Welwitschia mirabilis – a rare xerophytic South African gymnosperm in National Botanical Research Institute, Lucknow

The importance of a botanic garden is gauged by its diverse, rich and unique plant collections. The botanic garden, National Botanical Research Institute (NBRI), Lucknow has been engaged in growing scientifically interesting, economically valuable and evolutionary significant plants for promoting education and research. With persistent endeavour, we procured seeds of *Welwitschia mirabilis* Hook. *f.* in 1989 from the National Botanical Gardens, Kirstenbosch, Claremont, South Africa. The second lot of seeds was received from the Botanic Garden, Berlin– Dahlem, Germany during 1992.

After reviewing the literature pertaining to the cultural requirements, seeds were sown and data were recorded. Seeds were soaked in distilled water overnight before sowing. Seed sowing was undertaken by using a sterilized soil mixture of coarse sand and leaf-mould in 1 : 1 ratio along with old fused lime and brick powder in traces. Seeds started germinating after 10–15 days of sowing. As the viability of seeds is poor, freshly collected seeds respond better to germination. In this case percentage of germination remained 40–50% as observed in two lots. Seeds of *Welwitschia* are preferably sown directly in pots/places where they can establish without any hindrance. The phase of germination to acclimatization is quite difficult but once the seedlings get established, maintenance of adult plants becomes relatively easier. Matured seedlings were administered a dose of about 5.0 g of bonemeal and 2.5 g of urea in September–October after the monsoon for stimulating growth.

Gymnosperms have always posed challenging problems in evolutionary studies. *Welwitschia* is among the oldest of plant species still surviving in Southwest Africa. *W. mirabilis* is categorized as one of the rarest taxa in the whole plant kingdom. The generic name of this species commemorates the Austrian naturalist Friedrich M. J. Welwitsch, who has done extensive botanical explorations in the tropics of Southwest Africa in 1859. Welwitsch discovered this plant and proclaimed it as the most curious and ugliest plant encountered by him in nature.

The plant is native to Namibia and Angola and grows along the coastal strip in the Namib Desert where the annual rainfall does not exceed 2–3 cm. The plant is highly adapted to severe drought and heat-stress conditions. The leaves absorb the sea fog dew.

W. mirabilis is monogeneric with only species having individual male or female plants. The plant has the shape of a turnip or inverted cone above the ground, elliptical, attaining maximum diameter up to 1.0 m in older specimens which taper abruptly below the ground level, with 2.0–3.0 m long tapering tap root (Figure 1). The top of the young axis is bi-lobed, convex and depressed due to cessation of apical growth, but retaining meristematic activity along the periphery which is called the crown. The original single pair of leaves is leathery, strap-shaped, waxy, glaucous and light green. The leaves may reach a length up to 5.0–8.0 m. Leaves keep elongating continuously in opposite directions from the base at the rate of ca 13.8 cm per year, tapering gradually towards the apical ends which become shredded. No other species in the plant kingdom has the first, original pair of leaves with a longevity of over 1500 years, which has been a fascinating aspect. Inflorescence appears from the rim of the crown in dichasial cymes on 20.0–25.0 cm long stalks bearing cone-like structures. The male and female strobili appear on separate plants.

One plant raised in the Cacti and Succulent House of the botanic garden at NBRI, from the seeds procured from the Botanic Garden, Berlin–Dahlem remained in the juvenile stage for ten years under local climatic conditions. Initiation of inflorescence started towards the end of March 2002. Studies confirmed that it was a male plant (Figure 2). The male cones attained maturity in a period of 45 days and then the inflorescence withered by the end of May 2002.

Welwitschia is mostly seen on videofilms, textbooks or in museums from dead, dry or pickled specimens. The two developed, live plants maintained in the botanic garden at NBRI have generated a great deal of interest and enthusiasm among scholars and visitors. This plant is termed a living fossil and categorized under Appendix-II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Trade of this species in any form is strictly banned. Seeds are distributed/exchanged only through a permit system, purely for academic and research purposes. Few botanic gardens in the world have live plants of *Welwitschia*. Among the SAARC countries, the botanic garden at NBRI is the only one to raise it. This can be cited as a significant example towards sharing the genetic resource of extremely endangered plant species for research, conservation and educational purposes as advocated by the Botanic Garden Conservation Strategy, formulated and promoted by the Botanic Gardens Conservation International (BGCI), London, UK. Germplasm of such taxa should be judiciously exchanged among the botanic garden community throughout the world for inculcating the interest of masses towards conservation, education and sustainable utilization of precious plant resources.

Figure 1. *Welwitschia mirabilis* plant raised by seeds procured from NBG, Claremont, South Africa.

Figure 2. Male plant of *W. mirabilis* raised by seeds procured from Botanic Garden, Berlin–Dahlem, Germany.

S. C. SHARMA
ANIL K. GOEL*

National Botanical Research Institute, Lucknow 226 001, India
**For correspondence.*
e-mail: anilkumar_goel@rediffmail.com