

**W**hen the Austrian medical doctor Friedrich Welwitsch travelled through the Angolan part of the Namib Desert in 1859, he was overwhelmed at the sight of this weird and wonderful plant. It was an extraordinary discovery, sparking the interest of scientists around the world and initiating hundreds of research projects to investigate this unique evolutionary miracle. Despite a never-ending stream of scientists visiting the Namib and investigating the wonder plant from every possible angle, 140 years later we still do not have all the answers.

So what is this excitement all about? Let me take you a long way back in time when the dinosaurs roamed the planet (about 225-million years ago) and the first dramatic climate change from humid to more arid conditions had forced plants to adapt to coping with dry air and limited water. Early conifers (pine relatives) had by now replaced the more primitive ferns, and other groups of seed plant developed. These early seed plants (called gymnosperms or "naked seed") were the first to produce reproductive structures (seeds) equipped with a nutrient parcel and protected by a covering membrane from the desiccating influence of dry air. This and better means of preventing water loss enabled the seed plants to venture into dry habitats, which until then had been too hostile to colonise.

It is believed that *Welwitschia* (or an ancestor of the plant) developed in those days, completely unconnected to the conifers, following its own evolutionary path and as a result showing an interesting mixture of characteristics of "naked seed" and flowering plants. For many years *Welwitschia* has been considered the missing link between these two groups, but it is now assumed that it developed in parallel to the flowering plants.

An underground stem, two strap-like, frayed leaves and reproductive structures resembling



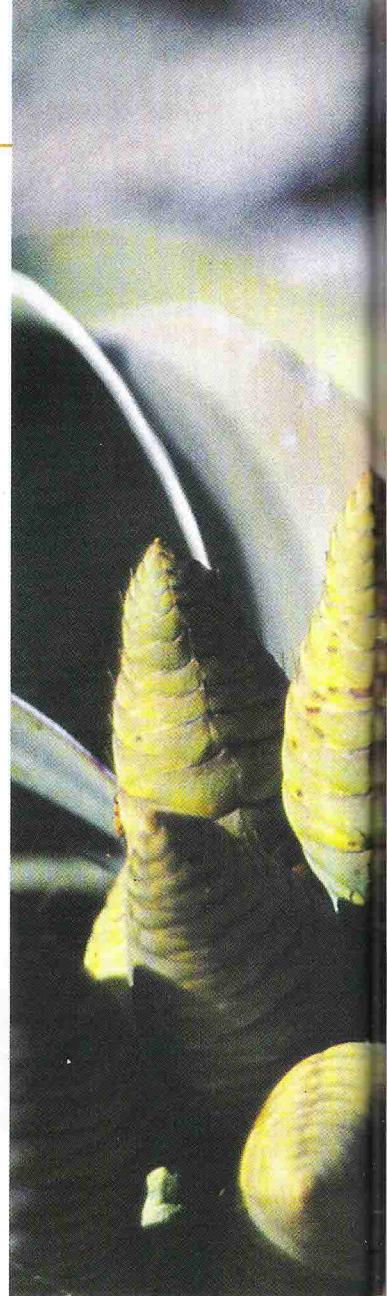
**A large *Welwitschia*, like this female plant, could well be 1000 years old.**

pine cones make the plant look like something from another planet and completely unrelated to any other plant.

This is not quite the case. As with all other "naked seed" plants, male and female cones develop on separate plants and the pine-cone-like structures, at first sight, suggest a relation to conifers or cycads. A closer look at the male cone, however, reveals that these are actually flowers and as such, the first that appeared in evolutionary history. What makes it a flower is the fact that pollen containers (the plant's sperm equivalent) and a female organ (called a stamen) are combined in one structure in the male cone. Although the female organ on the male cone is not functional, it is a first step towards the development of a true flower. To be able to see this, one needs a magnifying glass and the plant obviously has to be "in flower". Although still to be proven by hard evidence, it is believed that *Welwitschia* flowers are pollinated by wind and insects, unlike all other "naked seed" plants, which are wind-pollinated only.

Under the microscope even more exciting discoveries were made. The wood of the *Welwitschia* contains water- and nutrient-conducting elements typical of "naked seed" plants and flowering plants. In terms of its metabolism, *Welwitschia* was for a long time believed to be the oldest, most primitive plant showing a "night shift" (CAM) metabolism, an adaptation found among many desert plants. Without going into the intricate workings of a CAM metabolism, this essentially enables the plant to close its breathing pores during the heat of the day, while still capturing the sunlight, but processing its products and opening the pores at night. Recent research showed, however, that *Welwitschia* does not operate this water-saving metabolism, but rather the conventional metabolism most plants follow. Another superlative is that *Welwitschia* possesses the longest-lived and some of the largest leaves in the world. This is because leaves grow for the full lifetime of the plant, which can be as much as 1000 years. The leaves grow continuously from the base, while the ends die off at the tip. Some leaves have been measured at 6.2 metres in length.

A lot of unanswered questions surround the origin and distribution of the present populations of *Welwitschia*. From south of the Swakop River (just outside the Desert Research Station Gobabeb) to north of the Mossamedes in Angola,





Firebugs are often found on female cones, sucking the nutritious sap produced by the plant.

# The **wondrous** Welwitschia

*The desert octopus*

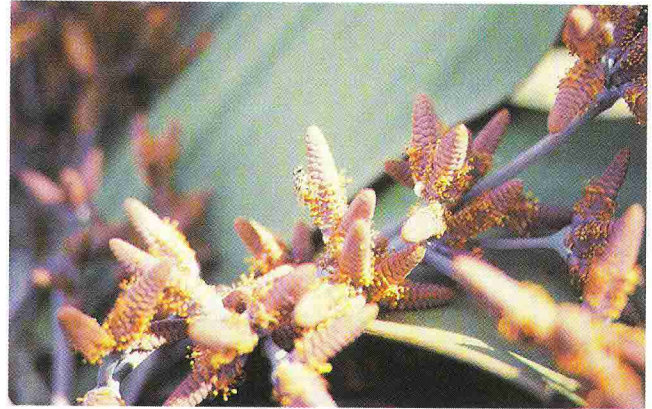
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BY ANTJE BURKE

Welwitschia is essentially confined to the eastern margin of the fog belt of the Namib Desert. It cannot take up fog directly through its pores and thrives mainly in washes which receive run-off from the surrounding plains and hills. Although its strange growth form and persistence in this very harsh environment may suggest that it is well adapted to desert conditions, this is not exactly true. The leathery leaves appear to prevent water loss, but its breathing pores are positioned in a way better suited to wetter climates. Carbon dating revealed that many of the plants, for example – the population at the Welwitschia Vlakte near Swakopmund – must have germinated more than 500 years ago, just about when the first Europeans set foot in this part of the world. Thus very few young plants are scattered between the established matrons. In addition, some of the southern-most populations are battling with a fungus infecting their seeds. This penicillin-related fungus is believed to be transmitted by

### **Air Namibia's Welwitschia**

*Air Namibia recently acquired a Boeing 747-400, the first of this type of aircraft to join Air Namibia's fleet. The new plane combines passenger and cargo-carrying facilities in a unique way for maximal versatility. The airline has named their new aircraft after the remarkable Welwitschia – described by Charles Darwin as " ... the platypus of the Plant Kingdom". The Welwitschia will begin its service for Air Namibia on 1 November, 1999.*



**It is believed that Welwitschia flowers are pollinated by wind and insects, such as this wasp.**

firebugs often associated with the plant. Whether this problem has a natural cause or is human-related is unknown at present.

When visiting some of the extensive populations, such as at Welwitschia Vlakte or in the Messum Mountains, one easily forgets that although there are many plants right there, this is the only place on earth where the "wonder plant" of the Namib grows.

Full of contradictions, protected by law and a national symbol (thus featuring in the logo of many government institutions), the octopus of the Namib, as the early traveller Bernard Carp called it, has been selected as the name for the new Air Namibia Boeing 747-400.

*Flamingo, November 1999*

