BOOPHONE HAEMANTHOIDES

Pondering the enigma of a gifbol that flowers during the hot, dry summer months on an exposed mountainside.

by ***Barrie Low****, Coastec, Rondebosch*

Walking the Oemsberg trail in a Richtersveld spring some years ago, we encountered a large emergent bulb in full leaf. Definitely an amaryllid was our conclusion but, *sans* flowers, a difficult proposition to identify. So, having photographed this fine specimen and with colour slide in hand, we descended upon Dr Graham Williamson, renowned authority on this special region. His conclusion - definitely a *Boophone*, with the species confirmed by amaryllid expert, Dr. Dee Snijman, as *Boophone haemanthoides* commonly known as the gifbol. And there, apart from the retrieval of that same slide for the odd talk, the *Boophone* was forgotten...until our work in the Matjies River Nature Reserve[1] where we chanced upon a population of some 5 000 individuals.

With the assistance of the then Cape Nature Conservation, we monitored the growth, flowering and fruit set of this species over the course of a year (see diagram). To catch the population in full flowering mode necessitated a quick break amongst the usual hectic end-of-the-year festivities. Leaving Cape Town just before midnight, but needing to return by the next evening, my hiking partner, Ann MacGregor, and I are between functions on consecutive nights .We reach Matjies River Nature Reserve four hours later. By prior arrangement with the manager, Johan Burger, we begin walking with two of the local rangers, Jan September and Colin Feloen, and reach the boophones just as dawn begins breaking, some one and a half hours later. (See cover photograph.) We spend some time marvelling at this wonderful spectacle, despite the fact it is not the most attractive of the amaryllid flowers. Photo session and sampling over, and satisfied with our work, we return to Cape Town the same day, exhausted, yet content at our record.

Facing page **The leaves of *Boophone haemanthoides* starting to turn brown, prior to withering in spring. This arid north-facing slope looking out towards the Tanqua Karoo, is the habitat of a large 5000-strong population of *Boophone haemanthoides* in the Matjies River Nature Reserve.** Above **The buds of the gifbol, *Boophone haemanthoides*, in the Matjies River Nature Reserve.**
Below ***Boophone haemanthoides* in full flower in the Matjies River Nature Reserve.** Photos: Barrie Low.

So, as a boophone at Matjies, why flower in summer, particularly on a north-facing slope in Upland Succulent Karoo, with a winter rainfall of less than 200 mm? Logically this makes little sense, particularly if a shallow-rooted plant sits at the arid margin of the region where annual rainfall is as minimal as it is erratic. And yet some species thrive with this strategy, indicating that logic might have no place in our assessment of the situation.

Assuming this species evolved in a summer or possibly an aseasonal rainfall regime, Dee Snijman of the Compton Herbarium, Kirstenbosch, has recently thrown some light on why these flowering patterns might have been retained[2]. Of the five types of growth patterns found in the Amaryllidaceae, the one that interests us is those species with winter growth and summer flowering. This trait is restricted to just three species: *Amaryllis belladonna* (belladonna or March lily), *Boophone disticha* (kopseerblom) and *Boophone haemanthoides*. Dee Snijman proposes that this group is able to produce seed during the summer months, which will survive the subsequent dry period because of the corky nature of the seed coat. With the advent of summer droughts during the Pliocene period (about 2 to 5 million years before present) genera such as *Crinum* and *Boophone*, retained their summer-flowering habit, whilst many of the family Amaryllidaceae pursued a growth pattern which relied on autumn flowering and winter growth. Correspondingly, most of the Cape Floral Kingdom geophytes - notably the irids – produce leaves in winter, and flowers and fruit in spring, thus avoiding the dry season.

Dee Snijman asserts that moisture in summer-flowering species in winter rainfall regions is supplemented by summer precipitation (fog or underground water). A number of semi-desert bulbs also have flat leaves that attract dew[3] but *Boophone* has erect leaves. However, in the more extreme climates such as at Matjies, summer moisture supplementation is rare, apart from the odd summer thunderstorm. So why occupy the driest, most exposed slopes, when one can change seasonality over time and grow and reproduce during the more favourable times of the year? Why not relocate to a more equitable environment, such as the populations on the West Coast?

Other factors probably play a role in their distribution. Firstly we are possibly looking at relictual populations that might have shrunk in size and are now just holding their own in these areas. Numerous populations along the arid eastern margin of the fynbos have barely ten individuals, so are these reflective of a gradual decline in number, exacerbated by the recent four or five dry winters? Or is lack of predation a factor? Moles and molerats, the diet of which comprises a high proportion of bulbs, are in short supply in these regions, probably because of drought and extreme rockiness. There is also a possible selective advantage of low competition, with no marked presence of large, or for that matter, any geophytes. The bulb, too, is protected by leaf bases in a vaguely corky outer layer, probably offering some protection from drought.

Perhaps a likely strategy is plants being able to reproduce vegetatively (hence many even-aged sub-populations), which, whilst not contributing to genetic variability (and therefore enhancing survivability over evolutionary time), nevertheless ensures the plant will survive periods of extreme aridity, and produce seedlings during wetter summers where thunderstorms might play a greater role in moisture amelioration (perhaps encapsulating Dee Snijman's theory?).

As with most scientific studies, we turn up more questions than answers and there is rarely a simple explanation for conundrums such as these. What we do know is that *Boophone* thrives in a variety of habitats. What we do not know is how secure these populations are and whether they will survive in the longer (evolutionary) term.

1. Low, B. 2000. The magic of the Matjies. *Veld & Flora*, **86** (4), 182-184.
2. Snijman, D. A. 1999. Growth periodicity, flowering and phylogeny of the African Amaryllideae (Amaryllidaceae). *In*: Timberlake, J. and Kativu, S. *eds. African plants: biodiversity, taxonomy and uses.* Royal Botanic Gardens, Kew. pp 389 – 404.
3. Esler, K. J. 1998. Unusual geophytes of the Succulent Karoo: How form can relate to function. *Veld & Flora*, **84** (1), 6-7.

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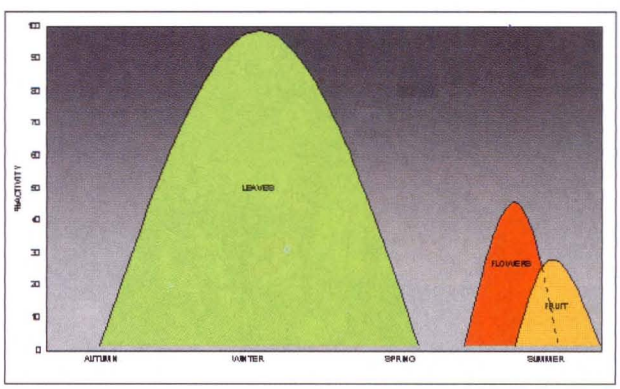

Representation of a year in the life of *Boophone haemanthoides*: its leaf growth (green), flowering (red) and fruit set (yellow).