The Linguistic History of Some Indian Domestic Plants

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THE LINGUISTIC HISTORY OF SOME INDIAN DOMESTIC PLANTS

From the mist of times emerge our earliest Indian texts, the Rgveda (c. 1300 -1000 BCE), composed in the Northwest of the subcontinent, and the Sangam texts (c. 2nd cent. BCE - early CE), composed in the extreme South. They contain valuable materials in archaic Indo-Aryan (Vedic Sanskrit) and in archaic Old Tamil respectively. The former belongs, along with Old Iranian (Avestan of Zarathustra), to the ancient Indo-Iranian subfamily of Indo-European that stretches from Iceland to Assam and Sri Lanka. The latter belongs to the Dravidian family that is restricted to the subcontinent but may have relatives in Northern Asia (Uralic) and beyond.

As for the plant names found in these old sources, it must be observed that recent advances in archaeobotany indicate at least three major nuclei of food production in the subcontinent. They can be briefly characterized as follows.

In the west of the subcontinent, the food producing package was derived from that of the Middle East: winter wheat, goat/sheep, with the Indian addition of the Zebu and water buffalo. Wheat even has a Near Eastern name and it is not the result of local domestication as was sometimes thought; instead it took some 2000 years in the western border regions of Pakistan and Afghanistan before it was acclimatized to Indian climatic conditions.

Second, there was a Lower Gangetic agricultural center with rice and water buffalo (c. 2500 BCE). Agriculture was first established only around 3000 BCE, in spite of what is now sometimes claimed by some local archaeologists. Indian rice (vrīhi, Oryza indica) is a hybrid of northern Indian wild rice, O. nivāra, and the southern Chinese domesticated variety, O. japonica (as recent genetic research has indicated).

Third, there is a somewhat later upper South Indian center with intensive cattle herding and growing of millets, including an African variety. Around 1800 BCE, it spread southward and also northward into Malwa.

Fourth, there may have been additional indigenous centers of food production,
one in the east (Orissa/Jharkhand), and one in the west (W. Gujarat, S. Rajasthan).  

Both the earliest Indo-Aryan (often still, but erroneously called “Aryan”) \(^9\) and Old Tamil texts contain names of trees, plants and agricultural products that shed considerable light on the early history of plants in the subcontinent – and of the people who used them. In addition, the testimony of later texts and languages, down to those still contained, but hidden in modern ones will be used.

In this investigation, only some of the most important plant terms can be dealt with, especially those for barley, oats, millet, wheat, and rice, -- some of which have diverse, sometimes surprising origins in all the major 5 linguistic families of the subcontinent – and well beyond.

The largest of them, Indo-European, is represented in the subcontinent by the great Indo-Iranian subfamily that includes Iranian, Nuristani (Kafiri in northeast Afghanistan) and Indo-Aryan («Aryan»). East of Nuristani, there is the IA subfamily of Dardic which exhibits most of the developments seen in the rest of the Indo-Aryan languages. Dardic includes the languages spoken from the borders of Afghanistan to the eastern, Kisthwar dialect of Kashmiri, among others: Kalasha, Khowar, Shina, Kohistani, and Kashmiri.

Dravidian covers all of the south and some parts of Central India as well as the North Dravidian outliers Brahui in Baluchistan, Kurukh in N. Madhya Pradesh, and Malto in S.E. Bihar. The latter three have moved out of Central India into their current homelands only around 1000 CE. \(^{10}\)

Besides the Indo-European and Dravidian families, there also is the Austroasiatic one, represented in India by the Munda languages \(^{11}\) of central and eastern India, by Khasi in the hills of Meghalaya and by Nicobarese. Another family is Tibeto-Burmese, spoken all over the northern sections of the Himalayan belt including Arunachal Pradesh and in the eastern states of Nagaland, Assam, Meghalaya, Manipur, Mizoram and Tripura. A fifth family is represented by Burushaski, \(^{12}\) a remnant language in Hunza (northernmost Pakistan), and finally there is Andamanese. To this, we can add substantial evidence for remnants of lost families (see below).

As for Indo-Aryan, the diverse origin of names for agricultural plants is not really surprising because of the predominantly pastoral interests of the early speakers of Vedic. Different from the frequently met with IE/IA terms for cattle, milk, horse, etc., agricultural ones such as ‘barley’, ‘ploughing’, etc. are significantly less frequent. Consequently, the multitude of Indo-Aryan words for plants that have come down to us stem from the other language families present then and especially so, from the now lost substrate languages. Linguistic investigation indicates that they covered large stretches of the subcontinent. \(^{13}\)

Such local (substrate) words can be isolated from Indo-Aryan fairly easily by linguistic observations. They have unusual sounds and word structure, and there usually is a lack of a convincing Indo-European etymology tracing back the word to cognates in other IE

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\(^{8}\) Fuller 2006, 2009.

\(^{9}\) The ancient Iranians (like King Darius, 519 BCE) also called themselves ariya/a’riia.

\(^{10}\) Elfenbein 1987.

\(^{11}\) See now the comprehensive volume edited by G. Anderson, 2008.

\(^{12}\) See Berger 1998.

languages. For example, in Vedic Sanskrit a word like busa ‘drizzle, chaff’ is actually not allowed: it should have been busā with a retroflex ś (as in Kṛṣṇa or bhāṣā). Indeed, the word is found in the non-IE Burushaski language as busa (and in neighboring Iranian languages).

Many such words stick out immediately like the proverbial sore thumb, just as words with initial ng-, nk- or mf- would do in English (Nkrumah, Zulu nkosi ‘god’, Mfume – now an American surname). The same applies to word structure. A ṛgvedic name like Balbūtha cannot be parsed according to Vedic or Indo-European rules: there is no IE/IA root word balb- and no suffix –ūtha. The word goes back to an unknown, lost language of the Greater Panjab, about which more below. Unfortunately, scholarship has not advanced that far in the analysis of Proto-Dravidian, and even less so in Munda, etc. Now, as for the names of these domestic plants and agricultural terms, some important aspects of their early history in the subcontinent can be gleaned from the oldest, strictly transmitted oral texts, the Vedas (c. 1300-1000 BCE) down to the records of early historical times. Many of the agricultural terms found in the Vedas have survived until today, like yava ‘barley’ as Hindi jau.

As for Indo-Aryan, the early evidence can be counterchecked and expanded by attestations in medieval (MIA) and modern (NIA) Indian languages. This is especially useful when studying words that have been ignored in the religious and ritualistic Vedas but that are available in Middle or New Indo-Aryan languages, such as the Buddhist Pāli texts, the various Prākṛts or modern languages like Hindi, etc., as compiled in R.L. Turner’s Comparative Dictionary of Indo-Aryan languages (CDIAL). For example, the old agricultural word for ‘flour’ turns up only in some of the modern Indo-Aryan languages, such as āṭā ‘flour’ in Hindi, etc. It goes back to the non-attested Vedic Sanskrit *ārta ‘flour’, CDIAK 1338, from rt ‘to grind.’

The current investigation also includes the detailed study of agricultural terms (and their sources) in Hindi by C. Masica and its use by D. Fuller, whose discussion fortunately includes their respective area of origin. For IA, we have the etymological dictionary of Sanskrit by Mayrhofer and Turner's CDIAL. For Dravidian there is the etymological dictionary by Burrow and Emeneau – actually just an extensive list of

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14 In the sequel, I frequently neglect (except in direct quotations) the Vedic pitch accents as they are of no consequence for loan words, thus busa instead of busā (cf. Kuiper 1991).

15 And, as loans in E. Iranian: Sariqoli bus and Waxi bīs, cf. also Munda: Santali busu'b, see Pinnow 1959: 93 § 120; cf. EWA II 229 sq.: for a possible Munda origin (cf. Sadani bhusā) see Osada, IIJ 38, 1995.


17 Texts before the first historical documents (Aṣokas inscriptions, c. 250 BCE), include the Buddhist canon in Pāli collected c. 250 CE under Aṣoka, Panini’s grammar and early commentaries of it (c. 350-150 BCE), the Indian epics (Mahābhārata, Rāmāyaṇa (c. 100 BCE), and a few texts such as the early parts of Kauṭilya’s Arthaśāstra.


19 Masica1979.

20 Fuller 2006, appendix.


related words— and the recent reconstruction of Proto-Dravidian by Bh. Krishnamurti.24 The situation is much worse for Munda,25 Burushaski,26 and Tibeto-Burmese.27

One constant problem to be taken into account in the following discussion is that (a) the exact botanical identification of certain plants (especially of the various sorts of millet/sorghum) are not always reliable and (b) that an older designation of a cereal plant may be used for a newly introduced one, as is especially frequent with millets, but which also occurs across species boundaries such as between barley and rice.

To indicate how people felt around 1000-500 BCE, we luckily have some Middle Vedic texts, composed in North India, which name seven or ten important domestic plants (saptā grāmyā āushedayah). The 7 plants are: rice, barley, sesame, mung beans, millets, wheat, lentil, other beans, and the pulse Dolichos biflorus; and the 10 are: vṛīhi rice, Oryza sativa; vāva barley, Hordeum vulgare; tīla sesame, Sesamum indicum; māśa mung beans, Phaseolus mungo; āṇu millet, Panicum miliaceum; priyāṅgu millet, Setaria italica (L.), Panicum italicum; godhūna wheat, Triticum aestivum/sativum; masūra lentil, Lens culinaris; khālava beans, Phaseolus radiatus, a variety of Phaseolus mungo = māśa(?); khalā-kula Dolichos biflorus L.29 These Vedic lists begin with the food most favorable to the gods (and humans), rice and barley.

Below, in the appendix, plants and their names are ordered according to their geographical origin, their first attestation in texts as well as the place of the texts' composition, so that a fairly detailed picture emerges for the ultimate 'origin' and the first textual attestation in time30 and space31 of Indian plants.

Likewise, in this paper, these data are presented in roughly historical and geographical order, starting in the northwest and west of the subcontinent with our oldest testimony.

§ 1 The Northwest: Rgveda and Other Vedic Texts

In this section our earliest texts are used: the Rgveda in archaic Vedic Sanskrit, and also the closely related Old Iranian Avesta of the Zoroastrians, as well as the languages that have descended from Old Iranian, Old Indo-Aryan and from Nuristani, such as modern Persian, Pashto, Hindi, etc.

A study of the names for domesticated plants indicates that the Rgveda contains just a few words that can be traced back to Indo-Iranian and Indo-European, and that most of the others are of local origin. This is not surprising for a mainly pastoral people such as the Indo-Iranians and Vedic Indo-Aryans.

The small number of inherited Indo-European terms rapidly diminished as the Indo-Aryans and pre-Iranians moved further away from their common home in northern and later in southern Central Asia as well as in the Hindukush area. However, copious residues of Indo-European terms are still found today in the Hindukush-Pamir area, that is in the local Iranian, Nuristani or the northwestern Indo-Aryan Dardic languages.

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27 Benedict 1972.
28 Taśtriya Samhitā 5.2.5.5, Śatapatha Brāhmaṇa 14.9.3.22.
31 See Witzel 1987.
(Kashmiri, Khowar, Kalasha, etc.). Such terms rapidly and increasingly diminish in number, and finally disappear, in the other Indo-Aryan languages of the subcontinent, beginning with the Panjab.

This, incidentally, is a clear indication that both the names as well as the population that spoke early Vedic came from the northwest – Afghanistan and beyond.\textsuperscript{32}

We begin, thus with the IE-derived names of domesticated cereal plants. As indicated, one has to be constantly aware of the frequent shift in meaning from older designations for cereal plants to more recently introduced (or to those that have gained greater importance, such as from ‘grain’ > ‘rice’, or the typical shift in meaning seen in British English \textit{corn} ‘wheat’ > American English ‘maize.’

\section*{§ 1.1. GRAIN, CORN}

Old Indo-Aryan (OIA) has two general words for ‘grain, cereals, corn’.\textsuperscript{33}

\subsection*{1.1.1. OIA dhānā ‘corn, grain’ is derived from Proto-Indo-Europena (PIE) *dʰohnāh₂ ‘corn’. It is still found in the Indo-Aryan (Dardic) language Khowar dān ‘parched grain’ and in various Iranian languages.\textsuperscript{34} The word and its derivatives are found in virtually all IA languages, if arranged as per R.L. Turner’s\textsuperscript{35} usual order of presentation, from west to northwest, Himalayas, then back west along the Gangetic plains, and finally south to Gujarat, Maharashtra, Goa and Sri Lanka (\textit{CDIAL 6777}):

\begin{itemize}
\end{itemize}

In other words, the term is found all over the general IA area except, inexplicably, in the some of the Northwest (Dardic), which may be a feature of lack of collections in the dictionaries or these smaller tongues.

\subsection*{1.1.2. Another word for grain is: PIE *sʰsya, *sʰsyóm ‘corn’ > OI sasyám ‘grain to be harvested, seeds’, sasá- m. ‘food, herb, grass, seeds’.\textsuperscript{36} (\textit{CDIAL 13294}),\textsuperscript{37} found also in

\footnotesize\textsuperscript{32} The opposite, a spread of these terms out of India, falls prey not just to Occam’s razor: why did only these early, PIE terms survive, and why only outside India? For this pseudo-problem, note the well established linguistic data and conclusions, in: Hock 1999, Witzel 2001, 2005. Such data are habitually disregarded and overlooked, for example by B.B. Lal (2001-2) who neglects the most typical IE tree \textit{bhūra}, the birch tree (found only in highland Kashmir above 7000 feet) that has a typical IE name ‘the white one’. The climatic conditions make it impossible for the word to have been exported form the plains of northern India -- unless one goes back to the glacial maximum of the last Ice Age, much too early for any IE language. -- In addition to the birch, the IE word for ‘oak’ may be contained in \textit{parkati} > ‘\textit{ficus infectiora}', (\textit{EWA II 194 s.v. plaksa}), and that for ‘willow’ in \textit{vetasa} > ‘\textit{Calamus rotang}’ (\textit{EWA II 578}), if so, then both with change of meaning in the Indian climatic context. As in some cases of crop names (see below), more such IE tree names are retained in E. Iranian and Dardic in the Northwest.

\footnotesize\textsuperscript{33} Many of the following IE details are taken from Wiczak 2003.

\footnotesize\textsuperscript{34} Such as Avestan \textit{dānā}-karś(a)- ‘carrying grains’, Khotanese \textit{dāna-} ‘grain, corn’, Sogdian \textit{do’n} ‘grain of cereal’ and note Ir. *\textit{dānā-} in the Pamir languages; further attested in a number of other IE languages: Hittite, Luwian, Lithuanian, Latvian; cf. Semitic *\textit{duhn-u} ‘\textit{Sorghum vulgare}’ and Dravidian *\textit{tin-ay} ‘Italian millet.’ Cf. below § 5.1.4.

\footnotesize\textsuperscript{35} See Turner, \textit{CDIAL 6777 dhānā} ‘corn, grain (esp. parched grain)’ for details about the various NIA languages including cf. various derived forms: \textit{P. dhānā} ‘parched grain’; H. \textit{gur–dhānī} ‘parched wheat and molasses’, etc. and \textit{CDIAL 6778 dhānū} ‘pertaining to grain’.

\footnotesize\textsuperscript{36} Avestan \textit{hahiua, hahhus}; further Hittite, Celtic > Provençal, Catalanian, Spanish; Gaulish, Welsh,
1.1.3. Perhaps related is PIE *sīṇ-, *sīy-, ‘corn’ > OI sī(h)īyam n. ‘corn’ (lex.), ‘ploughed’ in Pāṇini; Khowar siri ‘barley’, Kalasha sīlī ‘millet.’

38 However, the root *sā, ‘to sow’ as seen in Skt. sīā, sīrā, etc., is not from IE but stems from a Central Asian substrate and thus is not related to IE *seh₁ ‘to sow’: *sēh₁.m, ‘grain’ as in Latin sēmen ‘seed.’

1.1.4. Importantly, the following old IE words for ‘grain’ are no longer found in IA, but have been retained only in the western/northern arc surrounding the Greater Panjab: *h₂-ad- ‘grain’: Avestan āōu- ‘grain’, Sogdian ‘d’wk [āduk] ‘corn, grain, cereals,’ and, equally so, PIE *grh₁om ‘grain’ > ‘corn’, the origin of English ‘grain.’

§ 1.2. BARLEY

The most typical IE food grain was barley. It ultimately stems, along with wheat, from the Fertile Crescent. Its IE term yēwh₁os may originally just have meant “The Grass” as it is derived from the verbal root *yewh₁ ‘to graze.’ It is also the most widely spread Indo-Aryan term for cereals. In the Veda, originally it was the most common food for humans and gods, later added to by rice. Barley, just like wheat (below), originally stem from the Near East.

PIE yēwh₁os, -om ‘barley, corn’ > OIA yāva- m. ‘barley’; in Iranian: Avestan yauua- ‘grains’, yauua–ha- ‘pasture’; Ossetic yāw ‘millet.’ In the subcontinent, barley is found from Nuristani and Dardic in the northwest all the way south to Sinhala (CDIAL 10431): RV, Pāli, Prakrit; Gypsy - Dardic (Kalasha, Shina, etc.) – Sindhi - Lahnda-Panjabi - W. Pahari - Kumaoni - Nepali - Assamese – Bengali - Bihari - Maithili - Hindi - O. Marwari - Gujarati - Marathi - Sinhal; in some cases the meaning of the word has changed as to include more recently prominent cereal plants.

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37 sasā ‘grain, food’ RV. Or. sasa ‘kernel, nutritious part’; A. xah ‘crops’. – The derivative 13295 sasyā ‘grain, fruit’ AV., is found in K. sas ‘beans or peas or lentils, etc. porridge’ B. sā ‘grain, fruit, fleshy part of fruit’, Or. sāsā ‘kernel, nutritious part’; Old Si. hasas ‘crop’, Si. sas, has, as ‘corn crop’.

38 Also found in Greek and its dialects Mycenaean, Delphian.

39 And in Old Saxon sāmo, Old High German samo ‘Same,’ as well as in Old Prussian, Lithuanian, Old Church Slavonic. – However note also the similar Munda terms sī, see § 4.1.

40 Armenian, Lycian, Gothic, Tocharian. -- *h₂-adhor ‘Triticum dicoccum’; -- Hittite, Armenian < *h₂-ad ‘grain’.

41 In Pashto ẁst ‘grain’; further in Albanian, Latin, Old Irish, Welsh, Gothic, Old English corn, Old High German, Old Norse, Lithuanian Latvian, Old Prussian, Old Church Slavonic, Russian, etc.

42 Further in Hittite, Greek zeai found pronounced [zēa(í)/tēai] Triticum monococcum, Cretan; Old Irish, Lithuanian jāvas ‘Getreideart’, pl. javai ‘Getreide’; Russian, Tocharian B < *yewh₁om.

43 For details see CDIAL 10431 yāva ‘barley,’ attested from the RV onward. Changes in meaning are seen in European Gy., (eng. germ.) ‘oats’, Nuristani: Kāṃviri ordova ‘corn (maize).’ Derivations (with modern reflexes) are the Late Vedic 10072 yāva ‘consisting of or prepared from barley’ Kātyāśī, with reflexes in Sindhi and Nepali: the Late Vedic yāvakā- ‘a particular dish of barley’ Gaut.; the early post-Vedic 10439 yavāṅ ‘a kind of barley’ Pāṇī. com., ‘Prychotis ajowan’ Suśr. and the Vedic 10438 yavāgā ‘rice-gruel!’ TS. -- Further related is the post-Vedic CDIAL 10434 yavanāda ‘Andropogon bicolor’ Suśr., found from Lahnda jōdīl ‘oats, a weed like oats’ to N. junyālo, junelo ‘big millet’, H. jūnhār etc. ‘millet’ and M. jōdhā ‘the grain Holcus sorghum,’ cf. finally 10437 yavākāra ‘barley-shaped’ and derivatives, with meanings ranging from jowār, millet, to sorghum.
The other PIE designations for barley are only preserved in the mountainous arc northwest of the Greater Panjab.

1.2.2. PIE *(h)₁álh₁i ‘barley’ > Iranian *arbusā > Khotanese rrusā, Wakhi arbusi ‘Hordeum’, Pashto ārbūše ‘barley’; further, found in Greel and Albanian; all derived from < PIE *álh₁os ‘white’.

1.2.3 PIE *b₁ars- ‘barley’ > Iranian: Ossetic Dīgor bor (xwar) ‘millet’; Yazgulam vraxt ‘flour’ < *bršța.

1.2.4 PIE *g₁hér意义₁d₁- or *g₁hıntı₁- ‘barley’ > Iranian: Middle Persian jurtāk, zurtāk ‘corn’, Persian zurt, zurd ‘a kind of millet’, dial. jurdā ‘corn’.

1.2.5. PIE *kaskos ‘barley’ > Iranian *kaska- > Khotanese caska- ‘corn’, Munjan kosk ‘Hordeum’, Šughni čūśč, Rušāni čošč ‘barley’ etc., Persian kašk, Armenian. Note the unrelated Nuristani words (CDIAL 3112) Kāti kāča ‘millet’, Waig, kāč ‘millet’ (see § 2.4.6).

§ 1.3. RYE

Rye is a less respected cereal where people have other choices and then prefer wheat. Such was also the case in the Panjab and consequently the old IE word for ‘rye’ has survived only in the Iranian speaking areas of S. Asia: PIE *rug₁is, *rug₁yos ‘rye’ > Old Iranian *rug₁ika- > E. Iran. Šughni rož ‘ear of rye or rice’, Wanetsi rożyj ‘ear of corn’.

PIE *rug₁is is, of course, the origin of English ‘rye’.

§ 1.4. OATS

Oats, too, usually is a low-esteem cereal, also used for fodder. Two IE words may have perhaps survived in Vedic Sanskrit.

1.4.1 PIE *k’op[r] ‘oats’ > OIA šāpa- m. ‘driftwood, drifted reeds’; Iranian: Alan zabar ‘Avena,’ Šughni sip(i)yak ‘a kind of millet’, as in English dial. and haver, German Hafer.

barley, or even ‘soft grass of high altitude’ (Pahari). Prehistorically related is 10436 yāvasa- ‘grass’ RV and its derivatives.

44 Further in Greek, Albanian, Latin, Oscan/Umbrian, Old Irish, Old Norse, Old English bere ‘barley’, Old Church Slavonic, Russian; Old Irish, Welsh, Cornish, Breton, Latin: -- cf. Semitic *bur-/*barr- ‘grain, wheat’ as source or as loan from IE.

45 Also in Greek, Mycenaean, Albanian, Latin hordeum, Germanic *gerstō, Old High German, Dutch.

46 Or in Iranian < *krša-ka-; further Albanian, Tocharian B.

47 In Germanic: Old Norse, Old English ryge, Old Frisian, Old Saxon, Old High German; further: Lithuanian, Old Prussian, Old Russian; - cf. Afroasiatic: Egyptian rdd ‘cereals’, Hausa roogo; and East Caucasian *roččV ‘a kind of cereal (oats, rye). From Iranian stems Uralic words in Mordvinian, Komi, Udmurt.

48 From O. Iranian *sāpar-ku-; Persian sabz ‘vegetable; grass’, Pamir language: Rošāni sabēc ‘pod of bean’; -- further in Hittite, Greek, Middle Irish, Welsh, Cornish, Middle Breton, Breton, Old Norse, English dial. haver, Old Saxon, Old High German, Lithuanian šapas ‘stalk, branchlet, splinter.’ Cf. EWA II 629, CDIAL 12387.
1.4.2. PIE *pūrós, -ōm ‘Triticum compactum’ > Ol pūra- m. ‘cake’ CDIAL 833.49

1.4.3. The neighboring Iranian languages still have another variety: PIE *h₂(ə)wig-i/-s² ‘oats’ > Iranian *avi[ə]-sa- > Khotanese hau ‘oats’, Yazgulami wis ‘Avena.’50

§ 1.5. MILLET

There are many varieties of millet and sorghum. It is now clear that the IE speaking people already grew a variety of millet, perhaps broomcorn millet.51 (Other types of millet originated in India, China, and Africa, see § 2.4.)

However the IE words for millet are only found in the Dardic NIA languages in the northwest of the subcontinent (and in Nuristani). They have been lost in the Greater Panjab, where they have been substituted by local (substrate) words.

1.5.1. PIE *h₂árgw³ : *h₂órgweno- ‘millet’ > Nuristani *arjana- > Aṣkun az.ü, Kati awrī ‘millet’; Dardic: Paṣai arfīn, Kalaṣa arfīn, etc. ‘millet’.52

1.5.2. PIE *melH-i, ʼn-ēs ‘Italian millet’ > Dardic: Khowar blan ‘barley.’53

1.5.3. PIE *k’ers- ‘millet’ is found only in other IE languages,54 however, comparable are: Nuristani (Kāṁviri) kāṟī ‘millet’ and Dardic designations of ‘millet’: Kalaṣa karas, Khowar khrās, Phalura kāraž, Dameli kārač.55

Another PIE word for ‘millet’ is found only in the Iranian and Nuristani languages surrounding the Greater Panjab in the northwest.

1.5.4. PIE *swahǥrah₂ ‘common millet’ > Iranian hwārā > Alan hvar ‘millet’, Ossetic Digor xwar ‘corn, grain, millet’, Iron xor ‘corn, barley Hordeum vulgare’, Sogdian γwar-

49 CDIAL 8331 pūra ‘cake’ Rāmāyaṇa, pūrikā ‘cake’ MBh, found from Kashmiri pūru ‘a kind of cake fried in ghee’ to Marathi purī. In IE it is seen in Greek, Germanic (Old English, English fiurze ‘Triticum repens’), Lithuanian, Old Prussian, Church Slavonic, Slovenian, Czech, Russian. Cf. the non-IE Kartvelian (Georgian) p’uri ‘wheat, wheat, corn’ which maybe loaned from Greek.

50 Also in Greek, Latin, Lithuanian, Latvian, Old Prussian, Slavic: Russian, etc.

51 See Fuller 2009: 3.

52 O. Iranian *arzana- > Persian arzan, etc. and East Iranian: Pashto Ḿdan, Yidgha yźrzon, Wakhī yźrzn, Khotanese ęsyā, ęysam ‘millet, Panicum miliaceum’; also in Greek, Old Irish. See CDIAL 636 *arjana- ‘millet’, but cf. CDIAL 95 *aŋuna- ‘millet’, ānu- in Nuristani ārīn etc. ‘millet’, and in Dardic: Kalaṣa arīn, etc.; see below ānu § 2.4.


54 Hititite karas- ‘wheat Triticum dicoccum or Triticum durum’; -- Italic: Oscan, Sabine, Latin Ceres ‘goddess of fertility’, Germanic: Old High German, German Hirse, Old Saxon.

55 Note also the similar, but not connected, CDIAL 3112 kāṣa ‘a grass used for mats, Saccharum spontaneum,’ with meanings in Nuristani and IA from ‘(foxtail) millet’, ‘S. spontaneum’, to ‘a species of grass or reed’ and Gujarati kāṣ ‘a kind of white grass’. Turner CDIAL regards the connection of Dardic kāraž, kāraž ‘millet’ as not clear.

§ 1.6. WHEAT

Wheat was the staple of the Indus Civilization (2600-1900 BCE), however, it is not attested in the RV but only in post-Rgvedic texts, and even then it remains just another cereal, listed way behind barley and the newly adopted rice (see above).

Curiously, it is not an IE or Ilr word but an old Near Eastern loan word that has traveled east along with the plant, which was domesticated, like barley, in the Fertile Crescent in Neolithic times. It was first grown in the western piedmont areas of the subcontinent that had perennial rivers and primitive irrigation canals before it spread to the Indus plains. (There are remnants of another, equally ancient designations for wheat/grain in Burushaski.)

It is notable that the cultivation of wheat was arrested in the area west of the Indus for several thousand years, and that it spread further east and south only after extensive acclimatization around 2200 BCE.

OA gədʰūma- (with a popular etymology meaning ‘cow smoke’!) is an ultimately Near Eastern name. This is seen as a loan in Hittite kand, O. Egypt. xnd; Afroasiatic *ḥañt- ‘a kind of cereal’ > Akkadian ʾuṭṭatu, Hebr. ʾḥittā, Arab. ḥintar.-; cf. also North Caucasian *henkʷ-/ṣontkʷ- ‘barley,’ and a supposed ‘Anatolian’ *ṭʰan[t]ul, comparable with Drav. (Kanada) *gəṭṭi. A further development, east of the Fertile Crescent, was Iranian *gant-un.

The tracks of both loan words differ: the form *gant-un entered via the northern Iranian trade route (Media-Turkmenistan-Margiana/Bactria-Sistan) (while pre-Drav. gəṭṭi

56 Or PIE *sweer- > Iran. *x’ar- ‘to nourish’; -- Albanian, Lithuanian, Latvian, Tocharian AB; further in Iranian and Baltic: Avestan x’arna- ‘food’ > Slavic, Lithuanian; cf. also Semitic *šū’ār-(at-) ‘barley’ (lit. ‘hairy’), Uralic *sōra.

57 However, this is derived from IA lāvā ‘reaping.’ -- Finally, cf. Nur. tāj ‘in sorghum ~ tāji ‘maize’.


59 According to Berger (1959: 42) Bur. guriũ, gurei (pl.), γάρυμ < *por-am < **mund-; cf. also Bur. gur ‘barley, wheat colored’, bur ‘buckwheat’, However, gur has Macro-Caucasian links: Basque gari ‘wheat’ < P. Eastern Caucasian *Gōle ‘wheat’ (Bengston in Witzel 1999). These words are close to Afroasiatic *gēr/iir ~ garga/iir ‘grain, bean’, Semitic: Hebrew gērā, Arab. z,ar,ar-, Chadic *(a-)jēg/iir ~ *garga; Hausa guro, Cushitic: Oromo garii ‘seed’, etc.; cf. also Afraos. *gew-, gwar ‘to collect, harvest’; Chadic (Angas) gur, Somali gar, etc., all of which points back to an ancient Near Eastern source **qer/qend: for the variation of r/n see Witzel 2003.

60 Fuller, D. Q. Dissertation and 2006, 2009

61 The unfamiliar *gantum/gandum > *godum was analyzed as ga-dhūma ‘cow smoke’ (EWA I 498-9.

62 Loaned from local *kn- ‘rye or a similar cereal’ > Hittite kanta-, Luwian, Dacian, Lusitanian > Latin, Spanish Portuguese; Tocharian B; also loaned into Uralic/Fenno-Permian.

63 As well as in Hausa, Somali, etc.; cf. EWA I 499.

64 In Avar oq. Bežit oč, Ubykh xa ‘barley’.

65 Thus, Harmatta, see EWA I 499; or Klimov’s Proto-Kartvelian (Georgian) *ghomu.

via the southern route). The Iranian form has also been taken over by the Drav. newcomer\(^\text{67}\) in the region, Brahui with *xōlum* < IA *γολομ* (CDIAL 4287).

When the local pre-Iranian word *gantum* entered the Panjab, it inexplicably changed its initial syllable *gan-* to *ga-*, thus *godum*: the Pre-Iranian form *gantum* should have resulted in Vedic *gan-tuma* or *gan-dhūma*.\(^\text{68}\) The change from -an- to -o- is not typical for the Panjab but it found in the very sparsely reconstructable southern Indus language.\(^\text{69}\) The southern (Meluhhan) substrate form *gōdī* must have influenced the northern *gantum/gandum* so that the popular etymology *go-dhūma* 'cow smoke' was made possible.\(^\text{70}\) Notably, as mentioned, the word is *not* attested in the oldest text, the Rgveda. The change to *godum* was perhaps due to a northward expansion, out of Sindhi, of early Dravidian speakers at the end of the Rgvedic period.\(^\text{71}\) In the end, IA *godhūma* (CDIAL 4287) is found in Vedic and Nuristani and then from Dardic all the way south to Sinhala.\(^\text{72}\)

This word joins a fairly large number of Central Asian words that have been taken over both by Iranian and Vedic from the Oxus civilization (BMAC) and its surroundings.\(^\text{73}\) Such terms include those for sheaf, seed, ploughshare, lynch pin, well, canal, yeast, bread, pillar, brick, house, wooden peg, sand, gravel, bowl, spit, axe, club, cloak, hem, coarse garment, cloth and needle, as well as words for hemp, cannabis and mustard (and extend into religion as well).

It appears that the greater Hind Kush/Pamir area was and is a hotspot of linguistic diversity, which is also reflected in the names of domesticated plants of the area. We have IA languages (including Dardic like Kashmiri, Khowar, Kalasha), and west of it the third branch of Ir (Nuristani), further, the Eastern Iranian languages like the remnants of Sogdian (Yaghnobi) and Saka (Sariqoli), and the isolate Burushaski. The latter has yielded some rare loans already in the oldest Indian text, the Rgveda: *busa* 'chaff' (see above) or *kīlāla* 'biestings'), which is in need for more study.\(^\text{74}\)

§ 2. THE NORTHWEST: SUBSTRATE WORDS IN INDO-ARYAN PANJAB AND BEYOND

\(^{67}\) Brahui entered the Baluchistan area only about 1000 BCE (Elfenbein 1987), and thus has no Old or Middle East Iranian loans, but only recent ones from Baluchi, itself 'a late west Iranian immigrant language as well.

\(^{68}\) Cf. CDIAL 4020 Skt. (lex.) gandhāla 'fragrant rice', Pashai gandá 'a kind of grain'.

\(^{69}\) See Witzel 1999. A study of the substrates in Sindhi would be welcome in this respect, but has not even been proposed, except by my friend and collaborator F. Southworth 2006: 151.

\(^{70}\) This influence may be due to a post-Indus period, late Rgvedic Dravidian influx into the Panjab, as is visible in loan words (Witzel 1999). The precise nature of this influx and influence remains to be investigated.

\(^{71}\) See Witzel 1999.

\(^{72}\) CDIAL 4287 'wheat' (Yajurveda Sanhítās) VS. Pa. gōdhūma, Gandhārfi: NiDoc. goduma, gohomi, goma, Pk. gōhūma, Gv. gīšū, gēśū, gīhu, gīu, etc. 'wheat, rye'; -- Nuristani: gōm, gūm, etc. -- Dardic: gōm, gūm, gōom, gōh, Kalasha gīhūm, Khowar gōm, etc. K. guv (← Indic?), S. gēhā, WPa. gahā etc., Ku. guvā, N. gahā, gāu, A. gēh, Or. gahū, WB. gōhū, Bhoj. Awo. gōhū, H. gōhū, gehā, gahū, G. gahū, hāi m., M. gahū, Ko. gomv; Si. goyama 'growing corn'; cf. also A. gom-dhān 'maize'; B. gōm, gam 'wheat', Or. gahama, EBi. gohum, gohūm, Mth. gohum, gahām.


\(^{74}\) Also found in Dardic and Nuristani, EWA II 358. See now H. Berger’s detailed dictionary in Berger 1998. Cf. however also Tamil kizāan 'curd', DEDR 1580.
As indicated, the use of local, indigenous plant names in Indo-Aryan languages is steadily increasing when moving away from the Northwest and into the subcontinent. Apart from the just mentioned Central Asian loanwords in Vedic Sanskrit and the western Asian word for ‘wheat’, there is another strong substrate in the Rgveda. It is a purely local one, representing the lost substrate language of the Greater Panjab. Some 300 words\(^75\) in the RV belong to this group. As mentioned earlier, they do not fit IE/IIr patterns.

Many of them stem from the unknown prefixing Indus language(s), and from an equally unknown, generally North Indian substrate (‘Language X,’ as reflected in Hindi, etc.). They are joined, later on, by those from Dravidian which was not present in the Panjab until well after the Indus period, and also those from the Munda languages.

These words span all of local village life, from plant and animal names to the ‘small tradition’ of religion and ritual. They will have constituted the lost language of the northern Indus Civilization and its Neolithic predecessors.\(^76\) As they abound in Austroasiatic-like prefixes, I have (somewhat unfortunately) chosen to call it Para-Munda.\(^77\) It indeed resembles Munda in its typical use of prefixes (as in English for--give, for-get, be-get, be-head) but it does not overlap with very much as only a few words so far can be shown to have the typical Munda -n- infixes. Further, it has to be noted that the Munda languages have been recorded only over the past 200 years and a gap of some 3000 years of unrecorded developments separates them from the time of the RV. Perhaps we should simply call this language the Kubhā-Vipāś substrate (taken from the Kabul river and the Beas). Its plant names include those of vegetables, cereals, trees and so on. Some of them are treated in the sequel.

The linguistic results can now be correlated with the archaeobotanical study of plants as carried out by Dorian Fuller.\(^78\)

\section*{§ 2.1. BARLEY}

The indigenous word for barley has one such Para-Munda prefixes. It is attested in Late Vedic as kulmāśa, which compares with other words in –āśa, -āśā\(^79\) such as māśa ‘beans’. CDIAL has 3349 kul-māśa ‘half-ripe barley’ ChU, ‘sour gruel of fruit juice or rice’ Suśr. Pa. kumāśa ‘junket’; Pk. kumāśa ‘grain such as beans slightly wetted’; Si. komu ‘junket’. It thus survives today only at the southern end of the subcontinent, in Sinhala, -- which is a typical case for the spread and survival in retreat areas of terms that have been substituted by later ones.

\section*{§ 2.2. WHEAT}

The word for wheat has been treated above (§ 1.6). It is a West Asian loan word (CDIAL

\begin{itemize}
\item \(^76\) Ravi phase in the Panjab, early Mehrghar in Baluchistan, Birrana/Farmana in Haryana.
\item \(^77\) Even prominent linguists, such as the Dravidianist Krishnamurti (2003) and the Pāṇinian specialist Cardona 2003 have not understood the clearly stated difference between Proto-Munda and Para-Munda and have, accordingly, misrepresented and criticized the evidence, especially with regard to Para-Munda prefixes. This problem will be discussed separately, elsewhere. In contrast, Mayrhofer, EWA, consistently and correctly speaks of a ‘prefixing language’.
\item \(^78\) See his detailed abstract in Fuller 2006, 2009.
\item \(^79\) See the numerous cases listed and discussed in Kuiper 1991.
\end{itemize}
2.3. RICE

As discussed in detail below (§ 4.1.), rice (Oryza indica) is an indigenous domestication of the lower Gangetic plains. Consequently, there are some designations that do not have IA/IE etymologies.

The botanical term for ‘wild rice’ is still the same as the Vedic one (in the Yajurveda Samhitās): CDIAL 7571 nīvāra ‘wild rice’ VS.80 We may however also compare DEDR 3614 Ta. navarai ‘a kind of paddy’, etc.81 These Drav. terms, restricted to the literary languages, do not have a Proto-Drav. origin. Both the IA and the Drav. words must instead go back to a local substrate, obviously that of the Gangetic plains.

The old IA word for Oryza indica is CDIAL 12233 vrīhi ‘rice’ AV, though its descendants have disappeared from IA except for Sinhala viya ‘growing rice’ and for some northwestern languages. IA vrīhi is even found in Nuristani: Kt. wrič, ṛič ‘barley’ :: Kāmvi rwići ‘husked uncooked rice’, Pr. wuzī, as well as in NIA Dardic: Shina bṛū m. ‘rice’, Kohistani bī, etc. It must be remembered that Kashmir and the western Piedmont have early archaeological evidence for rice, which may have reached there along the Himalayan belt, where rice is grown in all suitable plains and river valleys, or via the Indus civilization whose late stage has evidence for rice.82

2.4. MILLET

The various types of millet have diverse origins: barnyard millet from China, N. Japan, broomcorn millet from the N. Caucasus, and foxtail millet from Bactria. Tropical millets stem from India and from Africa (sorghum). This has to be taken into account of any discussion of this wide spectrum of dissimilar plants. From China also stem Panicum miliaceum and Setaria italica.83 However, the Archaic Chinese words have no similarity to the Indian ones, and anyhow,84 a long stretch of Central Asian lands and the Hindukush separate them from the Indus area.

Other tropical millets such as sorghum, pearl millet, and finger millet came from Africa, and were found in Gujarat by 2200-1700 BCE.85 Millet was, thus, to some extent, a "new" import at the time of the Late Indus civilization;86 (cf. below, § 5.1. for Dravidian).

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80 Further: nīvāraka Suśr. Pa. nīvāra ‘wild rice’; K. nivar ‘a kind of hardy rice growing at high altitudes’; H. nyūr m. ‘wild rice’; G. navār, namār m. ‘rice growing spontaneously’. A derived form is 7605 navārā ‘made of wild rice’ TS. B. neyāl ‘rice—straw, cord made of rice—straw, straw—rope’.
81 Further: nakarai a kind of rice. Ma. navira, naviri, nakara a rice that ripens within two or three months, navara; Paspalum frumentaceum (?), Tu. navara a kind of grain; navare ‘a kind of rice’. Te. nivari, nivvari ‘Oryza.’
82 From IA stems CDIAL 9331 bhaktā ‘food’ RV., ‘meal, food’ > modern IA bhāt, etc.
Millet was important, especially in the savannah and drier regions, as it can be grown outside the preferred Indus growth period in winter (wheat, barley). In S. Asia its spread more or less coincides with the increasing spread of rice, which has markedly influenced the archaeologically attested emigration of Late Indus people towards the Gangetic plains, and towards Gujarat.

Some of the words for millet, such as ṛu, priyaṅgu, kaṅku, seem to be interrelated. They will be discussed next. The words ṛu and priyaṅgu are relatively old, as they occur already in Vedic (Yajurveda Saṃhitā).

§ 2.4.1. CDIAL 192 ṛu ‘the grain-plant Panicum miliaceum’ VS. Pk. ṛu, anu, anuā, anuā ‘a sort of edible grain’; also: 195 *anuni ‘millet.’ Surprisingly both words have been preserved only in the northwestern areas of the subcontinent in Nuristani and Dardic, but have been substituted by other terms elsewhere.

§ 2.4.2. CDIAL 8976 priyaṅgu ‘Panicum italicum’ VS, priyaṅgukā ‘P. italicum’ SāmovBr. Again it has been preserved only at the rims of the subcontinent, in Kashmiri, Marathi and Sindhi, and has been taken over into some Iranian Pamir languages.

Ved. priyaṅgu⁸⁰ seems to have been changed by popular etymology, like several other agricultural terms dealt with earlier (godhūma, gōḍī). The designations Ved. ṛu and *anuni (CDIAL 195) point to a contamination or cross of *kaṅgu and -(k/g)añgu and IA ṛu, thus: kaṅgu : *añgu : Ved. ṛu⁸²

§ 2.4.3. However, *kaṅgu is attested with some divergent IA forms, -- always a good indication of varying local substrates: *kankūnī, *kaṅguṇī, *taṅguṇī (CDIAL 2606). Accordingly, a northwestern *kaṅkun, a central-northern *kaṅgun, an eastern north Indian *taṅgun can be reconstructed for the pre-Vedic period.

They are superficially similar to some Drav. and Munda words: Dravidian DEDR 1084 kaṅgu (Tam. kaṅku), DEDR 1242 kampū (= Skt. kambū Hemādri), and Proto-Munda *gaṅ(-)gay. These words cannot easily be traced back to a single source. Hindi kaṅgni can be compared with IA *kaṅkūnī CDIAL 2606, less so with Tamil kampu and

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⁸⁸ Phal. ṛu ‘millet’; Nuristani and Dardic 195 *anuni: Kānvīri āṅ ‘millet’; D. ārīn ‘millet’, Kt. awēṅ, Dm. ārīn, Kānvīri āṅe ‘grain for eating’ > Kal. ārīn, Kho. olīn, etc.; all < *adīn. Cf. Sh. āno ‘Indian millet.’
⁹¹ EWA II 190.
⁹² If it originally contained the substrate prefix *priya- (Kuiper 1991: 42f.), then reinterpreted as *priya+gu ‘dear cow.’
⁹³ Kuiper 1991: 38 on the loss of initial consonant k-; note also CDIAL 112 anṅkāru ‘sprout’ Un. S. āgāru m. ‘sprout’; L. anṅgūrī ‘blade of corn when it first appears’, P. anṅgūrī, unṅgūrī, āṅgūrī ‘granulation in a healing sore’; H. āṅkū, rā m. ‘sprout’, next to *prāṅkāra (for which see Kuiper 1991 on a substrate prefix *pr-.)
⁹⁵ Note also i-kōṅgō in the language of the Ekonda, (Lakes Tumba and Leopold II area). The same word is shared by their Pygmy neighbors, the Batswa.
Munda *gaṇ(-)gay. The ultimate source of these words may have had a form such as **kaṇ-Cə (C indicating an uncertain consonant).

Indeed, the original source of kaṇku- and its derivatives lies in Africa. It is known that African millet was imported into India before 1900 BCE. As expected then, **kaṇ-Cə and even kaṇgu is reflected in Bantu -- itself a latecomer in E. Africa-- where we find Proto-Bantu *kangu and *punugu. Agriculture had spread to the area around 3500-2000 BCE, though the arrival of Bantu speakers in East Africa is later. Even Proto-Bantu *kangu goes back, thus, to an earlier East African substrate.

In short, all major language families of S. Asia have taken over the word from an unknown, East African source, though once it had arrived in India, various local developments in early Dravidian and Munda took over, resulting in the current forms. A clear difference between northern and eastern/southern forms is visible: PDrav. *kampu is opposed to PMunda *gaṇgay, while the IA forms stand in between the two.

§ 2.4.4. Further substrate words in Vedic texts include the following, first of all, again, millet, which occurs in two forms, one IA, the other two from a substrate. CDIAL 12667 śyāmāka ‘the millet Panicum frumentaceum’ VS. is clearly derived from Vedic śyāma ‘black’, though the reconstructed variant *śyāmākka points to a separate origin or development.101 The words are attested in

Nur. (→ Pashto) - SLPWPahNOrBiMthHGMSi

§ 2.4.5. The other word for 'millet, bājra' is from a substrate as well, though already attested in Late Vedic: CDIAL 9201 *bājjarā ‘millet’, HSS varjarī102 (cf. § 3.2). The

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98 Ehret 2002.
101 CDIAL: Pa. sāmāka ‘P. frumentaceum’, Pk. sāmāga, etc. S. sād ‘P. frumentaceum and its grass’; WPaḥ.bhal. sāmāu m. ‘a kind of darkish grass’; N. sāmā ‘a weed among rice’; B. sāmā ‘millet’; Or. suḍcāulā ‘P. frumentaceum’; Bi., Mth, etc.; H. sāwā, sāwā, sāmā m. ‘P. frumentaceum’; G. sāmo m. ‘inferior kind of self—sown grain’; M. sāvā, sāvā m. ‘P. frumentaceum or milaceum’; Si. hámi, amu ‘the grain Paspalum scrobiculatum’; -- further Wg. šāmāk, šāmāk ‘oats’; L. savāk, savāk ‘the grass P. colonum,’ ‘the grain Ophismenus frumentaceus’; P. sāvak ‘P. colonum’, suḍk, suḍk, sauk ‘wild rice’, soak ‘a kind of millet’; --however, *śyāmākka → Psht. šāmāxa, šāmīxa; cf. CDIAL 12668 *śyāmākatṛga ‘straw of a kind of grain’. M. sāvyān ‘straw of Panicum frumentaceum’.
word is attested from the W. Panjab to Maharashtra.

LPNBOrBiMthHGM

2.4.6. A special case is CDIAL 3112 kāśa ‘a grass used for mats, Saccharum spontaneum’; it is found from Late Vedic onward (Kauś. Sūtra, Pa. Pk, etc.) EWA I 345 states that its origins are unclear, rejecting earlier Drav. claims. The word is found from Nuristani and Sindhi to Gujarati.\textsuperscript{103} However, it can be added that the Nur. form (kāc-), along with Vedic (kāṣa) point to an Indo-Iranian reconstruction *kāc’a-. The word the may be another older, BMAC loan.

Nur.; -- SLPKuNABOOrBiMthHG

§ 2.4.7. The early word CDIAL 5827 tilā ‘Sesamum indicum’ AV., *tilaka, *tilla has been regarded as a Munda word.\textsuperscript{104} However, one must not forget the Mesopotamian word for sesame,  ellu, whose exact origin (why loss of *t-?) and spread to Mesopotamia remain unclear. There is a number of related words in IA (jar-tila ‘wild sesame’, tilvīla)\textsuperscript{105} that belong to the prefixing language that forms a substrate in early and later Vedic. The word tila is attested from Kashmiri to Sinhala\textsuperscript{106} and survives in the modern tel ‘oil’ as well.

KLPWPahKuNABOOrOAwBiMthBhojHOMarwGMSi; \(\rightarrow\) Mesopotam.

§ 2.4.7 Hindi kodon, CDIAL 3515 krodava ‘grain eaten by the poor’ Mbh., cf. koradīśa 'idem' Suśr., krodvaka KSS; and cf. DEDR 2163 Tam. kural, Kan. korale, korle; Konda koren 'a grain'.

§ 2.4.8. Finally, there are many words for 'grain' which I leave out here, and there also is maize, newly imported from the Americas just half a millennium ago. It may serve as a good example of how a new crop is assimilated into the Indian linguistic orbit. The designations for 'maize' are found (for IA) in CDIAL 5005a *chali ‘maize,’ 9879 markaka ‘Ardea argala’ and 10434 yavanāla ‘Andropogon bicolor’, cf. Suśr., yōnala; with which compare also Dravidian DEDR 2896 Ta. cōḷam, cōṇgaḷ ‘maize, great millet, Sorghum vulgare.’

\textsuperscript{103} Nur.: Kt. kāc ‘millet’, Wg. käc; S. kāhu ‘S. spontaneum’,  śā ‘a species of grass’; L. kāḥ f. ‘S. spontaneum’; P. kāḥ, kähi ‘S. spontaneum’, kāḥ ‘a kind of reed’; Ku. kās ‘a kind of grass used for religious purposes’; N. kā ‘S. spontaneum’, A. kāhūvā, B. kās, Or. kāsa, kāi{ṣ}a, kāci{ṣ}a, Bi. Mth. kās, kāsi, OAw. kāḍiṣa; H. kās m. ‘S. spontaneum’, kās ‘S. spont., the tall grass Imperata spontanea’; G. kās m. ‘a kind of white grass.’ -- Connection of Dm. Gaw. kāraṇ, Sv. kāraṇ ‘millet’ is not clear, as are Iranian forms in –h-, see EWA I 345.

\textsuperscript{104} Kuiper 1955: 157. A. Drav. source (T. Burrow BSOAS xii 142, 380) is, as per Turner CDIAL, less likely.


\textsuperscript{106} Pu. til ‘sesamum plant’, ‘its seed’, Pk. tila ‘the seed’, K. tēl, S. tiru ‘plant and seed’, L. P. WPah. Ku. N. A. B. til ‘the s. seed’, Or. ti[a], OAw. til[a]; H. til m. ‘sesamum plant and seed, a minute fragment’; OMār. tila ‘small particle’; M. til ‘sesamum seed’, Śī. tala ‘plant and seed’. - P. (Dogri) tir—caoli ‘sesamum and rice with sugar’. – Further: Or. tilā ‘a species of sesamum seed’; G. ilā—

\(\tilde{t}ād̐ā\) ‘as distinct as sesameum and rice, separated, dispersed’; M. til ‘a small white kind of sesamum’. – Finally: Ku. til ‘sesamum seed’, Bi. til, tilli ‘species with a white seed’; Mth. til, tilā ‘sesamum seed’; Bhoj. tili; G. til, tal ‘sesamum’, tali ‘a small variety.’
Apparently all these words have been taken form older designations for cereal plants. The common NIA word *makai (or similar) is derived from CDIAL 9879 *markaka ‘Ardea argala’.\textsuperscript{107}

§ 3. THE GANGETIC PLAINS: ANOTHER NUCLEAR AREA AND “LANGUAGE X”

In his 1969 study\textsuperscript{108} C. Masica has investigated the origins of agricultural terms in Hindi and found that some 30% of them are of unknown, «Language X» origin, while only 9.5% are from Drav. and 5.7% from Munda. His result could be broadened considerably if one would take into account the neighboring IA languages, as Franklin Southworth, David Stampe and this author are currently carrying out in our online substrate dictionary (TUFS, Tokyo, in progress, \url{http://www.aa.tufs.ac.jp/sarva/entrance.html}.)\textsuperscript{109}

However, agricultural terms in Tharu are from IA. The Tharu, an agricultural tribe in the Nepalese and adjoining Indian lowlands at the foothills of the Himalayas, have been long time local residents (and are immune against malaria). They now speak a northern Indo-Aryan language close to Maithili, Bhojpuri and Awadhi. Their language has a voluminous substrate.\textsuperscript{110} The designations for cereals are bājřā 'millet', dhān 'rice', makai 'maize', gehūm 'wheat'.

In contrast, the isolated Kusunda language in the hills of Nepal surprisingly has independent terms.\textsuperscript{111} The Kusunda were, until recently, hunter and gatherers who interacted with villagers to aquire cereals. One must wonder from which substrate language they derived their agricultural words, such as kharvi, kharugai 'wheat', khaidzi food, cooked rice (cf. khaḍ-d-i 's/he parches grain'). However rāko, rankwa 'millet' seems related to Proto-Austroasiatic *rkəw, Munda ruṅkub for 'rice', pointing to an earlier Munda occupation of the plains south of Nepal.\textsuperscript{112} The Kusunda even have a native word for the agricultural latecomer, ipən 'maize', usually called makai in IA. Further research is necessary to elicit more terms from the c. 20 scattered surviving speakers in central and western Nepal.

Some of the Gangetic substrate words have already been discussed as they appear in Vedic texts (§ 1). However, one set of Gangetic substrate words in Vedic, has geminate consonants that are fairly rare in Vedic;\textsuperscript{113} such as seen in pippala 'fig' RV : (su)-pispala AV, MS, guggulu 'bdellion' AV,PS : gulgulu KS, TS; kakata PS KSAśv. : kakt̥a 'a bird' TS, This is echoed in language ‘X’ by a few agricultural substrate words that contain such geminates. As mentioned, one word for cereals is *bājjara or IA *bāj̄ara 'millet' CDIAL 9201 bājjara, which turns up, slightly Sanskritized in a Late

\textsuperscript{107} Dardic: Sh. mākāī, K. mākoī etc. S. makāi, makī, makānī, L. makāi, P. makai, makī, mak, Ku. makai, N. makai, A. mākāī, B. makai, Or. makā, Bi. makaī, makaiyā, Mth. makaī, H. makā m., makī, G. makāī, makai, M. makā; cf. markaka, *markakakaṇa, *markaka-tṛṇa.

\textsuperscript{108} Masica 1969.

\textsuperscript{109} See upper right screen of: \url{http://www.aa.tufs.ac.jp/sarva/entrance.html} the starred items that Turner CDIAL found as non-attested in IA texts form its basis; however, this list has been cleared of all obvious IA words. The residue is expected to be from substrate languages, and also (when indicated) from Drav. and Munda as well as occasionally from Burushaski and Tibeto-Burmese. Additions from the various etymological dictionaries are in (slow) progress.

\textsuperscript{110} I have carried out a pilot project at the Asia-Africa Institute of the Tokyo University for Foreign Studies (TUFS ) in 2004, but have not yet found the time to edit and publish it.

\textsuperscript{111} Watters 2005.

\textsuperscript{112} Cf. Witzel 1999.

\textsuperscript{113} Especially of the mediae (b, d, g). They are often replaced by two dissimilar consonants (Kuiper 1991: 67).
Vedic text as HŚŚ: varjarī (§ 2.4.5.) It occurs from Sindhi to Marathi.114 CDIAL 9049 *phapphara ‘buckwheat’ is attested from Panjabi to Marathi.115 Another word for 'buckwheat' may be CDIAL 11313 varaṭa.116

Other examples of Gangetic plant names include: Hindi pipli/pīplā < CDIAL 8205 pippala– ‘berry (esp. of Ficus religiosa)’ RV.; pippāli ‘berry’ AV., ‘peppercorn, Piper longum’ Rāmāyaṇa, pippāli Āpast.117 is now found from Kashmiri to Konkani and Sinhala. Similarly, kaith < Skt. kapitthā ‘a tree, Feronia elephantum, wood apple’ CDIAL 2749 (for which cf. also aśva-tīthā), is seen from Nuristani and Dardic to Marathi. Further plants include 1693 udidda ‘a pulse’, 725 *aḷū ‘name of a tree or plant’, (Morinda citrifolia), 9724 matṭara ‘pea’.118 However, 3061 kārvēlla ‘the gourd Momordica charantia’ is probably derived from Dravidian, and 13482 *suppāra ‘areca nut’ (Kashmiri to Marathi) may be an old word, but the pratice of consuming it with betel leaves is only about 2000 years old in S. Asia, but earlier in S.E. Asia.

§ 3.1. Tibeto-Burmesese influence?

Next to the isolated substrates of Tharu and Kusunda, another important factor is Tibeto-Burmesese, spoken all along the Himalayan belt; it had some impact on IA vocabulary.119 For example, Tib.-Burm. speakers have left us some names in the eastern Gangetic plains, such as Kosala (Audh), Kausikī (now the Kosi River), perhaps also Kāśi and Kauśāmbi (now Kosam), that all seem to be based on Tib.-Burms. ku, ku ‘river.’120

Agricultural terms include: CDIAL 4749 Skt. cāmala or cāvala ‘husked rice’ and probably also PS sālī ‘rice’.121 The derivatives of cāmala/cāvala are now found from Sindhi and W. Panjabi to Gujarati,122 SPI/LWPahKuNAOBBO/BiMthBhojHOMarwG

114 CDIAL 9201 *bājara ‘millet’, see above, § 2.4.5.
115 CDIAL 9049 *phapphara ‘buckwheat’, P. phāṭrā, phāṭṛā ‘buckwheat’; WPah.jaru, phāṭṛā ‘husk of wheat’; Ku. phāṭār ‘a kind of buck- wheat growing near the snow-line’; N. A. phāṭar ‘buckwheat’; M. phāṭṛi f. ‘a kind of pot-herb.’
116 vbaratā ‘seed of safflower’ Ghryas., varaṭā lex., but note Dardic: Shīna bōrāo f. ‘buckwheat’ (= Bur. bōrā); Bi. barra, barre ‘seed of safflower’, H. bārrāi.
117 Probably of non- Aryan origin EWA II 133; cf. pipīlu from a similar source?
118 Cf. also CDIAL 13552 sūjji ‘coarse wheat meal’, *sōjjī, 10837 rōṭṭa ‘bread’.
120 Witzel 1993.
121 EWA II 632, takes sālī, AV śārī as unclear. CDIAL 4749 deliberates the same non-Aryan origin as tāṇḍuḷa, K. tomol ‘uncooked rice,’ perhaps having been contaminated, cf. also Dardic tr. tunūl; further: 12415 sālī ‘growing or unhusked rice’ MBh., Pa. sālī, Pk. sālī, Gy. saḷī, saḷī; Nuristani: Ash. salima, Wh. sālī, šālimā, Kt. sāḷī < Kāmvrī śālī, šēli, Pr. sīlī; Dardic: śālī ‘growing rice’, śālī, sōtē, sālī; Kalasha śālī ‘growing or unhusked rice’, Khowar sālī, etc.; further: S. sārī f. ‘un- husked rice’; A. sālī ‘principal variety of transplanted rice’; B. sālī, sālī ‘a kind of rice’; Or. sālī ‘growing or unhusked rice’, Bi. sārī, H. sālī, G. sālī, sālīyū, M. sālī, sāfī, Si. hāl, āl.
The question remains whether the word is related to Tib.-Burm. *dza ‘to eat’,\textsuperscript{123} because
one has to take into account Dravidian DEDR 2391,\textsuperscript{124} Ta. *avai etc. ‘usually flat rice’,
2343 Ta. *camai, 226, 268 Ta. *avi (-v-, -nt). As initial consonant can disappear in Tamil,
the related words in e-, s- in Gondi etc.\textsuperscript{125} may preserve a form closer to *cāmal.

An obvious latecomer is cīna ‘the Chinese one’, Panicum miliaceum\textsuperscript{126} (see.
§ 2.4). Nevertheless it is found from Dardic all the way east to Bengali, and earlier in
Buddhist texts. This serves as an opportune warning not to deduce ancient habitat simply
from the attestation and location of modern languages: obviously, the northwestern
languages were the first to receive the new variety, via the Silk Road or even earlier, via
the Chinese-influenced Kashmiri Neolithic.\textsuperscript{127} The word has remained restricted to the
northern IA languages:

\textit{DardSLPWPahBOrBhojH}

§ 3.2. Cereal crops plants

§ 3.2.1. The word for barley, CDIAL 12561 śūkaka ‘barley, a bearded kind of wheat’
Epic, lex., Or. sūkā, sukā ‘a kind of grain and its seed, Panicum frumentaceum, sarsarapilla’
may, however, ultimately be related to Skt. śūcī ‘needle’ as it also designates the ‘aw of
grain.’ (EWA III 494).

§ 3.2.2. A classical Skt. word for wheat is CDIAL 11425 valla ‘a kind of wheat’ VarBrS.,
‘winnowing corn.’ The double consonant, rare in early Skt.,\textsuperscript{128} indicates a Gangetic
origin (see § 2.4.5). The word is attested from Sindhi and Panjabi to Bihari and
Gujarati.\textsuperscript{129}

\textsuperscript{123} Bahing dz′u; Nagari dz′ya, Lushei ša, Burmese tsu, Garo šha; Kanauri za, from TB *dza, see
Benedict 1972, no. 66, p. 28.
\textsuperscript{124} 2391 Ta. avai ‘rice obtained from fried paddy by pestling it;’ avafi (-pp-, -it-) ‘to pound in a mortar,
crush, cuff, prod;’ avaiyal well-husked rice. Ma. avil ‘rice bruised and dried;’ avekka ‘to beat rice,’
avil ‘flattened rice obtained from paddy by pestling it.’ Ko. kac av (av−t) ‘to pestle (millet) second
time,’ akav av−(av−) ‘to pestle (millet) third time.’ To. af−(af−) ‘to pound with light strokes;’ ofil ‘puffed rice.’
Ka. aval ‘pound, beat,’ ‘pounding, beating in a mortar;’ (also) aval-akki ‘rice bruised and
crushed;’ Kod. avil-akki ‘rice fried and each grain pounded flat.’ Tu. abepuni, abeyuni, abeccuni ‘to
beat or pound rice.’
\textsuperscript{125} Kol. cavli mortar; Nk. savli, Pa. cavli; cavkol ‘pestle.’ Ga. savul ‘mortar,’ savkol ‘pestle,’ savvul
‘mortar,’ savkol ‘pestle,’ Go. sahki, sāhki, sahki, cahki, hahki, etc. (cf. 2799 Komdu sonki, Pe. henki).
\textsuperscript{126} 4842 cīna ‘Panicum miliaceum’, "aka, cīnaka ‘a particular grain’, cīnāka ‘fennel’ lex. Further:
cīna lex., ”aka Buddh. Hybrid Skt.; Pa. cīnaka ‘a kind of bean’; S. cīn ṭ ‘the millet Panicum
italicum’; L. cīnā ‘P. miliaceum’, P. cīnā m., Ku. cīnā. Note also: B. cīnā; Mth. cīn ‘P. italicum, P.
frumentosum’; Bhōj. cīn ‘a kind of grain;’ H. cīnā, cenā m. ‘P. miliaceum’; WPah. bhal. cīn e ṭ ‘a
kind of minute grain;’ Or. cīnā ‘millet;’ Bi. cīn ‘P. miliaceum’, cīnā, cīnā, cīnā ‘P. frumentosum’;
Dardic: Khowar cīn ‘a grain like wheat but bigger’, Sh. cīn ṭ ‘millet harvest’, ‘a kind of millet’: <
*cīn(a)kā?
\textsuperscript{127} See Fuller 2006, 2009.
\textsuperscript{128} Witzel 1999.
\textsuperscript{129} Pak. valla ‘a kind of grain’, vālā ‘a kind of grain, millet’; S. vali ṭ ‘heap of reaped ears of corn’, L.
val; Ku. bāl ‘ear of corn’, bālō, bālo ‘crops’; N. bāl ‘ear of corn’, bālī ‘cornfield, crops, harvest’
(bālāmū ‘to pick off ears of corn’); Bi. bāl ‘ear of wheat’, Mth. bāli; Aw. bālī ‘ear of maize’; H. bālī ṭ ‘spike
of corn’, bālī m. ‘beard of grain (esp. maize)’; OMarw. bālī ṭ ‘standing crop’; G. vāl m. ‘a
kind of pulse’; cf. 11426 *valla-puṭa ‘grain pod’, valāṭa ‘Phaseolus mungo’ lex.; G. vāl ṭ ‘beans in a
pod’, vāloly, ‘or ‘a bean, a kind of vegetable’.
§ 3.2.3. There are several words for rice that are different from vrīhi/*vrjjhi (above). CDIAL 2546 ödikā, ödī ‘wild rice’ lex. appears in Assamese uri—dal ‘a water grass producing grain like rice’, uri—dhān ‘wild rice’; and Bengali uri, uri—dhān ‘wild rice’ has been assumed to come from Munda.\textsuperscript{130}

However, CDIAL 4020 gandhālu ‘fragrant rice’ lex. is obviously derived from Skt. gandha ‘smell’, and 14268 āṇjana, seen in Kashmiri ānzonu, ānzan ‘a kind of rice with white grains which is soft and sweet—smelling when cooked,’ has been compared with Md. andun, adun ‘collyrium’.

The interrelated words for ‘millet’ have been dealt with earlier (§ 2.4.1-3.): CDIAL 2605 kaṅku, 3000 *kāṅkuka, kāṅguka.

§ 4. MUNDA AND OTHER CENTRAL INDIAN PLANT NAMES

As mentioned, the Munda languages are nowadays spoken in some parts of central and eastern India: N. Munda in the border region of Madhya Pradesh and Maharashtra (Korku), in Jharkhand, Chattisgarh, N. Orissa, S.E. Bihar and the western parts of Bengal, while Southern Munda is spoken in S. Orissa and N. Andhra, where the Sora (Śabara) are already attested in early Skt. (Aitareya Brāhmaṇa 7.18) and in Classical Graeco-Roman texts.

They form one branch of the Austroasiatic family that also includes Khasi, Nicobarese, Mon, Khmer, Vietnamese. This branch is distantly related to the great Austronesian family which is spread most across the globe (next to post-1500 IE), -- that is from its home in Taiwan to Indonesia, Polynesia and Madagascar, in a two-four thousand years old migration achieved with the help of outrigger boats.

The study of the Munda family of languages of central and eastern India is even less advanced than at of IA and Drav., though there has been a recent, extensive update on individual languages.\textsuperscript{131} However, there still is no etymological dictionary of Munda; for the time being one can still utilize Pinnow's 1959 extensive discussion of Kharia and Austroasiatic,\textsuperscript{132} and the online dictionaries by David Stampe.\textsuperscript{133} It has to be noted that northern Munda (Santali, Mundari, Korku, etc.) is quite different from the little studied southern Munda languages (Sora, Juang, Remo, Gutob, Gta, etc.). The northern branch has considerably been affected by IA, especially in the vocabulary.

In general, it must be added that the ancient Mundas were culturally much more sophisticated than usually assumed.\textsuperscript{134} Their homeland has been sought in S.E. Asia or, recently, inside India.\textsuperscript{135} It has long been shown that the early Munda speakers had words for rice farming.\textsuperscript{136} While japonica rice spread out of the Yangtze basin, Oryza indica is a

\textsuperscript{130} See discussion in Witzel 1999.
\textsuperscript{132} Pinnow 1959.
\textsuperscript{134} Such as e.g., in Parpola1994.
\textsuperscript{136} Zide & Zide 1976.
hybrid of a local wild rice. The linguistic data support these two areas of origin of cultivated rice; the words for rice in Austronesian do not correspond to words for rice in Austroasiatic.

§ 4.1. RICE

In northern and eastern India, rice cultivation has been said to emerge by the early 3rd millennium, though some earlier dates have recently been given (see above § 0).

The following words are strongly attested for Proto-Munda (and even for the rest of Austroasiatic): baba ‘paddy’, gele ‘ear of paddy’, jañ ‘grain seed’, sii ‘plow’, tutu ‘pestle’, seel ‘mortar’, loyoñ ‘wet paddy field’, etc. The important words for husked rice and its plant are N. Munda cauli etc., S. Munda ruñkub etc. (husked); N. Munda baba etc., S. Munda keroñ, kondem etc. (plant).

The Proto-Austroasiatic form for husked rice is *rkaw. Obviously, the Kusunda words râko, rañkwa ‘millet’ (above) are related to the Munda ones, with the usual shift in meaning seen in cereals. The Vedic substrate word vṛihi, which must go back to *vṛjjhi, subsequently transmitted to Nuristani (Kati) wriç, Pashto, Persian, etc., is somehow related to these forms, and also to Old Japanese uruchi (< urutî, *wurutî), even if the intermediary forms are not clear.

In addition to the words for husked rice (N. Munda cauli etc., S. Munda ruñkub etc.) and the rice plant (N. Munda baba etc., S. Munda keroñ, kondem etc.) we also get several words unrelated to other language families.


§ 4.1.2 So. ba.ba (M) ‘cooked rice’. (only in children's speech), Kh. ba? ‘rice in the hull, paddy’. Ju. bua ‘rice’, derived from ba.ba, Mu. ba.ba ‘the rice-plant, paddy (Oryza sativa, Linn.), or rice in the husk’. Ho ba.ba ‘the rice-plant, paddy (Oryza sativa, Linn.), or rice in the husk’. Ku. ba.ba ‘cauli rice’

138 For Munda plant names and loans into other Indian languages see now Osada 2006.
139 Osada 1995: 143 sqq.
140 At Chirand; further east at Sarutaru and Daojali, see Allchin & Allchin. The rise of Civilisation in India and Pakistan. Cambridge Univ. Press 1982. See now Hingham, C. Languages and Farming Dispersals: Austroasiatic Languages and Rice Cultivation, In: Bellwood and Renfrew 2002; latest update by Fuller 2009.
142 Details in Osada 1995: 143 sqq., 185 with related words in other Austroasiatic languages and in Austronesian, all the way to Taiwan.
144 Osada 1995: 186. Not yet aware of Osada 1995, etc. I have come to similar conclusions, see Witzel 1999.
145 Detailed discussion in Witzel 1999, though still assuming, with then current archaeology, just one locale for the origin of rice, in S. China. Note Austronesian *beras and Tibetan hbras (also in Burushaski).
§ 4.1.3 'cooked rice': Sa. daka 'cooked rice'. Mu. daha 'cooked rice; bee egg'.
§ 4.1.4 'cooked rice': Sa. jagu 'cooked rice'. Mu. jagu 'cooked rice'.
§ 4.1.5 'porridge, broken grain': So. karu/kul 'porridge, cooked rice soaked in water, rice gruel'. Mu. khudi ~ kudi 'broken grains', for which compare Drav. forms (§ 5.1.2.).
§ 4.1.6 'rice, flattened': Sa. tabēn 'flattened rice'. Mu. tabēn 'flattened rice'.

§ 4.2. Millet. As we have indigenous tropical millets in India, it is not surprising to find Munda words for them, such as Sa. gundli 'millet'. Mu. gundli 'millet'; and for 'millet sp.' Sa. irdi 'kind of millet'. Mu. irdi 'kind of millet'.

§ 4.2 Nahali
The c. 24 % substrate found in the Nahali (Nihali) language of Central India has many words for plants (and animals) that cannot be linked to IA, Drav. or Munda. A few prominent ones (including some imported plants) include the following words.146

āndij 'root like sweet potato', baŋ günü 'guava' (cf. 9125 bādara— n. 'fruit of the jujub tree?'), baru 'mulberry' (cf. various trees CDIAL 5872), buṭu 'kind of grass', bheda/ra 'potato' (!), bōy 'grass, fodder' (cf. DEDR 4535, grasses), dotako 'edible root', dhāwṛa 'gum tree', dhongāri 'type of grass', gugudo 'edible root', haro 'tumeric', jirvāṇā 'tomato'(!), jodū/jūd 'bamboo', jhāpon 'mushroom', khila 'parched rice', khude 'gourd', lubā 'incense', malkā 'pea (pod)', māyko 'mahua tree' (cf. DEDR 4772?), ḍohan 'mortar (with pestle)', orō 'millet, jawar' (cf. § 3.2.3 ḍō 'wild rice?'), phellyā 'groundnut', phendra 'vine', raymonyā 'wild thorny bush', rihā 'soap nut', sorokā 'bread', sidū 'mahua wine', sundu 'pod for beans', chāgā 'variety of thorny grass', chepiyā 'variety of grass', chunco 'a vegetable', chundu 'bean' (cf. CDIAL 4856?), tamāko'o 'tomato'(!), tāmku 'tobacco'(!), tāndur 'rice, cooked rice', tō 'ear (of corn). Nahali gele 'maize' is from Korku, gohā 'wheat' from IA, and many other common plants are loanwords from Munda, Drav. or IA.

§ 5. DRAVIDIAN

The evidence for plant names in the South of India is similarly difficult to describe. Most of the peninsula, except for the Munda languages, is or was covered by Dravidian languages. However, these too families have not been studied as extensively as the IE (Indo-Aryan) languages of the subcontinent. We have comparatively less tools, and they are less well developed than the IA ones. Worse, the study of substrates in the area of Dravidian languages is almost non-existent.147 Interestingly, an Australian substrate148 has recently been discovered in S. India, -- something we would have expected anyhow, given the history of human settlement 'Out of Africa,' and the subsequent peopling of South Asia, Southeast Asia and Australia. This has by now been confirmed both by archaeological and genetic evidence.

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The Comparative (etymological) Dravidian dictionary by Burrow and Emeneau (DEDR, 1984)\textsuperscript{149} is more of a somewhat disparate collection of data instead of a truly etymological dictionary that explains all parts of a word (root, stem, ending) under one head word, as has been done in the IA dictionary of Mayrhofer (1986-2000).\textsuperscript{150} A new version of DEDR with Proto-Dravidian etymological identifications and word analysis has been envisioned for 2004,\textsuperscript{151} but it has not yet emerged. We can glean some data from Krishnamurti’s book on the reconstruction of Proto-Dravidian.\textsuperscript{152}

However, there are wide error bars in Krishnamurti’s data. As in all reconstructions, the time frame of protolanguage is not one of 10 or even a 100 years span but it can cover much more, just as even ‘current’ English includes the antiquated forms of Shakespeare just as well as current slang. For example, reconstructed Vulgar Latin will have an ‘emperor,’ who before Caesar Augustus was just a temporary supreme army commander (and, thus, in Classical Latin). In the same way, Krishnamurti’s reconstruction of Proto-Dravidian surprisingly has kings, palaces, forts, moats and cities,\textsuperscript{153}-- all of which does not fit the archaeology of South India before 1000 BCE, when just pastoral and small agricultural village communities existed. Proto-Drav. is to be assumed for a much earlier period, well before his reconstruction of iron \textit{*cīr-umpu} (DEDR 2552)\textsuperscript{154} that is first attested archaeologically at c. 1200 BCE (Hallur, Karnataka).

Instead, Krishnamurti offers some very vague dating only,\textsuperscript{155} based on the antiquity of Proto-Drav. \textit{versus} its reconstructed daughter languages Proto-South Drav. I and II and on some references to Drav. words in Vedic (in a post-1000 BCE text): the split of South Drav. I and II «could precede the period of the Aitareya-Brāhmaṇa by at least four to five centuries, i.e. around the eleventh century BCE…» Surprisingly, Krishnamurti denies\textsuperscript{156}--without giving any reasons-- the reconstruction of cultural terms in \textit{three} subsequent stages discussed by F. Southworth.\textsuperscript{157}

Secondly, it must be observed that these agricultural terms are often heavily biased towards the literary South Dravidian languages (Tamil-Malayalam, Telugu, Kanada, Tulu), but are not all-Dravidian (including northern languages such as Gondi, Kurukh, Brahui, etc.). This bias leads to reconstructing merely a period (South Dravidian I and II) that is much later than Proto-Drav., which is assumed to have existed around 4000 BCE by Zvelebil, and well before the second millennium BCE, or rather in mid-third millennium BCE by Southworth.

All of the above is crucial when evaluating Drav. plant names. Some apparently widespread terms may be much later than Proto-Drav. and may reflect only the languages of the southern tip of the subcontinent.

\textsuperscript{149} DEDR: Burrow, T. and M.B. Emeneau 1984.
\textsuperscript{150} EWA: Mayrhofer 1986-2000.
\textsuperscript{151} Krishnamurti 2003: 502.
\textsuperscript{152} Krishnamurti 2003. For a detailed list of Proto-Drav. words (flora, fauna, agriculture, etc, see Southworth 2005: 257-281; cf. p. 79, and 2006: 134-141.
\textsuperscript{153} In his draft, he even had an ‘emperor’(!); see now Krishnamurti 2003: 7 sq., p. 15.
\textsuperscript{154} Krishnamurti 2003: 10.
\textsuperscript{155} Krishnamurti 2003: 501 sq.
\textsuperscript{156} Krishnamurti 2003: 15 n. 16.
In general, technical terms related to agriculture include (as per Krishnamurti 2003: 8 sqq) the reconstructed words for ploughing *uz DEFR 688, yoked plough *cēr 2815, dry and wet cultivation *pan-ā 'cultivated land' 3891; *pun 'dry land' 4337; *pol-am 'field' 4303; *kaz-āt 1355, *key-m 1958 'wet field'; *way-ā 5258, rice seedlings for transplantation ńātu 2919, etc.

Among other flora (Krishnamurti 2003: 12) may be mentioned: black pepper *mil-āku 4867, cardamon *ēl-ā 907, which Krishnamurto says «seem native … at least in south India.» The words for banana are *wāz-a 5373, ar-ṇṭṭi 205. They are of great interest as the plantain is a plant that ultimately stems for New Guinea; it was spread westward by sea trade early, so that it is archaeologically attested as far as in W. Africa by 500 BCE. Its original eastern term is derived, via Indonesia, all the way from the place of origin, as reflected in IA: CDIAL 2712 kadala, kadalī 'the banana plant Musa sapientum', MBh. Suśr., and *kadalī.\(^\text{158}\) Another interesting word is that for sugar cane, *kar-upnu 1288, *cet-ākk 2795. The Drav. words are quite different from *tu- in Austroasiatic and in Tibeto-Burmese (Newari): DEFR 387 Ta. ālai, 1414 Ta. kannya, 2795 Ka. ceruku sugarcane, 4916 Ta. munići.

The «early attested» (Krishnamurti 2003) word for 'ginger', however, goes back only to a Middle Indo-Aryan singivera or S. Dravidian form: the Greek loanword ziggiberis, pronounced [śiṅgiberis]\(^\text{159}\) is ultimately related to S. Drav. *cinki-wēr (wēr 'root'), Tam., Mal. *ciṅci- > Pāli singivera (artificially reconstituted as Skt. śṛṅgavera, EWA III 495).

The the areca nut at-ay-kkāy DEFR 88, is reconstructed by Krishnamurti for Proto-Drav. This may well be so, however the use of betel leaves together with areca is a later development and only about 2000 years old.

The Drav. word for areca, at-ay-kkāy, does not fit the northern substrate words seen in Indo-Aryan: CDIAL 13482 *suppāra, 3440 kṛmuṅkā, 4219 guvāka, guvāka, 5400 jhōda ‘betel-nut tree’, 5776 tāmbūla ‘betel, betel leaf’ Suśr.\(^\text{160}\) 9213 *bārī ‘betel leaf’,\(^\text{161}\) 12046 viṅ, all of which go back to local northern substrate languages or were imported from S.E. Asia along with the practice.

§ 5.1. MILLET

As indicated, there are many types of millets. As far as South India is concerned, we have indigenous tropical millets but also an early import from China and Africa (before 1900 BCE). This must be taken into account when evaluating the Dravidian terms.


\(^{159}\) However, attested only from the Hellenistic period onward.

\(^{160}\) From Austroasiatic, see KEWA I 495 with literature. The use of areca with the betel leaf is derived from S.E. Asia, see Madhi 1998,

\(^{161}\) From Austroasiatic: J. Przyluski BSL xxiv 257.
From China stem Panicum miliaceum and Setaria italicum, while sorghum, pearl millet and finger millet came from Africa. Some of the earliest African crops are found in Gujarat in the Late Harappan period (2200-1700 BCE), while some of them had spread to the South by 1600-1500. This import will account for some of the loanwords for ‘millet’ in IA and Drav. that accompanied the spread of the plant.

On the other hand, as multiple evidence shows, names for different types of millet can be exchanged for more recently acquired crops and this occurs even for different species such as ‘corn’ (wheat) and maize. South Asia has many such examples. It remains unclear for the time being, therefore, which of the old Drav. terms for millets indicated which variety.

Krishnamurti (2003) lists only the Proto-Drav. words *ār/ ar-ak, DEDR 812 (Tam. *irāki, Kan. rāgi, Tel. ēru, etc.) and *koṭ-ə 2165 (?), not found in DEDR). However, Burrow/Emeneau (1984) list 46 items related to millet, some of which just refer to part of it, to grinding etc. The actual terms are listed below; their respective dates need to be investigated further.

DED 812 *ar/ ar-ak seems to be related to 379 Ka. ārike the Indian millet, Panicum italicum. There also is a vague similarity with DEDR 525 Ta. itruku great millet (Sorghum vulgare); īrati Italian millet (Setaria italicica), black Italian millet (Panicum indicum), Ma. ituṇu a kind of maize. Cf. 812 Kođ. Eri, and Proto-Austroasiatic *rkev, Munda ruṇkub etc., Vedic vṛhi.

Ultimately, given the early attestation of various millets, these words may be loan words that made it into the various Drav. languages at various times and from different substrates preceding the spread of Dravidian.

§ 5.1.1 DEDR 1242 Ta. kampu, kampam-pul bulrush millet, Italian millet. Ma. kampu id.; kampam a grain; kamp-ari Holcus spicatus (< kampa ‘bulrush millet’ + ari ‘millet’ ?!) ; Ka. kambu, Te. kambu. DEDR compares Skt. kambū, for which cf. § 2.4.3 (discussion of kāngu).

§ 5.1.2. DEDR 2163 Ta. kural Italian millet, etc. Cf. the Munda words kuṛu, etc. (§ 4.1.5.)

§ 5.1.3. DEDR 286 Ta. cōlam, cōppal maize, great millet, Sorghum vulgare, etc.

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164 Further: ēru, ēruku Paspalum scrobiculatum Lin., Te. ēruka, ēruga, ārike, āriga P. scrobiculatum (P. frumentaceum), āllu (pl.) P. scrobiculatum. Go. ārk Setaria italicca; Pe. āru (pl.) a species of millet; Kuī āṛka, Kuī āṛgu (pl. ārka) Panicum italicum.
166 For the probably oldest traceable substrate, Proto-Australian, see Blažek 2006.
167 Hem. ù 847 = kura ki Pennisetum typhoides Rich. = Panicum spicatum Roxb. = H. spicatus Linn., and many other synonyms. — Note also: 1165 Ko. kank, kāṅku ‘stalk of the great millet;’ 195 Pa. aky a kind of grain called in Halbi kang (Panicum italicum); cf. Turner, CDIAL, no. 2605; Ga. (S.2) akyil ‘a kind of millet called in Te. kōrgu (Setaria italicca); = Panicum italicum Linn.; 56 Ko. vamb ‘millet, Panicum miari. ’ To. pem ‘millet,’ kafot sp. millet (ka- black). Ka. batta, bhatta ‘paddy.’
169 Ma. cōlam, To. svim ‘maize,’ Ka. jōḷa ‘a generic name for several species of millet,’ Kod. jōḷ ‘great millet,’ Tu. jōḷa, Te. jonna, jonnalu, Kōl. sonna (pl. sonnal), Nk. sonna juwar, Pa. jenna (pl. jennel) ‘small maize, juwar,’ Ga. jōnel (j = dz) ‘maize,’ jonnel cholam ‘millet,’ Go. jonna ‘jowar,
§ 5.1.4. DEDR 3265 *Ta. tiṅai* Italian millet, *Setaria italica*; wild Bermuda grass, *Panicum burmanni*; little millet (= *cāmai*); paddy-field grass, *P. fluitans*, etc.\textsuperscript{170}

§ 5.1.5. DEDR 3712 *Ta. nuṇāṇai* black Italian millet, etc.\textsuperscript{171}

§ 5.1.6. DEDR 5260 *Ta. varaku* common millet, *Paspalum scrobiculatum*; poor man's millet, *P. crusgalli*.\textsuperscript{172}

§ 5.2. RICE

Rice has been discussed earlier as far as IA and Munda are concerned (§ 2.3, 4.1). As mentioned, Krishnamurti\textsuperscript{174} lists three reconstructed Proto-Drav. words for 'rice': (paddy) *kūl-i* DEDR 1906, *nel* 3743, *war-iṅc* 5265, and adds words for dry and wet fields (2891, 4337), transplanted seedlings 2919, etc. He notes the relatively early attestation as a loanword in Greek *oryza* (however, only from Alexander's historians, c. 300 BCE onward), and derives it from Proto-Drav. *war-iṅc*, Tamil, Mal., Tel. *vari*, etc., (not from Tamil *arisi* < *arıki*;\textsuperscript{173} cf., however, Austronesian *beras*, Tibetan *ḥbras* and Skt. *vrīḥi* < *vrīhi*).

As a difference is always made in Asia between words designating cooked rice and uncooked rice (or rice still on the stalk), it is important to note that at least the literary languages of the South have words for 'cooked rice, thick porridge' कूज 1911, *amp-ali* 174, and gruel *kaṅc-i* 1104.

The three ancient, Proto-Drav. words for rice reconstructed by Krishnamurti are the following.

§ 5.2.1 *kūl-i* DEDR 1906, which is in fact found in some central Indian Drav. languages: Konda *kūli* 'paddy' Pe. *kūli*, Mand. *kūli*, Kui *kūdī* 'grain, paddy, seed.' Kuwi *kūli* 'paddy', and these are perhaps to be compared with *Ta. kūlam* 'grains, esp. of 18 kinds, viz. *nel, pul,* etc. However, North Dravidian *Br. xōlum* wheat is loaned from Skt. *godhūma*.

§ 5.2.2. *nel* DEDR 3743: *Ta. nel* 'rice, paddy, grain of paddy,' etc.\textsuperscript{176}

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\textsuperscript{171} Ma. *navaṇe, navaṇi* 'a small grain, the Italian millet or panic seed, *Panicum italicum*.’

\textsuperscript{172} Ma. *varaku* 'P. frumentaceum; a grass *Panicum,' Ka. *baraga, baragu* 'P. frumentaceum; Indian millet; a kind of hill grass of which writing pens are made.' Te. *varaga, varuvu* ‘*Panicum miliaceum.*' DEDR compares Mar. *barag* 'millet, *P. miliaceum*,' Skt. *varuka*- 'a kind of inferior grain.' ( *Paspalum scrobiculatum* Linn. = *P. frumentaceum* Rottb.) -- Cf. (*i)ari* 'rice', above § 5.2.3.

\textsuperscript{174} Krishnamurti 2003:9.

\textsuperscript{175} Krishnamurti 2003: 5.

\textsuperscript{176} Ma. *nel* 'rice (as growing), rice in the husk, paddy,' Ko. *nel* 'paddy, unhusked rice,' *nel aky* 'husked rice,' To. *neg* rice (in songs), *nējšky* rice (see *ašky*, s.v. 215 *Ta. ari*). Ka. *nel, nellu* 'paddy, rice in its husk, rice as growing, a grain of paddy,' Kođ. *nellī* 'rice, paddy,' Te. *nellūra* n. pr. a town.
§ 5.2.3 *war-iṅc DEDR 5265: Ta. vari 'paddy,' etc.¹⁷⁷ These words are similar to the S.E Asian ones and their history needs elucidation.¹⁷⁸ Maybe the following word is connected: 5287 Ta. valci 'paddy, husked rice, boiled rice, food,' Ma. varty 'grain of boiled rice from which the water is strained off,' Te. vadlu 'unhusked rice, paddy,' Kol. val 'grain of unhusked rice,' Nk. val 'paddy', valku (pl.) 'paddy, rice.'

However, Burrow/Emeneau (1984) also discuss the following words.

§ 5.2.4. DEDR 215 Ta. ari 'rice, paddy, ear of paddy;' arici 'rice without husk, any husked grain,' etc.¹⁷⁹

§ 5.2.5. DEDR 3614 Ta. navarai 'a kind of paddy;' nakarai 'a kind of rice,' etc.¹⁸⁰ To be compared is Skt. niṇāra 'wild rice' (CDIAL 7571, see § 2.3.) This word is attested from a relatively early Vedic period onward, the Yajurveda Samhitās.

§ 5.2.6. Some central Indian Drav. languages have an additional word: DEDR 4639 Ga. mājik rice; manjig unhusked rice, etc.¹⁸¹

§ 5.2.7. Finally, a few more designations for 'boiled rice' may be added from Burrow/Emeneau:

DEDR 4860 Ta. mitavai 'boiled rice, porridge, gruel, preparation of dhal;' miti 'food mixed with ghee;' vitavai 'boiled rice, gruel;' metvakku 'boiled rice;' Te. meduku, metuku 'a grain of boiled rice; boiled rice;' Ga. metkul 'cooked rice' (< Te.)

DEDR 3982 Ta. parukkai, porukku 'single grain of boiled rice;' perukkal 'rice'; poruku 'boiled rice,' etc. ¹⁸²

DEDR 5186 Pe. lay 'boiled rice,' Maṇḍ. lay, Kuwi lahi; lāḥ'i boiled manḍeya grain.

DEDR 2391 Ta. aval rice obtained from fried paddy by pestling it; avai (-pp-, -tt-) 'to pound in a mortar, crush, cuff, prod;'¹⁸³ (see however § 3.1.); the words are not

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¹⁷⁷ Ma. vari 'a wild-growing rice with rough beards,' Te. vari 'paddy,' Pa. verci, Ga. varstil, varcil, vars/varcil; vars pīru 'rice straw' (see 4225). Go. wanji 'rice, both growing and in the grain,' vanji 'paddy,' vanji 'rice, seed,' venji perek 'rice' (see 3982), vanji 'paddy.' -- Note Austronesian forms like wari, (Witzel 1999) and cf. 5287 Ta. valci.


¹⁷⁹ Ma. ari 'grain of rice freed from chaff, seed, grain,' (Kauṭ.) ariči 'rice,' Ko. aky 'grain of any grain food when husked,' To. aškya 'rice,' neššky (cf. s.v. 3753 Ta. nel), Ka. akki 'rice deprived of its husk, grain that resembles rice,' Ko. aki 'husked rice,' Tu. ari 'rice freed from husk, any small grain, akki 'rice, corn,' argi 'rice?;' To. ariči 'a sweetmeat made of rice, flour, and jaggery.' Cf. DEDR 3829 Ko. pack, To. počški. —See discussion above § 5.2.

¹⁸⁰ Further: Ma. navira, naviri, nakara 'a rice that ripens within two or three months,' navara, Paspalum frumentaceum (?). Tu. navara 'a kind of grain,' navare 'a kind of rice,' Te. nivari, nivvari 'Orzaya.'

¹⁸¹ nongre manjig 'broken pieces of rice after pounding,' Konda manzi (pl. -k) 'husked rice,' Pe. manji (cf. 3982 preyi), Kuwi manji, 'raw rice, rice without husk, husked rice, a grain of rice; manjiŋ 'husked rice,' Kr. manjiŋ 'seed in general.' Cf. Go. wanji, s.v. 5265 Ta. vari

¹⁸² Te. prālu 'rice,' Nk. perku 'husked rice,' Pa. perku (pl. perkul), Go. parēk 'husked rice, kutki, etc.; parek 'husked (of rice),' paraik, paraik, perek 'husked rice,' pere, pariku 'rice,' parem (pl. parek) 'grain of rice, etc.,' Konda per(a)(pl. perk) 'husked rice,' Pe. preyi, Maṇḍ. Preyi, Kuṅ prā'rice, husked paddy,' prāmā 'a grain of boiled rice,' kırūvrau, kırūvau 'flaked rice.'

¹⁸³ avaiyal well-husked rice,' Ma. avil 'rice bruised and dried,' avekka 'to beat rice,' aval 'flattened rice obtained from paddy by pestling it,' Ko. kac av- (avt-) 'to pestle (millet) second time,' avy av- (avt-) 'to pestle (millet) third time,' To. af- (af-) 'to pound with light strokes,' ofiľ 'puffed rice,' Ka. aval 'pound, beat, pounding, beating in a mortar,' (also aval-akki) 'rice bruised and crushed,' Kož. avv—
connected by Burrow-Emeneau) with rice but rather, \textit{DEDR} 268 with boiling: Ta. \textit{avi} (-\textit{v}-, \textit{-nt}-) 'to be boiled, cooked by boiling or steaming, swelter; (-\textit{pp}-, \textit{-tt}-) (which includes boiling rice).

\textsection{5.3. BARLEY}

Not unsurprisingly, this plant is attested only sparsely, at high altitude levels of the Nilgiris, in Toda and in Kota. \textit{DEDR} 1106 Ko. \textit{kaj} barley. To. \textit{koj} (cf. Pkt. \textit{gajja}). It is not listed in Krishnamurti 2003.

\textsection{5.4. WHEAT}

As discussed above (\textsection{1.6}), the Drav. word for ‘wheat’ (*\textit{gōdi}) arrived in S. Asia, along with the plant, before the Indus period via the southern Iranian route (Elam - Tepe Yahya - Bampûr- Sindh). It has resulted in the reconstructed southern Indus term (‘Meluhhan’) *\textit{gōdt}-, which is retained in Drav. *\textit{gōdi}. The pre-Iranian *\textit{gantum} must have become *\textit{go-tum} or *\textit{go-dum} in Sindh. Just as in IA, the Drav. word reflects a popular etymology\textsuperscript{185} of the unfamiliar plant: *\textit{godum}: from *\textit{kō-tumpai}, *\textit{low red plant} in PDrah. stage 3, at c. 1000 BCE.\textsuperscript{187} Significantly, there are no Proto-Drav. or old, indigenous words for ‘wheat’ in Dravidian – they could not be as the plant as been introduced fairly late in linguistic history.

\textsection{5.5. GRAIN}

A general word for 'grain' (or 'kernel') \textit{DEDR} 4153 is found in some languages, such as central Indian Gondi and Parji and Malayalam in the South. It is not listed in Krishnamurti 2003.

\textsection{6. Summary and Outlook}

We can detect several ancient centers of food production in India: the west (Indus civilization, including Haryana and W. Gujarat), the Gangetic plains and the South, each one with its own peculiar package of plants and domestic animals. The linguistic data, gleaned for the most ancient texts (Veda, Sangam) agree with this scenario. They actually


\textsuperscript{184} Kan. \textit{gōdi}, Tam. \textit{kōti}, \textit{DEDR} 1906; cf. also Kinda kūli ‘paddy' \textit{DEDR} 1906.

\textsuperscript{185} Cf. Southworth, F. C. \textit{Linguistic Archaeology of South Asia}. London and New York: Routledge 2005: 80, 198. However, wheat is found in S. India after 2200 BCE. The various Elamite, Sumerian, etc. loans into Drav. will have to be compared.

\textsuperscript{186} As reconstructed by Southworth 1988: 658, 660.

\textsuperscript{187} See \textit{DEDR} 3334: Tam. \textit{tumpai} etc. ‘nettle, weed.’ The exact development from *\textit{tumpai} > -\textit{di} is not clear; at this late date kō\textit{tumpai} could even be based on Ved. \textit{godhūmā}.
further improve and refine the picture, as they allow to go well beyond the ancient texts and access the earlier periods preceding them.

Behind the Late Bronze Age data of the Rgveda we can thus detect an ancient population that already possessed its own indigenous agricultural terms. We can connect this substrate with the preceding agricultural communities of the Indus Civilization (2600-1900), and even with its predecessors (c. 6000-2600 BCE), both of which had adopted the typical W. Asian wheat/cattle/caprid package.

The same procedure applies to the Gangetic plains as depicted in the later Vedic texts (c. 1000-500 BCE), and as still indicated by modern IA languages such as Hindi, etc. An earlier Gangetic substrate emerges that has peculiar agricultural terms corresponding to its specialized rice/buffalo package (c. 3000/2500 BCE).

The case for the South is again similar: the Dravidian languages indicate a southern package of food production (millet/cattle), especially when making use of reconstructed Proto-Dravidian. This early form differs considerably from the data of the later, iron-age stage of the southernmost languages (Tamil-Malayalam), with developed millet/rice agriculture and saw emerging state formation.

As is obvious, much of the relevant data are still obscured by the evidence hidden in the little studied substrates of the IA, Drav. and Munda languages. Much more work by linguists has to be done to see progress in the evaluation of the culture of these early periods. For a beginning, one may consult the online substrate dictionary (in progress), SARVA.

Second, many details need to be elucidated through close cooperation between linguists and archaeo-botanists. Unfortunately, strict procedures in dealing with flora (and fauna) in archaeological excavations in the subcontinent have been employed only fairly recently, and earlier reports cannot be trusted with regard to the (scanty) collections and identifications of plant and animal remains. We need substantive and representative regional collections for comparisons in order to achieve substantial progress.

Remembering such great early summaries as the 17th century *Hortus Malabaricus* for Kerala, or the still useful ones – such as Brandis’ on Indian trees, we also have to compare other early textual materials. Much is still hidden in the largely unpublished and untranslated texts on Vṛkṣa Āyurveda, which actually deal not just with trees but also with agriculture in general. This includes, for example, such unexpected methods of fertilization of trees by fish residue. Some of these Ayurveda texts contain elaborate pictures of the plants described. I have seen one such beautifully illustrated book in private possession (Ayurveda Society of Naradevi, Kathmandu) that had detailed descriptions in a multitude of Indian languages, or I have once come across a collation of agricultural data of many hundreds of Sanskrit pages, made for the Union Government, already in 1979.

Third, we urgently need regional surveys of smaller languages and dialects, especially of remnant languages like Kusunda, Tharu, Bhili, Nihali, Toda (and also of Andamanese, Shompen, Vedda) as to gain a clearer picture of the early stages of food production in India, especially for areas that do not have old literatures (such as Central India). This

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189 Reede tot Drakestein 2003; Brandis 1906.
has then to be expanded by the study of substrate words in the literary languages and in the extant vocabularies of all Indian languages – a task barely begun outside IA. Otherwise, we remain boxed in, for our earliest data, between those from the extreme Northwest (Ṛgveda) and the extreme South (Sangam), at 1000 and 200 BCE respectively, and have to extrapolate for the rest of the subcontinent.

I conclude, therefore, with an appeal to botanists\(^{191}\) (and zoologists)\(^{192}\) to join forces with archaeologists, geneticists, linguists and textual scholars to exchange data and discuss them in collaborative fashion.\(^{193}\) Only then real progress will be possible.

\(^{191}\) See however, already the paper, 40 years ago, 1967-68, by Vishnu Mittre, which is characterized as: “Vishnu Mittre looks into dating mechanism, environmental archaeology, and palaeontology in relation to archaeology and recommends a closer collaboration.”

\(^{192}\) Not treated here, but similarly promising.

Abbreviations for common language names
(listed in the etymological dictionaries in this order)

<table>
<thead>
<tr>
<th>Indo-Aryan</th>
<th>Dravidian</th>
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<tbody>
<tr>
<td>&lt;Nur. Nuristani&gt;</td>
<td>Ta Tamil</td>
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<tr>
<td>Dard. Dardic</td>
<td>Ma Malayalam</td>
</tr>
<tr>
<td>Gy Gypsy</td>
<td>Te Telugu</td>
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<td>Ko Kota</td>
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<td>Go Gondi</td>
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<td>Or Oriya</td>
<td>Kor Koraga</td>
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<td>Bi Bihari</td>
<td>Kur Kurukh (Oraon)</td>
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<td>Malt Malto</td>
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<td>H Hindi</td>
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<td>Marw Marwari</td>
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<td>Ko Konkani</td>
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<td>Si Singhalese</td>
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Other common abbreviations

AV Atharvaveda Samhitā
CDIAL Turner, Comparative Dictionary of the IA languages
DEDR Burrow and Emeneau, Dravidian etymological Dictionary
Drav. Dravidian
EJVS Electronic Journal of Vedic Studies
EWA Mayrhofer, Etymologisches Wörterbuch des Altindoarischen
IE Indo-European
IA Indo-Aryan
IIJ Indo-Iranian Journal
IIR Indo-Iranian
KS Kaṭha Saṃhitā of the YV
lex. = found in dictionaries only
MIA Middle Indo-Aryan
Mbh. Mahābhārata
MS Maitrīyani Saṃhitā of the YV
NIA New Indo-Aryan
O. old
Pa. Pali
PIE Proto-Indo-European
Pkt. Prakrit
R(ām). Rāmāyaṇa
RV  Rgveda-Saṃhita
Skt.  Śanskrit
Suśr.  Suśruta
TS  Taittirīya Saṃhitā of the YV
VS  Vājasaneyi Saṃhitā of the YV
YV  Yajurveda

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Bibliography Plant names


Fuller, D. Q. Silence before sedentism and the advent of cash-crops. A status report on early agriculture in South Asia from plant domestication to the development of political economies (with an excursus on the problem of semantic shift among millets and rice). In: T. Osada (ed.). Proceedings of the Pre-Symposium of RHIN and 7th ESCA Harvard-Kyoto Round Table. Published by the Research Institute for Humanity and Nature (RHIN), Kyoto 2006: 175-213.

Fuller, D. Q. Agricultural origins and frontiers in South Asia: a working hypothesis. Journal of World Prehistory 20, 2006a, 1-86

Fuller, D.Q. Framing a Middle Asian corridor of crops exchange and agricultural innovation. In: 13th Harvard University Round Table. Ethnogenesis of South and Central Asia (ESCA), Kyoto session. Kyoto: Research Institute for Humanity and Nature (RHIN), Kyoto, Japan, 30-31 May 2009, p. 3-11


Kuiper, F.B.J. Aryans in the Rigveda, Amsterdam-Atlanta: Rodopi 1991

B.B. Lal. The Homeland of Indo-European Languages and Culture: Some Thoughts. Purattattva 32, 2001-2, 1-4


Mahdi, W. Linguistic data on transmission of Southeast Asian cultigens to India and Sri Lanka, Blench, R. and M. Spriggs (eds.) Archaeology and Language II. Correlating archaeological and linguistic hypotheses. 1998 : 390-415


Meadow, R. H. Pre- and proto-historic agricultural and pastoral transformations in northwestern South Asia. Review of Archaeology. The transition to agriculture in the Old World (Special Issue ed. by Ofer Bar-Yosef) 19, 1998, 12-21


Mundlay, A. Who are the Nihals? What Do They Speak? Mother Tongue (Boston: Association for the Study of Language in Prehistory), Vol. II, p. 5-40


Osada, T. (ed.). Proceedings of the Pre-Symposium of RHIN and 7th ESCA Harvard-Kyoto Round Table. Published by the Research Institute for Humanity and Nature (RHIN), Kyoto 2006


Pinnow, H.J. Versuch einer historischen Lautlehre der Kharia-Sprache, Wiesbaden 1959

Ramachandran, Puthusseri and K. Nachimuthu (eds.) Perspectives in Place Name Studies: Proceedings of the National Seminar on South Indian Place Names, Held at Trivandrum on 21-23 June 1985. A Festschrift to Prof. V.I. Subramoniam, On His Sixtieth Birth Day. Trivandrum: Place Name Society 1987


Sato, Y.-I. of crops: what is common and what is different? - Fudo and agriculture. In: T. Osada (ed.). Proceedings of the Pre-Symposium of RHIN and 7th ESCA Harvard-Kyoto Round Table. Published by the Research Institute for Humanity and Nature (RHIN), Kyoto 2006: 73-78


Vishnu-Mitte, Birbal Sahni Institute of Palaeobotany, Lucknow: Inter-relations between Archaeology and Plant Sciences, Puratattva 1, 1967-68, 4-14


Note on Appendix I

The appendix contains a list of the oldest attested words for Indian agricultural plants, as found in the Vedas (c. 1500-500 BCE). The list is arranged in a twofold way: (1) area of origin of the plant in question; (2) inside these groups, according to age of attestation. We have to distinguish 5 levels (Witzel 1997): 1.1. Rgveda - 1.2. Mantra texts (Atharvaveda, Yajurveda) - 1.3. Yajurveda Sanhītā prose texts (MS, KS, TS) -- 1.4. Brāhmaṇa texts proper, including earliest Upānisās and Āryakas -- 1.5. Late Vedic (Sātras); -- post-Vedic, in other Old Indo-Aryan OIA texts: Epics, Middle Indo-Aryan (MIA), Classical Sanskrit, New Indo-Aryan (NIA).

<table>
<thead>
<tr>
<th>English term</th>
<th>Old Indo-Aryan term</th>
<th>Attestation level of texts: 1.1-5, or post-Vedic; area or composition</th>
<th>Origin: Language family or individual Language</th>
<th>Comments</th>
<th>Discussion</th>
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<tr>
<td>SW ASIAN Origin</td>
<td></td>
<td></td>
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<td>EWAi 1986-2000</td>
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<tr>
<td>Barley</td>
<td>yáva</td>
<td>1.1 = RV: Greater Panjab</td>
<td>Indo-Eur. Gr. zeiai, Lith.javai, Hitt. ewa</td>
<td></td>
<td>II 405</td>
</tr>
<tr>
<td>Plough</td>
<td>lāngula</td>
<td>1.1</td>
<td>Munda or N.E. (Witzel 1999)</td>
<td></td>
<td>I 477 un clear, EWA 504</td>
</tr>
<tr>
<td>To sow</td>
<td>vap ‘scatter’</td>
<td>1.1</td>
<td>Ilr. (O. Avest. vi-uupap); cf.</td>
<td></td>
<td>EWA 504</td>
</tr>
<tr>
<td>To plough</td>
<td>(yavam) kṛṣ ‘to plough ([for] grain)’</td>
<td>1.1</td>
<td>Hitt. huuapp?</td>
<td>EWA</td>
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<tr>
<td>furrow</td>
<td>*sā/sī // sītā ‘furrow’</td>
<td></td>
<td>IA *sā/saH? &lt; *seh₂ ‘throw’? EWA II 725 (sāyaka ‘a thrown object, arrow’); cf. IE *seh(y) ‘to sow’</td>
<td>EWA 731</td>
<td></td>
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</tbody>
</table>


| Lentil, Lens culinaris Med | masāra māsura                         | T.2/3 KS, TS (U.P.) | Local word? | II 335 Uncle |

| Flax / lin seed | atasā brushwood; atasī lin seed | T.1 Suśruta | Meanings unclear in RV | I 57 Uncle |

| S. ASIAN origin |

| Rice | Vṛihi | T.2 AV/PS (in U.P./ Haryana & Delhi) | Local? -- see Witzel 1999: < *vṛihi; <> Drav. (v)ar(i)(k) , variṣci etc.; > Greek oryza | Cf. Jpn. uruchi; Austro-Asian (Taiwan) a- ḅāṛa, avaras , etc.; Munda *ərīg > Drav. vari- |

<p>| Rice | śāli PS : śāri- AV | T.2 AV,PS C.N.India | Benedict, Con-spectus 28, # | &lt; Tibeto-Burmese ?? | II 632 |</p>
<table>
<thead>
<tr>
<th>Language/Species</th>
<th>Name</th>
<th>Reference(s)</th>
<th>Origin</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mung: Vigna radiata</td>
<td>mudgá</td>
<td>1.2 YV N.India</td>
<td>Local</td>
<td>Cf. RV name: Mudga-la 1.1.: II 361 clear;</td>
</tr>
<tr>
<td>Phaseolus mungo L. var. radiatus = Phaseolus Roxburghii</td>
<td>māša</td>
<td>1.2 AV C.N.India</td>
<td>Local</td>
<td>Cf. MPers. māš: NE: Shughni max</td>
</tr>
<tr>
<td>Dolichos biflorus L., a twining vine</td>
<td>khalá-kula</td>
<td>1.4 Up. 1.5 KauśS N. India</td>
<td>Local?</td>
<td>Cf. Tam. kol; Parji pl. kol-kul</td>
</tr>
<tr>
<td>Chaff, straw (fog)</td>
<td>busa</td>
<td>1.5 KauśS 1.1. RV 10</td>
<td>Local; non-IA s- after -u-</td>
<td>Cf. 231 uncert</td>
</tr>
<tr>
<td>Cotton (Gossypium sp.)</td>
<td>Ved.*karpāsa kārpāsa ‘made of cotton’</td>
<td>Sūtras</td>
<td>Local, typical Austro-As. like prefix (kar-; as in jar-tila: tila)</td>
<td>Cf. Mesopotamian kapazum; &gt; Gr. karposos</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>ikṣu</td>
<td>1.2 AV+ C.N.India</td>
<td>Local word in several dialect forms: ikṣu, *ukṣu, *rīkṣu, *akṣu &lt; rīkṣu?</td>
<td>Cf. RV +; name: Ikṣvāku; class. ikṣvāku ‘bitter gourd, Citrillus colocynthis’; AAs.? H. Berger WZKS 3,73 sqq</td>
</tr>
<tr>
<td>(Sugar)</td>
<td>śarkarā ‘pebbles’</td>
<td>1.2 AV+</td>
<td>Later: Class. Skt. ‘sugar’</td>
<td>~ Greek krokalē ?; AAs. prefix śar-?</td>
</tr>
<tr>
<td>AFRICAN Origin</td>
<td></td>
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</tr>
<tr>
<td>Setaria italica (L.) Pal. Beauv. = Panicum italicum L.</td>
<td>priyāṅgu priyāṅgukā</td>
<td>1.2/3</td>
<td>See Witzel, 1999: Popular etym. for (Drav.) kaṅgu, etc.</td>
<td>CDIAL 8976; Cf. s.v. kaṅgu (discuss. above; see below on Skt. kaṅgu)</td>
</tr>
<tr>
<td>Panicum miliaceum L.</td>
<td>ánu</td>
<td>1.2/3 TS</td>
<td>Adaptation from priyāṅgu, RV</td>
<td>Cf. anvaśī etc., RV</td>
</tr>
<tr>
<td>Plant</td>
<td>C.N. India</td>
<td><em>kāṇgu</em>, see Witzel 1999</td>
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<tr>
<td>Millet</td>
<td>varjārī :: <em>bājjara</em></td>
<td>1.5 HSS C.N. India CDIAL 9201 Panj. bājrā etc.</td>
<td>*bājara, *bājjara III 45: clear</td>
<td></td>
</tr>
<tr>
<td>Chickpea</td>
<td>cana(ka) Mbh, Susr.</td>
<td>CDIAL 4579 Pali, Pkt., NIA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass pea</td>
<td>*k(h)ēsāri &lt;&gt; kēsārī ‘hair, filament’ YV, cf. kesānī ‘a plant’ KausS.</td>
<td>CDIAL 3925 *k(h)ēsāri; *kēsārī only &gt; Hindi; not in Skt.</td>
<td></td>
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</tr>
<tr>
<td>Pea</td>
<td>*mattara</td>
<td>CDIAL 9724 Only NIA!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice (add.)</td>
<td>IA *cāmala</td>
<td>Prakrit+ <em>caulā, etc.</em></td>
<td></td>
<td>From Austric? But cf. Drav. [c]aval, etc. DEDR 2391, and 268 [zero+] avi (-v, -nt-) ‘to steam boil’ ---</td>
</tr>
<tr>
<td>Foxtail millet</td>
<td>*kāṇgu</td>
<td>Brāhatsamhītā, 550 CE</td>
<td></td>
<td>Cf. Bantu : *kōngō, *pungu; MW 1999: cf. priyāṅgu, anu PMu. (*h)oxy is too different; ditto Drav. DEDR 1242 kampu, 2163 kura, … III 43 Foreign word?</td>
</tr>
<tr>
<td>Urd : vigna mungo</td>
<td>*uḍidda ‘a pulse’</td>
<td>Pkt. uḍida</td>
<td>*uḍidda &lt; Tam. u.r.uuntu ‘black gram, phaseolus mungo’, Kan. urdu, DEDR 690 ---</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Transliteration</td>
<td>Reference</td>
<td>Description</td>
<td></td>
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<tr>
<td>Cucumber</td>
<td>kṣīraka</td>
<td>Lex. only</td>
<td>CDIAL : NIA 3667, 3698, 3703</td>
<td></td>
</tr>
<tr>
<td>Bitter gourd</td>
<td>kāravella, *kārella 'Momordica charantia'</td>
<td>Suśruta</td>
<td>CDIAL 3061 Pali kāravella, Pkt. kāiryallaː-kārellaya, etc.</td>
<td></td>
</tr>
<tr>
<td>Ivy gourd</td>
<td>kunduru 'Boswellia thurifera, its raisin' (incense tree);</td>
<td>Brhatasmiḥā, 550 CE; kundurukā Suśruta</td>
<td>CDIAL 3298 kunda 'raisin' kānduruka 'Boswellia thurifera' MIA, NIA</td>
<td></td>
</tr>
<tr>
<td>Luffa/sponge gourd</td>
<td>*tōrī 'gourd'</td>
<td>*tubara?</td>
<td>CDIAL 5977; Possibly &lt; *tubara/tumba Found in Northern NIA: Panj. tōrī, etc.</td>
<td></td>
</tr>
<tr>
<td>Okra</td>
<td>bhīṇḍā 'vegetable Abelmoschus esculentus'</td>
<td>Pañcatantra</td>
<td>CDIAL 9492; NIA</td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td>*roṭṭa</td>
<td>rotikā</td>
<td>CDIAL 10837 Pkt. roṭṭa 'rice flour' Deśinamāḷa ; roṭṭa, ruṭṭiā 'bread'</td>
<td></td>
</tr>
<tr>
<td>Areca nut (add.)</td>
<td>*suppāra</td>
<td>NIA only</td>
<td>CDIAL 13482, Hindi supāri</td>
<td></td>
</tr>
<tr>
<td>Sheep; Most other names for domestic animals are IA.</td>
<td>bhedra/medra/menḍha 'ram' Lex.</td>
<td>Pkt. menṣṭhi 'sheep'; mindha(ka) Buddh. Skt</td>
<td>mendha, metjua, medhra(ka), Lex. MIA, NIA; CDIAL 10310; Cf. 9604, 9606</td>
<td></td>
</tr>
</tbody>
</table>

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III 13: etym? kṣīrā' etc.
III 85: loan v
III 106: kundu conte Irania Austro origin
III 36: expl.'
III 43: Conne roṭ 'to beat'; Pkt. rō ṭā
III 4T: apparent foreign words conne with bheda bhēdr; bhēdi