

# Crop voyage in India and World

- The literary meaning of voyage is a long journey by water or air to a distance place.
- The crop voyage means the introduction of different crops from outside and movement of the crops originated in India to abroad.
- India is one of the mega agro-biodiversity countries of the world. Many plant species have been domesticated here.

# Enriched bio-diversity

The agro-biodiversity of the indigenously domesticated higher plant species was further enriched with introduction of exotic crops since ancient times, as reflected in different evidences.

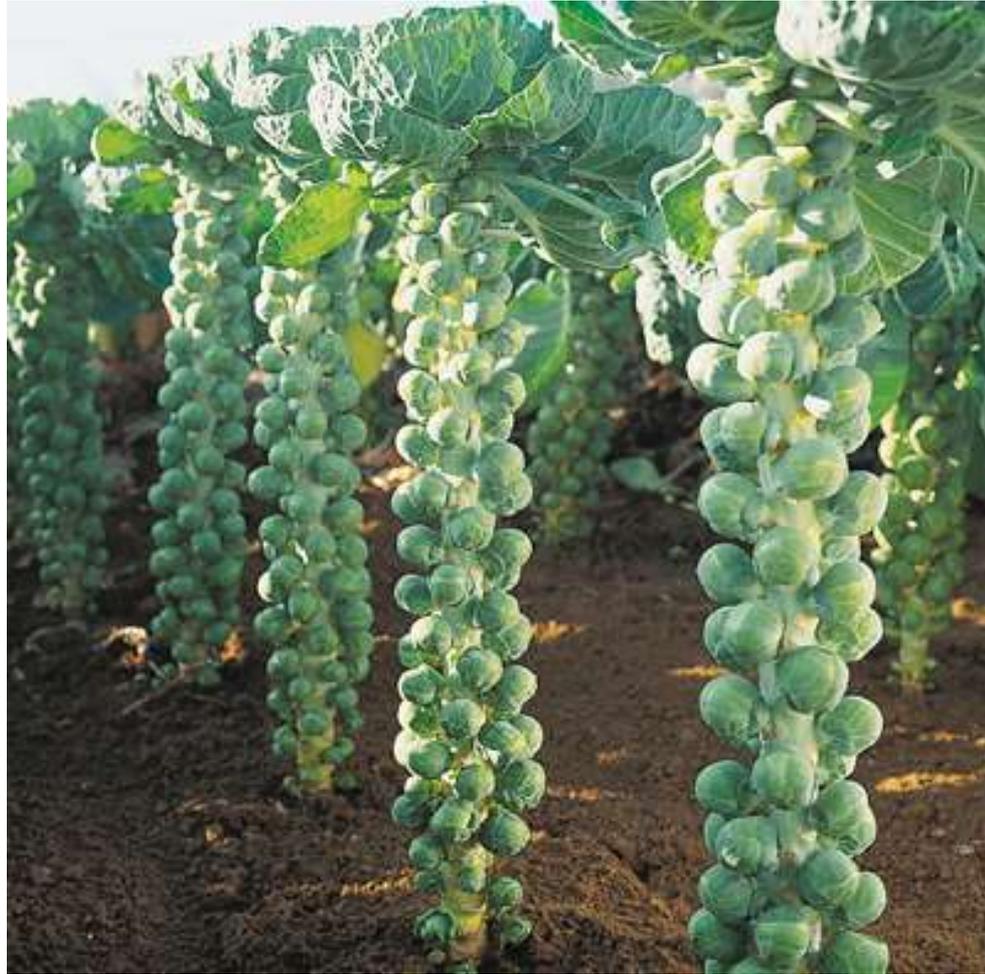
# Indices Used to Identify Ancient Introductions

- **Archeological remains**
- **Archaeo-botanical remains**
- **Literary sources**
- **Ancient dating**

**Can you identify?**



**Can you identify?**



**Can you identify?**



**Can you identify?**



**Can you identify?**



**Can you identify?**



# Limitations of evidences

- Limited archeological evidence in crops propagated vegetatively.
- Lack of knowledge of oriental languages, such as Sanskrit, Prakrits, Pali, Dravidian, etc.
- Difficulties in identification and verification of Latin synonyms of plant species
- Poor documentation/inadequate information regarding minor crops of marginal significance.
- Difficulties in distinguishing the ancient introductions from those of medieval period.

# **Probable Ancient Crop Introductions**

# *Abelmoschus esculentus* (L.) Moench,

## Okra / Lady's finger



- The genus *Abelmoschus* is of Asiatic origin, however, the exact ancestral home of the cultivated *A.esculentus* is disputed between Africa and India.
- Sanskrit names, *Tindisha* and *Gandhamula*,

# *Allium cepa* L.

## Onion



- The Central Asiatic region is considered primary center of origin whereas the near east Asiatic and Mediterranean regions are the secondary centers.
- In India, its reference is found in 6th century BC with Sanskrit names, *Palanduh* and *Sukanda*.
- Archaeobotanical remains of *A. cepa* have been recorded in India.

# *Allium sativum* L.

## Garlic



- Origin: Central Asia.
- The trade relationship between Mesopotamia, Egypt, and India during Mohenjo-Daro period, about 3000 BC, led to its introduction into India.
- Later, the bulbs as seed were brought and grown.
- Its Sanskrit names, *Mahaushadha*, *Lashunaha*, *Grانjanaha*, *Aristaha*, *Mahakandaha* and *Rasonakaha*.

# *Amaranthus hypochondriacus* L.

## Amaranth



- A native of the northern Mexico.
- Introduced into India three millennia BC.
- Widely cultivated as food crop in the Himalayan region.
- Its Sanskrit names are *Tanduliya*, meaning 'a field weed', *Kataib* and *Chaulai*.

# *Anacardium occidentale* L.

## Cashew nut



- A native of Brazil or Venezuela.
- Depiction of complete plant with flowers and fruits at the Jambukeshvara temple suggested its ancient cultivation.
- It has Sanskrit names *Beejara Sula* or *Bijara Sala*, *Shoephahara* and *Kajutaka*.

# *Ananas comosus* (L.) Merr.

## Pineapple



- A native of Brazil, pineapple was introduced into India, by the 5th century AD.
- A sculpture depicting its fruit has been found on the *vanamala* of Vishnu in his *Varaha avatara* in the Udayagiri cave temples in Madhya Pradesh, dated 5th century AD.
- Sanskrit names are *Anamnasam* and *Bahunetrphalam* .

# *Annona cherimolia* Mill.

## Large Annona, Custard Apple



- Native of of Colombia, Ecuador and Peru.
- Introduced into India in 1820.
- However, the fruit pineapple is shown held by a sculpted goddess figure on a wall of a Hoysala Dynasty temple in Karnataka, (13th century.)

# *Annona reticulata* L.

## Bullock's Heart, Custard Apple



- A native of tropical America, custard apple is naturalized in India to an extent that some authors considered it a native.
- It has Sanskrit names *Rama Sita*, *Luvunee*, *Ramphala* and *Krishnabeejam*.

# *Capsicum annuum* L.

## Chili Pepper



- A native of South America. It is generally believed to have been introduced into India by the Portuguese in 16th century AD.
- However, In Sanskrit, it has been referred to as *Marichiphalam*, *Katuvira*, *Katuirah* and *Rakta maricha*. (c.600AD)

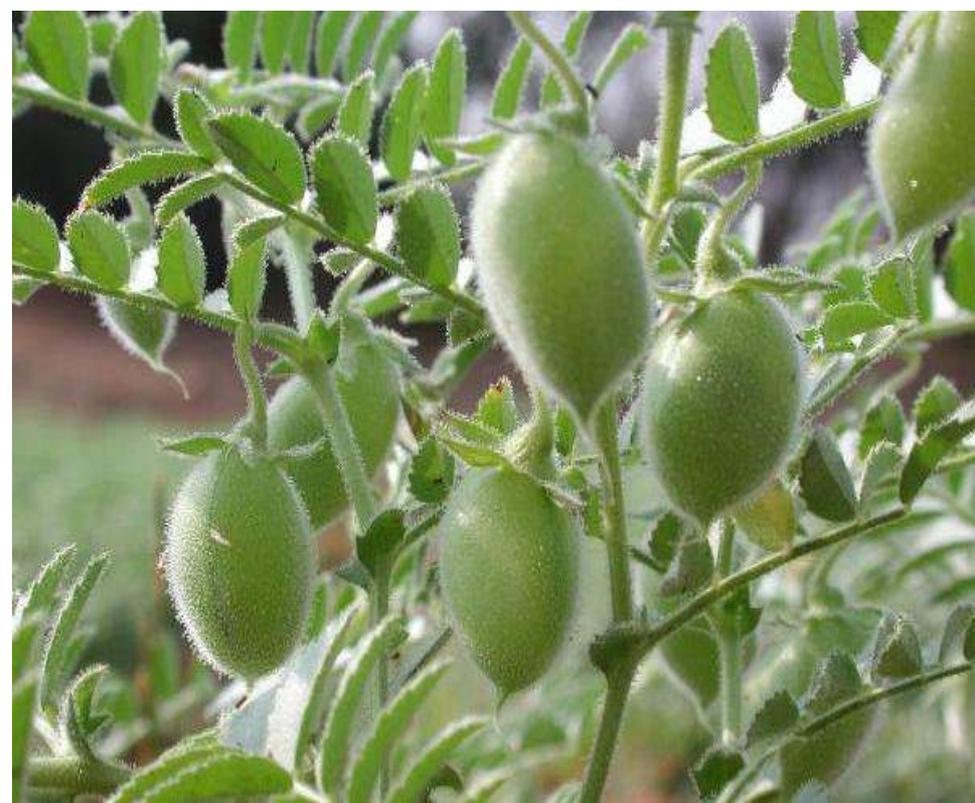
# *Carthamus tinctorius* L.

## Safflower



- Most evidence suggests origin of *C. tinctorius* in an area bound by the eastern Mediterranean and Persian Gulf.
- Ancient *Sanskrit* scriptures described it as *Kusumbha*.

# *Cicer arietinum* L., Chickpea (Bengal gram)



- First grown in Turkey about 7000 BC, and introduced into India as early as 2000 BC.
- It was cultivated in Mediterranean basin during 3000-4000 BC.
- In ancient Sanskrit writings, it has been referred to as *Chanaka*.

# *Citrullus lanatus* (Thunb.)

## Watermelon



- It is a native of southern Africa.
- By 4th-7th century AD, it reached India
- Sushruta mentioned cultivation along the banks of the Indus River.
- In Sanskrit it *Tarambuja*, *Krishnabija*, *Latapanasa*, *Madhuraphala* and *Alpapramanaka*.

# *Corchorus olitorius* L.

## Tosa jute



- Africa as the primary center of its origin, with India or Indo-Myanmar region being the secondary center.
- Discovery of jute textile the Indus Valley.
- In Sanskrit, it has been referred as *Patta* and *Kakka Tapattraka*.

# *Cucumis melo* L.

## Muskmelon



- Musk melon is a native of Africa .
- Indian Subcontinent is the original home of local variants and the common groups.
- In Sanskrit, it has been referred to as *Kalinga*, *Kharvuja* and *Madhuphala*.

# *Cucurbita pepo* L.

## Pumpkin



- Pumpkin is a native of North America.
- It is mentioned in the *Atharvaveda* dating before 800 BC; in the Buddhist *Jatakas* and other texts as early as the 4th century AD.
- It has Sanskrit names, *Kurkaru* and *Kushmanda*.

# *Gossypium barbadense* L., **Tetraploid** **Cotton**



- A native of South America, was introduced into India via Pacific.
- Indus civilization evidenced cultivation and export of cotton. The Sanskrit name is *Maghani*.

# *Guizotia abyssinica*

## Niger



- Niger originated in the Ethiopian highlands as an oilseed crop.
- It is believed to have been brought to India by the Ethiopian immigrants, probably in the 3rd millennium BC.
- In Sanskrit it has been referred to as *Rama Tilah*.

# *Helianthus annuus* L.

## Sunflower



- A native of Central and South America.
- It is mentioned in the *Charaka Sahmita* dated around the 4th century AD.
- Its Sanskrit names are *Suriya-mukhi*, *Adityabhakta* and *Suryamukhi*.
- Graphic depiction is found in Rani Gumphu cave, Udaigiri in Orissa dated to the 2<sup>nd</sup> century BC.

# *Hibiscus cannabinus* L.

## Kenaf or Deccan hemp



- Kenaf is originated in Africa (4000 BC).
- It spread to India at an early period via Persia.
- It has been referred in *Sanskrit* literature of ancient India of 7th century with name, *balamulika*.

# *Hordeum vulgare* L.

## Barley



- Barley was one of the first grains domesticated in Fertile Crescent .
- Barley is mentioned in early Sanskrit records with names such as *Yava*, *Sithashuka*, *Atiyava* and *Akshata*.

# *Ipomoea batatas* (L.) Lam.

## Sweet potato



- This native of South America.
- It was mentioned in Sanskrit literatures as *Valli*, *Pindalah* and *Raktaluh*, which are similar to the names used in northwestern South America.

# *Lagenaria siceraria*

## **Bottle gourd**



- Origin of Bottle gourd is southern Africa.
- In Sanskrit, it is referred to as *Alabu* and *Kutukumbi* confirming its ancient cultivation during Vedic age.

# Crops of India Origin

# *Oryza sativa*

## Rice



- India is an important centre of rice cultivation. The rice is cultivated on the largest areas in India.
- Archaeological evidences prove the rice is a crop of Indian subcontinent.

# *Oryza sativa*

## Rice...(2)



Historians believe that the **indica** variety of rice was first domesticated in the area covering the foothills of the Eastern Himalayas stretching through Burma, Thailand, Laos, Vietnam and Southern China, the **japonica** variety was domesticated from wild rice in southern China which was introduced to India.

# *Aegle marmelos*

## **Bael, wood apple**



- It is a native of India, Nepal, Myanmar.
- The tree is considered to be sacred by Aryans.
- Ancient Sanskrit texts described it as *Bilwa*.

# *Piper nigrum*

## Black pepper



- Black pepper is native to south India.
- The ancient history of black pepper is often interlinked with (and confused with) that of long pepper, the dried fruit of closely related *Piper longum*.

# *Solanum melongena*

## **Eggplant, Brinjal**



- A native of India and it has been cultivated in southern and eastern Asia since prehistory.
- indicate it was introduced throughout the Mediterranean area by the Arabs in the early middle ages.

# *Ziziphus mauritiana*

## Indian plum, Ber

- Ber is originated in Indo-Malaysian region of South-East Asia. It is now widely naturalized throughout the tropics from Southern Africa through the Middle east to the Indian sub-continent and China, Australia and Pacific islands.

