

The 'Laras' (Scales) of Angklung Tradisi: A Reality Between Perception and Theory

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ABSTRACT

Angklung music, as a traditional Indonesian instrument rich in cultural heritage, is often identified with selendro scales by some people. This claim creates a gap between perceptions spread in the community and theoretical findings as well as audio analysis. This research aims to prove the difference between public perception and the theory of scales in traditional angklung music so that it becomes a science for the general public. The research methodology includes analyzing the measurement of tonal intervals in several traditional angklung groups with the theory of Sundanese karawitan scales from R.M.A. Koesoemadinata which already has a certain frequency standard for each, as well as being adapted to international pitch standards. Data was obtained through book literature and several scientific papers as well as interviews with traditional angklung community leaders and angklung music activists in West Java. The analysis shows that the traditional angklung scales do not fully match the selendro scales according to theory. Analysis of audio measurements showed that there are differences in interval frequencies between traditional angklung scales and selendro scales according to theory, the reality proves that perceptions so far are still inaccurate, allowing further research on the relationship between music theory and public understanding of traditional music.

Keywords: Perception, Laras, Angklung, Salendro

INTRODUCTION

Based on the history of development, angklung music is widely spread in West Java, divided into two major groups, namely traditional angklung and angklung Padaeng. Gold (2016) in Budi, (2017), suggests that traditional angklung spreads in several areas in West Java, such as Angklung Baduy from Kanekes Baduy - Banten, Dog-dog Lojor from Sukaresmi - Sukabumi, Angklung Buncis from Arjasari - Banjaran, Ujung Berung - Bandung, Angklung Gubrag from Cipining-Bogor, Angklung Sered from Tasikmalaya and Ciamis, Angklung Dodod from Ciamis, Angklung Bungko from Cirebon, and Angklung Badeng from Sanding - Garut.

Bamboo musical instruments such as angklung are widely recognized in the region, which are cultural symbols closely associated with the lives of rural mountain communities. In Zanten (1995) this tradition includes not only the use of angklung in a musical context but also as an important part of cultural and ritual activities. Angklung is often used in various traditional celebrations and

ceremonies, demonstrating the depth of connection between the people of West Java and their natural surroundings, particularly the abundance of bamboo.

Angklung, as the dominant West Javanese traditional musical instrument, often uses salendro tuning in its scale arrangement. The salendro barrel, a traditional Indonesian music tuning system, inspires music practitioners with its unique flavor that has permeated their musical culture. However, it is sometimes thought of as a simple pentatonic scale of Indonesia's signature scales system. Salendro is actually much more complex and fundamentally different from more standardized Western musical systems. The differences in angklung usage across regions are not due to a lack of discipline or an inability to accurately and academically measure pitch frequencies, but rather reflect the richness of local cultures that highly value diversity. Other research has also shown that direct experience in the context of traditional music culture and practice plays an important role in how listeners and performers interpret and understand the salendro tuning. These analyses often involve looking at how local knowledge, practical experience, and hereditary traditions influence individuals' perceptions of the melodic patterns and nuances of the salendro tuning. A deeper understanding of laras salendro not only helps avoid misunderstandings but also makes a significant contribution to the study of global ethnomusicology.

The study of Laras salendro and Indonesian traditional music systems relies on several key theories within the field of ethnomusicology. Firstly, Ethnomusicology explores how Laras salendro is practiced and interpreted in the context of Indonesian culture. The theory of Tuning Systems examines how different cultures organize the intervals and relationships between notes in their music; for example, Laras salendro features a unique non-diatonic tuning system, in contrast to the more standardized scales of Western music as cultural and anthropological theories of music (Alan P. Merriam, 1964) highlight how music reflects the social and cultural identity of a society, explaining the important role of the Salendro tuning in establishing Indonesian musical identity. Finally, Comparative theory in Ethnomusicology compares musical systems from different cultures to explore the distinctiveness of the Salendro tuning in a global context. This understanding not only helps avoid misunderstandings but also highlights the complexity and richness of Indonesia's traditional musical heritage.

The conceptual framework for understanding Angklung Tradisi includes several key aspects. Firstly, traditional music theory examines the origins and evolution of scales in Indonesia, particularly pentatonic systems such as the salendro tuning. Second, music perception considers how individuals understand scales in the context of traditional music, including the psychological, social, and cultural factors that influence them. Thirdly, the local cultural context plays an important role in listeners' understanding of Angklung, including cultural values, rituals, and local wisdom related to the use of Angklung in daily life and traditional ceremonies. Finally, the salendro tuning has great significance

in establishing the identity of West Javanese traditional music, giving uniqueness and special characteristics to melodies played on Angklung.

This article focuses on the understanding and interpretation of 'Laras' in Angklung Tradisi, considering the various factors that influence how people perceive scales in Indonesian traditional music. The research covers theoretical aspects such as traditional music theory and musical anthropology, as well as analyzing the practical factors that shape such perceptions. As in Jaap Kunst's (1973) and Bruno Nettl's (1964) theories, the most important aim is to identify the basic concept of salendro tuning as a typical pentatonic scale system in Indonesian traditional music, especially in the context of Angklung usage in West Java. In addition, this research also explores the influence of cultural background, formal and informal musical training, aesthetic preferences, and historical and social contexts in shaping a deeper understanding of the salendro tuning. With the integration of theoretical and practical aspects, this research is expected to provide greater insight into Indonesian traditional music, as well as promote appreciation of the rich musical cultures in today's world.

As a traditional Indonesian art, angklung music plays an important role in enriching the country's cultural heritage. As a musical instrument, angklung functions as a medium to produce sounds and form musical elements. The sounds produced are adapted to the character of each community group, creating different frequencies, and forming scales or tunings such as pelog, salendro, degung, madenda, and so on. R.M.A. Koesoemadinata, through research and experimentation, has made this a basic theory. According to Kunst (1973), in Sundanese karawitan, the tuning is divided into two types, namely pelog and salendro tuning. Gunawan, Milyartini, & Masunah, (2022) state that from the salendro assembly, three additional assemblies emerged, namely the salendro assembly (padantara and bedantara), as well as laras degung and laras madenda. From rakitan pelog, laras pelog was formed, which has variations such as jawar, liwung, and sorog.

In the process of tonal auditory adaptation and measurement of frequencies or tonal intervals, prescribed frequency standards, such as the International Organization for Standardization (1953), stipulate that tone A is 440 Hertz along with other tones.

However, there is an assumption from some people that the traditional angklung music scale is selendro, which is a challenge to research. Dawson, (1967) was explained that, perception process is influenced by culture and environment. Diwyarthi, (2022). Several factors can influence a person's perception, such as knowledge, experience, values, beliefs, socio-cultural influences, and other psychological factors

To bridge the gap between people's perceptions and the theoretical reality of traditional angklung music scales, it is necessary to conduct an auditive analysis using a digital frequency meter. This will prove the truth of the perception and become scientific knowledge. This research also tries to

unify the differences in the interpretation of traditional angklung music scales from a theoretical and practical point of view.

Several previous studies have been conducted in the theoretical study of West Javanese traditional music scales, including angklung. This research seeks to provide a thorough analysis of the controversial arguments regarding angklung music scales while maintaining an accurate cultural interpretation. With a deeper understanding of the complexities of angklung scales, we can better appreciate the uniqueness of this musical art as an integral part of Indonesia's cultural identity.

METHODOLOGY

This research method uses a qualitative approach with a constructivist paradigm. Creswell, (2023) suggests that constructivism considers reality to be subjective, where a deep understanding of social reality and knowledge building centers on the subject's experience and interpretation. This method emphasizes an in-depth understanding of social reality and knowledge building. The research design uses Grounded Theory so that the two cases as a result of the community's perception of the laras are juxtaposed with the actual theoretical case academically. As in Creswell (2003), researchers seek to derive a theory by using the dual stages of data collection and refinement and reciprocal relationships of categories of information (Strauss&Corbin, 1990). Two key characteristics of this design are the constant comparison of data with emerging categories and the theoretical sampling of different groups to maximize similarities and differences in information. In a case study, the researcher explores a single entity or phenomenon ('case') bounded by time and activity (program, event, process, institution, or social group) and collects detailed information using a variety of data collection procedures over an extended period of time (Merriam, 1988; Yin, 1989).

The data collection technique uses document study, which focuses on tracing relevant historical sources, literature, and archives to understand the development of angklung from the past to the present, as well as analyzing Daeng Soetigna's important works in context. The type of data collected includes articles, books, historical records, and other materials related to angklung, with a limited amount of literature especially for traditional angklung documentation. Sources of data from Daeng Soetigna are also limited and mostly held by his extended family and students. The data collection technique involved systematically recording important information to understand the development of angklung from a historical and theoretical perspective. In addition, in-depth interviews, which involve direct interaction with individuals who have knowledge and experience of angklung, aim to obtain in-depth information not contained in written sources. The data captured will include the direct views and subjective experiences of participants regarding the innovation, development, and use of angklung, including their role in the development of the instrument, its manufacturing techniques, and their views on the future of angklung in the context of culture and

society. Interviews will be conducted with angklung experts, instrument makers, musicians, and music educators, both in person and through communication media, and will focus on personal stories, playing techniques, and the role of angklung in everyday life and in the digital age.

Data analysis in this study integrates qualitative approaches and comparative techniques to explore people's perceptions of salendro tuning in traditional angklung. Firstly, through questionnaires, data was obtained to reveal the community's subjective views and understanding of the slendro tuning. Next, through field data collection using audio recordings, tone sequences in angklung performances were analyzed using digital technology to ensure measurement accuracy. The analysis process involved detailed transcription of the audio recordings to identify the sequence and intervals of the tones played. These results were then compared with the theory of the salendro tuning proposed by Pak Mahyar, to find significant similarities and differences. This comparative technique not only tests the validity of laras salendro musically but also provides an in-depth insight into how it is received and applied in the cultural practices of communities that preserve the angklung tradition. With this approach, the research is expected to make a meaningful contribution to the understanding of the role of the salendro tuning in the context of Indonesian traditional music.

Denzin (2009) states that all interpretations, with or without theory status, are always provisional in two senses. Firstly, interpretations are always temporal, or in other words, they can never last; the temporal nature of interpretations can always be reworked or partially rejected (qualified). Secondly, like most knowledge, theory is limited by time: researchers and theorists are not God, but human beings who live in certain times, belong to certain societies, are under the constraints of certain ideas and ideologies, and so on. Thus, like changing conditions in a matrix; these factors affect the validity of the theory or in other words, the link between theory and temporal social reality.

RESULTS AND DISCUSSION

Angklung Tradition

Angklung is a musical instrument known in Sundanese and other regions in the archipelago. Kunst (1973) in "Music In Java" mentions that Angklung is spread across several regions in Indonesia such as Bali, Banyumas, Kalimantan, West Java, and others. However, Angklung is more commonly found in the mountainous areas of West Java, in accordance with the lives of farming communities and the presence of bamboo plants. In this study, three traditional angklung samples were selected, namely Angklung Dogdog Lojor in Ciptarasa Sukabumi, Angklung Badeng, and Angklung Buncis. This selection was based on the initial assumption that these three types of angklung have differences in tonal arrangement that are good enough to be used as comparative material in research.

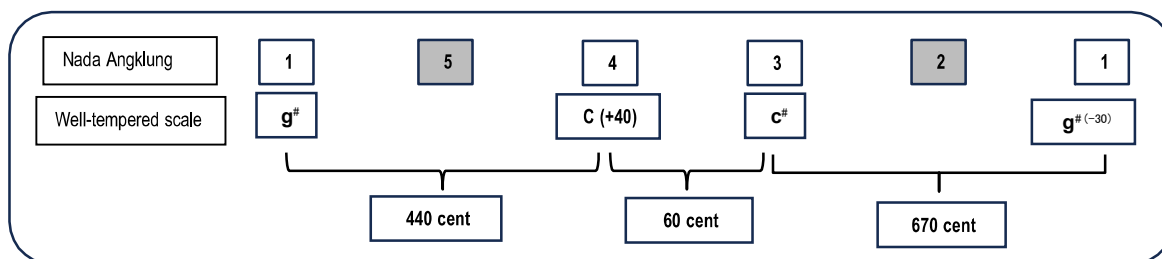
Angklung Dogdog Lojor di Ciptarasa, Sukabumi

Mack and Masunah, (2003) state that in the art of dogdog lojor music, there are only two types of musical instruments, namely two dogdog lojor and four angklungs. The four angklungs have their own

names, namely gonggong (the largest and lowest angklung), panembal (second angklung), kingking (third angklung), and inclok (fourth angklung). Angklung gonggong acts as the carrier of the main rhythmic beat pattern.

The scales used in dogdog lojor music, especially in the vocals, tend to be close to the salendro (nyalendro) tuning. However, unlike the vocals, only three of the five notes in the scale are used in angklung: gis/gis' (gonggong and inclok), c' (panembal) and cis' (kingking). When compared to the Western music scale (well-tempered scale), the arrangement of the five tones has an interval sequence that is close to the scale with a distance in cent units as described below:

Table 1: Mack, D. & Masunah, J. (2003) Arrangement Laras Angklung Dogdog Lojor Ciptarasa Sukabumi



Thus, the scales used in dogdog lojor are not purely pentatonic, but only three tones especially on the angklung or also called the incomplete salendro laras. In accordance with the scales (tunings) used, it can be said that all the songs performed are also in salendro tune. then the resulting laras interval: 1(da) to 3(na) = 670 cent; 3(na) to 4(ti) = 60 cent; 4(ti) to 1(da) = 440 cent.

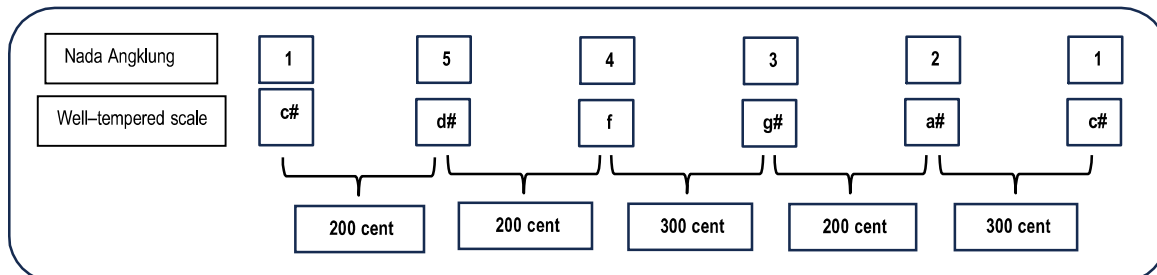
Angklung Badeng

Compared to the angklung dogdog lojor equipment, the angklung badeng art equipment has a little more variety. Kholid, (2019) Badeng angklung equipment consists of 9 angklung pieces, namely: 1) 1 angklung indung and 1 angklung bapa held by one player; 2) 2 angklung kencrung kaka (male and female) held by one player; 3) 2 angklung kencrung adi (male and female) held by one player; 4) 1 angklung kecer held by one player; 5) 2 angklung roel (indung and bapa) held by one player; 6) 2 dogdog lojor, 2 terebang, and 1 kecrek or thamrin.

The tuning in angklung Badeng cannot be determined with certainty as each angklung consists of three tubes with different tones. In this study, only the most dominant tone is taken, although it is very relative. As with angklung dog-dog lojor in badeng art, the rhythmic impression is more prominent than the melodic impression. The tones in angklung badeng involve a variety of tones, such as angklung indung with tones e (-40 cent), a (-10 cent) and fis 1 (-50 cent); angklung bapa with tones f, c1 and es2 ; angklung kencrung kaka (male) with notes ais (+20 cent), e2 (-30 cent), gis2 (-20 cent); angklung kencrung kaka (female) with notes bes1 (-50 cent), gis2, and dis3 (-50 cent); angklung kencrung adi (male) with notes ais (-30 cent), ais1 (-30 cent), cis2; description: specifically the tone ais

is difficult to determine. If the closest arrangement of angklung badeng tones is drawn, it is approximately as follows.

Table 2: Mack & Masunah, (2003) Arrangement Laras Angklung Badeng



The singing element in angklung is very important. The songs are not all in salendro but more likely in pelog. Based on the data in table 2 a above, the interval distance from each tone to the next tone was found. The frequency data of each tone was taken from the actual audio data from the results of research conducted by Dieter Mack, et al. in 2003. After knowing the frequency of each tone, the interval distance is calculated using the formula $\text{cent} = 1200 \cdot \log^2 (f^1/f^2)$, then the resulting laras angklung interval: 1(da) to 2(mi) = 300 cent; 2(mi) to 3(na) = 200 cent; 3(na) to 4(ti) = 300 cent; 4(ti) to 5(la) = 200 cent; and 5(la) to 1(da) = 200 cent.

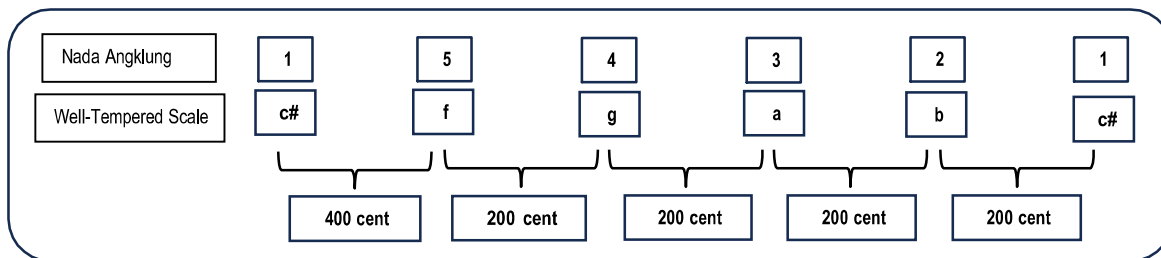
Angklung Buncis

The shape, number and tones found in angklung buncis consist of: 9 angklung (2 angklung indung with the tone 'na'(3); 2 angklung ambrug with the tone 'ti'(4); 2 angklung pancer with the tone 'la'(5); one angklung engklok with the tone 'mi'(2); (1)); 3 dog-dogs, (one dog-dog dalang; one dog-dog tempas; and one dog-dog pangrubuh); one bamboo kecrek; one trumpet; one bamboo gong.

The angklung buncis art tends to use the salendro tuning with five tones. Each angklung instrument with two angklung tubes (ambruk and indung) or three angklung tubes (engklok, pancer, and panempas) only uses an octave up or down so that the identity of the tone is quite guaranteed to be played melodically. Which octave region is most prominent remains difficult to determine.

Mack & Masunah, (2003) The five tones, when compared to the tones of Western music, are roughly equivalent to g^1 , a^1 , b^1 , $cis^2/(d^2)$, and f^1 . The f^1 tone is slightly lower and is perceived outside the basic tuning for melodic songs. In reality, it is only played by angklung engklok and sounds like an off-beat rhythmic element, meaning it does not participate in the formation of the main melody. When compared to the well-tempered scale of Western music, the arrangement of the five tones is close to that of the scale with its interval order (distance in cents) as below:

Table 3: Mack & Masunah, (2003) Arrangement Laras Angklung Buncis



Based on the data in Table 6 above, the interval distance from each tone to the next tone was found. The frequency data of each tone was taken from the actual audio data from the results of research conducted by Dieter Mack, et al. in 2003. After knowing the frequency of each tone, the interval distance is calculated using the formula $\text{cent} = 1200 \cdot \log_2 (f^1/f^2)$. then the resulting laras interval: 1(da) to 2(mi) = 200 cent; 2(mi) to 3(na) = 200 cent; 3(na) to 4(ti) = 200 cent; 4(ti) to 5(la) = 200 cent; and 5(la) to 1(da) = 400 cent.

Of the three data sources above, the average has a significant difference but there are also similarities even though the distance or frequency cannot be detected by our hearing. In addition, the value of the number of interval frequencies is small, and can even be categorized as the same, based on the provisions imposed by ISO 16: 1953 related to tolerance indicators of approximately 1Hz (Standardization, 1953), as shown in the following table 4

Table 4: Comparison of tunings of 4 types of traditional angklung

Laras	INTERVAL (Cent)				
	1 - 5	5 - 4	4 - 3	3 - 2	2 - 1
Angklun Dogdog Lojor	1 - 5		4 - 3	3 - 1	
	440		60	670	
Angklung Badeng	200	200	300	200	300
Angklung Buncis	400	200	200	200	200

Perception

Perception is the term used to describe the way a person uses their five senses to perceive and understand the information they receive. In addition, perception can affect social interactions and decision-making processes; different interpretations and responses depend on how a person perceives a situation or information.

Before humans in society were familiar with the writing system and culture, the prominent factor in the communication and information process was folklore or language culture (oral culture). One of them is that oral culture has served as the primary means of transmitting knowledge from one generation to the next.

The claim of salendro scales in traditional angklung that has been stated at the beginning is not the result of an in-depth study related to it, but rather a socio-cultural influence that affects the

perception of each supporting community. This is evidenced by data generated through questionnaires from several angklung activists who have been in the field for more than 20 years and whose perceptions are more from oral culture. The results of the data are illustrated in the following figure:

Figure 1: Graph of data collection results related to respondent background



Of the 50 respondents who are active in angklung activities, there is a dominance of professions, where 80% of them are teachers or trainers, while makers of arrangements/other angklung music work account for 10%. No respondents were craftsmen, 6% were players/musicians, and 4% were appreciators. Furthermore, in terms of experience, 66% of the respondents have been in the angklung world or field for more than 20 years, 20% between 10 to 20 years, and 10% between 5 to 10 years. No respondents had less than one year of experience, while 4% had one to five years of experience. In conclusion, the majority of respondents are angklung teachers/trainers, and most of them have been active in the angklung world for more than two decades.

Data related to claims or perceptions of tunings in traditional angklung are contained in the following table 5

Table 5: Response from teachers, trainers, or angklung figures

Perception	Laras					Where did you make a statement				
	Salendro	Pelog	Madenda	Don't Know	Other Laras	Own Statement	from an angklung activist resource person	Reaserch	reading	Teacher
Angklung Dogdog Lojor	74%	4%	0	18%	4%	20%	10%	10%	6%	54%
Angklung Badeng	70%	10%	0	20%	0	20%	15%	0	5%	60%
Angklung Buncis	84%	0	0	10%	6	25%	10%	10%	5%	10%

Table 5 details the information as follows:

Angklung Dogdog Lojor: The majority (74%) stated salendro laras, 4% pelog laras. 18% did not know the tuning, and 4% mentioned other tunings. Information came mainly from teachers, trainers, or angklung figures (54%).

Angklung Badeng: Most (70%) mentioned salendro laras, and 10% pelog laras. 20% did not know the tuning. The main source of information is teachers, trainers, or angklung figures (60%).

Angklung Buncis: The majority (84%) mentioned salendro tuning, and 6% other tunings. 10% did not know the tuning. Information came mainly from personal experience (48%) and teachers, trainers, or angklung figures (25%).

In conclusion, salendro tuning dominated respondents' perceptions of the three types of angklung. The main information was obtained from teachers, trainers, or angklung figures, and partly from personal experience.

Laras

Laras, according to Koesoemadinata (1969), are tones that are organized and in accordance with artistic taste. Kurniawan, & Ridhitanti, (2021) stated that in Sundanese music, damina notation is used with numbers 1 to 5 (da, mi, na, ti, la) and other terms such as Tugu/Barang, Loloran, Panelu, Galimer, and Singgul. Aziz, (2023) Since 1916, Koesoemadinata was interested in pelog and salendro tunings without being influenced by the Western music he studied. He believed that all music in the world used the 12-tone Western scale. Through experiments with the guitar, he discovered the similarity of pelog and salendro tones to the Western scale. From his findings, Koesoemadinata developed the theory of an equally spaced salendro padantara tuning of 240 cents and a 15-tone salendro assembly, inspired by the Gamelan Kyahi Mulya in Bandung. Retrieved from <https://www.detik.com/jabar/budaya/d-7029719/rd-machjar-koesoemadinata-sosok-di-balik-notasi-da-mi-na-ti-la-da..>

Laras Salendro

Table 6: Gunawan, Milayrtini, & Masunah, (2022) Laras SalendroPadantara R.M.A. Koesoemadinata

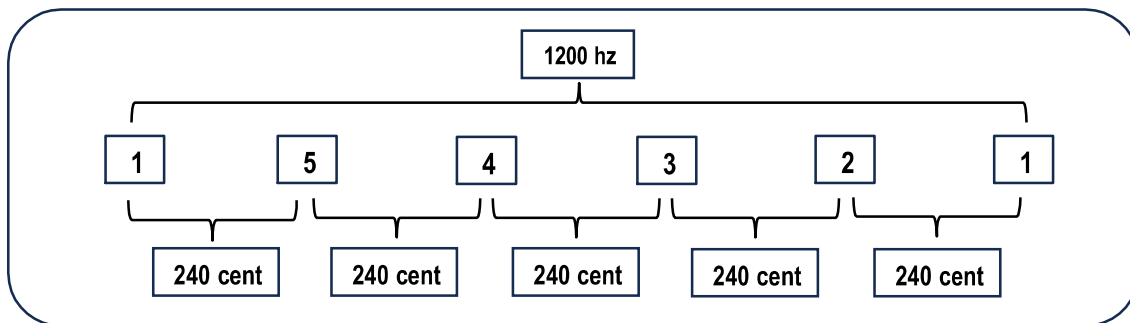


Table 7: Fausta, (2019) Laras Salendro Bedantara R.M.A. Koesoemadinata

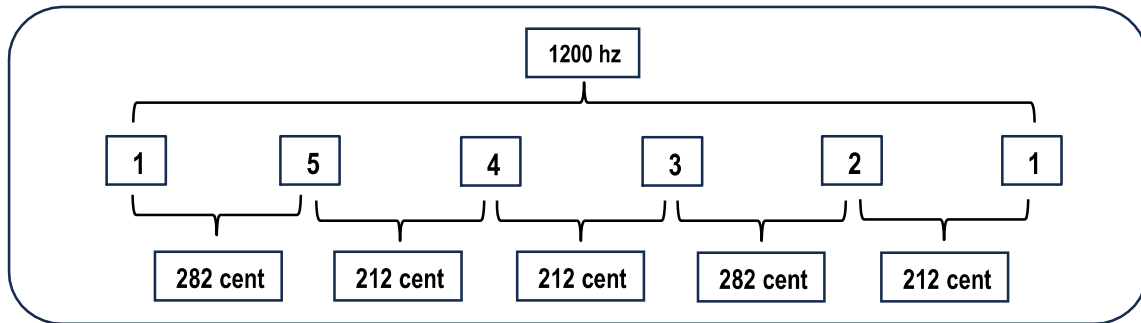


Table 8: Saepudin, (2015) Laras Salendro R.M.A Koesoemadinata.

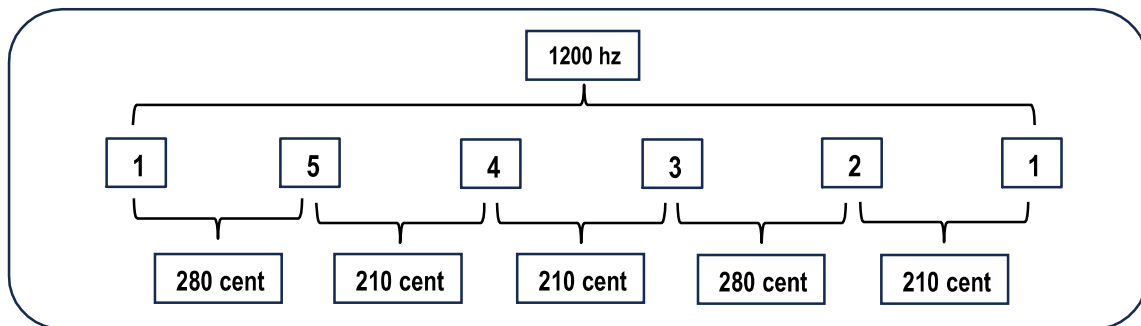


Table 9: Saepudin, (2007) Laras Salendro R.M.A. Koesoemadinata

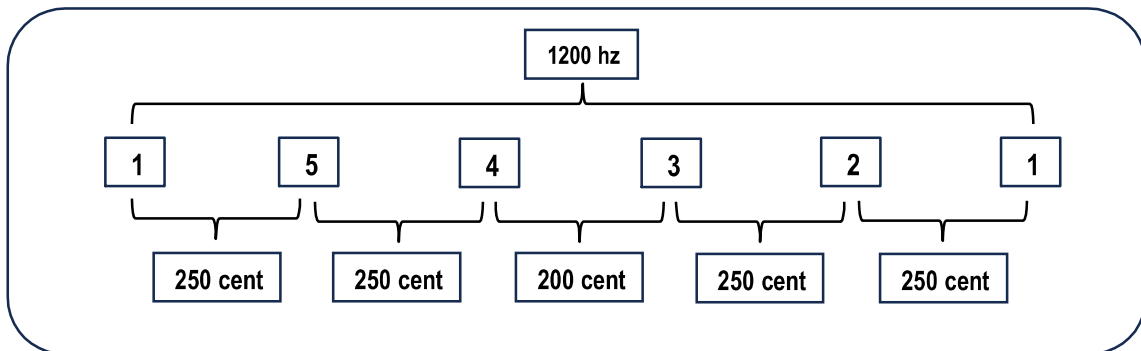
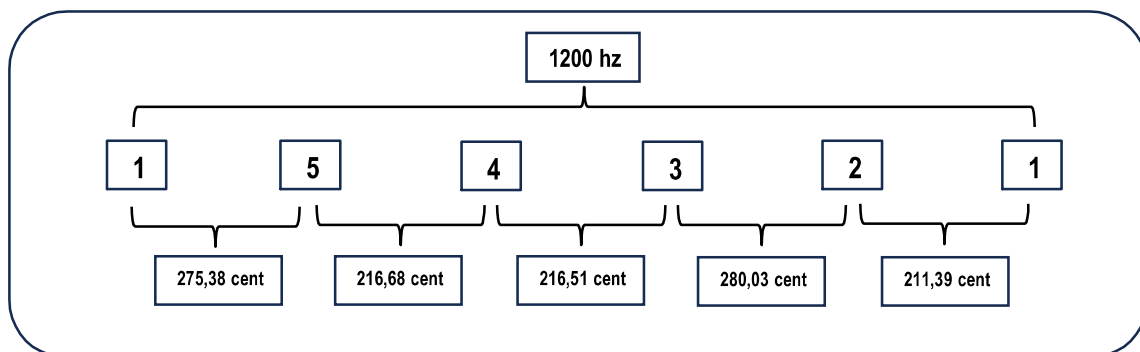


Table 10: Hermawan, (2002) Laras Salendro R.M.A. Koesoemadinata



Based on the data from tables 6-10 related to the salendro barrel there are differences, this is because the source of audio data can be based on field experience measured from the tone in the musical instrument that was being played at that time. However, the standardization of the salendro tuning that has been created by R.M.A. Koesoemadinata is data that is also cited in scientific research papers by Ega Fautsa in 2019 and Iwan Gunawan (2022), namely the salendro padantara tuning where the interval distance from one tone to the next is 240 cents, so that it can develop into degung, madenda, mataraman, etc. tuning

Table 11: Findings between Angklung Baduy Tuning and R.M.A. Koesoemadinata's Tuning Theory

Laras		INTERVAL (Cent)				
Tokoh		1 - 5	5 - 4	4 - 3	3 - 2	2 - 1
Salendro	Salendro Padantara (Fausta et al., 2019)	240	240	240	240	240
	Salendro Bedantara (Fausta et al., 2019)	282	212	212	282	212
	Salendro (Saepudin, 2015)	280	210	210	280	210
	Salendro (Asep Saepudin, 2007)	250	250	200	250	250
	Salendro (Deni Hermawan, 2002)	275,38	216,68	216,51	280,03	211,39
	Approximate complement (all notes and intervals)	200	200	300	200	300
Angklung Dogdog Lojor		1 - 4		4 - 3	1 - 3	
	Original Angklung	440		60	670	
	Angklung Badeng	200	200	300	200	300
	Angklung Buncis	400	200	200	200	200

The results of the findings outlined in Table 11 show the percentage value of the difference between the frequency value of R.M.A Koesoemadinata's salendro tuning from several with the interval frequency value on traditional angklung. The pattern of the calculation system is the theoretical interval value minus the interval value on traditional angklung then divided by the interval value in one octave of 1200 cents. The results seen when compared with the salendro tuning the percentage comparison of the difference is far, even nothing similar. The level of similarity that has been determined by the International Pitch Standard Iso is called the pitch tolerance of 1 hz (Standardization, 1953), if calculated in cent units it is equal to 4 cents approximately 0.03%.

Based on a document study and in-depth interviews about Angklung Tradisi, findings suggest that perceptions of 'Laras' in Angklung are influenced by cultural factors, historical influences, and individual experiences. Historical documents and related literature revealed that documentation on traditional angklung is limited, with most sources from Daeng Soetigna held by his family and students. Interviews with angklung experts, instrument makers, and musicians also highlighted that views of 'Laras' relate not only to techniques of making and playing but also to cultural values

associated with the use of Angklung in daily life and traditional ceremonies. The implication of these findings for the practice and teaching of Angklung Tradisi is the importance of considering cultural and historical aspects in understanding and teaching traditional music scales. By combining theoretical and practical perspectives, a deeper understanding of 'Laras' can help maintain and develop this cultural heritage in a modern context.

Conclusion and recommendation

Angklung enthusiasts generally believe that traditional angklung has a salendro tuning, which is influenced by oral culture. This information is passed down from one angklung teacher or trainer to the next generation without change. On the other hand, most academics within the angklung community have not conducted much related scientific research, focusing more on the history, value, and function of angklung. Audio data related to traditional angklung tones, once reviewed with existing theories, the claim that traditional angklung tones are salendro cannot be substantiated even within the limits of tolerance. This finding suggests the need for further research to determine and name the tunings of traditional angklung. This will provide a scientific benchmark that can be used as a reference for current and future generations.

Based on the analysis of perceptions and theories about 'Laras' in Angklung Tradisi, it can be concluded that cultural factors, historical influences, and individual experiences play a significant role in shaping the understanding of this scale system. Historical documents and in-depth interviews show that documentation related to traditional angklung is limited, so efforts to maintain and develop knowledge about 'Laras', especially through data collection from available sources, are important.

systematic search for literature related to traditional angklung. This includes collecting more historical sources and literature that can help enrich our understanding of the evolution and role of 'Laras' in the context of Indonesian culture and traditional music. In addition, it is important to engage more angklung experts, instrument makers, and musicians in in-depth interviews to gain a broader and more in-depth view of how 'Laras' is understood and interpreted in everyday practice.

Practically speaking, the teaching of Angklung Tradisi could be further enriched by incorporating more in-depth cultural and historical aspects, rather than just focusing on playing techniques and instrument making. This could help to maintain the richness of the culture and increase appreciation of the traditional values embodied in the use of Angklung. Thus, the maintenance and development of Angklung Tradisi can be carried out in a more sustainable manner, in accordance with the cultural values contained therein.

Angklung enthusiasts generally believe that traditional angklung has a salendro tuning, influenced by oral culture. This information is passed down from an angklung teacher or trainer to the next generation without change. On the other hand, most academics within the angklung community have not conducted many related scientific studies, focusing more on the history, value, and function of angklung. Audio data related to traditional angklung tones, after reviewing with existing theories,

the claim that the traditional angklung tune is salendro cannot be proven even within the limits of tolerance. This finding suggests the need for further research to determine and name the tunings in traditional angklung. This will become a scientific benchmark that can be used as a reference for current and future generations.

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Conflict of interest

The researcher declares that no conflict of interest affects the results of the research. In good faith, this research was conducted professionally and objectively. There are no financial relationships or other interests that could be considered a conflict regarding the research subject. The main purpose of the research was to investigate angklung 'tuning' claims in a general musical context, free from the influence or control of other parties.

Author contributions

Each author had an active role in this research. Their contributions included planning, data collection and analysis, adaptation of angklung tones to Western music, drafting the results section and perceptual data, and refining the writing structure and style. The first author focused on planning and interpreting the results, the second author was involved in analyzing the audio data, and the third author detailed the perceptual data and literature study. Their collaboration was key in producing this research, with all authors approving the final version of the manuscript before it was submitted for publication.

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REFERENCES

- Asep Saepudin. (2007). Tafsir Ulang atas Kajian Ulang Teori Laras dan Surupan Karya RMA Koesoemadinata. *Panggung, 17*, 23–32.
- Asep Saepudin. (2007). Tafsir Ulang atas Kajian Ulang Teori Laras dan Surupan Karya RMA Koesoemadinata. *Panggung, 17*, 23–32.
- Aziz, N. (2023). Rd Machjar Koesoemadinata, Sosok di Balik Notasi Da-Mi-Na-Ti-La-Da. *Detik Jabar*. <https://www.detik.com/jabar/budaya/d-7029719/rd-machjar-koesoemadinata-sosok-di-balik-notasi-da-mi-na-ti-la-da>
- Budi, D. S. U., Soedarsono, R. M., Haryono, T., & Narawati, D. T. (2014). Angklung DogdogLojor pada Upacara Seren Taun. *Resital, 15 No 2*. <https://journal.isi.ac.id/index.php/resital/article/view/848>

- Creswell, J. W. (2014). *Research Design*. SAGE Publications Ltd.
- Creswell, J. W. C. j. D. (2023). *Research Design: Qualitative, Quantitative, and MixedMtehods Approaches* (sixth). Sage Publications, Inc.
- Dawson, J. L. M. (1967). Cultural And Physiological Influences Upon Spatial-Perceptual Processes in West Africa – PART I. *International Journal of Psychology*, 2(2), 115–128. <https://doi.org/10.1080/00207596708247208>
- Deni Hermawan. (2002). *Etnomusikologi “beberapa Permasalahan dalam Musik Sunda.”* STSI Press Bandung.
- Dieter Mack, J. M. (2003). *Angklung di Jawa Barat sebuah Perbandingan*. P4ST UPI.
- Dinda Satya Upaja Budi. (2017). Modifikasi Angklung Sunda. *Resital*, 18, 43–52. <http://malvanabilla.blogspot.co.id/2014/03>
- Fausta, E., Seni, P., Penciptaan, M., Pengkajian, D., Pertunjukan, S., & Rupa, S. (2019). KONSEP LARAS SALENDRO R.M.A. KOESOEMADINATA DALAM ANGKLUNG PENTATONIS RAGAM LARAS. In *Jurnal Kajian Seni* (Vol. 05, Issue 02).
- Febiliana, M. (2019). *Kesenian Angklung Buhun Suku Baduy pada Upacara Ngaseuk Pare di Desa Kanekes Kecamatan Leuwidamar Kabupaten Lebak* [Indonesian University of Education]. <https://repository.upi.edu/43050/>
- Gunawan, I. (2013). *Metode Penelitian Kualitatif Teori dan Praktik* (Suryani (ed.); 1st ed.). PT Bumi Aksara.
- Gunawan, I., Milyartini, R., & Masunah, J. (2022). The Use of Laras in Contemporary Gamelan Music. *Harmonia: Journal of Arts Research and Education*, 22(1), 161–173. <https://doi.org/10.15294/harmonia.v22i1.35483>
- Isykariman Ismail, Aries Kurniawan, M. S., & dan Asri Radhitanti, M. D. (2021). *Perancangan Buku Ilustrasi Biografi Machjar Koesoemadinata sebagai Tokoh Pembaharuan dalam Gagasan dan Pemikiran Modern pada Seni Karawitan Sunda*.
- Jacoby, N., Undurraga, E. A., McPherson, M. J., Valdés, J., Ossandón, T., & McDermott, J. H. (2019). Universal and Non-universal Features of Musical Pitch Perception Revealed by Singing. *Current Biology*, 29(19), 3229–3243.e12. <https://doi.org/10.1016/j.cub.2019.08.020>
- Kholid, D. M. (2019). *The Model of Angklung Badeng Learning for Junior High School Students in Malangbong Garut*. 255(Icade 2018), 234–237. <https://doi.org/10.2991/icade-18.2019.54>
- Koesoemadinata, R. M. A. (1969). *Ilmu Seni Raras*. Pradjaparamita.
- Kunst, J. (1973). *Music in Java.pdf*. The Hague Martinus Nijhoff. <https://doi.org/10.1007/978-94-009-3469-6>
- McPherson, M. J., Dolan, S. E., Durango, A., Ossandon, T., Valdés, J., Undurraga, E. A., Jacoby, N., Godoy, R. A., & McDermott, J. H. (2020). Perceptual fusion of musical notes by native Amazonians suggests universal representations of musical intervals. *Nature Communications*, 11(1). <https://doi.org/10.1038/s41467-020-16448-6>
- Merriam, A. P. (1964). The Anthropology of Music. In *Ethnomusicology* (Vol. 10, Issue 1). <https://doi.org/10.2307/924202>

- Nettl, B. (1964). Theory and Method in Ethnomusicology. In *Ethnomusicology* (Vol. 1, Issue 1). A Division of Macmillan Publishing Co., Inc.
- Norman K. Denzin and Yvonna S. Lincoln. (2009). *Handbook of Qualitatif Reseach* (1st ed.). Sage Publications, Inc./ Pustaka Pelajar.
- Ni Desak Made Santi Diwyarhi, D. (2022). *Psikologi Umum* (dkk Oktavianis (ed.); 1st ed.). Rosyadi. (2012). Angklung: dari Angklung Tradisional ke Angklung Modern Angklung: from Traditional to Modern. *Angklung: Dari Angklung Tradisional Ke Angklung Modern Angklung: From Traditional to Modern*, 4(1), 26–40.
https://www.researchgate.net/publication/323787070_ANGKLUNG_DARI_ANGKLU NG_TRADISIONAL_KE_ANGKLUNG_MODERN
- Saepudin, A. (2015). Laras, Surupan, dan Patet dalam Praktik Menabuh Gamelan Salendro. *Resital*, 16, 52–64.
- Saprudin. (2011). *Model Pelatihan Musik Angklung pada Kegiatan Ekstrakurikuler di Tiga Perguruan Tinggi*. Universitas Pendidikan Indonesia.
- Sasaki, M., & Masunah, J. (2021). A Review of The Sundanese Scale Theory. In *Harmonia: Journal of Arts Research and Education* (Vol. 21, Issue 2, pp. 318–329). Universitas Negeri Semarang. <https://doi.org/10.15294/harmonia.v21i2.32995>
- Standardization, I. O. of. (1953). *Acoustics - Standard Pitch - A4 = 440 Hz* (Vol. 52, Issue 1). <https://www.iso.org/standard/3601.html>
- van Zanten, W. (1995). Aspects of Baduy music in its sociocultural context, with special reference to singing and angklung. *Bijdragen Tot de Taal-, Land- En Volkenkunde*, 151(4), 516–544.
- Wulandari, C. D., & Maryanti, R. (2022). *Jurnal Pendidikan dan Konseling The Influence of Angklung Extracurricular in Increasing Love for Sundanese Culture*. 4, 592–597.

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