

Relationship of Muna Language, Ciacia, Tukang Besi and Culambacu (Lexicostatistic and Glotochronology Study)

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Abstract:

This article is motivated by the results of the 2019 SIL research that the languages in Southeast Sulawesi Province vary in category. Some are strong and some are threatened. Among the languages that are categorized as threatened are the Muna language, the Ciacia language, while the Tukang Besi language is included in the strong language group. However, there are still several languages that have not been listed in the SIL research, namely the Culambacu language. This article discusses the kinship between the Muna language, Ciacia language, the Tukang Besi language and the Culambacu language. This paper uses the theory of comparative historical linguistics with lexicostatistical and glotochronological methods. The results of the analysis of the four languages are that the percentage of Muna and Ciacia language kinship is 49%, Muna language kinship with Tukang Besi 43%, Muna language with Culambacu language 36%, Ciacia language with Tukang Besi 43%, Ciacia language with Culambacu language is 37%, the Tukang Besi language is with Culambacu language 33%. Based on the glotochronology, the Ciacia language and Muna language have a separate year of 1912-1532, the Ciacia language and the Tukang Besi language have a separate year of 2279-183, the Ciacia language and Culambacu language have the years 2587-2211, the Muna language and the Tukang Besi language have a 2371-2335 year, Muna language with Culambacu language has the years 2658-2272, the Tukang Besi language with Culambacu language has a separate year 2885-2465.

Keywords:

kinship; lexicostatistics; glotochronology; comparative

I. Introduction

Southeast Sulawesi has a number of regional languages which are still used by the speaking community in various aspects of life. The regional language, apart from its main function as a tool for social interaction, is also a cultural symbol that has been rooted for a long time. Several studies with the nuances of comparative linguistics and dialectology conducted by Adrian (1914), Esser (1931) Anceaux (1978), Burhanuddin (1979), and Kaseng (1987) have not been completed. These researchers have not provided a strong analytical basis so that there is uncertainty about the boundaries of dialects and the language used, which results in differences in naming and grouping languages and dialects in Southeast Sulawesi.

Likewise, the results of a study conducted by the Jakarta language center in 1987, regarding the area of use of the Wolio language in the Buton district are also not very clear because it seems that the researcher equates the term Wolio with the Butonese language. While in reality the Wolio language is very different from the Butonese language. SIL's own research also only emphasizes the Bungku-Male language group on the Kendari mainland and the Menui islands, so it does not include other regional languages in Southeast Sulawesi.

This study targets four languages, namely Muna language, Ciacia language, Tukang Besi, and Culambacu language. Ethnologue (2019:35) explains that the Muna language has 266,000 speakers (2010 census). This language is spoken by people living in Buton Regency, Kendari City, Central Buton Regency, Muna Regency, West Muna Regency, and South Buton Regency, Southeast Sulawesi Province. This language belongs to the Austronesian, Malay-Polynesian family. Mn language has several dialects including the standard Muna dialect, Tiworo dialect, Gu, Lakudo, Mawasangka. The status of this language according to the EGIDS scale (Expanded Graded Intergenerational Disruption Scale) is threatened, namely the language used for face-to-face communication by all generations, but is starting to lose speakers.

Communication is the process of delivering messages by someone to other people to tell, change attitudes, opinions or behavior either directly orally or indirectly through the media. In this communication requires a reciprocal relationship between the delivery of messages and recipients namely communicators and communicants (Hasbullah, et al: 2018).

This study targets the Ciacia language, Muna language, Wakaobi language, and Culabacu language. Based on the fact that the languages in Southeast Sulawesi Province have similarities that can be studied to be used as a reference in determining the kinship between languages. As in the word knee in Muna [tu], Ciacia [cu], Tukang iron [tu] in Culambacu [cu]. There is clearly an indication here that there is a linguistic kinship. Naman, in Ciacia and Culambacu languages, is translated with [cu], while in muna and Tukeng Besi [tu], there is only one phoneme difference, namely [tc]. the change from [t] to [c] can be explained scientifically. These two consonants are lamino consonants. The difference is that [t] is laminoalveolar whereas [c] is laminopalatal. In the word father in muna [ama], in Ciacia [ama] in Tukang Besi [ama] in Culambacu [ama]. The word father is translated into Muna, Ciacia, Tukang Besi, and the same Culmabacu language. So it can be ascertained that the Muna language, Ciacia language, Tukang Besi language, and Culambacu language are still related to each other.

II. Research Methods

The approach used in this research is a quantitative and qualitative approach. The quantitative approach is carried out first, then the qualitative approach. A quantitative approach is used to obtain facts about the percentage of close kinship relationships between languages in IndonesiaSoutheast Sulawesi which cannot be explained by using a qualitative approach, while a qualitative approach is used in addition to describing (both syncomparatively and diacomparatively) its protolanguage, it is also used to find the law of sound changes in phonemes between the languages studied.

Sources of research data are native speakers of the languages studied. From each group of language speakers, a representative sample is taken. Each selected informant must meet the requirements in accordance with the existing provisions. In linguistic research, a speaker or several native speakers who qualify as informants can be considered adequate as informants. The method used to determine this informant is sampling. The technique used is purposive sampling technique. This technique also does not require random probability in taking members of the informant but is determined on the basis of its relevance with the intention of completeness of information on the linguistic aspect under study. There were two or more informants in each language studied.

To obtain orderly and complete data, a reference is needed in the form of a data collection tool. The data collection tool used in this study consisted of 200 Swadesh words. The data collection method used in this research is the proficient method with note-taking and recording techniques (Sudaryanto, 1993:7). In the implementation in the field, this method is implemented in the form of face-to-face conversation. That is, by meeting face to face, researchers and informants are involved in an informal and familial conversation and takes place naturally (Moleong, 1997:25-27).

The way this research works uses the techniques described below.

Lexicostatistics Technique

The term lexicostatistics is very useful for proving an isolect whether it is a different dialect or a different language. Likewise in this study. To prove these isolects, lexicostatistical terminology is also used.

Lexicostatistics is a technique for grouping languages or dialects that prioritizes statistically counting words to find out the number of similarity words of relatives being compared (Grimes, 1987). Lexicostatistics contains a list of the basic vocabulary of each language to be compared. Morris Swadesh proposes 200 universal basic vocabulary, which includes pronouns, numerals, words of limbs (its nature and activities), nature and its surroundings and everyday cultural tools.

Lexicostatistics as a language grouping technique has been widely used by experts/linguists in this world. This technique uses statistics in the form of numbers as the basis for sorting. This technique tries to find the kinship relationship of two or more languages by taking into account the elements of similarities that exist in the vocabulary.

According to Nothofer (1975) the lexicostatistic technique has several advantages when compared to other methods. The advantages in question are, among others (1) as a basic vocabulary list that can quickly determine the kinship relationship of one language (language relatives), (2) as a means of grouping related languages/dialects whose protolanguages are not that old/ancient, and (3) as a grouping tool/method that can be used at an early stage to determine language classification.

Furthermore, Nothofer (1975) establishes three basic assumptions of lexicostatistical techniques, namely (1) basic vocabulary is replaced at the same rate in all languages at the same time. According to this assumption that every 1000 years about 18-20% of basic vocabulary changes and is generally accepted in all languages simultaneously, (2) all basic vocabulary contained in the basic vocabulary list is most likely to change simultaneously, and (3) there is a so-called basic vocabulary which is considered to be generally accepted in every language in the world.

The way lexicostatistics works follows the patterns proposed by Keraf (1996), namely, (1) collecting a number of words from the basic vocabulary, and (2) determining pairs of related basic vocabulary. Furthermore, the effort to determine the basic vocabulary that is related follows the steps proposed by Keraf (1996), namely, (1) looking for vocabulary that is not from language/loan words, (2) experiencing single/free morphemes only by isolating all bound morphemes, and (3) compare all word pairs to determine the word pairs that are related based on recurrence, co-occurrence, and analogy. Efforts to determine the pair of words that are related is done by identifying all word pairs that are similar/same, word pairs that are phonetically similar,

word pairs that correspond to sound, and word pairs that have only one phoneme difference in one phoneme.

Glotochronology is a technique in dialectology that seeks to group together by prioritizing the calculation of the time or the age calculation of relatives' languages. In this case the age of the language is not calculated absolutely from a certain year, but is calculated in general using units of thousands of years. (Keraf 1996:121). A similar opinion was expressed by Crowley (1992: 79) who stated that the second method which is usually used to determine the exact time when closely related languages separated is called glotochronology. The data analysis technique used is the lexicostatistical technique. In this technique, to analyze the data is done with the following steps:

- a. Register the words obtained from the field.
The data obtained from the field is entered in the table for each language. For example, Toba data obtained from informants¹ are all entered in a table to choose which one is better used as data
- b. Choose the words that will be used as research data from each language.
The words that have been registered are then selected to find words that will be used as research data. This selection is made with the consideration that the word chosen is the one that has similarities among the three words compared from each language
- c. Determine related words to be analyzed.
The next step is the determination of related words based on the similarity of the sounds of the four dialects being compared.
- d. Calculate the kinship level of four languages
Next, to calculate the percentage of relatives, use the formula

$$C = \frac{K}{G} \times 100\%$$

Description: H= Kinship relationship

J = Number of related words, G= Glos (item)(Keraf: 1996: 127)

C= cognates or related words, K= total vocabulary of relatives, G= total gloss

- e. Determine the proto phoneme to determine the proto dialect.
To determine the proto dialect, first determine the proto phoneme for each gloss. From 200 swadesh vocabularies, each word has a proton phoneme. Then it is calculated from each dialect, which dialect has the most proto phonemes, it will become the proto dialect of the language in Southeast Sulawesi.
- f. Calculate the split time to the four languages
The separation time between two relative languages for which the percentage of relative words is known can be calculated using the following formula (Crowley, 1992:178; Keraf, 1996: 160):

$$t = \frac{\log c}{2 \log r}$$

separation time in thousands (mellenium) years ago r = retention or percentage constant in 1000, or also called index C = percentage of relatives Log = logarithm of

- g. Calculating the age of four languages.
To calculate the error range, the standard error is usually used, which is 70% of the estimated truth. Standard error is calculated by the following formula (Keraf: 1996:160): s = S = standard error in percentage of relative words c = percentage of related words n = number of words compared (both relatives and non-relatives)

$$S = \sqrt{\frac{c(1-c)}{n}}$$

The calculation can be done with the following rules:

1. 1 minus C
2. C multiplied by the result of (1)
3. the result of (2) divided by n
4. draw the root over the result of 3
5. the result of (4) is the error term and the percentage of relative words on the basis of 0.7 estimates of the actual truth. By obtaining the results in no (4) above, the standard error in years must be calculated, by following these steps:
 - a) the error term of the relative percentage of no (4) is added to C;
 - b) the amount in (1) is treated as a new C, which will be included in the time calculation formula;
 - c) the new time calculation as obtained in (2) is reduced by the first amount of time. This new number is added and subtracted by the first number to obtain the error range on the basis of 0.7 of the actual situation.

The result of this error is added up by the percentage of relatives to get a new C, with this new C again the split time is calculated using the split time formula. Based on the calculation results, it can be seen the estimated separation time and the age of the compared languages

III. Results and Discussion

3.1 Results

There are two data obtained in this analysis. The first is lexicostatistic findings in the form of the percentage of vocabulary kinship in the four languages, namely Muna language, Ciacia language, Tukang Besi, and Culambacu language. While the second is glotochronological findings in the form of separation time between the four languages.

The lexicostatistic findings can be seen in the following table.

Ciacia	-			
Muna	49%	-		
Tukang Besi	43%	35%	-	
Culambacu	37%	36%	33%	-
	Ciacia	Muna	Tukang Besi	Culambacu

Of the two hundred moris swadesh vocabularies of the Blust revision used to collect data between Muna and Ciacia languages, 96 related words were obtained, consisting of 37 identical glosses, 27 glosses which have phonemic correspondence, and glosses which have one different phoneme. 32, 3 glosses are not taken into account, and the rest are unrelated words.

Word pairs that have phonemic correspondence such as /abu/ in Muna [ghabu] and Ciacia [hawu], /baru/ in Muna [bughou] and in Ciacia [wukou]. Word pairs that are closely related are identical, such as /awan/ in Muna [olu] and Ciacia [olu], /buah/ in Muna [wua] and in Ciacia [wua]. Word pairs possessing possessing possessing one different phoneme such as the word /defend/ in Muna [bhongka], in Ciacia [bhogha]. The pairs of words that are not taken into account are /bilamana/, /danau/, and /pada/ in the Cicia language and the Muna language no equivalent is found. From this it can be concluded that the kinship of the Muna language and the Ciacia language is 49%.

From the two hundred moris swadesh vocabularies of the Blust revision used to collect data between Ciacia and Tukang Besi, 84 related words, consisting of 26 identical glosses, 31 phonemic correspondences with glosses, and glosses have one different phoneme as many as 27, glosses that are not counted as much as 3, and the rest are unrelated words.

Word pairs that have a phonemic correspondence such as the word /abu/ in Ciacia [hawu] and Tukang Besi [afu], the word /berkelahi/ in ciacia [pocumbu] and in Tukang Besi [pobusu]. Pairs of related words are identical, such as /father/ in ciacia [ama] and in Tukang Besi [ama], the word /bunga/ in Ciacia [kamba] and in Tukang Besi [kamba]. The pair of words that have possess and possess have one different phoneme, such as the word /bulu/ in the Ciacia language [wulu], in the Tukang Besi [fulu] language. The word pairs that are not taken into account are /bilamana/, /danau/, and /pada/ in the Cicia language no equivalent is found. From this it can be concluded that the Muna and Ciacia languages are 43% related.

Of the two hundred moris swadesh vocabularies of the Blust revision used to collect data between the Ciacia language and the Culambacu language, 73 related words were found, consisting of 31 identical glosses, 26 glosses which have phonemic correspondence, and 26 glosses which have one different phoneme. 16, 3 glosses are not taken into account, and the rest are unrelated words.

Word pairs that have phonemic correspondence are the same as /asap/ in Ciacia [hau] and culambacu [ahu], /debu/ in ciacia [ngawu] and in culambacu [papawu]. The related word pairs are identical like /bakar/ in ciacia [cunu] and in culambacu [cunu], the word /orang/ in Ciacia [mia] and in Culambacu [mia]. The pair of words that have and have which has one different phoneme, such as the word /jahit/ in Ciacia [dheu], in Culambacu [seu]. The word pairs that are not taken into account are /bilamana/, /danau/, and /pada/ in the Cicia language no equivalent is found. From this it can be concluded that the Muna and Ciacia languages are 37% related.

Of the two hundred moris swadesh vocabularies of the Blust revision used to retrieve data between the Muna language and the Tukang Besi language, there were 68 related words, consisting of 21 identical glosses, 33 phonemic correspondence glosses, and 33 different phonemes as many as 14, glosses that are not counted as much as 3, and the rest are unrelated words.

Word pairs that have a phonemic correspondence such as the word /abu/ in Muna [ghabu] and in Tukang Besi [afu], the word /woman/ in Muna [robhine] and in Tukang Besi [fofine]. Pairs of words that are closely related are identical, such as / animal/ in muna [kadadi] and Tukang Besi [kadadi], the word / comes/ in Muna [mai] and in Tukang Besi [mai]. The pair of words that have possess and possess have one different phoneme, such as the word /lima/ in Muna [dima], in Tukang Besi [lima]. The pairs of words that are not taken into account are /bilamana/, /danau/, and /pada/ in the Muna language no equivalent is found. From this it can be concluded that the Muna and Ciacia languages are 35% related.

Of the two hundred moris swadesh vocabularies of the Blust revision used to retrieve data between the Muna language and the Culambacu language, 72 related words were obtained, consisting of 21 identical glosses, 22 glosses which have phonemic correspondence, and 22 glosses which have one different phoneme. 29, 3 glosses are not taken into account, and the rest are unrelated words.

Word pairs that have phonemic correspondence such as the word /root/ in Muna [paraka] and in culambacu [haka], the word /batu/ in Muna [kontu] and in Culambacu [wacu]. Word pairs that are closely related are identical like /dog/ in muna [dahu] and in Culambacu [dahu], the word /blood/ in Muna [rea] and in Culambacu [rea]. Word pairs that have one different phoneme such as the word /laut/ in the Muna language [tehi], in the Culambacu language [tei]. The pairs of words that are not taken into account are /bilamana/, /danau/, and /pada/ in the Muna language no equivalent is found. From this it can be concluded that the Muna and Ciacia languages are related by 36%.

Of the two hundred moris swadesh vocabularies of the Blust revision used to retrieve data between the Tukang Besi and Culambacu languages, 66 related words were found, consisting of 20 identical glosses, 25 phonemic correspondence glosses, and 25 different phonemes. as many as 21, and the rest are unrelated words.

Word pairs that have phonemic correspondence such as the word /pusar/ in Tukang Besi [puo] and in culambacu [puhe], the word /tanah/ in Tukang Besi [futa] and in Culambacu [wita]. Identical related word pairs such as /gali/ in Tukang Besi [keke] and in Culambacu [keke], the word /pasir/ in Tukang Besi [one] and in Culambacu [one]. The pair of words that have possess and possess have one different phoneme, such as the word /lidah/ in the Tukang Besi language [ela], in the Culambacu language [elo]. The word pairs that were not taken into account were not found because all data both in the Tukang Besi language and in the Culambacu language data were filled in as a whole. From this it can be concluded that the Muna and Ciacia languages are 33% related.

After determining the percentage of relatives using the lexicostatistics method, the next step is to determine the year of separation using the glotochronology method.

a. Ciacia and Muna Separation Time

To determine the separation of languages, we use the formula

$$t = \frac{\log c}{2 \log r} \text{ with } c = 49\% \text{ or } 0.49, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.49}{2 \log 0.81} = -0.31 / -0.18 = 1.722$$

$$S = \sqrt{\frac{c(1-c)}{n}} \text{ with } c = 0.49; n = 197$$

$$S = \sqrt{\frac{0.49(1-0.49)}{197}} = 0.036 \text{ rounded up to } 0.04$$

The result of this standard error (0.04) is summed with the percentage of initial relatives (C1) to get C2 (C2 = C1 + S). so the result is 0.49+0.04 = 0.53. With the presence of C2, the separation time can be recalculated using the same formula, namely

$$t = \frac{\log c}{2 \log r} \text{ with } c = 0.53, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.53}{2 \log 0.81} = -0.28 / -0.18 = 1.532$$

The split time is multiplied by 1000 so that the result becomes 1.532

Thus, the error term = t-t1 = 1.722-1.532 = 190

Thus, the age of the Ciacia and Muna languages can be expressed as follows:

1. Ciacian and Munanese are thought to have formed a single language around 1722 ± 190 years ago.
2. Ciacian and muna languages were a single language in 1912-1532 years ago
3. Ciacian and Munanese are thought to have separated from their mother tongue around 108-488 AD (calculated in 2020)

b. The Time between Ciacia's Language and the Tukang Besi's Language

To determine the separation of languages, we use the formula

$$t = \frac{\log c}{2 \log r} \text{ with } c = 43\% \text{ or } 0.43, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.43}{2 \log 0.81} = -0.37 / -0.18 = 2056$$

$$S = \sqrt{\frac{c(1-c)}{n}} \text{ with } c = 0.43; n = 197$$

$$S = \sqrt{\frac{0.43(1-0.43)}{197}} = 0.035 \text{ rounded up to } 0.04$$

The result of this standard error (0.04) is summed with the percentage of initial relatives (C1) to get C2 ($C2 = C1 + S$). So the result is $0.43 + 0.04 = 0.47$. With the presence of C2, the separation time can be recalculated using the same formula, namely

$$t = \frac{\log c}{2 \log r} \text{ with } c = 0.47, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.47}{2 \log 0.81} = -0.33 / -0.18 = 1.833$$

The split time is multiplied by 1000 so that the result is 1833

Thus, the error term = $t - t1 = 2056 - 1.833 = 223$

So, the age of the Ciacia language and the Tukang Besi's language can be expressed as follows:

1. Ciacian and Tukang Besi are thought to have been a single language around 2056 ± 223 years ago
2. Ciacia language and the Tukang Besi language were a single language from 2279-1833 years ago
3. The Ciacian language and the Tukang Besi language are thought to have started to separate from their mother tongue around 259BC -187 AD (calculated in 2020)

c. The separation of Ciacia and Culambacu

To determine the separation of languages, we use the formula

$$t = \frac{\log c}{2 \log r} \text{ with } c = 37\% \text{ or } 0.37, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.37}{2 \log 0.81} = -0.43 / -0.18 = 2.399$$

$$S = \sqrt{\frac{c(1-c)}{n}} \text{ with } c = 0.37; n = 197$$

$$S = \sqrt{\frac{0.37(1-0.37)}{197}} = 0.034 \text{ rounded up to } 0.03$$

The result of this standard error (0.04) is summed with the percentage of initial relatives (C1) to get C2 (C2 = C1 + S). so the result is 0.37+0.03 = 0.40. With the presence of C2, the separation time can be recalculated using the same formula, namely:

$$t = \frac{\log c}{2 \log r} \text{ with } c = 0.40, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.40}{2 \log 0.81} = -0.40 / -0.18 = 2.211$$

The separation time is multiplied by 1000 so that the result becomes 2.211

Thus, the error term = t-t1 = 2399-2211 = 188

So, the age of the Ciacian language and the Culambacu language can be expressed as follows:

1. Ciacian and Culambacu languages are thought to have been a single language about 2399±188 years ago.
2. Ciacian and Culambacu were a single language between 2587-2211 years ago
3. Ciacian and Culambacu languages are thought to have started to separate from their mother tongues around 567 -- 191 BC (calculated in 2020)

d. Time for Muna to be separated from the Tukang Besi's Language

To determine the separation of languages, we use the formula

$$t = \frac{\log c}{2 \log r} \text{ with } c = 35\% \text{ or } 0.35, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.35}{2 \log 0.81} = -0.46 / -0.18 = 2.533$$

$$S = \sqrt{\frac{c(1-c)}{n}} \text{ with } c = 0.35; n = 197$$

$$S = \sqrt{\frac{0.35(1-0.35)}{197}} = 0.034 \text{ rounded up to } 0.03$$

The result of this standard error (0.04) is summed with the percentage of initial relatives (C1) to get C2 (C2 = C1 + S). so the result is 0.35+0.03 = 0.38. With the presence of C2, the separation time can be recalculated using the same formula, namely

$$t = \frac{\log c}{2 \log r} \text{ with } c = 0.38, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.38}{2 \log 0.81} = -0.42 / -0.18 = 2.335$$

The split time is multiplied by 1000 so that the result becomes 2335

Thus, the error term = t-t1 = 2533-2335 = 198

So, the age of the Muna language and the Tukang Besi language can be expressed as follows:

1. The Muna language and the Tukang Besi language are estimated to be a single language around 2533±198 years ago.
2. The Muna language and the Tukang Besi language were a single language in 2371-2335 years ago
3. The Muna language and the Tukang Besi language are thought to have started to separate from their mother tongue around 711-315 BC (calculated in 2020)

e. Time for Muna to separate from Culambacu

To determine the separation of languages, we use the formula

$$t = \frac{\log c}{2 \log r} \text{ with } c = 36\% \text{ or } 0.36, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.36}{2 \log 0.81} = -0.44 / -0.18 = 2465$$

$$S = \sqrt{\frac{c(1-c)}{n}} \text{ with } c = 0.36; n = 197$$

$$S = \sqrt{\frac{0.36(1-0.36)}{197}} = 0.034 \text{ rounded up to } 0.03$$

The result of this standard error (0.04) is summed with the percentage of initial relatives (C1) to get C2 (C2 = C1 + S). so the result is 0.36+0.03 = 0.46. With the presence of C2, the separation time can be recalculated using the same formula, namely

$$t = \frac{\log c}{2 \log r} \text{ with } c = 0.39, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.39}{2 \log 0.81} = -0.41 / -0.18 = 2272$$

The separation time is multiplied by 1000 so that the result becomes 2272

Thus, the error term = t-t1 = 2465-2272 = 193

So, the age of the Muna language and the Culambacu language can be expressed as follows:

1. Muna language and Culambacu language are estimated to be a single language around 2465±193 years ago.
2. Muna language and Culambacu language were a single language in 2658-2272 years ago
3. Muna and Culambacu languages are thought to have separated from their mother tongue around 638 -252 BC (calculated in 2020)

f. The Time between the 'Tukang Besi's Language and the Language of Culambacu

To determine the separation of languages, we use the formula

$$t = \frac{\log c}{2 \log r} \text{ with } c = 33\% \text{ or } 0.33, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.33}{2 \log 0.81} = -0.48 / -0.18 = 2675$$

$$S = \sqrt{\frac{c(1-c)}{n}} \text{ with } c = 0.33; n = 197$$

$$S = \sqrt{\frac{0.33(1-0.33)}{197}} = 0.033 \text{ rounded up to } 0.03$$

The result of this standard error (0.04) is summed with the percentage of initial relatives (C1) to get C2 (C2 = C1 + S). so the result is 0.33+0.03 = 0.36. With the presence of C2, the separation time can be recalculated using the same formula, namely

$$t = \frac{\log c}{2 \log r} \text{ with } c = 0.36, r = 81\% \text{ or } 0.81$$

$$\frac{\log c}{2 \log r} = \frac{\log 0.36}{2 \log 0.81} = -0.44 / -0.18 = 2465$$

3.2 Discussion

Muna language has five vowel phonemes namely /i/, /u/, /ε/, /o/, /a/, and twenty-five consonant phonemes namely /p/, /b/, /β/, /m /, /mp/, /mb/, /w/, /f/, /ð/, /nt/, /nd/, /t/, /d/, /s/, /ns/, /n/, /r/, /l/, /ŋ/, /ŋk/, /ŋg/, /k/, /g/, /γ/, /h/(La Ino, 2015).

Ethnologue (2019:21) explains that the Ciacia language has 104,000 speakers (2010 census). This language is spoken by people living in the interior of the island of Buton, Southeast Sulawesi province, namely in the areas of Sampolawa, Pasarwajo, Batu Atas Island and Binongko. This language belongs to the Austrinesian family. This language has dialects, namely the Wabula dialect and the Masiri dialect. The status of this language according to the EGIDS scale (Expanded Graded Intergenerational Disruption Scale) is threatened, namely the language used for face-to-face communication by all generations, but is starting to lose speakers.

Ciacia language has five vowel phonemes, namely /i/, /u/, /e/, /o/, /a/, and has twenty four consonant phonemes namely /β/, /b/, /c/, /d /, /đ/, /ğ/, /g/, /h/, j/, k/, l/, m/, n/, p/, r/, s/, t/, w/. /ŋ/, /nd/, /nt/, /ŋk/ /mb/, /mp/(La Ino, 2015).

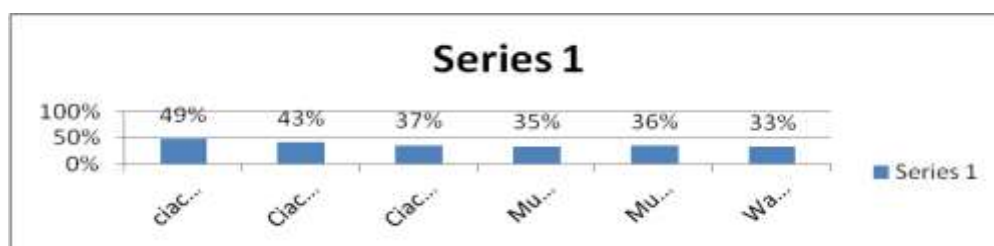
Ethnologue (2019:48) explains that the Tukang Besi language has 120,000 speakers (2010 census). This language is spoken by the people of Bacan Island, Buru Island, and Ambon Island in Maluku Province, Binongko Island, Kaledupa Island, Wangiwangi Island, in Southeast Sulawesi Province. The status of this language according to the EGIDS scale (Expanded Graded Intergenerational Disruption Scale) is strong, that is, language is used continuously for face-to-face communication by all generations.

The ironworker language has five vowels, namely /i/, /u/, /e/, /o/, /a/ and twenty-seven namely /p/, /b/, /b/, /mp/, /mb /, /m/, /w/, /f/, /t/, /d/, /nt/, /nd/, /ns/, /s/, /n/, /l/, /r/, /c/, /j/, /ny/, /y/, /k/, /g/, /ŋk/, /ŋg/, /ŋ/, /h/(La Ino, 2015).

The Culambacu language in the Ethnologue was not found. Based on preliminary research conducted by La Ino (2018), the culambacu language has five vowels, namely /i/, /u/, /e/, /o/, /a/ and twenty-two consonants, namely /p/, /b /, /w/, /t/, /d/, /k/, /g/, /c/, /j/, /y/, /h/, /s/, /l/, /r/, /m/, /n/, /ŋ/, /ŋk/, /mb/, /mp/, /nt/, /ŋg/.

Lexicostatistics and glotochronology techniques not only function to determine the percentage of relative words and calculate language age, but can also be used for grouping kin languages. Languages that show a high percentage are groups that are closer in membership, while those with a low percentage of kinship are groups whose membership level or kinship is more distant. Based on Crowley's opinion (1992:179) regarding language grouping, it can be determined the status of the ciacia language, Muna language, Tukang Besi language and culambacu language, namely Ciacia language with Muna language in 1912-1532 separated as languages in one family, ciacia with Tukang Besi language years apart 2279-183 grouped in one family in one clump, Ciacia with Culambacu years 2587-2211 were grouped into one family in one clump, Muna and Tukang Besi in 2371-2335 were grouped into one family in one clump, Muna and Culambacu in 2658-2272 were grouped in one family in one clump, Tukang Besi with culambacu in 2885- 2465 are grouped in families in one clump.

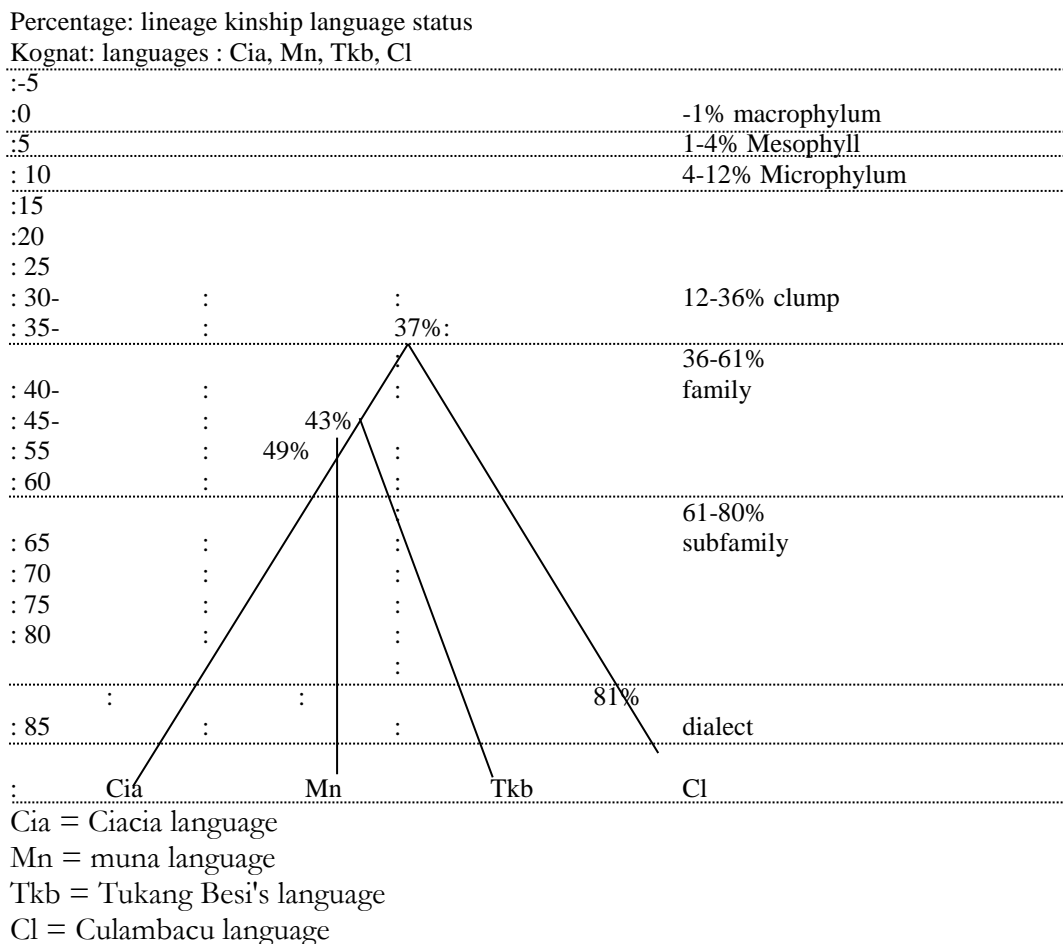
a. Graph of Percentage of Kinship in Ciacia, Muna, Tukang Besi, and Culambacu Languages



The graph above shows that the percentage of relative words in Ciacia, Muna, Tukang Besi, and Culambacu languages varies quite a bit. The highest percentage of kinship words is between Ciacia and Muna languages by 49%, Ciacia language with Tukang Besi 43%, Ciacia language with Culambacu language 37%, Muna language with Tukang Besi 35%, muna language with Culambacu language 36%, and the Tukang Besi language with that of Culambacu 33%. Based on the percentage comparison, we can conclude that the Ciacia language and the Muna language have a closer kinship level than other languages.

After knowing the percentage of kinship words from each language, the next step is to compile a branching graph or kinship lineage (stammbaum) from the Ciacia language, Muna language, Tukang Besi language, and Culambacu language.

b. Genealogy Chart of the Ciacia Language, the Muna Language, the Tukang Besi Language, and the Culambacu Language



Through the description of the graph above, it can be seen that (i) the kinship pedigree of the Ciacia language with the Muna language is closer than that of the Tukang Besi or Culambacu languages, (ii) the lexicostatistically speaking status of the language of Ciacia, Muna, Tukang Besi, and the Culambacu language is a family category.

IV. Conclusion

Based on the results of the analysis above, it can be concluded that the Ciacia and Muna languages have a kinship percentage of 49% and have a separation year of 1912-1532, the Ciacia language and the Tukang Besi language have a 43% kinship percentage and have a separation year of 2279-183, the Ciacia language and The Culambacu language has a relative percentage of 37% and has a separation year of 2587-2211, the Muna language and the Tukang Besi language have a relative percentage of 35% and has a separation year of 2371-2335, the Muna language and Culambacu language have a 36% relative percentage, and have the separation year is 2658-2272, and the Tukang Besi and Culambacu languages have a relative percentage of 33% and have a separation year of 2885-2465.

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