted by Vidal y Pinell [8], in terms of the initial vowel a and final vowel o, which alternates with u in the Yurí data. A form related to Yurí (h)ato, attu ‘father’ may also be identifiable in Carabayo jakomāata, the Carabayo man’s name, when compared with jakoma, the Carabayo man’s eldest son’s name, according to Venanci d’Arenys de Mar [21] (items 24 and 25 in Table 1). If one assumes that the first term literally means ‘Jakoma’s father’, then nate would mean ‘father’. This form matches attested Yurí forms relatively well, and it is strikingly similar to Tikuna (Yurí’s sister language) nayá ‘father’. The use of teknonyms is not attested for Tikuna or for other indigenous groups in the direct vicinity, but it is attested in other places in Amazonia. In any case, it seems clear that jakomāata is a complex form and it is likely that nate means ‘father’, even if the

Table 5. Summary of Carabayo and Yurí data compared.

<table>
<thead>
<tr>
<th>Carabayo</th>
<th>Yurí material compared</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 tfau/fofe ‘warm me’</td>
<td>tfau+ nore ‘warm’ (Wallace)/tsdu’erā ‘warm’ (Natterer)</td>
</tr>
<tr>
<td>2 tfauamenni ‘good, well, like’</td>
<td>tfau+ (su)mēniko ‘my heart’ (Spix)</td>
</tr>
<tr>
<td>3 tfauiba</td>
<td>tfau+ (tschu-liba’u) ‘my back’ (Martius)</td>
</tr>
<tr>
<td>4 tfutuliba</td>
<td>tfau+ toa (Martius) ‘body’/taieboi (Martius) toipuy (Spix) ‘week’/taieboi (Martius), toipuy (Spix), tai ron i (Natterer) ’night’</td>
</tr>
<tr>
<td>5 arot fə o neko</td>
<td>a re (Natterer), ahri (Martius), are (Spix), ahri (Wallace) ‘red’ + tschauināxo ‘1 bury’ (Martius)/t tfau + nihcō ‘live’ (Martius)/tschu-micks (Martius), subinjho (Spix) ‘my testicles’</td>
</tr>
<tr>
<td>6 hono ‘boy’</td>
<td>o nē ‘son’, o ēn ‘child’, ta innu ‘boy’ (Natterer), on ‘son’ (Martius), (su)unē ‘(my) son’ (Spix)</td>
</tr>
<tr>
<td>7 ao, -nate ‘father’</td>
<td>atu (Natterer), hato (Martius), hado (Wallace), (su)atu ‘(my) father’ (Spix)</td>
</tr>
<tr>
<td>8 hako ‘well!’</td>
<td>hoko ‘I am fine, this is good’ (Natterer), okō (Martius) ukō (Spix) ‘beautiful’</td>
</tr>
</tbody>
</table>
Carabayo do not employ a conventionalized system of teknonyms. Note that Venancy d’Arenys de Mar [21] claims that the Carabayo man called jakomante was not the father of the oldest Carabayo boy, who was called jakoma, but maybe his brother, without, however, providing any evidence or further argumentation for this claim. This claim contradicts all other sources, who assume they were father and son, especially Bergès [26], who probably knew the Carabayo best. Even if they were not father and son, they may have used a teknonym since it has been observed elsewhere in Amazonia that teknonyms are applied among relatives or people living together [27].

The Carabayo expression in item 8 in Table 5 is translated in Juan Berrchmans de Felanix [17] as ‘bites’. However, the context where this word was recorded is described by Juan Berrchmans de Felanix [20] as follows: Shortly after the Carabayo family was captured, they were led, bound, through the jungle. When they arrived at a place where the commission had left their dogs behind, the Carabayo family showed fear and repeated various times the word hako (“Al llegar al sitio donde estaban los perros, demostraron miedo, repitiendo distintas veces la palabra JACO” [20]). In this context it is possible that hako is some kind of interjection, especially because it was repeated various times. If so, it may correspond to the Yurí form hokó, which is given by Natterer as an equivalent of both ‘this is good’ [German dies ist gut] (contrasting with ‘this is not good’ [German dies taugt nichts], the preceding entry in Natterer’s list) and ‘I am fine’ [German Mir geht es gut] (apparently as an answer to ‘how are you?’ [German Wie geht es dir], the preceding entry in Natterer’s list). Natterer’s Yurí hokó probably corresponds to Martius’ Yurí ockó and Spix’s Yurí ukó, both given as equivalents of ‘beautiful’ [Latin pulcher in the original list]. The fact that it appears in various contexts suggests that Yurí hokó is a more widely applicable expression that may be translated as ‘well’ and that can also be used as an interjection rather than a literal translation of the equivalents given by Martius, Spix, and Natterer. Our experience with indigenous people of the area suggests that it is not unlikely that the same expression would be used in the contexts described for Carabayo hako as well as in the ones described for Yurí hokó, ockó, and ukó. For instance, the Bora people, the Yurí’s neighbors to the west, would use tehadjounc, which literally means ‘already like this’, in all of these contexts.

Additionally, we note that there are a number of further, far more hypothetical correspondences contained in the data summarized in Table 5. Firstly, Carabayo meni (item 2) may correspond to Yuri meniko ‘heart’ if one assumes that an expression translated as ‘good, well, like’ would be expressed as ‘pleases’ my heart’. Furthermore, in the Carabayo material for which no translation at all is provided, a number of forms can be identified that match Yurí forms, as noted in Table 5. For instance, oék in item 5 may correspond to Yurí are ‘red’, which is well attested in various sources for Yurí.

The two Nheengatu elements in Carabayo, kariba ‘white man’ and tupana ‘God’ are also attested in Yurí data: kalikidá (Natterer) and tupana (Martius). These correspondences do not provide evidence for an identification of Carabayo with Yurí because both items are widespread among languages of the region. However, the exact match between Yurí tupana (Martius) and Carabayo tupana is noteworthy, given that this form was apparently phonologically nativized differently in Coeruna, as tobi, and in Mura, as tupau. For Uainuma, tupana is reported, as well. For the other two candidate languages, words for ‘God’ which are non-related and probably native are documented, i.e. pokem for Passe and namipalagai for Coretti. No forms corresponding to kariba are attested in any of the candidate languages, except for Yurí, due to
Table 7. Carabayo-Tikuna correspondences (Abbreviations: sg – singular; pl – plural; # – word boundary; Ø – elision).

<table>
<thead>
<tr>
<th>CARABAYO</th>
<th>TIKUNA</th>
<th>Sound correspondences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>/fau/ame /‘good, well, like’</td>
<td>Ø-#n</td>
</tr>
<tr>
<td>2</td>
<td>gudda ‘wait!’</td>
<td>g-Ø, dd-n, u-Ø</td>
</tr>
<tr>
<td>3</td>
<td>ping ‘shrimp’</td>
<td>Ø-Ø</td>
</tr>
<tr>
<td>4</td>
<td>agu ‘bring!’</td>
<td>Ø#-Ø</td>
</tr>
<tr>
<td>(=3+4)</td>
<td>pin-g-Ø ‘bring shrimp!’</td>
<td>(see 3, 4)</td>
</tr>
<tr>
<td>5</td>
<td>gu ‘yes’</td>
<td>g-Ø, u-Ø</td>
</tr>
<tr>
<td>6</td>
<td>hako ‘no’</td>
<td>e-e</td>
</tr>
<tr>
<td>7</td>
<td>na ‘father’</td>
<td>(exception to Ø-#n)</td>
</tr>
<tr>
<td>8</td>
<td>ama ‘come!’</td>
<td>Ø-#Ø</td>
</tr>
<tr>
<td>9</td>
<td>pama ‘there, look!’</td>
<td>a-a</td>
</tr>
<tr>
<td>10</td>
<td>ao ‘children to call their’</td>
<td>a o ‘children to call their parents or parents to call children (affectional)’</td>
</tr>
<tr>
<td>11</td>
<td>jña ‘out’</td>
<td>na jña (3SG/get out)</td>
</tr>
<tr>
<td>12</td>
<td>assa ‘calling a child’</td>
<td>na ña (3SG/go) ‘come here, move!’</td>
</tr>
<tr>
<td>13</td>
<td>fja-naú ‘give me, show me’</td>
<td>fja na u (ekaktak/3SG/lower) ‘lower it (e.g., your hand)’</td>
</tr>
<tr>
<td>14</td>
<td>hako ‘bite’</td>
<td>jña ña (ekaktak/eat) ‘eat’; na ña (3SG/eat) ‘he eats’ (k-Ø)</td>
</tr>
<tr>
<td>15</td>
<td>fama ‘enough’</td>
<td>tama ‘negation’; fama ‘1s’</td>
</tr>
<tr>
<td>16</td>
<td>dimene ‘kill’</td>
<td>tømæni (1s/kill/auene) ‘our killers’; æymen ‘look!’</td>
</tr>
</tbody>
</table>

doi:10.1371/journal.pone.0094814.t007

the fact that there were no entries for this concept in the wordlist template that Martius, Spix, and Wallace used.

In summary, we can identify in Carabayo data four forms that match corresponding Yuri forms well: a first person singular prefix, and words for ‘warm’, ‘boy’, and ‘father’, in addition to a more hypothetical correspondence involving an interjection ‘well!’. Table 6 contrasts these Carabayo-Yuri correspondences with non-corresponding forms of other candidate languages.

The strongest evidence for a link between Carabayo and Yuri comes from the first person singular prefix (item 1 in Table 6). It is attested in one complex Carabayo form, for which there is a matching translation (/fau/ame ‘warm me’), and may be contained in further Carabayo forms given by Juan Berchmans de Felanix [17] without translations. For this form, the absence of corresponding forms in other candidate languages is particularly telling since for a first person singular pronoun, the absence of a corresponding form in a candidate language is unlikely to due to alternative words with similar meanings that happen to be recorded in the extant wordlist (as can easily happen with words for ‘warm’, ‘boy, son’, ‘father’, and ‘well’). Additionally, the first person singular forms of Yuri, Coeruna, Uainuma, Coretu, and Mura given in Table 6 have etymologies in their linguistic families, which excludes the possibility that they are mistakenly given as first person forms in the wordlist collection in the 19th century. And finally, personal pronouns are known to be especially resistant to borrowing [28], i.e. their similarity is truly indicative of a genealogical link, not of linguistic contact.

It should be noted that any of the suggested correspondences given in Table 6 involve a fair amount of speculation due to the scarcity of information on Carabayo as well as on Yuri. For instance, /fau/ame recorded in the context “the speaker ordered a child to warm his hands with fire and apply them to his body,” could mean many other things, e.g. ‘touch me’, ‘rub me’, or ‘hug me’. In addition, there is an unexplained correspondence between the bilabial consonant /b/ in Carabayo /nobe/ and the alveolar consonant /r/ in Yuri /nore/ ‘warm’. However, the existence of a whole set of five at least potentially matching forms shared by Carabayo and Yuri, and the lack of any matching forms in other candidate languages does strongly suggest that if Carabayo is related to any of the candidate languages, it is most likely related to Yuri.

Our comparison of Carabayo and Tikuna revealed a high number of very good matches between Tikuna and Carabayo, as summarized in Table 7. The Tikuna correspondences to Carabayo were provided by Abel Antonio Santos Angarita, a native speaker of Tikuna and trained linguist specializing in Tikuna dialectology [29], on inspection of the Carabayo material. These data contain at least 13 close correspondences. Among these, six items (numbers 1–7 in Table 7) constitute very good matches, both semantically and phonologically. Another six items (numbers 8–13 in Table 7) can be considered good matches. Another three items (numbers 14–16) are given here that match less well but are still worth considering (item 14 provides an alternative correspondence for hako). What adds credibility to the matches in Table 7 is that they exhibit regular sound correspondences between Carabayo and Tikuna, especially Carabayo g (or k) – Tikuna Ø and loss of word-initial n in Carabayo, both of which are attested in three well-matching pairs (counting also one case of loss of word-initial pØ). The matching elements include a number of items that are cross-linguistically very hard to borrow, especially first and third person pronouns and the verb ‘come’ [28]. Even for the other items, similarity is unlikely due to contact since there is a strong cultural avoidance of lexical borrowing in the entire region, and it is unlikely that the Carabayo would be an exception.

Thus the correspondences in Table 7 provide strong indications that Carabayo is genealogically related to Tikuna, but they cannot be taken as evidence for a closer relation with Tikuna than with Yuri, as the larger number of correspondences with Tikuna might suggest. In fact, we may expect a lower number of correspondences with the available Yuri data for a number of reasons. Firstly, Yuri is probably poorly represented, both phonologically and semantically, in the 19th-century data by travelers with no training in linguistics and probably no common language with the
Yuri they were interviewing. Secondly, with only a fixed list of Yuri words available, it is naturally much less likely to find matching elements than when a native Tikuna speaker actively searches correspondences to Carabayo items. Indeed, we have matching elements than when a native Tikuna speaker actively matched the (Yuri) tree. All this suggests that Yuri, Carabayo and the various dialects of Tikuna are genealogically related, with Carabayo somewhere in the middle between Yuri and Tikuna, but probably closer to Yuri. The case with which Carabayo data could be interpreted by a native Tikuna speaker additionally suggests that these languages are relatively closely related and may even form – or have formed in the past – a dialect continuum.

Conclusions

This paper presents evidence suggesting that the Carabayo people, who live in voluntary isolation in the Colombian Amazon region, speak a language related to Yuri and also Tikuna, i.e. that they are – direct or indirect – descendants of the Yuris that travelers such as Martius, Spix, Wallace, and Natterer encountered in the 19th century. We were able to provide correspondences to almost all Carabayo items for which reasonably reliable glosses are available. The correspondences we find between Carabayo and Yuri, on the one hand, and Carabayo and Tikuna, on the other hand, are unlikely to be instances of borrowing from Yuri and Tikuna and thus likely to truly reflect a genealogical link.

With the accelerating loss of indigenous languages, it becomes increasingly difficult to gain any further knowledge of the pre-colonial linguistic landscape of Amazonia. However, our meticulous study of Carabayo data from 1969 contributes to putting one language, Carabayo-Yuri, back on the map, and to placing another language, Tikuna, back in a linguistic family, Tikuna-Yuri, of which it had been presumed to be the only surviving member. We hope that this study will also contribute to awareness of the existence of groups that avoid contact and especially of their right to be left in peace.

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Author Contributions

Analyzed the data: FS JAE. Wrote the paper: FS.

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