

To: Script Ad-Hoc
From: Jan Kučera, Charles University
Subject: Comments on differences between Tulu and Tigalari proposals
Date: 25 October 2020

These comments are to contrast the proposals of U.B. Pavanaja, *Proposal to encode Tulu*, version 1.0 (henceforth the [Tulu proposal](#)), and of Vaishnavi Murthy K Y & Vinodh Rajan, *Preliminary proposal to encode Tigalari script in Unicode*, L2/17-378 (henceforth the [Tigalari proposal](#)). The scripts as proposed differ only marginally and therefore will be considered the same script for the purpose of these comments.

The Script Ad-Hoc provided extensive feedback on the Tigalari proposal in its L2/18-168 [recommendations](#), § 34, pp. 25-28. Since no updates have been submitted to date, this document compares the original proposals as referenced above, without considering and without affecting the feedback in the recommendations.

1. Script Name

Tigalari proposal	Tulu proposal
States that the script is known by several names depending on the location and period, including both Tulu and Tigalari (pp. 2).	Cites a paper suggesting that Tulu-Malayalam, Tulu, Tigalari, Malayalam and current Tulu are variants of each other (pp. 4). However, no differences between the variants are shown or described in the proposal.

Table 1

An important difference between the proposals appears that the Tigalari proposal is proposing to encode the script as used in the past and based on historical evidence, while the Tulu proposal is proposing to encode script as agreed on by the Karnataka Tulu Sahitya Academy (KTSA) established in 2007 (pp. 5), suggesting that the name Tulu is important to represent the modern variant used by KTSA, while the others in the Tigalari proposal might be deemed historic or alien.

Authors of the Tigalari proposal [indicated](#) that calling the script Tulu-Tigalari would be acceptable solution which seems to be a fair compromise. If only one name is to be used, it is worth noting that Tulu also refers to the language and geographical region, while Tigalari seems to be exclusively used to refer to the script.

2. Character Set

The Tulu proposal contains 84 characters, while the Tigalari one contains 91¹ characters, see below:

 only present in Tigalari proposal only present in Tulu proposal

a	ā	i	ī	ṁ	u	ū	ṛ	ṝ	ḷ	ḹ	ḥ	ḥ̄	e	ē	ai	o	ō	au
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Table 2. Initial vowels (16/17)

ā	i	ī	ṁ	u	ū	ṛ	ṝ	ḷ	ḹ	ḥ	ḥ̄	e	ē	ai	o	ō	au	-au
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Table 3. Vowel signs (16/16)

¹ The proposal claims 90, most likely not counting the au length mark.

The Tigalari proposal recognizes Tulu language’s need for **ɛ**, **ē**, **u**, and **–** unlike the Tulu proposal – also **ū**, but suggests these to be realized using **virāma** following **e/ē** and **u/ū** or **a/ā**², respectively (pp. 5 § 5.1 & pp. 13). Notably, this requires **virāma** to be allowed after both vowel letters and vowel signs, and causes undesired conjuncts to be formed if a consonant follows, to be prevented using ZWNJ. This problem and possible solutions are discussed in more detail in [L2/12-203](#)³.

0	1	2	3	4	5	6	7	8	9	10	100
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Table 4. Numerical characters (12)

k	kh	g	gh	ṅ		
c	ch	j	jh	ñ		
ṭ	ṭh	ḍ	ḍh	ṇ		
t	th	d	dh	n		
p	ph	b	bh	m		
y	r	ṛ	l	ḷ	ḷ	v
ś	ṣ	s				
h						

Table 5. Consonants (36)

	candra anunāsika		puṣpa alankāra		vedic tone mark svarita
ṁ	anusvāra		ōṃ alankāra		vedic tone mark anudatta
ḥ	visarga		śrī alankāra		
˘	avagraha		tiddu		

Table 6. Other signs (10/2)

The Tulu proposal suggests that **avagraha**, **danda** and **double danda** can be used from other scripts (pp. 14). The Tigalari proposal reserves codepoints for **danda** and **double danda** and suggests equivalent Devanagari characters to be used instead.

Tigalari proposal expects more **vedic tone marks** to come in the future, referring [L2/15-101](#)⁴ and [L2/15-113](#)⁵.

Both proposals contain single **virāma** character, but both proposals describe stacking behaviour. One vowel killer and one stacking character might be preferred instead.

3. Character Appearance

Note that the **e** and **o** vowels in the Tigalari proposal are unattested and created by author of the proposal. The proposal does not comment on the status of **ɛ**, but its attestation is not provided either.

² The use of **a+virāma** rather than **u+virāma** to represent **ū** is justified by glyph appearance in some manuscripts on pp. 13 of the Tigalari proposal. There is, however, no contrasting use, and could be potentially considered as a font variant. The **ū** glyph in the Tulu proposal corresponds to **u+virāma** as expected; see Table 7 onwards.

³ Supporting Tulu language written in the Kannada script

⁴ Encoding of Vedic characters used in non-Devanagari scripts

⁵ Comments on L2/15-101 on non-Devanagari Vedic characters

	a	ā	i	ī	u	ū	u	ū	ṛ	r	ḷ	ḻ
Tigalari	അ	ഈ	ഇ	ഈ	ഉ	ഊ	ഉ	ഊ	ഝ	ജ	ഞ	ഞ
Tulu	അ	ഈ	ഇ	ഈ	ഉ		ഉ	ഊ	ഝ	ജ		

Table 7. Initial vowels comparison I. Shaded fields not proposed as separate characters.

	ε	ē	e	ē	ai	o	ō	au
Tigalari	എ	ഈ	(ഇ)	ഈ	ഈ	(ഊ)	ഊ	ഊ
Tulu	എ	ഈ	ഇ	ഈ	ഈ	ഊ	ഊ	ഊ

Table 8. Initial vowels comparison II. Shaded fields not proposed as separate characters.

Burnell suggests that the distinction between **e/o** and **ē/ō** was first made by Dr. Gundert in the second half of the 19th century.⁶ Since short **e** and **o** vowels are not attested in the historical sources, various scholars introduce them differently:

Tigalari proposal reference	e ഐ	ē ഐ	ai ഐ	o ഐ	ō ഐ	au ഐ
Fig 43. (Vighnaraj) These forms correspond to the Tulu proposal. Authors of the Tigalari proposal deem the interpretation of o glyph as a short o to be a mistake.	ഐ	ഐ	ഈ	ഊ		ഊ
Fig 42. (Reddy, 2012) Reddy's e/ē look like ḷ/ḻ in Burnell; Reddy does not provide ḷ/ḻ vowels. He also used the ai form to denote short o .	ഐ	ഐ	ഈ	ഊ	ഊ	ഊ
Fig 30. (Burnell, 19th century) Burnell uses e and o in the table, but differentiates ē/ō and ē/ō in the text. The vowel signs in the table do not have hooks at the bottom, which corresponds to ē/ō in the Tigalari proposal but e/o in the Tulu proposal (see Table 10 below).		ഐ	ഈ		ഊ	ഊ
Fig 31. (Puninchattaya, 15th century) These forms of ē/ai are closer to the Malayalam forms.		ഐ	ഐ		ഊ	ഊ

Table 9. Variations in e/o shapes.

⁶ *Elements of South-Indian Palæography* by A. C. Burnell, 1968 edition, pp. 42.

	ε	ē	e	ē	ai	o	ō	au	-au
Tigalari	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚
Tulu	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	

Table 10. Vowel signs comparison I. Shaded fields not proposed as separate characters.

Note that in the Tulu proposal, the **au** vowel sign is only on the right side of the consonant (pp. 13), while in the Tigalari proposal, the **au** vowel sign is on both sides of the consonant.

	a	ā	i	ī	u	ū	u	ū	ṛ	ṛ	ḷ	ḷ
Tigalari		ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚	᳾᳚
Tulu		ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚		ᳺ᳚	᳻᳚	᳼᳚	᳾᳚		

Table 11. Vowel signs comparison II. Shaded fields not proposed as separate characters.

	0	1	2	3	4	5	6	7	8	9	10	100
Tigalari	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚	᳾᳚	᳿᳚
Tulu	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚	᳾᳚	᳿᳚

Table 12. Numerical characters comparison

	ka	kha	ga	gha	ṇa	ca	cha	ja	jha	ṇa
Tigalari	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚
Tulu	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚

Table 13. Consonants comparison (velar & palatal)

	ṭa	ṭha	ḍa	ḍha	ṇa	ta	tha	da	dha	na
Tigalari	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚
Tulu	ᳵ᳚	ᳶ᳚	᳷᳚	᳸᳚	᳹᳚	ᳺ᳚	᳻᳚	᳼᳚	᳾᳚	᳿᳚

Table 14. Consonants comparison (retroflex & dental)

notable glyph difference Tigalari proposal recognizes a glyph variant that matches Tulu

	pa	pha	ba	bha	ma	ya	ra	ra	l	la	la	va
Tigalari	പ	ഫ	ബ	ബ	മ	യ	ര	ര	ല	ല	ല	വ
Tulu	പ	ഫ	ബ	ബ	മ	യ	ര	ര	ല	ല	ല	വ

Table 15. Consonants comparison (labial & sonorants)

Note that **ra** glyph in the Tulu proposal is the same as the **la** glyph in the Tigalari proposal, while **ra** in Tigalari appears like **la** from the Tulu proposal with repha.

	ś	ṣ	s	h	ḥ	ṁ	virāma
Tigalari	ശ	ഷ	സ	ഹ	ഃ	ം	്
Tulu	ശ	ഷ	സ	ഹ	ഃ	ം	്

Table 16. Consonants comparison (sibilants) and symbols comparison

4. Layout Features

Stacking

Both proposals agree that the script has stacking behaviour. In Tulu proposal, the stacked characters are small (pp. 13), while in the Tigalari proposal the stacked characters are explicitly the same size (pp. 16 § 1), both with at least one example as evidence:

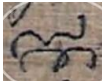
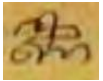


Tigalari proposal		Tulu proposal	
sta (സ + ട) pp. 54 fig. 15	ṣṇa (ഷ + ണ) pp. 54 fig. 14	lnā ല്ല (ല + ന + ാ) pp. 22 bottom right	llū ു (് + ് + ു) pp. 22 top right
			

Table 17. Stacking layout comparison

There is no printed evidence of stacking in the Tigalari proposal and there is no handwritten evidence of stacking in the Tulu proposal, so the difference might be between handwritten and printed appearance.

Conjuncts

The Tulu proposal does not mention any special conjuncts behaviour, and does not seem to present any evidence thereof. There is **tu** ligated on pp. 22. The Tigalari proposal discusses conjuncts on pp. 18 § 2-3.

Repha

The Tulu proposal does not mention any special repha behaviour, although at least the figure on pp. 19 shows the standard form as described in the Tigalari proposal. The Tigalari proposal describes complex repha behaviour on pp. 26 § 8.5.

Virāma

Tigalari proposal (pp. 12 § 5.4)	Tulu proposal (pp. 10)
<ul style="list-style-type: none">• conjunct creation• vowel killer• vowel retroflexion	<ul style="list-style-type: none">• conjunct creation (pp. 12)• vowel killer

Table 18. Virāma uses

As noted above, both proposals contain single **virāma** character fulfilling different functions. A separate vowel killer and stacking character might be preferred instead.

5. Character Names

Both proposals follow the standard Indic naming with TIGALARI and TULU prefixes, the only conflicts are shown below and can all be resolved by following the TIGALARI proposal which is consistent with other scripts.

	Tigalari proposal	Tulu proposal
virāma	TIGALARI SIGN VIRAMA	TULU SIGN HALANT
ṛ	TIGALARI VOWEL SIGN VOCALIC R	TULU VOWEL VOCALIC R
ṝ	TIGALARI VOWEL SIGN VOCALIC RR	TULU VOWEL VOCALIC RR
10	TIGALARI NUMBER TEN	TULU DIGIT TEN
100	TIGALARI NUMBER HUNDRED	TULU DIGIT HUNDRED

Table 19. Character name conflicts

The Tulu proposal includes the cerebral vowels **ṁ**, **ṅ** and **ṅ̄** as separate characters, named UA, AE and AEE, respectively. CEREBRAL U, E and EE respectively or another descriptive name might be more intuitive and consistent.

6. Collation

The Tulu proposal is claiming the proposed collation to be modelled after Kannada, but the supplied table does not follow it (places vowel signs after initial letters).

The Tigalari proposal suggests the Grantha and Malayalam model, but the two are not equivalent (VA < LLA and AU LENGTH MARK < VIRAMA in Malayalam but not in Grantha). The supplied table does not follow either (places anusvara and visarga after vowel letters).

Apart from the editorial discrepancies, there does not seem to be a conflict in collation proposals.

7. Evidence

Since the Tigalari proposal is based on historical sources, it contains a lot of historical evidence coming from variety of diverse sources. There is no modern running text, but there are modern character charts. The evidence includes few pages from a primer made by KTSA. As pointed out in the text, there is no evidence for TIGALARI LETTER E and TIGALARI LETTER O. There does not seem to be any evidence for the **ṅ** and **ṅ̄** forms either, but these are not proposed as separate characters.

The Tulu proposal, being based on recently agreed orthography, does not contain any historical evidence, although the proposal cites Burnell as a source of complete Tulu character set (pp. 4). The evidence in the Tulu proposal is very weak. Most attestations rely on one or two very low-resolution images of unsourced, undated text. There is no character chart as evidence. The proposal mentions a book on Tulu script published by KTSA (pp. 5) but it is not presented as evidence either.

Furthermore, subject to overlooking, the Tulu proposal does not provide evidence for:

- | | |
|--|----------------------|
| • TULU LETTER AE | • TULU SOUND AEE |
| • TULU LETTER OO | • TULU SIGN VISARGA |
| • TULU VOWEL SIGN UA | • TULU DIGIT THREE |
| • TULU VOWEL VOCALIC SIGN R ⁷ | • TULU DIGIT TEN |
| • TULU VOWEL VOCALIC SIGN RR | • TULU DIGIT HUNDRED |
| • TULU SOUND AE | |

The Tulu proposal also suggests using **avagraha** from another script block but does not provide any evidence of its usage in the script.

8. Editorial Feedback

Tulu Proposal

- Number all pages, tables, and figures.
- Page 4: If Tulu, Tigalari and Malayalam bear greater resemblances, show the difference between them.
- Page 5: Include the year when the script was standardised.
- Page 6: Refers Appendix-3 but appendices are numbered using letters.
- Page 9: Consonant table shows the same letter for both T and TH, while TH is different elsewhere.
- Page 12: Symbols for ten and hundred are not digits and should be called numbers.
- Page 15: 11B50 TULU SIGN ANUSVARA and 11B51 TULU SIGN VISARGA are missing glyphs
- Page 16: 11B92 TULU VOWELSIGN UA is missing space in the name
- Page 16: 11B99 TULU SOUND AE and 11BA4 TULU SOUND AEE: use VOWEL SIGN for consistency
- Page 16: There seems to be an unreasonable hole between the proposed codepoints of 11B99 and 11BA4, is that intentional?
- Page 17: 11BAB TULU SIGN HALANT: use VIRAMA for consistency
- Page 18: In Kannada collation model, vowel signs are after consonants.
- Page 20: Provide higher resolution image, include source and date of the article.
- Page 24: Provide higher resolution image, include source and date of the invitation.
- Provide missing evidence for characters listed above.
- Page 7 shows ೞ for TULU LETTER VOCALIC r̥r̥ but Page 20 shows ೞ as evidence. Either fix the reference form to not include the bottom right loop or include evidence for the proposed form.
- Page 9 shows ೠ for TULU VOWELSIGN anuswara am but Page 20 shows full size sign, e.g. ೡ as evidence. Either fix the reference form to be of full size or provide evidence for the proposed form.
- The KTSA started in 2007. Has there been no books yet in the standardised script that could be used as evidence?
- The provided figures show script behaviour not covered in the proposal, such as ಧ್ವನಿಶೀಲ
Can these be explained in the text?

⁷ The evidence for VOWEL VOCALIC SIGN R shows a Grantha-like appearance, i.e. there is no evidence for the standalone vowel sign form.

Tigalari Proposal

- Can the glyphs created by authors (i.e. with no evidence provided) be systematically marked? The short **e** and **o** are mentioned in the text, what about the various cerebral vowel forms?
- Page 21: There is an example of rotated BHA, but not of TTA shown in Burnell. Is that intentional?
- Page 30: Collation contains two LLA and VS. AI > VS. O.
- Page 30: Grantha and Malayalam collations differ, this one looks more like Malayalam. ANUSVARA ... VISARGA have ignorable primary weight and should therefore not sort between items.
- Page 59: Does Figure 24 show three dandas?
- Page 59: Highlight at least one of each of the marks in Figure 26.