Table2. Sources of Resistance to major biotic and abiotic stresses identified in the introduced germplasm in some important Vegetable Crops

Crop and Stresses	Introduced source of resistance
Tomato	
Bacterial wilt	EC 467725-935, EC 438314-317, EC 182761-182874, EC 26511-13
Fusarium wilt	Pan American, Florida, PI 79532
Root knot Nematode	Nemared, VNF-8, Florida, Hawaii cross
Heat tolerant lines	EC 198416, EC 501573-83, EC 479027, 31, 34, 36, 139, 140, 141 and 143
Brinjal	
Bacterial wilt	EC 104107, Florida Market
Phomopsis fruit rot	EC 305069, 316274
Tolerance to frost	Black torpedo, Long Tom '4'
Tolerance to drought	Supreme, Violette round
Chilli	
Cucumber mosaic virus	EC 312342-312349
PBNV mosaic virus	EC 121490
Aphids	EC 28, 30 and 34
Okra	
YVMV	EC 133408, EC169333, EC 169334, Ghana red
Jassids	EC 305656, 305694, 305695
Pea	
Powdery mildew	EC 342007
Cucumber	
Downy mildew, powdery mildew	Poinsette (PM, DM)
Muskmelon	
Downey mildew, powdery mildew, Anthracnose	Crimson sweet, shipper
Cabbage	
Black rot	EC 24855, EC 28770, Cabbage Standby
Cauliflower	
Black rot	Aemel, Olympus, Lawyana
Onion	
Purple blotch	EC 328494, EC 328492, EC 328501, EC 321463

meet the ever increasing demand of the vegetable production in India.

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In vitro Conservation of Exotic *Allium scorodoprasum* Germplasm

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Introduction of new plant material from wide and varied sources is an integral part of plant genetic resources activity programme. Extensive efforts were made by National Bureau of Plant Genetic Resources (NBPGR) to introduce the exotic germplasm of Alliums from different parts of the world to strengthen the *Allium* germplasm resources activity.

Alliums, representing an important genus amongst bulbous crops, are mostly used as a vegetable, spice or as a medicine (Chandel and Pandey 1992). These are either propagated through bulbs as some species are seed-sterile or propagated through seeds as well as bulbs. Since, it is a cross-pollinated crop, propagation through seed results in a highly heterogenous progeny.

Thus, species are selectively or exclusively vegetatively propagated by bulbs/cloves to maintain the desired genotypes.

Allium scorodoprasum (EC 32850), an exotic *Allium* species has been procured by the NBPGR from USSR. Commonly known as Spanish garlic, rocambole or sand garlic, it is used as a flavouring agent in soups whereas the bulb is used in the treatment of abscesses, amoebic dysentery, bronchitis, cholera, influenza, skin diseases and tuberculosis. This species is being maintained in the field genebank of NBPGR Regional Station at Bhowali. Field collections are generally susceptible to vagaries of weather, insects and diseases. Routine handling from one season to another also results in annual loss of these collections under field conditions. The aforementioned problems necessitate the usage of tissue culture techniques for safe and pathogen-free conservation of *A. scorodoprasum* for short-to medium-term. Successful *in vitro* clonal multiplication is desirable for *in vitro* conservation. The *in vitro* maintenance is based on culture cycles consisting of explant establishment, plantlet regeneration and storage. Such cycles have been established for *A. scorodoprasum.*

Cultures were initiated from bulbous bases following surface sterilization with 1% $HgCl_2$ for 20 min and subsequent rinsing with sterile distilled water four times for contamination free establishment. Bulbous bases were cut transversaly and implanted onto Murashige and Skoog's medium (1962) (MS) supplemented with 1.0 mg l^{-1} 1-naphthaleneacetic acid (NAA) and 4.0 mgl^{-1} 6-benzalaminopurine (BAP) for culture initiation. Multiple shoots were also obtained on the same medium and rooting achieved. After 5-6 subcultures, the proliferated shoots provided enough material for storage experiments. These cultures were maintained under 16 h photoperiod (30 mmol/m^2/s^1) provided by cool white fluorescent lamps (Philips, Mumbai).

Shoots measuring 3-5 mm were transferred to glass culture tubes containing 15 ml of shoot multiplication medium or that with reduced strength of nutrients or mannitol supplementation, depending upon the experiment. The tubes were closed with either cotton plugs or polypropylene caps as closures. Low temperature storage was accomplished by maintaining cultures at 4°C. At periodic intervals, cultures from each treatment were examined visually and then transferred to fresh medium under standard culture room conditions. Survival of *in vitro* cultures was assessed by their ability of cultures to resume growth on fresh medium. Six to eight week old plantlets with well developed roots were transferred to plastic pots and maintained under nethouse conditions.

There is relatively little information on application of *in vitro* techniques for *Allium* germplasm conservation (Astley, 1990). This was confirmed by reports concerning the IBPGR Database (Withers *et al.*, 1990). Short-, medium- and long-term conservation can be achieved in Alliums by maintaining cultures under normal/growth restrictive conditions or by using ultra low temperatures of liquid nitrogen (LN_2; -196°C). This has been clearly demonstrated in garlic (El-Gizawy & Ford-Lloyd 1987).Present study reveals that with the use of cotton plug as culture tube closures, cultures could be maintained for a period of 8 weeks on shoot multiplication medium whereas replacement of cotton plugs with polypropylene caps as closures could extend the subculture duration to 24 weeks under culture room conditions. Media manipulation or low temperature incubation was beneficial in extending the subculture duration to 48 weeks. Modification of nutrient medium by mannitol supplementation had little effect on increasing the shelf-life of cultures

The present findings on conservation of *A. scorodoprasum* are important because they offer the convenience of storing the germplasm for more than one growing season, without the need for subculturing *in vitro* or field maintenance

Acknowledgements

We thank Dr BS Dhillon, Director, National Bureau of Plant Genetic Resources, New Delhi for facilities, encouragement and guidance. Financial support provided by the Department of Biotechnology, Ministry of Science and Technology, is gratefully acknowledged.

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