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Grains of Mediaeval India

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not linear in the succession of elements, i. e., they do not occur between one element and another, even though they have specific position. These are: ‘, which is simultaneous with vowels; intonations (of questions, etc.) which were probably simultaneous with utterances; roots and patterns, which are intercalated with each other, forming together part of the linear succession; the passive *u\_a* morpheme which merely replaces vowels in other patterns; the jussive minus morpheme which drops phonemes from other morphemes.

The other relation which occurs in distribution is coexistence of one element with another in the same construction. In each level there are specific groups of elements which accompany others. One of the chief common features is the non-occurrence of the same element twice in succession. Repetition of an element does occur in the following cases: Two consonants may adjoin each other (but not the same consonant over). Two noun patterns (rarely, the same one over) may occur in one word. Several substantive phrases may adjoin each other in one clause (but rarely with the same initials, except *wa-*, *wa- · -*, ‘*o · -*’).

In the phonology, the vowels presented a more patterned system than the consonants. In the morphology, the verb patterns are more fully organized than the noun patterns. This is in part, but not wholly, due to the fuller grouping of morpheme variants for verbs than for nouns. However, the very fact that such grouping was possible for verbs indicates a close similarity be-

tween the distributions of verb patterns.<sup>54</sup> Note that most of the verb pattern variants were in the active *--u-* pattern.

Returning to the other method, the analysis of a construction into its component elements, the following relations are to be noted:

**Nuclearity:** Certain elements are always present in a construction, while others sometimes occur and sometimes do not. E. g., in a word the stem is always present; affixes may not be. The position of the nuclear element (that which is always present) relative to the others follows: In the word, the stem may have other elements before it or after it. In words having more than one stem, the main stem (the one which participates in the *i · m* concurrence, end of VI 2) is the first: *zagné · -ha’ · -ám · haḥ · -akamí · m* ‘the wise elders of the people.’ In the phrase, the main word comes first, preceding the following words. In the clause the 0 position usually comes first.

**Scope:** Each element in a construction applies over a certain part of the construction. Thus, in *zagné · ha’ · -ám · ◇* above, the *e ·* (variant of *i · m*) ‘m. pl.’ applies to *zagné*, not to ‘*ám ·*’. In general, each element applies only to the construction level in which it occurs, and within it up to the position where it could occur again (even if it does not). Thus the *◇* ‘m. sg.’ after ‘*ám ·*’ does not apply to *zagné*, for in that position it could occur again, replacing the *e ·* as a member of *i · m*. Similarly the connective morphemes described in VI 3 apply only to the construction which they introduce.

<sup>54</sup> The weakest grouping of morpheme variants is that for *ma--*; a different treatment of this morpheme group would yield a slightly different verb system.

## GRAINS OF MEDIAEVAL INDIA

HELEN M. JOHNSON

IT is a very usual convention in Sanskrit literature to refer to persons or things by a stereotyped number which sometimes refers to the actual number in the group and is sometimes probably only an arbitrary number, though certainly with some factual foundation. European Indologists have shown remarkably little curiosity about these groups, though they offer considerable information. Hemacandra, whose writings cover an almost in-

credible range, is conspicuously devoted to this practice. No doubt his contemporaries understood his allusions. It is difficult now, even for Indians, to explain them all.

As part of the wealth bestowed by Kubera on the native city of an Arhat, Hemacandra mentions “seventeen *dhānyas*.” These I finally located in the commentary by himself to Hemacandra’s *Abhidhānacintāmaṇi* 4. 234. They are given in a

quotation whose source I do not know. Grain (*dhānya*) is used in the wider sense of the word, as it is today in this country in statutory usage, which includes many plants besides the cereal grasses. I found also two lists of grains in Nemicaandra's *Pravacanasāroddhāra*, a work antedating Hemacandra by perhaps a century, with a commentary belonging to the end of the twelfth century. One list has twenty-four grains and the other twenty-five. The commentary to the *Kalpa-sūtra*, named *Subodhikā*, gives a list of twenty-four grains which is apparently copied from the *Pravacana*<sup>o</sup>.

These lists combined should give a fair picture of agriculture in Western India in the twelfth century and the same grains are cultivated today, with the possible exception of flax.<sup>1</sup>

1. *Vrihi*, *Oryza sativa*, rice in general, but specifically rice that ripens during the rainy season. Rice is probably indigenous to India. According to De Candolle, the cultivation of rice in India is subsequent to that in China, but it has been a valued crop since the classic period. It is the chief article of food over a large part of India at the present time. According to Dutt, there are

<sup>1</sup> Needless to say, botanists do not always agree on the classification of these grains. Roxburgh has 52 species of *Panicum*, some of which are classified differently by others. Popular usage and vernacular names do not recognize the scientific distinctions between very similar species. Also, vernacular names sometimes denote different plants in different provinces. Generally speaking, the lexicons are of little assistance in botanical matters. An exception is Molesworth-Candy's *Marāṭhī-English Dictionary* (MC), which is a mine of information too often disregarded. For Gujarātī I used Mehta's *Modern Gujarati-English Dictionary*; for Hindī Bate's *Dictionary of the Hindee Language*; and for Prakrit the *Ardha-Māgadhi Koṣa* (PE) and the *Pāia-sadda-mahānava* (PH). I found most useful the following:

Dutt, *Materia Medica of the Hindus*. Calcutta, 1900.  
Forbes, *Oriental Memoirs*. London, 1834.

Hemacandra, *Abhidhānacintāmaṇi*. Bhavnagar, 1919.  
Hemacandra, *Abhidhānacintāmaṇi*, ed. Böhrling and Rieu. St. Petersburg, 1847.

*Imperial Gazetteer of India*. 1909.

*Memoirs of the Department of Agriculture in India, Botanical Series*, especially Vol. IV.

Nemicaandra, *Pravacanasāroddhāra*. Bombay, 1922.

Roxburgh, *Flora Indica*. Calcutta, 1874.

Watt, *The Commercial Products of India*. London, 1908.

I have not been able to consult De Candolle at first hand. He is quoted from Watt and the *Imperial Gazetteer*.

three principal classes of rice: *vrihi*; *sāli*, reaped during the winter; and *saṣṭika*, grown in the hot weather and reaped within sixty days of its sowing.

2. *Yava*, *Hordeum vulgare*, barley. This has been cultivated in some of its forms from the remotest times. Watt and MW think *yava* was originally a general term for 'grain' and was later restricted to barley, which must have been an important grain. It is still a very important crop in India.

3. *Masūra*, *Lens esculenta* (Roxb. *Cicer lens*), lentil. De Candolle thinks it was originally introduced into India from Egypt and says it was known as an article of food from the most ancient times. At present it is cultivated all over India.

4. *Godhūma*, *Triticum vulgare*, wheat. The cultivation of wheat is prehistoric. Dutt considers one variety indigenous to India. Literary references show that it has been known in India from an early date, though Watt speaks of the silence of European authors regarding the cultivation of wheat in India "until well into the 18th, if not to the beginning of the 19th century."

5. *Mudga*, *Phaseolus radiatus*, Linn., kidney-bean, 'green gram.' It is the Hindī *mūṅg* and Gujarātī *mag*. There is confusion in the lexicons and even in botanical works in the names for *mudga* and *māsa* (see below). This is caused by Roxburgh's transposition of the original Linnean names. They are the ones now used by Indian botanists. *Mudga* is a valuable pulse, widely eaten.

6. *Māsa*, *Phaseolus mungo*, Linn., kidney-bean, 'black gram.' Its most common vernacular name is the Hindī *uṛad*, Guj. *aḍad*. Watt says there are two varieties of *uṛad*: "one with large black seeds and the other with small greenish seeds, and these correspond very possibly with *P. mungo* proper and the variety Roxburghii." *Uṛad* is the most valued of all Indian pulses. It is extremely palatable and is one of the many excellent native foods ignored by Europeans. It is the main ingredient of a thin biscuit called *pāpaṭa*, a staple article of food in Gujarat. *P. mungo* and *P. radiatus* are indigenous to India.

7. *Tila*, *Sesamum indicum*, sesame. De Candolle thinks the "plant was introduced into India

from Sunda isles at a period prior to the Aryan invasion." Watt says few, if any, of the early European travelers in India mention the plant or its oil. He says it is mentioned in the *Ain-i-Akbari* (1590), so it has been an "important crop for 300 years." Forbes<sup>2</sup> speaks of its extensive cultivation for oil in his time. Its oil and castor oil are the most esteemed, he says.

8. *Caṇaka*, *Cicer arietinum*, chick-pea, the common or Bengal gram of India. It is commonly used as food for horses. Its name comes from the Portuguese word for grain, *grão*. The word does not occur, so far as known, in the oldest Sanskrit or Prakrit literature, but does in *Suśruta*. Watt thinks it is not indigenous, but may have been introduced very early.

9. *Aṇava*. This presents difficulties. I have not been able to find any occurrence of the word except in these lists of grain and in the *Deśi-nāmamālā* (1. 52). Hemacandra defines it in the *Deśi*<sup>o</sup> as 'śālibheda,' but it is probable that *śāli* here is grain in general. The PE takes it to be *yāvanāla*, *juār*, *Sorghum vulgare* (*Andropogon sorghum*, *Holcus sorghum*), great millet. *Juār* is one of the most important foods of India and it would be strange for it to be omitted from the list. The commentator to the *Pravacana*<sup>o</sup> interprets it as 'yugandhari,' which I do not find quoted in any lexicon.

10. *Priyaṅgu*, *Setaria italica* (*Panicum italicum*), Italian millet. Generally considered not indigenous, though cultivated from a very early time. *Kaṅgu* (a Sanskrit synonym, also), *cīna* and *rālā* are common vernacular names, according to Watt, but *cīna* is properly *P. miliaceum*.

11. *Kodrava*, *Paspalum scrobiculatum*, kodo millet. It is a native of India and is cultivated during the rainy season. Its extensive cultivation is accounted for by the fact that it will grow in very poor soil. It is used as a human food, but in some seasons is poisonous. Damp weather at harvest time, a damp season, and damp soil are said to produce the poisonous kind.

12. *Mayuṣṭhaka* (or *mayasṭhaka*), *Phaseolus acontifolius*, the aconite-leaved kidney-bean. This is eaten as a vegetable and *dāl*, and also is used as

a valuable fodder. Its Hindī name is *moṭh*, Guj. *maṭh*, and Forbes speaks of 'mutt' and gram being the most nutritious food for cattle.

13. *Sāli*, *Oryza sativa*, rice that is grown under water and reaped during winter. See *vrihi* above.

14. *Āḍhakī*, *Cajanus indicus* (Roxb. *Cytisus cajan*), pigeon-pea. Not a native of India. It seems not to be mentioned in any of the early Sanskrit works, but it occurs in *Suśruta*. It also occurs in the *Prajñāpanāsūtra*, so it was probably known in India by the first century A. D., perhaps much earlier. The pigeon-pea is cultivated extensively in all tropical countries, because it is available during the hot weather. Another Sanskrit name for the pulse is *tuvarī*, which occurs also in Hindī, though *arahar* is more commonly used. In Guj. *tuvar* and in Marāṭhī *tūar* are the usual names.

15. *Kalāya*, *Pisum*, pea. Watt calls attention to the fact that it must be distinguished from *Lathyrus sativus*, which it resembles. The confusion is of long standing, evidently. In his commentary to *Abhi*. 4. 236, Hemacandra gives *tripuṭa* as another name of *kalāya*. *Tripuṭa* seems to be *Lathyrus* certainly. *Maṭar*, which is properly the pea, is also applied to *Lathyrus*. In Gujarātī it seems to be used indiscriminately. The *Pravacana*<sup>o</sup> interprets *kalāya* as *tripuṭa*, "others *caṇakika*" (p. 296) and describes it also as "*vṛttacaṇaka*." Watt points out the importance of distinguishing between *Pisum* and *Lathyrus* and says: "The wedge-shaped pea of the present plant (*Lathyrus sativus*), flattened on two sides and marbled on the surface, should easily be distinguished from all the peas or pulses of India, except perhaps gram (*Cicer arietinum*); but while gram is somewhat triangular in section, it is prominently tapered below into a beak and is devoid of the marbling of *Lathyrus*." Watt's remarks explain the "*caṇakika* of others" and the "*vṛttacaṇaka*" of the *Pravacana*<sup>o</sup>.

16. *Kulaththa*, *Dolichos biflorus*, horse-gram. Watt says: "In popular works on economic products the horse-gram of Madras is viewed as *D. uniflorus*, and under either of these names (*D. uniflorus* or *D. biflorus*) a pulse is described as grown in almost every district in India, but chiefly in Madras and Bombay." This horse-gram of

<sup>2</sup> *Oriental Memoirs*, II, p. 36.

Madras must be distinguished from the Bengal gram, the *Cicer arietinum*, the true gram of India, and both must be distinguished from *Lathyrus sativus*. The chief use of *D. biflorus* is as a cattle food, but it is also eaten by the poorer classes, as it is a very cheap pulse.

17. *Śana*, *Cannabis sativa*, hemp. Probably not an indigenous plant. There is considerable discussion whether *śana* in the older works refers to the true hemp, *Cannabis sativa*, or to Bengal *san*, *Crotalaria juncea*. The most common current name for the true hemp is *bhaṅg*, a name that goes as far back as the *Atharvaveda*. Hemacandra gives *śana* and *bhaṅga* as synonyms (*Abhi.* 4. 245, also *mātulānī*). Watt thinks *śana* was in use to denote the true hemp at the time of early Mogul emperors. "But while *śana*—a fibre—occurs in the Institutes of Manu (probably of date 100 to 500 A. D.) and in some of the later Sanskrit works, it apparently denotes *Crotalaria* rather than *Cannabis*. It would thus seem as if the word *śana* to denote the true hemp had been a comparatively modern usage." Watt also quotes from Dr. K. Garde of Poona, who says: "Later Sanskrit commentators and lexicographers interpret *bhaṅg* as *shana*, the Bengal sunn plant (*Crotalaria juncea*), which has been known in India from time immemorial as a plant-yielding fibre." I can not follow this reasoning. Since *bhaṅg* has always denoted the true hemp, it would seem that the commentators were interpreting *śana* as *Cannabis*, not interpreting *bhaṅg* as *Crotalaria*. I think there can be no doubt that Hemacandra intends *śana* and *bhaṅga* to refer to the true hemp, as the plant referred to is included in this list of grains. *Cannabis* produces edible seeds and the well known narcotic. *Crotalaria* has no edible products. Roxburgh quotes Hardwicke as saying that in the mountains above Hardwar a coarse cloth is made from the bark of *Cannabis*.

The *Pravacana*<sup>o</sup> lists these, with the exception of *aṇava*, *caṇa* and *mayuṣṭhaka*. In addition it names:

1. *Yavayava*, a kind of barley.
2. *Cavalaka* (Pk. *cavalaya*). *Cavalaka* or *cavala* is not quoted in the Sanskrit lexicons. It is obviously the Marāṭhī *cavalā*, the Gujarātī *colā*, which are names for the *Vigna catjang* (*Dolichos*

*sinensis*), the cow-pea. *Barbatī* and *lobiyā* are other common vernacular names. There is some popular confusion between *Dolichos lablab* and *V. catjang*. Through *lobiyā* is applied to *D. lablab* and loosely to any pulse by Indian market gardeners, it especially denotes the present plant, according to Watt, and he reserves the name for *V. catjang*.

3. *Kṛṣṇacaṇaka*, black chick-pea. Watt speaks of various forms of the chick-pea, indicated by the different colors of the pea. See *caṇa* above. However, the *Pravacana*<sup>o</sup> commentary describes it as round without a point.

4. *Valla*, *Dolichos lablab*, the climbing bean. This is the Gujarātī *vāl*, (Watt wall). Another Sanskrit name is *niṣpāva*. Watt thinks it is probably indigenous. It is a garden plant and is not a regular field crop.

5. *Atasī*, *Linum usitatissimum*, common flax. *Umā* and *kṣumā* are synonyms. (*Abhi.* 4. 245). Watt calls attention to the fact that, though the cloth made from *kṣumā* is regularly interpreted as 'linen,' flax was not used when he wrote (about forty years ago) to make cloth, but only to produce linseed and linseed oil. He thinks *kṣumā* may have originally denoted some other fibre. Forbes<sup>3</sup> speaks of flax being cultivated by many villages for the oil.

6. *Laṭva* (Pk. *laṭṭa*), *Carthamus tinctorius*, safflower. Though better known for its dye, safflower also produces oil and edible seeds, and the young shoots are eaten.

7. *Koradūṣaka* (*kodūsaga*), a kind of *kodrava*. See above, no. 11. Roxburgh gives *koradūṣa* simply as a synonym of *kodrava*, but, as the commentator takes them to be different and as they both occur in one list, they are probably different varieties.

8. *Baraṭhī*, the *Pravacana*<sup>o</sup>'s commentary's interpretation of the Pk. *varaṭṭa*. It is said to be

<sup>3</sup> Oriental Memoirs, II, p. 36. In this connection a news item from India is of interest. In Indian Information, August 15, 1940, published by the Government of India, there is an announcement of the approval of a government scheme for growing flax. Seed was purchased in Holland. Guarantees to cultivators are designed to discount risks attendant on the growing of a *new and unfamiliar crop*. (Italics mine.)

'well-known.' It is presumably the Marāṭhī *baraṭī*, which Gamme says is *Setaria glauca* as a grain crop; as a grass crop it is called *bhadli*. MC defines *baraṭī* as a 'grass-grain included amongst *trṇadhānya*. It is white and small and it resembles *varī* or *rālā*.' *Varī* is *Coix barbata*, and *rālā* *Panicum italicum*, according to MC. But Watt gives 'vari, wadi' as vernacular names of *Panicum miliaceum*.

9. *Siddhārtha*, *Brassica campestris*, Indian colza or sarson. Hemacandra (*Abhi.* 4. 246) gives *śvetasarsapa* as a synonym, and *siddhārtha* is called 'white mustard' by the lexicons. But it is not *Brassica alba*. Sarson is widely cultivated in India.

10. *Rālaka*, 'a kind of *kaṅgu*,' *Setaria italica*, M. *rālā*. See *priyaṅgu* above.

11. *Mūlaka*, *Raphanus sativus*, radish. Watt says that it is cultivated throughout the plains of India and in the Himalayas up to 10,000 feet. He does not say whether it was indigenous or not, nor when it was introduced. The PH cites it from the *Prajñāpanāsūtra*, so it must have been known for about 2000 years, at least.

The third list, *Pravacana*<sup>o</sup> 1004 f., which appears to be copied in the commentary to *Kalpasūtra* 89, adds four new grains:

1. *Ṣaṣṭika*, sixty-day rice. See *vrihi* above.

2. *Triputaka* (*tiugaḍa*), *Lathyrus sativus*, chickling-vetch. This is the pulse with which Pisum is often confused. See *kalāya* above. It is generally fed to cattle but among the poor it is eaten in the place of the better pulses. If eaten continuously for some time, it causes a form of paralysis, Lathyrism. Its common vernacular names are *teora*, *tiura* and, in Bombay, *lāṅg*.

3. *Iksu* (Pk. *ikkhu*, *ucchū*), *Saccharum officinarum*, sugar-cane. Very extensively cultivated. References to fields of sugar-cane are very common. Watt thinks that sugar-cane cultivation originated in South Asia, if not in India, but it has never been found wild in India, nor any other place.

4. *Dhānyaka*, *Coriandrum sativum*, coriander. Cultivated over India in the cold season.

Although this list adds only four new grains, it furnishes a number of different names for the same grains. *Harimantha* occurs, which Hemacandra

(*Abhi.* 4. 237) gives as a synonym of *caṇa*. The *Pravacana*<sup>o</sup> commentator, however, specifies *kr̥ṣṇa-caṇaka*. According to Watt, *harimandakam* is used at present in Tamil for the *Cicer arietinum* (*caṇa*). In this list *niṣpāva* (*nippāva*) is *Dolichos lablab*; *śilinda* is Hemacandra's *mayuṣṭhaka*, *Phaseolus acontifolius*; *rājamāsa* is another name for *Vigna catjang*. Hemacandra's *aṇava* occurs in this list (*aṇua*). Assuming that *aṇava* is *Sorghum vulgare*, there are only two grains omitted from these lists that one might expect to be included: *cīna* and *śyāmāka*. Though both these names occur in the *Abhidhānacintāmaṇi*, they may not have been widely cultivated at that time. Both of them are considered inferior grains, which may also have been a reason for their omission.

*Cīna* is generally identified with *Panicum miliaceum*, common millet. But the Gujarātī lexicon defines *cīno* as 'a poor kind of produce, the third crop from a field in the same year,' and calls it P. miliare. Watt says that P. miliare (little millet) forms together with *kodon* (*kodrava*) the crop generally taken from the poorest land in the village. Incidentally, Roxburgh says of both P. miliaceum and P. miliare that they "are generally cultivated on an elevated, light, rich soil." Watt gives *cīna* as one of the vernacular names for S. italica as well as P. miliaceum and Gamme says that *cīno* is used in Sind for a variety of S. italica.

*Śyāmāka*, P. frumentaceum, poor-man's millet, is called by Hemacandra 'jaghanyo vrihiḥ' (*Abhi.* 4. 242). It is the *baṅṭi* of Gujarat. It is the quickest growing of all millets and in some localities can be harvested six weeks after sowing. It is consumed chiefly by the poorer classes. It is mentioned in the Bower manuscript.

Two other grains, which are widely cultivated at the present time, can not be identified with any of the grains in these lists nor have they any Sanskrit names, so far as I can ascertain: Eleusine coracana, *rāgi*, a small millet, and Pennisetum typhoideum (Roxb. *Panicum spicatum*), *bājrā*, spiked millet. Roxburgh speaks of both of these as cultivated extensively on the Coromandel coast. They were both well-known in Gujarat in the time of Forbes. However, he calls Eleusine coracana 'nutchnee,' the Coromandel term, or 'boutah' (?).