American Crop Plants in Asia prior to European Contact

Carl L. Johannessen
Department of Geography
University of Oregon

Anne Z. Parker
Department of Geography
University of Oregon

American crop plants may have been present in Asia prior to Columbus's discovery of the New World. If they were, they would serve as indicators of contact between the New and Old World before the "European Age of Discovery." Since cultivated crop plants cannot be invented twice, if they are present on a continent not the home of the wild progenitors and if there is no possible manner of non-human seed dispersal, then they must have been carried by humans. If the crop germ plasm was transferred, it implies much cultural and technological information was probably also transferred. We need to know how the process of cultural advancement occurred. As one of the techniques to test the hypothesis, we conducted a search of the published records of the Asian region (Table 1). We have reviewed the English translations of the literature of early India and have been assisted by graduate students in reading the medicinal and religious materials in their original languages (Arabic, Farsi and Chinese) for any inclusion of information on crop plants.

Table 1. Biogeographical evidence for pre-Columbian contact between the old and the new worlds: an annotated bibliography

COUNTRY	DATE		SOURCE	REFERENCE
			Arachis hypogaea (peanut)	
China	———		Chang 1968, 157	peanut, *Arachis hypogaea*
China	23 & 27C	BC	Chang 1973, 527	peanut, *A. hypogaea*
			Ananas comosus (pineapple)	
India	1590	AD	Allami 1927, 70, 73	Pineapples called travelling jackfruits or Kathal-i safari
			Annona reticulata, A. squamosa (annona, sweetsops or custard apples)	
India	6C	BC	Bhishagratna 1907, 72	*annona reticulata*, Lavani
India	1590	AD	Allami 1927, 70	Custard-apples
India	———		Burkill 1969, 1:169	*Annona squamosa* gone wild in the forests of India
			Argemone mexicana (prickle poppy)	
India	6C	BC	Bhishagratna 1907, 78	Sringála-Kantaka, = *Argemone mexicana*
India	8C	BC	Sharma and Dash 1983, 89	Svarnaksirini, *A. mexicana*
			Capsicum annum, C. chinense, C. baccatum, C. pubescens (chili pepper)	
India	5C	AD	Tagare 1982, 453	Maricas (chillis)
India	5C	AD	Tagare 1969, 95	Chillis
India	10C	AD	Tagare 1983, 539	Maricam (pepper)
India	7C	AD	Kunzang 1973, 78, 80, 81, 85	*Capsicum annuum*
Egypt	12C	AD	Maimonides 1974, 239	*C. annuum*
			Ceiba pentandra (kapok)	
India	10C	AD	Tagare 1983, 179	Silk cotton
India	5C	AD	Tagare 1982, 408	Salmali (silk-cotton)
India	4C	BC	Toxopeus 1948, 1-19	*Ceiba pentandra*
Java	967	AD	Steinmann 1934, 110-113	Stone carving
India	10C	AD	Baker 1965, 185-216	*C. pentandra*
			Cucurbita (pumpkins and squashes)	
Greece	1C	AD	Gunther 1934, 175	Pepon, Pompion, *Cucurbita pepo*
India	5C	AD	*The Garuda Purana* 1978, 309	Kūṣmāṇḍa, *C. pepo*
India	5C	AD	*The Garuda Purana* 1979, 505	Kūṣmāṇḍa, *C. pepo*
India	5C	AD	Tagare 1982, 453	Kūṣmāṇḍa, pumpkin
Arabia	6C	AD	Siddiqi 1976, 1126	Pumpkin
China	6C	AD	Waters 1961, 178	Pumpkin
Egypt	9C	AD	Dols 1984, 132, 162	Pumpkin, Pumpkin Juice
Arabia	9C	AD	Kopf 1949, 70, 71	Pumpkin
Arabia	9C	AD	Levey 1966a, 30, 150	Pumpkin seed, Pumpkin oil
Iraq	9C	AD	Levey 1966b, 95	Pumpkin
Persia	10C	AD	Mowlavi 1978, 887	Pumpkin
Iraq	12C	AD	Levey 1965, 504	Colocynth (hanzel) *Cucurbitacae*
Egypt	12C	AD	Maimonides 1964, 33, 34, 37, 43, & 48	Gar' = Pumpkin Yaqtin = Round pumpkin Yactin, *C. pepo*
Egypt	12C	AD	Maimonides 1969, 48, 59, 62	Pumpkin, Yactin seed, Gourd
Egypt	12C	AD	Maimonides 1966, 25	Colocynth root, *C. pepo*
Egypt	12C	AD	Maimonides 1974, 71, 107, 121, 220, 222, 240	Pumpkin, *C. pepo*

Table 1. cont'd

COUNTRY	DATE		SOURCE	REFERENCE
Egypt	12C	AD	Maimonides 1979, 230-231	Qar', Al-dubbā', Al-yaqtīn, Al-fasaġ Pumpkin, Gourd
Persia	13C	AD	Levy and Al-Khaledy 1967, 73, 79, 189	Pumpkin, *C. pepo*, *C. maxima*, *Lagenaria vulgaris*, Gourds
China	16C	AD	Li 1960, 972	Pumpkin
India	1590	AD	Allami 1927, 71	Gourds, Kadu (= pumpkin)
			Helianthus annus (sunflower)	
India	5C	AD	Tagare, 1978, 144	Arka (the sun plant)
Mal- dives	pre- 12C	AD	Heyerdahl 1986, 2, 79	Sunflower stone carving
India	1590	AD	Allami 1927, 90	Aftabi (sun-flower)
			Phaseolus vulgaris (kidney bean)	
India	5C	AD	Kramisch 1928, 50	Kidney-bean
Arabia	12C	AD	Levey 1973, 55	Kidney bean, Arabic = Lubiya, Akkadian = Lubbu, Sumerian = LU.UB, Greek plural = Lobia, Sanskrit = Simbi, Hindustani = Sim
Persia	13C	AD	Levey and Al-Khaledy 1967, 217	Lubiya ahmar = Kidney bean (*P. vulgaris*), Iran = Lubia, in Teheran = Lubia-kermiz, Kashmir = Razmah
			Physalis minima (husk tomato)	
Greece	1C	AD	Gunther 1934, 468-471	Phusalis (*Physalis*)
			Psidium guayava (guava)	
India	8C	BC	Sharma and Dash 1983, 518	Psidium guajava = Paravata fruit
India	1590	AD	Allami 1927, 69, 70	Guavas, Amrud guava = pear
			Tagetes (marigold)	
Persia	9C	AD	Levey, 1966a, 192	Marigold
Persia and India	13C	AD	Levey and Al-khaledy 1967, 192	Marigold
			Zea mays (corn)	
India	5C	AD	Tagare 1982, 448, 486, 487, 498	Harvesting on the 13th day united with Magha constellation is good when the corn is ripe, Gleaning corn, Breaking or pounding corns.
India	5C	AD	*The Linga Purana* 1973, 58, 85	Ripe corn (fields), Corn vessel
India	5C	AD	Tagare 1969, 1008	Smoke of husks, Bits of grain, Grains of Corn
India	5C	AD	*The Garuda Purana* 1979, 728	Thief of corn becomes a rat
India	5C	AD	*The Garuda Purana* 1980, 925, 947, 1128	Corn, Corn leaves the husk, Grains of corn, husks of corn
Arabia	1000	AD	Shemesh, 1965, 88	Maize (from which tax is taken)
China	1368	AD	Gia 1966, 8	Southeast coast chig = yu-shu-shu (jade wheat of the west), Fan mai= wheat of the Barbarians, Yu-mai = jade wheat, Yu-mi = jade rice
China	1474	AD	Marszewski 1978, 142, 144	Maize stigma (maize "silk")

We had already become familiar with enough of the economic botanists and natural historians to realize that they believed such contact did not occur and therefore, in the case of most species of American plants, that the crop plants could not have been in the Old World (De Candolle 1883; Watt 1885; Sturtevant 1919; Burkill 1969; Ames 1939; Mangelsdorf and Oliver 1951; Merrill 1954; Mangelsdorf 1971; Baker 1978, pers. comm.). However, several more recent authors have questioned these conclusions with new data (Merrill 1954; Sauer 1960, 1963; Jeffreys 1965, 1971; Carter 1974 and 1977; Marszewski 1978; Heyerdahl 1979; Ashraf 1985a and 1985b; Johannessen 1981 and 1986). We concentrated on the ancient literature that most of the Western botanists previously have found difficult to translate, and which they may have supposed contained nothing of interest anyway. We too would have found it impossible except for the fact that the Sanskrit and other language materials have been translated recently from the original ancient languages. The encouragement of an Indian scholar, Professor Jaweed Ashraf of New Delhi, who had already found fairly positive evidence of tobacco, pineapple, potato, and maize (Ashraf 1985a, 1985b) in this medical and religious literature, caused us to consider the proposition that the curers in the societies, and their cohorts the priests, logically would have been the most likely segments of the society to accept an innovation in agricultural crops. They were educated people, and they could keep medical plants and magical secrets from the general population. As a result, they may not have generally written down their findings and uses. Ashraf contributed to our determination to search these sources for new evidence.

In addition to medical and ritual texts, we find that there is an abundant harvest of materials from cookbooks, poems, songs, sculptures, paintings, and frescoes that few investigators seem to have utilized in the past. Here we focus on the printed evidence.

Two groups of students in our seminars and other interested people helped to discover references to the citations presented in Table 1. We present these references knowing that there will be those who disagree with the translations and translators' identification in Asia of some of the species, especially those that were first put into the process of domestication in the New World.

However, there is no indication that the translators were purposely biasing their data; it comes from a large number of translators, and the references are found in many different cultures in different original languages for which there are cognates back through the historical literature at several dates for various species (Table 1). We use here references of pre-1500 A.D. existence. However, we raise the question of how long it takes for a new species to be accepted and used extensively. We suggest that it probably took centuries -not decades- for the spread across India or China to have taken place. As Ashraf (pers. comm.) suggests, there is a major time relation between introduction and acceptance by local farmers.

Some of these species historically have been considered to be New World in origin and appear to have been transported from the New World to Asia. These include peanuts, pineapple, annona, prickle poppy, chili pepper, kapok, pumpkin and other squashes, sunflower, kidney bean, husk tomato, guava, marigolds, and maize (Table 1). Kapok and kidney bean are included because they seem to appear in the translated literature, although we acknowledge that other explanations may be valid. Baker's (1965) studies of kapok, for example, suggest that floating of its wild seed to Africa may have accounted for the distribution across the Atlantic without human carriage. How would this account for the homologous folklore? Almost all of the possible wild progenitors for this list of crops are in the Americas. It may be that some of the *Cucurbita* species in Asia have separate origins, but not the *C. pepo* as written in the translations.

Tetraploid cotton and sweet potato, originally from the New World, have long been considered as likely candidates for presence in the western Pacific prior to A.D. 1492. Tetraploid cotton, along with the coconut and the gourd from the Old World, have been assigned by the non-cultural-diffusionists to drift voyages across the oceans by natural means in which drilling oceanic parasites (Teredo worms) and snapping fish are ignored. The sweet potato is placed among the crop plants that were present in both hemispheres in pre-Columbian times by Carter (1977, 120) because he points out that its name, Kumar, was used by Cuna Indians of Panama (who formerly lived on the Pacific coast of Colombia), and is also in the Sanskrit text of India, where the word Kumar is still currently used for sweet potato. This tends to obviate Brand's (1971) discussion countering the acceptance of the diffusion of the sweet potato to Asia. It is highly probable that the Polynesians on New Zealand and elsewhere in the Pacific had the sweet potato prior to any European contact, according to Yen (1971, 1974).

Langdon (1988) has recently demonstrated that several other American crops had been moved prehistorically into eastern Polynesia: manioc and edible canna to Easter Island and pineapple, tetraploid cotton, and perhaps chili pepper to Hawaii. If several of the species in our list prove to be validly present in both hemispheres before European contact, then it is more logical to propose that the above species could have been exchanged on shipboard rather than by free floating across the ocean. Traditionally, the diffusionists have not very often accepted the notion that the cultivated species floated independently.

In conclusion, we find 13 New World species (Table 1) that have been referred to in, and translated from, ancient literature and/or archaeological data or ethnobotanical consensus to suggest their presence in mainland Asia well before 1492 A.D., in addition to the species appearing in the Pacific. We are searching for more literature sources and trying to stimulate the search for archaeological evidence to date more firmly the presence of these 13 crop plants in China, India, Pakistan, and the Arabian Peninsula. The search for plant remains in early archaeological sites with C14 dating is somewhat recent in these countries and, we are told, non-existent in Bhutan, for example. No scientific excavations have been made in Bhutan; yet we found while we were there in 1985 that there are non-sacred caves that might yield evidence if they were examined with permission from the government in Bhutan as well as in Sikkim, Darjeeling, and Nepal. (Human remains should be left intact.)

Ashraf (pers. comm.) is in the process of publishing a large series of illustrations of sculptures and frescoes from India, mainly, that show such American crops as maize, pineapple, and annonas. Donald B. Lawrence (pers. comm.) and associates are working on a somewhat similar project on temple sculptures illustrating maize in India. We, too, are working to prove the validity of some of these representative sculpted stone statuaries, especially of maize, in Indian temples (Johannessen 1988; Johannessen and Parker 1989), though that need on our part would be less urgent were more of the actual archaeological remains of the crops to be discovered. In light of this growing body of evidence in the historical literature and in artistic representation, there is clearly a case for continued investigation of this topic.

In this brief bibliographic essay, we cannot examine all these translations of crop species from the ancient literature. We propose that they be checked by linguistic scholars in their respective languages (Table 1). We feel a word of caution is in order. Some of the early writings and their included nouns of plant names have been interpreted in more than one way according to some scholars. As with all arrangements of this sort, several authorities must be consulted and many people must have the chance to debate their respective positions. We, therefore, hope that the intellectual community will accept the stimulus of this report and help in reaching for a new consensus.

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