Modern Standard Mandarin Lacks a Basic Colour Term for ORANGE:
Formal and Experimental Evidence

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The term for ORANGE is one of the latest basic colour terms (BCT) in the chronological order of the lexical encoding of basic colour categories in each language; it belongs to the so-called derived colour category, located at the intersection of two primaries, RED and YELLOW. The orange portion of the spectrum had been thoroughly differentiated in Chinese cultural tradition. In Old and Classical Chinese orange shades were expressed by the contextually restricted 髟 xīng and 缇 tí, applied to mammal hair and silk fabric respectively. Despite the fact that China is a homeland of various citrus species that were known in China in the 5th century BCE, and that sweet orange Citrus sinensis in many languages is referred to as the ‘apple from China’, the present paper deploys different kinds of evidence to demonstrate that there is no monomorphemic monosyllabic colour term for encoding ORANGE in Modern Standard Mandarin (MSM), and the possible candidates do not possess the entire set of the criteria for basicness, established by Berlin and Kay and enriched by other scholars.

1. Colour and basic colour terms

The exact nature of colours we see is the result of a complicated interaction between the physics of light, the physiology of the human eye, environmental conditions at the time of viewing, the physical properties of the object being viewed and the way in which our brains receive and interpret all this information (Biggam 2012: 2).

Although colour vocabularies of different languages vary considerably in their details, they often make use of one of more of three principal dimensions: hue, brightness, and saturation. Hue is what is called colour in non-technical English, is the chromatic element to colours, such as red, green or blue. Saturation refers to the purity of a hue, in relation to the amount of grey it is perceived to contain. Brightness is concerned with the amount of light reaching the eye, but the nature and sources of such light are varied. An object may be bright because it is pale and well-lit, or because the surface is

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1 I am very grateful to Dr. Rüdiger Breuer (Ruhr-University Bochum) for helpful comments on Chinese poetry.

2 SMALL CAPITALS indicate a semantic feature, a colour category (as opposed to a word-form).
made of a reflective material (cfr. Biggam 2012: 3-5).

How many basic colour categories does a linguistic society have at any one time? The hypothesis postulated by Berlin and Kay (1999 [1969]) suggests that a language may encode between two and eleven basic colour categories, developed in a precise chronological order (Berlin and Kay 1999 [1969]: 2-5). According to that theory, for a colour term to be basic (BCT), it should correspond to the following criteria:\textsuperscript{3}:

i. It is monolexemic; that is, its meaning is not predictable from the meaning of its parts. This criterion eliminates examples like lemon-coloured (檸檬色的 ningméngsè), reddish (帶紅色的 dàiánhóngsè).

ii. Its signification is not included in that of any other colour term. This criterion eliminates examples like crimson (艷紅 yànghóng) and scarlet (絳 jìàng), which are both hyponyms of red.

iii. Its application must not be restricted to a narrow class of objects. This criterion eliminates examples like 驪 lì black, used only for description of the horse hair (see Bogushevskaya 2016: 46 – 48).

An interesting viewpoint on contextual freedom is described by Rakhilina and Paramei (2011), and called combinability, and refers to the ability (or inability) of a colour term to combine with terms for natural phenomena and artefacts.

iv. It must be psychologically salient for informants: (1) tendency to occur at the beginning of elicited lists of colour terms, (2) stability of reference across informants and across occasions of use, (3) occurrence in the idiolects of all informants.

The doubtful cases that arise should be handled by the following subsidiary criteria:

v. The doubtful form should have the same distributional potential as the previously established colour terms. E.g., in English, allowing the suffix –ish: reddish, greenish.

vi. Colour terms that are also the name of an object characteristically having that colour are suspect, e.g., gold, silver, and ash. This subsidiary criterion would exclude orange, in English, if it were a doubtful case on the basic criteria (i-iv).

vii. Recent foreign loanwords may be suspect.

viii. In cases where lexemic status is difficult to assess, morphological complexity is given some weight as a secondary criterion. The English term blue-green might be eliminated by this criterion.

The present paper deploys different kinds of evidence to demonstrate that there is no monomorphemic/monosyllabic colour term for encoding ORANGE in Modern Standard Mandarin (MSM), and the possible candidates do not possess the entire set of the criteria

\textsuperscript{3}I am quoting the definitions suggested by Berlin and Kay (1999 [1969]: 6-7) with my remarks for Chinese.
for “basicness”.

2. Lexemes expressing ORANGE in Old and Classical Chinese

In colour science brown is defined as “orange of low brightness” (Frumkina 1984: 23). In other words, in contrast, orange can be described as “brown of high brightness”. I would also add, as “highly saturated brown”, due to the absence of grey.

The BCT for ORANGE — together with those for PINK, PURPLE, and GREY — is one of the latest; it appears on the highest evolutionary stage of basic colour lexicon development, and belongs to the so-called derived colour category, located at the intersection of two primaries, RED and YELLOW (Kay and McDaniel 1978: 631-636).

In Old and Classical Chinese orange shades were included in the RED category, and were expressed by the contextually restricted lexemes 騂 xīng and 緹 tí, applied to mammal hair or silk fabric respectively.

Reddish animals were preferred in the Western Zhōu 西周 (ca. 1046–771 BCE) rituals:

皇皇后帝、皇祖后稷。  
享以驂犧、是饗是宜。  
To the great and sovereign God,  
And to his great ancestor Hou-ji,  
He offers the victims, red and pure,  
Then enjoy, they approve (Shījīng 詩經, Ode 300.3, translated by Legge)

秋而載嘗、夏而楅衡。  
白牡騂剛、犧尊將將。  
In autumn comes the sacrifice of the season,  
But in summer the bulls for it have had their horns capped.  
They are the white bull and the red one;  
[There are] the bull-figured goblet in its dignity (Ode 300.4, translated by Legge).

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4 There is no general consensus on the periodization of Chinese language with respect not only to the number of major periods and the terminology used, but also to the demarcation points and to the major linguistic changes that took place in each period. In the present paper, the term “Old Chinese” (OC) is used in a broad sense to refer to varieties of Chinese used before the unification of China under the Qin 秦 dynasty in 221 BCE. “Classical Chinese”: the language of the texts from 3rd century BCE till the end of the 2nd century CE. “Middle Chinese” refers to the language of the so-called rhyme books, especially the Qièyùn 《切韻》 of 601 CE and the Guǎngyùn 《廣韻》 of 1008 CE. “Old Mandarin”: 12th–20th centuries, “Modern Standard Mandarin” refers to contemporary Chinese, i.e. from the 20th century onwards. The scheme sketched here should be considered no more than a working outline.
Máo’s commentary says: “red-yellow (赤黃) is called xīng (騂)” (OC form *seŋ, see Schuessler 2007: 426). Kŏng Yĭngdá (孔穎達, a scholar of the Táng Dynasty, 618–907 CE) explains: “Xīng (騂) is a pure red colour (純赤色), but slightly yellowish, this colour is also called reddish-yellow (赤黃); this colour is bright and clear”. These explanations suggest that xīng refers to the highly saturated yellow-red — therefore, to orange — colour.

緹 tí (no OC reconstruction available) Emerges relatively late. Originally a textile term, glossed by Xŭ Shèn (許慎) in the Shuōwén jìězì 說文解字 (100 CE) as “the colour that [undyed silk] cloth acquires after being immersed into scarlet (丹) and yellow (黄) dyes” (Shuōwén 25, 系部, 1859), in the Hàn 漢 texts it is often applied to fabrics:

為治齋宮河上, 張緹絳帷, 女居其中 (Shǐjì 史記, “Huájī lièzhuàn” 滑稽列傳, 23.1).

For that [purpose, they] made a dwelling for fasting, stretched orange and scarlet curtains, and lodged the woman in there.

Other examples include 緹絹 tí tuó ‘orange sack’ (Yántiělùn 盐鐵論, Section “Sānbùzú 散不足”), 緹油 tí yóu ‘orange oilcloth’ (used under the frontal horizontal bar of a chariot to protect it from dirt) (Hànshū 漢書, Section “Xúnlìzhuàn 循吏傳”), 緹騎 tí qí ‘orange cavalry’ (officials wearing orange robes, who were sent out to arrest a lawbreaker) (Dōngguān Hānjì 東觀漢記, Chapter “Féng Fáng” 馮魴).

騂 xīng and 緹 tí can be therefore regarded to as the earliest terms for ORANGE, albeit both contextually restricted. In contemporary Chinese, they are archaisms.

3. Designations of the citrus fruits in Chinese

Colour terms are not the new linguistic formations purposefully formed to label new concepts; they already existed in a language, but labelled something different. Meaning, however, often changes during a word’s evolution, including a colour term’s evolution. Furthermore, in certain cases, the contexts of referents need to be added, because they influence colour terms’ combinability.

The classic example is the term ‘purple’. In Old English, it derived from Latin purpura ‘purple’, from Greek porphura, denoting molluscs that yielded a crimson dye, also — by semantic extension — cloth dyed with this dyestuff (OED 1989: 1442).

The oldest known reference to citrus appears in the Sanskrit literature, in the Vajasaneyi Samhita, a collection of devotional texts dated prior to 800 BCE and which is

5 I am using the Baxter-Sagart (2014) phonological reconstruction of Old Chinese (OC) and Middle Chinese (MC) of October 13, 2015, available online at http://ocbaxtersagart.lsait.lsa.umich.edu/ (last accessed on November 30, 2017).
part of the Brahmin sacred book called the *White Yahir-veda* (Scora 1975: 369).

The earliest Chinese references to citrus fruits are contained in the pre-Qín 先秦 texts, such as the “Kǎogōng ji” 考工記 Section of the Zhōulí 周禮 and the “Yǔ gòng” 禹贡 Section of the Shūjīng 書經:

橘逾淮而北為枳 (Zhōulí 周禮, “Kǎogōng ji” 考工記).
Take, for instance, the sweet-fruited orange; when it is transplanted to the north of the Huai River, it turns into the bitter-fruited orange (translated by Wenren 2013: 4).

厥篚織貝，厥包橘柚，錫貢 (Shūjīng 書經, “Yǔ gòng” 禹贡).
Their bundles contained small oranges and pummeloes, rendered when specially required (translated by Legge).

The materials in these classic texts were already old by the time they were written down, thus they probably refer to conditions before the beginning of the Eastern Zhōu 東周 (700–221 BCE) period.

Oranges and pummelos were a part of the tribute presented to the court or recommended as the most valued of fruits for the kings’ table, records of these citrus species have been identified in the Western Hán 西漢 (206 BCE – 9 CE) tombs at Mǎwángduī 馬王堆 (Huang 2000: 54). In another archaeological site assigned to the same historical period and discovered in the same area, have been found the residues of *Citrus sinensis* orange-peel (Krjukov et al. 1983: 147). *Citrus sinensis*, literally “Chinese citrus”, is the contemporary scientific name of sweet orange. It is noteworthy that the designations of the orange fruit in Indo-European languages very often literally meant ‘apple from China’ (for more, see Bogushevskaya 2017).

In 1179, Hán Yánzhí 韓彥直 in his Jú Lù 橘錄 Record of Orange named and described some 27 varieties of the sweet-sour orange-mandarin group, mainly grown in the Yǒngjiā 永嘉 county (in nowadays Zhèjiāng 浙江). That was the oldest known monograph on citrus in the world.

As Needham *et al.* pointed out, “there can be no manner of doubt that the original home and habitat of these [citrus] trees was on the eastern and southern slopes of the Himalayan massif; a fact which is reflected in the presence of the maximum number of old-established varieties in the Chinese culture-area, also in the extreme antiquity of the

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6 Compiled presumably not later than the 5th century BCE (Wenren 2013: xxiv)
7 *The Classic of Documents* is a collection of speeches made by rulers and important politicians from mythical times to the middle of the Western Zhōu 西周 (1046–771 BCE) period. The “Yǔ gòng” 禹贡 (Tribute of Yu) Section, however, is agreed to be composed relatively late, dating from at least the late Warring States 戰國 (475–221 BCE) period (Yee 1994: 76).
Chinese literary references. It is also betrayed by the considerable number of single written characters denoting particular species – not only 橘 jú for orange and 柚 yóu for pummelo, but also 柑 gān for certain kinds of oranges, 橙 chéng for sweet oranges, 橙 luán for the sour orange and 榮 yuán for the citron – always a sign of ancientness in the nomenclature”8 (Needham et al. 1986: 363).

4. Semantic extension of orange-the fruit and mandarin-the-fruit

The contemporary term for the orange fruit, 橙 chéng (OC *[d]ˤrəŋ > MC dreang), is glossed in the Shuōwén as ‘a variety of 橘 jú’ (OC *[s.k]ʷi[t] > MC kjwit) (Shuōwén 11, 木部: 741). The latter, glossed as ‘a fruit from Jiāngnán 江南’ (Shuōwén 11, 木部: 741), was a generic name applicable to all oranges in general (Needham et al. 1986: 104).

Mandarin is a native Chinese fruit, which has an extremely broad genetic base (Scora 1975: 372). In 2010, Chinese scientists received the very concrete molecular evidence that both sweet orange (Cintrus sinensis) and the sour orange (Citrus aurantium) were the hybrids of mandarin and pummelo, the former being morphologically closer to the mandarin (Li et al. 2010: 346, 348). This close morphological relationship can probably be a reason why in the Shuōwén the term for orange (chéng) is described via the term for mandarin (jú).

Semantic extension from the denotation of the fruit to the denotation of the colour orange took place in relatively recent time. In 1853, Zhāng Fúxī 張福僖 translated Newton’s Opticks, which was the first translated scientific work on colour dispersion in China. The orange colour was translated as a nominal-BCT compound9 (NC) 橙黄 chénghuáng (lit. ‘orange fruit + YELLOW’), which can be translated as ‘orangey-yellow’ or ‘yellow as the orange fruit’. In other words, chéng was still not an abstract colour term:

合則為白，分則為紅，為橙黃，為正黃，為綠，為藍，為老藍，為青

When additively mixed together, [they] result in white [light]; when split, [they] result in red, orangey-yellow, pure yellow, green, [light] blue, deep

8 One winter day a man on a sidewalk of a Beijing street got irritated by my question on how much were the júzi (橘子) he was selling from his tricycle and exclaimed: “These are not júzi, these are lúgān (蘆柑)” The term lúgān is absent in Chinese-English dictionaries. BKRS translates it as “yellow citrus, type of oranges grown in Fújiàn”. Lúgān remained totally obscure to me for years, until recently I have found its translation simply as ‘Lo tangerine’ (Citrus tangerine, Lugan) in Zhao et al. (2014: 2646).

9 A nominal-BCT compound is a compound consisting of BCT preceded by the name of an object usually with a typical colour as the modifier, indicating attributes of particular-object-like-colour (see Xu 2007: 41–43).
blue, and ‘blue-lotus’.

5. The ways of encoding orange-the-colour in MSM

In MSM explanatory dictionaries, the terms for ‘orange’ chéng and ‘mandarin’ jú are glossed, first of all, as fruits, and only in the secondary entries are sometimes glossed as particular-object-like-colour terms, each of them, however, requiring a semi-suffix 色 sè ‘colour’. Thus, the orange colour is encoded by the so-called nominal-色 compounds (N-SE) (Xu 2007: 42) 橙色 chéngsè ‘orange fruit + colour’ and 橘色 júsè ‘mandarin fruit + colour’.

Lin (1972) glosses jú as ‘orange and tangerine; a fruit of either chénghuáng ‘orangey-yellow’ (Lin 1972: 122), or júhóng ‘tangerine-red’ colour” (Lin 1972: 130). Both chéng and jú also form NCs, in which they act as initial nominals / modifiers, followed by one of the two basic constituents, RED or YELLOW. Cfr: 橙红 chénghóng (lit. ‘orange fruit + RED’) ‘orangey-red’ (XDHYCD 2005: 178) and 橘黄 chénghuáng (lit. ‘orange fruit + YELLOW’) ‘orangey-yellow’ (XDHYCD 2995: 178), 橘红 júhóng (lit. ‘mandarin fruit + RED’) (Cíhǎi 1994: 1559; GJHYCD 2004: 764; XDHYCD 2005: 737) ‘mandarin-red’ and 橘黄 júhuáng (lit. ‘mandarin fruit + YELLOW’) ‘mandarin-yellow’ (GJHYCD 2004: 764; XDHYCD 2005: 737).

There is no consensus on naming ORANGE among Chinese linguists either: some are in favour of the monosyllabic term chéng (see Lü 1997; Shí 1990; Yáo 1988; Yè 2001), while others deny the possibility of its independent usage and instead prefer the compounds júhuáng ‘mandarin fruit + YELLOW’ (see Lí 2007; Wǔ 1999) or júhóng ‘mandarin fruit + RED’ (Xú 2003).

6. Psycholinguistic and cultural evidence

As it was already mentions a few lines above, the intermediary area between RED and YELLOW can be encoded by NCs (chénghóng, chénghuáng, júhóng, júhuáng) or N-SE compounds (chénghóng or júsè).

The results of the psycholinguistic data collected by Xu (2007), suggest that, since a part of júhóng’s (‘mandarin fruit + RED’) foci overlaps the cluster of foci for ORANGE in Berlin and Kay’s universal system, júhóng might be interpreted as ‘reddish orange’ (Xu 2007: 82 – 83).

Chénghuáng (‘orange fruit + YELLOW’) and júhuáng (‘mandarin fruit + YELLOW’) are virtually identical in semantic structure. Despite the fact that mandarin and orange are very similar in colour appearance, jú ‘mandarin’ appears to be preferred over chéng ‘orange’ as initial nominal in the NCs designating intermediary hues between YELLOW and RED. The term júhóng (‘mandarin fruit + RED’) was unknown to 1% of the
participants\(^{10}\) of the comprehension test of the psycholinguistic experiment (Xu 2007: 83), whereas the term *chénghuáng* (‘orange fruit + YELLOW’) revealed to be unknown to 4% of the informants (Xu 2007: 89).

*Chéngsè* ‘orange fruit + colour’ appears to be an off-shade of YELLOW, because approximately half of it overlaps with the peripheral YELLOWS, while the other half fills the no-man’s land between the extent of YELLOW and RED (Xu 2007: 105 – 106).

*Júsè* ‘mandarin fruit + colour’ overlaps heavily with YELLOW, and thus could be considered an off-shade of YELLOW. Despite that *júsè* is distributed similarly to *chéngsè* in outcome Xu’s data (Xu 2007: 107 – 108), it should be noted that *júsè* is the N-SE compound that occurred only in the Naming Test (i.e., was elicited from the informants by showing them colour chips in randomly arranged order), whereas *chéngsè* appeared to be unknown to 1% of the participants.

According to Xu (2007: 88), since nowadays mandarin is one of the most common fruits in fruit stores all over China, whereas oranges are relatively rare and more expensive, this difference seems to be reflected in people’s use of colour vocabulary.

Instead, I am convinced that the preference of the mandarin-object-like-colour term is preferred over the orange-object-like colour term is conditioned by the cultural tradition, mnemonic imposed, and the education level of a speaker.

*Chéng* is often named among the seven rainbow colours by educated native speakers (or, at least, by those from the mainland). The mnemonic “赤橙黄緑青癔紫” *chì chéng huáng lǜ qīng lán zǐ* “Red, orange, yellow, green, blue, indigo, violet” — a loose analogue of the English “Richard-of-York-gave-battle-in-vain”\(^{12}\) that elicits the Newtonian rainbow sequence, — is taught at school, and derives from the line of *cí* 詞 poem “Dàbódì” 大柏地 by Máo Zédōng 毛澤東, written in the pattern of Púsà mán 菩薩蛮:

赤橙黄緑青癔紫，
誰持彩練當空舞? (Máo Zédōng 毛澤東“Dàbódì” 大柏地, quoted from

\(^{10}\) Seventy-nine adult native Chinese speakers with normal colour vision, the age range ran from 17 to 50, with an average of 33 at the time of investigation. The average schooling year was 16, with the lowest 10 years and highest 21 (Xu 2007: 28).

\(^{11}\) 青 *qīng* should be translated as *grue* (a construct out of the English terms for *GREEN* and *BLUE*), since it denotes the extended green-blue colour category, and in some cases can also denotes *MACRO-BLACK*. It is not a BCT in MSM, there are separate *psychologically salient* terms for *GREEN*, *BLUE* and *BLACK*. *Qīng*, however, has not faded away, but still remains in use (more on this, see Bogushevskaya 2015).

\(^{12}\) Or the Russian mnemonic *každyj* (‘red’), *oxotnik* (‘orange’), *želaet* (‘yellow’), *znat* (‘green’), *gde* (goluboj, ’light blue’), *sidit* (sinij, ‘blue’), *fazan* (‘purple’) “Each hunter wants to know where is a pheasant”.

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Red, orange, yellow, green, blue, indigo, violet,
Who is dancing, holding these coloured ribbons high above in the sky?

The informants of Xu’s psycholinguistic experiment were well-educated people,
with the average schooling year of 16 (see note 10 of this paper), and it is noteworthy that even to some of them the terms chéngsè and chénghuáng are unknown. According to my observations during my over a decade-long residing in Beijing, people with a relatively low education level, as, e.g., clothes’ vendors on a street market, would rather use the NCs that contain jú as the modifier, and would therefore name ORANGE either as júhóng or as júhuáng, depending on whether the hue in question tends more towards RED or more towards YELLOW. From the point of cultural tradition, jú is more familiar than chéng to an ordinary Chinese speaker.

7. The degree of basicness of the term for orange in MSM

The semantic word can be understood as the smallest meaningful unit in language, that is, the semantic word can be equated with “morpheme”. Since Chinese morphemes tend to correspond to one syllable, Chinese is essentially a monosyllabic language (Vermaas 2017: 434).

This leads to the following necessary modification of Berlin and Kay’s first (i) criterion regarding the assessment of a potential basic colour term (BCT): applied to Chinese, a term must be monomorphemic and moreover monosyllabic – rather than just monolexemic – since almost every syllable is a morpheme in Chinese. Therefore, chéngsè and júsè, both containing a semi-suffix sè ‘colour’, do not comply with this criterion.

Regarding the significations of chéng and jú, they are both included into the YELLOW colour category (Li 2007: 140 – 141).

As for the distributional potential of these lexemes, chéng and jú:

a) do not form resultatives with the semi-auxiliary verbs that convey visual colour-related effects, such as 發 fā ‘to show, to become visible’ or 變 biàn ‘change into, become’ (cfr. 發白 fā bái ‘turn (become; grow) white’; ‘turn pale (whitish)’ (BKRS); 變黃 biàn huáng ‘to become yellow’ (BKRS));
b) do not combine with the qualitative adverb very and its synonyms (e.g., 很 hěn ‘very, quite, much’, 非常 féicháng ‘very, extremely’);
c) do not demonstrate reduplication par excellence (cfr. 髹髹 ái’ái ‘pure white, white as snow’ (BKRS)), but chéng can be doubled in the final position in the trysyllabics 紅橙橙 hóngchéngchéng ‘reddish orange’ and 黃橙橙 huángchéngchéng ‘yellowish orange’ (Liú 1990: 243 – 244);
d) can not be modified by the 的 de marker, do not accept the 了–le particle (cfr.

13 Chromatic adjectives, when combined with the adverb very, vary in their degree of gradation (saturated or not), and therefore their quality, not quantity (more on this, see Bernez 2016).
The orange colour has not yet evolved from the fruit; the colour sense has not become abstract, but is still inseparable from a concrete object in the mind of a native speaker. It is nevertheless psychologically salient, because it can be expressed through the denotation of the citrus fruit (either orange or mandarin). The possible candidate lexemes have not become adjectives and/or verbs and always require the constituent sè ‘colour’.

8. Conclusion

The orange portion of the spectrum had been thoroughly differentiated in Chinese cultural tradition. In Old and Classical Chinese orange shades were expressed by the contextually restricted terms xīng and tí.

Despite the fact that China is a homeland of various citrus species, and that sweet orange Citrus sinensis in many languages is referred to as the ‘apple from China’, in MSM there is no BCT for ORANGE. The orange colour sense is still inseparable from a concrete object in the mind of a contemporary native Chinese speaker. There is also no consensus among Chinese linguists on naming ORANGE in MSM. Modern explanatory dictionaries gloss ORANGE as Nominal-BCT Compounds (NC). When used for object description, chéng and jú always require the constituent sè ‘colour’, forming Nominal-sè Compounds (N-SE).

Thus, the orange colour sense has not become abstract in MSM yet, but is psychologically salient and can therefore be defined as starting to become a BCT, though it still does not possess the entire set of the criteria for basicness.

REFERENCES


**Bogushevskaya**: MSM lacks a BCT for ORANGE.


