

## THE ORCHIDS OF PROTEA HILL FARM

Observations over 30 years

### Part 1 – Introduction

I first started keeping records of the orchids in the 1985-'86 season, the third after we took up residence at Protea Hill in July 1983. The terrestrial, or 'Ground Orchids', bloom and set seed during the months of the rainy season, November to March, the plants drying off soon after the last rain. There are no annual orchids – all terrestrial orchids produce perennating organs – tubers or pseudobulbs – to tide them over the long dry season.

In the literature the habitats of terrestrial orchids are usually described as woodland or grassland. These terms don't match the actual conditions to which the orchids are adapted. From the point of view of the orchid plant *woodland* means partial shade and leaf litter covering the soil surface, while *grassland* means full sunshine, frequent hot burns and bare soil between grass tufts. But as we shall see both definitions are over simplifications.

### Drought history

A severe drought occurred in the period 1980-'83. When recordings of the orchids started in 1986, two good rainy seasons had enabled the grassland vegetation to recover. The worst drought on record occurred during the period 1991-'95, this resulting in poor showings of orchids in the following years until 1999-2000. The 2001-'02 season started well enough but lack of rain in January resulted in most of the orchids collapsing, when the unshaded ground surface, heated by the sun, scorched the stems at their bases.

Much of what I've learned about the biology of terrestrial orchids has come from observations of one species, so let this one now take centre stage.



**Figure 1** – *Habenaria sochensis* in *Hyparrhenia filipendula* grassland. Protea Hill 7 Mar 2013

### ***Habenaria sochensis* Rchb.f.**

This is one of a group of tall orchid species bearing numerous small green flowers. Flowering in late February or early March, *H. sochensis* is the last to flower of the terrestrial orchids at Protea Hill. Records were kept for a number of years of this species at two sites, both of which had been cultivated briefly before 1985. Taller and more robust than any of the other species, it thrives in taller grass, dominated by *Hyparrhenia filipendula* or *Andropogon gayanus*. It is the only orchid species which I can describe as common at Protea Hill. The recent invasion of the more aggressive *Hyparrhenia rufa*, has seen the decline of this orchid, which is now

found mostly in marginal areas where woodland is regenerating.

*H. sochensis* has none of the charisma associated with the family, a sort of ugly duckling. It tends to pop up in unlikely places, such as wasteland in long established urban residential plots. I have found it on mine tailings at Mufulira.

**Figure 2** – The flowers are numerous, small, green and white, and scented at dusk.



### **Sunshine, shade and insects**

*H. sochensis* occurs most commonly in grasses of moderate height and density, which typically overtop the orchids and partially shade them. Having noticed that flowering appears to be suppressed when the grass is too dense, in December 2000 I conducted a simple experiment to see the effect of reducing the shade of the grass. Cutting the grass to a height of 50 cm stimulated the orchids to bolt and flower, while in the uncut grass, flowering was suppressed. In a third treatment the grass was cut at ground level. This treatment saw the rapid growth of weedy annuals, and the orchids were destroyed by insects. When I repeated the treatments in the following season, the results were different. This was a drier year and the grass was less dense. In this season it was the orchids in the uncut grass which flowered, probably because the grass was casting less shade than in the previous season. In subsequent seasons the orchids succumbed to the onslaught of insects. Many seedlings shriveled and died during this dry spell.



**Figure 3** – The thick grass mulch has protected the orchid from insect attack, but the absence of shade has resulted in the scorching of the leaves. 9<sup>th</sup> March 2011, after a dry February.

Its success has come at a price – most plants are attacked by insects, often to the extent that they fail to produce seed. A chance observation provided an insight into how insect damage might be avoided, or at least reduced. Through a thick layer of dried slashed grass a single isolated stem appeared, which was able to mature with only slight insect damage. I have grown nearly perfect specimens in the nursery, in pots. A small pot, the size of a coffee mug contains enough soil (1 liter) to nurture a fully grown plant. Alongside most mature plants are one or two daughters,

grown from small secondary tubers.



**Figure 4** – A mature plant surrounded by seedlings. The shading grass has been cut. 8 March 2001

#### **Orchid (self) propagation**

The Orchidaceae is, with one possible exception, the most diverse family of flowering plants, being rivalled only by the composites (Asteraceae), the Daisy family. Their success is largely due to their method of propagation. The seeds of orchids are like fine dust.

They are produced in great numbers and are carried far and wide in the wind. This explains why orchids often pop up in most unexpected places. Unlike seeds of most plants the orchid seed has no endosperm, the tissue which nourishes the embryo. Orchids rely on particular fungi, which they first parasitize, and then enter into a symbiotic relationship with, the fungi supplying mineral nutrients through the roots, while the orchid provides the fungi with carbohydrate food.