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*Abstracts*

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TSI: P-17

## **Grafting: A Tool for Resistance Breeding in Vegetable Crops**

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Grafting is a horticultural technique whereby tissues of two separate plants are united (an upper scion and bottom rootstock) so as to result into and continue their growth as a single plant. Utilization of grafted seedlings in vegetable production originated in Japan and Korea to avoid the serious crop loss caused due to infection of soil-borne diseases aggravated by successive cropping. This practice is now rapidly expanding throughout the world as a technique to combat the detrimental effects of biotic and abiotic stress on the growth and development of vegetable crops. The ability of a grafted plant to withstand stress is attributed to the inherent property of the rootstock that makes it resistant towards the adverse impact of various stresses. Researchers are exploiting various available genetic resources such as wild relatives and proven resistant sources as rootstocks in the grafting programme. The technique has been successfully utilized in vegetable crops such as cucumber, tomato, brinjal, capsicum and other cucurbits in which there is wide availability of stress resistant sources. A wild brinjal species, *Solanum torvum* Swartz. has been successfully utilized as a rootstock for inducing bacterial wilt resistance in tomato and brinjal. Vegetable grafting has been safely adapted for the production of organic as well as environmentally friendly produce which also aids in minimizing the uptake of undesirable agrochemical residues. In addition to the widely recognized advantages of disease tolerance and high crop yields, grafting technology is also highly effective in ameliorating crop losses caused by adverse environmental conditions such as low and high temperature, water stress and high soil salinity, especially under conditions where successive cropping or continuous farming is routinely practiced. Similarly, figleaf gourd (*Cucurbita ficifolia* Bouche.) is a proven source of low temperature tolerance for cucumber. Grafted seedlings are much favored in hydroponics farming systems where the chances of rapid spread of noxious diseases, once infected, is high. Improvised mechanical grafting techniques to cut down the labor cost will contribute further to the increased use of grafted vegetables worldwide.

**Key words:** Grafting, rootstock, biotic and abiotic stress resistance.

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## **Arid Vegetable Genetic Resource – Conservation and Utilization for Nutritional and Income Security under Hot Arid Agro-Climate**

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The vast and diverse land-landscape of hot arid, semi-arid and tribal area of north-western India is yet not getting logical thought for resource based production system and the native crop-plants both annual and perennials are drought tolerant and playing vital role in providing nutritious food and eco-restoration. Here, systematic cultivation with prioritized vegetable crop-plants is rare, un-organized and marketable produce is quite marginal, and this is only because of lack of matching genotypes and approaches. Traditionally, kachri (*Cucumis melo* var. *callosus* / *agrestis*), kakadia (*Cucumis melo* var. *momordica*), mateera (*Citrullus lanatus*), tinda (*Praecitrullus fistulosus*) and guar (*Cyamopsis tetragonoloba*) is grown with mixed cropping. Besides, khejri (*Prosopis cineraria*) has significant role in long-established farming system, and its tender pods are vegetable use. The crop-genotype studies over 45 vegetables at CIAH, Bikaner from 1995–2015 demonstrated that there is magnificent scope in obtaining high quality yields adopting HBCPSMA concept, provided trait specific genotypes. At Bikaner, systematic collection resulted to evaluation of 1725 accessions and out of them 1060 germplasm deposited at NBPGR. Based on characterization, about 500 germplasm utilized in improvement work and 17

varieties released and 15 genotypes are in pipe-line. With khejri models, better yield in prioritized vegetables and income @ Rs 75,000–2,25,000 ha/year is obtained in comparison to traditional cropping (23,000–42,000). Thus, the technological advancement in arid vegetables is a key to success toward better economic returns and nutrition to the inhabitants at resource poor environment.

**Key words:** Kachri, snap melon, mateera, khejri, arid vegetables, hot arid agro-climate, Rajasthan, India

TSI: P-19

## **Genetic Variability and Performance Studies in Vegetable Cowpea Germplasm under Hot Arid Agro-Climates**

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In traditional mixed cropping of arid region, cowpea (*Vigna unguiculata*) is grown for grain production but its pre-mature pods are also used for vegetable culinary. The indigenous germplasm of vegetable and multi-purpose pod-use was initially collected from arid, semi-arid and tribal areas of Rajasthan and Gujarat during 2001 and 2002 as regional diversity. The potential germplasm were used in breeding for purification over the years and 10 genotypes were maintained at CIAH. During rainy season of 2018, 28 diverse cowpea germplasm from wide geographical regions covering state of Rajasthan, Gujarat, Karnataka, Kerala and Uttar Pradesh were studied to quantify component of genetic variability and performance under hot arid agro-climate at CIAH, Bikaner. The germplasm were characterized for plant growth, maturity, pod quality and yield component and good amount of variations were recorded for characters such as plant height (41.6-207.3 cm), days to first harvest of tender pods (37-66 DAS), pod length (10.9-29.7 cm) and weight (2.2-7.3 g) at vegetable use stages. The line AHCP-1-4-1 and AHCP-2-3 were studied for their performance in comparison to popular varieties (RCV-7, Arka Garima, Kashi Nidhi and Kashi Kanchan). The AHCP-1-4-1 is purified line producing vegetable type pod quality and is from germplasm collected from local market (*Haatt*) of village Limkheda and Jhalod of district Daahod (Gujarat). The purified line AHCP-2-3 is multi-purpose type, locally known as bindodi-chawala and is trait specific for rainfed arid farming. It is very early in tender pods harvesting (47 DAS), high yielding and drought tolerating.

**Key words:** Vegetable cowpea, *Vigna unguiculata*, genetic variability, hot arid agro-climate, Rajasthan, India

TSI: P-20

## **Performance of Capsicum (*Capsicum annum* L. var. *grossum*) Genotypes in Open Field Conditions at Different Locations of Kumaon Hills of Uttarakhand under Changing Climate**

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Experiments were conducted in mid hills (Jurkafun, Almora) and high hills (Sunkiya, Nainital) of Kumaon region of Uttarakhand during summer 2017 under National Mission for Sustaining Himalayan Ecosystem (TF-6) scheme to study the performance of various genotypes of Capsicum namely, Lucky Star, Orobelle, Bharat, CITH-M-SP-5, CITH-M-SP-4, CITH-M-SP-2, Yamuna and California Wonder for growth, yield and quality parameters under changing climate. Prevailing night low temperature, high rainfall, hail, frost, higher relative humidity and cold wind are limiting factors for growing capsicum under open field conditions in hills of Uttarakhand. The experiments were conducted in open field condition in Randomized Block Design with three replications.