The phenomenon of typically dicotyledonous plants producing three cotyledons has been referred to as tricotyledony or tricotyly. More generally, the production of an abnormal number of cotyledons has been referred to as pleiocotyly. Molecular studies have shown that a few mutated genes could produce tricotyledonous traits in the model plant, Arabidopsis. Tricotyledonous seedlings occur sporadically in nurseries of dicotyledonous plant species in over 15 families of plants. However, the phenomenon has not been reported in seabuckthorn (Elaeagnaceae).

The actinorhizal plant seabuckthorn (Hippophae rhamnoides L., Elaeagnaceae) is dioecious and wind pollinated. Seabuckthorn berries are among the most nutritious of all fruits and have immense medicinal properties. Seabuckthorn is mentioned in the writings of ancient Greek scholars such as Theophrastus and Dioscorides. The medicinal value of seabuckthorn was recorded as early as the 8th century in the Tibetan medicinal classic rGyud Bzi (Four Text of Fundamental Tibetan Medicine). The shrub serves as a storehouse for researchers in the field of biotechnology, nutraceutical, pharmaceutical, cosmetic and environmental sciences.

During our study in 2009 to check seed viability of a 10-year-old seabuckthorn seed stock, we observed few seedlings with three cotyledon leaves. To check the frequency of tricotyledony in seabuckthorn, seeds from 30 different plants maintained in field gene bank (lat. 34°08.2’N, long. 77°34.3’E, altitude 3340 m amsl) at the Defence Institute of High Altitude Research, Leh-Ladakh were collected in 2010. Seedlings were raised in pots and emergence of cotyledon number was checked on each plant approximately every 3 days. Plants were scored in three categories: two full cotyledons, three full cotyledons and greater than three cotyledons. Tricotyledonous seedlings were transplanted into the greenhouse. The observed tricotyledon frequencies among the 2798 germinated seedlings from 30 plants ranged from 0% to 6.4%, with an average of 0.64%. A rare single tetracotyledon seedling was also observed. Low frequency of tricotyledony has also been reported in Brassica oleracea var. capitata (0.6%), Crotolaria juncia.

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None of the cotyledonal leaves showed any sign of external distortion or splitting and were arranged symmetrically in a whorl. Seedlings bearing three cotyledons also bear three true leaves at each internode of the first few internodes (Figure 1). Plants with three cotyledons are potentially useful for faster establishment of seedlings after planting because of the larger leaf area in the early growing stages and may serve as a morphological characteristics for distinguishing cultivars. Limited number of seedlings are available at the Defence Institute of High Altitude Research, Leh-Ladakh for five years. Recipients of cuttings have been asked to make appropriate recognition of the source of the germplasm if it is used in research studies, development of a new cultivar, germplasm, parental line or hybrid.

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Has Dracunculus really been eradicated?

Dracunculus medinensis (guinea worm), a nematode endoparasite, has been known since biblical times and had been endemic in India, Pakistan, West and Central Africa, and the Middle East. Rajasthan was severely affected by dracunculiasis, especially southern Rajasthan (Dungarpur, Banswara and Udaipur districts) and was hyperendemic about two decades ago. The alarming status of the guinea worm led to the launching of the SWACH project by the government in 1986. This project assured proper sanitation and development of a new cultivar, germplasm, parental line or hybrid.

The recurrence of Dracunculus in a so called ‘Dracunculus-free state’ is questionable. In its strive for existence, Dracunculus has possibly found some new reservoir or intermediate host like monkeys and dogs that share their habitat with humans, and may spread the infection by contaminating the drinking water sources that are generally open, or step wells in the villages. Another probability can be migration of these residents to other adjoining endemic states as Gujarat and Madhya Pradesh for earning their livelihood and in turn getting the infection. Dracunculus appears to have succeeded in maintaining its gene pool despite of so many efforts of the humans to eradicate it or rather cause its extinction.

Guinea worm

Figure 1. Guinea worm from a shallow ulcer in the foot of a 40-yr-old man (source: Choubisa).


_HAS DRACUNCULUS REALLY BEEN ERADICATED_


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