

SHORT COMMUNICATION

Allium roylei* Stearn — An Uncharted Precious Gene Reservoir of North-West Himalayas*Beetika Kohli^{1*}, Veenu Kaul¹ and RN Gohil²**¹Department of Botany, University of Jammu, Jammu-180 006, Jammu and Kashmir²Centre for Biodiversity Studies, Baba Ghulam Shah Badshah University, Rajouri, Jammu and Kashmir

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Allium roylei Stearn belonging to family Alliaceae is a lesser known plant of economic importance. The species is reportedly a repository of genes imparting resistance to various harmful fungal diseases. As per Hooker, the species in India is distributed along the Himalayan, sub-Himalayan ranges and Garhwal Himalayas. In Jammu and Kashmir, except for some plants growing along Gilgit slopes of Ladakh, there were no reports of its occurrence till 2002. Since then, explorations to several regions have unfolded two more populations from the state. The germplasm base of the taxon is likely to widen if extensive explorations are undertaken in Jammu and Kashmir (J&K) and its adjoining regions.

Key Words: *Allium cepa*, *A. roylei*, Downy mildew, Translocation heterozygotes

Allium roylei Stearn belonging to family Alliaceae is an important wild species. Commonly known as *panchali gajna* or *jungli pyaz*, its leaves and inflorescences are used by tribals for seasoning dishes. Bulbs are also consumed for getting relief from headache. In addition bulbs are also given to horses for relief from colic pain (Kohli and Gohil, 2009a). Herbarium specimens of *A. roylei* bearing voucher number 10065 and 10066 were submitted in the botanical herbarium of University of Jammu. It harbours genes imparting resistance against dreadful fungal diseases (downy mildew, leaf blight and anthracnose). Being sexually compatible with *A. cepa*, it has been successfully used as a donor of these genes for improving the common onion (Scholten *et al.*, 2007).

In India, the taxon has been reported from the Himalayan and sub-Himalayan ranges; Garhwal westwards between 6000–7000 ft. Surprisingly, the species finds no mention in the floras of Jammu, Srinagar and Udhampur (Sharma and Kachroo, 1981; Dhar and Kachroo, 1983; Swami and Gupta, 1998). It, however, figures in the flora of Ladakh, according to which it is distributed in Gilgit slopes (Murti, 2001). From Jammu province, Sharma and Gohil (2002) reported its occurrence for the first time from Bani (district Kathua) and Mendhar (district Poonch). Since then, some other areas of its distribution have been recorded from this province. A new population was collected from Gourwan (district Reasi) (Kohli, 2007) and another was reported from Kishtwar High

Altitude National Park (Kumar and Hamal, 2009). A map depicting areas of collection of various populations of this species is shown in Fig.1. With more explorations, there is every likelihood of the distributional range of this species getting widened.

Perusal of the literature brings forth interesting features associated with this plant species. *A. roylei* is a wild perennial herb (Figs 2a-d). Its preference for culinary purposes by locals, wherever it is found wild, hastens its rate of exploitation and may lead to total extinction in these regions. This exploitation has led to its being assigned the status of a rare species in western Himalaya (Pandey *et al.*, 2008). Notwithstanding its enormous potential, the species has remained unexplored in North-West Himalayas of which J&K forms a part.

A. roylei, therefore, faces various pressures on account of extrinsic and intrinsic factors. While the former can largely be attributed to the anthropogenic stress, intrinsic causes have been brought to light when three of the four populations reported from Jammu province were subjected to extensive morphological and cytological analyses (Sharma and Gohil, 2003; Kohli, 2007; Kohli and Gohil, 2009b). These studies revealed that the plants of all the three populations are complex translocation heterozygotes (Fig. 2e), unlike the normal diploids reported from Mussoorie. Complex translocations have imposed sexual sterility. As a result of anthropogenic pressure and bottlenecks in the sexual reproduction, the species is likely to become extinct.

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Fig. 1. Map of Jammu province: The letters highlighted and in bold represent the areas from which collections of *A. roylei* were made. Asterisk represents the region from which another population of *A. roylei* was reported but not collected.

Luckily, like most other species of genus *Allium*, *A. roylei* also propagates vegetatively through underground bulbs (Fig. 2b). Vegetative propagation provides an efficient means of survival for all these taxa. A single plant of *A. roylei* produces 4–5 new underground bulbs/bulblets. Under experimental conditions in the Jammu University Botanical Garden, healthy plants were raised separately from each such bulblet. This means that germplasm of *A. roylei* can be increased, maintained and utilized for various purposes.

Considering its importance, incomplete surveys, unknown distributional range and paucity of detailed cytological data, the present communication is an attempt to prompt botanists to undertake extensive explorations of North-West Himalayas and its adjoining areas. These explorations will be of both academic and applied interest. Besides widening the germplasm base of this important gene reservoir, these would help in establishing its actual status *vis-à-vis* conservation, cytological nature and the

evolutionary strategies adopted by the plant. Additions to the germplasm base may help isolating collections with other novel genes for plant breeders to exploit.

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Fig. 2. *Allium roylei* a) Plant; b) Bulbs; c) Inflorescence; d) Individual flower; e) A pmc at metaphase-I with 2VIII

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