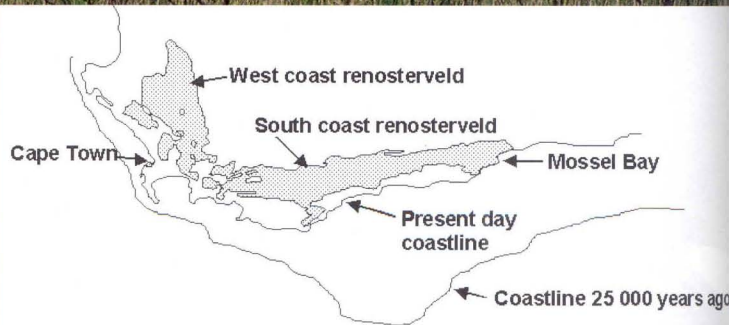


A year after a fire in renosterveld near Tulbagh. In the foreground are some burned renosterbos bushes (*Dicerthamnus* rhinocerotis*) with some branches that escaped the fire showing live growth. The bright pink *Watsonia marginata* and green *Ixia viridiflora* (plants that only occur in renosterveld) flower particularly well after a fire.
Photo: Graham Duncan.



The Matrix

The evolutionary development of coastal renosterveld



“...a 1-2 m high matrix of cupressoid and leptophyllous...shrubs”

McDowell, defining renosterveld

by Ian P Newton and Richard Knight,
Department of Biodiversity and Conservation Biology, University of the Western Cape

There have been a number of articles about coastal renosterveld appearing in *Veld & Flora* lately: rare geophytes, farmers' attitudes, seed dispersal, but all have avoided the question 'What is renosterveld?' Why should this be? A look at the literature describing the vegetation occurring within the regions that are currently classified as coastal renosterveld shows that there has been a big change in the landscape over the past 400 years.

We attempt to define renosterveld in two ways. Firstly, from an historical viewpoint: what the vegetation of the areas presently defined as west coast and south-west/south coast renosterveld would have been like before the Khoekhoen herders or the European farmers arrived. Secondly, we look at the problem from an etymological (the origin and meaning of the name) point of view. The map indicates the extent of coastal renosterveld – both west coast and south coast renosterveld. Coastal renosterveld occurs on relatively nutrient-rich soils compared with the soils upon which fynbos grows, which are generally derived from shales and granites.

The last Glacial

Grab your winter woolies and your raincoat, and lets return to a time when the coastal lowlands of the Western

Cape were being grazed by blue antelope, bontebok, giant buffalo, white rhinoceros, giant hartebeest and the Cape 'horse'. Twenty thousand years ago the world was in the grip of the Last Glacial Maximum (LGM). Sea levels were 140 m lower than at present, while average temperatures were five degrees lower. Grasslands were common on the south and west coast lowlands, and forest species grew north of Elands Bay.

But slowly, world temperatures began to rise. Over the next 10 000 years the polar ice caps began melting faster than they were accumulating fresh snow. Sea levels rose and the climatic belts moved towards their present-day positions. The frontal storms that allowed forest to grow at Elands Bay became weaker, and the coastal grassland and mesic shrub species started retreating southwards in the face of reduced precipitation.

The current interglacial

By 10 000 years before the present (ybp) the current interglacial had begun. The west-coast lowlands were still covered with grass, but they were isolated from the grasslands of the central interior of South Africa by mountains to the east, and by dry shrubland to the north. The south coast lowlands

became similarly isolated from the other grasslands of southern Africa by mountains to the north and by the Knysna forests to the east. The climate continued becoming drier, the grasslands continued to contract and the killer ape made another technological breakthrough. There is evidence that around 10 000 years ago there was a big advance in the development of hunting implements. The first major extinctions, believed to be partly ascribable to human activities, occurred: giant buffalo, giant hartebeest, southern springbok, Cape horse. The blue antelope, bontebok and other grazers became locally extinct on the west coast lowlands, but on the south coast lowlands they survived.

The middle of the current interglacial (5 000 ybp) saw the warmest driest period of the last 125 000 years. In west coast renosterveld, grasses were under pressure from invading asteraceous shrubs. The summer drought conditions resulted in very poor summer grazing, which aided the extinction of large grazing species. It is notable that the common large herbivores recorded in the western Cape by the early European settlers (eland, red hartebeest, elephant, black rhinoceros) were capable of surviving with a substantial shrub component in their diet.

Along the south coast, the return of the warm Agulhas current (believed to have been weak or absent during much of the previous glacial) had resulted in year-round precipitation being received in this area. The higher temperatures and summer rainfall allowed C4 (tropical) grasses to spread across the south coast plains, and a fierce battle between grassland and shrubland ensued. The grassland won: indicated by the survival of a greater range of grazing species such as bontebok, blue antelope, reedbuck and buffalo. An increase in rainfall from about 4 000 ybp, gave the grasses a further advantage, but the final victory of grassland over shrubland came with the introduction of herding by the Khoekhoen about 2 000 years ago. Regular burns led to the destruction of the asteraceous shrublands within south coast renosterveld.

On the west coast, where the summer drought conditions meant that the tropical grasses were unable to proliferate, the temperate C3 grasses were able to rally with the help of those regular burns; and the shrublands began retreating.

And then a certain Mijnheer van Riebeeck decided that Cape Town would be a nice place to build a holiday cottage. Within a hundred years, all the prime coastal renosterveld sites had been taken over by European farmers, and the big renosterbos invasion was on as a ‘...punishment for their sins’. Two hundred years later Acocks published *Veld types of South Africa* and renosterveld became official.

The name that defined the attitude

We now turn to two etymological problems. The purpose for the publication of Acock’s *Veld types of South Africa* was to indicate areas in which the farming potential was the same. There was no claim that the veld types had any ecological significance! Unfortunately, it proved a useful surrogate for vegetation mapping, and the areas and terms used were absorbed into the local botanical lingo and onto the botanists’ own maps. Renosterveld, being difficult to explain ecologically, largely followed Acocks’ boundaries, and this is where the problems have risen. Ecologically, coastal renosterveld is **not** homogeneous (all the same). Soil type, rainfall amount and seasonality, disturbance, and evolution have all shaped the different regions of ‘coastal renosterveld’. South coast renosterveld has probably evolved (over the past half million years, at least) as a grassland. Species composition may have changed from one glacial/interglacial cycle to another, but for most of the time it has structurally been a grassland. West coast renosterveld was also, probably,

structurally a grassland for most of the time, but tended towards an open shrubland during the brief (10 000 year) interglacials. We know it is a disturbed system, yet persist in basing our studies and conclusions upon the condition it is in now. Margaret Levyns noted in 1922 that on Signal Hill (classified as renosterveld) the vegetation on granite soils tended to have typical fynbos species, while the shale soils had typical renosterveld species.

So, what is renosterveld?

The first extant written reference to the renosterbos (*Elytropappus* rhinocerotis*) was by the person keeping the journal of Simon van der Stel’s expedition to what is now Springbok in 1685. On September 12th they camped somewhere in the Lange River valley, near where the present-day Sandberg siding is situated. The valley was described as being overgrown with ‘Rhenosters bosch’, so called because rhinoceros was usually found in it. Let us ignore the fact that they were in an area that is currently on the border of sand plain fynbos and mountain fynbos. Let us further ignore the fact that Burchell mentioned that even in 1811 ‘Rhinoster bosch’ was still a term given without distinction to several species of *Stoebe*.

Descriptions of the vegetation of the Cape by the numerous visitors it received between 1488 and 1662 continually refer to the grass, and to the cattle and sheep of the Khoekhoen. *Van Riebeeck’s Journal* makes reference to it in 1652: ‘Table Valley (now central Cape Town) covered with grazing sheep

South coast renosterveld has probably evolved (over the past half million years, at least) as a grassland.



and cattle', and in 1657 he describes the 'Exceptionally rich pasturage' of the present-day Somerset West region. In 1661, he writes of 'Valleys with waist high grass' between Piketberg and Olifantsrivierberg. Theal (writing his history in 1922) observes that by 1670, thirty to forty wagon loads of grass were being collected annually from the Tygerberg. In 1726, Valentyn writes of the Bottleray hills: 'in all of Africa no lovelier grass fields than here'.

Where were the renoster bosches? Probably on the Cape Flats – an area that is currently described as sand plain fynbos. If the areas currently classified as coastal renosterveld were described as grasslands, the sandy plains of the Cape Flats were typically described as being 'pale and bleak tracts of heath' (Sparmann in the early 1770s). It was in these areas that the black rhinoceros was mostly encountered. *Passerina*, *Stoebe*, *Metasia* – how different would they appear from today's renosterbos to people not at all versed in natural history? When the grasslands of what we now call renosterveld were being invaded by the 'true' renosterbos and by similar useless

BELOW: Does renosterveld (in this photograph, south coast renosterveld near Caledon) 'owe its presence to mans disturbance?'

THE RENOSTERVELD RELOADED

- The first and last person to correctly use the term 'renosterveld' was Acocks.
- From an ecological point of view, the only definition that currently satisfies the term 'renosterveld' is that it is those parts of the country where renosterbos will grow, and which have not been allocated to some other veld type.
- The current interglacial is due to end within the next two thousand years (assuming the current global warming process does not over-ride the cosmic level of influence). 'Renosterveld' will migrate northwards. Wheat farming will become viable around Vanrhynsdorp, and scientists in 25003* will be trying to conserve 'the most endangered veld type in South Africa', except that this time it will be situated 300 km north of its present position.

*Allowing for an extra 20-odd thousand years for the general inertia of systems, the climatic changes will take a few thousand years to occur and the vegetation movements and changes will be even slower. It's been about 20 000 years since the peak of the last glacial, and although the climatic change from cold to warm took about 10 000 years the vegetation changes would be slower.

"It seems probable that not only is renosterveld a result of bad farming practice; it is not even the veld type it etymologically developed from!"



TYPICAL DESCRIPTIONS OF COASTAL RENOSTERVELD

Pre 1900...

'Although it was mid-Winter the grass came up to our knees...and the abundance of cows and ewes is astonishing'

Thomas Aldworth in 1611 describing an area in the region of the Tygerberg.

'Table Valley (now central Cape Town) covered with grazing sheep and cattle like grass on the veld.'

Van Riebeeck's Journal, 16 Dec 1652.

'Exceptionally rich pasturage in the (Somerset West) region.'

Van Riebeeck's Journal, 1657.

'Valleys with waist high grass' between Piketberg and Olifantsrivierberg: Van Riebeeck's Journal, 1661.

'By 1670, thirty to forty wagon loads of grass were being collected annually from the Tygerberg.'

Theal in 1922.

'...in all of Africa no lovelier grass fields than here.'

Valentyn in 1726 describing the Bottleray hills.

In 1787 Mentzel described Groenekloof as a valley rich in grass between the Kapokberg and the Langeberg (The Langeberg has not been located, but the description is of the Darling-Mamre area.)

After 1900

'...a community dominated by renosterbos...associated with grasses.'

Bews in 1916 (referring to both south and west coast renosterveld).

'...owes presence to mans disturbance.'

R.S. Adamson in 1929 (referring to both south and west coast renosterveld).

'...not a stable type of plant community... burning leads to an immediate return of rhenosterveld...'

Levyns in 1929 (referring to west coast renosterveld).

'Before rhenosterveld is once more established there is a series of successional changes distributed over several years.'

Levyns in 1936 (referring to south coast renosterveld).

'...derived in historical times from a *Themeda triandra* dominated grassland.'

Cowling, Pierce & Moll in 1986 (referring to south coast renosterveld).

'...lack typical Cape species...transitional types...'

Taylor in 1978 (referring to both south and west coast renosterveld, as well as to strandveld).

'...half the communities phytosociologically classifiable as fynbos...rest are pseudo-fynbos.'

Boucher in 1987 (referring to west coast renosterveld).

'...a 1-2 metre high matrix of cupressoid and leptophyllous and/or orthophyllous divaricately branched shrubs..geophytes...are important components...Poaceae...well represented.'

McDowell in 1988 (referring to west coast renosterveld).

weedy shrubs, it would have been very likely that they would all have been colloquially referred to as renosterbos, and it would only be a short step from there to renosterveld. It seems probable that not only is renosterveld a result of bad farming practice; it is not even the veld type it etymologically developed from!

Some artistic licence has been used relating to the pictures 'painted' of conditions in the past. However, the facts (climate, species listed, human impacts) are based upon archaeological and other palaeoclimatic evidence. The absence of any sites within either west or south coast renosterveld makes it impossible to be certain that deductions made from sites in adjacent areas are correct. Indeed, one cannot even be certain that archaeological evidence correctly reflects the situation existing at the site. The important point that we wish to make is that it is a dynamic system.

In two thousand years or less, the earth is due to wobble into another 100 000 years of glacial conditions, Cape Town harbour will be 20 km from the coast, and False Bay will be populated. Tour guides will have to explain that Nelson Mandela's 'Long walk to Freedom' wasn't between 'Robben Island koppie' and Blouberg. The renosterveld reserves of today will change, and a new range of species will become endangered. Extinction is a requirement for evolution. To conserve, we need to throw off the shackles of the 'here and now' and try to view the world from a successional point of view.

**Elytropappus* has recently been revised and been given the completely new genus name of *Dicerotheramnus*. The renosterbos is now known as *Dicerotheramnus rhinocerotis*. (M. Koekemoer. 2002. 'Systematics of the *Metalasia* group in the Relhaniinae'. Unpublished Ph.D. thesis, Rand Afrikaans University.)

Suggested reading

Deacon, J. & Lancaster N. 1988. *Late Quarternary palaeoenvironments of southern Africa*. Clarendon Press, Oxford. (Readable without too much specialized knowledge, with a concise summary of climatic and environmental events of the past 130 000 years).

Raven-Hart, R. 1967 *Before Van Riebeeck: Callers at South Africa from 1488 to 1652*. Struik, Cape Town. (The European influence at the Cape started long before Van Riebeeck arrived – a good picture of conditions at the Cape can be obtained from this book, provided one remains aware that most of the writers were unversed in natural history and approached life from a Eurocentric point of view).

Thom, H. B. 1952. *Journal of Jan Van Riebeeck* Volume 1, 1651-1655. Van Riebeeck Society, Balkema, Cape Town. (Volumes 2 and 3 although of interest, are predominantly filled with civic matters).

Iziko SA Museum web sites for a description of the glacial fauna: www.museums.org.za/sam/muse/9711.htm (Duinefontein – near Koeberg), www.museums.org.za/sam/resource/palaeo/brownhya.htm (Swartklip), www.museums.org.za/sam/resource/arch/elandsfo.htm (Elandsfontein – near Hopefield).

About the authors:

Ian Newton is an M.Sc. student at the University of the Western Cape looking at west coast renosterveld from a temporal and spatial perspective.

Dr Richard Knight is a senior lecturer in landscape ecology at the University of the Western Cape.

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