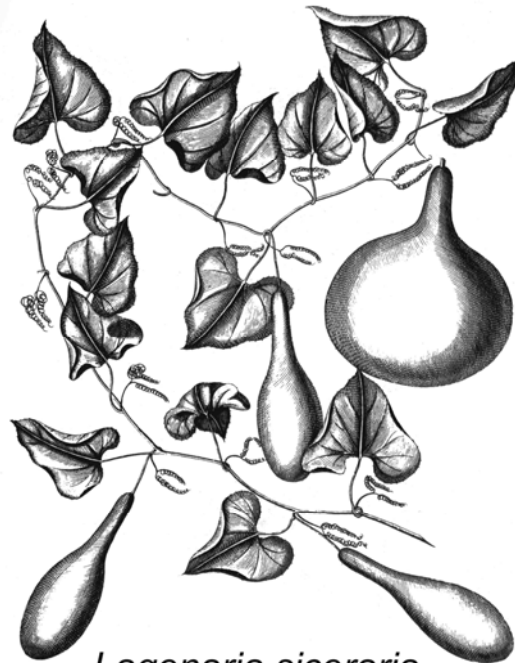
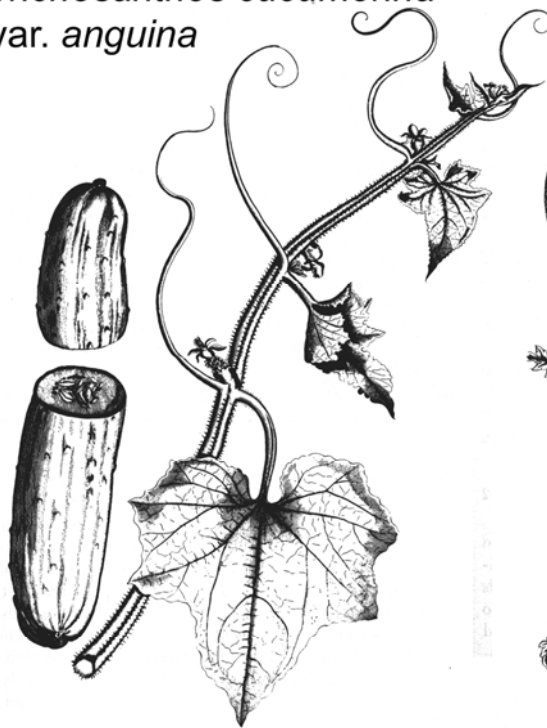




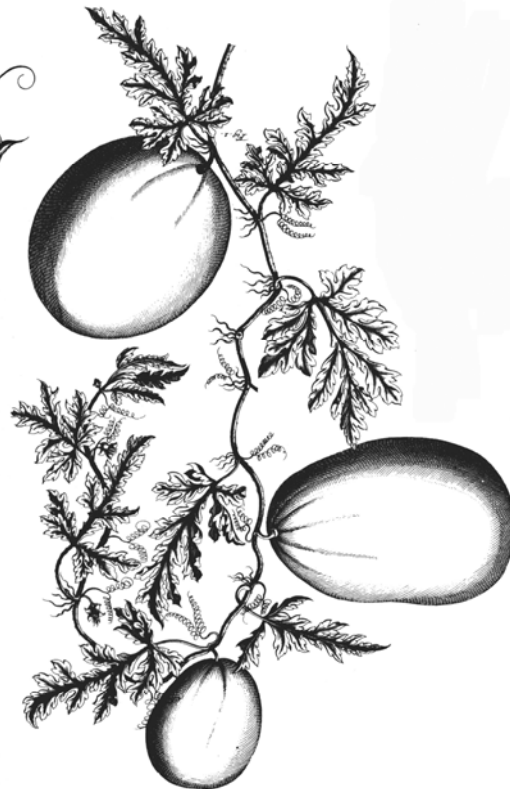
Trichosanthes cucumerina
var. *anguina*



Lagenaria siceraria



Cucumis sativus



Citrullus lanatus

Figure 7.1. Cucurbit crop species: *Trichosanthes cucumerina* var. *anguina* (after Rumphius), *Lagenaria siceraria* (after Rumphius), *Cucumis sativus* (after Rheede), *Citrullus lanatus* (after Rumphius)

Cucurbitaceae (taxonomy after Jeffrey via Walters 1989)

Tribe Melothrieae

Cucumis melo L. subsp. *agrestis* wild melon (Near East through Central India to Yunnan, formerly Yangzte(?) and Japan(?)) Multiple domestications

C. melo ssp. *melo* domesticated melons. Includes sweet and vegetable types. 甜瓜 *tian guā* ('sweet *gua*'); 菜瓜 *cai guā* ('vegetable *gua*'). Probable separate domestications in Subsaharan Africa, Egypt/Near East, South Asia, Lower Yangzte, Japan(?)

C. sativus L. *sativus* domesticated cucumber. 黄瓜 *huang guā* ('yellow *gua*')

C. sativus ssp. *hardwickii* wild progenitor in western Himalayan foothills

Melothria heterophylla (Lour.) Cogn. (syn. *Solena heterophylla* Lour.) Mouse cucumber: India, Southeast Asia, S. China, Taiwan. *Melothria* types found archaeologically in South India; *Melothria* spp. found on Jomon sites in Japan. Also native *Melothria* spp. in the New World

Tribe Joliffieae

Subtribe Thladianthinae

Momordica charantia L., bitter gourd or bitter cucumber, cultivated throughout the tropics; two domestications: Himalayas (India/Nepal), and Yunnan, China (Marr et al. 2005, *Economic Botany*)

Wild= subsp. *abbreviata* Ser..

Cultivar groups, divided on the basis of fruit size, into *minima* and *maxima*.

Chinese 苦瓜 *ku guā*

M. balsamina L., a pantropical of dry areas which can also be eaten (Reyes et al 1993). Indian origin

M. cochinchinensis (Loureiro) Sprengel, sweet gourd or spiny bitter cucumber, a root-tuberous perennial, is grown widely in mainland and island southeast Asia, as well as China and Japan, and occurs in the wild throughout much of this range, but appears absent from Java (Reyes et al. 1993). Chakravarty 1959: Burma, Assam, Bengal: Chittagong, Garjania, Khulna and Jessore, Madras, one collection by Wright no. 1130 Kew from Madras. Chinese 木鳖子 *mu bie zi*

M. subangulata Blume, Indonesia and Malaysia known as kamas; in Southern Thailand as phakmae is used from wild populations, distributed in mainland Southeast Asia and Java, and a little in India (Chkaravarty 1959). Chinese 凹萼木鳖 *ao e mu bie*

M. dioecia Roxb. ex Willd. A root-tuberous perennial. Extends from Burma and Yunnan through India, partially cultivated in some parts of India for fruits (Chakravarty 1959). Chinese 云南木鳖 *yun nan mu bie*

Subtribe Telfairinae

Telfairia pedata (Sm. ex Sims) Hook, Zanzibar oilvine, oyster nut. Cultivated in East Africa for oily seeds.

Tribe Trichosantheae

Trichosanthes cucumerina L. var. *anguina* (L.) Haines snake gourd (domesticated), cultivated India, China, SE Asia. Chinese 蛇瓜 *she gua*; Thai *būap ngū*

Trichosanthes cucumerina L. var. *cucumerina* wild snake gourd, India, Yunnan, Burma, mainland Southeast Asia

Trichosanthes globosa Blume; another species also called "snake gourd", wild but eaten in South Asia (syn. *Trichosanthes cucumeroides* (Ser.) Maxim.)

Trichosanthes dioica Roxb., pointed gourd, palwal, South Asia

Trichosanthes tricuspida Lour. Reported to be eaten; wild from India through Guizhou, mainland & island Southeast Asia

Other wild species include: *T. quinquangulata* A. Gray [mainland Southeast Asia, Yunnan]; *T. globosa* Blume [Indonesia]; *T. rosthornii* Harms (south China); *T. villosa* Blume [southwest China, mainland and island Southeast Asia]

Hodgsonia macrocarpa (Blume) Cogn. Chinese lard-fruit. South China through SE Asia. Oily seeds & edible fruits. Chinese *you zha guo* 油渣果

Tribe Benincaseae

Subtribe Luffinae

Luffa acutangula (L.) Roxb., ridge loofah, domesticated India. Ch. 丝瓜 *si gua*; Thai *Būap liem*

Luffa aegyptiaca Mill. (syn. *L. cylindrica* M. Roem.) sponge loofah; also cultivated as vegetable; domesticated twice, South Asia (Himalayan foothills, Yunnan South China. Ch. 广东丝瓜 *Guangdong si gua*; Thai *Būap kom*

Subtribe Benincasinae [see Walters and Decker-Walters in *Econ Bot* 1989: 274-8]

Benincasa hispida (Thunb.) Cogn., the wax gourd, winter melon; important in China and Japan. Native to Southern China/ Yunnan/ maybe eastern India

Four cultivar groups: Unridged winter melon, ringed winter melon, fuzzy gourd, wax gourd, Moderately dry lowland tropics, up 1000m, optimal growth 23-28 C temp. Mature fruits 100-160 days after sowing. Chinese 冬瓜 *dong gua*; Vietnam *bi dao*; Thai *fak kio*

Citrullus lanatus (Thunb.) Matsum. & Nakai water melon. Origins Africa, Sahara(?); advanced large, sweet juicy forms may have been developed in India and dispersed in Arab period.

Cultivar= subsp. *lanatus*. 西瓜 *xi gua* 'Western *gua*'

Progenitor: *Citrullus lanatus* (Thunb.) Matsum. & Nakai var. *citroides* (L. H. Bailey) Mansf.

Currently wild in Southern part of Africa; formerly in Sahara(?)

Citrullus colocynthis (L.) Schrad. Colocynth dist includes wild in Western and Central India though Sahara and Sahel. May have been cultivated or collected for the seeds.

Citrullus ecirrhosus Cogn. Tsama melon, collected wild by Namib hunter-gatherers

Coccinia grandis (L.) Voight ivy gourd, little gourd, *kundee*, *tindora*

Praecitrullus fistulosus (Stocks) Pangalo squash-melon, round melon *tinda* (Hindi). Cultivated in India & Pakistan

Lagenaria siceraria L. - The bottle gourd, originally wild only in Africa(?); 4 other wild species in Africa in genus.

Widely translocated and cultivated(?) since Palaeolithic times. Chinese 葫芦 *hu lu*

Tribe Cucurbitae (New World squashes, introduced post-Colombus)

e.g.

Cucurbita anyrosperma C. Huber Mesoamerican

Cucurbita ficifolia Bouché Black-seed squash, *chilacayote* Latin America

Cucurbita maxima Duchesne great pumpkin, winter squash, Native southern South America

Cucurbita pepo L. Mesoamerica, most squash varieties, common pumpkin; with separate Eastern North American domesticate (from wild var. *ozarkiana*)

Consumption matrix for cucurbits

	Eaten immature	Eaten mature
Eaten (mainly) raw	<i>Cucumis sativus</i> , <i>Coccinia grandis</i>	<i>Cucumis melo</i> , <i>Citrullus lanatus</i>
Eaten (mainly) cooked	<i>Luffa cylindrica</i> , <i>Luffa acutangula</i> , <i>Momordica charantia</i> , <i>Momordica dioecia</i> , <i>Lagenaria siceraria</i> (extra immature), <i>Trichosanthes cucumerina</i> , <i>Coccinia grandis</i>	<i>Benincasa hispida</i> , <i>Cucurbita</i> spp., <i>Cucumis melo</i> (vegetable varieties)
Seeds eaten roasted/ processed for oil		<i>Cucurbita</i> spp., <i>Citrullus</i> spp., <i>Telfairia pedata</i> , <i>Hodgsonia macrocarpa</i>

Bibliography

Bates, D. M. and R. W. Robinson (1995). Cucumbers, melons and water-melons. In: Smart and Simmonds (eds) *Evolution of Crop Plants*, second edition. Longman, Harlow. Pp. 89-96

Dane, F. and Jiarong Liu (2007) Diversity and origin of cultivated and citron type watermelon (*Citrullus lanatus*). *Genetic Resources and Crop Evolution* 54(6): 1255-1265

Decker-Walters, D. S. (1999) Cucurbits, Sanskrit and the Indo-Aryans. *Economic Botany* 53(1): 98-112

Decker-Walters, D. S., M. Wilkins-Ellert, Sang-min Chung and J. E. Staub (2004) Discovery and Genetic Assessment of Wild Bottle Gourd [*Lagenaria Siceraria* (Mol.) Standley; Cucurbitaceae] from Zimbabwe. *Economic Botany* 58(4): 501-508

Erikson, D. L., B. D. Smith, A. C. Clarke, D. H. Sandweiss and N. Tuross (2005) An Asian origin for a 10,000-year-old domesticated plant in the Americas. *PNAS* 102(51): 18315-18320

Hammer, K., P. Hanelt and P. Perrino (1986) *Carosello* and the taxonomy of *Cucumis melo* L. especially its vegetable races. *Kulturpflanze* 34: 249-259

Janick, J., H. S. Parrish and D. C. Parrish (2007) The cucurbits of Mediterranean antiquity: identification of taxa from ancient images and descriptions. *Annals of Botany* 100: 1441-1457

Jeffrey, C. (1967). *Flora of Tropical East Africa. Cucurbitaceae* (eds. E. Milne-redhead & R. M. Polhill). London: Crown Agents for Overseas Governments.

Jeffrey, C. (2001). Cucurbitaceae. In: Hanelt, P. and Institute of Plant Genetics and Crop Plant Resources (eds) *Mansfield's Encyclopedia of Agricultural and Horticultural Plants*. Berlin: Springer-Verlag. P. 1520. [Also on-line](#)

Keraudren-Aymonin, M. 1975. *Cucurbitacées*, Vol. 15 in Aubreville, A. and Leroy, J.-F. (ed.) *Flore du Cambodge, du Laos et du Viet-Nam*. Paris: Muséum National D'Histoire Naturelle

Lira, R. and J. Cabellero (1990) Ethnobotany of the Wild Mexican Cucurbitaceae. *Economic Botany* 56(4): 380–398

Marr, K. L., Bhattarai, N., & Xia, Y.-M. (2005b). Allozymic, morphological, and phenological diversity of cultivated *Luffa acutangula* (Cucurbitaceae) from China, Laos, and Nepal, and Allozyme divergence between *L. acutangula* and *L. aegyptiaca*. *Economic Botany*, 59(2), 154–165.

Marr, K. L., Mei, X. Y., & Bhattarai, N. (2004). Allozyme, morphological and nutritional analysis bearing on the domestication of *Momordica charantia* L. (Cucurbitaceae) from China, Laos, and Nepal. *Economic Botany*, 58(3), 435–455.

Marr, K. L., Xia, Y.-M., & Bhattarai, N. (2005a). Allozymic, morphological, phenological, linguistic, plant use, and nutritional data on wild and cultivated collections of *Luffa aegyptiaca* Mill. (Cucurbitaceae) from Nepal, Southern China, and Northern Laos. *Economic Botany*, 59(2), 137–153.

Matthews, P. J. (2003) Identification of Benincasa Hispida (Wax Gourd) from the Kana Archaeological Site, Western Highlands Province, Papua New Guinea. *Archaeology in Oceania* 38: 186-191

Stol, M. (1987) The cucurbitaceae in the cuneiform texts, *Bulletin on Sumerian Agriculture* 3: 81-92

Tanaka, K., A. Nishitani, Y. Akashi, Y. Sakata, H. Nishida, H. Yoshino, K. Kato (2007) Molecular characterization of South and East Asian melon, *Cucumis melo* L., and the origin of Group Conomon var. *makuwa* and var. *conomon* revealed by RAPD analysis. *Euphytica* 153: 233-247

Walters, T. W. (1989) Historical overview on domesticated plants in China with special emphasis on the Cucurbitaceae. *Economic Botany* 43 (3): 297-313

Wasylikowa, K. and Van der Veen, M. (2004) An archaeobotanical contribution to the history of watermelon, *Citrullus lanatus* (Thunb.) Matsum. *Vegetation History and Archaeobotany* 13(4): 213-217

Yang, S. and T. W. Walters (1992) Ethnobotany and the economic role of the cucurbitaceae of China. *Economic Botany* 46: 349-367

Zheng, Y. and X. Chen (2006) The archaeological study of the origin of melon, based on unearthed seeds from the Lower Yangtze. In Zhejiang Provincial Institute of Cultural Relics and Archaeology (ed.) *Remembering 70 years since the discovery of Liangzhu*. Beijing: Wenwu Press. 578-585 [in Chinese]

For Indian names of gourds, see also Table 1 in Fuller, D. Q (2006). 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 Osada, T. (eds.), *Proceedings of the Pre-Symposium of RIHN and 7th ESCA Harvard- Kyoto Roundtable*, Research Institute for Humanity and Nature, Kyoto, pp. 175-213

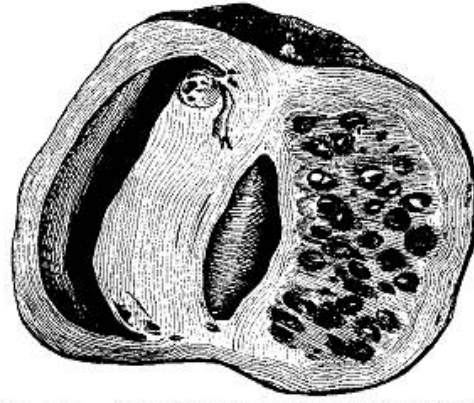
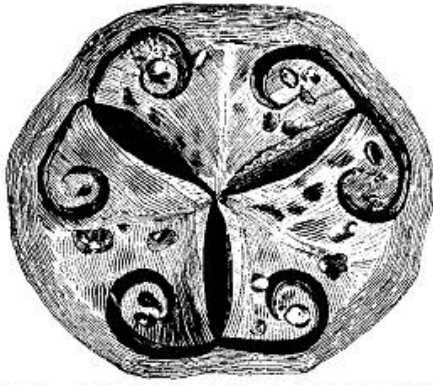
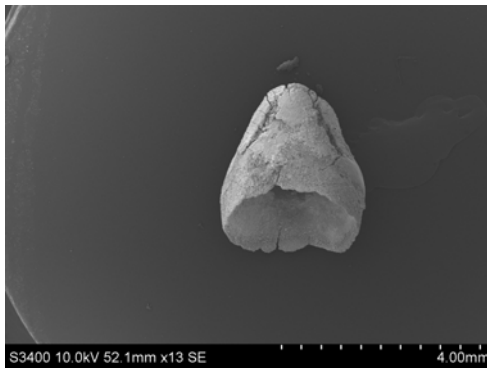
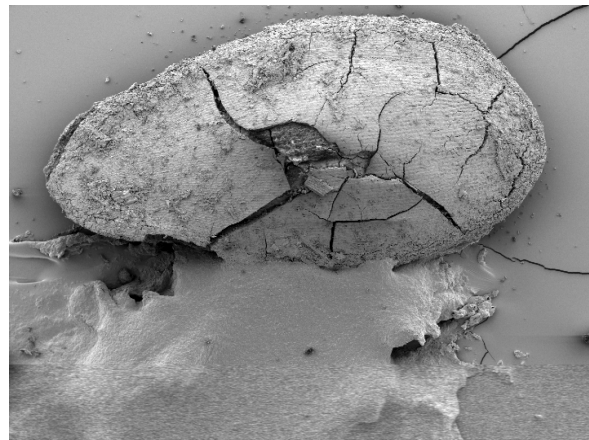


FIG. 242.—Transverse section of colocynth fruit. FIG. 243.—Longitudinal section of colocynth fruit.

Citrullus colocynthis from Sayre (1917) *Materia medica*



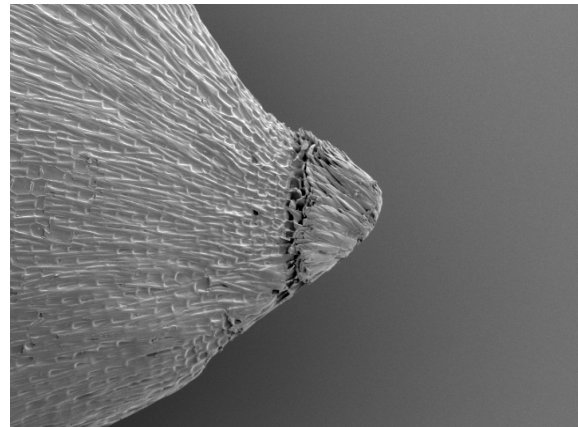
Citrullus lanatus seed apex, charred from Essouk, Mali



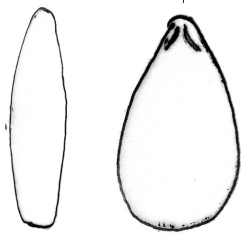
Melothria sp. type from Southern Neolithic Hallur (after Fuller et al 2004, mis-reported as *Cucumis* sp.!)



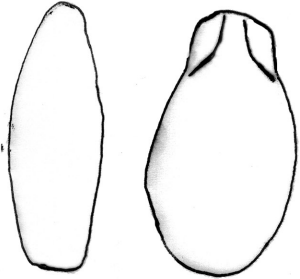
Charred *Cucumis melo* from Longshan Baligang



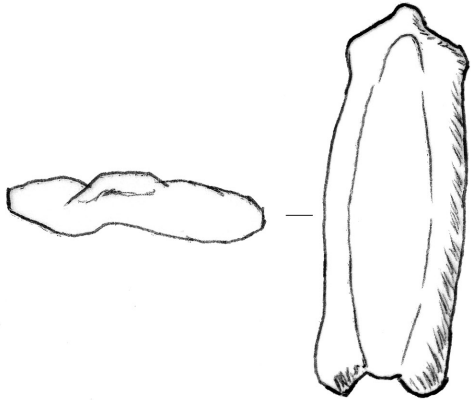
SEM of modern *Cucumis melo* seed tip



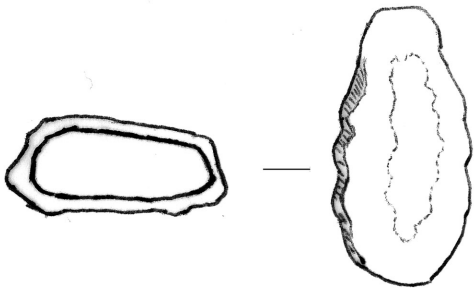
Citrullus colocynthis



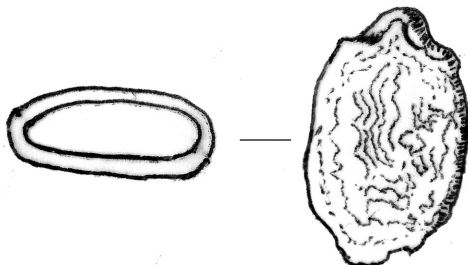
Citrullus lanatus



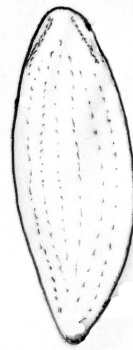
Lagenaria siceraria



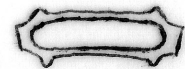
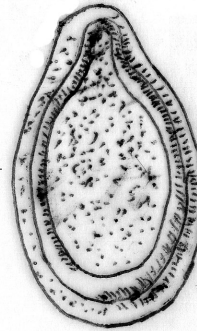
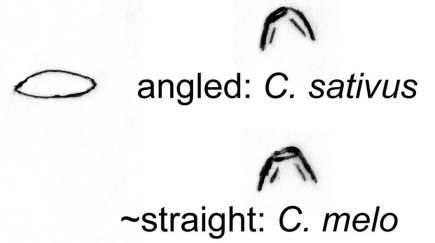
Trichosanthes cucumerina
var. *anguina*



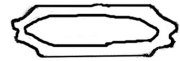
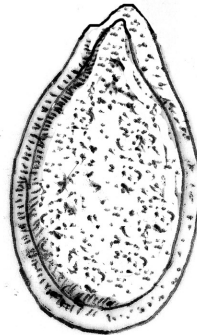
Momordica charantia



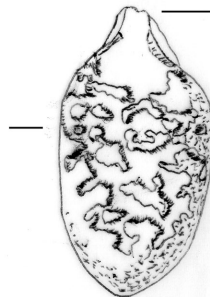
Cucumis



Praecitrullus fistulosus



Benincasa hispida



Luffa acutangula



Luffa cylindrica