# Papers in Austronesian subgrouping and dialectology

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# 4 *Lexical similarity, sound change and intelligibility of Atayalic dialects*

DER-HWA VICTORIA RAU

## 1 Introduction[1]

The Atayalic language group comprises two major subgroups: Atayal and Sediq. The former can be further divided into two major dialects: Squliq and C'uli'. In terms of the degree of dialectal divergence, C'uli' dialects are considered to be the most divergent, followed by Sediq, while Squliq dialects are fairly uniform (Li 1981).

Li (1980, 1981, 1982a,b, 1985, 1996) has contributed substantially to our understanding of the classification and phonology of the Atayalic groups. Other phonological studies include Squliq Atayal (Egerod 1966; Hirano 1972; Yamada & Liao 1974; Chiang 1996) and Sediq (Yang 1976). Detailed phonological accounts of individual C'uli' varieties are, however, lacking. This study is an attempt to further clarify the relationship between the three Atayalic dialects of Ren-Ai Township, Nantou County.

Ren-Ai Township is located in central Taiwan, as illustrated in Map 1, and is claimed to be the 'Atayalic homeland' (Li 1993) due to its great dialectal diversity. As shown in Map 2, except for two Bunun villages (1. Zhong-Zheng, 2. Fa-Zhi) to the southwest of Nantou County and two Han villages (14. Rong-Xing, 9. Da-Tong) toward the northeast, the rest of the county houses mostly speakers of Atayalic dialects with Atayal dialects on the north and Sediq dialects on the west and the south. Wan-Da, in Qin-Ai village (4), is the only C'uli' Atayal speech community, surrounded by Sediq speakers (Map 2).

There are different reference terms used in the paper. Under the township, there are Chinese village names, followed by the Chinese names of the speech community. Mstbaun, Inago, and Palngawan are the names Atayalic people use to refer to their own groups and have been adopted by Li (1980, 1982a) in his description of those groups and their dialects. The distribution of the local Atayalic dialects in the township is illustrated in Map 3. The

1 This study was supported by a grant from the National Science Council for the project 'Sociolinguistic Survey of the Atayalic Dialects of Nantou County', 8/1/1997–7/31/1998 (NSC-87-2411-H-126-010).

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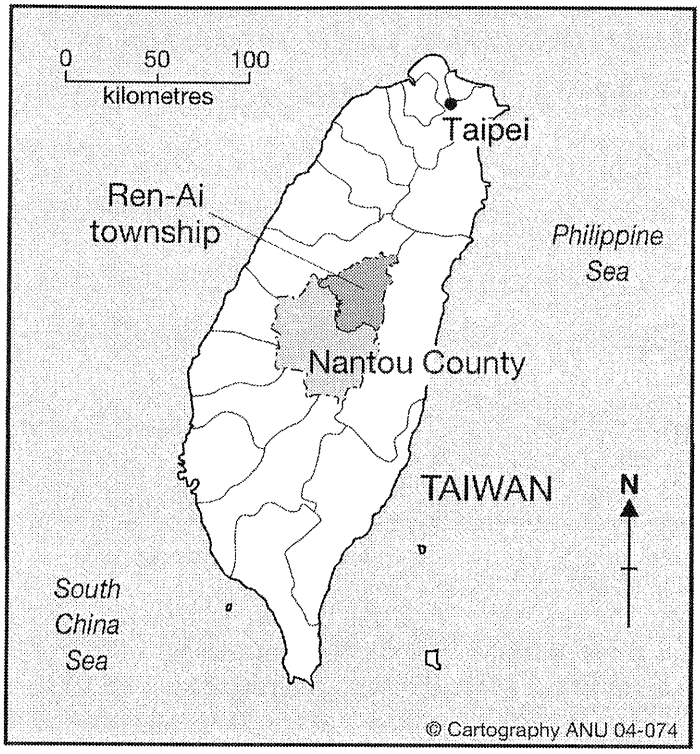
local Atayalic dialects belong to three major dialects, as classified by Li. Mstbaun is a Squliq dialect. B'ala' and Palngawan are C'uli' dialects. Tongan, Toda, Truwan, and Inago are Sediq dialects.

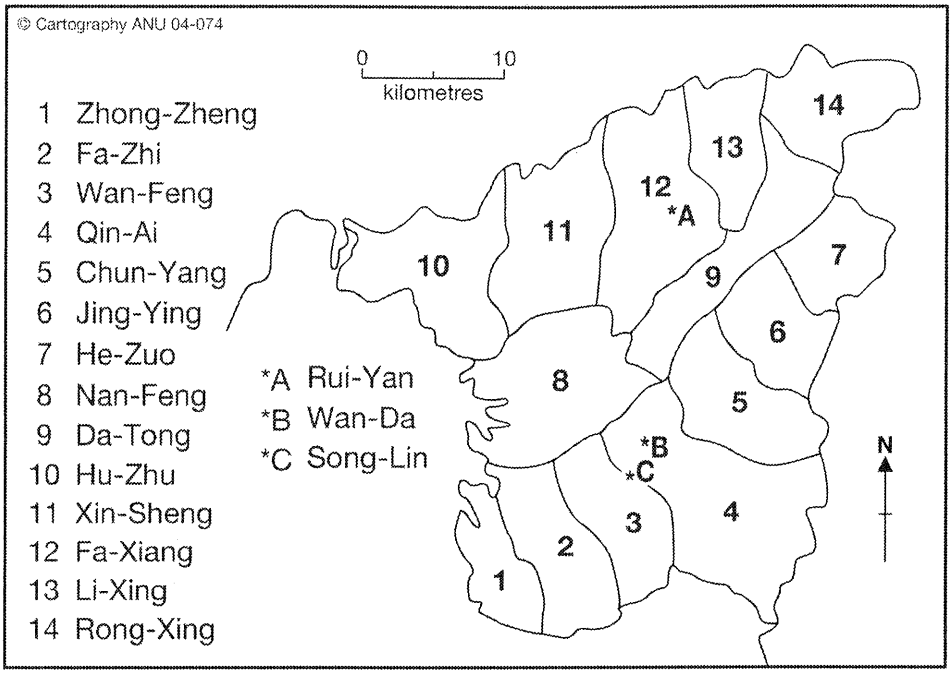



**Map 1:** Ren-Ai Township, Nantou County in Taiwan

Three speech communities, Rui-Yan (Fa-Xiang Village), Wan-Da (Qin-Ai Village), and Song-Lin (Qin-Ai Village), representing the three dialects, Squliq, C'uli', and Sediq respectively, were chosen as reference sites for the study. Wan-Da and Song-Lin communities are within walking distance of each other while linguistically Palngawan and Inago are classified as Atayal and Sediq respectively. Language contact between the two communities is inevitable. Rui-Yan, on the other hand, is geographically separated from the other two communities although linguistically Mstbaun is classified as an Atayal dialect, more closely related to Palngawan than Inago.

The total population of the fourteen villages of Ren-Ai Township was 15,143 as of 1996. 76% of the residents are aborigines. Over 90% of the population of the two villages in our study are Atayalic.

The presentation of this paper is organised as follows. After this introduction, a review of Li's studies of the dialect situation is presented in §2. Section 3 introduces my data, followed by the cognate percentages in §4 and sound correspondences in §5. Section 6 summarises the findings of the two previous sections. Section 7 discusses the results from dialect intelligibility testing. The Appendices contain the following kinds of data: Appendix 1. Word lists, part 1: 326 lexical items, part 2: 190 lexical items, Appendix 2. Recorded text tests for intelligibility.




**Map 2:** Villages in Ren-Ai Township of Nantou County

## 2 Atayalic dialects

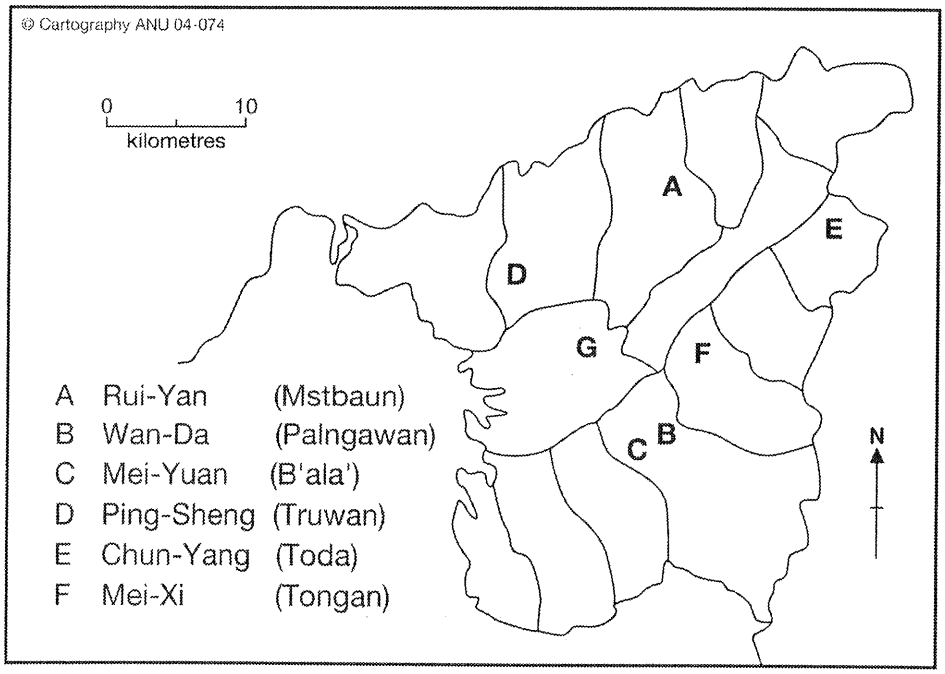
The term 'Atayalic' refers to both Atayal and Sediq. The important phonological differences between Atayal and Sediq, as pointed out by Li (1980, 1985), are as follows: (1) Atayal retains word-final labial stops and nasals /p, b, m/ while Sediq has changed to velars /k, ŋ/; (2) Sediq retains voiced stops /b, d, g/ in word-initial and medial positions whereas Atayal has the corresponding fricatives and liquids /β, r, ɣ/; (3) Sediq retains /r/ while Atayal has changed to /y/, /z/ or zero; (4) the Proto Atayalic *-d has reflexes *-t* or *-ʔ* in Atayal, but *-c* in Sediq; (5) for the Proto Atayalic *-g-, Atayal has *-g-* [ɣ] as reflexes, while Sediq has *-r-*; (6) Proto Atayalic *-g'- has Atayal reflexes *-r-*, *-s-*, or trill *r*, while Sediq generally has *-y-* if preceded by /i/ or *-g-* elsewhere. Li (1980, 1996) also presented Tsuchida's three criteria for subgrouping Squliq and C'uli' dialects: (1) phonological, (2) morphological, and (3) lexical differences. First, in terms of phonological differences, three types of phonetic correspondences were cited: (a) Squliq /s/ corresponds to C'uli' /c/ (< PA *c) as in /sbiŋ/ vs /cbiŋ/ 'sweet'; (b) Squliq /-r-/ corresponds to C'uli' /-s-/ (<PA *g') as in /pira'/ vs /pisa'/ 'how many', /kira'/ vs /kisa'/ 'a little later'; (c) Squliq /-ʔ/ corresponds to C'uli' /-t/ or /-c/ (< PA *-d) as in /qoliʔ/ vs /qolit/ 'rat'. Li (1996:188) presented the regular sound changes in the C'uli' varieties of Nan-Ao Township, Yi-Lan County as follows: (1) *q* > *ʔ* or *-ʔ-*, (2) *-p* > *-k*, *-m* > *-ŋ*, (3) loss of initial consonant, (4) /g-/ > *x*. Second, morphological differences, specifically pronominal differences, are illustrated with the following examples in Li (1980), Squliq /saku'/ or /ku'/ vs C'uli' /cu/, /ci/, /su/ or /si/ 'I'. Li (1996:188) generalised two types of morphological differences between Squliq and C'uli' varieties in Yi-lan due to the innovation of male forms: (1) last syllable or the last vowel/consonant differences, for

example *sas-aw* > *sas-iq* 'shade',[2] *bga-yaw* > *bga-ti?* 'Alocasia'; (2) insertion of an infix, e.g. *qmalup* > *qmalu-ya-k* 'hunt', *luhuŋ* > *luh-i-uŋ* 'mortar', *guquh* > *guq-il-uh* 'banana'. Third, lexical differences between the two subdialects include, to name a few, cited by Li (1996:185),

| | 'chicken' | 'shoulder' | 'sweat' | 'plant' | 'hit' |
|---|---|---|---|---|---|
| Squliq: | *ŋta?* | *qhiyaŋ* | *yabux* | *muya?* | *mihiy* |
| C'uli': | *wayluŋ* | *hŋali?* | *rinaŋ* | *muhi?* | *mahiy* |

There are certainly exceptions to these three general criteria, as indicated by Li (1996:185). The variations were attributed to borrowing and language contact and further research was called for. Li (1996:187) cited Tsuchida's (1980) finding of reflex *s* instead of *r* in many C'uli' dialects including Ren-Ai Township, Nantou County, for example *pgyaran* 'escape' instead of *pgyasan*. This indicates an early borrowing before dialectal diffusion.

Palngawan, a C'uli' dialect in the neighborhood of Sediq dialects, was found to share the phonological features of Sediq rather than Atayal. Li, therefore, concluded that lexical evidence is more useful than phonology for subgrouping Atayal and Sediq. Li (1985) later presented lexical evidence to show that Palngawan is an Atayal dialect because it shares 214 lexical items exclusively with other Atayal dialects, whereas only 11 lexical items are shared exclusively with Sediq. Furthermore, Palngawan has 50 unique lexical items, different from other Atayal dialects and Sediq.




**Map 3:** Atayalic speech communities in Ren-Ai County

2 The difference between Squliq /sasaw/ and C'uli' /sasi'/ 'shade' was classified as a lexical difference in Li (1980a) but was reclassified as a morphological difference in Li (1996).

Li (1980, 1982a) further proposed that the Atayalic group shares the same direction of sound change: (1) *-l* > *-n*; (2) *-t*, *-d* (only in Sediq) > *-c*; (3) *-b* > *-p*; (4) *-p* > *-k*, *-m* > *-ŋ*; (5) *-g* > *-w*, *-y*; (6) *c* > *s*, (7) vowel-deletion before stress. Age and gender both affect sound change, but the former was claimed to be more important than the latter. In the case of sound change from labials to velars in (4), Li reported his observation of the change in Palngawan dialect and cited Tsuchida's observation that the same change is completed in Mstbaun dialect. But our word-list elicitation of Mstbaun dialect shows that the sound change from labials to velars is still in progress. This finding will be discussed in §5. Li (1982a) certainly made several important observations and hypotheses on sound change, which await further quantitative analyses based on a methodology of sociolinguistic variation.

Li's studies (1980, 1982b, 1983) indicate that Mayrinax and Pa'nakuali' are the only two dialects of Atayal that show certain well-defined differences between the male and female forms of speech. The female forms preserve archaic features, whereas the male forms are innovative. But the majority of the male forms in Mayrinax are the ones currently used in other Atayal dialects and used as representative forms in the Atayalic word list in Li (1996).

Several phonemic and phonetic features in C'uli' which are different from Squliq were mentioned in Li (1980a) and are summarised as follows. In terms of phonemic differences, /e, o/ seem to be phonemic and /q/ does not occur in Maspazi'. Skikun and Mayrinax do not have /z/. As for phonetic differences, the bilabial fricative [β] is replaced by labiodental [v] in the speech of younger speakers of Maspazi'. The liquid [r] is commonly a flap in Maspazi', but is a retroflexed fricative [ɻ] or [ʐ] in Skikun. The devoicing of [ɣ] is completed in younger and female speakers of Skikun dialect. The palatalisation of /t/ before /i/ does not occur in Maspazi' and Mayrinax. Final /r/ occurs in Mayrinax and Palngawan. Vowels before penult and diphthongs are preserved in Maspazi' and Mayrinax.

Finally the sound systems of the three dialects in this study, based on Li (1980a, 1981) are summarised in Tables 1–3.

**Table 1:** Sound system of Mstbaun (Squliq)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| p | t | (c) | k | q | | ʔ | | i | | | | u |
| b[β] | | z | g[ɣ] | | | | | | e | | o | |
| | | s | x | | h | | | | | a | | |
| | l | | | | | | | | | | | |
| | r | | | | | | | | | | | |
| m | n | | ŋ | | | | | | | | | |
| w | | y | | | | | | | | | | |

**Table 2:** Sound system of Palngawan (C'uli')

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| p | t | c | k | | | ʔ | | i | | | | u |
| b | | | g | | | | | | | | | |
| | | s | x | | h | | | | e | | o | |
| | l | | | | | | | | | a | | |
| | r | | | | | | | | | | | |
| | r̃ | | | | | | | | | | | |
| m | n | | ŋ | | | | | | | | | |
| w | | y | | | | | | | | | | |

**Table 3:** Sound system of Inago (Sediq)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| p | t | (c) | k | q | ʔ | | i | | u |
| b | d | | g | | | | | ə o | |
| | | s | x | | h | | | a | |
| | l | | | | | | | | |
| | r | | | | | | | | |
| m | n | | ŋ | | | | | | |
| w | | y | | | | | | | |

## 3 Goals of the study

This study is a sociolinguistic survey of three Atayalic dialects of Ren-Ai Township, Nantou County, and a systematic comparison of Atayalic dialects to further clarify the subgroupings of the Squliq and C'uli' dialects of the Atayal and the Sediq language. The goals of the study are to investigate lexical similarity, dialect intelligibility and systematic sound change of the three dialects in Nantou. Three speech communities, Rui-Yan, Wan-Da, and Song-Lin, representing the three dialects Mstbaun Squliq, Palngawan C'uli', and Inago Sediq respectively, were chosen as reference sites for the study.

Since Ren-Ai Township is considered the 'homeland' of the Atayalic people and Rui-Yan is located in their 'place of origin', Mstbaun's status as a representation of Squliq dialect is certainly justifiable. Although Squliq and Palngawan are considered the most innovative and not comparable with Mayrinax in terms of value for historical reconstruction, they are nonetheless included as evidence for Li's reconstruction of Proto Atayalic phonology. Since Palngawan and Inago speech communities are within walking distance of each other while linguistically classified as Atayal and Sediq respectively based on Li's lexical evidence, a better understanding of Palngawan is important to clarify its relationship with other Atayalic dialects.

### 3.1 Research questions

Our quest is further divided into the following three questions:

(1) Is Palngawan more similar to Atayal or Sediq in terms of lexical evidence?

(2) Does Palngawan share more phonological features (i.e. sound change) with Atayal or Sediq?

(3) What are the levels of intelligibility among the three dialects?

### 3.2 Data

Two sets of word lists were used for analysis of lexical similarity and sound correspondences. One is the 326 Atayalic lexical items in Li (1981) with an addition of our Mstbaun data and a revision of Li's Palngawan and Inago data, the other is the 190 Atayal lexical items[3] (Li 1996:196–213) with addition of our Palngawan and Mstbaun data. All the data on Mstbaun, Palngawan, and Inago were collected by the author while the others are Li's. The word list with 326 items is a comparison among all three Atayalic dialects, while

[3] Li's (1996) word list contains 190 entries but the last four are sentences.

the list with 190 items is mostly concerned with the comparison between Squliq and C'uli'. Thus the first word list contains two Squliq dialects, four C'uli' dialects, and four Sediq dialects, while the second word list contains ten Squliq varieties and eight C'uli' varieties. The word lists of Mstbaun, Palngawan, and Inago that we collected are included in Appendix 1 along with the background information on our informants. All the word lists have reached a reliability code of C and above: 'average survey situation with good bilingual informants and satisfactory opportunity to double check' (Wimbish 1989:31). The shorter list with 190 lexical items was used with our older informants. There are only 74 overlapping items in both lists, cross-referenced in Appendix 1, part 1.

Three texts were recorded for the intelligibility test. A narrative text of personal experience approximately three minutes long was elicited from each reference site to be made into recorded text tapes for listening comprehension. Ten content questions for each text were abstracted from the story, translated into the three dialects, and dubbed onto the tapes as the test questions. The three texts for the RTT are included in Appendix 2.

## 4 Lexical similarity

Lexical similarity is usually cited to answer the question whether Palngawan is more similar to Atayal or Sediq. Based on Li's (1985) lexical evidence, Palngawan is found to share more exclusive lexical items with Atayal than with Sediq. However, the problems with Li's study are twofold: first, several different Atayal and Sediq dialects, ranging from Mayrinax to Squliq in Atayal and from Tongan to Inago in Sediq, are compared with Palngawan depending on which data are available for comparison; second, no criteria are given to determine lexical similarity, for example high strength of correspondence sets, so that there is no reason to believe that the word 'juice' *bu?* in Palngawan shares exclusively with *buq* in Mayrinax but not with *beyuq* in Tongan (1985:702). In our study, the languages for comparison were constant and a principle of quantification was established to group cognates.

### 4.1 WordSurv

Two sets of word lists were entered into the WordSurv computer program (Wimbish 1989) for analysis. After the word lists were entered into the computer with the cognate decisions made by the researcher, the program provided the following three types of information, which served as the basis to answer our first question: (1) shared vocabulary counting, (2) phonostatistic analysis of cognates, and (3) the COMPASS analysis to measure the strength of proposed phoneme correspondences and give an indication of the likelihood that words grouped in cognate sets are actually cognates.

#### *4.1.1 Shared vocabulary counting*

The 'shared' function of the Wordsurv program was used to produce the number of shared cognates as a percentage of the basic vocabulary. Since the first classification of the cognates was based on their appearance (apparent cognates) and the accurate determination of cognates depends on application of comparative method, these preliminary counts are used only for comparison.

### *4.1.2 Phonostatistic analysis*

The 'degrees of difference' (DD) analysis rather than the 'sound changes' analysis was adopted for the phonostatistic analysis. The degrees of difference between sounds is the number of minimal steps that would be required to change one to the other. Under this approach, all identical correspondences are counted as having a DD value of 0, while each nonidentical correspondence pair has a DD value of 1, regardless of its features. The advantage of this default strategy is that it avoids researcher bias in entering DD values into the computer, but it has the disadvantage of assigning small values to potentially large sound changes. Since the results of the 'shared' function of the program are used for comparison only, the default strategy is sufficient for our purpose.

### *4.1.3 The COMPASS analysis*

COMPASS, for 'Comparativist's Assistant', is an algorithm that was cited by Wimbish (1989:67) as having been developed by Donald Frantz (1970) based on the comparative method for linguists to determine genetic relationship between languages and to reconstruct the protolanguage. It is used to measure the likelihood that forms entered as cognates in the word-list database are in fact historically cognates, and does this by examining their frequency of occurrence in the data. The COMPASS algorithm was used to generate the following three tables: (1) phoneme correspondences, (2) item pairs list with cognate strengths, and (3) the number of word pairs within given ranges of strength. The strength index representing the likelihood that the correspondence is the result of a regular sound change was assigned by using the default threshold values of the program (upper threshold 15, lower threshold 2, bottom threshold 1). A correspondence with 15 or more occurrences scores a maximum strength of +1, representing the maximum confidence that it is regular correspondence. A correspondence with only 1 occurrence scores a maximum negative strength of –1, representing maximum confidence that it is not. A correspondence with 2 occurrences scores a medium negative strength of –0.5, while correspondences with between 3 and 14 ocurrences score a positive strength between 0 and 1 which grows proportionately with the number of occurrences. Values between the two extremes (+1 and –1) represent intermediate degrees of likelihood.

The pairs of correspondences that have the highest average segment strength of 1.00 in the COMPASS tabulation were chosen to represent true cognates. Other cognates with strengths greater than 0.85 but smaller than 1.0 are also compared.

## 4.2 Results of lexical similarity

The following section discusses the results of lexical similarity of the three Atayalic dialects based on a word-list analysis to answer the question whether Palngawan is more similar to Atayal or Sediq based on lexical evidence. We begin by examining the shared vocabulary counts of the Atayalic dialects and proceed to compare the cognates among the three dialects, obtained from the COMPASS analysis, then explain the differences between Li's (1985) results and ours.

### *4.2.1 Shared vocabulary counting*

Table 4 was generated using the 'shared' function of the WordSurv program to calculate the similarity percentages among Atayalic dialects. The set of word lists (326 words) comprises one Squliq dialect (Squliq in Taoyuan County), three C'uli' dialects (Maspazi? in Hsinchu County, Skikun in Yilan County, Mayrinax in Miaoli County), and three Sediq dialects (Tongan, Toda, Truwan) in Nantou County from Li's (1981) data and one Squliq (Mstbaun), one C'uli' (Palngawan), and one Sediq (Inago) in Nantou County from the current study (Appendix 1, part 1). The similarity percentages report the number of shared cognates as a percentage of the basic vocabulary compared.

In Table 4, the first two varieties from the top (Mstbaun and Squliq) are classified as Squliq dialects, the next four (from Palngawan to Mayrinax) as C'uli', and the last four (from Inago to Truwan) as Sediq. A first look at the similarity percentages between Palngawan–Mstbaun and Palngawan–Inago seems to indicate that Palngawan is slightly more similar to Mstbaun than Inago (85% vs 83%). But we are still far from being able to draw the conclusion that Palngawan is more similar to Atayal than Sediq because of the following results: (1) Mstbaun is more similar to Inago than Palngawan (86% vs 85%), (2) Squliq is more similar to Inago than Palngawan (92% vs 90%). These differences are so slight that they may not be significant. Squliq dialects also seem to be more similar to Sediq than to C'uli' dialects.

**Table 4:** Similarity percentages among Atayalic dialects

| Mstbaun | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 96 | Squliq | | | | | | | | | |
| 85 | 90 | Palngawan | | | | | | | | |
| 91 | 96 | 91 | Maspazi? | | | | | | | |
| 94 | 97 | 88 | 96 | Skikun | | | | | | |
| 90 | 96 | 90 | 97 | 97 | Mayrinax | | | | | |
| 86 | 92 | 83 | 89 | 89 | 88 | Inago | | | | |
| 90 | 98 | 90 | 95 | 95 | 95 | 96 | Tongan | | | |
| 91 | 98 | 89 | 96 | 95 | 96 | 96 | 100 | Toda | | |
| 91 | 98 | 89 | 95 | 95 | 96 | 97 | 100 | 100 | Truwan | |

Squliq dialects | C'uli' dialects | Sediq dialects

Tables 5 and 6 were generated the same way, but based on a different set of word lists including mainly dialects of Atayal. Table 5 compares Palngawan with other Squliq dialects while Table 6 compares Palngawan with other C'uli' dialects and Mstbaun with other Culi' dialects. The word lists (190 words) contain data from nine Squliq dialects (Pyanan, Lmuan, Habun Bazinuq, Syanuh, Kulu, ŋŋupa, Haga-Paris, Kubaboo, Rghayuŋ) and seven C'uli' dialects (Mnibu?, Mnawyan, Mkgugut, Pyahaw, Ryuhiŋ, Mtlaŋan, Knŋyan) in Yilan County from Li's data (1996) and one Squliq (Mstbaun) and one C'uli' (Palngawan) in Nantou County from the current study (Appendix 1, part 2).

**Table 5:** Similarity percentages between Palngawan and other Squliq dialects

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Mstbaun | | | | | | | | | | |
| 92 | Pyanan | | | | | | | | | |
| 88 | 91 | Lmuan | | | | | | | | |
| 94 | 91 | 91 | Habun | Bazinuq | | | | | | |
| 93 | 93 | 92 | 97 | Syanuh | | | | | | |
| 90 | 92 | 88 | 91 | 90 | Kulu | | | | | |
| 84 | 88 | 80 | 84 | 81 | 90 | Ŋŋupa | | | | |
| 91 | 92 | 88 | 88 | 90 | 97 | 88 | Haga-Paris | | | |
| 90 | 89 | 86 | 90 | 89 | 94 | 92 | 94 | Kubaboo | | |
| 92 | 91 | 88 | 92 | 92 | 95 | 90 | 95 | 98 | Rghayuŋ | |
| 66 | 65 | 65 | 66 | 64 | 68 | 70 | 67 | 67 | 68 | Palngawan[4] |

**Table 6:** Similarity percentages between Palngawan and other C'uli' dialects

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Palngawan | | | | | | | | |
| 62 | Mnibu? | | | | | | | |
| 60 | 96 | Mnawyan | | | | | | |
| 69 | 69 | 71 | Mkgugut | | | | | |
| 67 | 67 | 68 | 95 | Pyahaw | | | | |
| 66 | 68 | 69 | 96 | 94 | Ryuhiŋ | | | |
| 66 | 66 | 67 | 93 | 93 | 96 | Mtlaŋan | | |
| 68 | 65 | 67 | 94 | 93 | 94 | 93 | Knŋyan | |
| 66 | 76 | 77 | 78 | 77 | 76 | 74 | 76 | Mstbaun |

Table 5 shows that Palngawan is very different from any of the Squliq dialects. The similarity percentages are so low (64%–70%) that Palngawan can be almost considered a different 'language/dialect' from Atayal. Table 6, on the other hand, shows that Palngawan is also very divergent from other C'uli' dialects. The similarity percentages range from 60% to 69%. This seems to indicate Palngawan is a different 'language/dialect' from other C'uli' dialects. Even Mstbaun is more similar to other C'uli' dialects than is Palngawan (74%–78% vs 66%).

The different word lists yield very different results for the similarity percentages, as reflected in the closeness between Palngawan and other Atayalic dialects in Table 4 and the divergence between Palngawan and other Squliq and C'uli' dialects in Tables 5, 6.

Incidentally, Table 6 seems to provide similarity percentages that support Li's (1996: 192–193) findings that Mkgugut, Pyahaw, Ryuhiŋ, Mtlaŋan and Knŋyan are very similar to one another (93%–96%) but are very different from Mnibu? and Mnawyan (66%–71%). Meanwhile, Mnibu? and Mnawyan are very similar to each other (96%). This also seems to support Li's (1981) claim that Squliq dialects are fairly uniform while C'uli' dialects are considered to be the most divergent.

4 We use *Palngawan* rather than *Palŋawan* to retain consistency in spelling in the paper.

However, since similarity percentages have been responsible for so much confusion, as pointed out correctly by Grimes (1995) — appearing to be easy to calculate and understand whereas riddled with difficulties — we can not draw any conclusions based on shared vocabulary counting alone. Instead, it is better to use cognate strength, calculated by the COMPASS program, to obtain the answer to our first research question whether Palngawan is more similar to Atayal or Sediq.

### *4.2.2 COMPASS results*

The 'COMPASS' function was used to produce an item pairs list calculating cognate strengths and tables of number of words, within given ranges of strength, between three pairs of languages/dialects: Mstbaun-Palngawan, Palngawan-Inago, and Mstbaun-Inago. The tables for the first pair are generated from both word lists (326 words, 190 words) while those for the last two pairs are from the first word list (326 words). The results are presented in Tables 7–11. True cognates are first chosen from the word lists based on the highest average segment strength, 1.00, in the COMPASS tabulation, followed by those with strengths between 0.95 and 1.00, between 0.90 and 0.95, and between 0.85 and 0.90.

#### *4.2.2.1 True cognates (strength = 1)*

**Table 7:** True cognates (strength = 1) among Mstbaun, Palngawan, and Inago based on the word list of 326 lexical items

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 166 | *pila?* | *pila?* | *pila?* | money |
| 325 | *?isu?* | *?isu?* | *?isu?* | you (sg.) |
| 122 | *hiya?* | *hiya?* | *hiya?* | he |
| 322 | *msuyak* | *masurak* | *msurak* | yawn |
| 275 | *ŋuŋu?* | *ŋuŋu?* | *ŋuŋu?* | tail |
| 313 | *?ima?* | *?ima?* | *?ima?* | who |
| 312 | *?inu?* | *?inu?* | *?inu?* | where |
| 309 | *mhuyiq* | *mahuri?* | *mhuriq* | wet |
| 232 | *mpitu?* | *mapitu?* | *mpitu?* | seven |
| 305 | *?ita?* | *?ita?* | *ita?* | we (incl.) |
| 104 | *hi?* | *hi?* | *hii?* | flesh, meat |
| 186 | *?ini?* | *?ini?* | *?ini?* | not |
| 62 | *?ina?* | *?ina?* | *?ina?* | daughter-in-law |
| 226 | *bnaqiy* | *buna?iy* | *bnaqiy* | sand |
| 260 | *taŋuw* | *taŋuw* | *taŋuw* | sprout |
| 298 | *pipi?* | *pipi?* | *pipi?* | vulva |
| 295 | *qalaŋ* | *?alaŋ* | *?alaŋ* | village |
| 220 | *malah* | *malah* | *malah* | to warm |
| 53 | *lukus* | *lukus* | *lukus* | clothes |
| 91 | *mtakuy* | *matakur* | *mtakur* | fall |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 269 | *habuk* | *habuk* | *habuk* | straps |
| 268 | *btunux* | *batunux* | *btunux* | stone |
| 250 | *mhnuk* | *mahnuk* | *mhnuk* | soft |
| 266 | *sknux* | *sakanux* | *sknux* | stink |
| 123 | *tunux* | *tunux* | *tunux* | head |
| 115 | *musa?* | *musa?* | *musa?* | go |
| 121 | *lubuw* | *lubuw* | *lubuw* | jew's-harp |
| 281 | *pqaya?* | *pa?aya?* | *pqaya?* | hang down |
| 43 | *bliŋ* | *baliŋ* | *bliŋ* | cave, hole |
| 278 | *tmalaŋ* | *tumalaŋ* | *tmalaŋ* | taste |
| 40 | *mlawa?* | *malawa?* | *mlawa?* | call |
| 192 | *kulu?* | *kulu?* | *kulu?* | pail, box |
| 242 | *syaw* | *syaw* | *siyaw* | side |
| 267 | *lhbun* | *lahabun* | *lhbun* | stomach |
| 21 | *habuk* | *habuk* | *habuk* | belt |
| 66 | *para?* | *para?* | *para?* | deer |
| 36 | *smayuk* | *sumaruk* | *smaruk* | broil |
| 29 | *qasu?* | *?asu?* | *?asu?* | boat |
| 96 | *qnalaŋ* | *?inalaŋ* | *qnalaŋ* | fence |
| 157 | *gitu?* | *gitu?* | *gitu?* | loquat |
| 156 | *bgiya?* | *bagira?* | *bgiya?* | reed of loom |
| 214 | *mbinah* | *mubinah* | *mbrinah* | return |
| 52 | *galiq* | *gali?* | *galiq* | cloth |
| 110 | *raŋi?* | *raŋi?* | *daŋi?* | friend |
| 85 | *gbyan* | *gabyan* | *gbiyan* | evening |
| 15 | *ŋurus* | *ŋurus* | *ŋudus* | beard |
| 154 | *prahuŋ* | *parahuŋ* | *pdahuŋ* | lips |
| 162 | – | *habaraw* | *hbaraw* | many (people) |
| 320 | – | *matas* | *matas* | write |
| 160 | – | *lalbu?* | *llbu?* | low |
| 77 | – | *bicuw* | *bicuw* | earthworm |
| 293 | – | *tarasi?* | *tarasi?* | umbrella |
| 270 | – | *mŋaŋah* | *mŋaŋah* | stupid |
| 152 | – | *raklic* | *raklic* | leopard |
| 145 | – | *mapika?* | *mpika?* | lame |
| 14 | – | *baluku?* | *bluku?* | winnowing |
| 273 | – | *lumaŋuy* | *lmaŋuy* | swim |
| 200 | – | *haruŋ* | *haruŋ* | pine tree |
| 16, 207 | – | *mabatunux* | *mbtunux* | beautiful, lovely |
| 9 | – | *batakan* | *btakan* | bamboo |
| 8 | – | *?abulic* | *qabulic* | ashes |
| 261 | – | *rapic* | *rapic* | flying squirrel |
| 81 | – | *maspac* | *maspac* | eight |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 323 | *kawas* | – | *kawas* | year |
| 158 | *sumiq* | – | *sumiq* | body louse |
| 314 | *labaŋ* | – | *labaŋ* | wide |
| 75 | *rhyan* | – | *dhran* | earth |
| 234 | *sasaw* | – | *sasaw* | shade |
| 306 | *tminun* | – | *tminun* | weave |
| 67 | *libu?* | – | *libu?* | den, nest |
| 265 | *mrŋin* | – | *mdŋin* | sticky |
| 302 | *qsya?* | – | *qsiya?* | water |
| 184 | *tmatuk* | – | *tmatuk* | nod head |
| 296 | *qsahuy* | – | *qsahur* | mind, inner heart |
| 11 | *yawa?* | – | *rawa?* | bamboo basket |
| 217 | *balay* | - | *balay* | right (correct) |
| 94 | *qthuy* | – | *qthur* | fat, rough |
| 54 | *yuluŋ* | – | *ruluŋ* | cloud |
| 289 | *raŋay* | – | *daŋar* | trap |
| 127 | *sulay* | – | *sulay* | anus |
| 284 | *wayay* | – | *waray* | thread |
| 165 | *karaŋ* | – | *kadaŋ* | molar |
| 280 | *qaya?* | – | *qaya?* | thing |
| 258 | *taku?* | – | *taku?* | spoon, scoop |
| 113 | *?utux* | – | *?utux* | ghost |
| 271 | *bagan* | – | *rbagan* | summer |
| 112 | *qluŋ* | – | *qluŋ* | edible fungus |
| 188 | *smuran* | – | *smudan* | old thing |
| 106 | *phpah* | – | *phpah* | flower |
| 185 | *stunux* | – | *stunux* | noisy |
| 204 | *siyaŋ* | – | *siyaŋ* | pork |
| 100 | *tuba?* | – | *tuba?* | fish-poison |
| 138 | *ku?* | – | *ku?* | I |
| 98 | *puniq* | – | *puniq* | fire |
| 256 | *tuyuq* | – | *tuyuq* | spittle |
| 173 | *slaq* | – | *slaq* | mud |
| 5 | *smyuk* | – | *smiyuk* | answer |
| 147 | *msuqi?* | – | *msuqi?* | late |
| 178 | *puga?* | – | *puga?* | navel |
| 245 | *mtyu?* | – | *mtru?* | six |
| 227 | *kmugus* | – | *kmugus* | scrub |
| 164 | *ska?* | – | *ska?* | middle |
| 31 | *pyatu?* | – | *pratu?* | bowl |
| 42 | *ŋiyaw* | – | *ŋiyaw* | cat |
| 196 | *?utas* | – | *?utas* | penis |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 193 | *supih* | – | *supih* | ladle |
| 175 | *pupuk* | – | *pupuk* | mumps |
| 46 | *laqi?* | – | *laqi?* | child |
| 44 | *bagah* | – | *bagah* | charcoal |
| 124 | *rmaw* | *rumaw* | – | help |
| 82 | *hiku?* | *hiku?* | – | elbow |
| 161 | *bhluk* | *bahiluk* | – | lungs |
| 308 | *mŋilis* | *maŋilis* | – | weep |
| 153 | *mskkiy* | *maskakiy* | – | to lie on one's side |
| 303 | *tgliq* | *tagli?* | – | waterfall |
| 142 | *buq* | *bu?* | – | juice |
| 297 | *mutaq* | *muta?* | – | vomit |
| 135 | *pira?* | *pira?* | – | how many |
| 134 | *mkilux* | *makilux* | – | hot (weather) |
| 36 | *smayuk* | *sumaruk* | – | broil |
| 35 | *maras* | *maras* | – | bring |
| 2 | *bgayaw* | *bagayaw* | – | Alocasia |
| 285 | *lmuhuw* | *lumuhuw* | – | thread a needle |
| 205 | *limuk* | *limuk* | – | pot |
| 119 | *quri?* | *?uri?* | – | hair, gray |
| 78 | *qpuri?* | *?apuri?* | – | earwax |
| 114 | *miq* | *mi?* | – | give |
| 24 | *mŋihuy* | *maŋihur* | – | salty, hot |
| 111 | *mtŋi?* | *matŋi?* | – | full |
| 192 | *kulu?* | *kulu?* | – | pail, box |
| 259 | *smamaw* | *sumamaw* | – | spread a mat |
| 95 | *mŋuŋu?* | *maŋuŋu?* | – | fear |
| 181 | *sinyuw* | *sinyuw* | – | necklace |
| 79 | *maniq* | *mani?* | – | eat |
| 210 | *mgaliq* | *magali?* | – | ragged |
| 218 | *tuqiy* | *tu?iy* | – | road |
| 252 | *yama?* | *yama?* | – | son-in-law |
| 240 | *qsuyan* | *?asuran* | – | elder sibling |
| 159 | *kuhiŋ* | *kuhiŋ* | – | head louse |
| 190 | *tanux* | *tanux* | – | outside |
| 206 | *ŋahi?* | *ŋahi?* | – | sweet potatoes |
| 33 | *bubu?* | *bubu?* | – | breasts |
| 80 | *tlaqiy* | *tula?iy* | – | eel |
| 41 | *rknus* | *rakinus* | – | camphor laurel |

Table 7 shows that the three dialects share 47 true cognates (strength = 1). Palngawan shares 35 true cognates exclusively with Mstbaun, whereas it shares only 16 true cognates exclusively with Inago. We may draw a tentative conclusion from these numbers that Palngawan shares more cognates with Atayal than Sediq; therefore, Palngawan should be classified as an Atayal dialect, as suggested by Li (1985). However, Mstbaun shares 46 cognates exclusively with Inago but only 35 with Palngawan. It would be misleading to draw the conclusion that Mstbaun should be classified as a Sediq dialect rather than an Atayal dialect.

We then examined the list of cognates at lower strengths of correspondences to find out if the number of shared cognates would change as the threshold is lowered. The results are presented in Tables 8–10 for those with strengths (1) between 0.95 and 1.00, (2) between 0.90 and 0.95, and (3) between 0.85 and 0.90, respectively.

**Table 8:** Comparison of cognates (0.95 <= strength < 1.00) among Mstbaun, Palngawan, and Inago based on the word list of 326 lexical items

(* indicates the item also occurs in Table 7 between different dialects)

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 233 | *smaqis* | *cuma?is* | *sma?is* | sew |
| 194 | *tmapaŋ* | *cumapaŋ* | *smapaŋ* | patch |
| 245 | – | *matu?* | *mtru?* | six* |
| 296 | – | *?acahur* | *qsahur* | mind, heart* |
| 239 | – | *gikus* | *gikus* | shuttle |
| 45 | – | *paskani?* | *paskan* | chew |
| 3 | – | *masa?aŋ* | *masaaŋ* | angry |
| 262 | – | *buhuc* | *brihuc* | squirrel |
| 103 | – | *banux* | *brnux* | flat |
| 60 | – | *kumuc* | *kmruc* | kill |
| 133 | – | *rami?* | *dmai?* | horse |
| 126 | – | *babawi?* | *babaraw* | high |
| 302 | – | *?usye?* | *qsiya?* | water* |
| 235 | – | *mic* | *miric* | sheep |
| 142 | – | *bu?* | *biyuq* | juice* |
| 255 | – | *turu?* | *tudu?* | spine |
| 204 | – | *syeŋ* | *siyaŋ* | pork* |
| 155 | *bsyaq* | – | *busiyaq* | long time |
| 136 | *m?uyay* | – | *mu?uray* | hungry |
| 257 | *tmuyoq* | – | *tmuyuq* | spit |
| 68 | *mhoqin* | – | *mhuqin* | die |
| 38 | *lmoŋ* | – | *lmauŋ* | burn |
| 237 | *qhyaŋ* | – | *hiraŋ* | shoulder |
| 317 | *qmisan* | - | *misan* | winter |
| 197 | *qsyu?* | - | *sru?* | pestle |
| 245 | *mtyu?* | *matu?* | – | six* |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 296 | *qsahuy* | *ʔacahur* | – | mind, heart* |
| 145 | *pikaʔ* | *mapikaʔ* | – | lame |
| 54 | *yuluŋ* | *raruluŋ* | – | cloud* |
| 64 | *kaxaʔ* | *makaxaʔ* | – | day after |
| 113 | *ʔutux* | *ʔamutux* | – | ghost* |
| 270 | *ŋaŋah* | *mŋaŋah* | – | stupid* |
| 47 | *gmoyaw* | *gumuraw* | – | choose |
| 271 | *bagan* | *ʔabagan* | – | summer* |
| 56 | *mumuk* | *ʔumumuk* | – | cover |
| 319 | *smabuʔ* | *cumabuʔ* | – | wrap |
| 264 | *hokuʔ* | *hukuʔ* | – | stick |
| 311 | *knon* | *kanun* | – | when |
| 209 | *ŋahoq* | *ŋahuʔ* | – | pus |
| 291 | *mpusan* | *mapusar* | – | twenty |
| 265 | *mrŋin* | *muraŋir* | – | sticky* |
| 202 | *pturiŋ* | *panturiŋ* | – | point at |
| 225 | *mtnaq* | *mintanaʔ* | – | same |
| 77 | *bisuw* | *bicuw* | – | earthworm* |

**Table 9:** Comparison of cognates (0.90 <= strength < 0.95) among Mstbaun, Palngawan, and Inago based on the word list of 326 lexical items

(@ indicates this item also occurs in Table 8 between different dialects,
* indicates this item also occurs in Table 7 between different dialects)

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 88 | *tquciʔ* | *tiʔutiʔ* | *tquciʔ* | break wind |
| 26 | *qalux* | *makalux* | *mqalux* | black |
| 144 | *tmuciŋ* | *tumutiŋ* | *tmuciŋ* | knock |
| 243 | *ramat* | *raramac* | *damac* | side dish |
| 86 | *quciʔ* | *ʔutiʔ* | *quciʔ* | excrement |
| 167 | *ruŋay* | *ruŋiy* | *ruŋay* | monkey |
| 94 | *qthuy* | *katuhur* | *qtəhur* | fat, rough |
| 197 | *qsyuʔ* | *ʔasuʔ* | *sruʔ* | pestle |
| 8 | *qbuliʔ* | *ʔabulic* | *qabulic* | ashes |
| 224 | *cimuʔ* | *timuʔ* | *cimuʔ* | salt |
| 14 | *lukuʔ* | *balukuʔ* | *blukuʔ* | winnowing |
| 240 | – | *ʔasuran* | *qbsuran* | elder sibling* |
| 2 | – | *bagayaw* | *barayaw* | Alocasia* |
| 284 | – | *wariy* | *waray* | thread* |
| 68 | – | *mahuʔir* | *mhuqin* | die@ |
| 38 | – | *lumoŋ* | *lmauŋ* | burn@ |
| 127 | – | *suliy* | *sulay* | anus* |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 280 | – | *ya?aya?* | *qaya?* | thing* |
| 211 | – | *warux* | *qwarux* | rattan |
| 236 | – | *cumbu?* | *smbu?* | shoot |
| 11 | – | *rarawa?* | *rawa?* | bamboo basket* |
| 124 | – | *rumaw* | *dmayaw* | help* |
| 54 | – | *raruluŋ* | *ruluŋ* | cloud*@ |
| 47 | – | *gumuraw* | *gmaw* | choose@ |
| 303 | – | *tagli?* | *tglaq* | waterfall |
| 225 | – | *mintana?* | *mtna?* | same@ |
| 108 | – | *ciŋas* | *sas* | food particle |
| 155 | – | *buse?* | *busiyaq* | long time@ |
| 4 | – | *sm?ay?aya?* | *smqaya?* | annoyed* |
| 290 | – | *kahnuni?* | *qhuni?* | tree |
| 254 | – | *sinburaŋan* | *smbraŋan* | spear |
| 203 | – | *?arinuc* | *mqrinuc* | poor |
| 57 | – | *rarapa?* | *dapa?* | cow |
| 189 | – | *gumawah* | *rmawah* | open |
| 282 | – | *luŋluŋ* | *lmŋluŋ* | think |
| 291 | – | *mapusar* | *mpusal* | twenty@ |
| 113 | – | *?amutux* | *?utux* | ghost@ |
| 56 | – | *?umumuk* | *gmumuk* | cover@ |
| 175 | – | *tapupuk* | *pupuk* | mumps |
| 271 | – | *?abagan* | *rbagan* | summer*@ |
| 240 | *qsuyan* | – | *qbsuran* | elder sibling* |
| 2 | *bgayaw* | – | *barayaw* | Alocasia* |
| 260 | *kmut* | – | *kmruc* | kill@ |
| 261 | *yapit* | – | *rapic* | flying squirrel* |
| 9 | *takan* | – | *btakan* | bamboo* |
| 70 | *ŋaŋah* | – | *mŋaŋah* | stupid*@ |
| 145 | *pika?* | – | *mpika?* | lame@ |
| 276 | *mlahaŋ* | – | *qmalahaŋ* | take care |
| 316 | *tmabus* | – | *tmbus* | winnow |
| 81 | *mspat* | – | *maspac* | eight* |
| 70 | *spi?* | – | *mspi?* | dream |
| 65 | *qanux* | – | *ruqnux* | deer* |
| 59 | *cyaquŋ* | – | *cyaquŋ* | crow |
| 92 | *waqit* | – | *waqic* | fang |
| 230 | *mita?* | – | *qmita?* | see |
| 262 | *bhot* | – | *brihuc* | squirrel@ |
| 235 | *mic* | – | *miric* | sheep@ |
| 229 | *siluŋ* | – | *wusiluŋ* | sea, lake |
| 152 | *kli?* | – | *raklic* | leopard* |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 260 | *kmut* | *kumuc* | – | kill@ |
| 284 | *wayay* | *wariy* | – | thread* |
| 68 | *mhoqin* | *mahu?ir* | – | die@ |
| 38 | *lmoŋ* | *lumoŋ* | – | burn@ |
| 261 | *yapit* | *rapic* | – | flying squirrel* |
| 127 | *sulay* | *suliy* | – | anus* |
| 280 | *qaya?* | *ya?aya?* | – | thing* |
| 9 | *takan* | *batakan* | – | bamboo* |
| 200 | *hayuŋ* | *haruŋ* | – | pine tree* |
| 81 | *mspat* | *maspac* | – | eight* |
| 293 | *cyasi?* | *tarasi?* | – | umbrella* |
| 136 | *m?uyay* | *ma?uriy* | – | hungry@ |
| 168 | *byaciŋ* | *buratiŋ* | – | moon |
| 326 | *simu* | *cimu* | – | you (pl.) |
| 23 | *kmat* | *kumac* | – | bite |
| 87 | *squci?* | *mas?uti?* | – | defecate |
| 198 | *byok* | *barok* | – | pig |
| 37 | *mumun* | *rumumur* | – | bud |
| 304 | *sami* | *cami* | – | we (excl.) |
| 179 | *sobih* | *sobih* | – | near |
| 109 | *payat* | *parac* | – | four |
| 93 | *tohiy* | *tuhiya?* | – | far |
| 222 | *gamin* | *gamir* | – | root |
| 12 | *tokan* | *tokan* | – | man's basket |
| 301 | *qsya?* | *?usye?* | – | water@ |
| 216 | *pagay* | *pagiy* | – | rice plant |
| 75 | *rhyan* | *rahar* | – | earth* |
| 287 | *hmali?* | *hamalic* | – | tongue |
| 58 | *kagaŋ* | *kakagaŋ* | – | crab |
| 16 | *betunux* | *mabatunux* | – | beautiful* |
| 301 | *mahuq* | *mabahu?* | – | wash (clothes) |

**Table 10:** Comparison of cognates (0.85 <= strength < 0.90) among Mstbaun, Palngawan, and Inago based on the word list of 326 lexical items

($ indicates this item also occurs in Table 9 between different dialects, @ indicates this item also occurs in Table 8 between different dialects, * indicates this item also occurs in Table 7 between different dialects)

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 78 | *qpuri?* | *?apuri?* | *qpuji?* | earwax |
| 311 | *knon* | *kanun* | *knuwan* | when |
| 61 | *mnkuŋ* | *miŋkuŋ* | *mkuuŋ* | dark |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 50 | *mkaraw* | *uŋkaraw* | *mkraw* | climb |
| 103 | *bʔnux* | *banux* | *brnux* | flat |
| 215 | *box* | *box* | *buwax* | rice, husked |
| 236 | *mbuʔ* | *cumbuʔ* | *smbuʔ* | shoot |
| 229 | – | *waciluŋ* | *wusiluŋ* | sea, lake$ |
| 5 | – | *cumik* | *smiyuk* | answer* |
| 92 | – | *wawaʔic* | *waqic* | fang$ |
| 237 | – | *haŋaliʔ* | *hiraŋ* | shoulder@ |
| 12 | – | *tokan* | *tokan* | man's basket$ |
| 143 | – | *putiŋ* | *puciŋ* | small knife |
| 159 | – | *kuhiŋ* | *quhiŋ* | head louse |
| 23 | – | *kumac* | *kmyuc* | bite$ |
| 140 | – | *ʔumbuw* | *rmbuw* | immerse |
| 28 | – | *yumuk* | *miyuk* | blow |
| 136 | – | *maʔuriy* | *muʔuray* | hungry$@ |
| 265 | – | *muraŋir* | *mdŋin* | sticky*@ |
| 20 | – | *nabos* | *nbuyas* | belly |
| 98 | – | *hapuniʔ* | *puniq* | fire* |
| 79 | – | *maniʔ* | *mkan* | eat* |
| 177 | – | *ragirir* | *dgrin* | narrow |
| 120 | – | *maʔas* | *mqaras* | happy |
| 46 | – | *ʔuleʔ* | *laqiʔ* | child* |
| 222 | – | *gamir* | *gamil* | root |
| 12 | *tokan* | – | *tokan* | man's basket$ |
| 133 | *rmeʔ* | – | *dmaiʔ* | horse@ |
| 290 | *qhoniq* | – | *qhuniʔ* | tree$ |
| 282 | *mŋluŋ* | – | *lmŋluŋ* | think$ |
| 124 | *rmaw* | – | *dmayaw* | help*$ |
| 132 | *tryuŋ* | – | *tjiyuŋ* | hornet |
| 208 | *mhoniʔ* | – | *muhnuniʔ* | priest-shaman |
| 146 | *keʔ* | – | *kariʔ* | language |
| 225 | *mtnaq* | – | *mtnaʔ* | same@$ |
| 301 | *mahuq* | – | *mahuʔ* | wash (clothes)$ |
| 228 | *sokiʔ* | – | *sokiʔ* | scythe |
| 200 | *hayuŋ* | – | *haruŋ* | pine tree |
| 83 | *qmyuʔ* | – | *mʔruʔ* | epidemic |
| 45 | *pskon* | – | *paskan* | chew* |
| 195 | *matuk* | – | *gmatuk* | peck |
| 56 | *mumuk* | – | *gmumuk* | cover@$ |
| 285 | *lmuhuw* | – | *lmihuw* | thread a needle |
| 90 | *rqes* | – | *daqras* | face |
| 291 | *mpusan* | – | *mpusal* | twenty@$ |

| Number | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| 141 | *kraya?* | – | *daya?* | inland |
| 163 | *raga?* | – | *dara?* | maple tree |
| 119 | *quri?* | – | *quji?* | hair, grey* |
| 319 | *smabu?* | – | *lmabu?* | wrap |
| 142 | *buq* | – | *biyuq* | juice*@ |
| 264 | *hoku?* | – | *hukuc* | stick@ |
| 229 | *siluŋ* | *waciluŋ* | – | sea, lake$ |
| 5 | *smyuk* | *cumik* | – | answer* |
| 92 | *waqit* | *wawa?ic* | – | fang$ |
| 237 | *qhyaŋ* | *haŋali?* | – | shoulder@ |
| 133 | *rme?* | *rami?* | – | horse@ |
| 290 | *qhoniq* | *kahuni?* | – | tree$ |
| 148 | *kira?* | *kīra* | – | a little later |
| 262 | *bhot* | *buhuc* | – | squirrel*@ |
| 155 | *bsyaq* | *buse?* | – | long time@$ |
| 175 | *pupuk* | *tapupuk* | – | mumps*$ |
| 212 | *mteloq* | *matelu?* | – | raw |
| 13 | *kiri?* | *kagiri?* | – | woman's basket |
| 137 | *qmaluk* | *malrak* | – | hunt |
| 263 | *metaq* | *meta?* | – | stab |
| 84 | *mgey* | *magiy* | – | escape |
| 324 | *hera?* | *hira?* | – | yesterday |
| 152 | *kli?* | *raklic* | – | leopard*$ |
| 318 | *kyu?* | *kuya?* | – | worm |
| 238 | *boluŋ* | *baluluŋ* | – | shrimp |
| 279 | *boq royeq* | *bu?na rori?* | – | tears |

As we lower the threshold to include all cognate pairs with strength ranges above 0.85, the total numbers of cognates exclusively shared between Palngawan–Inago (PA–IN), Mstbaun–Palgnawan (MS–PA), and Mstbaun–Inago (MS–IN) change depending on how the strength level is set.

| Strength | PA–IN | MS–IN | MS–PA |
|---|---|---|---|
| 1.00 | 16 | 46 | 35 |
| ≥0.95 | 31 | 54 | 54 |
| ≥0.90 | 60 | 73 | 85 |
| ≥0.85 | 79 | 98 | 105 |

Therefore, we decided to use only true cognates (strength = 1.00) for comparison. Remember that even this decision is not without arbitrariness. The relationship among the three dialects can be represented in Figure 1.

IN _____ MS _____ PA

**Figure 1**: Dialect chain based on lexical similarity data

This result does not lead us to believe that Palngawan should be classified under either Atayal or Sediq, but rather it shows Palngawan is at the periphery of the Atayalic dialect chain.

A further breakdown of the list of cognates according to their strengths of correspondences can help us define what should be considered exclusively shared cognates between a pair of dialects. Some pairs, indicated with *, @ or $ in Table 10, may change their status from exclusively shared cognates between a pair of dialects to cognates among all three dialects when the strength is lowered; for example, #5 'answer', #92 'fangs', #237 'shoulder', #12 'man's basket', #133 'horse', and #290 'tree'. This will help us evaluate Li's (1985) results with a quantified criterion for exclusively shared cognates.

Before we turn to Li's study, we present the partial results ($0.85 \leq$ strength $\leq 1$) of the COMPASS analysis for the word list of 190 lexical items in Table 11 for comparison.

**Table 11:** Comparison of cognates between Mstbaun and Palngawan based on the word list of 190 lexical items

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| **(strength = 1.00)** | | | |
| 57 | *raŋi?* | *raŋi?* | friend |
| 22 | *?irah* | *?irah* | sister-in-law |
| 133 | *miq* | *mi?* | give |
| 17 | *kira?* | *kira?* | later |
| 115 | *buli?* | *buli?* | small knife |
| 108 | *qasu?* | *?asu?* | boat |
| 45 | *squliq* | *ci?uli?* | person |
| **(0.95 ≤ strength < 1.00)** | | | |
| 75 | *rknus* | *rakinus* | camphor laurel |
| 172 | *sasan* | *sasan* | morning |
| **(0.90 ≤ strength < 0.95)** | | | |
| 21 | *bgira?* | *bagiara?* | batten of loom |
| 54 | *wihiŋ* | *wihiŋ* | water leech |
| 179 | *babaw* | *babaw* | above |
| 186 | *lliw* | *liliw* | tip |
| 58 | *bisuw* | *bicuw* | earthworm |
| 99 | *hmali?* | *hamalic* | tongue |
| 123 | *qmuli?* | *?amulic* | mixed cake |
| 43 | *qbuli?* | *?abulic* | ashes |
| 5 | *sbiŋ* | *cacibiŋ* | sweet |
| 177 | *laxi* | *laxi* | don't |
| 18 | *mqeru?* | *ma?iru?* | nine |

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| **(0.85 ≤ strength < 0.90)** | | | |
| 185 | *kuŋ* | *kuriŋ* | I |
| 128 | *lmoŋ* | *lumoŋ* | burn |
| 32 | *hasa* | *haca?* | there |
| 175 | *suxan* | *cuxan* | tomorrow |
| 66 | *tgliq* | *tagli?* | waterfall |
| 6 | *mtalaŋ* | *matatalaŋ* | run |
| 184 | *ska?* | *cacka?* | between |
| 20 | *kiri?* | *kagiri?* | basket |
| 83 | *taŋuw* | *taŋuw* | bud |
| 16 | *pira?* | *pira?* | how many |
| 174 | *soni?* | *soni?* | today |
| 103 | *lihuy* | *lihul* | forehead |
| 124 | *sbil* | *tasbilian* | lunchbox |
| 120 | *tuqiy* | *tu?iy* | road |
| 42 | *kli?* | *rakalic* | leopard |
| 50 | *ŋli?* | *raŋalic* | fly |
| 73 | *kasi?* | *kamcie?* | sugar |
| 7 | *bagan* | *?abagan* | summer |

### *4.2.3 Comparison with Li (1985)*

Li (1985) claimed Palngawan is an Atayal dialect based on lexical evidence because, among the 800 lexical items, Palngawan shared 214 items exclusively with other Atayal dialects (in his List A), but only 11 items with Sediq (in his List B), and had 50 unique lexical items differing both from other Atayal dialects and from Sediq (in his List C). However, as briefly mentioned in §4, the problems with Li's study are twofold: first, the languages for comparison were not constant but depended on which data were available for comparison; and second, a principle of quantification was not established to group cognates. Our results rectify the two problems.

In Li's (1985) study, Palngawan was compared with Mayrinax as the representative of the Atayal dialects and Tongan as that of the Sediq dialects unless indicated otherwise. As shown in Tables 4, 5 and 6, the similarity percentages within each dialect group (Squliq, C'uli', or Sediq) are not necessarily homogeneous, especially among the C'uli' dialects. It is, therefore, misleading to compare Palngawan with a mixture of Squliq and C'uli' dialects with different similarity percentages, grouped together as 'Other Atayal'.

In Li's List A, where Palngawan is shown to share exclusively with other Atayal dialects but differ from the Sediq dialects, the following lexical items would not be included in the list if different strengths of cognates (< 1.00) were considered.

| Number | MS | PA | IN | Strength | Gloss |
|---|---|---|---|---|---|
| 142 | *buq* | *bu?* | | 1.00 | juice |
| | | *bu?* | *biyuq* | 0.95 | |
| | buq | | *biyuq* | 0.85 | |
| 77 | | *bicuw* | *bicuw*[5] | 1.00 | earthworm |
| | *bisuw*[6] | *bicuw* | | 0.95 | |
| 262 | | buhuc | *brihuc* | 0.95 | squirrel |
| | *bhot* | | *brihuc* | 0.90 | |

When strength is set at 1.00, Palngawan is said to share exclusively with Mstbaun in 'juice' (*bu?* vs *buq*). But if the threshold is lowered to 0.95, Inago can be brought into the cognate set with Palngawan (*bu?* vs *biyuq*). If the strength is again lowered to 0.85, all three dialects can be said to share the same cognate (*buq*, *bu?*, and *biyuq*). By the same token, 'earthworm' and 'squirrel' would not be included in Li's List A.

Similarly, in the same list, pairs that Li cited as exclusively shared cognates also demonstrate different levels of strength as follows:

| Number | MS | PA | IN | Strength | Gloss |
|---|---|---|---|---|---|
| 41 | *rknus* | *rakinus* | | 1.00 | camphor laurel |
| 259 | smamaw[7] | *sumamaw* | | 1.00 | spread a mat |
| 153 | *mskkiy* | *maskakiy* | | 1.00 | to lie on one's side |
| 80 | *tlaqiy* | *tula?iy* | | 1.00 | eel |
| 202 | *pturiŋ* | *panturiŋ* | | 0.95 | point at |
| 198 | *byok*[8] | *barok* | | 0.90 | pig |
| 23 | *kmat* | *kumac* | | 0.90 | bite |
| | | *kumac* | [9]*kmyuc* | 0.85 | |
| 84 | *mgey* | *magiy* | | 0.85 | escape |
| 13 | *kiri?*[10] | *kagiri?* | | 0.85 | woman's basket |

In Li's List C and F where Palngawan is shown to be different from both the other Atayal dialects and Sediq, the following two lexical items would not be included in List C if different strengths of cognates were considered.

5 Li's example is *bicur* in Tongan.
6 Li's example is *bisug* in Mayrinax.
7 Li's example is *sumamag* in Mayrinax.
8 Li's examples are *bauwak/?ibubuh* in Mayrinax.
9 Li's example is *qmiyuc* in Tongan.
10 Li's example is *kagisi?* in Mayrinax.

| Number | MS | PA | IN | Strength | Gloss |
|---|---|---|---|---|---|
| 168 | *byaciŋ*[11] | *buratiŋ*[12] | | 0.90 | moon |
| 209 | *ŋahoq* | *ŋahu?*[13] | | 0.95 | pus |

Palngawan shares exclusively with Mstbaun in 'moon' and 'pus' if the strengths are set at 0.90 and 0.95 respectively.

Similarly, the following four lexical items would not be included in List F if different strengths of congates were considered.

| Number | MS | PA | IN | Strength | Gloss |
|---|---|---|---|---|---|
| 237 | *qhyaŋ* | *haŋali?* | *hiraŋ* | 0.85 | shoulder |
| 236 | | *cumbu?* | *smbu?*[14] | 0.90 | shoot |
| 20 | | *nabos* | *nbuyas* | 0.85 | belly |
| 137 | *qmaluk*[15] | *malrak*[16] | | 0.85 | hunt |

'Shoulder' is a cognate among all three dialects at 0.85. Palngawan shares exclusively with Inago in 'shoot' and 'belly' at the level of 0.90 and 0.85 respectively, whereas it shares exclusively with Mstbaun at 0.85 in 'hunt'.

Similarly, based on the results of the COMPASS analysis of the word list of 190 lexical items, partially presented in Table 11, some examples in Li's list A where Palngawan shares exclusively with other Atayal dialects can be ranked according to their strengths as follows.

| Number | MS | PA | Strength | Gloss |
|---|---|---|---|---|
| 45 | *squliq* | *ci?uli?* | 1.00 | person |
| 115 | *buli?* | *buli?* | 1.00 | small knife |
| 5 | *sbiŋ* | *cacibiŋ?* | 0.90 | sweet |
| 175 | *suxan* | *cuxan* | 0.89 | tomorrow |
| 130 | *mtama?* | *tatama?* | 0.77 | sit |
| 104 | *szik* | *sarik* | 0.70 | liver |

But in Li's list F, where Palngawan is different from Squliq and Sediq, the following two examples might be excluded from the list if their strengths as cognates were taken into consideration.

11 Li's example is *buatiŋ* in Mayrinax.
12 Li's example is *baluŋ*.
13 Li's example is *gilu?*.
14 Li's example is *cmebu?*.
15 Li's example is *qmalup*, a form of older generation.
16 Li cited *qumaluap* from Mabatu?an, but no data in Palngawan.

| Number | MS | PA | Strength | Gloss |
|---|---|---|---|---|
| 124 | *sbil* | *tasbilian* | 0.86 | lunchbox |
| 37 | *mu?* | *macmbu?* | 0.54 | shoot |

### 4.3 Summary

Both our shared vocabulary counts and COMPASS analysis seem to, at first glance, point to the conclusion that Palngawan shares more true cognates with Mstbaun than with Inago. But the same method also leads us to the conclusion that Mstbaun is more similar to Inago than Palngawan. If we accept Li's conclusion that Palngawan is closer to Atayal than Sediq based on lexical evidence, and that Palngawan should thus be classified as Atayal, we do not see the whole picture. Only after we understand the lexical similarity between Mstbaun and Sediq can we draw a conclusion on the status of Palngawan. Therefore the results of lexical similarity lead us to believe that, although Palngawan is more similar to Mstbaun than Inago, Mstbaun is also more similar to Inago than Palngawan. In other words, they form a dialect chain, with Mstbaun between Palngawan and Inago. Thus, Palngawan cannot be classified either under Atayal or Sediq but rather at the periphery of the Atayalic dialect chain.
Our investigation of lexical similarity also contributes to further understanding of the problems of interpretation of lexical similarity. We suggested two areas for rectification of the problems in Li (1985). First, the language for comparison should be set constant due to the great divergence among the C'uli' dialects. Second, the criterion for cognate sets can be quantified to reflect relative strengths.

## 5 Sound correspondences

The following section addresses the question whether Palngawan shares more phonological features (i.e. sound change) with Atayal or Sediq. First, the reconstructed phonology and the sound changes that resulted in the contemporary speech varieties are presented. Second, each sound change is documented in detail with actual examples, and data that fail to fit the general patterns are discussed. Finally, four types of sound changes are identified, using Agard's (1984) critieria as further applied in Milliken and Milliken's (1996) work. A rule distribution tableau is made, and correlation coefficients among the sound change rules were calculated to show the relationships among the three Atayalic dialects.

### 5.1 Reconstructed Proto Atayalic phonology

The Proto Atayalic phonology was reconstructed by Li (1981:272), following Dahl's (1976) reconstructed Proto Austronesian phonology, as in Figure 2.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *p* | *t* | | *k* | *q* | *ʔ* | | |
| *b* | *d* | *g'* | *g* | | | *i* | *u* |
| | | *c* | | | | *ə* | |
| | | *s* | *x* | | *h* | *a* | |
| *m* | *n* | | *ŋ* | | | | |
| | *l* | *r* | | | | *aw, ay, uy* | |
| *w* | | *y* | | | | | |

**Figure 2:** Li's reconstructed Proto Atayalic phonology

## 5.2 Sound correspondences from Proto Atayalic to modern reflexes

Table 12 illustrates Li's (1981) reconstructed Proto Atayalic phonology and the reflexes in Mstbaun, Palngawan, and Inago from our data. Three positions are differentiated, namely word-initial (I), word-medial (M), and word-final (F).

**Table 12:** Sound correspondences in Mstbaun, Palngawan, and Inago

| PA | Modern | PA | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|---|
| **p* | *p-p-p* (I) | **pag'ay* | *pagay* | *pagiy* | *payay* | rice plant |
| | *p-p-p* (M) | **ma-pitu?* | *mpitu?* | *mapitu?* | *mpitu?* | seven |
| | *p-k-k* (F) | **miyup* | *myup* | *yumuk* | *miyuk* | blow |
| | *k-k-k* (F) | **qalup* | *qmaluk* | *malrak* | *maduk* | hunt |
| **t* | *t-t-t* (I) | **tunux* | *tunux* | *tunux* | *tunux* | head |
| | *c-t-c* (I) | **tyaquŋ* | *cyaquŋ* | *teʔuŋ* | *cyaquŋ* | crow |
| | *t-t-t* (M) | **kita?* | *mita?* | *tahan* | *qmita?* | see |
| | *c-t-c* (M) | **quti?* | *quci?* | *ʔuti?* | *quci?* | excrement |
| | *t-c-c* (F) | **waqit* | *waqit* | *wawaʔic* | *waqic* | fang |
| **k* | *k-k-k* (I) | **kadaŋ* | *karaŋ* | *kacaŋ* | *kadaŋ* | molar |
| | *k-k-q* (I) | **kuhiŋ/*kucuʔ* | *kuhiŋ* | *kuhiŋ* | *quhiŋ* | head louse |
| | *q-k-q* (I) | **kitəhur* | *qthuy* | *katuhur* | *qtəhur* | fat |
| | *k-k-k* (M) | **skənux* | *sknux* | *sakanux* | *skənux* | stink |
| **q* | *q-ʔ-q* (I) | **qabulid* | *qbuliʔ* | *ʔabulic* | *qabulic* | ashes |
| | *q-ø-q* (I) | **ʔulaqiʔ* | *laqiʔ* | *ʔuleʔ* | *laqiʔ* | child |
| | *q-ø-ø* (I) | **qhiraŋ* | *qhyaŋ* | *haŋaliʔ* | *hiraŋ* | shoulder |
| | *q-ʔ-ʔ* (M) | **cumaqis* | *smaqis* | *cumaʔis* | *smaʔis* | sew |
| | *q-q-q* (F) | **cəlaq* | *slaq* | *calaq* | *səlaq* | mud |
| | *q-ʔ-ʔ* (F) | **mabahuq* | *mahuq* | *mabuhuʔ* | *mahuʔ* | wash clothes |
| **ʔ* | *ʔ-ʔ-ʔ* (I) | **ʔimaʔ* | *ʔimaʔ* | *ʔimaʔ* | *ʔimaʔ* | who |
| | *ʔ-ʔ-ʔ* (M) | **muʔuray* | *mʔuyay* | *maʔuriy* | *muʔuray* | hungry |
| | *ʔ-ʔ-ʔ* (F) | **qudiʔ* | *quriʔ* | *ʔuriʔ* | *qujiʔ* | gray hair |

| PA | Modern | PA | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|---|
| *b | ß-b-b (I) | *batunux | ßtunux | batunux | btunux | stone |
| | k-k-k (F) | *masurab/ *masuwab | msuyak | masurak | msurak | yawn |
| *d | r-r̃-d (I) | *daqis | rqes | r̃ayes | daqəras | face |
| | r-ʔ-d (I) | *dapal | rapan | ʔapar | dapin | sole |
| | r-r-d (M) | *pada? | para? | para? | pada? | pygmy deer |
| | r-r-j (M) | *qudi? *qudas | quri? | ʔuri? | quji? | grey hair |
| | ʔ-c-c (F) | *qawlid | qoli? | ʔolic | qowlic | mouse |
| *g | ɣ-g-g (I) | *gamil | ɣamin | gamir | gamin | root |
| | ɣ-g-g (M) | *kumugus | kmuɣus | kakugus | kmugus | scrub |
| | ø-ø-r (M) | *qagum | qom | ʔoŋ | ʔaruŋ | anteater |
| | ø-ø-ø (M) | *kagac | kmat | kumac | kmyuc | bite |
| | ɣ-ø-r (M) | *daga? | raɣa? | r̃a? | dara? | Maple tree |
| | y-y-y (F) | *bunaqig | bnaqiy | buna?iy | bnaqiy | sand |
| | w-w-w (F) | *lubug | lubuw | lubuw | lubuw | jew's-harp |
| *g[17] | ɣ-g-r (M) | *bagayag | bɣayaw | bagayaw | barayaw | Alocasia |
| *g' | r-r-y (M) | *pig'a? | pira? | pira? | piya? | how many |
| | y-r-y (M) | *bagig'a? | bgiya? | bagira? | bgiya? | reed of loom |
| | r-r-g (M) | *cuhig'a? | hera? | hira? | siga? | yesterday |
| | y-y-y (F) | *mabarig' | baziy | miniy | mariy | buy |
| | y-y-y (F) | *kəgig' | kgiy | kuŋkagiy | kəriy | hemp |
| *c | s-c-s (I) | *cəlaq | slaq | calaq | səlaq | mud |
| | s-c-s (M) | *qacahur | qsahuy | ʔacahur | qsahur | inner heart |
| | ʔ-ʔ-c (F) | ʔhawkuc | hoku? | huku? | hukuc | stick |
| | t-c-c (F) | *kuməguc | kmut | kumuc | kmruc | kill |
| *s | s-s-s (I) | *siyag | syaw | syaw | siyaw | side |
| | ø-ø-s (I) | *səpat | payat | parac | səpac | four |
| | s-s-s (M) | *mapusal | mpusan | mapusar | mpusan | twenty |
| | s-s-s (F) | *lukus | lukus | lukus | lukus | clothes |
| *x | x-x-x (M) | *makaxa? | kaxa? | makaxa? | ŋkaxa? | day after tomorrow |
| | x-x-x (F) | *tunux | tunux | tunux | tunux | head |
| *h | h-h-h (I) | *hii? | hi? | hi? | hii? | flesh |
| | ø-h-ø (I) | *hapuy | puniq | hapuni? | puniq | fire |
| | h-h-h (M) | *mabahuq | mahuq | mabuhu? | mahu? | wash clothes |
| | h-h-h (F) | *malah | malah | malah | malah | to warm |
| *r[18] | ø-ø-r (M) | *kari? | ke? | ke? | kari? | language |
| | z-ø-g (M) | *ʔiril | tzin | ʔir | ʔigiy | left |

17 This *g corresponds to Proto Austronesian *ɣ.

18 This *r corresponds to Proto Austronesian *ɣ.

| PA | Modern | PA | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|---|
| *r | *y-r-r* (I) | **ruluŋ* | *yuluŋ* | *raruluŋ* | *ruluŋ* | cloud |
| | *ø-r-l* (I) | **rima?* | *imagan* | *ramagar* | *lima?* | five |
| | *ø-r-r* (I) | **raŋaw* | *ŋli?* | *raŋalic* | *rəŋəci?* | fly |
| | *y-r-r* (M) | **qəbəsuran* | *qsuyan* | *?asuran* | *qbsuran* | elder sibling |
| | *z-n-r* (M) | **mabarig'* | *baziy* | *miniy* | *mariy* | buy |
| | *y-ø-r* (M) | **matəru?* | *mtyu?* | *matu?* | *mtəru?* | six |
| | *y-r-r* (F) | **kitəhur* | *qthuy* | *katuhur* | *qtəhur* | fat |
| *l[19] | *l-l-l* (I) | **lumuhug* | *lmuhuw* | *lumuhuw* | *lmihuw* | thread a needle |
| *l | *l-l-l* (M) | **pila?* | *pila?* | *pila?* | *pila?* | money |
| | *ø-ø-ø* (M) | **qaliutux* | *?utux* | *?amutux* | *?utux* | ghost |
| | *n-r-n* (F) | **mapusal* | *mpusan* | *mapusar* | *mpusan* | twenty |
| *n | *n-n-n* (M) | **tinun* | *tminun* | *tuminu?* | *tminun* | weave |
| *m | *m-m-m* (I) | **mataq* | *mteloq* | *matelu?* | *mi?iluq* | raw |
| | *m-m-m* (M) | **?ima?* | *?ima?* | *?ima?* | *?ima?* | who |
| | *ŋ-ŋ-ŋ* (F) | **padahum* | *prahuŋ* | *parahuŋ* | *pdahuŋ* | lips |
| *ŋ | *ŋ-ŋ-ŋ* (I) | **ŋuŋu?* | *ŋuŋu?* | *ŋuŋu?* | *ŋuŋu?* | tail |
| | *ŋ-ŋ-ŋ* (F) | **kadaŋ* | *karaŋ* | *kacaŋ* | *kadaŋ* | molar |
| *w | *w-w-w* (I) | **waray* | *wayay* | *wariy* | *waray* | thread |
| | *w-w-w* (M) | **rawa?* | *yawa?* | *rarawa?* | *rawa?* | bamboo basket |
| *y | *y-y-y* (M) | **qəya?* | *qaya?* | *ya?aya?* | *qaya?* | thing |
| *a | *a-a-a* (M) | **?ita?* | *?ita?* | *?ita?* | *?ita?* | we (incl.) |
| | *a-a-a* (M) | **caqis* | *smaqis* | *cuma?is* | *sma?is* | sew |
| | *ø-a-a* (M) | **laŋuy* | *mŋyoq* | *lumaŋuy* | *lmaŋuy* | swim |
| *i | *i-i-i* (M) | **?inu?* | *?inu?* | *?inu?* | *?inu?* | where |
| | *i-i-i* (M) | **daŋi?* | *raŋi?* | *raŋi?* | *daŋi?* | friend |
| *u | *u-u-u* (M) | **kucu?* **kuhiŋ* | *kuhiŋ* | *kuhiŋ* | *quhiŋ* | head louse |
| | *u-u-u* (M) | **?isu?* | *?isu?* | *?isu?* | *?isu?* | you (sg.) |
| *ə | *ə-u-ə* (M) | **bənaqig* | *bənaqiy* | *buna?iy* | *bənaqiy* | sand |
| | *ø-ø-ə* (M) | **rakəlid* | *kli?* | *raklic* | *rakəlic* | leopard |
| *aw | *o-o-o* (M) | **tawkan* | *tokan* | *tokan* | *tokan* | man's basket |
| | *o-u-o* (M) | **manahawqil* | *mhoqin* | *mahu?ir* | *mhoqin* | die |
| | *aw-aw-aw* (F) | **babaw* | *babaw* | *bawi?* | *baraw* | above |
| *ay | *e-e-e* (M) | **maytaq* | *metaq* | *meta?* | *metaq* | stab |
| | *ay-iy-ay* (F) | **pag'ay* | *pagay* | *pagiy* | *payay* | rice plant |
| *ai | *e-e-ai* (M) | **suwai?* | *sswe?* | *suse?* | *swai?* | younger sibling |
| *uy | *u-u-u* (M) | **kahuy* | *qhuniq* | *kahuni?* | *qhuni?* | tree |
| | *y-uy-uy* (F) | **laŋuy* | *mŋyoq* | *lumaŋuy* | *lmaŋuy* | swim |
| *ø[20] | *ø-ø-ø* (M) | **sauk* | *smok* | *suŋkanux* | *pskənux* | smell |

19 This **l* corresponds to Proto Austronesian **c*.

20 This *ø* corresponds to Proto Austronesian **g'*.

## 5.3 Sound change in the Atayalic group

We begin our discussion with the sound changes that are characterised by Li (1980) as genetically shared by most dialects in the entire group. Some sound changes are completed changes (§5.3.1), while others are ongoing changes (§5.3.2). Sound correspondences that occurred three or more times in our COMPASS analysis are included in our discussion.

### *5.3.1 Completed changes*

*5.3.1.1* -t, -d > -c

In Palngawan and Inago, *-t, -d > -c*:

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **waqit* | *t-c-c* | *waqit* | *wawa?ic* | *waqic* | fang |
| **qawlid* | *?-c-c* | *qoli?* | *?olic* | *qowlic* | mouse |

*5.3.1.2* -b > -p

No examples that illustrate the rule *-b > -p* can be found in our data because most of them have further undergone *-p > -k*.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **masurab/ *masuwab* | *k-k-k* | *msuyak* | *masurak* | *msurak* | yawn |

*5.3.1.3* *-g > -w, -y

Final *-g becoming *-w* or *-y* in all three dialects is illustrated below:

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **bunaqig* | *y-y-y* | *bnaqiy* | *buna?iy* | *bnaqiy* | sand |
| **lubug* | *w-w-w* | *lubuw* | *lubuw* | *lubuw* | jew's-harp |

*5.3.1.4* c > s

In Mstbaun and Inago, *c > s*:

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **cəlaq* | *s-c-s* | *slaq* | *calaq* | *səlaq* | mud |
| **qacahur* | *s-c-s* | *qsahuy* | *?acahur* | *qsahur* | inner heart |

### *5.3.2 Ongoing changes*

*5.3.2.1* -l > -n

In both Mstbaun and Inago, *-l* > *-n*, but in Palngawan, *-l* > *-r* (retroflex *r*).

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **mapusal* | *n-r-n* | *mpusan* | *mapusar* | *mpusan* | twenty |

There are variations between *-l* and *-n* as illustrated by the following list of words (Table 13) from our preliminary fieldwork in Mstbaun. Age was found to influence the direction of change (Li 1982a). But further investigation is needed to determine whether the variation is due to lexical diffusion or conditioned by other phonological and social factors.

**Table 13:** Variations between *-l* and *-n* in Mstbaun

| Gloss | Informant 1 (Y.P. 65 years old) | Informant 2 (B.T. 34 years old) |
|---|---|---|
| hundred | *kbhol* | *kbhol* |
| lunch box | *sbil* | *sbil* |
| bladder | *bubul* | *bubul* |
| earth | *rhyal* | *rhyan* |
| dog | *hozil* | *hozin* |
| Atayal | *tayal, tayan* | *tayal* |
| thirty | *mtyul, mtyun* | *mtyun* |
| pain | *mxan* | *mxan, mxal* |
| woman | *knerin* | *knerin* |
| die | *mhoqin* | *mhoqin* |
| three | *ciwan* | *ciwan* |

In some cases, *-n* is further changed to *-ŋ*:

| Gloss | Informant 1 (Y.P. 65 years old) | Informant 2 (B.T. 34 years old) |
|---|---|---|
| hair | *bukil* | *bukiŋ* |

In the following examples, word medial *-l-* is deleted in all three dialects :

| PA | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|
| **qaliutux* | *ʔutux* | *ʔamutux* | *ʔutux* | ghost |

*5.3.2.2* -p > -k, -m > -ŋ

The changes from final *-p* to *-k* and from final *-m* to *-ŋ* are illustrated in the following examples:

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **qalup* | *k-k-k* | *qmaluk* | *malrak* | *maduk* | hunt |
| **padahum* | *ŋ-ŋ-ŋ* | *prahuŋ* | *parahuŋ* | *pdahuŋ* | lips |

Even though the changes are considered complete in Li's (1982) study, our preliminary investigation of a few words with final *-p* and *-m* in Mstbaun (Tables 14, 15) indicates there is still change in progress. There is another variation between *-k* and *-c* in the process of change that requires further investigation.

**Table 14:** Variations between *-p*, *-k* and *-c* in Mstbaun

| Gloss | Informant 1 (Y.P. 65 years old) | Informant 2 (B.T. 34 years old) |
|---|---|---|
| seed | *qhak* | *qhap* |
| blow | *zimuk* | *myup* |
| yawn | *msuyak* | *msuyak* |
| catch | *kmiyak* | *kmiyak* |
| eaves | *talak* | *talak* |
| sink | *tgiyuk* | *tgiyuk* |
| enter | *miyuk* | *miyuk* |
| hunt | *qmaluk* | *qmaluk* |
| opposite shore | *qciyak* | *qciyak* |
| scissors | *qatak* | *qatak* |
| ginger | *qurik* | *qurik* |
| stab | *hmak* | *hmak* |
| suck | *pshuk* | *pshuc* |
| fold | *qmuyuc* | *qmuyuc* |
| to fish | *pnec* | *pnec* |

**Table 15:** Variations between *-m* and *-ŋ* in Mstbaun

| Gloss | Informant 1 (Y.P. 65 years old) | Informant 2 (B.T. 34 years old) |
|---|---|---|
| ant-eater | *qom* | *qom* |
| pork | *syam* | *syaŋ* |
| needle | *rom* | *roŋ* |
| grope | *hŋhuŋ* | *hmhuŋ* |
| gall | *yuhuŋ* | *yuhuŋ* |
| lips | *prhuŋ* | *prahuŋ* |
| taste | *tmalaŋ* | *tmalaŋ* |
| burn | *lmoŋ* | *lmoŋ* |
| run | *mktliuŋ* | *mktliuŋ* |
| wipe | *smoŋ* | *smoŋ* |
| dark | *mnkuŋ* | *mnkuŋ* |

#### *5.3.2.3 Vowel deletion before stress*

Unstressed vowels are always deleted or reduced in Mstbaun, whereas they are retained in Palngawan. Some unstressed vowels are reduced and some are retained in Inago:

| Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|
| *bgayaw* | *bagayaw* | *barayaw* | Alocasia |
| *qbuli?* | *?abulic* | *qabulic* | ashes |
| *mlawa?* | *malawa?* | *mlawa?* | call |
| *bliŋ* | *baliŋ* | *bəliŋ* | cave |
| *smyuk* | *cumik* | *smiyuk* | answer |
| *kmat* | *kumac* | *kmyuc* | bite |
| *smayuk* | *sumaruk* | *smaruk* | broil |
| *kmut* | *kumuc* | *kməruc* | kill |

## 5.4 Sound changes that differentiate Atayal from Sediq

In this section, we discuss the sound changes that are claimed by Li (1980a, 1985) to be major phonological differences between Atayal and Sediq. Sound correspondences that occurred three or more times in our COMPASS analysis are included in our discussion.

### *5.4.1 [-p, -b, -m] versus final [-k, -ŋ]*

Atayal is claimed to retain word-final labial stops and nasals [p, b, m] while Sediq has changed to velars [k, ŋ]. As discussed in §5.3.2.2, Mstbaun retains some final *-p* and *-m* while Palngawan and Sediq have changed completely to velars. In this case, Palngawan behaves more like Sediq than Atayal.

### *5.4.2 [β, r, ɣ] versus [b, d, g]*

Sediq is claimed to retain voiced stops [b, d, g] whereas Atayal has the corresponding fricatives and liquids [β, r, ɣ] in word-initial and medial positions. But after a closer look at the correspondences of the reflexes, we need to further divide the rule into three subrules.

Inago and Palngawan retain a voiced stop [b] whereas Mstbaun has the fricative [β] in word-initial and -medial positions.

Inago retains a voiced stop [d] or becomes palatalised to [j] before [i] whereas Mstbaun and Palngawan have changed to [r] in word-medial positions.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **pada?* | *r-r-d* | *para?* | *para?* | *pada?* | pygmy deer |
| **qudi?/*qudas* | *r-r-j* | *quri?* | *?uri?* | *quji?* | grey hair |

In word-initial position, Palngawan has developed trilled *r* [r̃].

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **daqis* | *r-r̃-d* | *rqes* | *r̃ayes* | *daqəras* | face |

Inago and Palngawan retain the voiced stop [g] whereas Mstbaun has fricative [ɣ] in word-initial and -medial positions.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **gamil* | *ɣ-g-g* | *ɣamin* | *gamir* | *gamin* | root |
| **kumugus* | *ɣ-g-g* | *kmuɣus* | *kakugus* | *kmugus* | scrub |

### *5.4.3 /y, z, ø/ versus /r/*

Sediq is claimed to retain /r/ while Atayal has changed to /y/, /z/ or zero. In this case, Palngawan is more similar to Inago than Mstbaun.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **ruluŋ* | *y-r-r* | *yuluŋ* | *raruluŋ* | *ruluŋ* | cloud |
| **qəbəsuran* | *y-r-r* | *qsuyan* | *ʔasuran* | *qbsuran* | elder sibling |
| **kitəhur* | *y-r-r* | *qthuy* | *katuhur* | *qtəhur* | fat |
| **raŋaw* | *ø-r-r* | *ŋliʔ* | *raŋalic* | *rəŋəciʔ* | fly |
| **mabarig'* | *z-n*[21]*-r* | *baziy* | *miniy* | *mariy* | buy |

In some cases, only Palngawan retains [r], while Mstbaun and Inago have changed to [ø] and [l] respectively.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **rimaʔ* | *ø-r-l* | *imagan* | *ramagar* | *limaʔ* | five |

### *5.4.4 /-t, -ʔ/ versus /-c/*

The Proto Atayalic **-d* has reflexes *-t* or *-ʔ* in Atayal, but *-c* in Sediq. This has been discussed in §5.3.1.1. In this case, Palngawan is more similar to Inago than Mstbaun.

### *5.4.5* -g- *versus* -r-

For the Proto Atayalic **-g-* [ɣ], Atayal has *-g-* as reflexes, while Sediq has *-r-*. In this case, Palngawan is more similar to Mstbaun than Inago.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **bagayag* | *ɣ-g-r* | *bgayaw* | *bagayaw* | *barayaw* | Alocasia |
| **qagum* | *ø-ø-r* | *qom* | *ʔoŋ* | *ʔaruŋ* | anteater |

### *5.4.6* -r-, -s-, -r̃- *versus* -y-, -g-

Proto Atayalic **-g'-* was claimed to have reflexes *-r-*, *-s-*, or trill *r* in Atayal, while Sediq generally has *-y-*, if preceded by */i/ or -g-* elsewhere. In this case, Palngawan is more similar to Mstbaun than Inago.

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21 The correspondence *z-n-r* occurs less than three times in our data.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **pig'a?* | *r-r-y* | *pira?* | *pira?* | *piya?* | how many |
| **cuhig'a?* | *r-r-g*[22] | *hera?* | *hira?* | *siga?* | yesterday |

From the discussion above, Palngawan was found to share some phonological features with Atayal and some other features with Sediq. A quantitative analysis of the sound change rules is deferred until §5.6 to address whether Palngawan is more similar to Atayal or Sediq in terms of sound change.

## 5.5 Sound changes that differentiate C'uli' from Squliq

In this section, phonemic and phonetic differences between C'uli' and Squliq dialects, stated in Li (1980a) are presented as a basis for comparison among the three Atayalic dialects.

### *5.5.1 Phonemicisation of /e/ and /o/*

According to Tables 1–3, /e/ and /o/ are both phonemes in Palngawan and Mstbaun, while /e/ is not a phoneme in Inago.

### *5.5.2 /q/*

Mstbaun retains /q/, wheras Palngawan has merged into /ʔ/.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **qabulid* | *q-ʔ-q* | *qbuliʔ* | *ʔabulic* | *qabulic* | ashes |
| **cumaqis* | *q-ʔ-ʔ* | *smaqis* | *cumaʔis* | *smaʔis* | sew |
| **mabahuq* | *q-ʔ-ʔ* | *mahuq* | *mabuhuʔ* | *mahuʔ* | wash clothes |

In some cases, Palngawan retains /k/, while Mstbaun and Inago have changed to /q/:

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **kitəhur* | *q-k-q* | *qthuy* | *katuhur* | *qtəhur* | fat |

### *5.5.3 /z/*

Mstbaun has developed a phoneme /z/, whereas Palngawan and Inago retain /n/ and /r/ respectively, as discussed in §5.4.3.

### *5.5.4 Phonetic features*

#### *5.5.4.1 [ß] versus [v]*

The bilabial fricative [β] is observed to occur as labiodental [v] in the speech of younger female speakers of Palngawan.

22 This sound correspondence occurred less than three times in our data.

#### *5.5.4.2 [r] versus [ɹ]*

The liquid /r/ has a contrast between a trilled or flap [r] and retroflex [ɹ] in word-initial position in Palngawan. These are represented as e.g. *r̃a* 'maple tree' (trill/flap) versus *ramagar* 'five' (retroflex).

#### *5.5.4.3 [h] versus [x]*

Mstbaun and Inago have retained the contrast between /h/ and /x/, whereas /h/ is merged with /x/ in Palngawan.

#### *5.5.4.4 Palatalisation*

Palngawan retains [t] before high front vowels while Mstbaun and Inago have undergone palatalisation in word-initial and -medial positions.

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **tyaquŋ* | *c-t-c* | *cyaquŋ* | *teʔuŋ* | *cyaquŋ* | crow |
| **quti?* | *c-t-c* | *quci?* | *ʔuti?* | *quci?* | excrement |

#### *5.5.4.5 Final [r]*

Final *-l* has changed to retroflex *-r* in Palngawan, while Mstabaun and Inago have changed to *-n*, as discussed in §5.3.2.1.

#### *5.5.4.6* -aw, -ay *versus* -ow, -iy

Proto Atayalic **-ay* is raised to *-iy* in Palngawan:

| PA | Correspondence | Mstbaun | Palngawan | Inago | Gloss |
|---|---|---|---|---|---|
| **pag'ay* | *ay-iy-ay* | *pagay* | *pagiy* | *payay* | rice plant |

Palngawan *-aw* is raised to *-ow* in the speech of the younger generation, as shown in the word list of 190 lexical items in Part 2 of Appendix 1.

## 5.6 Classifications of sound change

All the sound changes discussed in §5.3–§5.5 are further classified based on Agard's (1984) critieria, which are further applied in Milliken and Milliken's (1996). A rule distribution tableau is made and listed in Table 16. Type 0 involves only feature change, but the contrastive pattern does not change. In Type 1, one set of dialects loses a contrast, others do not. Thus the overall system of the language still has the contrast. No significant loss of intelligibility is expected from either Type 0 or Type 1. In Type 2, all sets of dialects lose a contrast, which is still unlikely to impede intelligibility. In Type 3, all sets of dialects lose an

earlier contrast. The structural consequences of this loss are different in one set of dialects than in another. At this point, a single underlying representation is no longer possible, thus this is the kind of change that can impede intelligibility for structural reasons. In Type 4, one set of dialects loses a contrast by one route, while another set loses the same contrast by a different route. Since the languages are split apart structurally, such a change normally impedes intelligibility between the two sets of dialects.

**Table 16:** A rule distribution tableau classified according to Agard's criteria

| Rule | Type 0 | Type 1 | Type 2 | Type 3 | Type 4 |
|---|---|---|---|---|---|
| *-*g*'- > -*r*- | | | | x | |
| *-*g*'- > -*y*-/ __ *i* | | | | x | |
| *-*g*'- > -*g*-/ elsewhere | | | | x | |
| phoneme /e/ | | | | x | |
| phoneme /o/ | | | | x | |
| -*b* > -*p* | | | x | | |
| *-*g* > -*w* | | | x | | |
| *-*g* > -*y* | | | x | | |
| -*l* > -*n* | | x | | | |
| -*l* > -*r* | | x | | | |
| *t* > *c* palatalisation | | x | | | |
| -*t* > -*c* | | x | | | |
| -*d* > -*c* | | x | | | |
| -*p* > -*k* | | x | | | |
| -*m* > -*ŋ* | | x | | | |
| *c* > *s* | | x | | | |
| *V* > *ø* /__*V́* | | x | | | |
| *d* > *r* | | x | | | |
| *r* > *y* | | x | | | |
| *q* > *?* | | x | | | |
| *h* > *x* | | x | | | |
| -*ay* > *iy* | | x | | | |
| *b* > *β* | x | | | | |
| *r* > *r̃* | x | | | | |
| *d* > *j* | x | | | | |
| *g* > *ɣ* | x | | | | |
| *r* > *z* | x | | | | |
| *β* > *v* | x | | | | |
| -*aw* > *ow* | x | | | | |

Following Milliken's (1988) procedures, we quantified the results of major sound changes established on the basis of word lists to measure the extent of sound change in Atayal (Table 17). Only the first five sound changes belong to Type 3 change where intelligibility can be impeded for structural reasons. For the rest of the sound changes from Type 2 to Type 0, no significant loss of intelligibility is expected.

**Table 17:** Measuring the extent of sound change in Atayal

| Number | Change | Mstbaun | Palngawan | Inago | Type |
|---|---|---|---|---|---|
| 1 | *-*g'*- > -*r*- | 1 | 1 | 0 | 3 |
| 2 | *-*g'*- > -*y*-/ __ *i* | 0 | 0 | 1 | 3 |
| 3 | *-*g'*- > -*g*-/ elsewhere | 0 | 0 | 1 | 3 |
| 4 | phoneme /e/ | 1 | 1 | 0 | 3 |
| 5 | phoneme /o/ | 1 | 1 | 1 | 3 |
| 6 | -*b* > -*p* | 1 | 0 | 0 | 2 |
| 7 | *-*g* > -*w* | 1 | 1 | 1 | 2 |
| 8 | *-*g* > -*y* | 1 | 1 | 1 | 2 |
| 9 | -*l* > -*n* | 1 | 0 | 1 | 1 |
| 10 | -*l* > -*r* | 0 | 1 | 0 | 1 |
| 11 | *t* > *c* palatalisation | 1 | 0 | 1 | 1 |
| 12 | -*t* > -*c* | 0 | 1 | 1 | 1 |
| 13 | -*d* > -*c* | 0 | 1 | 1 | 1 |
| 14 | -*p* > -*k* | 1 | 1 | 1 | 1 |
| 15 | -*m* > -*ŋ* | 1 | 1 | 1 | 1 |
| 16 | *c* > *s* | 1 | 0 | 1 | 1 |
| 17 | *V* > *ø* /__*V́* | 1 | 0 | 1 | 1 |
| 18 | *d* > *r* | 1 | 1 | 0 | 1 |
| 19 | *r* > *y* | 1 | 0 | 0 | 1 |
| 20 | *q* > *ʔ* | 0 | 1 | 0 | 1 |
| 21 | *h* > *x* | 0 | 1 | 0 | 1 |
| 22 | -*ay* > *iy* | 0 | 1 | 0 | 1 |
| 23 | *b* > *β* | 1 | 0 | 0 | 0 |
| 24 | *r* > *r̃* | 0 | 1 | 0 | 0 |
| 25 | *d* > *j* | 0 | 0 | 1 | 0 |
| 26 | *g* > *ɣ* | 1 | 0 | 0 | 0 |
| 27 | *r* > *z* | 1 | 0 | 0 | 0 |
| 28 | *β* > *v* | 0 | 1 | 0 | 0 |
| 29 | -*aw* > *ow* | 0 | 1 | 0 | 0 |

Key: 0 = absent, 1 = present; Type = Sound changes based on Agard's criteria (Type 3 to 0)

The correlation coefficient values were calculated for the twenty nine changes from Table 16 and these are presented in Figure 3.

| | Mstbaun | Palngawan | Inago |
|---|---|---|---|
| Mstbaun | 1.00 | | |
| Palngawan | -0.28 | 1.00 | |
| Inago | 0.11 | -0.17 | 1.00 |

**Figure 3:** Dialect similarity matrix based on sound changes

According to this analysis, Mstbaun shares more sound changes with Inago than with Palngawan; therefore, Mstbaun is more similar to Inago than Palngawan. But if we separate Type 3 changes from the rest of the changes and calculate the correlation coefficient based on the five Type 3 changes, Mstbaun and Palngawan are found to share the same sound changes and have a correlation coefficient value of 1.00, as presented in Figure 4. The correlation coefficient values for Type 0 to Type 2 changes are presented in Figure 5. This tells us that Palngawan resembles Mstbaun in Type 3 changes but Mstbaun resembles Inago in the rest of the sound changes.

| | Mstbaun | Palngawan | Inago |
|---|---|---|---|
| Mstbaun | 1.00 | | |
| Palngawan | 1.00 | 1.00 | |
| Inago | -0.67 | -0.67 | 1.00 |

**Figure 4**: Dialect similarity matrix based on Type 3 sound changes

| | Mstbaun | Palngawan | Inago |
|---|---|---|---|
| Mstbaun | 1.00 | | |
| Palngawan | -0.54 | 1.00 | |
| Inago | 0.27 | -0.07 | 1.00 |

**Figure 5:** Dialect similarity matrix based on Type 0 to Type 2 sound changes

## 6 Summary of the findings

### 6.1 Is Palngawan more similar to Atayal or Sediq in terms of lexical evidence?

Contrary to Li's findings that lexical evidence was more useful than phonology for subgrouping Atayal and Sediq, our study shows that lexical counts are riddled with difficulties and confusion. It was also misleading to conclude that Palngawan was an Atayal dialect based on lexical evidence when Palngawan was compared with a mixture of Squliq and C'uli' dialects with different similarity percentages, grouped together as 'other Atayal'. Although the results of shared vocabulary counting and COMPASS analysis indicate that Palngawan shares more cognates with Mstbaun than with Inago, this is only half of the picture. The real story is that Mstbaun, Palngawan and Inago form a dialect chain, with Mstbaun between Palngawan and Inago. In other words, although Palngawan is more similar to Mstbaun than Inago, Mstbaun is also more similar to Inago than Palngawan. Thus Palngawan cannot be simply classified as a C'uli' but rather is another Atayalic dialect at the periphery of the dialect chain.

### 6.2 Does Palngawan share more phonological features (i.e. sound change) with Atayal or Sediq?

There is no evidence from our study to support Li's claim that Palngawan shares more phonological features with Sediq than Atayal. On the contrary, Mstbaun shares more sound changes with Sediq than does Palngawan, consistent with our lexical evidence too. Mstbaun was found to share the majority of sound changes that do not impede intelligibility with Inago while Palngawan was found to share all the Type 3 changes with Mstbaun. In other words, in terms of quantity, Palngawan shares no more phonological features with Atayal than with Sediq, but in terms of quality, Palngawan shares with Atayal the type of sound change that impedes intelligibility with other dialects.

## 7 Dialect intelligibility

In this section, we discuss the results of the dialect intelligibility test. Since intelligibility cannot be predicted from lexical similarity counts (Grimes 1985), a recorded text test (RTT) was conducted to determine dialect intelligibility of the three dialects.

### 7.1 Recorded text test (RTT)

The procedures for RTT follow Casad (1974) and Blair (1990:73–85). A pilot test was conducted with a panel of ten people to finalise the ten questions in each community. The average score for the ten questions was above 90%. Ten adults, both males and females, with an age range from 29 to 82 were chosen as subjects through a network of friends for the final testing. Each listened to a taped introduction, a hometown test (i.e. the subject's own dialect), and two other dialect tapes. Ideally, only testees who scored 100% in the hometown test would be allowed to continue with the rest of the tests. But if one or two testees in a reference site could not reach 100% due to unfamiliarity with the testing precedure, we still allowed them to participate in the study as long as they demonstrated comprehension of the hometown story by retelling it, and the average hometown test scores for the whole group were above 90%. The order for the two other tapes was not randomised, but fixed as follows: (1) MS hometown–PA–IN, (2) PA hometown–IN–MS, (3) IN hometown–PA–MS. A testing session for each testee lasted for approximately 40 to 50 minutes. All answers to the questions were tape-recorded and translated into Chinese for later scoring by the author and two trained graduate assistants. A correct answer was marked with '1', an incorrect with '0', and a half correct with '.5'. The means and standard deviations of the tested scores were used to distinguish inherent intelligibility from acquired intelligibility.

### 7.2 The intelligibility findings

Ten adult testees were recruited from each reference site through a network of friends to ensure an equal distribution of gender and age. Inago was slightly overrepresented by middle-aged testees because male senior citizens were not readily available due to early mortality. Each testee listened to three tapes, including his/her 'hometown' test tape and two other dialect tapes. The three autobiographical stories for each reference sites are transcribed, translated and listed in Appendix 2.

The mean scores between each pair of dialects based on the intelligibility data were calculated and rounded to the nearest integer to indicate their levels of intelligibility, as presented in Figure 6.

| | | *Tapes* | | |
|---|---|---|---|---|
| | | Mstbaun | Palngawan | Inago |
| *Subjects* | Mstbaun | 100 | 16 | 39 |
| | Palngawan | 23 | 98 | 64 |
| | Inago | 32 | 62 | 91 |

**Figure 6:** Summary matrix of the intelligibility data

The average hometown test scores for the three villages are all above 90% (MS = 100, PA = 98, IN = 91). MS subjects scored better in listening to the Inago tape than to the Palngawan tape (MS–IN = 39 vs MS–PA =16). Palngawan subjects also scored higher on the Inago test than on the Mstbaun test (PA–IN = 64 vs PA–MS = 23). Inago subjects scored better on the Palngawan test than on the Mstbaun test (IN–PA = 62 vs IN–MS = 32). The overall intelligibility between Palngawan and Mstbaun is lower than that between Palngawan and Inago, even though intelligibility is not necessarily mutual (MS–PA = 16, PA–MS =23; PA–IN = 64, IN–PA = 62). The higher intelligibility between PA and IN is not unexpected due to their close proximity to each other. IN children walk through PA village to attend the same school. Dialectal contacts and learning are frequent. An IN resident claimed PA speakers were once heard to speak IN dialect when they were drunk.

While PA and IN residents reported they had more contact with each other than with MS, they claimed they should know a little bit of the MS dialect. But only a few MS residents reported they had any contact with IN speakers and almost no one had any contact with PA speakers. PA dialect was thought to be very divergent from any other Atayalic dialect, even by the PA speakers themselves.

We then further calculated the standard deviations for each mean to determine whether the intelligibility scores reflect inherent intelligibility or acquired intelligibility. The former is the degree of understanding a speaker has of a similar variety from the same linguistic stock while the latter is through exposure to it (Blair 1990:24). Blair (1990:25) gives a rule of thumb that if the standard deviation of the intelligibility score is low (less than 10–12%), then the score is probably an indication of inherent intelligibility. If the standard deviation is high (greater than12–15%), then what is being measured is at least partly acquired intelligibility.

The matrix of average intelligibility scores is presented in Figure 7. The standard deviations between each pair of dialects are all high, indicating that a more thorough bilingualism study with reference to the dialects concerned is needed to separate the effects of inherent and acquired intelligibility.

| | | *Tapes* | | | | | |
|---|---|---|---|---|---|---|---|
| | | Mstbaun (N=10) | | Palngawan (N=10) | | Inago (N=10) | |
| | | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| *Subjects* | Mstbaun | 100 | 0.00 | 16.00 | 13.50 | 39.00 | 16.63 |
| | Palngawan | 22.5 | 15.50 | 97.50 | 4.25 | 64.00 | 15.78 |
| | Inago | 32.5 | 17.65 | 61.50 | 19.30 | 91.00 | 9.94 |

**Figure 7:** Matrix of average intelligibility scores

Comparing the average scores with the standard deviations, we found most IN and PA people understand each other's story on the tape well, but some have difficulty. This is what Blair (1990:25) called Situation 1, with both high average score and high standard deviation. For the other two pairs (MS–PA, MS–IN), on the other hand, many people could not understand the story, but a few were able to answer correctly. This is Blair's Situation 3, where the average score is low but the standard deviation is high.

PA has frequent communication with IN but no contact with MS. Some MS speakers claimed to have contact with Tongan dialect (a Sediq dialect closely related to IN), but no contact with PA.

The results of intelligibility testing all show less than 60% intelligibility. According to Blair's (1990:23) criteria, MS, PA, and IN should be referred to either as dissimilar dialects or different languages depending on the conventions governing the use of the terms 'dialect' and 'language' in the area being surveyed. Therefore, Mstbaun, Palngawan and Inago should be considered three dissimilar dialects.

In terms of percentages of intelligibility, Palngawan is more similar to Inago than Mstbaun due to frequent contacts. Mstbaun has higher intelligibility with Inago than with Palngawan. In other words, Palngawan is considered peripheral in the Atayalic intelligibility networks. This finding conforms to the general attitudes among the three speech communities.

## Appendix 1: Word Lists

### Part 1: Word lists with 326 lexical items

Informants' Background:

| Dialect | Informant's Name | Sex | Age |
|---|---|---|---|
| Mstbaun | Batu Temu (Kao, Tsing-hsian) | M | 34 |
| Palngawan | Temi Temu | F | 50 |
| Inago | Tusung Pengan, | M | 47 |
| | Walis Tadaw | M | 55 |

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 1 | *babaw* | *bawi?* | *baraw* | above | #179 |
| 2 | *bgayaw* | *bagayaw* | *barayaw* | Alocasia | #12 |
| 3 | *myuhung* | *masa?aŋ* | *masaaŋ* | angry | |
| 4 | *smqaya?* | *mahubu?* | *smqaya?* | annoyed | |
| 5 | *smyuk* | *cumik* | *smiyuk* | answer | #127 |
| 6 | *kuluŋ* | *máma?*[23] | *qtahi?* | ant | |
| 7 | *qom* | *?oŋ* | *?aruŋ* | anteater | #56 |
| 8 | *qbuli?* | *?abulic* | *qabulic* | ashes | #43 |

23 *mamá?* 'clean, flat land after cultivation'.

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 9 | *takan* | *batakan* | *btakan* | bamboo | |
| 10 | *buqoh* | *ga?iluh* | *blbun* | banana | #15 |
| 11 | *yawa?* | *rarawa?* | *rawa?* | bamboo basket | |
| 12 | *tokan* | *tokan* | *tokan* | man's basket | |
| 13 | *kiri?* | *kagiri?* | *buluŋuy* | woman's basket | #20 |
| 14 | *luku?* | *baluku?* | *bluku?* | winnowing basket | |
| 15 | *ŋurus* | *ŋurus*[24] | *ŋudus* | beard | |
| 16 | *betunux* | *mabatunux* | *mbtunux* | beautiful | |
| 17 | *sakaw* | *pa?* | *halakaw* | bed | |
| 18 | *qpitay* | *katipar* | — | bedbug | |
| 19 | *sigasuk* | *tuŋa?* | *tgak* | belch | |
| 20 | *ktu?* | *nabos*[25] | *nbuyas* | (upper) belly | #35 |
| 21 | *habuk* | *habuk* | *habuk* | belt | |
| 22 | *pzit* | *kabahni?* | *qtuta?* | bird | |
| 23 | *kmat* | *kumac* | *kmyuc* | bite | |
| 24 | *mŋihuy* | *maŋihur*[26] | *mnihur* | bitter, hot, sour | |
| 25 | *qmtux* | *sa?upaŋ* | *qmupaŋ* | bitter | |
| 26 | *qalux* | *makalux* | *mqalux* | black | #170 |
| 27 | *ramu?* | *ramurux* | *dara?* | blood | #105 |
| 28 | *myup* | *yumuk* | *miyuk* | blow | |
| 29 | *qasu?* | *?asu?* | *?asu?* | boat | #108 |
| 30 | *pŋeloq* | *bahuni?* | *buci* | bow | #106 |
| 31 | *pyatu?* | *ratiŋ* | *pratu?* | bowl | |
| 32 | *luqus* | *lu?iŋ* | *luqi?* | brain, marrow | |
| 33 | *bubu?* | *bubu?* | *?unoh* | breasts | |
| 34 | *?aluk* | *huŋu?* | *hakaw* | bridge | |
| 35 | *maras* | *maras* | *matas* | bring | |
| 36 | *smayuk* | *sumaruk* | *smaruk* | broil | |
| 37 | *mumun* | *rumumur* | *tmumun* | bud | |
| 38 | *lmoŋ* | *lumoŋ* | *lmauŋ* | burn | #128 |
| 39 | *baziy* | *miniy* | *mariy* | buy | |
| 40 | *mlawa?* | *malawa?* | *mlawa?* | call | |
| 41 | *rknus* | *rakinus* | *sakus* | camphor laurel | #75 |
| 42 | *ŋyaw* | *ŋaw* | *ŋiyaw* | cat | |
| 43 | *bliŋ* | *baliŋ* | *bəliŋ* | cave, hole | |
| 44 | *bagah* | *beluh* | *bagah* | charcoal | |
| 45 | *pskon* | *paskani?* | *paskan* | chew | |
| 46 | *laqi?* | *?ule?* | *laqi?* | child | |
| 47 | *gmoyaw* | *gumuraw*[27] | *gmaw* | choose | |
| 48 | *tkata?* | *caciryec* | *kjiyac* | cicada | |
| 49 | *mtasaw* | *matasi?* | *mtasaw* | clean | #11 |

24 'hair'.

25 *labos* 'belly' in the speech of younger generation.

26 *maŋihur* 'salty, hot', *sapiser* 'sour'.

27 *gumuraw* (older generation) varies with *gumurow* (younger generation).

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 50 | *mkaraw* | *uŋkaraw*[28] | *mkaraw* | climb | |
| 51 | *qmlu?* | *?unlu?* | *məduk* | close | |
| 52 | *galiq* | *gali?* | *galiq* | cloth | |
| 53 | *lukus* | *lukus* | *lukus* | clothes | |
| 54 | *yuluŋ* | *raruluŋ* | *ruluŋ* | cloud | |
| 55 | *tltu?* | *gahra?* | *lətu?* | cold (thing) | |
| 56 | *mumuk* | *?umumuk* | *gmumuk* | cover | |
| 57 | *kacing* | *rarapa?* | *dapa?* | cow | |
| 58 | *kagaŋ* | *kakagaŋ* | *kmaraŋ* | crab | |
| 59 | *cyaquŋ* | *te?uŋ*[29] | *cyaquŋ* | crow | #48 |
| 60 | *kmut* | *kumuc* | *kməruc* | kill | |
| 61 | *mnkuŋ* | *miŋkuŋ* | *mkuuŋ* | dark | #160 |
| 62 | *?ina?* | *?ina?* | *?ina?* | daughter-in-law | |
| 63 | *ryax* | *řex* | *jiyan* | day | |
| 64 | *kaxa?* | *makaxa?* | *ŋkaxa?* | day after tomorrow | |
| 65 | *qanux* | *wanux* | *ruqənux* | deer | |
| 66 | *para?* | *para?* | *pada?* | deer, pygmy | |
| 67 | *libu?* | *libuk* | *libu?* | den, nest | |
| 68 | *mhoqin* | *mahu?ir* | *mhuqin* | die | #131 |
| 69 | *kmihuy* | *kumehur* | *kmari?* | dig | |
| 70 | *spi?* | *masper* | *msəpi?* | dream | #9 |
| 71 | *mnbuw* | *ma?abu?* | *mimah* | drink | |
| 72 | *turiŋ* | *masturiŋ* | *tujiq* | drip | |
| 73 | *mbusuk* | *manukan* | *bsukan* | drunk | #189 |
| 74 | *papak* | *caŋe?* | *birac* | ear | |
| 75 | *rhyan* | *rahar* | *dhəran* | earth | #61 |
| 76 | *unuw* | *monuw* | *runuw* | earthquake | |
| 77 | *bisuw* | *bicuw* | *bicuw* | earthworm | #58 |
| 78 | *qpuri?* | *?apuri?* | *qpuji?* | earwax | |
| 79 | *maniq* | *mani?* | *məkan* | eat | |
| 80 | *tlaqiy* | *tula?iy* | — | eel | |
| 81 | *mspat* | *maspac* | *masəpac* | eight | |
| 82 | *hiku?* | *hiku?* | *hiqur* | elbow | |
| 83 | *qmyu?* | *?nu?ric* | *mə?əru?* | epidemic | |
| 84 | *mgey* | *magiy* | *qtuliq* | escape | #25 |
| 85 | *gbyan* | *gabyan* | *gbiyan* | evening | |
| 86 | *quci?* | *?uti?* | *quci?* | excrement | |
| 87 | *squci?* | *mas?uti?* | *qmuci?* | defecate | |
| 88 | *tquci?* | *ti?uti?* | *tquci?* | break wind, fart | |
| 89 | *royeq* | *řori?* | *doriq* | eye | |
| 90 | *rqes* | *řayes* | *daqəras* | face | #89 |

28 *uŋkaraw* (older generation) varies with *uŋkarow* (younger generation).

29 *te?uŋ* (older generation) vaires with *teruŋ* (younger generation).

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 91 | *mtakuy* | *matakur* | *mtakur* | fall | |
| 92 | *waqit* | *wawa?ic* | *waqic* | fang | |
| 93 | *tohiq* | *tuhiya?* | *dhiyaq* | far | |
| 94 | *qthuy* | *katuhur* | *qtəhur* | fat, rough | |
| 95 | *mŋuŋu?* | *maŋuŋu?* | *mi?isu?* | fear | |
| 96 | *qnalaŋ* | *?inalaŋ* | *qnalaŋ* | fence | |
| 97 | *tluliŋ* | *taruli* | *luliŋ* | finger | |
| 98 | *puniq* | *hapuni?* | *puniq* | fire | |
| 99 | *qulih* | *?ucix* | *qsurux* | fish | #49 |
| 100 | *tuba?* | *riluŋ* | *tuba?* | fish-poison | |
| 101 | *psabu?* | *kobu?* | *qowbu?* | fishweir | |
| 102 | *imagan* | *ramagar* | *lima?* | five | |
| 103 | *b?nux* | *banux* | *brənux* | flat | |
| 104 | *hi?* | *hi?* | *hii?* | flesh, meat | |
| 105 | *mqliw* | *mulic* | *qluli?* | flow, adrift | #28 |
| 106 | *phpah* | *rapak* | *phəpah* | flower | |
| 107 | *ŋli?* | *raŋalic* | *rəŋəci?* | fly (insect) | #50 |
| 108 | *pspan* | *ciŋas* | *siŋas* | food particles between teeth | #107 |
| 109 | *payat* | *parac* | *səpac* | four | |
| 110 | *raŋi?* | *raŋi?* | *daŋi?* | friend | #57 |
| 111 | *mtŋi?* | *matŋi?* | *mteŋi?* | full | |
| 112 | *qluŋ* | *kakluŋ* | *qəluŋ* | edible fungus | |
| 113 | *?utux* | *?amutux* | *?utux* | ghost | #68 |
| 114 | *miq* | *mi?* | *mu?at* | give | #133 |
| 115 | *musa?* | *musa?* | *musa?* | go | |
| 116 | *haru?* | *ba?iy* | *biqir* | goitre | |
| 117 | *hnunux* | *sinunux* | *snonux* | hair | |
| 118 | *qpugu?* | *?apuhur* | *sala?* | hair whorl | |
| 119 | *quri?* | *?uri?* | *quji?* | hair, grey | |
| 120 | *mqes* | *ma?as* | *mqaras* | happy | |
| 121 | *lubuw* | *lubuw* | *lubuw* | jew's-harp | |
| 122 | *hiya?* | *hiya?* | *hiya?* | he | |
| 123 | *tunux* | *tunux* | *tunux* | head | |
| 124 | *rmaw* | *rumaw*[30] | *dmayaw* | help | |
| 125 | *kgiy* | *kuŋkagiy* | *kəriy* | hemp plant | #24 |
| 126 | *wawiq* | *babawi?* | *baraw* | high | |
| 127 | *sulay* | *suliy* | *sulay*[31] | anus | |
| 128 | *payah* | *pinah* | *parih* | hoe | |
| 129 | *karuh* | *woc* | *bkaruh* | hoe | |
| 130 | *kmyak* | *ñumili?* | *dmijin* | hold (in hand) | |
| 131 | *hziŋ* | *hiriŋ* | *walu?* | honeybee | |
| 132 | *tryuŋ* | *ñyuŋ* | *tjiyuŋ* | hornet (bee) | |

30 *rumaw* (older generation) varies with *rumow* (younger generation).

31 *sulay* 'hip', *bliŋ sulay* 'anus'.

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 133 | *rme?* | *rami?* | *dmai?* | horse | |
| 134 | *mkilux* | *makilux* | *mcilux* | hot (weather or thing) | |
| 135 | *pira?* | *pira?* | *piya?* | how many | #16 |
| 136 | *m?uyay* | *ma?uriy* | *mu?uray* | hungry | #162 |
| 137 | *qmaluk* | *malrak* | *maduk* | hunt | #13 |
| 138 | *ku?* | *cu?* | *ku?* | I | |
| 139 | *saku?* | *kuriŋ* | *yaku?* | I | |
| 140 | *tbuw* | *?umbuw* | *rəmbuw* | immerse in water | |
| 141 | *kraya?* | *řetux* | *daya?* | inland, up | |
| 142 | *buq* | *bu?* | *biyuq* | juice | |
| 143 | *buli?* | *putiŋ* | *puciŋ* | knife | #115 |
| 144 | *tmuciŋ* | *tumutiŋ* | *tmuciŋ* | knock | |
| 145 | *pika?* | *mapika?* | *mpika?* | lame | |
| 146 | *ke?* | *ke?* | *kari?* | language, word | |
| 147 | *msuqi?* | *sunarahu?* | *msuqi?* | late | #163 |
| 148 | *kira?* | *kiřa?* | *kiya?* | a little later | |
| 149 | *lbak* | *?abaw*[32] | *wasaw* | leaf | |
| 150 | *sragiy* | *soruk* | *dagic* | leggings | |
| 151 | *tzin* | *?ir* | *?igiy* | left | |
| 152 | *kli?* | *raklic* | *rakəlic* | leopard | #42 |
| 153 | *mskkiy* | *maskakiy* | *skiiy* | lie on one's side | |
| 154 | *prahuŋ* | *parahuŋ* | *pdahuŋ* | lips | |
| 155 | *bsyaq* | *buse?* | *busiyaq* | long time | |
| 156 | *bgiya?* | *bagira?* | *bgiya?* | reed of loom | |
| 157 | *gitu?* | *gitu?* | *gitu?* | loquat | |
| 158 | *sumiq* | *lumi?* | *sumiq* | body louse | #52 |
| 159 | *kuhiŋ* | *kuhi* | *quhiŋ* | head louse | |
| 160 | — | *lalbu?* | *ləbu?* | low | |
| 161 | *bhluk* | *bahiluk* | *baraq* | lung | |
| 162 | *piyux* | *habaraw* | *hbaraw* | many (people) | |
| 163 | *raga?* | *řa?* | *dara?* | maple tree | #84 |
| 164 | *ska?* | *cacka?* | *səka?* | middle | |
| 165 | *karaŋ* | *kacaŋ* | *kadaŋ* | molar | #90 |
| 166 | *pila?* | *pila?* | *pila?* | money | |
| 167 | *yuŋay* | *ruŋiy* | *ruŋay* | monkey | |
| 168 | *byaciŋ* | *buratiŋ* | *?itas* | moon | |
| 169 | *luhuŋ* | *lahyuŋ* | *dahuŋ* | mortar | #14 |
| 170 | *yamux* | *řimuli?* | *dmuriq* | moss | |
| 171 | *qoli?* | *?olic* | *qowlic* | mouse | |
| 172 | *nqoq* | *ŋawa?* | *quwaq* | mouth | |
| 173 | *slaq* | *calaq* | *səlaq* | mud | #60 |
| 174 | *tlyu?* | *rkinus* | *kliyuc* | mulberry | |

32 *?abaw* (older generation) varies with *?abow* (younger generation).

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 175 | *pupuk* | *tapupuk* | *pupuk* | mumps | |
| 176 | *qehuŋ* | *ihur* | *liwa* | (wild) mushroom | |
| 177 | *gzil* | *ragirir* | *dgərin* | narrow | #169 |
| 178 | *puga?* | *pupuk* | *puga?* | navel | #93 |
| 179 | *sobih* | *sobih* | *labih* | near | |
| 180 | *gryuŋ* | *wariŋ* | *duyuŋ* | neck, back of | |
| 181 | *sinyuw* | *sinyuw* | *wasin* | string | |
| 182 | *roŋ* | *ñoŋ* | *qomi?* | needle | #116 |
| 183 | — | *gagi?us* | *giyus* | nit | #59 |
| 184 | *tmatuk* | *?umatuŋ* | *tmatuk* | nod head | |
| 185 | *stunux* | *suntatunux* | *stunux* | noisy | |
| 186 | *?ini?* | *?ini?* | *?ini?* | not | |
| 187 | *?uka?* | *?uŋac* | *?uŋac* | not exist | #176 |
| 188 | *smuran* | *sagiraŋan* | *smudan* | old (thing) | |
| 189 | *gmih* | *gumawah* | *rmawah* | open | |
| 190 | *tanux* | *tanux* | *ŋawuc* | outside | |
| 191 | *ŋuyiq* | *ruk* | *ruw* | owl | |
| 192 | *kulu?* | *kulu?* | *kulu?* | box | |
| 193 | *supih* | *tupih* | *supih* | pan | |
| 194 | *tmapaŋ* | *cumapaŋ* | *smapaŋ* | patch | |
| 195 | *matuk* | *?umatuŋ* | *gmatuk* | peck | |
| 196 | *?utas* | *ranah* | *?utas* | penis | #100 |
| 197 | *qsyu?* | *?asú?* | *səru?* | pestle | #117 |
| 198 | *byok* | *barok* | *babuy* | pig | |
| 199 | *?onray* | *saputu?* | *kalac* | pineapple | |
| 200 | *hayuŋ* | *haruŋ* | *haruŋ* | pine tree | #85 |
| 201 | *sgalu?* | *saminalu?* | *pwalu?* | pitiful | |
| 202 | *pturiŋ* | *pantuñiŋ* | *tumiyu?* | point at | |
| 203 | *qzinut* | *?arinuc* | *mqrinuc* | poor, lonely | |
| 204 | *syaŋ* | *syeŋ* | *siyaŋ* | pork | |
| 205 | *limuk* | *limuk* | *limuk* | pot | |
| 206 | *ŋahi?* | *ŋahi?* | *buŋa?* | sweet potato | |
| 207 | *betunux* | *mabatunux* | *mbtunux* | pretty, lovely, cute | |
| 208 | *mhoni?* | *murahu?* | *muhuni?* | priest-shaman | |
| 209 | *ŋahoq* | *ŋahu?* | *nalaq* | pus | |
| 210 | *mgaliq* | *magali?* | *mhaliq* | ragged | |
| 211 | *qoyux* | *warux* | *qwarux* | rattan | #70 |
| 212 | *mteloq* | *matelu?* | *mi?iluq* | raw | |
| 213 | *mtalah* | *matanah* | *mbanah* | red | |
| 214 | *mbinah* | *mubinah* | *mbrinah* | return | |
| 215 | *box* | *box* | *buwax* | rice, husked | |
| 216 | *pagay* | *pagiy* | *payay* | rice plant | |
| 217 | *balay* | *cubay* | *balay* | right (correct) | |
| 218 | *tuqiy* | *tu?iy* | *?əlu?* | road | #120 |
| 219 | *kituru?* | *kinkahan* | *tuqiy* | road, animal trail | |
| 220 | *malah* | *malah* | *malah* | to warm, roast | |

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 221 | *ramuw* | *ɾamu?iy* | *damux* | roof | #113 |
| 222 | *gamin* | *gamir* | *gamin* | root | |
| 223 | *ŋbay* | *laŋiy* | *halus* | saliva | |
| 224 | *cimu?* | *timu?* | *cimu?* | salt | |
| 225 | *mtnaq* | *mintana?* | *mtəna?* | same | |
| 226 | *bnaqiy* | *buna?iy* | *bnaqiy* | sand | #62 |
| 227 | *kmugus* | *kakugus* | *kmugus* | scrub, shave | |
| 228 | *soki?* | *kawih* | *soki?* | scythe | |
| 229 | *siluŋ* | *waciluŋ* | *wusiluŋ* | sea, lake | #64 |
| 230 | *mita?* | *tahan* | *qmita?* | see | |
| 231 | *ghaq* | *gagrak* | *gəhak* | seed | |
| 232 | *mpitu?* | *mapitu?* | *mpitu?* | seven | |
| 233 | *smaqis* | *cuma?is* | *sma?is* | sew | |
| 234 | *sasaw* | *sasi?* | *sasaw* | shade | #10 |
| 235 | *mit* | *mic* | *miric* | sheep | |
| 236 | *mbu?* | *cumbu?* | *səmbu?* | shoot | #37 |
| 237 | *qhyaŋ* | *haŋali?* | *hiraŋ* | shoulder | #2 |
| 238 | *boluŋ* | *baluluŋ* | *kboluŋ* | shrimp | |
| 239 | *?ikus* | *gikus* | *gikus* | shuttle | |
| 240 | *qsuyan* | *?asuran* | *qbsuran* | elder sibling | |
| 241 | *sswe?* | *suse?* | *swai?* | younger sibling | |
| 242 | *syaw* | *syaw* | *siyaw* | side | |
| 243 | *ramat* | *raramac* | *damac* | side-dish | #122 |
| 244 | *girgin* | *gigiran* | *gigan* | sifter | |
| 245 | *mtyu?* | *matu?* | *mtəru?* | six | |
| 246 | *pulas* | *gagox* | — | skin disease | |
| 247 | *khway* | *matahayuw* | *mthuway* | slow | |
| 248 | *cipoq* | *yuyuk* | *ciway* | small | #154 |
| 249 | *smok* | *suŋkanux* | *pskənux* | smell | |
| 250 | *mhnuk* | *mahnuk* | *mhənuk* | soft | |
| 251 | *rapan* | *?apar* | *dapin* | sole (of foot) | #88 |
| 252 | *yama?* | *yama?* | *?ama?* | son-in-law | |
| 253 | *mhap* | *?unrak* | *gməhak* | sow | |
| 254 | *qoqoq* | *sinburaŋan* | *smbraŋan* | spear | |
| 255 | *qni?turu?* | *turu?* | *tudu?* | spine | |
| 256 | *tuyuq* | *taruna?* | *tuyuq* | spittle | |
| 257 | *tmuyoq* | *pataruna?* | *tmuyuq* | spit | |
| 258 | *taku?* | *hita?* | *taku?* | spoon, scoop | |
| 259 | *smamaw* | *sumamaw*[33] | *smapaw* | spread a mat | |
| 260 | *taŋuw* | *taŋuw* | *taŋuw* | sprout | |
| 261 | *yapit* | *rapic* | *rapic* | flying squirrel | |
| 262 | *bhot* | *buhuc* | *brihuc* | squirrel | |

33 *sumamaw* (older generation) varies with *sumamow* (younger generation).

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 263 | *metaq* | *meta?* | *metaq* | stab | |
| 264 | *hoku?* | *huku?* | *hukuc* | stick, pole | |
| 265 | *mrŋin* | *muraŋir* | *mdəŋin* | sticky | |
| 266 | *sknux* | *sakanux* | *skənux* | stink | |
| 267 | *lhbun* | *lahabun* | *lhəbun* | stomach | |
| 268 | *btunux* | *batunux*[34] | *btunux* | stone | |
| 269 | *habuk* | *habuk* | *habuk* | straps, belt | |
| 270 | *ŋaŋah* | *mŋaŋah* | *mŋaŋah* | stupid | #156 |
| 271 | *bagan* | *?abagan* | *rbagan* | summer | #7 |
| 272 | *wawi?* | *wagi?* | *hedaw* | sun | |
| 273 | *mŋyoq* | *lumaŋuy* | *lmaŋuy* | swim, bathe | |
| 274 | *msaniq* | *pisani?* | *bsaniq* | taboo | |
| 275 | *ŋuŋu?* | *ŋuŋu?* | *ŋuŋu?* | tail | |
| 276 | *mlahaŋ* | *malahaŋ* | *qmalahaŋ* | take care | |
| 277 | *sehuy* | *cehur* | *sari?* | taro | |
| 278 | *tmalaŋ* | *tumalaŋ* | *tmalaŋ* | taste | |
| 279 | *boq royeq* | *bu? na rori?* | *rusuq* | tears | |
| 280 | *qaya?* | *ya?aya?* | *qaya?* | thing | |
| 281 | *pqaya?* | *pa?aya?* | *pqaya?* | hang down | |
| 282 | *mŋluŋ* | *luŋluŋ* | *lmŋəluŋ* | think | |
| 283 | *qani* | *hani* | *nii* | this | #29 |
| 284 | *wayay* | *wariy* | *waray* | thread | |
| 285 | *lmuhuw* | *lumuhuw* | *lmihuw* | thread a needle | |
| 286 | *ciwan* | *tugar* | *toru?* | three | |
| 287 | *hmali?* | *hamalic* | *həma?* | tongue | #99 |
| 288 | *gnux* | *?apanux* | *gupun* | tooth | #86 |
| 289 | *raŋay* | *pinoŋ* | *daŋar* | trap | |
| 290 | *qhoniq* | *ahuni?* | *qhuni?* | tree | |
| 291 | *mpusan* | *mapusar* | *mpusan* | twenty | |
| 292 | *saziŋ* | *sayiŋ* | *daha?* | two | |
| 293 | *cyasi?* | *tarasi?* | *tarasi?* | umbrella, cap | |
| 294 | *?uyiq* | *?ugir* | *?urac* | vein, sinew | #97 |
| 295 | *qalaŋ* | *?alaŋ* | *?alaŋ* | village | |
| 296 | *qsahuy* | *?acahur* | *qsahur* | inner heart | |
| 297 | *mutaq* | *muta?* | *tbərlih* | vomit | |
| 298 | *pipi?* | *pipi?* | *pipi?* | vulva | |
| 299 | *hzinuk* | *hawinuk* | *hginuk* | waist | |
| 300 | *mnaga?* | *mana?* | *tmaga?* | wait | #150 |
| 301 | *mahuq* | *mabuhu?* | *mahu?* | wash (clothes) | |
| 302 | *qsya?* | *?usye?* | *qsiya?* | water | |
| 303 | *tgliq* | *tagli?* | *tgəlaq* | waterfall | #66 |
| 304 | *sami* | *cami* | *yami* | we (exc.) | |
| 305 | *?ita?* | *?ita?* | *?ita?* | we (incl.) | |
| 306 | *tminun* | *tuminu?* | *tminun* | weave | |

[34] *batunux* (older generation) varies with *urati/* (younger generation).

| Number | Mstbaun | Palngawan | Inago | Gloss | Cross-ref. with 190 lexical items list |
|---|---|---|---|---|---|
| 307 | *mqumah* | *rumohak* | — | to work in the field | |
| 308 | *mŋilis* | *maŋilis* | *lmiŋis* | weep | |
| 309 | *mhuyiq* | *mahuri?* | *mhuriq* | wet | |
| 310 | *nanu?* | *?amur* | *manu?* | what | |
| 311 | *knon* | *kanun* | *knuwan* | when | |
| 312 | *?inu?* | *?inu?* | *?inu?* | where | |
| 313 | *?ima?* | *?ima?* | *?ima?* | who | |
| 314 | *labaŋ* | *rahalaŋ* | *llabaŋ* | wide | #168 |
| 315 | *pali?* | *?alihur* | *tərak* | wings | #44 |
| 316 | *tmabus* | *tumapis* | *tmbus* | winnow | #152 |
| 317 | *qmisan* | *mula?iy* | *misan* | winter | |
| 318 | *kyu?* | *kuya?* | *kui?* | worm | |
| 319 | *smabu?* | *cumabu?* | *lmabu?* | wrap | |
| 320 | *miru?* | *matas* | *matas* | write, tatoo | |
| 321 | *mr?uqu?* | *maguruw* | *mqnuqu?* | wrong | |
| 322 | *msuyak* | *masurak* | *msurak* | yawn | |
| 323 | *kawas* | *iŋkaralan* | *kawas* | year | |
| 324 | *hera?* | *hira?* | *siga?* | yesterday | #19 |
| 325 | *?isu?* | *?isu?* | *?isu?* | you (sg.) | |
| 326 | *simu* | *cimu* | *yamu* | you (pl.) | |

**Part 2: Word lists with 190 lexical items**

Informants' Background:

| Dialect | Informant's Name | Sex | Age |
|---|---|---|---|
| Mstbaun | Batu Temu (Kao, Tsing-hsian) | M | 34 |
| Palngawan | Temu Bakan | M | 75 |
| | Bakan Iwal | F | 81 |
| | Api Rupi? | F | 75 |

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| 1 | *ŋta?* | *gilung* | chicken |
| 2 | *qhyaŋ* | *haŋali?* | shoulder |
| 3 | *yabux* | *rinaŋ* | sweat |
| 4 | *mbrus* | *ma?ihur* | to lie |
| 5 | *sbiŋ* | *cacibiŋ* | sweet |
| 6 | *mtalaŋ* | *matatalaŋ* | run |
| 7 | *bagan* | *?abagan* | summer |

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| 8 | *qora?* | *kora?* | all |
| 9 | *spi?* | *sipil* | dream |
| 10 | *sasaw* | *sasi?* | shade |
| 11 | *mtasaw* | *matasi?* | clean |
| 12 | *bgayaw* | *bagayaw* | Alocasia |
| 13 | *qmaluk* | *macabu?* | hunt |
| 14 | *luhuŋ* | *lahyuŋ* | mortar |
| 15 | *buqoh* | *ga?iluh* | banana |
| 16 | *pira?* | *pira?* | how many |
| 17 | *kira?* | *kira?* | later |
| 18 | *mqeru?* | *ma?iru?* | nine |
| 19 | *hera?* | *hira* | yesterday |
| 20 | *kiri?* | *kagiri?* | women's basket |
| 21 | *bgira?* | *bagira?* | batten of loom |
| 22 | *?irah* | *?irah* | sister |
| 23 | *mbaziy* | *mababiniy* | trade |
| 24 | *kgiran* | *kuŋkagiy* | peel hemp |
| 25 | *mgey* | *magiy* | escape |
| 26 | *pgeran* | *matalayiŋ* | shun |
| 27 | *sragiy* | *soruk* | covering |
| 28 | *mqliw* | *minturu?* | flow |
| 29 | *qaniy* | *kani?* | this |
| 30 | *haniy* | *nil* | here |
| 31 | *qasa* | *kaca?* | that |
| 32 | *hasa* | *haca?* | there |
| 33 | *qitun* | *?atiy* | corn |
| 34 | *qabay* | *?abalic* | jaw |
| 35 | *ktu?* | *labun* | (upper) belly |
| | *hbuw* | *bunax* | (lower) belly |
| 36 | *mihiy* | *mahiy* | beat |
| 37 | *mu?* | *macmbu?* | shoot |
| 38 | *muya?* | *mamuhi?* | plant |
| 39 | *qmun* | *?untaŋ* | swallow |
| 40 | *hozin* | *huyil* | dog |
| 41 | *qoli?* | *?olic* | rat |
| 42 | *kli?* | *rakalic* | leopard |
| 43 | *qbuli?* | *?abulic* | ashes |
| 44 | *pali?* | *?alihul* | wings |
| 45 | *squliq* | *ci?uli?* | person |
| 46 | *bgax* | *bariŋ* | egg |
| 47 | *kwali?* | *ruk* | hawk |
| 48 | *cyaquŋ* | *te?uŋ* | crow |
| 49 | *qulih* | *?ucix* | fish |
| 50 | *ŋli?* | *raŋalic* | fly |
| 51 | *ka?* | *putuc* | mosquito |
| 52 | *sumiq* | *lumi?* | body louse |

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| 53 | *qmici?* | *?amagal* | flea |
| 54 | *wihiŋ* | *wihiŋ* | water leech |
| 55 | *?ubu?* | *yuyux* | nest |
| 56 | *qoŋ* | *?om* | pangolin |
| 57 | *raŋi?* | *raŋi?* | friend |
| 58 | *bisuw* | *bicuw* | earthworm |
| 59 | — | *gi?us* | nit |
| 60 | *slaq* | *macalaq* | mud |
| 61 | *rhyan* | *rahal* | earth |
| 62 | *naqiy* | *buna?iy* | sand |
| 63 | *biŋah* | *haŋituh* | star |
| 64 | *siluŋ* | *waciluŋ* | sea, lake |
| 65 | *sbisuw* | *baluŋ* | thunder |
| 66 | *tgliq* | *tagli?* | waterfall |
| 67 | *qsyak* | *tagacaq* | opposite |
| 68 | *utux* | *?amutux* | ghost |
| 69 | *sapiŋ* | *cacapiŋ* | palm tree |
| 70 | *qoyux* | *warux* | rattan |
| 71 | *bonaw* | *tabiŋ* | peanut |
| 72 | *bilus* | *cabilis* | sugar cane |
| 73 | *kasi?* | *kamcie?* | sugar |
| 74 | *?agiq* | *lami?ul* | miscanthus |
| 75 | *rknus* | *rakinus* | camphor laurel |
| 76 | *wasiq* | *ragutumun* | *Solanum nigrum* |
| 77 | *yahuw* | *ragu?* | *Sonchus oleracus* |
| 78 | *bakih* | *bageluh* | *Laportea pterost* |
| 79 | *sqiy* | *iciga?* | nettle, *Urtica thunberg* |
| 80 | *bukin* | *basikal* | *Alpinia speciosa* |
| 81 | *qabaŋ* | *riluk* | *Rubus taiwan* |
| 82 | *qeruk* | *?uli? gehal* | ginger, pepper |
| | *?ulik* | | (hot pepper) |
| 83 | *taŋuw* | *taŋuw* | bud |
| 84 | *raga?* | *ra?* | maple |
| 85 | *hayuŋ* | *tu?iluŋ* | pine |
| 86 | *gnux* | *?apnux* | tooth |
| 87 | *bukiŋ* | *kumis* | body hair |
| 88 | *rapan* | *?apal* | sole |
| 89 | *rqes* | *rayes* | face |
| 90 | *karaŋ* | *kacaŋ* | molar |
| 91 | *mosiq* | *moci royi?* | eye secretion |
| 92 | *puŋih* | *ilis* | tumor |
| 93 | *puga?* | *pupuk* | navel |
| 94 | *bubul* | *yayubun na babus* | bladder |
| 95 | *yaba bahat* | *temubahak* | heart |
| 96 | *qcyan* | *utin* | hip |

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| 97 | *ʔuyiq* | *ʔugil* | vein, sinew |
| 98 | *luqus* | *luʔiŋ* | marrow |
| 99 | *hmaliʔ* | *hamalic* | tongue |
| 100 | *ʔutas* | *ranah* | penis |
| 101 | *lliw ʔutas* | *tatukul* | glans penis |
| 102 | *puluc* | *ruruy* | clitoris |
| 103 | *lihuy* | *lihul* | forehead |
| 104 | *szik* | *sarik* | liver |
| 105 | *ramuʔ* | *ramurux* | blood |
| 106 | *pŋeloq* | *paneluk* | bow |
| 107 | *pspan* | *ciŋas* | food particle |
| 108 | *qasuʔ* | *ʔásuʔ* | boat |
| 109 | *tnuxan* | *patanóan* | pillow |
| 110 | *qbubuʔ* | *tamuku* | hat |
| 111 | *muyaw* | *moroŋ* | house |
| 112 | *tatak* | *rasaliʔ* | hut |
| 113 | *ramuw* | *lamuyi*[35] | roof |
| 114 | *qmayah* | *mumarah raŋuʔ* | dry land |
| 115 | *buliʔ* | *buliʔ* | small knife |
| 116 | *roŋ* | *roŋ* | needle |
| 117 | *qsiyuʔ* | *ʔasúʔ* | pestle |
| 118 | *ʔayaŋ* | *ariŋuʔ* | soup |
| 119 | *lupiʔ* | *siru* | mat |
| 120 | *tuqiy* | *tuʔiy* | road |
| 121 | *kagaw* | *cacobah* | broom |
| 122 | *ramac* | *raramac* | side food |
| 123 | *qmuliʔ* | *ʔamulic* | mixed cake |
| 124 | *sbil* | *tasbilian* | lunch box |
| 125 | *thay* | *tahal* | leftover |
| 126 | *maqus* | *tararú* | ask |
| 127 | *smyuk* | *cumik* | answer |
| 128 | *lmoŋ* | *lumoŋ* | burn |
| 129 | *thekan* | *rakac* | stool |
| 130 | *mtamaʔ* | *tatamaʔ* | sit |
| 131 | *mhoqin* | *mahuʔil* | die |
| 132 | *syunaw* | *yumunaw* | substitute |
| 133 | *miq* | *miʔ* | give |
| 134 | *mhŋaw* | *paŋuw* | rest |
| 135 | *surux* | *macaruw* | stand |
| 136 | *qmataq* | *kunteruʔ* | eat raw |
| 137 | *mnayaŋ* | *tumabul* | clear land |
| 138 | *kigaqaw* | *kunagaʔuw* | new land |
| 139 | *lmaguʔ* | *naumic* | keep plants |
| 140 | *lmahiŋ* | *mumarah* | to thin out, to weed |

35 *ramuyi* varies with *ramu/iy*.

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| 141 | *mbun* | *abulun* | bury |
| 142 | *mtux* | *manawaral* | bark |
| 143 | *qmatak* | *matak* | cut |
| 144 | *t?asuy* | *masuhul* | cough |
| 145 | *tgyuk* | *maruk* | sink |
| 146 | *rmhaw* | *luŋhaw* | sharpen |
| 147 | *mxan* | *muxal* | pain |
| 148 | *nbu?* | *muxal* | sick |
| 149 | *smxu?* | *cunxu?* | pound |
| 150 | *mnaga?* | *mana?* | wait |
| 151 | *mhkaŋi?* | *makakiy* | walk |
| 152 | *tmabus* | *tumapis* | winnow |
| 153 | *cyaba?* | *yoba?* | big |
| 154 | *cipoq* | *yuyuk* | small |
| 155 | *mbuloq* | *maritux* | blind |
| 156 | *mŋuciq* | *mŋaŋah* | dumb, stupid |
| 157 | *smyax* | *picyeh* | bright |
| 158 | *hiyaq* | *gara?* | cold |
| 159 | *shyu?* | *magaluyiŋ* | straight |
| 160 | *mnkuŋ* | *miŋkuŋ* | dark |
| 161 | *mkyay* | *maŋu?*[36] | dry |
| 162 | *m?uyay* | *ma?uriy* | hungry |
| 163 | *msuqi?* | *sunrahu?* | late |
| 164 | *giqas* | *ga?arus* | new |
| 165 | *mnkis* | *nakis* | old |
| 166 | *msayux* | *masarux* | shy |
| 167 | *mqŋuqu?* | *maŋurah* | sleepy |
| 168 | *glabaŋ* | *rahalaŋ* | wide |
| 169 | *gzil* | *ragiril* | narrow |
| 170 | *qalux* | *makalux* | black |
| 171 | *hmswa?* | *hunco?* | why |
| 172 | *lhŋan* | *cka baŋi?* | night |
| 173 | *sasan* | *sasan* | morning |
| 174 | *soni?* | *soni?* | today |
| 175 | *suxan* | *cuxan* | tomorrow |
| 176 | *?uka?* | *?uŋac* | not have |
| 177 | *laxi* | *laxi* | don't |
| 178 | *hga?* | *laha* | they |
| 179 | *babaw* | *bawi?* | above |
| 180 | *kraya?* | *yatux* | upland |
| 181 | *glaŋ* | *galeŋ* | lead |
| 182 | *suruw* | *bukuy* | behind |
| 183 | *qsahuy* | *rik* | inside |

36 *maŋu?* varies with *maraŋu?*.

| Number | Mstbaun | Palngawan | Gloss |
|---|---|---|---|
| 184 | *ska?* | *cacka?* | between |
| 185 | *lliw* | *liliw* | tip |
| 186 | *kuŋ* | *kuriŋ* | I |
| 187 | *Kuŋ ga Tayal.* | *Itaral kuriŋ*[37] | I am a native. |
| 188 | *Iyat saku Tayal.* | *Arac u Itaral.* | I am not a native (Atayal). |
| 189 | *mbusuk* | *manukan* | drunk |
| 190 | *Nyux ku mbusuk la.* | *Manukan cu la.* | I am drunk. |

## Appendix 2: Recorded text tests for intelligibility

### Mstbaun Text (narrated by Yabu Pawan, M, 65 years old)

*lalu mu Tayal ga Yabu Pawan, lalu Gipun ga Yamagucu Masaaki, lalu Cyukok ga Yang A-Ji. Kawas mu ga mtyu pgan magan.*

*ru arin ku laqi ga mqzinut qu qnxan maku, ru trang keku imagan kawas ga, si say mlahang ku qsuyan maku mbuloq, lalu nya ga Pihaw.*

*ru mqelang myan mcisan lru, kmayan qsuyan maku Pihaw ru: 'Hata hkangi putung ru hata lmom qnahi muci ru', lon myan putung ru, ini saluw hiya, kuzing qu mutung lru, mtlom lru, wan si itta rgyax qu puneq ru, ulung su splawa qora mrkyas qalang ru, son nha muyut.*

*ru gbyan nasa lga, tpihun mina yaba kesat ga bucyow, Kohara bucyow lalu nya. yaya mu ru qsuyan maku Pihaw ru kuzing, muha myan qzitan qnawan (qzitan qnawan hiya ga hasisyo), ru tpihun mina bucyow ru qusan minya ru bhiyan minya. ru bhiyan ku nya ru, ini nya bhziy yan qsuyan maku Pihaw qya mbuloq royeq nya, yaya mu ru kuzing ga bhyan nya.*

*baqun maku Gipun qaniy ga, maki balay regi nya, anay ta tmubun qora ke ru noy ta nya ini bhziy muci saku ru, mihiy lga stubun maku wi maku son 'Konniciwa' ru; mihiy loziy ga 'Kongbangwa' son maku ru, mihiy loziy ga 'Ohayogoraymas' son mu, qora balay regi Gipun ga wan maku skayan ga, ini alay taling mihiy qu Gipun qasa ru son ta alay nanu kmayan soəobey mihiy la i- key nya ini baqiy mung ke ta muci saku ru mihiy loziy, wi knya lklun ru wi knya bhlan ru, qora balay regi wan maku stubun qora ga, ini balay the, obey mihiy.*

*ru yaya maku ga bhyan nya ga imaw mtbuling, ru kmayan yaya mu lga: 'Yat ta pqyanux lru, phoqin ta la, talagay alay mxan hi yayun ta nya mihiy muci yaya mu ru', ke ska bengi lga, pwahun mina bucyow Gipun qasa lru, muha myan ngasan lru.*

*kmayan yaya maku, 'simuw ssekay aku hru, yasa qu hoqin kun muci ru', bhlan nya wasin qolu maku ru, nga ... nga ku mngilis, 'iyat saku balay phci qolu', son maku yaya mu ru, ulung su key wan muci nanu lru, ini ku nya bhiy qolu lru, moyay ku mngilis.*

*nanu yasa qu son mha trang laqi cipoq ga, key kuzing wan nya sqnutan arin nxan na Gipun qaniy. Ima lux baq yow qaniy, Gipun qaniy ga, 'Ini kita bnkis ru laqi, si nya tmahiy tmahiy mihiy ru uka balay ryosin nya qu Gipun qaniy.'*

*ru nanu yasa qu yaya mu uzi ga ulung su key wan muci nanu lru ini nya pskciy qu qolu maku ru. nyux ku mbzinah msmoniy misuw qaniy ga, qaniy ga gnalu na Utux Kayal.*

37 *Itaral kuriŋ* varies with *Itaral cukuŋ*.

**Translation of Mstbaun story**

My Atayalic name is Yabu Pawan. My Japanese name is Yamagucu Masaaki. My Chinese name is Yang, A-ji. I am sixty-five years old.

During my childhood, my family was very poor. When I was about five years old, I began to take care of my older brother, who was blind. His name was Pihaw.

When we were bored with playing, my older brother, Pihaw, suggested, 'Let's go find matches to burn the mountain!' After we found the matches, because he could not see, I was the one who lit the matches to burn the mountain. The fire spread quickly to the top of the mountain. Fortunately, our call summoned all the young people from the village. They came to put out the fire.

That evening, the Japanese policeman called us in. His name was Mr Kohara. My mother, my older brother Pihaw and I went to the police bureau. He interrogated us and then beat us. He beat me but not my older brother Pihaw because he was blind. Thus my mother and I were beaten.

I knew that Japanese had many polite expressions. I thought if I said all the polite words, he might not beat us. When he beat me, I bowed my head and said, 'Good afternoon!' When he beat me again, I said, 'Good evening!' When he still beat me, I said, ' Good morning!' After I had said all the Japanese greetings, he still did not stop beating me. No matter what I said, he still beat me. I wondered if he did not understand what I had said. Therefore, I repeated all the polite expressions again, but it did not work. He still tied me up and beat me.

My mother was beaten so hard that she flew across the room. My mother said, 'We can't live anymore. We'll die. Our bodies have been so badly beaten'. Not until midnight were we released by the policeman. Then we went home.

My mother said, 'I'll first hang you, and then I'll hang myself'. When she tied a rope around my neck, I cried and shouted, 'Don't choke me!' Fortunately, I did not know what happened, but my neck was not tied. But I was still crying very hard.

During my childhood, I was probably the only one who had been beaten hard by the Japanese. Who knows why? Those Japanese did not have any conscience. They beat anybody, young or old.

Something miraculous happened that my mother did not choke me. I have been able to survive until now. This is God's will.

**Palngawan text (narrated by Temi Temu, F, 50 years old)**

*kuring hiya ong Temi Temu ka lalu mu, lalu na itaral kani. ka ausa mu hiya ga, murnarah cu kararih na kanel. ru karuma ga musa mu marah ong, aska kalama musa matoh cu usix. ru amoka usix mu ga maki tagacak na luling.*

*utux rih ong musa cu matoh. moka luling na usix hani ga, tagic si gawah cu yaba, tagic si hatuw. ini mu nak bayi ka kanon karih huntuw uri ru kanon ka gumawah.*

*rih cikaca ga musa cu matoh cu usix tagacak. musa cu hang ga, yuyuk ka luling hani hang, ho ru tamasu cu sumbali cu puying na usix mu hani la ga, bagi cu rasali mu la ga, yaba ka usix la. lunglung cu bayu tanainu mascarak cuka luling hani mikong. ungac carong tatavingan kasun luling hiya kai. aska minoh linglungan tanak hapo mascarak caga. mulәuli kinang ka huyil. maksisiyaw cu ana mu ahkalangi ka pacarapan kaluling hani. hapo ka usix ni. ascu tamaluh macaruw tagacak hang. pasco tala mikong. utux na cu sababaə ka kinanuhan mu hani. pintaringan nak uli ka sababaə ka utux morong min. sababaə min cu ka tensikiu hani ca. lunglung cu yunani pakalu cu rarihung na ausa hani*

*ong. balbali ta cumun yababawi mikong. musa sinbabaəan tanak ong ana ta musa ana inu ga maki babang anali aska ana inu ong. maki kararih kasun yababawi ulasu itan ca ga.*

*ho ru lunglung cu cumun yababawi la ga. ascu lunglung cu ka yaba mu. lima wal bawi karal ka yaba mu. yaba mu sinbali kinang hiya mini ka kinanuhan mu hani. kani ka tagaga cu cumun ga baliə cu lunglung cu ka yaba mu hang. ho ru kumaral cu cuka kei mu. yaba mu isu cebawi. isuka sumbali kinang. yosunani sumbali kinang ong baliun saku pakaiyanux babaw na rahal hani. micu necu bakalu cu ka rarih ong na ausa hani. balii taluhing moka cinun mu hani ga taluhingi paspa yaba bawi ka kei mu hani. kani ka lamun mu kora kasun kei na kiukai sinbabaan mu nak hiya ga, tensikiu kani ka lungpu cu tianzhu jing, shengmu jing, guangrong jing.*

*tamasu cu cumun yaba bawi la ga, ho mukung puson mu kora ka ugil mu tanabuy cu yaba bawi pinlarang cu carong gumoro ka luling hani. asmu lunglungi ka kei ni yaba mu. gomoro luling maka yaba mu ga malahang cu kasun masapow na luling ma. maraara ka usix la ong mahuyo hari ka insa na usix hani. baliun mu malah ka lukus mu. moka huyil mu muuli kinang hani ga kalalama gomoro ka huyil hani. wal mulic nanu hugal ka huril hani kai. ga, iyaə ta lunglungi kaca mikong. tamasu tanak cumun yaba bawi laga. balbali? tanak kunhapo cuka ausa tanak hani. ananak aspaskura babang laga unga ka ciəuliə unil lumo kinang caga. kani ka puson munak kinhapo na linglungan puson munak linglungan ka yaba mu parow kinang ka yaba mu mikong.*

*kani ka gumoro cu ka luling haca la. gomoro cuka luling haca ong. minutux cu umara paragan mu kake mu 'yaba bawi balii cu gunlasu mikong, yaba bawi balii cu gunlasu mikong.' maha cu minramagal matuə gumoro ascu nak tahi mascarak cu kaluling hani la. mascarak cu la ong ascu paksangi sisyaw babang na luling. mayanux ta ong mikong. mayanux tala ga pakalahang ta cu uli ci morong, mrong ta mikong.*

**Translation of Palngawan text**

My name is Temi Temu. This is my Atayaic name. Concerning my life, I go to work every day as a woman. Sometimes I go to the field, but I have to check the source of the water first. The water is on the other side of the river.

One day I went to check the water. The water flow of the river was sometimes very rapid but sometimes under control. I did not know when the water was blocked and when it was released. One day, I went to check the water across the river. When I started, the water flow was small. When I finished checking the source of the water and was on my way back to the hut, the waterflow became rapid. I did not know how to cross the river. I thought there was nothing for me to hold onto in the river. I could only depend on my strong faith to get across. My dog was following me. I was walking near the edge, trying to find a way to cross the river. The waterflow was very strong. I was staring across the river. I was wondering what to do. Fortunately I had faith. Since I was a child, my family have believed in God. We believe in Catholicism. I thought I should pray devoutedly to Our Heavenly Father whenever I came across any difficulty. I believed Our Heavenly Father was protecting us wherever we go at all times.

While I was praying to Our Heavenly Father, I suddenly thought about my father. My father had already gone to Heaven. My father made me and gave me life. Therefore, when I began to pray I thought about my father. I prayed, 'You are my father up there. You made me. Since you made me, you wanted me to live well on earth. Now I am facing a problem in my life. Please pray well for me. Tell my word to Our Heavenly Father'. I remembered all my church teachings and recited Ave Maria, etc.

After I had prayed to Our Heavenly Father, I decided to use up all my energy. I firmly believed in Our Heavenly Father and I was determined to go across the river. All of a sudden, I remembered what my father said before. He said, 'When crossing the river, I look for the shallow place, where the water splits. If the water splits, it has less force'. Thus I took off my clothes. The dog that was following me went ahead of me to cross the river. It was drifting downward. I stopped thinking about my feeling temporarily. Since I had prayed to Our Heavenly Father, I might as well confront it with faith no matter what happened. No matter how much I looked around, hoping to find somebody, no one could come to help me. I decided to strengthen my heart. My father came to mind. I thought my father would help me.

Now I was ready to cross the river. Each step I took, I shouted, 'Heavenly Father, protect me! Heavenly Father, protect me!' I repeated it for five or six times while I was going across the river. Suddenly I saw I was able to cross the river. After I arrived at the bank of the river, I felt totally motionless. I thought, 'I survived'. After I survived, I wanted to take good care of my children and my family.

**Inago text (narrated by Walis Tadaw, M, 55 years old)**

*rngaw mu sayang o nədaəan sapah mu sipiyaw. mensa hetay sipiyaw ka tama mu o taha pi ka mensuwai. kentatah hetay ka tama mu o wata ini baka mssbu ka hetay tanah tunux. ataw ka mensa hetay ka tama mu o mimah sinaw kəjijiyah. muəutux uhway kia o mtjiyan kəjiyah. uhway kia o bubu mu bhragun nia, uhway kia o yami mensuwai maku pi makələmiqu mataqiy. basukan ka hiya naqeh balay. babaw nya o miyah ka təməsaə ka sinəyesu kiokay ka sinəhiyi ka tama mu ta.*

*babaw miyah sinəhiyi ka tama mu ta o ini imah sinaw ta. kia ka sitatao nətrumuc pi miyah kiokay ta. kana bubu mu mi laqi nya kana to miyah kiokay la, rima ka laqi senaw mi truka laqi karijin. kia ka miyah kiokay kana ta. kia ka nədaəan sapah mu sipiyaw.*

*kia ka seikacu nami sipiyaw ta o. blalay piha o mhuma masu, mhuma bunga mi basaw uli. kia ka seikacu sipiyaw kia miyah ka tluw ta o. babaw nya to o seikacu ini tnataə. sipiyaw ho o ini kan abula ha cimu nanak ha kentatah ka menkan abula ta o mi?ing pila ta mhuma masu mi bunga ha. kentatah ka menkan abula ta o, miəing pila ta. mhuma masu mi bunga ha o, ini ingi pila ha. mhuma payay ta o ming pila ta. kia ta o məkələmiqu ta mosa miəing pila ləmiqu. saw kia ta o səmələy kingsering, tsun ta ha sapah. brigun ta ha cimu mi abula. babaw nya o tbriyoh ka seikacu ta. pinaw ka bunga o ini taha kuhi mkan ta itaw masu oli o ini taha kuhi. kia ka sayang ta o miəing pila muyic balay ta. kia ka sayang ta o balalay mhuma nasi ha pinaw yami hini o llubu pika hini kia ka nasi o ini aoli. naqaih ka nasi oli o wata sakatun ta. babaw nasi to o mhuma saka mu la, mhuma saka mu ucula naka mamei oli. babaw nya o mkala ka seikacu babaw thəgani ta o. ana manu ni ta o pila ta o bhrakun ta ha. kia ka seikacu nami ta o mahuma ambali ta. pinaw ambali o basiyaq o maluka netang nia ha. pinaw ka hici ta o, naqeh ka netang ka nia ta. kia ka naqeh ka ambali ta o, musa miəing pila ta. kia ka laqi ta o musa kampah ngawuc la kəmpah katawa ku məgənteking uli. kia ka o ləngəlung nami ta, kia ka parajing miyah təmusa mhuma ocia ta. kia ka mhuma ocia mi betak sayang. yapi zu ko nen ta kenta kia ka seikacu nami ta o, malu hali la. kia ka marana marana marana. kia ka seikacu nami ta ya mhuma nami ocia ni ta o. ana uli o mangan ina uli. uhway kia uli o seikacu laqi ta ha uli o. wata malu malu pika sayang ta. mahuway namu balay ta.*

**Translation of Inago text**

Now I am going to talk about what happened to my family. When my father served in the military, there were only my brother and I. He returned home after the Japanese military was defeated in the war. Because he had served in the military, he often drank and sought trouble. After he got drunk, he either punched or chased my mother around. Because there were only two of us as brothers, we went to hide on the mountain whenever he got drunk.

My father was very mean after he drank. But after the Christian church came to preach the Gospel, my father believed in it. When he became a believer, he did not drink anymore. He attended the church regularly and my mother and all the children, five sons and three daughters, went to church. Our whole family went to church. This is what happened to my family.

Now I am going to talk about life in the past. We originally planted millet and sweet potatoes. After the Mainland Chinese came here [Taiwan Retrocession], our life was different. In the past we did not have oil to eat but only salt. If we wanted to eat oil, we had to look for more money. But we did not make much money by planting millet and sweet potatoes; therefore, we went to the mountain to look for another source of income. Sometimes we brought home a kind of herbal medicine [Jin xian lian in Chinese] to sell in order to buy salt and oil. Later the living standard increased more, and our children did not like to eat either sweet potatoes or millet. Thus we were busy trying different ways to make more money. First, we tried to grow pears. But the altitude in this area was too low for pears. So the pear trees were taken down. Next, we tried to grow corns, lima beans and red beans. But the cost of living kept increasing too quickly for us to catch up. It required more money to keep up to par. So we began to grow red pears. The price for the fruit was high for a while. But when the price went too low, we had to go after more money again. So our children left home for construction work, pouring cement and tying steel. Because we were concerned for our children's hard labor, we began to grow tea. It has been fifteen years since we started to grow tea. Our living standard has been increasing ever since. We have made enough money from growing tea that our children could afford to get married. Our children's lives are getting better and better. Thank you very much.

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