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SOME LESSER KNOWN MINOR CUCURBITACEOUS VEGETABLES : THEIR DISTRIBUTION, DIVERSITY AND USES

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Indian subcontinent is rich with genetic diversity in vegetable crops. Several species of family cucurbitaceae are available locally. Many of them are cultivated or found as semi- domesticated in the areas of their distribution. The most important crop genera included *Citrullus, Cucumis* and *Cucurbita.* Some genera like *Fevillea, Genostemma, Hemsleya, Actinostema, Bulbostemma, Cucumeropsis, Cucumis, Momordica, Siraitia, Telfairia, Hodgsonia, Gemnopetalum, Trichosanthes, Acanthosicyas, Bemincasa, Bryonia* or *Coccinia, Citrullus, Diplocyclos, Echallium, Praecitrullus, Cayaponia, Cucurbita, Sicana, Cyclanthera, Echinocystis* and *Sechium* and a large number of wild species have not only contributed towards food but also are rich genepool for important traits. These prized materials alongwith their close wild relative serve as genetic stocks by plant breeders for the development of improved vegetable varieties. With drastic increase in the world population, there is a great need to explore newer sources of vegetables. In this paper, diversity available in some minor/lesser known vegetables of the family Cucurbitaceae along with brief description has been illustrated. A check list of species with common names/local names, frequency and place of cultivation and uses is also included. This information will be very useful in screening newer sources of vegetables for present and future needs.

Key words : Cucurbitaceae, minor vegetables, *Fevillea, Cucumis, Trichosanthes, Cyclanthera, Sechium, Coccnia, Momordica,* distribution, diversity, uses

Minor cucurbitaceous vegetables have their importance mainly in the areas of their occurrence. Due to varied climate and physiography, enormous diversity has been developed in the Indian sub continent and tremendous wealth in terms of vegetables is available. Many species are edible. Some provide hard shelled fruits for vessels and musical instruments, whereas others are valuable as ornamental vines and for medicinal purposes. With ever increasing population and fast depletion of natural resources, it has become extremely important to diversify vegetable farming/cultivation to meet the present day's demands. The minor vegetables which have tremendous potential for commercial exploitation but remained ignored, however, offer a good scope in the present situation. In cucurbitaceae, apart from cultivated vegetables, enormous diversity occurs in semi-domesticated and wild types in local pockets. Such types have been selected locally by native people as part of their routine vegetable requirements. Resilient and adaptive, many of them are tolerant to biotic adverse conditions and can grow on lands which are not suitable for other vegetables. They do not require a high input technology and can be raised with comparatively lower management costs. Several of them are very nutritious, remunerative and have often come to the rescue of people in times of crisis. Several species which possess medicinal

properties include *Fevillea cordifolia, Gynostemma pentaphyllum, Hemsleya amabilis* Diels, *Actinostemma tenerum* Griff., *Balbostemma paniculatum* (Maxim.) Franq. *Momordica balsamina* L; *Momordica cochinchinensis* (Lour), *Siraitia grosvenorii* (Swingle) Lu & Zhang, *Thaldiantha dubia* Burge, *Trichosanthes kirilowii* Maxim, *Trichosanthes lepiniana* (Naud) Cogn., *Bryonia alba* L, *Bryonia cretica* L., *Bryonia dioica* Jacq; *Citrullus colocynthis* (L.) Schrad, *Cayaponica ophthalmica* R.E. Schult and *Cayaponia Kathemathophora* R.E. Schult are used by pharmaceutical industries. Consumption of some minor vegetables is usually in the ripe or unripe/raw form, sliced, pickled, sun dried or made into drinks during extreme hot. In general, attention has not been given on specific breeding/evaluation programmes for these minor cucurbits so far. The wild genepool possess important traits and may be exploited both by direct selection or improvement through breeding. They also constitute a priceless reservoir that contain genes conferring better adaptation to stress environments and also resistance to disease and pests.

I. Distribution and Diversity

Indian sub continent is one out of 12 centres of diversity in crop plant in the world. Cucurbits comprise 118 genera and 825 species in the world, out of them 36 genera and 100 species are found in India. In this family, approximately 38 species are economically important and their cultivation is practised throughout the world from tropical to sub temperate zones. Many cultivated and wild species of cucurbitaceae dating back to pre historic times are associated with man's culture. Occurrence of genera alongwith species are given in Table 1.

Distribution and diversity is threatened due to several reasons: fragmentation of habitats, deforestation, over exploitation of the genetic resources, rapid changes in the hydrological regime and land use patterns, soil degradation, air and water pollution, the adverse impact of development and increase in the population. As a result, a significant number of species are considered vulnerable and endangered.

Table 1. Global occurrence of some of the Cucurbits species

Crops	Species reported in the world	Species available in India
Citrullus species	4	2
Coccinia species	13	1
Cucumis species	26	5
Luffa species	5 (2 cultivated & 3 wild)	2
Momordica species	60	7
Neoluffa species	1	1
Trichosanthes species	44	22
Lagenaria species	6	1
Cucurbita species	27	4
Sechium species	8	1
Benincasa species	1	1

In different-ecological zones, several cucubitaceous vegetables are distributed (Table 2a). The change of environmental conditions poses problems and therefore, an environment similar to the natural one should be selected for initial evaluation to understand the full potential of the crop. In this context, cultivation status, distribution status, genetic variability status, genetic erosion status and germplasm collection priority has to find a place in the existing or modified system or place (Table 2b).

II. Rare and endangered cucubitaceous species in India

There are several species of cucurbitaceous vegetables which are being eroded at a fast pace. Some endangered cucurbitaceous species and its biogeographic zones are given in Table 2c.

Table 2a. Distribution of minor cucurbitaceous vegetables

Zones	Species
Western Himalaya	*Cucumis hardwickii, Cucumis trigonus, Luffa graveolens, Trichosanthes multiloba and Trichosanthes himalensis*
Eastern Himalaya	*Cucumis trigonus, Luffa graveolens, Neoluffa sikkimensis*
North-eastern region	*Cucumis hystrix, Cucumis, trigonus, Luffa graveolens, Momordica cochinchinensis, Momordica macrophylla, Momordica subangulata, Trichosanthes cucumerina, Trichosanthes diocia, Trichosanthes dicaleosperma, Trichosanthes khasiana, Trichosanthes ovata, Trichosanthes truncata*
Gangetic plains	*Luffa echinata, Momordica cymbalaria, Momordica dioica, Momordica cochinchinensis*
Indus plains	*Momordica balsamina, Citrullus colocynthis, Cucumis prophetarum*
Western peninsular tract	*Cucumis setosus, Cucumis trigonus, Luffa graveolens, Momordica cochinchinensis, Momordica subangulata; Trichosanthes anamalaeiensis, T. bracteata, T. cuspidata, T. horsfieldii, T. perottitiana, T. nerifocia, T. villosa*
Eastern peninsular tract	*Cucumis hystrix, C. setosus, Luffa acutangula var. amara, Luffa graveolens, Luffa umbellata M. cymbalurea, M. denticulata, Momordica dioica, M. cochinchinensis, Trichosanthes bracteata, Trichosanthes cordata, Trichosanthes lepiniana, Trichosanthes himalensis, Trichosanthes multiloba*

III. Specific adaptability

There are several cucurbitaceous vegetables which have specific adaptability in a particular area, where its existence is still maintained, for example, chow-chow (*Sechium edule*) has specific adaptation in Mizorum and *Momordica cochinchinensis* in Tripura, Assam and West Bengal, *Trichosanthes dioica* in Eastern U.P., Bihar and West Bengal, Sikkim and Assam valley etc. A detailed list of some vegetables which have been adapted to specific environment is listed in Table 2d.

Table 2b. Variability, distribution and genetic erosion status of Cucurbitaceous vegetables

Crop	Genera	CS	DS	GVS	GES	GCP
Bitter gourd	*Momordica* spp.	C	W	H	M	H
		W	W	H	H	H
Bottle gourd	*Langenaria* spp.	C	W	H	M	M
		W	W	H	M	M
Cucumber	*Cucumis* spp.	C	W	H	M	M
		W	W	H	H	H
Muskmelon	*Cucumis melo*	C	L	H	H	H
		W	L	H	H	H
Pointed gourd	*Trichosanthes* spp.	C	L	H	H	H
Pumpkin	*Cucurbita* spp.	C	W	H	M	H
Ridge gourd	*Luffa anguiculata*	C	W	H	H	H
		W	W	H	M	H
Round melon	*Praecitrullus fistulosus*	C	L	M	M	M
Snake gourd	*Trichosanthes cucumerina*	C	W	H	M	H
Snap melon	*Cucumis sativus* var. *momordica*	C	W	H	M	H
Sponge gourd	*Luffa cylindrica*	C	W	H	M	H
		W	W	H	M	H
Water melon	*Citrullus lanatus*	C	R	H	M	M
Ash gourd	*Benincasa hispida*	C	W	H	M	M

CS - Cultivation status, C = Cultivated, W = Wild; DS - Distribution status; W = Wide spread, R = Regional distribution, L = Localised; GVS - Germplasm variability status; H = High, M = Medium, L = Low; GES - Genetic erosion status; H = High, M = Medium, L = Low and GCP - Germplasm collection priority, H = High, M = Medium

Table 2c. Rare and endangered cucubitaceous species

Cucubitaceous species	Biogeographic zones
Corallocarpus gracillipes (Naud.) Cogn	WG
Gomphogyne macrocarpa Cogn	EH
Indofevillea khasiana Chatterjee	NE
Luffa umbellata (Kleir) Roem	WG
Melothria amplexicaulis Cogn	DP
Momordica sub angulata Bl	DP,WG
Trichosanthes lepiniana (Naud.) Cogn	Dp,WG
Trichosanthes perrotteliana Cogn	WG
Trichosanthes villosula Cogn	DP,WG

Source - R.R. Rao. Biodiversity in India (Floristic Aspects) 281p. Bishen Singh and Mahendra Pal Singh, New Cannaught Place, Dehradun (Uttar Pradesh).

Table 2d. Specific adaptability of some cucurbitaceous vegetables

Crop	Area	Remarks
Chow-chow (*Sechium edule*)	Mizoram, Karnataka, Maharashtra	Highly naturalized
Parwal (*Trichosanthes dioica*)	Bihar, U.P., West Bengal	Abundant
Cucumber (*Cucumis sativus*)	Rajasthan, Himachal Pradesh, Mahaeashtra, Karnataka, Andra Pradesh, Madhya Pradesh	Grown in winter-Hazipur (Bihar) specially in Son Ganga commond area
Bittergourd (*Momordica charantia*)	Tamil Nadu, Kerala, U.P., Bihar, West Bengal, Maharashtra	Highly specific adaptability
Kakrol (*M. cochinchinensis*)	Mizoram, Tripura, West Bengal, Bihar, Vindhya hills of U.P.	A speciality favourite with natives
Watermelon (*Citrullus lanatus*)	Rajasthan, Punjab, Haryana, Western U.P., Karnataka, M.P.	Near river beds only; more sweetness in Arid zone
Musk melon (*Cucumis melo*)	Rajasthan, Eastern U.P., Punjab	More sweetness in Arid zone

IV. NBPGR's effort in germplasm collection

Important vegetable crops for which native diversity still need more emphasis for collection include *Cucumis* species, *Trichosanthes cucumerina, Trichosanthes dioica, Trichosanthes bracteata Cumunis melo, Cucumis melo* var. *utilissimus, Coccinia cordifolia, Luffa* species, *Lagenaria sicararia, Citrullus colocynthes, Cucumis hardwickii, Cucumis hystrix, Cucumis setosus, Momordica dioica, Momordica cochinchinensis*, on priority basis. The National Bureau of Plant Genetic Resources, New Delhi till date has collected following cucurbitaceous vegetables (Table 3).

Table 3. Collection of cucurbitaceous vegetables

Vegetables	Number of collection
Cucumber (*Cucumis sativus*)	294
Snap melon (*C. melo* var. *momordica*)	433
Musk melon (*C. melo*)	238
Kachri (*Cucumis callosus*)	156
Pumpkin (*Cucurbita moschata*)	795
Bottle gourd (*Lagenaria siceraria*)	664
Bitter gourd (*Momordica charantia*)	519
Sponge gourd (*Luffa cylindrica*)	566
Ridge gourd (*L. acutanguda*)	335
Ash gourd (*Benincasa hispida*)	326
Pointed gourd (*Trichosanthes dioica*)	188
Ivy gourd (*Coccinea indica*)	15
Round gourd (*Citrullus fistulosus*)	49
Water melon (*Citrullus lanatus*)	75
Snake gourd (*Trichosanthes anguina*)	144

V. Economic species of lesser importance

1. *Momordica* species

In *Momordica* spp., total 60 species are reported world wide and out of them 7 species are available in India but only four species (*Momordica balsamina, Momordica charantia, Momordica cochinchinensis and Momordica dioica*) are commonly found. *M. balsamina* occurs in semi-dry north-western plains, northern parts of eastern and western Ghats. *Momordica dioica* and *Momordica cochinchinensis* occur in wild/semi wild form in gangetic plains. *M. cochinchinensis is* a dioecious, and perennial vegetable having tuberous roots. *M. subangulata* is also dioecious and perennial in nature with short annual vines. *M. littorea* is a new species of this group. It is also a dioecious climber with succulent trifoliate leaves and conspicuous bracteate flower. *Momordica foetida* is used in traditional medicine in Western Africa. *Momordica grosvenori* can be used for extraction of sweetener component, appeared to be glycoside (Lee, 1975). Immature tender fruits

of *Momordica balsamina* is used as vegetable or pickled. Fruits, leaves and roots of *Momordica* spp. is used as stomachic, carminative, antipurgative, regulating diabetes, leaf extracts as vermifuge, anthelmintic, appetizer, astringent and in liver and spleen disorders. Roots are useful in piles and urinary disorders.

2. *Luffa* species

Luffa gourd, essentially an old world genus, is considered to comprise 9 species in the world and out of this 7 species (*Luffa acutangula, Luffa cylindrica, L. echinata* (dioecious) *L. graveolens, L. hermaphrodita, L. tuberosa* and *L. umbellata* are native to India. There is ambiguity with regards to *L. tuberosa* and *L. umbellata* because they are considered synonym to species of *Momordica* and *Cucurbita* respectively (Chadha and Lal, 1993; Umesh Chandra, 1995). *Luffa cylindrica* is indigenous to India. *Luffa acutangula*, found in western, central and southern India, is regarded as wild form of cultivated species. *Luffa acutangula* var. *amara* occurs in peninsular India and is the wild relative of cultivated sponge gourd, *L. echinata* (Western Himalaya, Central India and Gangetic plains) and *L. graveolens* (considered a wild progenitor of *L. hermaphrodita* in Bihar and Sikkim) are potential species. A strikingly large number of variants evolved gradually through introgression and selection from wild forms, many of which are still cultivated in different parts of India. Ridgegourd or Ara Torai (*L. acutangula*), Kadvi Torai or *Tita Jhinga* (*L. acutangula* var. *amara* Roxb.), Satputia (*L. hermaphrodita*) and *L. echinata* Roxb. Bindal are also common. *L. forskohlii* (Harms) Heiser and Schilling, a wild form confined to Yamen but possibly developed from escapes of the cultivated forms. Fruits of Satputia (*L. hermaphrodita*) borne in cluster. This is commonly cultivated species in north eastern Uttar Pradesh and Bihar. Fruit is diuretic and expectorant in nature and used for curing biliousness, bronchitis, spleen diseases and ulcers. Seed has the of emetic and cathartic property.

3. *Trichosanthes* spp.

In *Trichosanthes*, total 44 species have been reported and out of them 22 species occur in India. The major zone of species concentration are:

a) Along the Malabar coast in Western Ghats

b) Low and medium elevation zones in Eastern Ghats

c) North-eastern hill region.

The wild species can be found along forest edges and in open forests upto 1000 m altitude. *Trochosanthes cucumerina* occurs wild in the total zone of concentration as stated above. It is an ancient cultivar. Only occasionally, it is cultivated as vegetable. *Trichosanthes ovigera* Blume is another important species. Its boiled fruits are eaten as a dish with rice. Starch of the tuber is sometimes extracted and is quite useful product for industries. Young fruits of *Trichosanthes villosa* are also eaten after boiling. Its sap from the leaves is used to cure dysentery, pounded leaves are applied on the body to reduce fever and lower down the pain of swollen legs. Till now, *Trichosanthes* remained a minor cucurbitaceous vegetable in South-East Asia. Adequate investigation of the wild species might reveal desirable characteristics of interest for improvement for domestication of the species.

4. *Citrullus* species

According to (FAO), watermelon is one of the world's most popular cucurbit. In *Citrullus*, 4 species has been reported so far and out of these 2 species are available in India. *Citrullus lanatus* is commonly cultivated species. *Citrullus colocynthis* - a perennial species exhibits much variation in north-western plains, central and southern India, where it is a potential crop. This is a vigorous West African plant, very similar in general appearance and habit to watermelons and

cultivated in the same way. The fruits are allowed to mature. Seeds are used as edible flour and cooking oil (Esquinas - Alcazar and Gulic, 1983). Sub species *mucosospermus* is supposed to be the wild form of *Citrullus* having small fruits and white, bitter flesh especially important for its large, protein-rich seeds. *Citrullus ecirrhosus* is a perennial species, without tendrils and with extreme bitter fruits, adapted to the extreme climatic conditions of the desert. Elevations up to 1000 m normally provides suitable conditions for growth although excessive high temperature of more than 30°C may be harmful, reducing the degree of fertilization. Wild form of *Citrullus spp* are found in the dry sandy areas of South Africa (mainly in the Kalahari desert).

5. *Praecitrullus fistulosus*

Tinda (*Praecitrullus fistulosus*) Stocks Pang. is an important monospecific genus and *Praecitrullus* group and confined to the drier regions of South Asia. It is commonly known as round melon. Immature fruits are cooked as vegetable. Fruits are having high nutritional value hence this potential crop is becoming very popular among vegetable growers. Due to its keeping quality, it may be an excellent export oriented vegetable. The small round fruits up to 10 cm in diameter can be canned as a preserved vegetable. It may be used for the preparation of pickles or candies. The seeds are parched and eaten. The fruit juice has a cooling effect. It is helpful during typhus fever, infection of urinary organs and hepatitis.

6. *Cucumis* species

In *Cucumis* species, total 30 species are reported so far which are distributed over two geographically distinct areas but in India, according to Chakravarty (1982), out of these 6 *species* are available. Five wild species of *Cucumis* included *C. agrestis, C. hystrix, C. setosus, C. prophetarum* and *C. hardwickii. C. callosus* occurs mainly in Punjab, Himachal Pradesh, Rajasthan, Uttar Pradesh, Bihar and Tamil Nadu. Wild related species of *C. sativus* is *C. hardwickii* and *C. trigonus. C. hardwickii* is found wild in foothills of NW Himalayas and southern hills, *C. setosus* endemic to Maharashtra; *C. prophetarum* to Sirohi (Abu) of Rajasthan, Gujarat, Maharashtra and Tamil Nadu; *C. hystrix* to Meghalaya, Assam and Mizoram. *C. setosus* is the only cultivated species indigeneous to India (Umesh Chandra and Koppar, 1992). West Indian Gherkin (*Cucumis anguria* (L.) var. *anguria* is an annual. The immature young fruits are used as salad, pickles and also used as cooked vegetables. It is a heavy yielder in comparison to general cucumber (*C. sativus*). Another species, which is having economic value is Kachari (*Cucumis callosus*). Its immature tender fruits and semi ripe fruits are used as vegetables, pickles etc. Snapmelon (*Cucumis melo* var. *momordica*) - commonly called as **phoot** under *Cucumis* group is very potential vegetable. Its productions and popularity is largely limited to India. Its immature fruits are used for cooking and mature fruits are consumed like muskmelon by adding little amount of sugar. It is a totally rainfed vegetable crops and farmers grow it as a inter-crop in maize, jowar, bajra etc. *C. ficifolius, C. prophetarum C. sacleuxii, C. quintanilhae* and *C. zeyheri* are monoccious perennial *Cucumis* spp., whereas *C. asper, C. figarei, C. globosus, C. heptadactylis, C. hirsutus* and *C. meeusei* are considered as dioecious perennial *Cucumis* spp. *Cucumis melo* L var. *conomon* is rapid growing species and tolerant to high temperature and relatively high rainfall. *Cucumis hardwickii* is an annual monoecious species resembling *Cucumis sativus.* It hybridizes with *Cucumis sativus* producing a fertile F_1. *Cucumis hardwickii* plants are typically slow growing in early stage of growth and remain vegetative for extended period of time. After the slow growth period, vine developed at fast rate and sets large number of fruits per plant than *C. sativus.*

7. *Coccinia* species

The genus *Coccinia* with 30 species, is confined to tropical Africa. In India, *Coccinia cordifolia* is commonly grown as a cultivated type. Fruits and young shoots are used as vegetable. It is also becoming popular as a salad. It is a potential crop among the growers of tropical belt. Due to heavy yield and continuous fruiting for longer period and good transportation ability, farmers can earn a lot by this minor vegetable. *Coccinia wightiana* (Roem.) is considered as wild relative of *C. cordifolia.*

8. *Cyclanthera* species

This genus includes about 30 species, all are native to the neotropics. Under *Cyclanthera* spp. group, *Cyclanthera pedata* (L.) Schrad is a perennial and very nutritious vegetable. It can be grown as an annual. Young fruits having thick and fleshy tissue are eaten, raw or cooked. It is highly productive and potential for wide use in high altitude cultivation. The seeds are obtained from the older fruits; the seed cavity is suitable for stuffing. The closely related species *C. brachystachia* (Ser.) Cogn. (synonym *C. explodens* Naudin) is also cultivated for its edible fruits. It occurs in Nepal and South Taiwan.

9. *Benincasa* species

Ashgourd (*Benincasa hispida* (Thumb.) Cogn.) is the most important genus of Cucurbitaceae family and is widely distributed throughout tropical Asia. It has been reported to occur in the wild form in Indonesia (Java) (Purseglove, 1974). The young leaves and flower buds both immature and mature seeds are consumed. The main product of ashgourd is the mature fleshy fruit. Fruits are mostly used by confectioner in preparing delicious sweet candy, locally called '**Petha**'. Due to long storage capacity, farmers usually fetch high price in the market. Its tender fruits are used for cooking and in making **Bari** (ripe fruits flesh mixed with soaked and ground Urid dal, spices etc.) of fully matured fruits. No wild related species are known. Relatively high temperature and moderate rainfall seem to be suitable for its growth. The fruit is a good source of carbohydrate, Vitamin A and C and minerals (Randhawa *et al.*, 1983). An enzyme extracted from ashgourd juice can be used in place of calf rennet for producing cheddar cheese (Gupta and Eskin, 1977). It is also used to cure several ailments. Its use in Ayurvedic and naturopathy system of medicine is also reported. (Ramesh *et al.*, 1989 and Chandrasekhar *et al.*, 1989).

10. *Solena* species

Among minor vegetable of cucurbitaceae family, 'Bankunari' (*Solena amplexicaulis* (Lamk.) Gandhi is very nutritious and well known for medicinal value. It is synonym of *Melothria heterophylla* (Lour.) Cogn or *Solena heterophylla* Lour. It is a dioecious and climbing herb. The upper portion of vine dries every year but underground rhizomes sprout during rainy season. It is a very rare vegetable tasty and widely distributed in Bihar, West Bengal, Assam, Tripura, Kerala and U.P. hills up to an elevation of 2100 m. It needs domestication on priority basis.

11. *Telfairia* species

Genus *Telfairia* has 3 species and all are distributed in Tropical Africa. Under *Telfairia* group, two species *Telfairia occidentalis* Hook. F (fluted gourd) and *Telfairia pedata* (Sm. ex. Sims) Hook. (Oyster nut) are of economic importance. *Telfairia pedata* is a very large dioecious climber. Leaves and shoots are used as vegetable and its edible, aromatic seed has many uses. Its adaptation and cultivation is very common in humid tropics. Seeds of *Telfairia pedata* is a potential substitute for almonds. The fiber from the stem is used for making cords.

12. *Hodgsonia* spp

Hodgsonia spp. and its subtribe are monospecific. It is distributed in Indo-Malayan region. *Hodgsonia macrocarpa* is under cultivation to a limited extent in south and south-east Asia. Immature fruits are used as vegetables and seed for cooking oil.

13. *Lagenaria* spp.

Under genus *Lagenaria*, six species are reported so far. *Lagenaria siceraria* (bottle gourd) is generally cultivated species. All other species are wild, perennial and dioecious in nature. Its immature tender fruits are used as vegetables but dry shells are used for making bowls, bottles, containers, float for fishing nets, pipes and musical instruments. From seeds, edible oil is also extracted. It has a cooling, cardiotonic and diuretic properties. It is also useful in controlling asthma, bronchitis, inflammation and ulcer.

14. *Sicana* spp.

Under *Sicana* genera, three species are reported and all are distributed in the neotropics. Among them, *Sicana odorifera* (Vell.) Naud. (Casabanana) is under cultivation to a very limited area in central and northern parts of South America. Its fruits are quite useful as a dessert.

15. *Cucumeropsis* spp.

Cucumeropsis spp. is a monospecific genus and widely distributed in tropical West Africa. An edible oil is being extracted from *Cucumeropsis manii* Naud. (Egusi melon) and the fruits are used as vegetable when tender. It is a potential crop of tropics (Esquinas-Alcazar and Gulic, 1983).

16. *Cucurbita* species

The genus *Cucurbita* has 27 species, five of which are cultivated. It has stored carbohydrate, vitamin C, minerals and carotene. Its both mature and immature fruits are used as vegetables. *Cucurbita ficifolia* - a vigorous perennial trailing herb is under cultivation since 4000-3000 BC. Its leaves are prickly broad, usually lobed and seeds are edible. Though buffalo gourd (*Cucurbita foetidissima* H.B. & K), a potential minor cucurbitaceous vegetable is a native of semi arid regions of the Western North America and Mexico, and is now well adapted to desert environment of India. It is drought resistant. Its seeds are rich in oil and proteins and roots have more starch. It has been also utilized as food, used in soap, shampoo, medicine and as stain remover since 1000 years. *Cucurbita cucadorensis* proves to be resistant to the most important and common diseases of *Cucurbita pepo*.

17. *Sechium* species

Chow-chow or Chayote (*Sechium edule* Sw.) is now under cultivation in India. Its local cultivars are commonly grown in the coastal and low hills (1000-2000 m) of Maharashtra, Karnataka, Tamil Nadu and North-Eastern Hill Regions. Unlike other seeded cucurbits, chow-chow has only one seed in the fruit with viviparous germination. Fruits are fleshy and pyriform with longitudinal furrows. Almost all parts of chow-chow are edible, young leaves and shoots and tendrils are cooked as green vegetables. Unripe fruits are either fried or cooked like bottle gourd. Being rich in calcium (170-140 mg/100 g), fruits of chow-chow are a good supplement in a tropical diet. The starchy roots are reasonably sweet in taste.

VI. Ethnobotanical uses

Wild plants of economic value have played an important role in the life of tribal people. Several local cucurbitaceous vegetable and under ground roots are regular part of their diet. They are collected directly from the wild or cultivated/protected as backyard cultigens by the

Table 4. Ethnic uses of cucurbitaceous vegetable species

Common Name	Botanical Name	Frequency	Place of cultivation	Usages
Antidote vine	*Fevillea cordifolia*	Rare	Neotropics	Medicinal
Jiao-gu-lan	*Gynostemma pentaphyllum*	Localized	Asia	Medicinal
Luo-ago-di	*Hemsleya amabilis* Diels	Localized	Asia	Medicinal
He-zi-cao	*Actinostemma tenerum* Griff	Localized	Asia	Medicinal
Psendo-tritillary	*Balbostemma paniculatium*	Localized	Asia	Medicinal
White seed melon	*Cucumeropsis mannii* Naud	Localized	Africa	Food
Bur gherkin	*Cucumis anguria* L.	Localized	Wide spread	Food
Teasel gourd	*Cucumis dipsaceus* Ehrenb. ex.	Sporadic	Wide spread	Ornamental
African horned cucumber	*Cucumis metaliferus* E. Mey ex. Naud	Sporadic	Wide spread	Food
Sponge plant	*Momordica angustisepala* Harms	Rare	Neotropics	Utilitarian
Balsam apple	*Monordica balsamina* L.	Frequent	Wide spread	Medicinal
Cochin chin gourd	*Monordica cochinchinensis* (Lour.) Spreng	Sporadic	Wide spread	Medicinal
Kaksa	*Momordica cymbalaria* Frenzl. ex. Hork	Rare	Old world	Food
Luo-han guo	*Siraitia grosvenovrii* (Swingle) Lu & Zhang	Localized	Asia	Food
Red hail stone	*Thladiantha dubia* Bunge	Localized	Wide spread	Medicinal, ornamental
Fluted pumpkin	*Telfairia occidentalis* Hook f.	Localized	Africa	Food
oyster nut	*Telfairia pedata* (Sims) Hook	Localized	Africa	Food
Hard plant	*Hodgsonia macrocarpa* (Bl.) Cogn	Infrequent	Asia	Food
—	*Gymnopetlum cochinchinensis* (Lour.) Kurz.	Rare	Asia	Food
Snake gourd	*Trichosanthes cucumerina* l.	Frequent	Widespread	Food
Chinese Snake gourd	*Trichosanthes kirilowii* Maxim.	Localized	Asia	Medicinal
Indreni	*Trichosanthes lepiniana* (Naud.) Cogn.	Localized	Asia	Medicinal
Japanese Snake gourd	*Trichosanthes ovigera* Blume	Frequent	Asia	Food
Mi-Mao-qua-lou	*Trichosanthes villosa* Blume	Localized	Asia	Food
Inara	*Acanthosicyos horridus* Wel. ex Hook. f.	Localized	Asia	Food
Wax gourd	*Benincasa hispida* (Thumb.) Cogn.	Frequent	Widespread	Food
Bryoni	*Bryonia alba* L.	Sporadic	Widespread	Medicinal
Bryoni	*Bruonia cretica* L.	Localized	Old world	Medicinal
Bryoni	*Bryonia dioica* Jacq.	Sporadic	Widespread	Medicinal
Colocynth	*Citrullus colocynthis* (L.) Schrad	Sporadic	Widespread	Medicinal
Ivy gourd	*Coccinia abyssinica* (L.) Cogn.	Localized	Africa	Food
—	*Coccinia grandis* (L.) Voigt.	Sporadic	Widespread	Food
Lollipop climber	*Diplocyclos palmatus* (L.) C. Jeffery	Localized	Old world	Ornamental
Squirting cucumber	*Ecballium elaterium* (L.) A. Rich.	Sporadic	Old world	Ornamental
Round melon	*Praecitrullus fistulosus* (Stocks) Pang	Localized	Asia	Food
—	*Cayaponica kathematophora* R.E. Schult.	Rare	Neotropics	Ornamental
—	*Cayaponica ophthalmica* R.E. Schult.	Rare	Neotropics	Medicinal
Malabar gourd	*Cucurbita ficifolia* Bouche	Localized	Widespread	Food
Casabanana	*Sicana odorifera* (Vell.) Naud.	Sporadic	Neotropics	Food
Stuffing cucumber	*Cyclanthera brachybotys* (Poepp. & Endl.) Cogn.	Sporadic	Neotropics	Food
Stuffing cucumber	*Cyclanthera explodens* Naud.	Localized	Neotropics	Food
Stuffing cucumber	*Cyclanthera pedata*	Sporadic	Widespread	Ornamental
Wild cucumber	*Echinocystis lobata* (Michx.) Torr. & Gray	Sporadic	Widespread	Ornamental
Chayote	*Sechium edule* (Jacq.) Swartz	Common	Widespread	Food
Chayote	*Sechium tacaco* (Pitt.) C. Jeffrey	Localized	Neotropics	Food

native people which include species viz., *Citrullus, Momordica, Trichosanthes, Fevillea, Genostemma, Hemsleya, Bulbostemma, Thaldiantha, Bryonia, Cayaponia*, which commonly occur in areas surrounding local habitation. Human beings have utilized plants as the main source of medicine and have learned much about the avoidance and curing illness through the consumption and application of plants and their products. Plants contain thousands of compounds, a few are beneficial and most have functions that are still unknown. For example buffalo-gourd has been utilized by man as food and medicine since 1000 years. These tribals use these species in herbal therapy also since the beginning of human history (Tables 4 & 5).

Table 5. Some specific medicinal uses

Vegetables		Medicinal properties
1.	*Momordica* spp.	Hemorrhoids, gout, rheumatism, parasites, Antitumor compounds skin disorders, burns, wounds etc.
2.	*Citrullus* spp.	Urinary tract infections, poor blood circulation
3.	*Cucumis* spp.	Sunstroke, stomach cancer
4.	*Luffa* spp.	Purgative
5.	*Trichosanthes* spp.	Cure dysentery, reduce fever, alleviate pain of swollen legs, purgative glycoside
6.	*Cucurbita* spp.	Anticancer compounds, Urinary problem
7.	*Benincasa hispida*	Laxative, diuretic, aphrodisiac. Cures urinary infections, biliousness, blood disease, tonic for heart, cooling, anthelmintic, dry cough, fever.
8	*Coccinia* spp.	Roots are used in the treatment of diabetes, sores and skin disease. Leaf decoction for bronchitis.
9	*Lagenaria* spp.	Leaves are diuretic, laxative

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