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Aloe arborescens Mill. (Asphodelaceae) is spreading in Portugal

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Summary: Two species of *Aloe* L., *Aloe vera* (L.) Burm.f. and *A. arborescens* Mill. have been recorded as naturalised in Portugal: *A. vera* as an occasional escape along the Algarve in the south, and *A. arborescens* from central coastal regions around Lisbon. Here we record the spread of *A. arborescens* further north along the Portuguese coast, especially around the coastal town of Nazaré. This species has become firmly established as part of the introduced flora of the country. Its potentially serious impact as an invasive species is emphasised.

Zusammenfassung: Die beiden Arten *Aloe vera* (L.) Burm.f. und *A. arborescens* Mill. sind in Portugal als naturalisiert nachgewiesen worden: *A. vera* ist ein gelegentlicher Gartenflüchtling entlang der Algarve im Süden, und *A. arborescens* in den mittleren Küstenregionen um Lissabon. Hier halten wir die Ausbreitung von *A. arborescens* weiter nach Norden entlang der portugiesischen Küste fest, insbesondere um die Küstenstadt Nazaré. Die Art hat sich fest als Teil der eingeführten Flora des Landes etabliert. Ihr möglicherweise ernsthafter Einfluss als invasive Art wird betont.

Introduction

In many parts of the world introduced organisms are relentlessly continuing their often destructive march across both natural and artificial environments (Argüelles & Zilletti, 2000; McNeely *et al*., 2001). Some of these become noxious weeds, while others attain and maintain a more moderate residential status (see for example Smith & Figueiredo (2007) on the Mexican *Agave americana* L. and *A. salmiana* Otto ex Salm-Dyck that have become established along the southeastern coastal areas of Portugal). However, in time even some innocent appearing entities may prove able to rapidly and irreversibly transform once pristine habitats.

Two species of *Aloe* L., *Aloe vera* (L.) Burm.f. and *A. arborescens* Mill. have been recorded as naturalised in Portugal: *A. vera* as an occasional escape along the Algarve in the south, and *A. arborescens* from central coastal regions around Lisbon (Franco & Afonso, 1994). This paper provides information on the northward spread of *A. arborescens* Mill. in Portugal, as part of efforts to create awareness of the existence and dangers of introduced organisms in the environment.

Observations

A. arborescens is a shrubby, to tree-like leaf succulent from southern Africa, where it grows from the Cape Peninsula, along a more or less coastal band stretching somewhat inland along the eastern seaboard to as far north as Malawi (Smith *et al*., 2008). Significantly, the species appears to have even colonised South Africa's Mediterranean region around Cape Town, where it probably escaped from cultivation (Moll & Scott, 1981; Kesting, 2003). The coastal regions of western Portugal have a similar Mediterranean climate.

A. arborescens is moving northwards along the coast of Portugal as a result of human activities aimed at beautifying the landscape. The town of Nazaré on the central Portuguese coast is a popular holiday resort for, among other reasons, the spectacular beaches and coastal cliffs. As part of beautifying and stabilising the steep coastal cliffs, a number of soil binding species were established near the town. One of these species, *A. arborescens* was planted in thick drifts on steppe-like embankments to prevent soil erosion and no doubt because their fiery

Figure 1. *A. arborescens* (red leaved plants) was planted in dense rows along the rail track leading up the steep cliffs above the beaches of Nazaré, a coastal town in Portugal. Photo: Gideon F. Smith. **Figure 2**. *A. arborescens* has escaped from the sites where it was established to serve as a soil binder and to beautify the landscape, and can now be found dotted around the cliffs of Nazaré. Photo: Estrela Figueiredo.

inverted cone-shaped inflorescences provide sheets of crimson in winter. The slope was first stabilised with concrete slabs that were eventually interplanted with *A. arborescens*, which easily took root and thrived in the resulting microhabitats that resemble cliffs rich in limestone deposits. Unfortunately the species is no longer restricted to the neat rows in which it was planted but has spread along the cliffs (Figures 1 & 2).

Some 70 years ago *A. arborescens* was not recorded in the Flora of Portugal (Coutinho, 1939). More recently (Franco & Afonso, 1994), it was recorded only as having become established in the central coastal areas of Portugal, around Lisbon, in an area referred to as CW olissip., which extends to *c.* 45 km north of Lisbon. The town of Nazaré is about 60 km further north of the CW olissip. limit. The species has also been observed as occurring as an invasive further north in Portugal, near the coastal city of Oporto (M.J. Pinto, pers. comm.), where it has escaped from cultivation. These records therefore significantly extend the confirmed naturalised distribution range of the species in a northerly direction along the mild, Mediterranean coast of the country.

Plants of *Aloe* species appear to have become popular in amenity and domestic horticulture in Portugal, and no longer is the cultivation of these species an indication of the affluence of the landowner. The invasiveness of *A. arborescens* is not mentioned by Cullen (1986) or Webb (1980) but the species is recorded in the Portuguese official list of invasive species (Ministério do Ambiente, 1999: 9106).

Conclusion

It is becoming critically important that an early warning system that will lead to the rapid detection of invasive organisms is established across the globe (Smith *et al.*, 2003). Biologists, taxonomists and field naturalists have a duty to society to report on or, better still, predict an emerging invasion. Despite the existence of official lists of invasive plants, these often have omissions and are apparently ignored by local landscape designers and horticulturalists. Given the wanton human-aided spread of *A. arborescens* in Portugal recorded here, it is clear that this species should be carefully monitored, and its cultivation in areas where it is spreading through self-seeding or human intervention should be curtailed.

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