

Distribution of Cucurbits In Arid Ecosystem of Western India

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Abstract

Variability is a prerequisite in any breeding program for crop improvement. Wild Cucurbits are very important source of plant diversity which harbors a wide genetic diversity. Aravalli foothills and part of western India harbors a wide range of genetic diversity for these species. Wild spp. which belongs to primary and secondary gene pool can be exploited in crop improvement in cucurbits by crossing and wide hybridization. Many wild spp are best source of genes for biotic and abiotic stress resistance due to their wide distribution across diverse climatic conditions. Many varieties and hybrids are made in cucurbits by using wild spp. as one of the parent in wide hybridization.

Keywords: Cucurbits, variability, distribution, diversity

Introduction

Cucurbitaceae is with around 800 species in 130 genera are among the economically most important plant family (Ali *et al.* 2009). Cucurbitaceae is having around 130 genera with around 800 sp. Are found mostly in tropical and subtropical zones of the world. (Jeffery 2005, Kocyan *et al.*, 2007).

Among these 34 genera and 108 species occurs in India. (Swaroop Vishnu, 2006). Cucurbits are mostly originated in old world and most of the species were also originated in new world.. this family is having a huge diversity within the family, and the wide adaptation for cucurbits species. (Kocyan *et al.*, 2007). The genera like *Trichosanthes* with 23 species, *Cucumis* with 12 (two wild), *Momordica* having 9, *Zehneria* having 5 spp.

India is of main important due to having a broad range of lineages and most of them are primitive and phylogenetically separated (Susanne S. Renner 2013).

So the role of gathering wild species from natural habitat from centers of origion and their screening for using in crop breeding cannot be under estimated.

Cucurbits contain a chemical compound known as Cucurbitacins (A-T), having a group of various triterpenoid compound which already studied for their bitter and toxic property.

Arid and semi arid eco-system: These regions are known by their harsh climatic conditions like with no or insufficient or irregular rainfall so it's become difficult to sustain crop production. In India about 53.4 % area is falls under arid and semi arid climatic conditions.

The rains are irregular and usually come in form of heavy storms for short durations most of water will be go waste as run off rather than percolating in soil. In arid regions, farming bounded to more productive but land is limited, and a large population of animals depend on the native vegetation of region.

List of Cultivated and Wild cucurbits in West India: (Bhandari, 1978)

Cultivated cucurbits:

Cucumismelo L. varmelo- Kharbooja. (Hindi).

Cucumissativas L.- khira, Balamkakri. (Hindi).

Cucumicallosus (kachri, kachrio)

Cucurbitamoschata- sithafalmithakaddu. (Hindi).

Cucutbita maxima

Cucurbitapepo L.

(Vilaytikaddu, Khola.)

Citrulluslanatus

Wilbrandiaebracteata.

Citrulluslanatus var. fistulosus

Lagenariasiceraria- Lauki.

Momordicacharantia -(Bitter melon)

Cucurbitapepo .(Pumpkin).

Cucurbitaandreaana.

Cucurbitaficifolia .

Luffacylindrica.

Trichosanthes cucumerina (Snake gourd)

Wild cucurbits

<i>Cucumisprofetearum.</i>	<i>Corallocarpudskonocarpus</i>	<i>Momordicadioica</i>
<i>Cucumissetosus.-rare sp</i>	<i>Cucumisprophetarum</i>	<i>Cocciniagrandis.</i>
<i>Blastiniafimbristipula</i>	<i>Corallocarpudsepigaeus.</i>	<i>Ctenolepis cerasiformis</i>
<i>Blastiniagarcini</i>	<i>Luffaumbellata(klein)-very rare</i>	<i>Diplocyclospalmatus</i>
<i>B. lacinosa</i>	<i>Melothriaperpusilla</i>	<i>Momordicacochinchinensis</i>
<i>Citrulluscolocynthis-tumba</i>	<i>(Bitter apple): Tumba(Hindi)</i>	<i>Momordicabalsamia</i>
<i>Bryopsislaciniosa.-rare sp.</i>	<i>Melothriamaderaspatana</i>	<i>Citrulluscolocynthis</i>
<i>Luffaechinata</i>	<i>Melothriaheterophylla(Lour</i>	<i>Dactylendrawelwitschi- (badiaankhphootnikibel.)</i>

Genera of Cucurbits adopted in Arid Ecosystem of Western India.

1.) <i>Cucumis</i>	9). <i>Blastinia</i>
2) <i>Cucurbita</i>	10). <i>Diplocyclose.</i>
3) <i>Lageneria</i>	11). <i>Melothria</i>
4) <i>Momordica</i>	12). <i>Bryonopsis</i>
5) <i>Citrullus</i>	13). <i>Ctenolepis</i>
6) <i>Luffa</i>	14). <i>Dactyliandra</i>
7). <i>Trichosanthes</i>	15). <i>Coralocarpus</i>
8). <i>Coccinea</i>	16). <i>Dicaelosprumritchiei (doubtfull))taxon.)</i>

Conclusion

The evaluation of IC and EC germplasm introduction, and their crossing resulted in the selection of 112 superior cultivar, 48 improved varieties, 26 hybrids and 7 disease resistant varieties in 8 major cucurbits have been identified and recommended through All India coordinated Vegetable improvement project. Various Hybrid cultivars are commercialized at national as well as state level which express desirable heterosis for yield.

Various resistant varieties are developed by clonal selection (Pointed guard clones: IIVR PG-1, & 2, IIVR PG 105), mutation breeding (Bitter gourd variety MDU-I and in Ridge gourd PKM -1), polyploidy breeding (Triploid watermelon.Pusabedana) Fruits and leaves extract of bottle gourd inhibits histamine induced asthma. In *Cucumis callosus* (AHK-119 line) a trait for high yield and drought tolerance has been identified . Plant parts of *Citrullus colocynthis* were highly effective against Plasmodial factors.

Future prospects

Interspecific hybridization has been practiced successfully in cucurbit improvement more, compared with any other plant family, but still there is a need for further biosystematics studies to understand and accommodate the variation and its application for germplasm and varietal improvement. Cucurbitaceae is such a family which is having highest morphological variability and this variability can be explored with the help of modern breeding approaches for the development of cultivar which can withstand to biotic and abiotic stress.

Development of varieties or hybrids with better adaptability under off season should be undertaken. Species' karyotyping will be key in the search for new sources of genes for cucurbit improvement. Global population sampling will be necessary to assess whether cucurbits have been domesticated multiple times.

References:

- Ali, A.; Mohamed, A.; Alian, A.; Hassan A.; Elmahi. (2013). Phytochemical Analysis of Some Chemical Metabolites of Colocynth Plant (*Citrullus colocynthis* L) and its Activities as Antimicrobial and Antiplasmodial. *J. Basic. Appl. Sci. Res.*, 3(5)228-236.
- Bhandari, M. M.(1978).Cucurbitaceae. Flora of Indian desert. scientific publishers:distributer,united book traders. pp 147-157.
- Dwivedi, N. ;K.; Dhariwal, O. P.; GopalaKrishnan, S.; Bhandari, D. C.(2009). Distribution and extent of diversity in Cucumis species in the Aravalli ranges of India. *Genet Resour Crop Evol.* 57:443-452.
- Kocyan A, Zhang LB, Schaefer H, Renner SS (2007). A multilocus chloroplast phylogeny for the Cucurbitaceae and its implications for character evolution and classification. *Mol Phylogen Evol* 44:553–577

Renner, S. S.; Schaefer H, Kocyan A (2007) Phylogenetics of Cucumis (Cucurbitaceae): Cucumber (*C. sativus*) belongs in an Asian/Australian clade far from melon (*C. melo*). *BMC Evol Biol.* 7:58