DUNES, ACACIA CYCLOPS AND BIRDS AT EYRE, WESTERN AUSTRALIA

THE DUNES

Spectacular dunes of white calcareous sand are found between the former Eyre Telegraph Station - now the headquarters of the Eyre Bird Observatory - and the Southern Ocean. Because of their mobility these dunes are seen as a threat to the continued functioning of the building. An historical precedent for this concern is not hard to find as the sister telegraph station at Eucla, found much further east but also on the Roe Plain, is partly buried in sand drifts.

Drifting sand is not a new phenomenon for the coast of the Roe Plain either geologically or historically. As the plain was forming, dunes became strand lines of the retreating sea. E.J. Eyre the first European explorer to this area (in 1840) found "high drifts of sand" (Eyre, 1845) but inspection of relatively recent aerial photographs (from 1945) revealed that an increase in the area of mobile sand has occurred in the last 40 years. Just how the dunes moved in the century between the times of early exploration and the Second World War is unknown but it is likely that the stock introduced by the telegraph operators (from about 1877) and the invasions of rabbits at about the turn of the century, were destabilizing influences. These influences were moderated upon closure of the telegraph station in 1927 but perhaps exacerbated by the passage of vehicles and stock associated with pasturalist's pursuits up until the establishment of the Nuytsland Nature Reserve (1965) to which the observatory is attached.

Presently, immediately above the beach at Eyre is a vegetated mini-dune about 2m tall and 10m wide. This is followed by an erosion pavement of weakly cemented calcareous sand which is about 300m wide: all of this has occasional patches of shrubs but Acacia becomes prominent on

the inland half. Merging with the pavement on the inland side is the area of mobile dunes with remnant patches of mallee scrub and pioneering patches of Acacia cyclops (and some other Acacia spp.), Olearia axillaris and the exotic herb Euphorbia paralias: much of this area lacks vegetation. Beyond this zone is the mallee scrub typical of this part of the Roe Plain and covering old stable dunes. Remnant skeletons of mallees with their exhumed root systems are scattered about the dune field and erosion pavement suggesting that mallees may have been established quite close to the sea in historical times.

ACACIA CYCLOPS

The potential for using Acacia cyclops as a dune binder is evident from its natural colonizing ability at Eyre, its introduction as a sand binder overseas and its prolific seed production. The species is a shrub typically about 4 m tall and up to 15 m diameter but small trees up to 6 m tall were found in remnant mallee stands. The species was imported into South Africa to help solve a mobile dune problem there and was so successful that it is now regarded as a weedy threat to conservation values. Free of its usual predators in South Africa the plant is liable to perform better than in its country of origin but if the checks and balances here are known they can be modified or avoided when the plant is used for its cover value. The species is a prolific seed producer and is naturally regenerated from seed rather than by vegetative means.

Recent research on Acacia cyclops has suggested that seedling establishment from seed is likely to be best at some distance from the parent plant. On bare sand, the high temperatures of summer are likely to improve the chances of seed germination when the soil eventually moistens. Away from the litter beneath the parent plants, predatory bugs are less likely to damage seed. For these reasons, any attempt at establishment by

seed should occur in the open and meters away from established clumps, not immediately adjacent to them.

For establishment, short-term soil stability (at least) may be necessary. This may be achieved by artificially increasing the surface roughness to reduce wind speed at the soil surface and by avoiding areas too close to sources of large volumes of mobile sand which could overwhelm the planting. By picking the tangled groups of open Acacia pods as units (rather than removing individual seed) and placing the pods with attached and loose seed onto the surface of the soil the effective wind velocity can be reduced by the bulk of the pods. Thus the seed may be placed both on the surface and above it thereby enabling seed to be close to the soil surface even if limited erosion or deposition occurred. It is suggested that the pods be covered by netting and the whole trial established say 5 to 10 meters to the seaward side of the edge of the mobile dunes on the erosion pavement.

BIRDS

Successful establishment of Acacia cyclops may enhance the populations of certain species of birds at Eyre. The abundant seeds attract birds both as predators and dispersers. In 1982 the pink cockatoos (Cacatua leadbeateri) - used as emblems of the observatory - were enthusiastic predators of immature seed. As the seed matured it turned from green to black and was encircled by a bright red aril of very high food value. This aril is most attractive to the birds responsible for the spread of the seed through their faeces. The silvereye (Zosterops lateralis) seems to be a major disperser in this region but others such as the currawong (Strepera versicolor), singing honeyeater (Meliphaga virescens) and red wattle bird (Anthochaera carunculata) are likely dispersers. The brush bronzewing (Phaps elegans) has been reported to excrete seed at Eyre: it would be of

interest of know whether or not some seed is usually crushed by this species. The list of birds feeding on seeds and arils of Acacia cyclops is likely to increase as observation continues.

Other values of shrubs of A. cyclops to birds may be found in their use as nesting sites or as sources of insects. Singing honeyeaters nest in Acacia cyclops and white-eared honeyeaters (Meliphaga leucotis), as well as other birds mentioned above, may be active in bushes of this species.

CONCLUSIONS

Acacia cyclops has potential value as a sand binder at Eyre. The species is native to the area, is a natural colonizer of dunes and has marked ornithological interest. Use of seed for establishment, rather than seedlings, is recommended.

REFERENCE

Eyre, E.J. (1845). "Journals of Expeditions of Discovery into Central Australia and Overland from Adelaide to King George's Sound in the year 1840-1".

Acacia cyclops in Australia: Distribution and Dispersal

Acacia cyclops is a shrub found along the coast of southwestern Australia and of mediterranean-climate South Australia. It is associated with naturally- and artificially-disturbed environments within this range. Reproduction of the species is by seed. Regionally, human dispersal for horticulture and revegetation projects has occurred across thousands of kilometers. Locally, birds distributed the seed in regurgitated pellets or in faeces. Pellets were associated with feeding sites, particularly, while faeces were common under perches and near watering points. Seed moved in these ways was found less than 200 meters from the nearest mature bush. Secondary movement of seed by ants occurred. Ants left seed on the surface or took it into nests: dispersal distances were less than 2 m. Birds also took fallen seed. Seed-feeding bugs were common in the litter beneath bushes and absent from bare ground. Summer temperatures experienced on bare ground are likely to improve germination. Dispersal away from canopies onto bare ground seems most likely to allow successful establishment because of reduced predation and enhanced chances of germination and establishment.