Miscellaneous note

VARIOUS AUTHORS

NOTES ON THE DISTRIBUTION AND HABITAT OF ALOE BOWIEA (LILIACEAE/ASPHODELACEAE: ALOOIDEAE), AN ENDANGERED AND LITTLE KNOWN SPECIES FROM THE EASTERN CAPE

A. bowiea is an extremely rare species only known from a limited area in the eastern Cape. Under conditions of normal rainfall it is a dwarf rosulate leaf succulent (sensu Newton 1974), reaching a height of 300 mm at the flowering stage.

Morphologically and taxonomically *A. bowiea* is insufficiently known. A study on these aspects is in progress and will be reported elsewhere.

HABITAT

Geographical situation

Aloe bowiea is known only from the three study sites discussed below (Figure 1). Locality 1 is located south of Uitenhage, between Uitenhage and Despatch, on the farm 'Jachtvlakte'. Locality 2 is situated at Coega, approximately 25 km east of Uitenhage, on 'Maasward', a private nature reserve bordering the Uitenhage–Sundays River mouth road. Locality 3 is on the farm 'Brakkefontein', 20 km from the Kirkwood turn-off on the Uitenhage–Jansenville road. These localities will subsequently be referred to as Uitenhage, Coega and Kariega, respectively. Although the population of *A. bowiea* at Uitenhage, still thriving in 1983, is now considered extinct, this locality will be included in this paper. Hitherto this species was only known from the latter locality.

Climate

The climate at the three study sites is warm temperate and conforms to the semi-arid valley climate recognized by Cowling (1983a) for the river valleys of the south-eastern Cape.

At Uitenhage the average annual rainfall is 435 mm with monthly maxima in April, August and November and minima in the summer and winter months. Temperatures are moderate with all months being between 13° and 23°C. Coega and Kariega (Figure 2: Hermitage and Hillside Farm respectively) experience a warmer and more arid









FIGURE 2.—Walter-Lieth climate diagrams of selected stations. Data from Weather Bureau (1984).

climate. Rainfall is generally erratic with an average annual figure of 373 mm at Hermitage and 339 mm at Hillside Farm. Both sites have a bimodal distribution of rain, with peaks in autumn and late spring. At these sites the mean monthly temperatures show a slightly greater range $(13-24^{\circ}C)$ with maximum temperatures exceeding 40°C and minima dropping below 0°C.

Vegetation

Field observations at all the localities have shown that Aloe bowiea is restricted to the Sundays River Scrub variation of Valley Bushveld [Veld Type 23 sensu Acocks 1988)] of the Uitenhage, Coega and Kariega regions in the south-eastern Cape. Acocks (1988) did not specifically mention the vegetation surrounding Uitenhage, Coega and Kariega, but at all localities it would, on the ground of shared Euphorbia species, fit into his Sundays River Scrub variation. On the map which accompanied Acocks (1988) the vegetation of this area is given as Valley Bushveld. Other authors have referred as follows to the vegetation with which A. bowiea is associated: Thicket (Jessop & Jacot Guillarmod 1969), Addo Bush (Penzhorn & Olivier 1974), Valley Bushveld (sensu Olivier 1977, 1981; Moll et al. 1984), Subtropical Transitional Thicket (Cowling 1984; Everard 1987), Subtropical Transitional Thicket, including Valley Bushveld (sensu Lubke et al. 1986) and Subtropical Thicket (Van Wyk et al. 1988a, 1988b). This vegetation type is confined mainly to the valleys of rivers which flow east and drain into the Indian Ocean, and currently covers approximately 15% of the eastern Cape (Everard 1987). These valleys are relatively hot and dry in comparison to the intervening ridges.

The Valley Bushveld vegetation at both the Uitenhage and Coega localities included in the present study forms a dense and, where undisturbed, almost impenetrable thicket. It agrees with the differentiating characters given by Everard (1987) for Mesic Succulent Thicket in having a mean total cover of about 90%, an average canopy height

of about 2,5 m and a large proportion of succulents (more than 20%). At the Kariega locality the vegetation is less dense (average total cover of approximately 60%) with a slightly lower shrub canopy (2,0-2,5 m) and succulents comprise about 30% of the species. This locality falls within the Xeric Succulent Thicket suborder. Succulents associated with A. bowiea include, at Uitenhage: Aloe africana Mill., A. striata Haw., Bulbine caulescens L., B. latifolia Roem. & Schult., Euphorbia stellata Willd., meloformis Ait., E. globosa (Haw.) Sims and *E*. Pachypodium succulentum (L. f.) A. DC.; at Coega: Aloe ferox Mill., Gasteria maculata (Thunb.) Haw., Haworthia xiphiophylla Bak., Euphorbia meloformis, E. clava Jacq., E. ledienii Berger and Pachypodium succulentum and at Kariega: Bulbine latifolia, Haworthia sordida Haw. (M.B. Bayer pers. comm.), and Haworthia sp. cf. cooperi Bak. At all three localities species of Cotyledon L., Crassula L. and the Mesembryanthemaceae occur in large numbers.

Although the vegetation at the three localities where *Aloe bowiea* is known to occur can be broadly classified as thicket, plants of this species have never been encountered in the shade of surrounding vegetation. It seems to be restricted to ecological niches where the valley bush opens up naturally to form a less dense karroid/grass community. These breaks in the canopy layer do not appear to be man-induced (at least in recent times) since they also occur in nature reserves which lie within valley bush, such as Springs Reserve at Uitenhage and Maasward Private Nature Reserve at Coega. As a result of litter decomposition the soils on which thicket occurs usually contain high levels of organic matter. *Aloe bowiea* was not recorded from these humic soils.

ENDEMISM

Everard (1985) lists only three species of *Aloe* as being endemic to the eastern Cape, namely, *A. africana, A. tidmarshii* and *A. bowiea*. On the other hand Cowling (1982, 1983b) states that five of the 25 species of *Aloe* indigenous to the eastern Cape are endemic to this region. For *A. bowiea* Cowling (1982, 1983b) prefers to uphold the name *Chamaealoe africana*. The discrepancies in the literature with regard to the number of *Aloe* taxa indigenous or endemic to the eastern Cape (Cowling 1982, 1983b; Everard 1985; Gibbs Russell & Robinson 1981; Holland 1978) can be explained by the different delimitation of the eastern Cape by the different authors.

CONSERVATION

According to Everard (1985) the eastern Cape currently has 662 threatened taxa. Of these, 485 are listed in the category **uncertain whether safe or not**. This conservation status category is defined as one for plants that are so little known that there is an even chance that they could prove to be safe. Everard (1985) listed *Aloe bowiea* in this category. Field observations during recent years have, however, revealed only three localities for this species. Moreover, the population of *A. bowiea* at Uitenhage is now extinct and at both Coega and Kariega the populations are vulnerable and declining. With the exception of the Coega locality, where *A. bowiea* occurs in a privately owned nature reserve, none of the known populations are conserved. This species takes readily to cultivation, but it is horticulturally unattractive and poorly represented in succulent plant collections. The distribution of known populations of A. *bowiea* is shrinking fast. For example, whereas in 1983 the population at Uitenhage comprised 141 individuals, no plants could be found at this locality in 1988.

CONCLUSION

Recent field observations have shown that *Aloe bowiea* has a very limited geographical distribution and that it is now extinct at Uitenhage, the only previously known locality. At the other two localities, Coega and Kariega, the populations of *A. bowiea* are endangered and should be added as such to the list published by Everard (1988).

It is recommended that populations be securely fenced to prevent game animals and domestic stock from grazing individuals of this species. This would allow plants to flower and set seed and could ultimately lead to the expansion of existing populations and the establishment of new ones. Unless immediate action in the form of land acquisition and the education of land owners are taken, this unique and localized species of the karroid vegetation of Valley Bushveld may soon be extinct in nature.

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