





A Range of Flowers

BENEATH ITS BLAND
EXTERIOR, THE CAPE
RANGE PENINSULA HIDES
A UNIQUE AND BEAUTIFUL
PLANTLIFE. SURVEYS
OVER THE PAST FIVE
YEARS HAVE YIELDED A
NUMBER OF SURPRISES.

by
Greg Keighery
and
Neil Gibson

Extending like a finger pointing north into the Indian Ocean, the Cape Range Peninsula lies north of a line connecting Ningaloo Homestead to the bottom of Exmouth Gulf (Bay of Rest). It includes the Cape Range and the Rough Range, the surrounding coastal white sands and red sand dunefields. To the south and west is another series of lower limestone ranges, the Giralia and Gnargoo Ranges, that probably helped build up the sandplains and calcarenites linking the peninsula with the mainland to the south.

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The canyons of the Cape Range provide cooler, often relatively fire-free refuges for plants unable to survive on the exposed tops and slopes of the range.

Photo – Marie Lochman

Inset: Rock morning glory—a tropical species on the southern edge of its distribution.

Photo – Tony Tapper

Below: Yardie Creek is the major biological refuge for freshwater aquatic plants in the range.

Photo – Geoff Taylor/Lochman Transparencies

Most Western Australians, when asked to list the major conservation values of the area, would nominate the western sea, full of the wonders of the Ningaloo Reef (see 'Wall of Mouths', *LANDSCOPE*, Spring 1988), the dramatic scenery of the Cape Range— especially Yardie Creek—and perhaps the ancient wetland lifeforms under the range itself (see 'Subterranean Secrets', *LANDSCOPE*, Autumn 1994). Few would consider the plants that clothe the area as one of its major conservation features.

Bottom left: Northern coppercup is confined to, but not endemic to, the Cape Range. It extends south of the range to the Giralia Range and west of Lake Macleod.

Photo – Greg Keighery

Bottom right: The rarely seen form of the mistletoe *Amyema miraculosa* was previously thought to be confined to the western margins of Cape Range, but is now known also to occur near Carnarvon.

Photo – Greg Keighery



At first, this view seems quite reasonable. The area is arid, which by itself shortens growing seasons and increases the number of poor growing seasons. This also lowers the number of plant species that can occupy a given habitat. The level of plant diversity at monitoring sites on the peninsula and ranges reaches 44 species, but 16–30 is the norm. On the Swan Coastal Plain around Perth, the richest sites contain 83 species, with the norm being 40–65 species per 100 square metres. The Cape Range and peninsula area also has low habitat variation, with no permanent freshwater, major rivers or wetlands. It is composed largely of limestone, which tends to be species-poor because the soils derived from limestone 'lock up' plant nutrients. Therefore it would be reasonable to expect a relatively impoverished flora.

This perception is also enhanced by the general appearance of the vegetation. The peninsula and ranges are clothed by relatively uniform, low and sparse wattle, eucalypt or heath shrublands over spinifex or spinifex grasslands. On the coast, there is coastal strand vegetation, mangroves, samphire and saltbush low shrublands. These vegetation types are a reminder that this is indeed an arid area, with a long hot dry season, little water and no





Left: Ashby's banksia, unlike most southern banksias, has lignotubers and can resprout after fire.

Photo – Geoff Taylor/Lochman Transparencies



Below left: Cape Range morning glory is abundant on limestone terraces on the west side of the range.

Photo – Tony Tapper

obvious signs of the massed spring wildflower displays seen on loamy soils to the south, around Minilya and Carnarvon.

However, as part of the Symposium on the Biogeography of the Cape Range, organised by the Western Australian Museum in late 1992, knowledge of the composition and biogeography of the vascular (flowering) plants of the North West Cape was reviewed. The review unearthed a surprisingly varied, attractive and biologically fascinating flora, yet one that was poorly known.

VEGETATION

The Cape Range has a diverse flora because of the ameliorating effect of the sea, especially on the western side of the range (there is a sharp climatic gradient west to east). It also has winter and summer rainfall, which gives the flora its special character, with many of the plants growing at their northern and southern range limits. There are unusual vegetation types, outlier species, and some species exclusive to the peninsula.

The vegetation of the Cape Range is dominated by eucalypts—which is

unusual in the Carnarvon Basin, where acacias dominate nearly all the vegetation types. One of these eucalypts is confined to the range, while the other extends as an outlier to the Pilbara.

The wattle *Acacia startii*, which dominates the vegetation of the Rough Range, is confined to the peninsula and the adjacent Giralda Range. This species, which was only recently officially named, demonstrates the incomplete knowledge of the flora of the area.

Several mangrove species—club mangrove (*Aegialitis annulata*), yellow mangrove (*Ceriops tagal*), red mangrove (*Rhizophora stylosa*) and seablite (*Suaeda australis*)—end their ranges around North West Cape. South of the cape, the only mangrove found is white mangrove (*Avicennia marina*), which extends to Bunbury. The cape is the southern limit of the tropical mangrove forests.

The heath over spinifex vegetation of the red sandplains is often dominated by Ashby's banksia (*B. ashbyi*), which reaches its northern limit on the dunes at Cape Vlamingh.

Despite superficial similarities, the species composition (floristics) of the major limestone ranges on the peninsula, the ranges to the south and the Coral Bay limestone ridges, differs greatly. The massive tertiary limestones of Cape Range are dominated by eucalypts over shrubs such as the endemic Cape Range grevillea (*G. variifolia*), Yardie morning glory (*Ipomoea yardiensis*) and *Grevillea calcicola*. The younger limestone ridges of the Western Coastal Plain and the Rough Range feature generally low shrublands of tangling melaleuca (*M. cardiophylla*) and *Hibbertia spicata* over spinifex (*Triodia* spp.). The lower and drier tertiary limestones of the Gnargoo and Giralda Ranges are dominated by wattles (*Acacia startii*, *A. victoriae* and *A. tetragonophylla*) over a rich herb layer, as are the Coral Bay calcarenites and the low western terraces of the Cape Range. These variations in plant communities of similar soil types add greatly to the floral diversity of the peninsula.

COMPOSITION AND RELATIONSHIPS

Surveys record 630 species of vascular (flowering) plants on the peninsula—an area of some 218 500 ha. For an arid limestone area, this is a surprisingly high number. The Nullarbor Plain, by comparison, contains only 317 species of vascular plants in an area about 70 times the size (14 876 400 ha).

The flora is, however, basically arid in nature. It is rich in the annual species and herbs that form the major components of all flora in arid areas of Western Australia. There are 21 species of mulla mullas, 51 species of daisies, 75 species of grasses, and 47 species of peas. Herbs represent more than half of the flora of the North West Cape, and yet the area lacks the carpets of annual flowers that usually go with them.

While limestone soils in arid areas are generally species-poor, especially in areas with low undulation and a lack of

habitat diversity, Cape Range is an exception. Habitat diversity is low, but environmental conditions are very different from the Nullarbor. As noted previously, the ameliorating effect of the sea around the peninsula, the sharp climatic gradient across the range, the thin mantle of red sand that often overlies the limestone, and the summer and winter rain, contribute to the special features of the flora that increase species richness.

SPECIAL FEATURES

There are at least 15 types of vascular plants, ranging from trees through large shrubs to low shrubs and perennial herbs, that are confined to the Cape Range Peninsula (see box). There is also a group of species that has its main distribution on the peninsula, but populations can be found on the ranges that extend south to near the Minilya River, or on limestone outcrops that extend west of Lake MacLeod to near Cape Cuvier. Examples of these species include *Pileanthus 'septentrionalis'*, *Acacia startii*, *Acacia alexandri*, and *Acanthocarpus humilis*.

The Cape Range has a mix of Western Australia's tropical and temperate plants, primarily because of the number of species occurring at the limit of their ranges.

Many species with tropical affinities, such as the mangroves, approach the end of their range on the North West Cape (although some continue on coastal limestones to the Shark Bay Islands). Most of the tropical species are located along the gorges and valleys on the western side of the Cape Range. These areas are relatively fire-free, they receive cooling sea breezes, are relatively sheltered and slightly wetter during the summer growth period for tropical plants. However, any wetter tropical elements have been eliminated, even from these refuge areas, by the harsh climate and freely draining soils.

The freshwater pools and gorges of the Yardie Creek system contain populations of leafy club-rush, Indian sundew (*Drosera indica*), cumbungi (*Typha domingensis*) and Millstream palm, which are hundreds of kilometres away from their main distributions. The occurrence of the Millstream palm, for example, is the only one outside the Fortesque River area of the Pilbara.

The other species at their range limits are 50 temperate plant species that occur in three areas on the peninsula: the red sandplains between the hills and on top of the Cape Range, the deep limestone valleys that cut across it, and the white

coastal sands on its western side.

Finally, the seas around the peninsula are a mixing ground for temperate and tropical seagrasses, and a major area of species richness for these marine flowering plants in Western Australia.

Hidden beneath its veneer of uniformity, the Cape Range peninsula boasts rich and varied vegetation and flora. Though that flora is still poorly known, symposia and extensive biological surveys, such as the Carnarvon Basin Survey of 1995 (see 'Patterns in Nature', *LANDSCOPE*, Summer 1995-96), help scientists to gradually add to that knowledge. And as taxonomic and ecological studies proceed, more of the fascinating range of flowers will undoubtedly be discovered and identified.

Below left: *Grevillea calcicola*, a Cape Range endemic, grows in soil-filled cracks on the limestone of the range and associated cliffs.
Photo - Greg Keighery

Below: A tropical sundew, which is able to survive in the area at Yardie Creek and other deep, shady, moist canyons on the range.
Photo - Jiri Lochman



A RANGE OF ENDEMICS

A major feature of the peninsula is a series of endemics, something few other arid limestone areas have produced. These endemics are a varied lot in terms of related species and life forms, and further detailed studies will reveal more about their poorly known biology and distribution. The following endemic plants of the Cape Range Peninsula illustrate the variety:

Cape Range kurrajong (*Brachychiton obtusilobus*)

This small tree, growing to five metres, is common on the western coastal plain on limestone ridges and in gullies and gorges. There are also scattered occurrences on limestone outcrops in dunefields on the Cape Range. Like many other members of this genus, the species is summer-deciduous and produces bunches of cream-red blotched flowers at the ends of bare branches at the start of summer. In winter, the plant is covered in glossy dark-green leaves, making an attractive sight on the slopes of the range at sunset.

This species is an example of an endemic with tropical relatives. The genus *Brachychiton* is largely tropical and arid, and *B. obtusilobus* is closely related to the species *B. collinus*, from the Pilbara.

Grevillea calcicola

This is a large shrub, growing to four metres, with large, dense bunches of white flowers above the foliage in winter and early spring. The flowers are insect-pollinated and, at least in western parts, are killed by fire. *G. calcicola* is common on the western escarpment of the Cape Range in gullies, gorges and deep valleys. It is also generally scattered over the range and on low limestone ridges in the dunefields.

It is apparently related to *Grevillea leucadendron*, a species of tropical and arid Australia.

Cape Range grevillea (*Grevillea varifolia* subsp. *varifolia*)

This spreading shrub grows to one-and-a-half metres tall and two metres wide, with rigid green fan-shaped leaves. The species bears pendant sprays of red flowers in winter and spring, which are eagerly sought by honeyeaters for their copious nectar. The subspecies is confined to the Cape Range and the Rough Range, with a few populations on the low terraces at the base of the Cape Range. It is often found where there is a shallow mantle of red sand over limestone.

The *varifolia* subspecies is closely related to an unnamed subspecies of *G. varifolia* which occurs south of the peninsula on the Coral Bay calcarenites and extends west of Lake MacLeod to Cape Cuvier. It differs in having rigid leaves with three triangular points. Both subspecies are closely related to *G. preissii*, found on coastal limestones between Mandurah and Shark Bay.

Yardie morning glory (*Ipomoea yardiensis*)

This spectacular shrub grows to more than a metre from a large underground tuber, and is covered by felty, silvery-grey leaves. The plant bears large bell-shaped soft pink flowers in autumn and winter, which are visited by nectar-seeking hawkmoths, flies and bees. This species resprouts from the tuber after fire. It appears to be the most geographically restricted of the Cape Range endemics, only common on the low limestone terraces immediately below the Cape Range, on the western coastal plain between Yardie Station and just south of Yardie Creek. There are scattered plants and populations on the main range and in gullies and gorges.

The genus *Ipomoea* is tropical, and the closest relative of this species is probably the widespread tropical species, *I. costata*.

Stackhousia umbellata

This plant is a low, sprawling, soft-wooded shrub that grows to 30 centimetres from a corky rootstock. It bears umbells of tubular, yellow flowers at the ends of branches in winter and spring. Its means of pollination and response to fire are unknown. The *S. umbellata* is the most widespread of the Cape Range peninsula endemics. It is found along the entire range, and on some of the west coast terraces as far south as the Ningaloo area, but not on the Rough or Giralia Ranges or on the Coral Bay calcarenites.

S. umbellata is not closely related to any other *Stackhousia* species, but it may be distantly related to *S. scoparia*, a species found in the sandplains of south-western Australia.

Verticordia serotina

This is a low-spreading, sparsely branched but multistemmed shrub that grows to one metre. It has clusters of pink flowers near the ends of the branches in spring. The pollinators of these flowers are unknown. The species resprouts from a rootstock after fire, and is found on shallow red sand over limestone in only three areas on the western side and summit of the Cape Range.

V. serotina is closely related to *V. forrestii*, a dune-dwelling species that occurs between the Cape Range, Carnarvon and the Kennedy Range.



Grevillea varifolia subsp. *varifolia* Photo - Tony Tapper

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The Perth Observatory celebrates its centenary this year, and during its 100 years' life it has played some major roles in the world of astronomy. Find out more on page 10.



The Cape Range, in north-west WA, is known for its harsh environment. But if you look a little closer you'll discover the vast 'Range of Flowers' that live there. See page 28.



In 1961, the noisy scrub-bird was rediscovered at Two Peoples Bay. In 1994, the Gilbert's potoroo turned up unexpectedly. Find out more about this haven for the lost and found on page 35.



John Forrest National Park has long been a popular picnicking spot for Perth residents, but this place of beauty has much more to offer. See page 16.



If all goes to plan, the Ord River area, will soon be known as a prime farming area for rare tropical timbers. Find out why on page 23.

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COVER

Fox-baiting has been shown to be a major tool in rebuilding populations of native animals. Now, scientists are embarking on a Statewide feral animal control program to help bring back native species, such as the western swamp tortoise, from the brink of extinction. The project is called 'Western Shield'.

The story is on page 41.

Illustration by Philippa Nikulinsky



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