



The Linguistic History of Some Indian Domestic Plants

Citation

Witzel, Michael. 2009. The linguistic history of some Indian domestic plants. *Journal of BioSciences* 34(6): 829-833.

Published Version

doi:10.1007/s12038-009-0096-1

Permanent link

<http://nrs.harvard.edu/urn-3:HUL.InstRepos:8954814>

Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Open Access Policy Articles, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#OAP>

Share Your Story

The Harvard community has made this article openly available.
Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

Michael Witzel,
Harvard University
witzel@fas.harvard.edu

THE LINGUISTIC HISTORY OF SOME INDIAN DOMESTIC PLANTS

From* the mist of times emerge our earliest Indian texts, the R̥gveda (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.¹ The latter belongs to the Dravidian family² that is restricted to the subcontinent but may have relatives in Northern Asia (Uralic) and beyond.³

As for the plant names found in these old sources, it must be observed that recent advances in archaeobotany⁴ 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.⁵

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.⁶ Indian rice (*vr̥thi*, *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).⁷

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,

* The transcription followed in this paper is the standard scholarly one for Indian languages, thus ā = long a, ī = long i (ee), ū = long u (oo), e, o (long e, o), etc.; consonants: ṛ, ṅ, ṇ, ṭ, ḍ, ś, ṣ; however Dravidian/Middle Indo-Aryan: long ē, ṃ; Tamil alveolar ṇ, ṣ = r + double underdot -- as in 'Tamil/Tamizh'. – Reconstructed forms are indicated by *; > means 'develops to', < 'is derived from'; *h₁₋₃ are the reconstructed IE laryngeals, similar to the Tamil *āytam* consonant. For ease of reading, ə is used (in reconstructions marked by * only) to indicate 'any vowel', instead of the linguistic shorthand V.

¹ See Beekes 1995, Szemerényi 1996. For material archaeology, see J.P. Mallory & Adams 1997.

² See now Krishnamurti 2003.

³ Such as the proposed Nostratic superfamily that includes IE, Dravidian, Uralic, Altaic, Afroasiatic and Kartvelian (Georgian). For Nostratic dictionaries, see <http://starling.rinet.ru/main.html>.

⁴ Fuller 2006, 2009.

⁵ Fuller Diss. London, and Fuller 2006, 2009.

⁶ Tewari, R. *et al.*, 2009. -- However, see discussion by D. Q. Fuller, <http://Archaeobotanist.blogspot.com/indian-archaeology-watch-lahuradewa.html>.

⁷ Sato 2004, 2006.

one in the east (Orissa/Jharkhand), and one in the west (W. Gujarat, S. Rajasthan).⁸

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 subdamiliy 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 languages¹¹ 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. Differently 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

⁸ Fuller 2006, 2009.

⁹ The ancient Iranians (like King Darius, 519 BCE) also called themselves *ariya/a¹riia*.

¹⁰ Elfenbein 1987.

¹¹ See now the comprehensive volume edited by G. Anderson, 2008.

¹² See Berger 1998.

¹³ Witzel, M. 1999; cf. <http://ejvs.laurasianacademy.com/issues.html>.

languages. For example, in Vedic Sanskrit a word like *busa* ‘drizzle, chaff’¹⁴ is actually not allowed: it should have been *buṣa* with a retroflex ṣ (as in *Kṛṣṇa* or *bhāṣā*). Indeed, the word is found in the non-IE Burushaski language as *busa* (and in neighboring Iranian languages).¹⁵

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)¹⁶ down to the records of early historical times.¹⁷ 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 *ātā* ‘flour’ in Hindi, etc. It goes back to the non-attested Vedic Sanskrit **ārta* ‘flour’, CDIAK 1338, from *ṛt* ‘to grind.’¹⁸

The current investigation also includes the detailed study of agricultural terms (and their sources) in Hindi by C. Masica¹⁹ and its use by D. Fuller,²⁰ whose discussion fortunately includes their respective area of origin. For IA, we have the etymological dictionary of Sanskrit by Mayrhofer²¹ and Turner’s *CDIAL*.²² For Dravidian there is the etymological dictionary by Burrow and Emeneau²³ – actually just an extensive list of

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 *busá* (cf. Kuiper 1991).

¹⁵ And, as loans in E. Iranian: Sargoli *bus* and Waxi *bis*, cf. also Munda: Santali *busu’b*, see Pinnow 1959: 93 § 120; cf. *EWA* II 229 sq.; for a possible Munda origin (cf. Sadani *bhusū*) see Osada, *IJ* 38, 1995.

¹⁶ For the Vedas and their strict oral transmission, see Witzel, M. 1997, <http://www.people.fas.harvard.edu/~witzel/canon.pdf>.

¹⁷ Texts before the first historical documents Aśoka’s inscriptions, c. 250 BCE), include the Buddhist canon in Pāli collected c. 250 CE under Aśoka, Pāṇini’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*.

¹⁸ Turner, *CDIAL* 1338 with discussion, **ārta* ‘flour’, *aṭṭa* ‘food’ MBh., ‘boiled rice’ lex; Gāndhārī: Niya Doc.s; Gy. eur. *aro*, *varo*, *vanro*, etc.; Dardic: *ōṭ*, *āṭ*, *aṭ* etc. K. abl. *āṭ*; S. *aṭo* ‘meal’, L. *ātā* ‘flour’, P. *āṭṭā*, etc., N. *āṭo*, *āṭo*, A. B. *ātā*, etc., H. *ātā*, G. *aṭo*; M. ‘grit of rice boiled and mixed with flour’.

¹⁹ Masica 1979.

²⁰ Fuller 2006, appendix.

²¹ *EWA*: Mayrhofer 1986-2000.

²² *CDIAL*: Turner 1966.

²³ *DEDR*: Burrow, T. and M.B. Emeneau 1984.

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 (*saptá grāmyā ośadhayah*). The 7 plants are: rice, barley, sesame, mung beans, millets, wheat, lentil, other beans, and the pulse *Dolichos biflor*,²⁸ and the 10 are: *vrihí* rice, *Oryza sativa*; *yáva* barley, *Hordeum vulgare*; *tila sesame*, *Sesamum indicum*; *māṣa* mung beans, *Phaseolus mungo*; *ánu* millet, *Panicum miliaceum*; *priyáṅgu* millet, *Setaria italica* (L.), *Panicum italicum*; *godhūma* wheat, *Triticum aestivum/sativum*; *masūra* lentil, *Lens culinaris*; *khálva* beans, *Phaseolus radiatus*, a variety of *Phaseolus mungo* = *māṣa*(?); *khalá-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: ṚGVEDA AND OTHER VEDIC TEXTS

In this section our earliest texts are used: the Ṛgveda 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 Ṛgveda 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

²⁴ Krishnamurti 2003.

²⁵ David Stampe, online dict.: <http://ling.lll.hawaii.edu/austroasiatic>.

²⁶ Berger 1998.

²⁷ Benedict 1972.

²⁸ Taittirīya Saṃhitā 5.2.5.5, Śatapatha Brāhmaṇa 14.9.3.22.

²⁹ W. Rau, 1997: 205.

³⁰ See Witzel 1997; 2006.

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.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 *corn* ‘wheat’ > American English ‘maize.’

§ 1.1. GRAIN, CORN

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

1.1.1. OIA *dhānā́* ‘corn, grain’ is derived from Proto-Indo-European (PIE) **d^hohnáh₂* ‘corn’. It is still found in the Indo-Aryan (Dardic) language Khowar *dān* ‘parched grain’ and in various Iranian languages.³⁴ The word and its derivatives are found in virtually all IA languages, if arranged as per R.L. Turner’s³⁵ 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 (*CDIAL* 6777):

RV, Vedic, Pali, Prakrit. – Gy(psy) - K(ashmiri) – S(indhi) – P(anjabi) - Pah(ari) – N(epali) – A(ssamese) - B(engali) – Or(iya) – Bi(hari) - Mth (Maithili) – Bhoj(puri) – Awadh(i) – H(indi) – G(ujarati) – M(arathi) – Si(nhala).

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.

1.1.2. Another word for grain is: PIE **s^esyā*, **s^esyóm* ‘corn’ > OI *sasyám* ‘grain to be harvested, seeds’, *sasá-* m. ‘food, herb, grass, seeds’.³⁶ (*CDIAL* 13294),³⁷ found also in

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 *bhūrja*, 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 from 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 *parkaṭī* > ‘*ficus infectiora*’, (*EWA* II 194 s.v. *plakṣa*), and that for ‘willow’ in *vetasa* > ‘*Calamus rotang*’ (*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.

³³ Many of the following IE details are taken from Wiczak 2003.

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

³⁵ See Turner, *CDIAL* 6777 *dhānā́* ‘corn, grain (esp. parched grain)’ for details about the various NIA languages including cf. various derived forms: P. *dhānā́* ‘parched grain’; H. *gur—dhānī* f. ‘parched wheat and molasses’, etc. and *CDIAL* 6778 *dhānyā* ‘pertaining to grain’.

³⁶ Avestan *hahiia*, *haṅhuš*; further Hittite, Celtic > Provençal, Catalanian, Spanish; Gaulish, Welsh,

Iranian and other IE languages.

1.1.3. Perhaps related is PIE **sīto-*, **sītyo-* ‘corn’ > OI *sī(i)yam* n. ‘corn’ (lex.), ‘ploughed’ in Pāṇini; Khowar *siri* ‘barley’, Kalasha *šilī* ‘millet.’³⁸ However, the root **sā* ,to sow‘ as seen in Skt. *sītā*, *sīrā*, etc., is not from IE but stems from a Central Asian substrate and thus is not related to IE **seh₁* ‘to sow’ : **séh₁m*, ‘grain’ as in Latin *sēmen* ‘seed.’³⁹

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: **h₂ad-* ‘grain’: Avestan *āδū-* ‘grain’, Sogdian *’d’wk* [*āduk*] ‘corn, grain, cereals,’⁴⁰ and, equally so, PIE **gr̥nom* ‘grain’ > ‘corn’, the origin of English ‘grain.’⁴¹

§ 1.2. BARLEY

The most typical IE food grain was barley. It ultimately stems, along with wheat, from the Fertile Crescent. Its IE term *yéwh₁os* 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 *yéwh₁os*, *-om* ‘barley, corn’ > OIA *yáva-* m. ‘barley’; in Iranian: Avestan *yauua-* ‘grains’, *yauua-ha-* ‘pasture’; Ossetic *yāw* ‘millet.’⁴² 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 - Sinhala; in some cases the meaning of the word has changed as to include more recently prominent cereal plants.⁴³

Breton; note the loan into Eastern Caucasian **sūsV* ‘rye’ > Chechen *sos* ‘oats’, etc.

³⁷ *sasá* ‘grain, food’ RV. Or. *sasa* ‘kernel, nutritious part’; A. *xah* ‘crops’. – The derivative 13295 *sasyá* ‘grain, fruit’ AV., is found in K. *sas* ‘beans or peas or lentils, etc. porridge’ B. *sās* ‘grain, fruit, fleshy part of fruit’, Or. *sāsa* ‘kernel, nutritious part’; Old Si. *hasa* ‘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. -- **h₂adh_{or}* ‘Triticum dicoccum’; -- Hittite, Armenian < **h₂ad-* ‘grain’.

⁴¹ In Pashto *zazay* ‘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 *zeiaí* pronounced [zdeiaí/tseiaí] ‘Triticum monococcum’, Cretan; Old Irish, Lithuanian *jāvas* ‘Getreideart’, pl. *javaĩ* ‘Getreide’; Russian, Tocharian B < **yewh₁om*.

⁴³ For details see *CDIAL* 10431 *yáva* ‘barley,’ attested from the RV onward. Changes in meaning are seen in European Gy. (eng. germ.) ‘oats’, Nuristani: Kāmviri *juvór* ‘corn (maize).’ Derivations (with modern reflexes) are the Late Vedic 10072 *yāva* ‘consisting of or prepared from barley’ KātyŚr., with reflexes in Sindhi and Nepali; the Late Vedic *yāvaka-* ‘a particular dish of barley’ Gaut.; the early post-Vedic 10439 *yavānī* ‘a kind of bad barley’ Pāṇ. com., ‘Ptychotis ajowan’ Suśr. and the Vedic 10438 *yavāgū* ‘rice-gruel(!)’ TS. -- Further related is the post-Vedic *CDIAL* 10434 *yavanāla* ‘Andropogon bicolor’ Suśr., found from Lahnda *jōḍūl* ‘oats, a weed like oats’ to N. *junyālo*, *junelo* ‘big millet,’ H. *junhār* etc. ‘millet’ and M. *jōdhā* ‘the grain Holcus sorghum;’ cf. finally 10437 *yavākāra* ‘barley-shaped’ and derivatives, with meanings ranging from jowār, millet, to sorgum,

The other PIE designations for barley are only preserved in the mountainous arc northwest of the Greater Panjab.

1.2.2. PIE **(h₂)álb^hi* ‘barley’ > Iranian **arbusā* > Khotanese *rrusā*, Wakhi *arbāsi* ‘Hordeum’, Pashto *ōrbūše* ‘barley’; further, found in Greel and Albanian; all derived from < PIE **alb^hos* ‘white’.

1.2.3 PIE **b^hárs-* ‘barley’ > Iranian: Ossetic Digor *bor* (*xwar*) ‘millet’; Yazgulam *vragt* ‘flour’ < **bršta*.⁴⁴

1.2.4. PIE **g^hérsd^(h)-* or **g^hrôd^h-* ‘barley’ > Iranian: Middle Persian *jurtāk*, *zurtāk* ‘corn’, Persian *zurt*, *zurd* ‘a kind of millet’, dial. *jurdā* ‘corn’.⁴⁵

1.2.5. PIE **kaskos* ‘barley’ > Iranian **kaska-* > Khotanese *caska-* ‘corn’, Munjan *kosk* ‘Hordeum’, Šughni *čūšč*, Rušani *čošč* ‘barley’ etc., Persian *kašk*, Armenian.⁴⁶ Note the unrelated Nuristani words (*CDIAL* 3112) Kati *kāčō* ‘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 **rug^his*, **rug^hyos* ‘rye’ > Old Iranian **rujika-* > E. Iran. Šughni *rožz* ‘ear of rye or rice’, Wanetsi *rōžj* ‘ear of corn’.⁴⁷ PIE **rug^his* 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[rj]* ‘oats’ > OIA *śāpa-* m. ‘driftwood, drifted reeds’; Iranian: Alan *zabar* ‘*Avena*,’ Šughni *sip(i)yak* ‘a kind of millet’,⁴⁸ as in English dial. and *haver*, German *Hafer*.

barley, or even ‘soft grass of high altitude’ (Pahari). Prehistorically related is 10436 *yávasa-* ‘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 **burr-/*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 *rdrd* ‘cereals’, Hausa *roogo*; and East Caucasian **rōčêV* ‘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: Rošani *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 *šāpas* ‘stalk, branchlet, splinter.’ Cf. *EWA* II 629, *CDIAL* 12387.

1.4.2. PIE **pūrós*, -óm ‘Triticum compactum’ > OI *pūra*- m. ‘cake’ *CDIAL* 833.⁴⁹

1,4.3. The neighboring Iranian languages still have another variety: PIE **h₂(a)wiġ-i/-s⁰* ‘oats’ > Iranian **avi[z]-sa-* > Khotanese *hqu* ‘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 **h₂árg^{wh}3* : **h₂órg^{wh}eno-* ‘millet’ > Nuristani **arjana-* > Aškun *az.ü*, Kati *awrī* ‘millet’; Dardic: Pašai *aṛīn*, Kalaša *aṛin*, etc. ‘millet’.⁵²

1.5.2. PIE **melH-i*, ⁰*n-és* ‘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 (Kāmviṛi) *kārī* ‘millet’ and Dardic designations of ‘millet’: Kalaša *karas*, Khowar *khəṛāš*, Phalura *kāraž*, Dameli *kārac*.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 **swah₂rah₂* ‘common millet’ > Iranian *hwārā-* > Alan *huvar* ‘millet’, Ossetic Digor *xwar* ‘corn, grain, millet’, Iron *xor* ‘corn, barley *Hordeum vulgare*’, Sogdian *γwr-*

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 *furze* ‘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 *ždan*, Yidgha *yūrzun*, Wakhi *yīrzn*, Khotanese *eysā*, *āysam* ‘millet, *Panicum miliaceum*’; also in Greek, Old Irish. See *CDIAL* 636 **arjana-* ‘millet’, but cf. *CDIAL* 95 **aṇuni-* ‘millet’, *āṇu-* in Nuristani *ārīn* etc. ‘millet’, and in Dardic: Kalasha *aṛin*, etc.; see below *aṇu* §2.4.

⁵³ In Greek, Latin *milium* ‘millet’, Old Norse, Lithuanian; -- etymology: IE **melh-* ‘to grind, mill’; or **melh₂-n-* ‘black’, cf. OI *śyāmāka-* ‘Indian millet / *Panicum frumentaceum*’: *śyāmā-* ‘black’, opposite IE **alb^h-i* ‘barley’ < IE **alb^ho-* ‘white’. Cf. also Georgian *meleuli*, *meleuri* ‘millet bound up in harvesting’ from **meli* ‘millet’ – Turner, *CDIAL* 10385: from Skt. *mlāna-* ‘withered, shrivelled, dark-coloured’, seen in Khowar *blan* ‘a kind of barley.’

⁵⁴ Hittite *karas-* ‘wheat *Triticum dicocum* 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 *kāśa* ‘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 *kās* ‘a kind of white grass’. Turner *CDIAL* regards the connection of Dardic *kāraz*, *kāraž* ‘millet’ as not clear.

‘barley’, Middle Persian *xwār* ‘food.’⁵⁶ One may compare Nur. Kāmvi: *r’oa, r’ov* millet (Panicum mileacum).⁵⁷

§ 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-Ṛgvedic 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 IIR 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.⁵⁸ 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.)⁵⁹ It is notable that the cultivation of wheat was arrested in the area west of the Indus for several thousand years,⁶⁰ and that it spread further east and south only after extensive acclimatization around 2200 BCE.

OIA *gōdhūma-* (with a popular etymology meaning ‘cow smoke’!)⁶¹ is an ultimately Near Eastern name. This is seen as a loan in Hittite *kand*,⁶² O. Egypt. *xnd*; Afroasiatic **hənt-* ‘a kind of cereal’ > Akkadian *uṭṭatu*, Hebr. *ḥittā*, Arab. *ḥintat-*;⁶³ cf. also North Caucasian **henk^w-/*honk^w-* ‘barley,’⁶⁴ and a supposed ‘Anatolian’ **ghond[ū]*,⁶⁵ comparable with Drav. (Kanada) **gōdi*. A further development, east of the Fertile Crescent, was Iranian **gant-um*.⁶⁶

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

⁵⁶ Or PIE **swer-* > Iran. **x^var-* ‘to nourish’; -- Albanian, Lithuanian, Latvian, Tocharian AB; further in Iranian and Baltic: Avestan *x^varəna-* ‘food’ > Slavic, Lithuanian; cf. also Semitic **šū^cār-(at-)* ‘barley’ (lit. ‘hairy’), Uralic **šōra*.

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

⁵⁸ In the area west of the Zagros and south of the Caucasus, in the western Fertile Crescent. Some scholars had claimed, parallel to the recent, still fashionable denial of movements of people, a purely local development (cf. Allchin 1995 : 46, cf. Allchin, F. R. and N. Hammond 1978; Kenoyer 1998).

⁵⁹ According to Berger (1959: 42) Bur. *guriñ, gureñ* (pl.), *γárum* < **γor-um* < ***γund-*; 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 **g^(w)i/ar ~ garga/ir* ‘grain, bean’, Semitic: Hebrew *gērā*, Arab. *z,arz,ar-*, Chadic **('a-)g^(w)a/ir ~ *gargar*: Hausa *guro*, Cushitic: Oromo *garii* ‘seed’, etc.; cf. also Afroas. **g^war-*, *gu/ar* ‘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 *go-dhūma* ‘cow smoke’ (*EWA* I 498-9, Kuiper *IJ* 34, 1991, 119) which is as nonsensical as many such adaptations of foreign words (cf. Amer. Engl. *wood-chuck*, ultimately from a local Amerindian word, *ōsitomu*).

⁶² Loaned from local **knt-* ‘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 *ōX*, Ubykh *X_wa* ‘barley’.

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

⁶⁶ As in Avestan *gantuma-*, Sogdian *gantum* vs. **ganduma-* > Khotanese *ganam*, Pašto *yanəm* (< **gandūma?*), Yigdha *gondum*, Munjan *γandām*, Middle Pers. *gandum*, Baluchi *gandīm*, etc.; cf. Berger 1959: 40sq., *EWA* I 498.

via the southern route). The Iranian form has also been taken over by the Drav. newcomer⁶⁷ in the region, Brahui with *xōlum* < IA **γolum* (CDIAL 4287).

When the local pre-Iranian word **gantum* entered the Panjab, it inexplicably changed its initial syllable **gan-* to *go-*, thus **godum*: the Pre-Iranian form **gantum* should have resulted in Vedic **gan-tuma* or **gan-dhūma*.⁶⁸ The change from *-an-* to *-o-* is not typical for the Panjab but it is found in the very sparsely reconstructable southern Indus language.⁶⁹ The southern (Meluhhan) substrate form **gōdi* must have influenced the northern **gantum/gandum* so that the popular etymology *go-dhūma* 'cow smoke' was made possible.⁷⁰ Notably, as mentioned, the word is *not* attested in the oldest text, the R̥gveda. The change to **godum* was perhaps due to a northward expansion, out of Sindh, of early Dravidian speakers at the end of the R̥gvedic period.⁷¹ In the end, IA *godhūma* (CDIAL 4287) is found in Vedic and Nuristani and then from Dardic all the way south to Sinhala.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.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 Hindukush/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 IIr (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 R̥gveda: *busa* 'chaff' (see above) or *kīlāla* 'biestings'), which is in need for more study.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.) *gandhālu* 'fragrant rice', Pashai *gandār* '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 R̥gvedic 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 Samhitās)VS. Pa. *gōdhūma*, Gāndhārī: NiDoc. *goduma*, *gohomi*, *goma*, Pk. *gōhūma*, Gy. *gišu*, *gēsū*, *gihu*, *giu*, etc. 'wheat, rye'; -- Nuristani: *gōm*, *gūm*, etc. -- Dardic: *gōm*, *gōm*, *gūm*, *gōom*, *ghōm*, Kalasha *gūhum*, Khowar *góm*, etc. K. *guyu* (← Indic?), S. *gehñ*, WPah. *gahñ* etc., Ku. *gyñ*, N. *gahñ*, *gañ*, A. *ghēh*, Or. *gahñ*, WBi. *gohñ*, Bhoj. Aw. *gōhñ*, H. *gohñ*, *gehñ*, *gahñ*, G. *gahñ*, *ghañ* m., M. *gahñ*, Ko. *gamiv*; Si. *goyama* 'growing corn'; cf. also A. *gom-dhān* 'maize'; B. *gom*, *gam* 'wheat', Or. *gahama*, EBi. *gahum*, *gohum*, Mth. *gohum*, *gahūm*.

⁷³ See Lubotsky 2001; Witzel 1999, 2003.

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 R̥gveda. It is a purely local one, representing the lost substrate language of the Greater Panjab. Some 300 words⁷⁵ 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

§ 2.1. BARLEY

The indigenous word for barley has one such Para-Munda prefix. It is attested in Late Vedic as *kulmāṣa*, which compares with other words in *-āṣa, -āśā*⁷⁹ such as *māṣa* ‘beans’. *CDIAL* has 3349 *kul-māṣa* ‘half-ripe barley’ ChU, ‘sour gruel of fruit juice or rice’ Suśr. Pa. *kummāsa* ‘junket’; Pk. *kummāsa* ‘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.

§ 2.2. WHEAT

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

⁷⁵ See list in Kuiper 1991, and cf. http://www.aa.tufs.ac.jp/sarva/materials_frame.html.

⁷⁶ Ravi phase in the Panjab, early Mehrgarh in Baluchistan, Birrana/Farmana in Haryana.

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’.

⁷⁸ See his detailed abstract in Fuller 2006, 2009.

⁷⁹ See the numerous cases listed and discussed in Kuiper 1991.

4287 *gōdhūma*).

§ 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 Saṃhitās): *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*, *rič* ‘barley’ :: Kāmvirī *wrūji* ‘husked uncooked rice’, Pr. *wuzī*, as well as in NIA Dardic: Shina *brīū* m. ‘rice’, Kohistani *bīū*, 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).

⁸⁰ Further: *nīvāraka* Suśr. Pa. *nīvāra* ‘wild rice’; K. *niwar* ‘a kind of hardy rice growing at high altitudes’; H. *nyār* m. ‘wild rice’; G. *navār*, *namār* m. ‘rice growing spontaneously’. A derived form is 7605 *naivārā* ‘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.

⁸³ Fuller 2006, 2009: 5; Fuller, *The Archaeobotanist* 25 Aug 2009.

⁸⁴ Karlgren 1923, no. 543 **liang* < ,*liang* ‘millet, sorghum’, 1095 **tsi* ‘common millet’, 1051 **tsi* < *tsiak* ‘panicked millet, god of agriculture’, 903 **ṣu* < *d’z’juet* ‘glutinous millet’, 135 **si^Wok* ‘rice, millet’, 914 **si^Wo* ‘glutinous millet.’

⁸⁵ Fuller 2006, 2009: 8.

⁸⁶ Southworth 1988: 665; Randhawa 1980-1986; summarized by Meadow 1998, Meadow and Patel 2003, Fuller 2006, 2009.

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,⁸⁷ 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 *aṇu*, *priyaṅgu*, *kaṅku*, seem to be interrelated. They will be discussed next. The words *aṇu* and *priyaṅgu* are relatively old, as they occur already in Vedic (Yajurveda Saṃhitā).

§ 2.4.1. *CDIAL* 192 *áṇu* ‘the grain-plant *Panicum miliaceum*’ VS. Pk. *aṇu*, *aṇua*, *aṇuā* ‘a sort of edible grain’; also: 195 **aṇuni* ‘millet.’⁸⁸ 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’ SāmavBr. 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.⁸⁹

Ved. *priyaṅgu*⁹⁰ seems to have been changed by popular etymology, like several other agricultural terms dealt with earlier (*godhūma*, *gōdi*).⁹¹ The designations Ved. *aṇu* and **aṇuni* (*CDIAL* 195) point to a contamination or cross of **kaṅgu* and **(k/g)aṅgu* and IA *aṇu*, thus: *kaṅgu* : **aṅgu* : Ved. *aṇu*⁹²

§ 2.4.3. However, **kaṅgu* is attested with some divergent IA forms, -- always a good indication of varying local substrates: **kaṅkunī*, **kaṅgunī*, **taṅgunī* (*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 *kampu* (= Skt. *kambū* Hemādri), and Proto-Munda **gañ(-)gay*.⁹³ These words cannot easily be traced back to a single source. Hindi *kaṅgnī* can be compared with IA **kaṅkunī* *CDIAL* 2606, less so with Tamil *kampu* and

⁸⁷ Kenoyer 1998: 163, 173, 178, Glover and Hingham 1996: 413-441.

⁸⁸ Phal. *āṇu* ‘millet’; Nuristani and Dardic 195 **aṇuni*: Kāmiviri āñ ‘millet’; D. *ārīn* ‘millet’, Kt. *awrī*, Dm. *ārīn*, Kāmiviri *āñe* ‘grain for eating’ > Kal. *arīn*, Kho. *oḷīn*, etc.; all < **aḍin*. Cf. Sh. *āno* ‘Indian millet.’

⁸⁹ Further: Pa. *piyaṅgu* ‘a panic seed, a medicinal plant’; Pk. *piamṅgu* ‘millet’; K. *pinga* f. ‘P. italicum’; M. *pīgvī*, °*gī* ‘heart—pea, *Cardiospermum halicacabum*’, *pīgvē*, °*gē* ‘its seed’; Si. *piyaṅgu* ‘millet’, *pupaṅgu* ‘the plant *Sinapis nigra*.’ Imported into E. Iran.: Shgh. *pinj* ‘*Panicum italicum*’, Wj. *puñjev*.

⁹⁰ *EWA* II 190.

⁹¹ If it originally contained the substrate prefix **pər-* (Kuiper 1991: 42f.), then reinterpreted as **priya+gu* ‘dear cow.’

⁹² Kuiper 1991: 38 on the loss of initial consonant *k-*; note also *CDIAL* 112 *ānkūrā* ‘sprout’ Uṇ. S. *āgūru* m. ‘sprout’; L. *aṅgurī* ‘blade of corn when it first appears’, P. *aṅgūrī*, *uṅgurī*, *āgūr* ‘granulation in a healing sore’; H. *ākūr*, °*rā* m. ‘sprout’, next to **prānkūra* (for which see Kuiper 1991 on a substrate prefix **pər-*).

⁹³ Southworth 1988: 660, Zide, A. and N.H. Zide 1973: 8.

⁹⁷ Note also *i-kōngó* in the language of the Ekonda, (Lakes Tumba and Leopold II area). The same word is shared by their Pygmy neighbors, the Batswa.

Munda **gañ(-)gay*. The ultimate source of these words may have had a form such as ***kañ-Cə* (C indicating an uncertain consonant).

Indeed, the original source of *kañku-* and its derivatives lies in Africa. It is known that African millet was imported into India before 1900 BCE. As expected then, ***kañ-Cə* and even *kañgu* is reflected in Bantu --itself a latecomer in E. Africa-- where we find Proto-Bantu **kangu* and **pungu*.⁹⁷ Agriculture had spread to the area around 3500-2000 BCE, though the arrival of Bantu speakers in East Africa is later.⁹⁸ 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 **gañgay*, 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, *bajra*’ is from a substrate as well, though already attested in Late Vedic: CDIAL 9201 **bājjara* ‘millet’, HŚS *varjari*¹⁰² (cf. § 3.2). The

⁹⁸ Ehret 2002.

¹⁰¹ CDIAL: Pa. *sāmāka* ‘P. frumentaceum’, Pk. *sāmāga*, etc. S. *sāḍ*: ‘P. frumentaceum and its grass’; WPah.bhal. *śāmāu* m. ‘a kind of darkish grass’; N. *sāmā* ‘a weed among rice’; B. *sāmā* ‘millet’; Or. *suācāulā* ‘P. frumentaceum’; Bi., Mth, etc.; H. *sāwā*, *sāwā*, *sāmā* m. ‘P. frumentaceum’; G. *sāmō* m. ‘inferior kind of self—sown grain’; M. *sāvā*, *sāvā* m. ‘P. frumentaceum or miliaceum’, Si. *hāmi*, *amu* ‘the grain *Paspalum scrobiculatum*’; -- further Wg. *śamāk*, *śamāk* ‘oats’; L. *savāk*, *savāk* ‘the grass P. colonum,’ ‘the grain *Ophismenus frumentaceus*’; P. *sāvak* ‘P. colonum’, *suāk*, *sāuk*, *saūk* ‘wild rice’, *soak* ‘a kind of millet’; --however, **śyāmākka* → Psht. *śamāxa*, *śamūxa*; cf. CDIAL 12668 **śyāmākatṛṇa* ‘straw of a kind of grain’. M. *sāvyaṇ* ‘straw of *Panicum frumentaceum*’.

¹⁰² S. *bājhari*, *bājhirī*, *oro* ‘the grain *Holcus spicatus*’; L. *bājra*, *bājhrā*, *orī* ‘spiked millet’; P. *bājra*, *orī* ‘millet’, N. *bājuro*, B. *bājra*, Or. *bājarā*; Bi. *bājra* ‘millet’, *bājri* ‘a small pea’; Mth. *bājra* ‘millet’, H. *bājra*, *bājra* m.; G. *bājri* ‘millet’, *orī* ‘a large variety’; M. *bājra* ‘millet’, *orī* ‘a small variety’.

word is attested from the W. Panjab to Maharastra.

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.¹⁰³ However, it can be added that the Nur. form (*kāc-*), along with Vedic (*kāśa*) point to an Indo-Iranian reconstruction **kāc’a-*. The word may be another older, BMAC loan.

Nur.; -- SLPKuNABOrBiMthHG

§ 2.4.7. The early word *CDIAL* 5827 *tilā* ‘*Sesamum indicum*’ AV., **tilaka*, **tilla* has been regarded as a Munda word.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’, *tilvila*)¹⁰⁵ that belong to the prefixing language that forms a substrate in early and later Vedic. The word *tila* is attested from Kashmiri to Sinhala¹⁰⁶ and survives in the modern *tel* ‘oil’ as well.

KLPWPahKuNABOrOAwBiMthBhojHOMarwGMSi; → Mesopotam.

§ 2.4.7 Hindi *kodon*, *CDIAL* 3515 *kodrava* ‘grain eaten by the poor’ Mbh., cf. *koradūṣa* ‘idem’ Suśr., *kodravaka* KŚS; and cf. *DEDR* 2163 Tam. *kural*, Kan. *koṛale*, *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 **challī* ‘maize,’ 9879 *markaka* ‘*Ardea argala*’ and 10434 *yavanāla* ‘*Andropogon bicolor*’, cf. Suśr., *yōnala*; with which compare also Dravidian *DEDR* 2896 Ta. *cōlam*, *coṇṇal* ‘maize, great millet, *Sorghum vulgare*.’

¹⁰³ Nur.: Kt. *kāc* ‘millet’, Wg. *kāc*; S. *kāhu* ‘S. spontaneum’, °*hī* ‘a species of grass’; L. *kāh* f. ‘S. spontaneum’; P. *kāh*, *kāhī* ‘S. spontaneum’, *kāh* ‘a kind of reed’; Ku. *kās* ‘a kind of grass used for religious purposes’; N. *kās* ‘S. spontaneum’, A. *kāhuwā*, B. *kās*, Or. *kāsa*, *kāśa*, *kāīca*, Bi. Mth. *kās*, *kāsī*, OAw. *kāmsa*; 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. *kāraz*, Sv. *kāraž* ‘millet’ is not clear, as are Iranian forms in *-h-*, see *EWA* I 345.

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

¹⁰⁵ See discussion in Witzel 1999, 2004.

¹⁰⁶ Pa. *tila* ‘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. *tiḷa*, OAw. *tila*; H. *til* m. ‘sesamum plant and seed, a minute fragment’; OMarw. *tila* ‘small particle’; M. *tiḷ* ‘sesamum seed’, Śi. *tala* ‘plant and seed’. - P. (Dogri) *tir—caoli* ‘sesamum and rice with sugar’. -- Further: Or. *tiḷā* ‘a species of sesamum seed’; G. *taḷā—tādḷā* ‘as distinct as sesamum and rice, separated, dispersed’; M. *tiḷī* ‘a small white kind of sesamum’. -- Finally: Ku. *tiḷ* ‘sesamum seed’, Bi. *tiḷ*, *tillī* ‘species with a white seed’; Mth. *tiḷ*, *tilā* ‘sesamum seed’; Bhoj. *tiḷi*; G. *til*, *tal* ‘sesamum’, *talī* ‘a small variety.’

Apparently all these words have been taken from older designations for cereal plants. The common NIA word *makai* (or similar) is derived from *CDIAL* 9879 *markaka* ‘*Ardea argala*’.¹⁰⁷

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

In his 1969 study¹⁰⁸ 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, <http://www.aa.tufs.ac.jp/sarva/entrance.html>).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.¹¹⁰ The designations for cereals are *bājrā* 'millet', *dhān* 'rice', *makai* 'maize', *gehūṃ* 'wheat'.

In contrast, the isolated Kusunda language in the hills of Nepal surprisingly has independent terms.¹¹¹ The Kusunda were, until recently, hunter and gatherers who interacted with villagers to acquire cereals. One must wonder from which substrate language they derived their agricultural words, such as *khərwi*, *khərugəi* 'wheat', *khaidzi* food, cooked rice (cf. *khaṅ-d-i* 's/he parches grain'). However *rāko*, *raṅkwa* 'millet' seems related to Proto-Austroasiatic **rkəw*, Munda *ruṅkub* for 'rice,' pointing to an earlier Munda occupation of the plains south of Nepal.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:¹¹³ such as seen in *pippala* 'fig' RV : (*su-*)*piṣpala* AV, MS, *guggulu* 'bdellion' AV, PS : *gulgulu* KS, TS; *kakṛaṭa* PS KSAśv. : *kakṛaṭa* '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 **bājvara* or IA **bājara* 'millet' *CDIAL* 9201 *bājvara*, which turns up, slightly Sanskritized in a Late

¹⁰⁷ Dardic: Sh. *mākāi*, K. *makōyū* etc. S. *makāi*, *makī*, *makāñī*, L. *makaī*, P. *makaī*, *makkī*, *mak*, Ku. *makaī*, N. *makai*, A. *mākāi*, B. *makai*, Or. *makā*, Bi. *makaī*, *makaiyā*, Mth. *makaī*, H. *makkā* m., *makāi*, G. *makaī*, *makai*, M. *makā*; cf. *markaṭaka*, **markakakaṇa*, **markaka-tṛṇa*.

¹⁰⁸ Masica 1969.

¹⁰⁹ See upper right screen of: <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.

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.

¹¹¹ Watters 2005.

¹¹² Cf. Witzel 1999.

¹¹³ Especially of the mediae (*b*, *d*, *g*). They are often replaced by two dissimilar consonants (Kuiper 1991: 67).

Vedic text as HŚS: *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 *piplī/pīplā* < *CDIAL* 8205 *pippala*- ‘berry (esp. of *Ficus religiosa*)’ RV.; *pippalī* ‘berry’ AV., ‘peppercorn, Piper longum’ Rāmāyaṇa, *pippali* Āpast.¹¹⁷ is now found from Kashmiri to Konkani and Sinhala. Similarly, *kaith* < Skt. *kapittha* ‘a tree, Feronia elephantum, wood apple’ *CDIAL* 2749 (for which cf. also *aśva-tthā*), is seen from Nuristani and Dardic to Marathi. Further plants include 1693 *uḍidda* ‘a pulse’, 725 **allā* ‘name of a tree or plant’, (*Morinda citrifolia*), 9724 *maṭṭara* ‘pea’.¹¹⁸ However, 3061 *kāravēlla* ‘the gourd *Momordica charantia*’ is probably derived from Dravidian, and 13482 **suppāra* ‘areca nut’ (Kashmiri to Marathi) may be an old word, but the practice of consuming it with betel leaves is only about 2000 years old in S. Asia, but earlier in S.E. Asia.

§ 3.1. Tibeto-Burmese influence?

Next to the isolated substrates of Tharu and Kusunda, another important factor is Tibeto-Burmese, 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), *Kausīkī* (now the Kosi River), perhaps also *Kāśī* and *Kausāmbī* (now *Kosam*), that all seem to be based on Tib.-Burm. *khu, ku* ‘river.’¹²⁰

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

SPLWPahKuNAOBBOrBiMthBhojHOMarwG

¹¹⁴ *CDIAL* 9201 **bājjara* ‘millet’, see above, § 2.4.5.

¹¹⁵ *CDIAL* 9049 **phapphara* ‘buckwheat’, P. *phaphrā, phāphrā* ‘buckwheat’; WPah.jaun. *phāphrā* ‘husk of wheat’; Ku. *phāpar* ‘a kind of buck-wheat growing near the snow-line’; N. A. *phāpar* ‘buckwheat’; M. *phāprī* f. ‘a kind of pot-herb.’

¹¹⁶ *v/baraṭa* ‘seed of safflower’ Ṛgṛhas., *varaṭā* lex., but note Dardic: Shina *bḍrāo* f. ‘buckwheat’ (= Bur. *bḍru*); Bi. *barrī, barre* ‘seed of safflower’, H. *barrai*.

¹¹⁷ Probably of non-Aryan origin *EWA* II 133; cf. *piplu* from a similar source?

¹¹⁸ Cf. also *CDIAL* 13552 *sūjjī* ‘coarse wheat meal’, **sōjjī*, 10837 *rōṭṭa* ‘bread’.

¹¹⁹ *Kirāta* now designates the eastern Tib.-Burmese speaking Nepalese tribes of the Rai and Limbu; however, the *Kirātas* are attested since the Atharvaveda, see Witzel, M. Nepalese Hydronomy: Towards a history of settlement in the Himalayas. *Proceedings of the Franco-German Conference at Arc-et-Senans, June 1990*. Paris 1993: 217-266;

<http://www.people.fas.harvard.edu/%7Ewitzel/hydro.pdf>. For a recent discussion of Tibeto-Burmese homelands in the Himalayan region see van Driem 2006.

¹²⁰ Witzel 1993.

¹²¹ *EWA* II 632, takes *śāli*, AV *śāri*° as unclear. *CDIAL* 4749 deliberates the same non-Aryan origin as *tāṇḍula*, K. *tomul* ‘uncooked rice,’ perhaps having been contaminated, cf. also Dardic tor. *tunōl*; further: 12415 *śāli* ‘growing or unhusked rice’ MBh., Pa. *sāli*, Pk. *sāli*, Gy. *sal, sāli*; Nuristani: Ash. *salima*, Wg. *śēlī, śalimā*, Kt. *śāli* < Kāmvirī *śāli, śēlī*, Pr. *śilī*; Dardic: *śāli* ‘growing rice’, *śāl, sōle, śālī*, Kalasha *śālī* ‘growing or unhusked rice’, Khowar *śāli*, etc.; further: S. *sārī* f. ‘un-husked rice’; A. *xāli* ‘principal variety of transplanted rice’; B. *sāl, sāil* ‘a kind of rice’; Or. *sāli* ‘growing or unhusked rice’, Bi. *sāri*, H. *sāl*, G. *sāl, sāliyū*, M. *sāl, sālī*, Si. *hāl, āl*.

¹²² S. *cāuru, cāvaru* ‘a grain of rice’, *cāuro* ‘pertaining to husked rice’; L. *cāval, cāvul*, P. *cāval, cāvar, cāul, caul*, Ku. *caül*, N. *cāwal, cāmal*, A. *sāul*, OB. *tāula*, B. *cāul, cāl*, Or. *cāuḷa, cāura*, Bi. Mth. Bhoj. *cāur*, H. *cāwal, cāwal, cā~war*, G. *cāval*.

The question remains whether the word is related to Tib.-Burm. **dza* ‘to eat’,¹²³ because one has to take into account Dravidian *DEDR* 2391,¹²⁴ Ta. *aval* etc. ‘usually flat rice’, 2343 Ta. *camai*, 226, 268 Ta. *avi* (-*v*-, -*nt*). As initial consonant can disappear in Tamil, the related words in *c*-, *s*- in Gondi etc.¹²⁵ may preserve a form closer to **cāmal*.

An obvious latecomer is *cīna* ‘the Chinese one’, *Panicum miliaceum*,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.¹²⁷ The word has remained restricted to the northern IA languages:

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. *sūā*, *suā* ‘a kind of grass and its seed, *Panicum frumentaceum*, sarsaparilla’ 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.,¹²⁸ indicates a Gangetic origin (see § 2.4.5). The word is attested from Sindhi and Panjabi to Bihari and Gujarati.¹²⁹

¹²³ Bahing *dz’a*; Nagari *dz’ya*, Lushei *śa*, Burmese *tsa*, Garo *tśha*; Kanauri *za*, from TB **dza*, see Benedict 1972, no. 66, p. 28.

¹²⁴ 2391 Ta. *aval* ‘rice obtained from fried paddy by pestling it;’ *avai* (-*pp*-, -*tt*-) ‘to pound in a mortar, crush, cuff, prod;’ *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;’ *aky av-* (*avt*-) ‘to pestle (millet) third time.’ To. *af-* (*afit*-) ‘to pound with light strokes;’ *ofil* ‘puffed rice.’ Ka. *aval* ‘pound, beat;’ ‘pounding, beating in a mortar;’ (also *aval-akki* ‘rice bruised and crushed;’ Koḍ. *avl-akki* ‘rice fried and each grain pounded flat.’ Tu. *abepuni*, *abeyuni*, *abeccuni* ‘to beat or pound rice.’

¹²⁵ Kol. *cavli* mortar; Nk. *savli*, Pa. *cavil*; *cavkol* ‘pestle.’ Ga. *savul* ‘mortar,’ *savkol* ‘pestle,’ *savvul* ‘mortar,’ *savkol* ‘pestle;’ Go. *sahkī*, *sāhkī*, *sahki*, *cahki*, *hahki*, etc. (cf. 2799 Konḍa *sonki*, Pe. *henki*).

¹²⁶ 4842 *cīna* ‘*Panicum miliaceum*’, °*aka*, *cīnaka* ‘a particular grain’, *cīnāka* ‘fennel’ lex. Further: *cinna* lex., °*aka* Buddgh. Hybrid Skt.; Pa. *cīnaka* ‘a kind of bean;’ S. *cīṇo* m. ‘the millet *Panicum italicum*’; L. *cīṇā* ‘P. *miliaceum*’, P. *cīṇā* m., Ku. *ciṇā*. Note also: B. *cīnā*; Mth. *cīn* ‘P. *italicum*, P. *frumentosum*’; Bhoj. *cīn* ‘a kind of grain;’ H. *cīnā*, *cenā* m. ‘P. *miliaceum*’; WPah. bhal. *cin* e i f. ‘a kind of minute grain;’ Or. *cīnā* ‘millet;’ Bi. *cin* ‘P. *miliaceum*’, *cīnh*, *cīnā*, *cinnā* ‘P. *frumentosum*’; Dardic: Khovar *cin* ‘a grain like wheat but bigger’, Sh. *cīn* f. ‘millet harvest’, ‘a kind of millet’: < **cīn(a)kā*?

¹²⁷ See Fuller 2006, 2009.

¹²⁸ Witzel 1999.

¹²⁹ Pk. *valla* ‘a kind of grain’, *vālā* ‘a kind of grain, millet;’ S. *vali* f. ‘heap of reaped ears of corn’, L. *val*; Ku. *bāl* ‘ear of corn’, *bālo*, *bālro* ‘crops;’ N. *bālo* ‘ear of corn’, *bāli* ‘cornfield, crops, harvest’ (*balyāunu* ‘to pick off ears of corn’); Bi. *bāl* ‘ear of wheat’, Mth. *bālī*, Aw. *bālī* ‘ear of maize;’ H. *bālī* f. ‘spike of corn’, *bālū* m. ‘beard of grain (esp. maize);’ OMarw. *bālī* f. ‘standing crop;’ G. *vāl* m. ‘a kind of pulse;’ cf. 11426 **valla-puṭa* ‘grain pod;’ *valāṭa* ‘*Phaseolus mungo*’ lex.; G. *vālḥ* ‘beans in a pod’, *vālḥ*, °*or* ‘a bean, a kind of vegetable’.

§ 3.2.3. There are several words for rice that are different from *vr̥hi*/**vr̥jhi* (above). *CDIAL* 2546 *ōḍikā*, *ōḍī* ‘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.¹³⁰

However, *CDIAL* 4020 *gandhālu* ‘fragrant rice’ lex. is obviously derived from Skt. *gandha* ‘smell’, and 14268 *āñjana*, seen in Kashmiri *anzonu*, *anzan* ‘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 *kañku*, 3000 **kāñkuka*, *kāñguka*.

§ 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 that of IA and Drav., though there has been a recent, extensive update on individual languages.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,¹³² and the online dictionaries by David Stampe.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.¹³⁴ Their homeland has been sought in S.E. Asia or, recently, inside India.¹³⁵ It has long been shown that the early Munda speakers had words for rice farming.¹³⁶ While *japonica* rice spread out of the Yangtze basin, *Oryza indica* is a

¹³⁰ See discussion in Witzel 1999.

¹³¹ Gregory D. S. Anderson (ed.). *The Munda Languages*. London and New York: Routledge 2008.

¹³² Pinnow 1959.

¹³³ David Stampe, online dict.: <http://ling.ill.hawaii.edu/austroasiatic> cf. http://www.aa.tufs.ac.jp/sarva/materials_frame.html (Austroasiatic).

¹³⁴ Such as e.g., in Parpola 1994.

¹³⁵ See now P. Donegan and D. Stampe, <http://ling.ill.hawaii.edu/austroasiatic/AA/rhythm1983.pdf>.

¹³⁶ Zide & Zide 1976.

hybrid of a local wild rice.¹³⁷ The linguistic data¹³⁸ support these two areas of origin of cultivated rice: the words for rice in Austronesian do not correspond to words for rice in Austroasiatic.¹³⁹

§ 4.1. RICE

In northern and eastern India, rice cultivation has been said to emerge by the early 3rd millennium¹⁴⁰ though some earlier dates have recently been given (see above § 0).¹⁴¹

The following words are strongly attested for Proto-Munda (and even for the rest of Austroasiatic):¹⁴² *baba* ‘paddy’, *gele* ‘ear of paddy’, *jan̄* ‘grain seed’, *sii* ‘plow’, *tutu* ‘pestle’, *seel* ‘mortar’, *loyon̄* ‘wet paddy field’, etc. The important words for husked rice and its plant are N. Munda *cauli* etc., S. Munda *run̄kub* etc. (husked); N. Munda *baba* etc., S. Munda *keron̄*, *kondem* etc. (plant).¹⁴³

The Proto-Austroasiatic form for husked rice is **rkəw*.¹⁴⁴ Obviously, the Kusunda words *rāko*, *ran̄kwa* ‘millet’ (above) are related to the Munda ones, with the usual shift in meaning seen in cereals. The Vedic substrate word *vr̄thi*, which must go back to **vr̄tjhi*, subsequently transmitted to Nuristani (Kati) *wrič*, Pashto, Persian, etc., is somehow related to these forms, and also to Old Japanese *uruchi* (< **uruti*, **wuruti*), even if the intermediary forms are not clear.¹⁴⁵

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

§ 4.1.2. Paddy: So. *sārō/ sār* ‘paddy’. Sa. *Hoṛo* ~ *huṛu* ‘paddy, the rice plant (Oryza sativa, L.)’. Mu. *huṛu* (K) ‘rice’. (equals Mu. *baba*) Bh. *huṛu* ‘rice’. Tu. *huṛu* ‘rice’. So. *sarō/ sar* (D) ‘paddy’. Kh. *kōsr̄ō pē?* ‘rice prepared for making beer’. Mu. *kōsōr̄ā* ~ *kōsō:r̄ā* ‘rice or millet cooked for brewing’. Mu. *kōsr̄ā* ‘to parboil rice for making beer’.

§ 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’

¹³⁷ Sato 2004, 2006.

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.

¹⁴¹ Fuller 2006, 2009.

¹⁴² Details in Osada 1995: 143 sqq., 185 with related words in other Austroasiatic languages and in Austronesian, all the way to Taiwan.

¹⁴³ ‘cooked rice’: *cauli* Mundari, *caole* Santali, *cauli* Ho, *rumku* Kharia, *run̄kub* Juang, *ron̄ko* Sora, *r̄un̄k*, *-ajan̄* Gorum, *rko*’, *-ro* Gta’, *run̄ku*, *nikuk* Remo, *rukug* Gutob, ? Korku; --‘rice plant’ Mundari *baba*, Santali *hoṛo*, Ho *baba*, Kharia *ba*’, Juang *bua*, Sora *səro*, *kondem*, Gorum *kundem* (-ar), Gta’ *condia*’, *kia*, *ja* (note Tib.-Burm. **dža?* see § 3.1.), Remo *keron̄*, *-ker*, Gutob *keron̄*, *-ker*, Korku *baba*.

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. *kuṛu/ 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. *iri* 'kind of millet'. Mu. *iri* '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', *baḍāgo* 'guava' (cf. 9125 *bādara*— n. 'fruit of the jujube tree?'), *baru* 'mulberry' (cf. various trees CDIAL 5872), *buṭu* 'kind of grass', *bhed(a)rā* 'potato' (!), *bōy* 'grass, fodder' (cf. DEDR 4535, grasses), *ḍotako* 'edible root', *dhāwrā* 'gum tree', *dhongāri* 'type of grass', *gugudo* 'edible root', *hardo* 'tumeric', *jiryāngā* 'tomato'(!), *jodu/jūḍ* 'bamboo', *jhāpon* 'mushroom', *khila* 'parched rice', *khude* 'gourd', *lubā* 'incense', *malkā* 'pea (pod)', *māyko* 'mahua tree' (cf. DEDR 4772?), *óhan* 'mortar (with pestle)', *oró* 'millet, jawar' (cf. § 3.2.3 *ōḍī* 'wild rice?'), *phellyā* 'groundnut', *phendrā* 'vine', *raymonyā* 'wild thorny bush', *riṭhā* 'soap nut', *sokorā* 'bread', *siḍu* 'mahua wine', *sundu* 'pod for beans', *chāgā* 'variety of thorny grass', *chepiyā* 'variety of grass', *chunco* 'a vegetable', *chunḍu* 'bean' (cf. CDIAL 4856?), *tamāko'o* 'tomato'(!), *tāmku* 'tobacco'(!), *tāndur* 'rice, cooked rice', *tó* 'ear (of corn)'. Nahali *gele* 'maize' is from Korku, *gohū* '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.

¹⁴⁶ From Mundlay 2006. See: <http://www.aslip.org>.

¹⁴⁷ For an early attempt see Zvelebil, K. 1970, 1990 on a Nilgiri substrate, cf. Witzel 1999, and the discussions of place names in: Ramachandran and Nachimuthu 1987.

¹⁴⁸ Blažek 2006. For a substrate in the Nilgiris, Zvelebil 1970, 1990: 64, 68 sqq; Witzel 1999.

The Comparative (etymological) Dravidian dictionary by Burrow and Emeneau (*DEDR*, 1984)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).¹⁵⁰ A new version of *DEDR* with Proto-Dravidian etymological identifications and word analysis has been envisioned for 2004,¹⁵¹ but it has not yet emerged. We can glean some data from Krishnamurti's book on the reconstruction of Proto-Dravidian.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,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 **cir-umpu* (*DEDR* 2552)¹⁵⁴ that is first attested archaeologically at c. 1200 BCE (Hallur, Karnataka).

Instead, Krishnamurti offers some very vague dating only,¹⁵⁵ based on the antiquity of Proto-Drav. *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-Brah̥maṇa by at least four to five centuries, i.e. around the eleventh century BCE...» Surprisingly, Krishnamurti denies¹⁵⁶ --without giving any reasons-- the reconstruction of cultural terms in *three* subsequent stages discussed by F. Southworth.¹⁵⁷

Secondly, it must be observed that these agricultural terms are often heavily biased towards the literary South Dravidian languages (Tamil-Malayalam, Telugu, Kannda, 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.

¹⁴⁹ *DEDR*: Burrow, T. and M.B. Emeneau 1984.

¹⁵⁰ *EWA*: Mayrhofer 1986-2000.

¹⁵¹ Krishnamurti 2003: 502.

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.

¹⁵³ In his draft, he even had an 'emperor'(!); see now Krishnamurti 2003: 7 sq., p. 15.

¹⁵⁴ Krishnamurti 2003: 10.

¹⁵⁵ Krishnamurti 2003: 501 sq.

¹⁵⁶ Krishnamurti 2003: 15 n. 16.

¹⁵⁷ Southworth 1995: 258-77, 2005: 242, 245, assumes Proto-Drav. at 3000-2500 BCE, and S. Drav. at 1500-1000 BCE, and Zvelebil 1970: 18, 1990 at c. 4000-3500 BCE.

In general, technical terms related to agriculture include (as per Krishnamurti 2003: 8 sqq) the reconstructed words for ploughing **uṣ* DEDR 688, yoked plough **cēr* 2815, dry and wet cultivation **paṇ-ə* 'cultivated land' 3891; **pun* 'dry land' 4337; **pol-am* 'field' 4303; **kaṣ-ət* 1355, **key-m* 1958 'wet field'; **way-ə* 5258, rice seedlings for transplantation *ñāṭu* 2919, etc.

Among other flora (Krishnamurti 2003: 12) may be mentioned: black pepper **mil-əku* 4867, cardamon **əl-ə* 907, which Krishnamurti says «seem native ... at least in south India.» The words for banana are **wāz-a* 5373, *ar-əṇṭṭi* 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 **kaḍalī*.¹⁵⁸ In addition to **wāz-a* 5373, *ar-əṇṭṭi* 205, there is a handful of Drav. words for the plantain/banana, but they do not overlap with IA *kadal-/kētak-*.

Another interesting word is that for sugar cane, **kar-umpu* 1288, **cet-əkk* 2795. The Drav. words are quite different from **tu-* in Austroasiatic and in Tibeto-Burmese (Newari): DEDR 387 Ta. *ālai*, 1414 Ta. *kaṇṇal*, 2795 Ka. *ceruku* sugarcane, 4916 Ta. *muñci*.

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

The the areca nut *aṭ-ay-kkāy* DEDR 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, *aṭ-ay-kkāy*, does not fit the northern substrate words seen in Indo-Aryan: CDIAL 13482 **suppāra*, 3440 *kṛmuká*, 4219 *guvāka*, *gūvāka*, 5400 *jhōḍa* 'betel-nut tree', 5776 *tāmbūlā* 'betel, betel leaf' Suśr.¹⁶⁰ 9213 **bāru* 'betel leaf',¹⁶¹ 12046 *vīṭi*, 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.

¹⁵⁸ From Austroasiatic, with different prefixes, such as *ke-lui*, *te-lui*. See KEWA I 150 with lit.; Pa. *kadalī* 'banana, flag'; Pk. *kayala*, °*lī*, *kēla*, °*lī* 'the banana plant', *kayala* 'its fruit'; K. *kela* 'fruit of the plantain'; S. *kero* 'Pandanus odoratissimus' ~ *keviro* 'banana plant' < *kētaka*; Garh. *kēlu* 'plantain', Ku. *kelo* 'banana', *kyaw*, N. *kero* (← Mth.), A. *kal*, °*lā*, B. *kalā*, Or. *kaḷā*, *kerā*, Mth. Bhoj. Aw. *kerā*, H. *kelā*, °*lī*; OG. *kaili*, G. *keḷi* 'the plant', °*lū* 'the fruit'; M. *keḷ*, °*lī* 'the plant', °*lē* 'the fruit', Ko. *keḷē*; Si. *kehel*, *kesel* 'banana plant', *keheliya* 'banner'; --- with *-ll-* > S. *kelo* 'Pandanus odoratissimus'; P. *kēlā*, *kellā* 'banana'. Further: Mth. *kaṛari* 'banana', Md. *keyo* (*kēlek*), *kēl*. -- See now Osada 2006: 158 sqq.

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. Przymuski BSL xxiv 257.

From China stem *Panicum miliaceum* and *Setaria italica*,¹⁶² 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),¹⁶³ 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. *ērugu*, 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.

DEDR 812 **ar/ar-ak* seems to be related to 379 *Ka. ārike* the Indian millet, *Panicum italicum*.¹⁶⁴ There also is a vague similarity with DEDR 525 *Ta. iruṅku* great millet (*Sorghum vulgare*); *iraṭi* Italian millet (*Setaria italica*), black Italian millet (*Panicum indicum*), *Ma. iruṅṅu* a kind of maize. Cf. 812 *Koḍ. Eri*, and Proto-Austroasiatic **rkew*, Munda *ruṅkub* etc., Vedic *vr̥hi*.¹⁶⁵

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.¹⁶⁶

§ 5.1.1 DEDR 1242 *Ta. kampu, kampak-pul* bulrush millet, Italian millet. *Ma. kampu* id.; *kampak* a grain; *kamp-ari* *Holcus spicatus* (< *kampu* ‘bulrush millet’ + *ari* ‘millet’ ?!); *Ka. kambu*, *Te. kambu*. DEDR compares Skt. *kambū*,¹⁶⁷ for which cf. § 2.4.3 (discussion of *kaṅgu*).

§ 5.1.2. DEDR 2163 *Ta. kural* Italian millet, etc.¹⁶⁸ Cf. the Munda words *kuṛu*, etc. (§ 4.1.5.)

§ 5.1.3. DEDR 286 *Ta. cōlam, connal* maize, great millet, *Sorghum vulgare*, etc.¹⁶⁹

¹⁶² Fuller 2006, 2009: 5.

¹⁶³ Fuller 2006, 2009: 8.

¹⁶⁴ Further: *hāraka, hāraku* *Paspalum scrobiculatum* Linn., *Te. āruka, āruḡa, ārike, āriḡa P. scrobiculatum* (*P. frumentaceum*); *āḷḷu* (pl.) *P. scrobiculatum*. *Go. ārk* *Setaria italica*; *Pe. ārku* (pl.) a species of millet; *Kui ārka, Kuwi ārgu* (pl. *ārka*) *Panicum italicum*.

¹⁶⁵ Detailed discussion in Witzel 1999, Osada 1995.

¹⁶⁶ For the probably oldest traceable substrate, Proto-Australian, see Blažek 2006.

¹⁶⁷ Hem. *Uṅ* 847 = *kuruvinda Pennisetum typhoideum* Rich. = *Panicum spicatum* Roxb. = *H. spicatus* Linn., and many other synonyms). -- Note also: 1165 *Ko. kank, kaṅuku* ‘stalk of the great millet;’ 195 *Pa. ayk* a kind of grain called in Halbi *kaṅḡ* (*Panicum italicum*); cf. Turner, *CDIAL*, no. 2605; *Ga. (S.2) aykil* ‘a kind of millet called in *Te. korralu* (*Setaria italica*; = *Panicum italicum* Linn.; 56 *Ko. vatm* ‘millet, *Panicum miliare*.’ *To. potm* ‘millet,’ *kafotm* sp. millet (*ka-* black). *Ka. batta, bhatta* ‘paddy.’

¹⁶⁸ *Ko. koyl* *Setaria italica*; *korly*. *Ka. korale, korle* ‘a kind of millet, *Panicum italicum* Linn. *Te. korralu* (pl.); *korra* ‘the cereal yielding *korralu*.’ *Pa. koyla* *P. italicum*. *Go. kōhalā, kohalā, kohala, ko* ‘*Panicum miliare*; *gorraṅ* (pl.), *gor* a (pl. -ṅ), *korra* ‘mandeya corn,’ *Eleusine coracana*. *Koṅḡa koṅḡ* (pl.) ‘a grain’ (= Or. *kāṅgu*). *Kui kueri* ‘millet.’ *S. italica* Beauv. = *P. italicum* Linn.

¹⁶⁹ *Ma. cōlam*, *To. swḷm* ‘maize,’ *Ka. jōla* ‘a generic name for several species of millet,’ *Koḍ. jḷa* ‘great millet,’ *Tu. jōla, Te. jonna, jonnalu, Kol. sonna* (pl. *sonnal*), *Nk. sonna juwari, Pa. jenna* (pl. *jennel*) ‘small maize, juwar,’ *Ga. jōnel* (j = dz) ‘maize,’ *jonnēl cholam* ‘millet,’ *Go. jonna* ‘jowar,

§ 5.1.4. DEDR 3265 *Ta. tiṇai* Italian millet, *Setaria italica*; wild Bermuda grass, *Panicum burmanni* ; little millet (= *cāmai*); paddy-field grass, *P. fluitans*, etc.¹⁷⁰

§ 5.1.5. DEDR 3712 *Ta. nuvaṇai* black Italian millet, etc.¹⁷¹

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

§ 5.2. RICE

Rice has been discussed earlier as far as IA and Munda are concerned (§ 2.3, 4.1). As mentioned, Krishnamurti¹⁷⁴ lists three reconstructed Proto-Drav. words for 'rice': (paddy) **kūl-i* DEDR 1906, **nel* 3743, **war-iñc* 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-iñci*, Tamil, Mal., Tel. *wari*, etc., (not from Tamil *arisi* < **ariki*,¹⁷⁵ cf., however, Austronesian **beras*, Tibetan *ḥbras* and Skt. *vr̥hi* < **vr̥jhi*).

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' *kūz* 1911, **amp-ali* 174, and gruel **kañc-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: Koṇḍa *kūli* 'paddy' Pe. *kūli*, Maṇḍ. *kūli*, Kui *kūḍi* '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.¹⁷⁶

maize,' *jona*, *jōnnang* 'jowar,' *jonā* 'maize,' *jannā*, *jandra* 'jowar', *Kuwi kā'wa* 'jōna millet.' Similar words in IA, see CDIAL 10434 *yavanāla*, see above. (*Andropogon sorghum* Brot. = *Holcus sorghum* Linn. = *S. vulgare* Pers.).

¹⁷⁰ Ma. *tina* '*P. italicum*.' Ko. *ten* 'ear (of any grain),' Ka. *tene* 'a spike, ear of corn,' *tene-giḍa* Italian millet, *P. italicum*. (*S. italica* Beauv. = *P. italicum* Linn.)

¹⁷¹ Ka. *navāṇe*, *navāṇi* 'a small grain, the Italian millet or panic seed, *Panicum italicum*.'

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. (*v*)*ari* 'rice', above § 5.2.3.

¹⁷⁴ Krishnamurti 2003:9.

¹⁷⁵ Krishnamurti 2003: 5.

¹⁷⁶ Ma. *nel* 'rice (as growing), rice in the husk, paddy,' Ko. *nel* 'paddy, unhusked rice,' *nel aky* 'husked rice,' To. *neṣ* rice (in songs), *neṣiṣky* rice (see *ašky*, s.v. 215 *Ta. ari*). Ka. *nel*, *nellu* 'paddy, rice in its husk, rice as growing, a grain of paddy,' Koḍ. *nelli* 'rice, paddy,' Te. *nelluru n. pr.* a town.

§ 5.2.3 **war-iñc* 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. *varru* 'grain of boiled rice from which the water is strained off', Te. *vaḍlu* '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. *nīvāra* '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. *māñjik* 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;' *metukku* '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,' Mand. *lay*, Kuwi *lahi*; *lāh*'i boiled *mandeya* 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

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

¹⁷⁸ Discussion in Witzel 1999, Southworth 2005.

¹⁷⁹ Ma. *ari* 'grain of rice freed from chaff, seed, grain,' (Kauṭ.) *arici* 'rice,' Ko. *aky* 'grain of any grain food when husked,' To. *ašky* 'rice,' *neṣišky* (cf. s.v. 3753 Ta. *nel*), Ka. *akki* 'rice deprived of its husk, grain that resembles rice,' Koḍ. *akki* 'husked rice,' Tu. *ari* 'rice freed from husk, any small grain,' *akki* 'rice, corn,' *argi* 'rice?'; Te. *arise* 'a sweetmeat made of rice, flour, and jaggery.' Cf. DEDR 3829 Ko. *pack*, To. *počišky*.—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* 'Oryza.'

¹⁸¹ *nongre manjik* 'broken pieces of rice after pounding,' Konḍa *manzi* (*pl.* -*k*) 'husked rice,' Pe. *manji* (cf. 3982 *preyi*), Kuwi *manji*, 'raw rice, rice without husk, husked rice, a grain of rice; *manjiin* 'husked rice,' Kur. *māñjī* 'seed in general.' Cf. Go. *wanjī*, s.v. 5265 Ta. *vari*

¹⁸² Te. *prālu* 'rice,' Nk. *perku* 'husked rice,' Pa. *peruk* (*pl.* *perkul*), Go. *paṛēk* 'husked rice,' *kuṭkī*, etc.; *parek* 'husked (of rice),' *paraik*, *paraik*, *perek* 'husked rice,' *pere*, *pariku* 'rice,' *paṛem* (*pl.* *parek*) 'grain (of rice, etc.),' Konḍa *per(u)* (*pl.* *perku*) 'husked rice,' Pe. *preyi*, Mand. *Preyi*, Kui *prāu* 'rice, husked paddy,' *prāma* 'a grain of boiled rice,' *kōruvrau*, *kōruvau* '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,' *aky av-* (*avt-*) 'to pestle (millet) third time,' To. *af-* (*aft-*) 'to pound with light strokes,' *oḥil* 'puffed rice,' Ka. *aval* 'pound, beat, pounding, beating in a mortar,' (also *aval-akki*) 'rice bruised and crushed,' Koḍ. *avl-*

connected by Burrow-Emeneau) with rice but rather, *DEDR* 268 with boiling: Ta. *avi* (-*v-*, -*nt-*) 'to be boiled, cooked by boiling or steaming, swelter; (-*pp-*, -*tt-*) (which includes boiling rice).

§ 5.3. BARLEY

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

§ 5.4. WHEAT

As discussed above (§ 1.6), the Drav. word for 'wheat' (**gōdi*) arrived in S. Asia, along with the plant, before the Indus period via the southern Iranian route (Elam - Tepe Yahya - Bampūr- Sindh). It has resulted in the reconstructed southern Indus term ('Meluhhan') **gōd/t-*, which is retained in Drav. **gōdi*.¹⁸⁴ The pre-Iranian **gantum* must have become **go-tum* or **go-dum* in Sindh. Just as in IA, the Drav. word reflects a popular etymology¹⁸⁵ of the unfamiliar plant: **godum*: from **kō-tumpai*, 'low red plant'¹⁸⁶ in PDrav. stage 3, at c. 1000 BCE.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.

§ 5.5. GRAIN

A general word for 'grain' (or 'kernel') *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.

§ 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

akki 'rice fried and each grain pounded flat,' Tu. *abepuni, abeyuni, abeccuni* 'to beat or pound rice,' Kol. *cavli* 'mortar,' Nk. *Savli*, Nk. *Savli*, Pa. *cavil, cavkol* (pl. *cav- kocil*) 'pestle,' Ga. *savul* 'mortar,' *savkol* 'pestle,' *savvul* 'mortar,' *savkōl* 'pestle'? Go. *sahkī, sāhkī, sahki, cahki, hahki, ahki, a'ki, ahk* (or with 2799 *Konḍa sonki*, Pe. *henki*). Cf. *CDIAL* 4749 **cāmala, cāvala* 'husked rice.'

¹⁸⁴ Kan. *gōdi*, Tam. *kōti*, *DEDR* 1906; cf. also *Kinda kūli* 'paddy' *DEDR* 1906.

¹⁸⁵ Cf. Southworth, F. C. *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.

¹⁸⁶ As reconstructed by Southworth 1988: 658, 660.

¹⁸⁷ See *DEDR* 3334: Tam. *tumpai* etc. 'nettle, weed.' The exact development from **tumpai* > *-di* is not clear; at this late date *kōtumpai* could even be based on Ved. *godhūma*.

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 R̥gveda 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 comparisons¹⁸⁸ 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,¹⁸⁹ 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,¹⁹⁰ 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

¹⁸⁸ Meadow 1998, 12-21, Meadow and Patel 2003.

¹⁸⁹ Reede tot Drakestein 2003; Brandis 1906.

¹⁹⁰ Or, for example the illustrated manuscript of the *Kitab al-Hashaish*, in the Khuda Baksh Oriental Public Library, Patna, no. HL 2189, see: *Vijñānavidhi. Manuscript Treasures of India*. New Delhi: National Mission for Manuscripts 2007: 62 (in Arabic, and occasionally, in Greek).

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 botanists¹⁹¹ (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.

¹⁹³ Such as at our yearly Harvard Round Tables:
<http://www.people.fas.harvard.edu/~witzel/ROUND%20TABLES-2007.htm> and later ones (2008-2009) at the same website.

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

Indo-Aryan		Dravidian	
<Nur.	Nuristani>	Ta	Tamil
Dard.	Dardic	Ma	Malayalam
Gy	Gypsy	Te	Telugu
K	Kashmiri	Ko	Kota
S	Sindhi	To	Toda
L	Lahnda	Ka	Kanada
P	Panjabi	Kod	Koḍagu
WPah	W. Pahari	Tu	Tulu
Garh	Gahrwali	Kol	Kolami
Ku	Kumauni	Nk	Naike
N	Nepali	Pa	Parji
A	Assamese	Ga	Gadba
B	Bengal	Go	Gondi
Or	Oriya	Kor	Koraga
Bi	Bihari	Kur	Kurukh (Oraon)
Mth	Maithili	Malt	Malto
Bhoj	Bhojpuri	Br	Brahui
Aw	Awadhi		
H	Hindi		
Marw	Marwari		
G	Gujarati		
M	Marathi		
Ko	Konkani		
Si	Singhalese		

Other common abbreviations

AV	Atharvaveda Saṃhitā
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
IJ	Indo-Iranian Journal
Iir	Indo-Iranian
KS	Kaṭha Saṃhitā of the YV
lex.	= found in dictionaries only
MIA	Middle Indo-Aryan
Mbh.	Mahābhārata
MS	Maitrāyaṇi Saṃhitā of the YV
NIA	New Indo-Aryan
O.	old
Pa.	Pali
PIE	Proto-Indo-European
Pkt.	Prakrit
R(ām).	Rāmāyaṇa

RV R̥gveda-Saṃhita
 Skt. Sanskrit
 Suśr. Suśruta
 TS Taittirīya Saṃhitā of the YV
 VS Vājasaneyi Saṃhitā of the YV
 YV Yajurveda

Bibliography Plant names

Allchin, F.R. and B. Allchin. *The rise of Civilisation in India and Pakistan*. Cambridge Univ. Press 1982

Allchin, F. R. *The Archaeology of Early Historic South Asia. The Emergence of Cities and States*. With Contributions from George Erdosy, R. A. E. Coningham, D. K. Chakrabarti and Bridget Allchin. Cambridge: Cambridge University Press 1995

Allchin, F. R. and N. Hammond, *The Archaeology of Afghanistan from the earliest times to the Timurid period*. London, New York: Academic Press 1978

Anderson, G. D. S. (ed.). *The Munda Languages*. London and New York: Routledge 2008

Beekes, R.S.P. *Comparative Indo-European linguistics: an introduction*, Amsterdam/Philadelphia: J. Benjamins Pub. 1995

Bellwood, P. and C. Renfrew (eds.) *Examining the farming/language dispersal hypothesis*. Cambridge: McDonald Institute for Archaeological Research/Oxbox Books. University of Cambridge 2002

Benedict, P.K. *Sino-Tibetan. A conspectus*. Cambridge 1972

Berger, H. Die Burušaski-Lehnwörter in der Zigeunersprache. *IJJ* 3, 1959, 17- 43

Berger, H. *Die Burushaski-Sprache von Hunza und Nager*. Wiesbaden: Harrassowitz 1998

Blažek, V. Was there Australian Substratum in Dravidian? *Mother Tongue* XI, 2006, 275-285.

Brandis, D. *Indian trees : an account of trees, shrubs, woody climbers, bamboos, and palms indigenous or commonly cultivated in the British Indian Empire*; assisted by Indian foresters. London: A. Constable & co., ltd 1906

Burrow, T. and M.B. Emeneau. *A Dravidian Etymological Dictionary*. Second Edition. Oxford: Clarendon Press 1984

Cardona, G. *The Indo-Aryan languages*, edited by George Cardona and Dhanesh Jain, London; New York: Routledge 2003

Donegan, P. and D. Stampe, Rhythm and the Holistic Organization of Language Structure. Based on the version in: *Papers from the Parasession on the Interplay of Phonology, Morphology, and Syntax*, ed. John F. Richardson, Mitchell Marks, and Amy Chukerman. Chicago: Chicago Linguistic Society, 1983, : 337–353. <http://ling.ill.hawaii.edu/austroasiatic/AA/rhythm1983.pdf>

Driem, G. van. The prehistory of Tibeto-Burmese in the light of emergent population genetic studies. *Mother Tongue* XI, 2006, 160- 211

- Ehret, C. Language Family Expansions: Broadening our Understandings of Cause from an African Perspective, in: Bellwood, P. and Renfrew, C. (eds.) *Examining the farming/language dispersal hypothesis*. Cambridge, UK: McDonald Institute for Archaeological Research, University of Cambridge; Oxford; Oakville, CT. Distributed by Oxbow Books 2002: 163-176
- Elfenbein, J.H. A periplous of the 'Brahui problem'. *Studia Iranica* 16, 1987, 215-233
- 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
- Fuller, D.Q. *The Archaeobotanist*, 25 June 2009, <http://Archaeobotanist.blogspot.com/indian-archaeology-watch-lahuradewa.html>
- Fuller, D. Q. *The Archaeobotanist* 25 Aug 2009; <http://archaeobotanist.blogspot.com/2009/08/millets-and-mistakes.html>
- Glover, L.C. and Hingham, C.F.W. New evidence for early rice cultivation in South, Southeast and East Asia. In: D. R. Harris (ed.), *The origins and spread of agriculture and pastoralism in Eurasia*. London: UCL Press 1996: 413-441
- Hingham, C. Languages and Farming Dispersals: Austroasiatic Languages and Rice Cultivation, In: Bellwood and Renfrew 2002, 223-232
- Hock, H.H. Out of India? The linguistic evidence. In: Bronkhorst, J. & M. Deshpande (eds.), *Aryan and Non-Aryan in South Asia. Evidence, Interpretation and Ideology*. Harvard Oriental Series. Opera Minora, vol. 3. Cambridge 1999, 1-18
- Karlgren, B. *Analytical Dictionary of Chinese and Sino-Japanese*. Paris 1923
- Kenoyer, J. M. *Ancient Cities of the Indus Valley Civilization*. Oxford: Oxford University Press/American Institute of Pakistan Studies 1998
- Krishnamurti, Bh. *The Dravidian Languages*. Cambridge: Cambridge University Press 2003.
- Kuiper, F.B.J. Rigvedic loan-words. In: O. Spies (ed.) *Studia Indologica. Festschrift für Willibald Kirfel zur Vollendung seines 70. Lebensjahres*, Bonn: Orientalisches Seminar 1955
- 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
- Lubotsky, A. The Indo-Iranian Substratum, in: *Early Contacts between Uralic and Indo-European: Linguistic and Archaeological Considerations*, ed. Chr. Carpelan, A.Parpola, P.Koskikallio. Helsinki, Suomalais-Ugrilainen Seura 2001: 301-317
- 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
- J.P. Mallory & Adams, D.Q., *Encyclopedia of Indo-European culture*, London; Chicago: Fitzroy Dearborn 199

- Masica, C P. Aryan and Non-Aryan Elements in North Indian Agriculture. In: M. M. Deshpande and P. E. Hook (eds.), *Aryan and Non-Aryan in India* (Ann Arbor : Center for South and Southeast Asian Studies), 1979: 55-151
- Mayrhofer, M. *Kurzgefasstes etymologisches Wörterbuch des Altindischen*. Heidelberg 1956-1976.
- Mayrhofer, M. *Etymologisches Wörterbuch des Altindischen*. Vol. I-IV Heidelberg: Winter 1986-2000
- 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
- Meadow, Richard H. and Ajita K. Patel. Prehistoric pastoralism in northwestern South Asia from the Neolithic through the Harappan period. Chapter 3 in Steven A. Weber and William R. Belcher (eds.) *Indus Ethnobiology: New Perspectives from the Field*. Latham, MD: Lexington Books 2003: 65-93
- 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. The agricultural Vocabulary in Proto-Munda. In: *The Rice and Food Culture of Munda in Eastern India: An Ethnolinguistic Study*. [in Japanese] Kyoto 1995: 143-157
- 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
- Osada, T. How many Pro-Munda words in Sanskrit? – with special reference to agricultural vocabulary. In : Osada 2006: 151-174
- Parpola, A. *Deciphering the Indus script*. Cambridge: Cambridge University Press 1994.
- 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
- Randhawa, M. S. *A history of agriculture in India*. New Delhi : Indian Council of Agricultural Research 1980-1986
- Rau, W. The earliest literary evidence for permanent Vedic settlements. In: *Inside the Texts, Beyond the Texts. New Approaches to the Study of the Vedas*. (M. Witzel, ed.) Harvard Oriental Series. Opera Minora, vol. 2. Cambridge 1997, 202-206.
- Reede tot Drakestein, Hendrik van. *Hortus malabaricus* (English version: *Malabar Garden*) with annotations and modern botanical nomenclature by K.S. Manilal. Thiruvananthapuram : University of Kerala, 2003
- Sato Y.-I. Rice and the Indus Civilization. In: Osada 2006: 213-214.
- 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
- Southworth, F.C. Ancient economic plants of South Asia: linguistic archaeology and early agriculture. In: *Languages and Cultures. Studies in Honor of Edgar C. Polomé*. M.A. Jazayery and W. Winter (eds.), Berlin/New York : Mouton de Gruyter 1988, 659-668

Southworth, F.C. Reconstructing social context from language: Indo-Aryan and Dravidian prehistory. In: Erdosy, G. (ed.) (1995) *The Indo-Aryans of Ancient South Asia*. (Indian Philology and South Asian Studies, A. Wezler and M. Witzel (eds.), vol. 1), Berlin/New York: de Gruyter 1995: 258-277

Southworth, F.C. *Linguistic Archaeology of South Asia*. London and New York: Routledge 2005

Southworth, F.C. New light on three South Asian language families. *Mother Tongue* XI, 2006, 124-159.

Southworth, F.C., D. Stampe, M. Witzel, SARVA substrate dictionary, <http://www.aa.tufs.ac.jp/sarva/entrance.html>;

Stampe, D. Online Munda dictionaries: <http://ling.ill.hawaii.edu/austroasiatic> cf. http://www.aa.tufs.ac.jp/sarva/materials_frame.html

Szemerényi, O. Introduction to Indo-European linguistics. Oxford : Clarendon Press / New York : Oxford University Press 1996.

Tewari, R. *et al.*, Early Farming at Lahuradewa, International Seminar on the First Farmers in Global Perspective, Lucknow 18-20 Jan. 2006, *Prāgdhārā* 18 (2009).

Turner, R. L. *A comparative Dictionary of the Indo-Aryan Languages*. London 1966

Vijñānavidhi. Manuscript Treasures of India. New Delhi: National Mission for Manuscripts 2007

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

Watters, D. *Notes on Kusunda grammar (a language isolate of Nepal)*. Kathmandu: National Foundation for the Development of Indigenous Nationalities 2005

Wiczak, K.T. *Indoeuropejskie nazwy zbóż*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego 2003

Witzel, M. Nepalese Hydronomy: Towards a history of settlement in the Himalayas. *Proceedings of the Franco-German Conference at Arc-et-Senans, June 1990*. Paris 1993: 217-266

Witzel, M. Early Sources for South Asian Substrate Languages. *Mother Tongue* (extra number): 1-70, Boston 1999; cf. "Substrate Languages in Old Indo-Aryan (R̥gvedic, Middle and Late Vedic)," *Electronic Journal of Vedic Studies* Vol. 5-1: 1-67. Available at <http://ejvs.laurasianacademy.com/issues.html>

Witzel, M. The Development of the Vedic Canon and its Schools: The Social and Political Milieu. In: *Inside the Texts, Beyond the Texts. New Approaches to the Study of the Vedas*. (M. Witzel, ed.) Harvard Oriental Series. *Opera Minora*, vol. 2. Cambridge 1997, 257-345. <http://www.people.fas.harvard.edu/~witzel/canon.pdf>.

Witzel, M. Autochthonous Aryans? The Evidence from Old Indian and Iranian Texts. *EJVS* 7-3, 2001, <http://www.people.fas.harvard.edu/~witzel/EJVS-7-3.pdf>.

Witzel, M. *Linguistic Evidence for Cultural Exchange in Prehistoric Western Central Asia*. Philadelphia: Sino-Platonic Papers 129, Dec. 2003

Witzel, M. Central Asian Roots and Acculturation in South Asia: Linguistic and Archaeological Evidence from Western Central Asia, the Hindukush and Northwestern South Asia for Early Indo-Aryan Language and Religion. In: T. Osada (ed.) *Linguistics, Archaeology and the Human Past*. Kyoto: Indus Project, Research Institute for Humanity and Nature 2004, 87-211. Reprinted by Manohar, Delhi

Witzel, M. Indocentrism: Autochthonous visions of ancient India. In: *The Indo-Aryan controversy : evidence and inference in Indian history / edited by Edwin F. Bryant and Laurie L. Patton*. London ; New York : Routledge 2005

Witzel, M. South Asian agricultural vocabulary. 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: 96-120

Zide, A. and N.H. Zide, Semantic reconstruction in proto-Munda cultural vocabulary. *Indian Linguistics* 34, 1973, 1-24

Zvelebil, K. *Comparative Dravidian Phonology*, The Hague 1970

Zvelebil, K. *Dravidian Linguistics: an Introduction*. Pondicherry: Pondicherry Institute of Linguistics and Culture 1990

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. R̥gveda - 1.2. Mantra texts (Atharvaveda, Yajurveda) - 1.3. Yajurveda Saṃhitā prose texts (MS, KS, TS) -- 1.4. Brāhmaṇa texts proper, including earliest Upaniṣads and Āraṇyakas -- 1.5. Late Vedic (Sūtras); -- post-Vedic, in other Old Indo-Aryan OIA) texts: Epics, Middle Indo-Aryan (MIA), Classical Sanskrit, New Indo-Aryan (NIA).

English term	Old Indo-Aryan term	Attestation level of texts: 1.1-5, or post-Vedic; area or composition	Origin: Language family or individual Language	Comments	Discus Mayrh EWAi 1986-:
Geographic origin of plant					
<u>SW ASIAN Origin</u>					
Barley	yáva	1.1 = RV: Greater Panjab	Indo-Eur. Gr. <i>zeiai</i> , Lith. <i>javai</i> , Hitt. <i>ewa</i>		II 405
Plough	lāṅgula	1.1	Munda or N.E. (Witzel 1999)	For Near Eastern connections, see Blažek & Boisson 1991)	I 477 clear,
To sow	vap 'scatter'	1.1	Īr. (O. Avest. vi-uuap); cf.		EWA 504

To plough furrow	(yavam) kṛṣ 'to plough ([for] grain)' *sā/sī // sītā 'furrow'	1.1	Hitt. huuapp? Irr.: Avest. yao-karšti , etc., yauunanam karš; < IE *kwels IA *sā/saH? < *seh ₂ 'throw'? EWA II 725 (sāyaka 'a thrown object, arrow'; cf. IE *seh ₁ (y) 'to sow'	Cf. also <i>sītā</i> 'furrow'; EWA II 732	EWA EWA 731
Wheat	godhūma	1.2 AV+ KS, TS Central northern India; (E.Panjab: KS)	Loan < Near East, via N. Iran (Witzel 1999)	Iranian (Avest.) gantuma < Hitt. kant , Egpt. xnd ; influenced by *Pre-Drav. *go- (cf. Caucas. *ghomu)	I 499: foreign word; popul. etymol. ('cow smoke
Lentil, Lens culinaris Med	masūra māsura	1.2/3 KS, TS (U.P.)	Local word?		II 335 Uncle
Flax / lin seed	<i>atasá</i> brushwood; <i>atasī</i> lin seed	1.1 Suśruta	Meanings un- clear in RV		I 57 Uncle
S. ASIAN origin					
Rice	Vrīhī	1.2 AV/ PS (in U.P./ Haryana & Delhi)	Local? -- see Witzel 1999: < *vrijhi; <> Drav. (v)ari(ki), variñci etc.; > Greek <i>oryza</i>	Cf. Jpn. <i>uruchi</i> ; Austrones. (Taiwan) ə- bərəə, vərəs , etc.; Munda *ərig > Drav. <i>vari-</i>	II 597 MPers. Pashto (pl.),
Rice	śāli PS ; śāri- AV	1.2 AV,PS C.N.India	Benedict, Con- spectus 28, #	< Tibeto- Burmese ??	II 632

			66 any conn. with cāmala?		
Mung: <i>Vigna radiata</i>	mudgá	1.2 YV N.India	CDIAL 10198 Local	Cf. RV name: Mudga-la 1.1.:	II 361 clear ; 409 b
<i>Phaseolus mungo</i> L. var. <i>radiatus</i> = <i>Phaseolus</i> <i>Roxburghii</i>	māṣa	1.2 AV C.N.India	CDIAL 10097 Local	Cf. MPers. <i>māš</i> ; NE: Shughni <i>max</i>	II 352 proble
<i>Dolichos biflorus</i> L., a <i>twining vine</i>	khalá-kula	1.4 Up. 1.5 KauśS N. India	Local?	Cf. Tam. <i>kol</i> ; Parji pl. <i>kol-kul</i>	I 449
chaff, straw (fog)	busa (busá)	1.5 KauśS 1.1. RV 10	Local; non-IA -s- after -u-		II 231 uncert
Cotton (<i>Gossypium</i> sp.)	Ved.*karpāsa kārpāsa 'made of cotton'	Sūtras	Local, typical Austro-As. like prefix (kar-; as in jar-tila: tila)	Cf. Meso- potamian kapazum; > Gr. karposos	I 317 probal loanw
Sugar cane	ikṣu	1.2 AV+ C.N.India	Local word in several dialect forms: ikṣu, *ukṣu, *rikṣu, *akṣu < ṛkṣu?	Cf. RV +; name: Ikṣvāku; class. ikṣvāku 'bitter gourd, Citrillus colocynthis'; AAs.? H. Berger WZKS 3,73 sqq	I 185: opinic I 185 Probal foreign
(Sugar)	śarkarā 'pebbles'	1.2. AV+	Later: Class. Skt. 'sugar'	~ Greek krokalē ?; AAs. prefix śar- ?	EWA 619
AFRICAN Origin					
<i>Setaria italica</i> (L.) Pal. Beauv. = <i>Panicum italicum</i> L.	priyaṅgu priyaṅgukā	1.2/3 1.4 Br.	See Witzel , 1999: Popular etym. for (Drav.) <i>kaṅgu</i> , etc.	CDIAL 8976; Cf. s.v. <i>kaṅgu</i> (discuss. above; see below on Skt. <i>kaṅgu</i>)	II 190 foreign word? Cf. B <i>proñ</i>
<i>Panicum miliaceum</i> L.;	áṅu	1.2/3 TS	Adaptation from <i>priyaṅgu</i> ,	Cf. <i>anvañi</i> etc., RV	I 55 Uncle

		C.N.India	<i>kaṅgu</i> , see Witzel 1999		
Millet	varjarī :: *bājara	1.5 HSS C.N.India	CDIAL 9201 Panj. bājra etc.	*bājara, *bājjara	III 45/ clear
<u>ATTESTED</u>	<u>ONLY</u>	<u>LATER:</u>	<u>*OIA, MIA,</u>	<u>NIA</u>	
<u>SW ASIAN origin</u>					
Chickpea	cana(ka) Mbh, Susr.		CDIAL 4579 Pali, Pkt., NIA		III 17/ unclear
Grass pea	*k(h)ēsārī <> kēsara ‘hair, filament’ YV, cf. kesānī ‘a plant’ KausS.			CDIAL 3925 *k(h)ēsārī; *kēsārī only > Hindi; not in Skt.	<> Cf cf. ke CDIA 3475 ‘mane (keśa
Pea	*mattara			CDIAL 9724 Only NIA!	
<u>S.ASIAN origin</u>					
Rice (add.)	IA *cāmala	Prakrit+ <i>cāulā</i> , etc.	Cf. Tibeto-Burm. dza ‘to eat’, Benedict, <i>Conspectus</i> : 28, #66; Austri-Thai *c’amaq, Benedic, Au-Jp.	From Austric? But cf. Drav. [c]aval, etc. DEDR 2391, and 268 [zero+] avi (-v, -nt-) ‘to steam boil’	---
Foxtail millet	kaṅgu	Brhatsamhitā, 550 CE	Cf. Bantu : *kóngó, *pungu; MW 1999: cf. priyaṅgu, aṅu	PMu. (<i>h</i>)oxy is too different; ditto Drav. DEDR 1242 kampu, 2163 kura, ...	III 43 Foreign word?
Urd : vigna mungo	*uḍidda ‘a pulse’	Pkt. uḍida	Pkt. uḍida CDIAL 1693; cf. uḍidda CDIAL 14302, Mar. uḍid, Hindi uḍ(a)d	*uḍidda < Tam. u.r.untu ‘black gram, phaseolus mungo’, Kan. urdu, DEDR 690	--

Cucumber	kṣīraka	Lex. only	CDIAL : NIA 3667, 3698, 3703		III 13: etym? kṣīra'1 etc.
Bitter gourd	kāravella, *kārella 'Momordica charantia'	Suśruta	CDIAL 3061 Pali kāravella, Pkt. kāriyallaī;- kārellaya, etc.	Drav. origin of kārella 'black spear' ~ kāṇḍīra	III 85: loan v
Ivy gourd	kunduru 'Boswellia thurifera, its raisin' (incense tree);	Brhatsamhitā, 550 CE; kundurukā Suśruta	CDIAL 3298 kunda 'raisin' kānduruka 'Boswellia thurifera' MIA, NIA	kunduru < Iranian? -- kunduru ~ mukunda 'raisin of Bosw.' < Austro-As.?	III 10: kundu contes Iranian Austro origin
Luffa/sponge gourd	*tōrī 'gourd'	*tubara?	CDIAL 5977; Possibly < *tubara/tumba	Found in Northern NIA: Panj. tōrī, etc.	---
Okra	bhiṇḍā 'vegetable Abel- moschus esculentus'	Pañcatantra	CDIAL 9492; NIA		III 36: expl.'
Bread	*roṭṭa	rotikā Bhagavat- Purāṇa	CDIAL 10837 Pkt. <i>roṭṭa</i> 'rice flour' Deśīnamālā ; <i>roṭṭaga</i> , <i>ruṭṭiā</i> 'bread'	Cf. *roñc, CDIAL 10836 'to crush, grind', Pkt. romcaī	III 43: Conne roṭ 'to beat' ; Pkt. ro
Areca nut (add.)	* <i>suppāra</i>	NIA only	CDIAL 13482, Hindi supāri		---
Sheep; Most other names for domestic animals are IA.	bhedra/ meḍra/ meṇḍha 'ram' Lex.	Pkt. meṇṭhī 'sheep'; miṇḍha(ka) Buddh. Skt	meṇḍha, meṭṭa, meḍhra(ka), Lex.	MIA, NIA; CDIAL 10310; Cf. 9604, 9606	III 41: appare foreign words conne with . bhedra bhedr: bheḍī