IOSR Journal Of Humanities And Social Science (IOSR-JHSS)
Volume 18, Issue 6 (Nov. - Dec. 2013), PP 35-55
e-ISSN: 2279-0837, p-ISSN: 2279-0845.
www.iosrjournals.org

Reconstructionand Sub-grouping of Batak Languages

Himpun Panggabean[1], Robert Sibarani[2], Dwi Widayati[3],
Namsyah Hot Hasibuan[4]

[1]Universitas Methodist Indonesia, Medan, Indonesia, [2]Universitas Sumatera Utara, Medan, Indonesia,[3]Universitas Sumatera Utara, Medan, Indonesia, [4]Universitas Sumatera Utara, Medan, Indonesia

Abstract:*This article contains a report of research into reconstruction and sub-grouping of Batak languages (BLs) composed of Toba language (TL), Simalungun language (SL), Pakpak Dairi language (PDL), Angkola language (AL), Karo language (KL), and Mandailing language (ML) spoken in North Sumatera, Indonesia.The research problems cover the sound correspondences, proto-phonemes, and sub-grouping of BLs. The data are the utterances of the native speakers of BLsbeing recorded in IPA Kiel transcription and are analysed with comparative method. The analysis shows that sound correspondence sets in BLs are of two types, namely the sets resulted from linear inheritance and the setsfrom sound innovation.Based on the correspondence sets, proto-phonemes are reconstructed and BLs are sub-grouped.The analysis also shows that BLs can be classified into three sub-groups, namely TL-AL-ML, PDL-KL, and SL.*
Keywords*: Batak languages, sound correspondences, proto-phonemes, reconstruction, sub-grouping.*

I. Introduction

Languages keep changing. The changes of languages occur regularly and recognizably and can be seen in genetically related languages called sister languages. Schleicher (1871) in McManis*et al.* (1987:265) proposed the Family Tree Theory assuming that languages change in regular, recognizable ways (the Regularity Hypothesis) and that because of this, similarities between languages are due to genetic relationship between those languages (the Relatedness Hypothesis).

Batak languages (BLs) comprising Toba language (TL), Simalungun language (SL), Pakpak Dairi language (PDL), Angkola language (AL), Karo language (KL), and Mandailing language (ML) spoken in six neighboring areas in North Sumatera, Indonesia are genetically-related languages. Crowley (1992:90) states that languages that have genetic relationships are descended from the same proto-language. BLs are descended from a proto-language p(BLs), for they are genetically-related and have similarities between them which are regular and recognizable as shown by sound correspondence sets. The correspondence sets are the basis of the reconstruction of proto-phonemesand BLs' sub-grouping.

In the following table, the correspondence sets are shown.

Table 1

Glos	TL	SL	PDL	AL	KL	ML
bamboo	ˈbulu	ˈbuluh	ˈbuluh	ˈbulu	ˈbuluh	ˈbulu

The correspondence sets for *bamboo* are /b-b-b-b-b-b/, /u-u-u-u-u-u/, /l-l-l-l-l-l/, /u-u-u-u-u-u/, and /ɸ-h-h-ɸ-h-ɸ/. Based on the correspondence sets, the proto-phonemes of BLs can be reconstructed. The proto-phoneme for the first set is /*b/, for the second set is /*u/, for the third set is /*l/, for the fourth set is /*u/, and for the fifth set is /*h/.The reason for the reconstruction of /*b/, /*u/, and /*l/ is the fact that those phonemes are inherited linearly by allof the sister languages, Tl, Sl, PDl, Al, Kl, and Ml from the proto-language p(BLs). The reason for the reconstruction of /*h/ as the proto-phoneme of the fifth set is the phenomenon that in languages, /h/ is commonly lost.

The proto-phoneme /*h/ develops into /ɸ/ in SL,PDL, and KL undergoes retention in TL, AL, and ML.. By comparing the proto-phoneme and its reflexes, sound change can be formulated. The rule of the sound change in the correspondence set /ɸ-h-h-ɸ-h-ɸ/ is /*h/ changes into /ɸ/ in TL, AL, and ML at the final position before vowel (h → ɸ/___#).

On the basis of the sound change of BLs, the languages can be sub-grouped into TL-AL-ML and SL-PDL-ML. However, when additional data are available, the sub-grouping separates SL from the latter as shown below and places it in a position that does not belong to the former or to the latter.

Table 2

Glos	TL	SL	PDL	AL	KL	ML
die	ˈmatɛ	ˈmatei	ˈmatɛ	ˈmatɛ	ˈmatɛ	ˈmatɛ

In the table, sound correspondence /ɛ-ei-ɛ-ɛ-ɛ-ɛ/ isolates SL from TL-PDL-AL-KL-ML because it is the only language that has /ei/ in the final position. Since SL is isolated, the sub-grouping is TL-AL-ML, PDL-KL, and SL. In rigorous data as shown in the following part of the article, such sub-grouping is clear.

In conjuction with what is stated previously, the research questions deal withsound correspondence sets, proto-phonemes, sound changes, and sub-grouping of BLs.

II. The Method of Research

Following this is the method of approaching the research questions.

1. Data Gathering

The data are gathered using a list of BLs' basic vocabulary. Each of the words in the data gathering instrument matches a word in each of TL, SL, PDL, AL, KL, and ML. The sources of the data are the utterances of the native speakers of each of the languages. Their utterances are recorded in phonetic symbols using IPA Kiel. The data to be analysed are only free-morphemes, meaning that bound morphemes are excluded.

2. SoundCorrespondence Sets

The data having been gathered are examined by using comparative method to discover sound correspondence sets, namely the phonemes in BLs that are similar or share retention and those that share innovation.

3. Reconstruction of Proto-phonemes

The reconstruction of a proto-phoneme is conducted by looking into every sound in asoundcorrespondence set. The sounds that are similar in comparable sets in all of BLs are the reflexes of a single proto-phoneme similar to them. The reconstruction of phonemes that undergo innovation is based on what sounds have the largest distributions and what sound changes are the most plausible.

4. Rule of Sound Change

Following the discovery of proto-phonemes, the rules of sound change from proto-phonemes into their reflexes may be formulated by examining the regularity of the sound changes.

5. Sub-grouping

The sub-grouping is conducted by grouping BLs in accordance with shared innovation occurring in BLs. The languages with shared innovation are placed in one group.

III. Linear Sound Correspondence Sets

3.1 Linear Sound Correspondence Sets

3.1.1 Sound Correspondence Set/ʌ-ʌ-ʌ-ʌ-ʌ-ʌ/n Initial and Middle Positions

Sound correspondence set /ʌ-ʌ-ʌ-ʌ-ʌ-ʌ/in BLs occurs regularly and recurrently in initial and middle positions as seen below:

Initial Positions

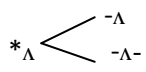
Glossary	TL	SL	PDL	AL	KL	ML
dust	ˈʌbu	ˈʌbu	ˈʌbu	ˈʌbu	ˈʌbu	ˈʌbu
afternoon	ʌˈriʌn	-	-	ʌˈriʌn	-	ʌˈriʌn

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
stone	ˈbʌtu	ˈbʌtu	ˈbʌtu	ˈbʌtu	ˈbʌtu	ˈbʌtu
lie	ˈgʌbus	-	ˈgʌbus	-	-	ˈgʌbus
moon	ˈbulʌn	ˈbulʌn	ˈbulʌn	ˈbulʌn	ˈbulʌn	ˈbulʌn
fly	ˈhʌbʌŋ	ˈhʌbʌŋ	ˈkʌbʌŋ	ˈhʌbʌŋ	ˈkʌbʌŋ	ˈhʌbʌŋ

Langacker (1972:334) and Crowley (1992:96) state that the choice of proto-segment to underlie a correspondence is straight forward when its reflex is the same in all daughter languages. In the above data, the sounds in correspondence set /ʌ-ʌ-ʌ-ʌ-ʌ-ʌ/in initial and middle positions are the same, namely /ʌ/ in TL, SL, PDL, AL, KL, and ML.In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the proto-phoneme is conducted by choosing /*ʌ/ as the proto-phoneme since its reflex is the same in all six sister languages.

The distributionof /ʌ/ is as follows:



3.1.2 SoundCorrespondence Set/a-a-a-a-a-a/in Initial, Middle, and Final Positions

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
I	'au	'au	'aku	'au	'aku	'au
child	'**a**nak	-	-	-	'**a**nak	'**a**nak
wind	'aŋin	-	'aŋin	'aŋin	'aŋin	'aŋin
what	'aha	'aha	-	'aha	-	'aha
fire	'api	'api	'api	'api	'api	'api

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
roof	'tarup	'tayup	'tarup	'tarup	'tarup	'tarup
dark	'golap	'golap	'ŋgelap	'golap	'gelap	'golap
father	'bapa	'bapa	'bapa	'bapa	'bapa	'bapa
we	'hami	'hami	'hami	'hami	'kami	'hami
return	'mulak	'mulak	'mulak	'mulak	'mulak	'mulak

Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
five	'lima	'lima	'lima	'lima	'lima	'lima
flower	'buŋa	'buŋa	'buŋa	'buŋa	'buŋa	'buŋa
forget	'lupa	'lupa	'lupa	'lupa	'lupa	'lupa
salt	'sira	'sira	'sira	'sira	'sira	'sira
eye	'mata	'mata	'mata	'mata	'mata	'mata

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /a-a-a-a-a-a/. In the above data, the sounds in correspondence set /a-a-a-a-a-a/ in initial, middle, and final positions are the same, namely /a/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*a/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /a/ is as follows:

a < a-, -a-, -a

3.1.3 Sound Correspondence Set /u-u-u-u-u-u/ in Initial, Middle, and Final Positions

Sound correspondence set /u-u-u-u-u-u/in BLs occurs regularly and recurrently in initial, middle, and final positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
rain	'udʌn	'udʌn	'udʌn	'udʌn	'udʌn	'udʌn
don't	'unaŋ	'ulaŋ	'ulaŋ	'unaŋ	ulaŋ	'unaŋ
snake	'ulɔk	'ulɔk	-	'ulɔk	-	'ulɔk

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
take	'buet	'buʌt	'buat	'buat	'buʌt	'buat
smoke	'timus	'timus	-	'timus	-	'timus
chicken	'manuk	-	'manuk	'manuk	'manuk	'manuk
burn	'tutuŋ	'tutuŋ	'tutuŋ	'tutuŋ	'tutuŋ	'tutuŋ
bamboo	'bulu	'buluh	'buluh	'bulu	'buluh	'bulu

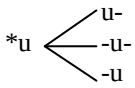
Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
I	'au	'au	'aku	'au	'aku	'au
thosand	'ribu	'ribu	'ribu	'ribu	'ribu	'ribu
three	'tolu	'tolu	te'lu	'tolu	te'lu	'tolu
seven	'pitu	'pitu	'pitu	'pitu	'pitu	'pitu

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /u-u-u-u-u-u/. In the above data, the sounds in correspondence set /u-u-u-u-u-u/ in initial, middle, and final positions are the same, namely /u/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly

inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted bychoosing /*u/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /u/ is as follows:



3.1.4 Sound Correspondence Set /i-i-i-i-i-i/

Sound correspondence set /i-i-i-i-i-i/ in BLs occurs regularly and recurrently in initial, middle, and final positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
chin	ˈisaŋ	-	ˈisaŋ	ˈisaŋ	ˈisaŋ	ˈisaŋ
tooth	ˈipɔn	ˈipɔn	-	ˈipɔn	ˈipen	ˈipɔn
nose	ˈiguŋ	ˈiguŋ	ˈeguŋ	ˈiguŋ	ˈiguŋ	ˈiguŋ
remember'	ˈiŋɔt	ˈiŋat	-	ˈiŋɔt	ˈiŋet	ˈiŋɔt
who	ˈise	ˈise	ˈise	ˈise	ˈise	ˈise

Middle Positions

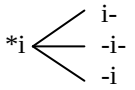
Glossary	TL	SL	PDL	AL	KL	ML
calf	ˈbitis	ˈbitis	ˈbitis	ˈbitis	ˈbites	ˈbitis
lips	ˈbibir	ˈbibir	ˈbibir	ˈbibir	ˈbiber	ˈbibir
wash	ˈburi	burih	buˈrih	-	buˈrih	-
lick	ˈdilʌt	ˈdilʌt	ˈndilat	ˈdilʌt	ˈdilʌt	ˈdilʌt
cat	ˈhutiŋ	ˈhutiŋ	-	ˈhutiŋ	-	ˈhutiŋ
sky	ˈlʌŋit	ˈlʌŋit	ˈlaŋit	ˈlaŋit	ˈlaŋit	ˈlaŋit

Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
day	ˈari	ˈari	ˈari	ˈari	ˈwari	-
bath	ˈidi	ˈidi	ˈidi	ˈidi	ˈidi	ˈidi
sweet	tɔŋˈgi	-	teŋˈgi	teŋˈgi	-	-
string	ˈtali	ˈtali	ˈtali	ˈtali	ˈnali	ˈtali
bone	ˈholi	ˈholi	-	ˈhɔli	-	ˈhɔli

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /i-i-i-i-i-i/. In the above data, the sounds in correspondence set /i-i-i-i-i-i/ in initial, middle, and final positions are the same, namely /i/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*i/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /i/ is as follows:



3.1.5 Sound Correspondence Set /b-b-b-b-b-b/ in Initial and MiddlePositions

Sound correspondence set /b-b-b-b-b-b/ in BLs occurs regularly and recurrently in initial and middle positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
take	buet	buʌt	buat	buat	buat	buʌt
dog	ˈbiʌŋ	bʌˈliʌŋ	ˈbiʌŋ	-	ˈbiʌŋ	-
stale	ˈbʌri	ˈbʌsi	-	ˈbʌri	ˈmali	ˈbʌri
stone	ˈbʌtu	ˈbʌtu	ˈbʌtu	ˈbʌtu	ˈbʌtu	ˈbʌtu
split	ˈbola	ˈbolah	-	ˈbola	-	ˈbola
heavy	bɔˈrat	bɔˈrat	ˈberat	bɔˈrat	ˈberat	bɔˈrat

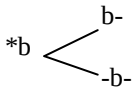
Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
fur	ibˈbulu	amˈbulu	-	imˈbulu	-	-
coconut	haˈrabbir	haˈlambir	-	haˈrambir	-	haˈrambir

more	'lobi	-	'lebih	'lobi	'lebih	'lobi

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /b-b-b-b-b-b/. In the above data, the sounds in correspondence set /b-b-b-b-b-b/ in initial and middle positions are the same, namely /b/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*b/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /b/ is as follows:



3.1.6 Sound Correspondence Set /t-t-t-t-t-t/

Sound correspondence set /t-t-t-t-t-t/ in BLs occurs regularly and recurrently in initial, middle,and final positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
smoke	'timus	'timus	-	'timus	-	'timus
knock	'tuktuk	'tuktuk	'tuktuk	'tɔkɔk	'tuktuk	'tɔkɔk
sharp	ta'jɔm	-	'tajem	ta'jɔm	-	ta'jɔm
string	'tali	'tali	'tali	'tali	'nali	'tali
earth	'tanɔ	'tanɔh	'tanɔh	'tanɔ	'tanɔh	'tanɔ
hand	'taŋan	'taŋan	'taŋan	'taŋan	'taŋan	'taŋan

Middle Positions

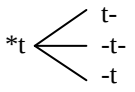
Glossary	TL	SL	PDL	AL	KL	ML
calf	'bitis	'bitis	'bitis	'bitis	'bites	'bitis
star	'bittaŋ	'bittaŋ	'bintaŋ	'bintaŋ	'bintaŋ	'bintaŋ
stupid	'ɔtɔ	-	'mɔtɔ	'ɔtɔ	'mɔtu	'ɔtɔ
sap	'gɔta	'gɔtah	'gɛtah	'gɔta	-	'gɔta
heart	'atɛ	'atɛ	'atɛ	'atɛ	'atɛ	'atɛ

Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
four	'ɔpat	'ɔpat	em'pat	'ɔpat	em'pat	'ɔpat
remember	'iŋɔt	'iŋat	'eŋet	'iŋɔt	'iget	'iŋɔt
lick	'dilʌt	'dilʌt	'ndilat	'dilʌt	'dilʌt	'dilʌt
shock	'sɔŋgɔt	'sɔŋgɔt	'seŋget	sɔŋgɔt	'seŋget	'sɔŋgɔt
stingy	ho'lit	ho'lit	ko'lit	ho'lit	-	ho'lit
sky	'lʌŋit	'lʌŋit	'laŋit	'laŋit	'laŋit	'laŋit

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /t-t-t-t-t-t/. In the above data, the sounds in correspondence set /t-t-t-t-t-t/ in initial, middle, and final positions are the same, namely /t/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*t/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /t/ is as follows:



3.1.7 Sound Correspondence Set /j-j-j-j-j-j/

Sound correspondence set /j-j-j-j-j-j/ in BLs occurs regularly and recurrently in initial and middle positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
pretty	je'ges	jɛ'ŋɛs	-	'jeges	-	'jeges
stand	'jɔŋjɔŋ	'jɔŋjɔŋ	-	'jɔŋjɔŋ	-	'jɔŋjɔŋ
corn	'jʌuŋ	'jʌgul	'jaguŋ	'jauŋ	'jauŋ	'jegaŋ
beard	'jʌŋgut	-	'jʌŋgut	'jaŋgut	'jaŋgut	'jaŋgut

finger	ˈjʌri	ˈjʌri	ˈjari	ˈjʌri	ˈjari	jʌri
meet	jumpa	ˈjuppaŋ	ˈjuppah	ˈjumpa	-	ˈjumpa
Middle Positions						
Glossary	TL	SL	PDL	AL	KL	ML
stand	ˈjɔŋjɔŋ	ˈjɔŋjɔŋ	-	ˈjɔŋjɔŋ	-	ˈjɔŋjɔŋ
tired	ˈlojʌ	ˈlojʌ	leˈja	ˈlojʌ	-	ˈlojʌ
spit	ˈtijur	ˈtujur	-	ˈtijur	-	-
sharp	taˈjɔm	-	ˈtajem	taˈjɔm	-	taˈjɔm

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /j-j-j-j-j-j/. In the above data, the sounds in correspondence set /j-j-j-j-j-j/ in initial and middle positions are the same, namely /j/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*j/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distributions of /j/ is as follows:

*j < j-
*j < -j-

3.1.8 Sound Correspondence set /r-r-r-r-r-r/

Sound correspondence set /r-r-r-r-r-r/ in BLs occurs regularly and recurrently in initial, middle, and final positions as shown below:

Initial Positions						
Glossary	TL	SL	PDL	AL	KL	ML
mosfly	ˈrɔŋit	ˈrɔŋit	-	ˈrɔŋit	ˈreŋit	ˈrɔŋit
sing	ˈɛddɛ	-	ˈɛndɛ	ˈɛddɛ	ˈɛndɛ	-
deligent	riŋˈgʌs	riŋˈgʌs	-	riŋˈgʌs	-	riŋˈgʌs
hundred	ˈratus	ˈratus	ˈratus	ˈratus	ˈratus	ˈratus
thousand	ˈribu	ˈribu	ˈribu	ˈribu	ˈribu	ˈribu
Middle Positions						
Glossary	TL	SL	PDL	AL	KL	ML
dry	-	ˈhɔrah	keˈrah	-	keˈrah	ˈkɔriŋ
night	ˈbɔrŋin	ˈbɔrŋin	ˈberŋin	ˈbɔrŋin	ˈberŋin	ˈbɔrŋin
pasir	-	ˈhɔrsik	-	ˈhɔrsik	kerˈsik	ˈhɔrsik
pull	ˈtarik	-	ˈtarik	ˈtarik	ˈtarik	ˈtarik
bright	ˈtɔrang	ˈterang	-	ˈtɔrang	ˈterang	ˈtɔrang
Final Positions						
Glossary	TL	SL	PDL	AL	KL	ML
swollen	-	-	-	ˈbɔsar	ˈbesar	ˈbɔsar
full	ˈbosur	ˈbosur	ˈbosur	ˈbesur	-	ˈbosur
dirtty	ˈkɔtɔr	-	ˈkɔtɔr	ˈkɔtɔr	-	ˈkɔtɔr
straight	tiˈgɔr	-	ˈtɛgɛr	tiˈgɔr	-	-
white	bɔtˈtar	-	ˈmbentar	bɔtˈtar	ˈbentar	bɔnˈtar

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /r-r-r-r-r-r/. In the above data, the sounds in correspondence set /r-r-r-r-r-r/ in initial, middle, and final positions are the same, namely /r/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*r/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /r/ is as follows:

*r < r-
*r < -r-
*r < -r

3.1.9Sound CorrespondenceSet /l-l-l-l-l-l/

Sound correspondence set /l-l-l-l-l-l/ in BLs occurs regularly and recurrently in initial, middle, and positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
run	'lojoŋ	-	'lojaŋ	'lɔjɔŋ	-	'lojoŋ
escape	'luʌ	'luʌh	'luah	'luʌ	-	'luʌ
forget	'lupa	'lupa	'lupa	'lupa	'lupa	'lupa
tired	'lojʌ	'lojʌ	le'ja	'lojʌ	-	'lojʌ
slippery	lʌd'dit	lan'dit	'ndalit	lan'dit	'dalit	lan'dit
Middle Positions						
Glossary	TL	SL	PDL	AL	KL	ML
induce	'elek	'ɛlɛk	-	'ɛlɛk	-	'ɛlɛk
hill	'dolok	'dolok	de'leŋ	-	de'leŋ	'dolok
moon	'bulʌn	'bulʌn	'bulʌn	'bulʌn	'bulʌn	'bulʌn
eight	u'ʌlu	'wʌluh	'waluh	-	'waluh	-
walk	'dʌlʌn	'dʌlʌn	'dalan	'dalan	'dalan	'dalan
three	'tolu	'tolu	te'lu	'tolu	te'lu	'tolu
Final Positions						
Glossary	TL	SL	PDL	AL	KL	ML
duduk	'huddul	'hundul	'kundul	-	'kundul	-
difficult	ma'ɔl	ma'ɔl	-	ma'ɔl	-	ma'ɔl
thickl	ha'pal	-	'kapal	ha'pal	'kapal	ha'pal
ear	'piŋgol	'piŋgol	-	'piŋgol	-	-
deaf	nɛ'ŋɛl	nɛ'ŋɛl	-	'iŋɔl	-	'iŋɔl

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /l-l-l-l-l-l-l/. In the above data, the sounds in correspondence set /l-l-l-l-l-l-l/ in initial, middle, and final positions are the same, namely /l/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*l/ as its proto-phoneme since its reflex is the same in all the six sister languages.

The distribution of /l/ is as follows:

*l < l-
-l-
-l

3.1.10 Sound Correspondence Set /ŋ-ŋ-ŋ-ŋ-ŋ-ŋ/

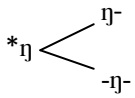
Sound correspondence set /ŋ-ŋ-ŋ-ŋ-ŋ-ŋ/ in BLs occurs regularly and recurrently in middle and final positions as shown below:

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
beard	'jʌŋgut	-	'jaŋgut	'jaŋgut	'jaŋgut	'jʌŋgut
eat	'maŋan	'maŋan	'maŋan	'maŋan	'man	'maŋan
back	taŋ'guruŋ	taŋ'guruŋ	-	taŋ'goru	'goru	taŋ'goru
stick	'tukkɔt	'tukkɔt	'tɔŋket	'tukkɔt	"tɔŋkat	'tuŋkɔt
ear	'piŋgol	'piŋgol	-	'piŋgol	-	-
Final Positions						
Glossary	TL	SL	PDL	AL	KL	ML
dog	'biʌŋ	bʌ'liʌŋ	'biʌŋ	-	'biʌŋ	-
meat	'dʌgiŋ	-	'dʌgiŋ	-	'dʌgiŋ	-
berak	'mitiŋ	-	'miciŋ	'mitiŋ	-	'mitiŋ
star	'bittaŋ	'bittaŋ	'bintaŋ	'bintaŋ	'bintaŋ	'bintaŋ
blind	'pituŋ	'pituŋ	'pituŋ	'petuŋ	-	-
leaf	'buluŋ	'buluŋ	'buluŋ	'buluŋ	'buluŋ	'buluŋ

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /ŋ-ŋ-ŋ-ŋ-ŋ-ŋ/.In the above data, the sounds in correspondence set /ŋ-ŋ-ŋ-ŋ-ŋ-ŋ/ middle and final positions are the same, namely /ŋ/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*ŋ/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /ŋ/ is as follows:



3.1.11 Sound Correspondence Set /p-p-p-p-p-p/

Sound correspondence set /p-p-p-p-p-p/ in BLs occurs regularly and recurrently in initial, middle, and final positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
young	pɔ'sɔ	pɔ'sɔ	-	pɔ'sɔ	-	pɔ'sɔ
bitter	pa'ɛt	pa'ɛt	'pagit	pa'ɛt	'pagit	pa'ɛt
shorth	-	'pɔndɔk	'pendek	'pendek	-	'pɔn'dɔk
navel	'pusɔk	'pusɔk	-	'pucɔt	'pusuŋ	'pusɔt
egg	'pira	-	-	'pira	pi'laru	'pira

Middle Positions

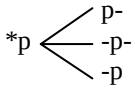
Glossary	TL	SL	PDL	AL	KL	ML
four	'ɔpat	'ɔpat	em'pat	'ɔpat	em'pat	'ɔpat
cotton	'hapas	'hapas	'kapas	'hapas	'kapas	'hapas
hut	'sɔpɔ	'sɔpɔ	'sapɔ	'sɔpɔ	'sapɔ	'sɔpɔ
narrow	sɔp'pit	sɔp'pit	-	sɔp'pit	-	sɔm'pit
thin	ni'pis	rap'pis	'tipis	'tipis	'tipis	'tipis
whistle	-	'sɔppul	'sumpul	-	sem'pul	-

Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
dark	-	'golap	'ŋgelap	go'lap	ge'lap	go'lap
suck	'ɔssɔp	'ɔssɔp	'isap	'iccɔp	-	'incɔp
hold	'tiop	-	-	'tiop	-	'tiop
catch	'takkup	'takkap	'taŋkup	'takkup	'taŋkap	'taŋkup

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /p-p-p-p-p-p/. In the above data, the sounds in correspondence set /p-p-p-p-p-p/ in initial, middle, and final positions are the same, namely /p/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*p/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /p/ is as follows:



3.1.12 Sound Correspondence Set /g-g-g-g-g-g/

Sound correspondence set /g-g-g-g-g-g/ in BLs occurs regularly and recurrently in initial and middle positions as shown below:

Initial Positions

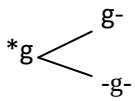
Glossary	TL	SL	PDL	AL	KL	ML
lie	'gʌbus	-	'gʌbus	-	-	'gʌbus
sap	'gɔta	'gɔtah	'gɛtah	'gɔta	-	'gɔta
strong	go'go	go'goh	-	gɔ'gɔ	'gəgəh	gɔ'gɔ
yellow	-	gɔr'siŋ	-	gɔr'siŋ	'gersiŋ	gɔr'siŋ

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
disgusted	gigi	'gigi	-	'gigi	-	-
if	'aŋgɔ	'aŋgɔ	'aŋgɔ	-	'aŋgɔ	-
when	ʌd'digʌn	an'digan	'ndigan	an'digan	'digan	an'digan
sweet	tɔŋ'gi	-	teŋ'gi	tɔŋ'gi	-	-
house	'bʌgʌs	-	'bages	'bagas	-	'bagas

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /g-g-g-g-g-g/. In the above data, the sounds in correspondence set /g-g-g-g-g-g/ in initial and middle positions are the same, namely /g/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*g/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /g/ is as follows:



3.13 Sound Correspondence Set /d-d-d-d-d-d/

Sound correspondence set /d-d-d-d-d-d/ in BLs occurs regularly and recurrently in initial and middle positions as shown below:

Initial Positions

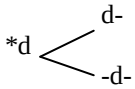
Glossary	TL	SL	PDL	AL	KL	ML
lake	-	-	ˈdanau	daˈnɔ	ˈdanau	ˈdanau
near	-	dɔˈhɔr	-	dɔˈnɔk	ˈdeher	dɔˈnɔk
world	-	duˈnia	duˈnia	duˈnia	ˈdɔni	duˈnia
torn	-	-	ˈdori	-	ˈduri	ˈduri
fall	dʌˈbu	dʌˈbu	-	dʌˈbu	dabuh	dʌˈbu

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
rice	idˈdahan	inˈdʌhʌn	-	inˈdahan	-	inˈdahan
sing	ˈɛddɛ	-	ˈɛndɛ	ˈɛddɛ	enˈde	-
one	ˈsʌdʌ	ˈsʌdʌ	ˈsada	ˈsada	ˈsada	ˈsʌdʌ
horn	ˈtadˈduk	ˈtanduk	ˈtanduk	ˈtanduk	tandɔk	ˈtanduk

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /d-d-d-d-d-d/. In the above data, the sounds in correspondence set /d-d-d-d-d-d/ in initial and middle positions are the same, namely /d/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*d/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /d/ is as follows:



3.14 Sound Correspondence Set /m-m-m-m-m-m/

Sound correspondence set /m-m-m-m-m-m/ in BLs occurs regularly and recurrently in initial, middle, and final positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
shy	mʌˈilʌ	ˈmɛla	ˈmɛla	mʌˈilʌ	ˈmela	mʌˈilʌ
die	ˈmatɛ	ˈmatei	ˈmatɛ	ˈmatɛ	ˈmate	ˈmatɛ
win	ˈmɔnaŋ	ˈmɔnaŋ	meˈnaŋ	ˈmɔnaŋ	meˈnaŋ	ˈmɔnaŋ
drink	ˈminum	ˈminum	ˈminum	ˈminum	ˈminum	ˈminum
vomit	ˈmutʌ	ˈmutah	ˈmutah	ˈmuta	ˈmutah	ˈmuta

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
fat	mɔkˈmɔk	-	ˈŋgɔmɔk	-	mɔkˈmɔk	mɔkˈmɔk
right	siʌmun	siˈhamun	kaˈmuhen	-	kaˈmuhen	-
incense	haˈmijjɔn	haˈmɔnan	kemeˈnyen	haˈmɔnyan	kemeˈnyen	-
moustache	ˈkumi	ˈgɔmis	ˈkumis	ˈkumis	ˈkumis	ˈkumis
whistle	-	-	ˈsumpul	ˈɔmbus	semˈpul	ˈɔmbus

Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
cheek	ˈhurum	ˈhuyum	-	-	ˈkurum	-
recover	ˈmalum	ˈmalum	ˈmalum	ˈmalum	ˈmalem	-

well	ˈsumur	ˈsumur	ˈsumur	ˈsumur	ˈsumur	ˈsumur
bury	-	-	ˈtanem	ˈtanɔm	-	ˈtanɔm
sleep	ˈmodom	ˈmodom	meˈdem	ˈmodom	meˈdem	meˈdem

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /m-m-m-m-m-m/. In the above data, the sounds in correspondence set /m-m-m-m-m-m/ in initial and middle positions are the same, namely /m/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*m/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /m/ is as follows:

*m < m-, -m-, -m

3.15 Sound Correspondence Set /s-s-s-s-s-s/

Sound correspondence set /s-s-s-s-s-s/ in BLs occurs regularly and recurrently in initial, middle, and final positions as shown below:

Initial Positions

Glossary	TL	SL	PDL	AL	KL	ML
bite	-	-	ˈsarut	sargut	-	sargut
nail	siˈsilon	siˈsilon	siˈselu	siˈsilon	siˈlusilu	saˈsilon
damage	ˈsegʌ	ˈsedʌ	ˈceda	ˈsegɔ	ˈceda	ˈsegʌ
nine	ˈsiʌ	ˈsiʌh	ˈsibah	-	siˈwah	-
narrow	sɔpˈpit	sɔpˈpit	-	sɔpˈpit	-	-
glad	ˈsɔnaŋ	-	seˈnaŋ	ˈsɔnaŋ	ˈsɔnaŋ	ˈsɔnaŋ

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
dumb	-	-	-	ˈbisu	ˈbisu	ˈbisu
chilly	lʌˈsiʌk	lʌˈsinʌ	-	laˈsiak	-	laˈsiak
breath	ˈhɔsa	ˈhɔsah	keˈsah	ˈhɔsa	keˈsah	ˈhɔsa
who	ˈise	ˈise	ˈise	ˈise	ˈise	ˈise

Final Positions

Glossary	TL	SL	PDL	AL	KL	ML
smoke	ˈtimus	ˈtimus	-	ˈtimus	-	ˈtimus
rice	ˈbɔras	ˈbɔras	ˈberas	-	ˈberas	-
pretty	jeˈges	jɛˈŋɛs	-	ˈjeges	-	ˈjeges
languish	ˈmalɔs	ˈmelus	ˈmelus	malɔs	ˈmelus	malɔs
hot	ˈlas	miˈlʌs	-	miˈlas	meˈlas	miˈlas

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /s-s-s-s-s-s/. In the above data, the sounds in correspondence set /s-s-s-s-s-s/ in initial and middle positions are the same namely /s/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same, sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*s/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /s/ is as follows:

*s < s-, -s-, -s

3.16 Sound Correspondence Set /n-n-n-n-n-n/

Sound correspondence set /n-n-n-n-n-n/ in BLs occurs regularly and recurrently in middleand final positions as shown below:

Middle Positions

Glossary	TL	SL	PDL	AL	KL	ML
child	ˈanak	-	-	ˈanak	ˈanak	ˈanak
ayam	ˈmanuk	-	ˈmanuk	ˈmanuk	ˈmanuk	ˈmanuk
brave	ˈbaˈrani	-	beˈrani	-	-	beˈrani
hang	-	-	ˈgantuŋ	-	-	ˈgantuŋ

mother	ˈinoŋ	ˈinaŋ	ˈinaŋ	-	-	-
Final Positions						
Glossary	TL	SL	PDL	AL	KL	ML
wind	ˈaŋin	-	ˈaŋin	ˈaŋin	ˈaŋin	ˈaŋin
moon	ˈbulʌn	ˈbulʌn	ˈbulʌn	ˈbulʌn	ˈbulʌn	ˈbulʌn
fish	-	ˈikʌn	ˈikan	ˈikʌn	-	ˈikʌn
year	ˈtaɔn	ˈtahun	ˈtahun	ˈtaɔn	ˈtahun	ˈtahun
hand	ˈtaŋan	ˈtaŋan	ˈtaŋan	ˈtaŋan	ˈtan	ˈtaŋan
place	iˈŋanan	ˈianan	-	iˈŋanan	iˈŋan	-

The method of reconstruction applied above is used to reconstruct the proto-phoneme of /n-n-n-n-n-n/. In the above data, the sounds in correspondence set /n-n-n-n-n-n/ in middle and final positions are the same, namely /n/ in TL, SL, PDL, AL, KL, and ML. In other words, it can be stated that the sounds are linearly inherited from the same sound. On the basis of the fact, the reconstruction of the sound correspondence set is conducted by choosing /*n/ as its proto-phoneme since its reflex is the same in all six sister languages.

The distribution of /n/ is as follows:

*n < n-
-n-

3.2 Innovation-based SoundCorresponde Sets

3.2.1 Sound Correspondence Set /ɔ-ɔ-e-ɔ-e-ɔ/

Sound correspondence set /ɔ-ɔ-e-ɔ-e-ɔ/ in BLs occurs regularly and recurrently in middle positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
come	ˈrɔ	ˈrɔh	ˈreh	ˈrɔ	ˈreh	ˈrɔ
cold	ˈbɔrgɔ	ˈbɔrgɔh	ˈmbergɔh	-	ˈbergeh	-
four	ˈɔpat	ˈɔpat	ˈempat	ˈɔpat	ˈempat	ˈɔpat
tooth	ˈipɔn	ˈepen	ˈipɔn	ˈipɔn	ˈipen	ˈipɔn
surprised	ˈsɔŋgɔt	ˈseŋget	ˈsɔŋgɔt	ˈsɔŋgɔt	ˈseŋgɔt	ˈsɔŋgɔt

According to Keraf (1991:61) and Crowley (1992:101), the sound that has the widest distribution in a correspondence set is reconstructed as the proto-phoneme. In *The Comparative Method and Linguistic Reconstruction, http//en.wikipedia.org/wiki/Comparative method,*thewidest distribution refers to *mojoriy wins* principle.

In the sound correspondence set /ɔ-ɔ-e-ɔ-e-ɔ/, /ɔ/ has the widest distribution in comparison to /e/ or abides by *majority wins* principle.On the basis of the fact, the proto-phoneme of /ɔ-ɔ-e-ɔ-e-ɔ/ is reconstructed as /*ɔ/.

The innovation of proto-phoneme /*ɔ/ into /ɔ/ and /e/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:

/ɔ/: /e/ → /ɔ/ → [ɔ]
/ɔ/ → [e]

The rule of the sound change is /ɔ/ changes into /e/ in PDL and KL due to the lenition or weakening of rounded back central /ɔ/ to become unrounded centeral low /e/ between two consonants.

*ɔ → e/C___C in PDL and KL

3.2.2 Sound Correspondence Set /o-o-e-o-e-o/

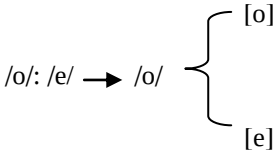
Sound correspondence set /o-o-e-o-e-o/ in BLs occurs regularly and recurrently in middle positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
bile	pogu	pogu	peggu	pogu	pegu	pogu
dark	-	golap	ŋgelap	golap	gelap	golap
lebih	ˈlobi	-	ˈlebih	ˈlobi	-	ˈlobi

three	'tolu	'tolu	te'lu	'tolu	te'lu	'tolu

In the sound correspondence set /o-o-e-o-e-o/, /o/ has the widest distribution in comparison to /e/ or abides by *majority wins* principle.On the basis of the fact, the proto-phoneme of /o-o-e-o-e-o/ is reconstructed as /*o/.

The innovation of proto-phoneme /*ɔ/ into /ɔ/ and /e/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /o/ changes into /e/ in PDL and KL due to the lenition or weakening of rounded back central /o/ to become unrounded centeral low /e/ between two consonants.
*o → e/C___C in PDL and KL

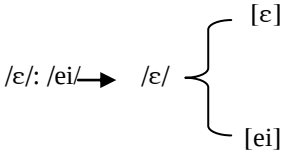
3.2.3 Sound Correspondence Set /ɛ-ei-ɛ-ɛ-e-ɛ/

Sound correspondence set /ɛ-ei-ɛ-ɛ-e-ɛ/ in BLs occurs regularly and recurrently in final positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
die	'matɛ	'matei	'matɛ	'matɛ	'mate	'matɛ
corpse	bakkɛ	bakkei	baŋke	-	-	-
foot	-	nahei	neh	-	nahɛ	-
paddy	ɛmɛ	omei	-	ɛmɛ	-	ɛmɛ

In the sound correspondence set /ɛ-ei-ɛ-ɛ-ɛ-ɛ/, /ɛ/ has the widest distribution in comparison to /ei/ or abides by *majority wins* principle. On the basis of the fact, the proto-phoneme of /ɛ-ei-ɛ-ɛ-ɛ-ɛ/ is reconstructed as /*ɛ/.

The innovation of proto-phoneme /*ɛ/ into /ɛ/ and /ei/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /ɛ/ changes into/ei/ in SL due to the vowel breaking (typically, *off glide*) processin which unrounded /i/ is added to /ɛ/after which /ɛ/ weakens to become /e/, resulting in diphthong/ei/ in the final positions.
*ɛ → ei /___# in SL

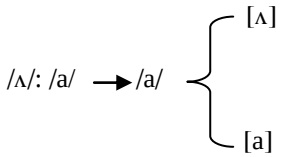
3.2.4 Sound Correspondence Set /ʌ-ʌ-a-ʌ-a-ʌ/

Sound correspondence set /ʌ-ʌ-a-ʌ-a-ʌ/ in BLs occurs regularly and recurrently in middle positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
stale	bʌri	bʌsi	mbari	bʌri	mali	bʌri
deep	bʌgʌs	bʌgʌs	mbages	bʌgʌs	bages	bʌgʌs
far	dʌo	dʌo	ndaɔh	dʌo	dʌɔh	dʌo

In the sound correspondence set /ʌ-ʌ-a-ʌ-a-ʌ/, /ʌ/ has the widest distribution in comparison to /a/ or abides by *majority wins* principle. On the basis of the fact, the proto-phoneme of /ʌ-ʌ-a-ʌ-a-ʌ/ is reconstructed as /*ʌ/.

The innovation of proto-phoneme /*ʌ/ into /ʌ/ and /a/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /ʌ/ changes into /a/ in PDL and KL due to the lenition or weakening of unrounded central back /ʌ/ to become unrounded low back in middle positions between two consonants and between consonant and vowel.

*ʌ → a/C___C in PDL and KL
C V

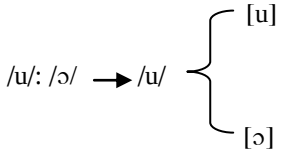
3.2.5 Sound Correspondence Set /u-u-ɔ-u-u-u/

Sound correspondence set /u-u-ɔ-u-u-u/ in BLs occurs regularly and recurrently in middle positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
moustache	ˈkumis	gumis	ˈgɔmis	ˈkumis	ˈkumis	ˈkumis
curcuma	hunik	huniŋ	hɔniŋ	hunik	kuniŋ	hunik
cat	hutiŋ	hutiŋ	kɔciŋ	hutiŋ	kuciŋ	hutiŋ

In sound correspondence set /u-u-ɔ-u-u-u/, /u/ has the widest distribution in comparison to /ɔ/ or abides by *majority wins* principle. On the basis of the fact, the proto-phoneme of /u-u-ɔ-u-u-u/ is reconstructed as /*u/.

The innovation of proto-phoneme /*u/ into /u/ and /ɔ/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /*u/ changes into /ɔ/ in PDL due to the lenition or weakening of rounded high back /u/ to become rounded low back /ɔ/ in middle positions between two consonants.

*u → ɔ/C___C in PDL

3.2.6 Sound Correspondence Set /i-i-i-i-e-i/

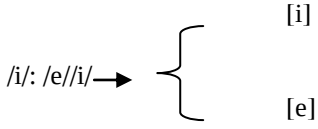
Sound correspondence set /i-i-i-i-e-i/ in BLs occurs regularly and recurrently in middle positions as shown below:

Glos	TL	SL	PDL	AL	KL	ML
calf	ˈbitis	ˈbitis	bitis	bitis	bites	bitis
lips	ˈbibir	bibir	bibir	bibir	biber	bibir

In the sound correspondence set /i-i-i-i-e-i/, /i/ hast he widest distribution in comparison to /i/ or abides by *majority wins* principle.On the basis of the fact, the proto-phoneme of /i-i-i-i-e-i/ is reconstructed as/*i/.

The innovation of proto-phoneme /*i/ into /i/ and /e/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic.

The innovation can be shown in the following diagram:



The rule of the sound change is /*i/ changes into /e/ in KL due to the lenition or weakening of unrounded high front /i/ to become unrounded centeral front /e/ in middle positions between two consonants.
*i → e/C___Cin KL

3.2.7 Sound Correspondence Set/ɸ-h-h-ɸ-h-ɸ/

Sound correspondence set /ɸ-h-h-ɸ-h-ɸ/ in BLs occurs regularly and recurrently in final positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
bamboo	bulu	buluh	buluh	bulu	buluh	bulu
half	bolʌ	-	bolʌh	bolʌ	-	bolʌ
wash	buri	burih	buri	-	burih	buri
come	rɔ	rɔh	rɔh	rɔ	rɔh	rɔ
cold	bɔrgɔ	bɔrgɔh	mbergɔh	bɔrgɔ	bergeh	bɔrgɔ
fall	dʌbu	dʌbuh	dʌbuh	dʌbu	dʌbuh	dʌbu

In reconstructing the proto-phoneme of /ɸ-h-h-ɸ-h-ɸ/, the widest distribution or *majority wins* principle does not apply, for none of /ɸ/ and /h/ has the widest distribution. The occurances of the two sounds are equal, three times. The solution to it is to refer to what Crowley (1992:100) states that /ʔ/ and /h/ are sounds that are very commonly lost in languages. In BLs, the phenomenon exists. In Proto-Austronesian (PAN) descending BLs, the equivalents of *rain* retain sound /h/ as in/*hudˈan/ in Wurm *et al*.(1978:164), /*hudˈan/ (Dempwolf, 1938),/*huDan/ (Lopez,n.d.), /*hujan/ (Brandstetter and Dempwolf, 1943), and/*hudˈan/ (Capell, 1943). In BLs, /*h/is lost to become/udʌn/in TL, SL,PDL, AL, KL, and ML. Besides, in final position, there is /*h/ in the equivalent of *bamboo*/*buluh/ (Urm and Wilson, 1978:12).The sound is lost in TL, SL, AL, and ML to become /bulu/.

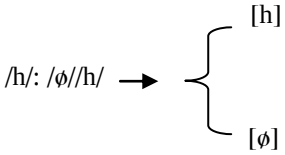
As of the loss of /*h/, in regressive assimilation, /h/ is lost after changing into /k/ in TL as in /duŋ/ ˈafterˈ+ /**h**ɔ/ ˈyouˈ → /du**kˈk**ɔ/ ˈafter you'. Based on it, it can be inferred that /h/ is lost from TL, AL, and ML. Consequently, /h/ can be reconstructed as the proto-phoneme of /-ɸ,-h,-h,-ɸ,-h,-ɸ/.

The status of /*h/ as proto-phoneme of /-ɸ,-h,-h,-ɸ,-h,-ɸ/ is strengthened by the presence of the sound in initial position of the equivalent of *come* in Alas language (AL), the language which is very close to BLs as seen in the following:

TL	SL	PDL	AL	KL	ML	AL
ˈˈrɔ	ˈrɔh	ˈrɔh	ˈrɔ	ˈreh	ˈrɔ	ˈrɔh

The rule of the sound change is /*h/ changes into /ɸ/ in TL, SL, and ML due to the loss of the sound after vowel in the final position
*h → ɸ/___# in TL,SL, and ML
V

The innovation of proto-phoneme /*h/ into /h/ and /ɸ/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



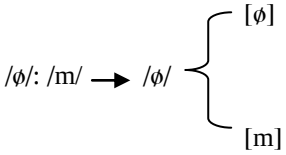
3.2.8 Sound Correspondence Set /ɸ-ɸ-m-ɸ-ɸ-ɸ/

Sound correspondence set /ɸ-ɸ-m-ɸ-ɸ-ɸ/ in BLs occurs regularly and recurrently in initial positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
stale	bʌri	bʌsi	mbari	bʌri	mali	bʌri
swollen	-	-	mbesar	bɔsar	besar	bɔsar
clean	-	bɔrsih	mbersih	-	bersih	-
big	bʌlgʌ	bʌggʌl	mbelgʌh	-	-	-
afraid	biʌr	biʌr	mbiar	biar	biar	biar

In the sound correspondence set /ɸ-ɸ-m-ɸ-ɸ-ɸ/, /ɸ/ has the widest distribution in comparison to /m/ or abides by *majority wins* principle. On the basis of the fact, the proto-phoneme of /ɸ-ɸ-m-ɸ-ɸ-ɸ/ is reconstructed as /*ɸ/.

The innovation of proto-phoneme /*ɸ/ into /*ɸ/ and /m/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /*ɸ/ changes into /m/ in PDL due to the addition (prothesis) of /m/ before voiced stop bilabial /*b/ in initial position.
*ɸ → m/___C in PDL

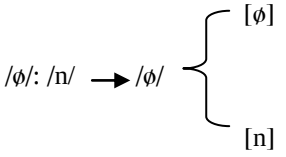
3.2.9Sound Correspondence Set /ɸ-ɸ-n-ɸ-ɸ-ɸ/

Sound correspondence set /ɸ-ɸ-n-ɸ-ɸ-ɸ/ in BLs occurs regularly and recurrently in initial positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
fall	dʌˈbu	ˈdʌbu	ˈndabuh	ˈdabu	ˈdabu	ˈdabu
far	dʌˈo	ˈdʌo	ˈndaɔh	dʌˈo	ˈdʌɔh	dʌˈo
lick	ˈdilʌt	ˈdilʌt	ˈndilʌt	ˈdilʌt	ˈdilʌt	ˈdilʌt
long	-	ˈdɔkah	ndeˈkah	-	deˈkah	-
bright	-	-	nteˈraŋ	tɔˈraŋ	tɔˈraŋ	tɔˈraŋ

In the sound correspondence set /ɸ-ɸ-n-ɸ-ɸ-ɸ/, /ɸ/ has the widest distribution in comparison to /n/ or abides by *majority wins* principle.On the basis of the fact, the proto-phoneme of /ɸ-ɸ-n-ɸ-ɸ-ɸ/ is reconstructed as /*ɸ/.

The innovation of proto-phoneme /*ɸ/ into /*ɸ/ and /n/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /*ɸ/changes into /n/ in PDL due to the addition (prothesis) of /n/ before voiced stop alveolar /*t/ and voiceless stop alveolar in initial positions.
*ɸ → n/___C in PDL

3.2.10 Sound Correspondence Set /ɸ-ɸ-ŋ-ɸ-ɸ-ɸ/

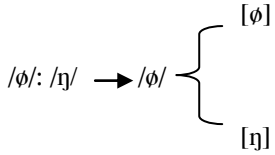
Sound correspondence set /ɸ-ɸ-ŋ-ɸ-ɸ-ɸ/ in BLs occurs regularly and recurrently in initial positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
strong	goˈgo	goˈgo	ˈŋgego	goˈgo	ˈgege	goˈgo
dark	-	ˈgolap	ŋgelap	ˈgolap	ˈgelap	ˈgolap
yellow	-	ˈgɔrsiŋ	ˈŋgersiŋ	ˈgɔrsiŋ	ˈgersiŋ	"gɔrsiŋ
long	gʌjˈjʌŋ	gʌnˈjʌŋ	ˈŋgenaŋ	ginˈjaŋ	ˈgedaŋ	ginˈjaŋ

In the sound correspondence set /ɸ-ɸ-ŋ-ɸ-ɸ-ɸ/, /ɸ/ has the widest distribution in comparison to /ŋ/ or abides by *majority wins* principle.On the basis of the fact, the proto-phoneme of /ɸ-ɸ-ŋ-ɸ-ɸ-ɸ/ is reconstructed as/*ɸ/.

The innovation of proto-phoneme /*ɸ/ into /*ɸ/ and /n/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic.

The innovation can be shown in the following diagram:



The rule of the sound change is /*ɸ/ changes into /ŋ/ in PDL due to the addition (prothesis) of /ŋ/ before voiced stop velar /*g/ in initial positions.

*ɸ → ŋ/___C in PDL

3.2.11 Sound Correspondence Set /h-h-k-h-k-h/

Sound correspondence set /h-h-k-h-k-h/ in BLs occurs regularly and recurrently in initial positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
cotton	ˈhapas	ˈhapas	ˈkapas	ˈhapas	ˈkapas	ˈhapas
cat	ˈhutiŋ	ˈhutiŋ	ˈkɔciŋ	ˈhutiŋ	ˈkuciŋ	ˈhutiŋ
lice	ˈhutu	ˈhutu	ˈkutu	ˈhutu	ˈkutu	ˈhutu
breath	ˈhɔsa	ˈhɔsah	ˈkesah	ˈhɔsa	ˈkesah	ˈhɔsa
fly	ˈhʌbʌŋ	ˈhʌbʌŋ	ˈkʌbʌŋ	ˈhʌbʌŋ	ˈkʌbʌŋ	ˈhʌbʌŋ

In accordance with the *majority wins* principle, the proto-phoneme of /h-h-k-h-k-h/ must be /*h/ for it has the widest distribution, in initial positions of TL, SL, AL, and ML in comparison to /k/ of which distribution is only in PDL and KL. However, the reconstruction does not apply in the reconstruction of proto-phoneme of /h-h-k-h-k-h/ because /h/ has been reconstructed as proto-phoneme of /ɸ-h-h-ɸ-h-ɸ/.

Because of it, the data of BLs should be extended by including the data of AL and Bahasa Indonesia (BI).According to Panggabean (1994:178), the equivalent of *cotton* in AL is /kapas/ and according to Sugono *et. al* (2008:621), the equivalent of the word in BI is /kapas/. Provided that AL and BI data for the equivalent of *cotton* are included, there will be new correspondence set /h-h-k-h-k-h-k-k/ as seen below:

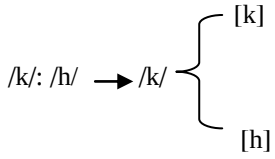
TL	SL	PDL	AL	KL	ML	AL	BI
ˈhapas	ˈhapas	ˈkapas	ˈhapas	ˈkapas	ˈhapas	ˈkapas	ˈkapas

However, the data extension cannot bring about the proto-phoneme of /h-h-k-h-k-h/ since /h/ and /k/ respectively occur four times and none of them has the widest distribution. Thanks to it, the datum of the language in the higher level, PAN, needs to be referred to.

According to (Wurm and Wilson,1978), the equivalent of the word *cotton* is /kapas/ in Lopez (n.d.) and /kapes/in Charles (1973).

Following the inclusion of the data of AL, BI, and PAN, the distribution of /k/ is dominant. Consequently, /*k/ is reconstructed as proto-phoneme of /h-h-k-h-k-h/.The innovation of /*k/ to become /h/ is summed up with the assumption that /*k/ changes into /h/ (/*k/>/ h/)in TL, SL, AL, and ML and undergoes retention in PDL and KL.

The innovation of proto-phoneme /*k/ into /*k/ and /h/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



The rule of the sound change is /*k/ changes into /h/ in TL, AL, and ML before vowel in initial position.

*k → h/#___V in TL, AL, and ML

3.2.12 Sound Correspondence Set /k-k-ŋ-k-ŋ-k/

Sound correspondence set /k-k-ŋ-k-ŋ-k/ in BLs occurs regularly and recurrently in middle positions as shown below:

Glossary	TL	SL	PDL	AL	KL	ML
catch	'takkup	'takkap	'taŋkap	'takkap	'taŋkap	'takkup
round	tik'kɔ	-	'nteŋkɔ	-	-	-
corpse	'bakkɛ	bak'kei	'baŋke	-	-	-
stick	'tukkɔt	'tukkɔt	'tuŋkɔt	'tukkɔt	'tuŋkɔt	'tukkɔt

Like in the reconstruction of /ɸ-h-h-ɸ-h-ɸ/, in the reconstruction of /k-k-ŋ-k-ŋ-k/, the widest distribution or *majority wins* principle does not apply.

To reconstruct the proto-phoneme of the correspondence set, we refer to the principle stated by Crowley (1992:96)*, "Any reconstruction should involve sound changes that are plausible."* He says that lenition is more likely to take place than fortition by giving example that /*k/ becomes /*ʔ/ (/*k/>/*ʔ/is more likely to take place than /*ʔ/ becomes /k/ (/*ʔ/>/k/).

However the example does not cover the question which one is more likely to take place /*ŋ/ becomes /k/ (/*ŋ/>/ k/) than /*k/ becomes /ŋ/ (/*k/>/ŋ/) since both of them have the same point of articulation namely, dorsavelar. Despite it, the plausibility of sound change principle can be implemented in finding out the solution to the problem whether /*ŋ/ becomes /k/(/*ŋ/>/ k/) or /*k/ becomes /ŋ/ (/*k/>/ŋ/).

Based on the plausibility, it can be singled out that /*ŋ/ changes into /k/(/*ŋ/>/ k/) instead of /*k/ changes into /ŋ/ (/*k/>/ŋ/).

There are two premises that can be put forward to prove it. Firstly, in written forms of all BLs, cluster phoneme /ŋk/ is used to record spoken form /kk/. For instance, the equivalent of the word *cup* are written orthographically as *mangkuk* /maŋkuk/ in all BLs but it is pronounced in two different ways, /maŋkuk/ in PDL, KL, and ML and /makkuk/ in TL, SL, and ML. On the basis of it, there is a strong ground to say that /*ŋ/ changes into /k/ (/*ŋ/>/ k/) instead of /*k/ changes into /ŋ/ (/*k/>/ŋ/).

Secondly, in assimilation process in TL, /ŋ/ tends to be conditioned sound instead of conditioning sound. Concerning the tendency that sound tends to be modified by its environment, (Pike,1968:58) may be referred to. The change of /ŋ/ into /k/ in the assimilation is shown below:

1. /ŋ/ changes into /k/ when followed by the word with initial sound /p/ as in /da**ŋ**/ 'not'+ /**p**ɔrlu/ 'neccessary' → /da**kp**ɔrlu / 'not neccessary'.
2. /ŋ/ changes into /k/ when followed by the word with initial sound /h/ as in /du**ŋ**/ 'after' + /**h**ɔ/ 'you'→ /du**kk**ɔ/ 'after you'.
3. /ŋ/ changes into /k/ when followed by the word with initial sound /s/ as in /da**ŋ**/ 'not'+ /**s**aut/ 'happen' → /da**ks**aut/ 'not happen'.
4. /ŋ/ changes into /k/ when followed by the word with initial sound /t/ as in /mana**ŋ**/ 'or' + /tuʌk[1]/ → /mana**kt**uʌk/ 'or tuak'.

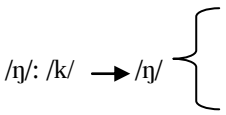
Sound /ŋ/ is also conditioned by the other sounds in assimilation. According to (Sibarani:1997) in (Marice, 2010:211), /ŋ/ changes into /k/ when followed by the word with initial phoneme /p/ (/ŋ + p/ → /kp/), into /k/ when followed by the word with initial phoneme /s/ (/ŋ + s/ → /ks/), and into /k/ when followed by the word with initial phoneme /t/ (/ŋ + t/ → /kt/).

For this reason, it can be presumed that in the history of development of BLS, /ŋ/ changes into **/k/** in TL**.** Following the change of/ŋ/ into **/k/** in TL, correspondence set /k-k-ŋ-k-ŋ-k/ becomes /ŋ-k-ŋ-k-ŋ-k/.

To support the plausibility of the change of /ŋ/ into /k/, the AL's datum is referred to. In the language, the equavalent of the word *stick* is /tɔŋ'kat/ and the equivalent of the word *catch* is /taŋ'kap/ (See Panggabean 1994:125). The distributions of /ŋ/ and /k/ after the change of /ŋ/ into **/k/** in TL and the inclusion of AL is shown below:

TL	SL	PDL	AL	KL	ML	AL
'tuŋkɔt	'tukkɔt	'tɔŋket	'tukkɔt	'tɔŋkat	'tukkɔt	'tuŋkɔt
'taŋkup	'taŋkap	'takkap	'takkap	'taŋkap	'takkup	'taŋkup

Based on the data /*ŋ/ can be reconstructed as proto-phoneme of /k-k-ŋ-k-ŋ-k/. The innovation of proto-phoneme /*ŋ/ into /*ŋ/ and /k/ does not result in difference of meaning since the two reflexes in the sister languages are not distinctive. The varieties are not phonemic rather subphonemic or allophonic. The innovation can be shown in the following diagram:



[1] tuak is traditional strong drink of Batak people

The rule of the sound change is /*ŋ/ changes into/k/ in TL, SL, AL, and MLin middle positions before vowels.

*ɸ → ŋ/___V in TL, SL, AL, and ML

III. The Sub-grouping of BLs

Crowley (1992:164-165) and Langacker (1992:339) say that shared innovation is used to establish the sub-grouping of sister languages**.**To carry out BLs' sub-grouping, the innovation-based correspondence sets of BLs are shown again below:

	TL	SL	PDL	AL	KL	ML
1	ɸ	h	h	ɸ	h	ɸ
2	ɸ	ɸ	m	ɸ	ɸ	ɸ
3	ɸ	ɸ	n	ɸ	ɸ	ɸ
4	ɸ	ɸ	ŋ	ɸ	ɸ	ɸ
5	h	h	k	h	k	h
6	k	k	ŋ	k	ŋ	k
7	ɔ	ɔ	e	ɔ	e	ɔ
8	o	o	e	o	e	o
9	ɛ	ei	ɛ	ɛ	ɛ	ɛ
10	ʌ	ʌ	a	ʌ	a	ʌ
11	u	u	ɔ	u	u	u
12	i	i	i	i	e	i

Based on the above chart, it is revealed that in TL, AL, and ML in number 1 /*h/ is lost in final position or h→ ɸ /___ # and in number 6 /*ŋ/ changes into /*k /or ŋ→ k /#___#. Such innovations do not occur in SL, PDL, and KL. Based on the shared innovation, TL, AL, and ML belong to one group.

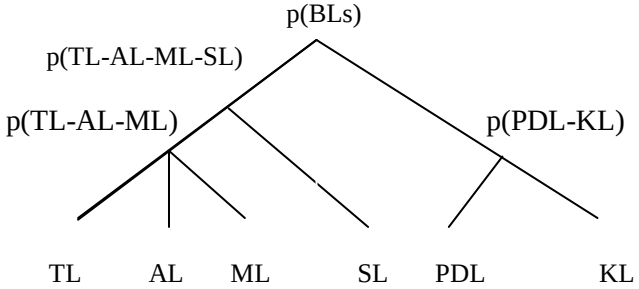
In addition to the shared innovation, the three sister languages show closeness as seen in number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12.

. Meanwhile, in PDL and bK, in number 7, /*ɔ/ changes into /e/ in middle position or ɔ→ e /#___#, in number 8 /*o/ changes into /e/ in middle position or o→ e /#___#, and in number 10, /*ʌ/ changes into /*a/ or ʌ→ a /#___#. Such innovations do not occur in TL, SL, AL, and KL. Based on the shared innovation, PDL and KL belong to one group.

In addition to the shared innovation, the two sister languages show closeness as seen in number 1, 5, 6, 7, 8, 9, and 11.

In SL,/*ɛ/changes into /*ei/ in final positionor ɛ→ ei /___#. Such innovation does not occur in the first group (TL-AL-ML) and in the second group (PDL-KL). Only SL does have diphthong. SL has another diphthong, namely /ɔu/ in the equivalent of *hut*, /sɔpɔu/. Although SL shares similarities with TL-AL-ML as in number 5,6,7,8,10,11, and 12 leading to the possibility that it belongs to the group, it shares similarity with PDL-KL as in number 1. That means, sound innovation in SL is not consistent. Based on the inconsistency and the presence of diphthong in SL, this language is unique. Because of its unique characteristic, SL does not belong to TL-AL-ML and PDL-KL sub-proups.

Although SL is separated from TL-AL-ML and PDL-KL, it is closer to TL-AL-ML than to PDL-KL. The sub-grouping of BLs can be shown in the following diagram:



The diagram shows that TL-AL-ML has proto-nuclear, namely p(TL-AL-ML), TL-AL-ML along with SL has proto-nuclear, namely p(TL-AL-ML-SL), and PDL-KL has proto-nuclear, namely p(PDL-KL) before they are connected to proto-Batak Languages, p(BLs).

IV. Conclusion

According to the data analysis above, the sound correspondence sets with linear reflexes in BLs are as follows: /ʌ-ʌ-ʌ-ʌ-ʌ-ʌ/ with proto-phoneme /*ʌ/, /a-a-a-a-a-a/ in initial, middle, and final positions with proto-phoneme /*a/, /u-u-u-u-u-u/ in initial, middle, and final positions with proto-phoneme /*u/, /i-i-i-i-i-i/ in initial, middle, and final positions with proto-phoneme /*i/, /b-b-b-b-b-b/ in intial and middle positions with proto-phoneme /*b/, /t-t-t-t-t-t/ in initial, middle and final positions with proto-phoneme /*t/, /j-j-j-j-j-j/ in initial and middle positions with proto-phoneme /*j/, /r-r-r-r-r-r/ in initial, middle, and final positions with proto-phoneme /*r/, /l-l-l-l-l-l/ in initial, middle, and final positions with proto-phoneme /*l/, /ŋ-ŋ-ŋ-ŋ-ŋ-ŋ/ in initial, middle, and final positions with proto-phoneme /*ŋ/, /p-p-p-p-p-p/ in initial, middle, and final positions with proto phoneme /*p/, /g-g-g-g-g-g/ in initial and middle positions with proto-phoneme /*g/, /d-d-d-d-d-d/ in initial and middle positions with proto-phoneme /*d/, /m-m-m-m-m-m/ in initial, middle, and final positions with proto-phoneme /*m/, /s-s-s-s-s-s/ in initial, middle, and final positions with proto-phoneme /*s/,and /n-n-n-n-n-n/ in initial, middle, and final positions with proto-phoneme /*n/.

Meanwhile**, t**he innovation-based sound correspondence sets in BLs are /ɔ-ɔ-e-ɔ-e-ɔ/ in middle position, with proto-phoneme /*ɔ/, /o-o-e-o-e-o/ in middle position with proto-phoneme /*o/, /ɛ-ei-ɛ-ɛ-ɛ-ɛ/ in final position with proto-phoneme /*ɛ/, /ʌ-ʌ-a-ʌ-a-ʌ/ in middle position with proto-phoneme /*ʌ/, /u-u-ɔ-u-u-u/ in middle position with proto-phoneme /*u/, /i-i-i-i-e-i/ in middle position with proto-phoneme /*i/, /ɸ-h-h-ɸ-h-ɸ/ in final position with proto-phoneme /*h/, /ɸ-ɸ-m-ɸ-ɸ-ɸ/in initial position with proto-phoneme /*ɸ/, /ɸ-ɸ-n-ɸ-ɸ-ɸ/ in initial position with proto-phoneme /*ɸ/, /ɸ-ɸ-ŋ-ɸ-ɸ-ɸ/ in initial position with proto-phoneme /*ɸ/, /h-h-k-h-k-h/ in intial position with proto-phoneme /*k/, and /k-k-ŋ-k-ŋ-k/ in middle position with proto-phoneme /*ŋ/.

BLs consist of three language sub-groups, namely TL-AL-ML, PDL-KL, and SL.

References

[1]. Brandstetter & Dempwolf (1943). inWurm, S.A. & Wilson, B. Pacific Linguistics. Series C- No.33. English Finderlist of Reconstructions in Austronesian Languages (Post- Brandstetter). (Canberra: Department of Linguistics Research School of Pacific Studies The Australian National University.1978)

[2]. Capell (1943).inWurm, S.A. & Wilson, B.(Pacific Linguistics. Series C- No. 33. English Finderlist of Reconstructions in Austronesian Languages (Post- Brandstetter). (Canberra: Department of Linguistics Research School of Pacific Studies The Australian National University.1978)

[3]. Charles (1973).inWurm, S.A. & Wilson, BPacific Linguistics. Series C- No. 33. English Finderlist of Reconstructions in Austronesian Languages (Post- Brandstetter). (Canberra: Department of Linguistics Research School of Pacific Studies The Australian National University.1978)

[4]. Crowley Terry. An Introduction to Historical Linguistics. (Oxford. Oxford University Press.1992)

[5]. Dempwolff (1938)inWurm, S.A. & Wilson, B Pacific Linguistics. Series C- No. 33. English Finderlist of Reconstructions in Austronesian Languages (Post- Brandstetter). Canberra: Department of Linguistics Research School of Pacific Studies The Ustralian National University.1978)

[6]. Keraf, Gorys. Linguistik Bandingan Historis. (Jakarta: Gramedia Utama. 1991)

[7]. Langacker Ronald W.Fundamentals of Linguistics Analysis.(Sandiego: University of California. 1972)

[8]. Marice. Bahasa Batak Toba di Kota Medan (Kajian Interferensi dan Sikap Bahasa). (Medan: Sekolah Pascasarjana Universitas Sumatera Utara. 2010)

[9]. McManis, Carolyn, Stollenwerk & Zheng-Sheng, Zhang.(Ohio: Language Files. Advocate Publishing Group.1987)

[10]. PanggabeanHimpun.Telaah Bahasa-bahasa Batak dari Segi Leksikostatistik. Bandung: Universitas Padjadjaran.1994)

[11]. Pike, Kenneth. L. Phonemics: A Techniquefir Reducing Language to Writing.(Michigan: 1968)

[12]. Sugono, Dendy et.al. Kamus Besar Bahasa Indonesia (Departemen Pendidikan Nasional, Jakarta:2008)

[13]. The Comparative Method and Linguistic Reconstruction, (Retrived on February 23, 2013 from http://en.wikipedia.org/wiki/Comparative_method)

[14]. Wurm, S.A. & Wilson, B. Pacific Linguistics. Series C- No. 33. English Finderlist of Reconstructions in Austronesian Languages (Post- Brandstetter). Canberra: Department of Linguistics Research School of Pacific Studies The Australian National University. 1978)