

HEPATICAE AND ZANNICHELLIACEAE

NEW RECORDS FROM AN EPHEMERAL PAN, BLOUVLEI, IN WESTERN CAPE, SOUTH AFRICA

Seasonal vleis and ephemeral pans were once common in the vicinity of Cape Town, but have now all but disappeared as a consequence of urban development, freshening of previously saline systems or eutrophication. Blouvillei, probably the last ephemeral pan within the Cape Metropolitan Area, was incorporated into a business park, Century City, during 1997 (Lochner & Rossouw 1997). As part of the Environmental Management Plan for this development, an eight-hectare portion of the original vlei environment was rehabilitated (alien removal) and conserved. Blouvillei has been classified by the Botanical Society as one of 37 Core Conservation Areas on the Cape Flats (Maze & Rebelo 1999).

Associated water quality

Surface water quality in the ephemeral pans on this site is typically heavily humic-stained and saline, reaching salinities in excess of 40 parts per thousand during the last weeks in which the pans contain water.

Composition of the major ions is typically $\text{Na} > \text{Mg} > \text{Ca} > \text{K}$, and $\text{Cl} > \text{SO}_4$. At the time of the collections reported on here, i.e. August 1998, concentrations of the major ions were (in mg per liter; corresponding values for July 1999 in parentheses): $\text{K} = 94$ (55); $\text{Na} = 3813$ (2908); $\text{Ca} = 232$ (174); $\text{Mg} = 509$ (400); Sulphate = 1217 (1142) and chloride = 7010 (4863). The pH of the water was 9.6 (8.5), and the alkalinity (as CaCO_3) was 246 mg per liter.

HEPATICAE

Riella purpureospora

Riella purpureospora Wigglesworth (Sphaerocarpaceae) is an annual, salt-tolerant aquatic liverwort, first described from the Cape Peninsula (Wigglesworth 1937; Proskauer 1955). It was last collected in 1954 by Mr S. Garside who worked on bryophytes at the Bolus Herbarium, Cape Town. No collections were recorded during the subsequent 44 years until the senior author found

it growing in a restored ephemeral pan system at Blouville, Goodwood, Cape Town. *R. purpureospora* was discovered for the first time during 1998, in a shallow, exposed area of the pans containing no other hydrophytes. Although the formation of involucre was not noted during 1998, prolific production of these structures occurred for an extended period during 1999.

A short description of the species follows, but a detailed account may be found in Perold (2000). A *Riella* species was also recorded in Rocher Pan, West Coast, during 1981/2 (Coetzer 1987); it had been identified as *R. capensis*, but this has not been confirmed.

Riella species are unique in being the only truly aquatic liverworts. They are characterized by entirely submerged, erect, up to 60 mm long stems, invested along one side with a thin, 3–4 mm wide, undulating wing, which overarches the apex of the stem, giving it a somewhat circinate appearance. The spore-containing capsules are enveloped by large, bottle-shaped involucre, borne along the stem, often on the same side as the wing, the youngest being near the apex. The antheridia are mostly borne on separate plants in a row of pockets along the thickened free margin of the wing. The spores are released upon decay of the involucre and capsule wall; they are large and the ornamentation, as well as sometimes the colour, are regarded as species-specific and essential for correct identification. *R. purpureospora* has purple spores, hence its specific epithet; it is thus easily recognized, since the other four southern African *Riella* species have brown spores.

ZANNICHELLIACEAE

Pseudalthenia aschersoniana

Pseudalthenia aschersoniana (Graebn.) Hartog (Zannichelliaceae) is a member of the eurysaline group of the Zannichelliaceae. This 'vlei grass' is an endemic component of the ephemeral estuarine environments of the Cape Peninsula (Den Hartog 1980, 1981). Earliest herbarium records report *P. aschersoniana* from the southwestern Cape Peninsula (Kommetjie) in 1897, from Rietvlei (Milnerston) in 1930, and again from both Rietvlei and Kommetjie during the early to mid-1960s.

Routine monitoring of the ephemeral pans, usually wet between April and September, during the late winter and spring of 1997 and 1998, revealed *Bolboschoenus maritimus* and *P. aschersoniana* as the dominant aquatic plant species, with *B. maritimus* dominant in the deeper (0.3–0.5 m) water, and *P. aschersoniana* in the shallow (< 0.2 m) areas.

The dominant plants in both areas during the dry season is a species of *Sarcocornia*. Collections of *Pseudalthenia aschersoniana* were made on 31 August 1998, and submitted to the National Botanical Institute for identification.

Subsequent to the pans drying out during September 1998, healthy specimens of *P. aschersoniana* were discovered during early 1999, growing in \pm 0.3 m of water

on the top of gabion baskets forming the sides of an artificial canal system on the property, and constituting a boundary of the ephemeral pan area.

These plants are regarded as pond weeds (Reinecke 1964) and are annuals with slender, sympodially branched rhizomes. The nodes give rise to upright stems, up to 400 mm long, the length apparently governed by the depth attained by the seasonal body of water in which they are growing. The leaves are alternate and linear, 20–75 \times 1–2 mm, gradually narrowing to the rounded apex, and expanded below to form a 5 mm long sheath which is auriculate above. The floral parts are extremely reduced, male and female flowers are borne together in the axils. The male flower is a single stamen, at first enveloped in a thin membranous spathe, the filament lengthens rapidly at anthesis, up to 25 mm long and the 4 locules form a rectangular, 8-sporangiate anther that dehisces longitudinally. The female flowers are 1-carpellate and surrounded by a vaginate spathe and an inner, flask-shaped 'perianth', the style lengthens rapidly during anthesis, the ephemeral stigma is large and obliquely funnel-shaped. The fruits are asymmetrically graniform to somewhat bean-shaped drupelets, \pm 4 mm long and stalked at maturity. The stalks of fruits borne higher up on the erect shoots are only 1 or 2 mm long, whereas they are 20–60 mm long on those formed lower down, as well as on the rhizomes and are positively geotropic (Obermeyer 1966), burying the fruits in the mud, thus affording them greater protection during the dry season. Germination starts soon after the first rains begin to fill the ponds.

DISCUSSION

The rare and sporadic occurrence of species of *Riella* and *Pseudalthenia* may be attributed to loss or alteration of habitat, particularly those changes brought about by urbanization. During August/September 1999 *R. purpureospora* was absent in other Western Cape vlei localities where it was previously collected, or likely to have been present, namely Zandvlei (Westlake), Wildevlei, Papkuilsvlei, Bloubergsvlei and Valkenberg Vlei. It should be noted that the level of disturbance of these vleis is considerably higher than in Blouville, and that in many cases the 'original' vlei environment is no longer discernible. The reappearance of *R. purpureospora* and *P. aschersoniana* at Blouville provides a valuable indication of the resilience of ephemeral pan floral communities to rehabilitation, and of the unique value of this conservation area within a high-density commercial development.

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