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DIVERSITY OF CUCUMBER AND MELONS FROM RAJASTHAN

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An exploration was undertaken in south-west, west, south-east and central parts of Rajasthan and wide range of variability was observed/collected particularly in cucumber, snapmelon, *Kachri* and snake cucumber. A total of 399 collections were made. Jodhpur, Nagaur and Bikaner areas were veritable 'goldmine' of snapmelons. The germplasm were highly variable for fruit characters and widely distributed (including in the sand-dunes habitats). *Kachri* (*Cucumis collosus*) melons were uniformly distributed throughout Rajasthan. Locally adapted landraces in Cucumber (Sawanariya, Balamkakdi) had move variation in Sirohi (Abu) and Shekhavati areas for fruit shape, fruit skin colour, fruit skin mottling, colour of stripes, fruit skin glossiness, fruit length/width, weight and stem-end/blossom-end fruit shape, flesh texture and flesh colour.

Key words : Cucumber, melons, diversity, exploration/collection

Out of 6 species of *Cucumis* in India, *Cucumis sativus* and *C. melo* are widely cultivated. Cytological studies revealed that the species under this genus belongs to two distinct geographically isolated groups i.e., Asiatic and African group. Species bearing chromosome number 2n = 14 are all of Himalayan origin while species of 2n = 24 are basically originated from tropical and south Africa. Therefore it is presumed that Cucumber (*Cucums sativus*) is thought to have originated in India where its wild relative (*C. hardwickii*) of chromosome number 2n = 14 are presently found. The species being cultivated since 3000 years (de Condolle, 1982) all over India, has two forms - creeping one, cultivated in the field during hot season and climbing form, cultivated during rainy season. Morphologically they differ in fruit size. The closely related wild species *C. hystrix* Chakr. also grown wild in Meghalaya state (of India) which may however be a weedy form of a cultigen. This can be a valuable material for breeding purpose with the cultivated cucumber, since they are well adapted to wild habitat at 900-1500 m altitude and resistant to several diseases/pests. Wild related types of *C. sativus* exhibit diversity in the Himalayas in *C. hardwickii* and *C. trigonus*. *C. hardwickii* - small bitter cucumber with sparse and stiff spines has been found wild in the foothills

of Himalayas. Many landraces were under- represented in the national germplasm collection to reasonably match the potential genetic diversity available and hence, an exploration mission (October-November 1992) was organised to collect and conserve the available diversity in cucumber and melons from Rajasthan (India) before their possible erosion due to several factors including destruction of habitat. A total of 399 collections were made (Table 1) and rich diversity in cucumber, melons (*Cucumis melo* var. *momordica* and *C. callosus*) were sampled from Rajasthan.

Table 1. Diversity collected in *Cucumis* species and other crops

Crops	Botanical Name	No. of germplasm collected
Cucumber	*Cucumis sativus*	110
Snapmelon	*Cucumis melo* var. *momordica*	194
Muskmelon	*Cucumis melo*	04
Snake cucumber	*C. melo* var. *utilissimus*	08
Kachri	*Cucumis callosus*	83
Total germplasm collected	:	399

PHYSIOGRAPHY AND AGRO-CLIMATE

In Rajasthan (69° 10'- 78° 10'E and 23° 5'- 30°N), in the southern half, mostly hard rocks are found. The alluvium as well as the blown-sand-covered regions support potable aquifers. The fluctuations in water level are less in northern than the southern part. In south-eastern region, the water table is generally within 15m of depth but in north-western part, it is deeper (30-100m). The rainfall pattern in highly influenced by timing, duration and intensity of north-east and south-east monsoons and the topographic and geographic features. The predominantly dry conditions and extremes of other climatic components that characterize these regions support a poor flora.

GERMPLASM COLLECTION

North-western (Jodhpur, Pali, Nagaur, Bikaner and Sriganganagar districts), eastern/central (Sikar Jaipur and Tonk districts), south east (Bhilwara and Chittaurgarh) and south-western (Udaipur, Sirohi and Jalor districts) of Rajasthan, India were surveyed for collection of cucumber and melons germplasm. A total of 399 collections were made from 72 sites Table 1. Due to paucity of time, some of the areas could not be covered. However, it was possible to move across from north to south covering east and west along plain and mountaineous areas. The collection route map (Fig. 1) indicates the areas followed during the trip and the concentrations of available germplasm espe-

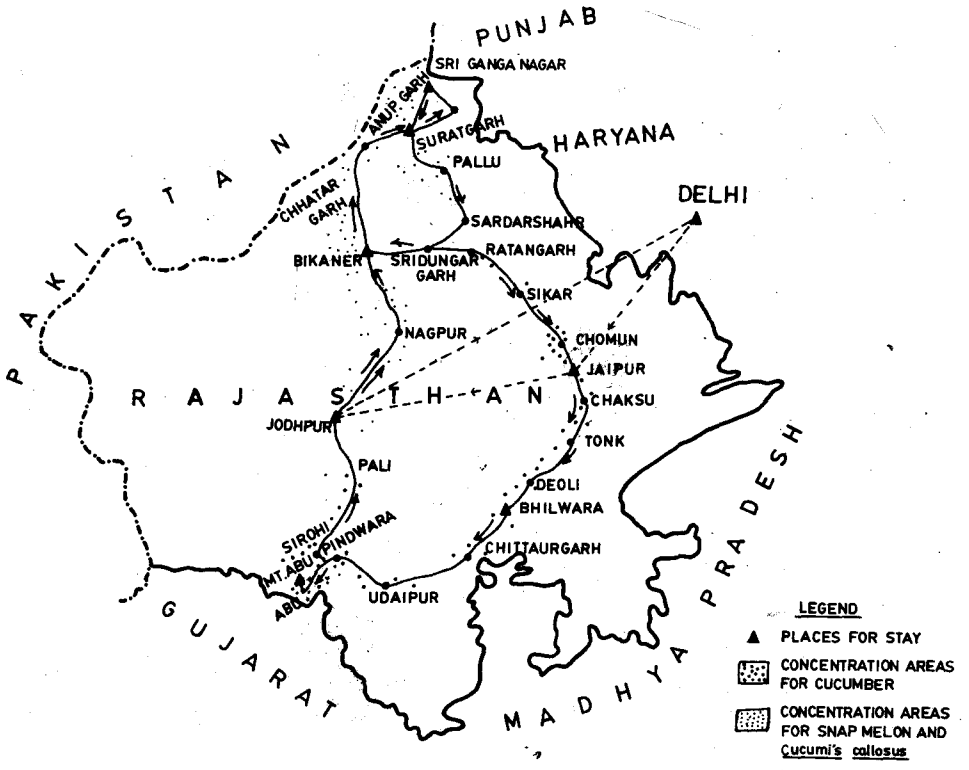

Fig. 1. Exploration route map for collection of cucumber and melon germplasm from parts of Rajasthan

cially for locally adapted landraces in cucumber, snapmelon and *Cucumis callosus*. The sites were selected at every 15-20 km. based on the availability of the target species in the pockets specified and other areas, preferably with some fallow land, cultivated lands/abandoned land/edges of agricultural fields/protected/disturbed areas. The sampling sites were selected in different climatic zones so as to collect large range of variation, Population samples were taken and passport data recorded. Some morphological and other important data on fruit characters were also recorded. Ripe seed were extracted from 4-5 fruits in each accession. Herbarium specimens were prepared for some samples collected.

EXTENT OF DIVERSITY COLLECTED

The arid region of Rajasthan is endowed with rich genetic diversity in snapmelon and *Cucumis callosus*. The landrace variability is of considerable

interest, as it is atuned to dry conditions and adapted under agro-ecological niches with acute water stresses. The extreme dry climate is characterized by high solar radiation, seasonally and diurnally fluctuating temperatures and erratic low annual rainfall which varies from year to year without following any trend. The desert is characterised by wind blown sand dunes of various types besides the occurrence of saline and sporadic aquatic habitats. Melons (Snapmelon) and *Cucumis callosus* have tremendous diversity. Mostly monoecious types were observed in snapmelon. The germplasm varied in plant growth habit (bushy/intermediate/prostrate type), in ovary pubescence (short/intermediate/long), fruit shape (globular/oblate/elliptical/ovate/elongated), fruit ribs (generally absent but occassionally superficial to deep ridging), fruit skin colour (green, whitish yellow, yellow, orange, brown and grey), secondary fruit skin colour (yellow, orange, green and pink occasionally), fruit skin texture (smooth/grainy/with spines/with warts), in design produced by secondary colour (speckled/spotted/striped/streaked), in blossom scar-generally obscure but occassionally conspicuous, fruit length (2.5 - 34.0 cm.), fruit width (2.5-13.0 cm.), fruit weight (6.8-149.2g) and in flesh colour (white, yellow, orange), flesh texture (smooth/grainy type) and seed coat colour generally white but occassionally brown in colour.

Cucumber germplasm has concentration in south-west, south east and central part of Rajasthan. Locally adapted landraces **'Sawanariya'** from Sikar, Laxmangarh, Shekhawati areas and Chomun areas of Jaipur (from Purohit ki Dhandi, Nauri ki Dhandi villages) and **"Balamkakdi"** from Tonk, Deoli, Kir ka Kheda (Chittaurharh district), Abu Road, Mungthala, Phongur, Ghoria, Sanar, Kui, Khejra, Uplagarh, Amba, Sagna, Dotara etc. (Sirohi district) have been collected. Amazing diversity in fruit (shape, size and colour) were observed. Germplasm collected varied in plant habit (bushy to prostrate), in sex type (monoecious generally to gynomonoecious/andromonoecious), fruit shape (elliptical, elongated/oblong/globular/stem- end tapered/blossom- end tapered), fruit skin colour, (yellowish white/light green/medium green/dark green/yellow with uneven colour dark green colour at stem-end portion and light green with whitish splashes on other parts of the fruit), fruit skin mottling (generally absent), colour of stripes (absent/white/green/yellow), in fruit skin glossyness (dull/glossy), fruit length (15-46.2 cm), fruit width (7.2 cm. - 30.0 cm.), fruit weight (110-4900 g), in stem- end fruit shape/blossom- end fruit shape (depressed/flattened/rounded/pointed), flesh texture (smooth/grainy/soft), flesh colour (white/greenish white/green) and in seed coat colour (white/tan/yellow).

Since aim of the collection mission was to collect several landraces in cucumber and melons specifically, it is highly likely that the variability collected in these two crops from sites differing in pH, altitude, rainfall type, and vegetation components, would provide a basis to determine the ecologically

and geographically related genetic variability when these collections are evaluated morphologically, chemically and on molecular marker basis. It is hoped that some of these collections would be of use as straight introductions or as parents in the hybridization programme.

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