An obvious, although superficial similarity exists between two fairly remotely related members of the family Cyperaceae, namely *Ficinia arenicola* Arnold & Gordon-Gray var. *erecta* Arnold & Gordon-Gray and *Mariscus durus* (Kunth) C. B. Cl. Morphological, anatomical and ecological comparison has revealed additional shared characters which may be interpreted as an example of convergence in these two taxa.

The geographical distributions of these taxa (Fig. 12. 1a & 2a) are almost identical: extending along the southern Cape coast from Mossel Bay to just east of Port Elizabeth (22°E–27°E) i.e. in an intermediate zone between the summer and winter rainfall regions. Both taxa are normally restricted to a 5–10 km wide belt of grassland, close to the sea, but extend slightly further inland (up to 30 km) between 26°E and 27°E.

In *M. durus* the inflorescence takes the form of a simple, more or less contracted umbel (Fig. 12. 1b) and in *F. arenicola* var. *erecta* (Fig. 12. 2b) it is a compact head-like spike. In both taxa the inflorescence is terminally situated at the apex of the inflorescence stem, but appears to be lateral or sublateral due to the presence of the lowermost inflorescence bract which closely resembles and outwardly appears to be a continuation of the culm (particularly in *M. durus).* This condition is rare in both genera.

The resemblance in habit (Fig. 12. 1b & 2b) between these taxa is enhanced by the similarity in plant size. The culms of *M. durus* average 260 mm in height, whereas in *F. arenicola* var. *erecta* the average height is 240 mm.

In both taxa the stem bases are woody and are covered by old persistent leaf bases. In *M. durus* they are horizontally or obliquely displaced and are notably thickened, whereas in *F. arenicola* var. *erecta* they are erect and slender. Both taxa have slender horizontal, wiry subterranean stolons, 2 or 3 mm in diameter. These extends to a length of 2–12 cm and are clothed in light brown lanceolate, papery scales. Each stolon originates laterally from the base of the stem and forms a single new plant at its extremity.

The leaves of both taxa generally exceed the culms in height. They are olive-green in colour, glabrous, erect and rigid, lack a midrib, are subcylindrical to reniform in cross section (sometimes with the apex dorsiventrally flattened) and superficially closely resemble the culms. In *Ficinia* this leaf type is not uncommon, also being found in *F. ixioides* Nees subsp. *glabra* Arnold & Gordon-Gray, *F. pinquior* C. B. Cl. and *F. deusta* (Berg.) Levyns. Among the South African species of *Mariscus,* however, *M. durus* is the only species without expanded leaf blades. This leaf shape, resulting from the permanent infolding of the leaf margins, is usually regarded as a direct adaptation to water stress, with the degree of infolding of the leaf margins having been correlated with dry environmental conditions as it effectively reduces the leaf area from which transpiration can take place (Metcalfe, 1970).

The taxa grow in almost identical habitats and have on occasion been seen to grow side by side. They are confined almost exclusively to the margins of seasonally inundated depressions. The soil of these depressions is usually a heavy, dark clay which binds residual water and reduces its availability during dry periods (Russell, 1950; Hillel, 1971). Protective adaptation against desiccation may also be necessary as these plants often grow close to the sea where the soil and air have a high saline content. According to Dyer

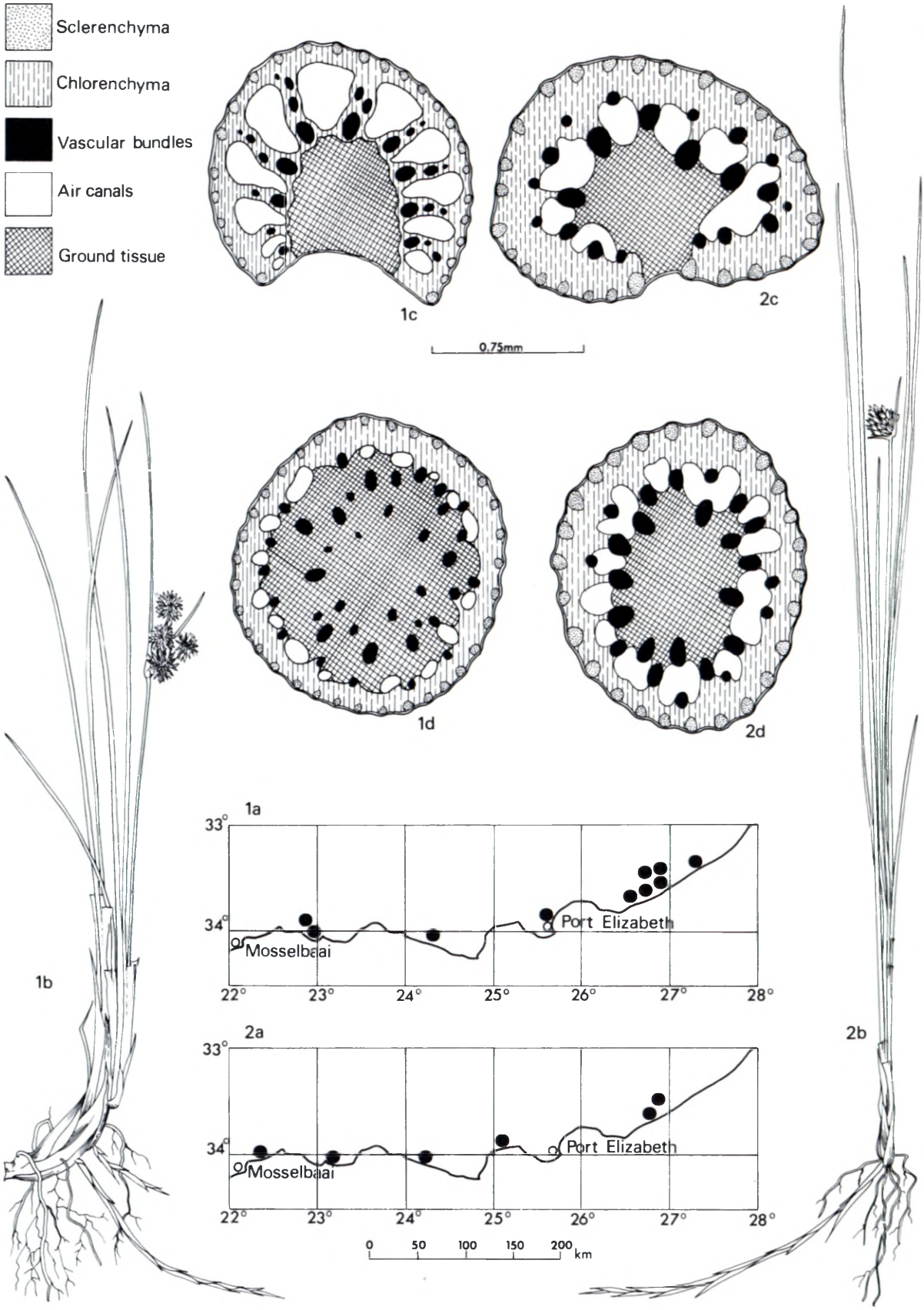

FIG. 12.—Comparison of distribution, morphology and leaf and culm anatomy. 1a–d, *Mariscus durus;* 2a–d, *Ficinia arenicola* var. *erecta*. 1a & 2a, sympatric distribution. 1b & 2b, habit (1b, *Vorster* 2332, × 0,25; 2b, *Arnold* 603, × 0,5) illustrating erect growth form with leaves over-topping the inflorescence and well-developed subterranean stolons. 1c & 2c, transverse sections of leaf blade (1c, *Vorster* 2358; 2c *Arnold* 603) showing large air canals, reduced abaxial surface and similar terete outline. 1d & 2d, transverse sections of culm (1d, *Vorster* 2342; 2d, Arnold 603) showing circular distribution of air canals.

(1937) salt vleis and saline marshes near the coast, without direct communication with the sea, are characterized by a rich cyperaceous flora, including *M. durus*.

A study of the cross-sectional leaf anatomy of these taxa (Fig. 12. 1c & 2c) shows that both have well-developed chlorenchymatous tissue limited to a band directly adjacent to the abaxial epidermis. The vascular bundles in both taxa are typically collateral, extending in an arc through the centre of the leaf between the chlorenchyma and ground tissue (hypodermis), and decreasing in size towards the infolded, somewhat obscure, leaf margins.

An arc of large, well-developed lacunae or air canals is a typical feature of the anatomy of both taxa. In *M. durus* these are surrounded by chlorenchyma and are located between radial rows of 1–4 vascular bundles which increase progressively in size towards the ground tissue. In *F. arenicola* var. *erecta* the air canals are irregularly dispersed between the vascular bundles without a regular pattern of arrangement.

In cross-section the culms of *M. durus* (Fig. 12. 1d) are circular, and in *F. arenicola* var. *erecta* (Fig. 12.2d) they are slightly elliptical in shape. In both taxa a band of chlorenchyma occurs immediately adjacent to the epidermis. In *M. durus* the air canals are smaller and more regular in shape and are located in a circle along the margin between the chlorenchyma and ground tissue alternating with the outer vascular bundles. In *F. arenicola* var. *erecta* the irregularly shaped air canals are located between the smaller outer vascular bundles and the larger inner bundles and ground tissue perimeter.

The presence of large well-developed air canals in the leaves and culms of these taxa is seen as a significant and necessary adaptation to water-logging of the soil and periodic partial submergence of the plants during the wet season. The air canals are essential for aeration of the subterranean parts of the plant during flooding (Sifton, 1957; Esau, 1965; Fahn, 1969). In contrast, in *F. arenicola* var. *arenicola* which grows in well-drained, well-aerated sandy soil (often in close proximity to var. *erecta),* the air canals if present at all, are poorly developed and very small, being less than ¼ the size of the largest vascular bundles. A detailed account of the anatomical differences exhibited by the two varieties of *F. arenicola* will be presented in a later paper. *M. durus* lacks air canals in the leafy extensions to the culms, representing the lowermost inflorescence bract, notwithstanding the presence of well-developed canals in the culms. No information on this aspect is available for *F. arenicola* var. *erecta.*

The morphological and anatomical similarities exhibited by these two taxa could be interpreted as a possible example of convergent evolution resulting from their apparent adaptation of the same ecological niche, where they cope with extremes in water availability at various times of the year. On the one hand the need exists for water conservation during dry periods, while conversely, good aeration becomes critical during excessively wet periods.

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T. H. ARNOLD & P. J. VORSTER