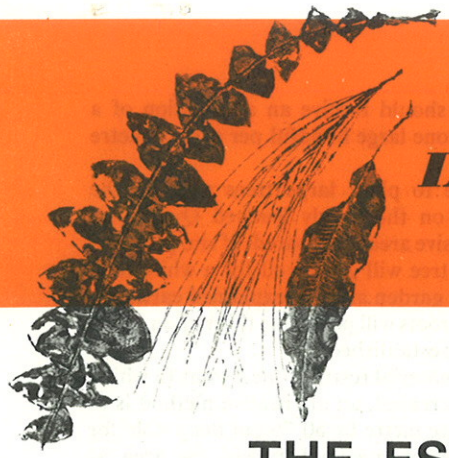

INFORMATION SHEET 28

FORESTS DEPARTMENT WESTERN AUSTRALIA

THE ESTABLISHMENT OF PLANTS BY THE SEASIDE

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The strong salt-laden winds and porous infertile sands of the south-west coastline of Western Australia presents a hostile environment for the establishment of trees and shrubs in home gardens, caravan parks and recreation areas situated in close proximity to the ocean. The main deterrents to success are wind, salt, sandblast, moisture and an infertile, highly leached growing medium. The amount of success achieved is relevant to the extent that these factors can be controlled.

Wind, salt and sandblast

Strong winds create problems with foliage burn and tree shape, but in areas close to the sea the damage is accentuated by the presence of salt and sand. Plants in exposed positions and in close proximity to surf beaches suffer the most as salt spray from the turbulent waves and sand from unstabilised dunes wreak havoc on foliage, stems and branches. The denuded plants are then exposed to hot summer sun and reflected rays from the white sand which further aggravate the damage.

Moisture

Moisture is necessary for the successful establishment of all plants. In soils of reasonable fertility some trees can be established under natural winter rainfall conditions. However, the selection of plants is limited and the rate of growth is confined to the period of available moisture in the soil.

Soil fertility

The predominant soil type of the coastal area belongs to the Quindalup dune system and is a creamy calcareous sand, practically devoid of humus material and with no moisture holding properties. Occasionally, as in the vicinity of Cottesloe, Fremantle and Spearwood, the yellow brown sand of the Spearwood dune system intrudes. This soil type is formed from the underlying, frequently shallow, limestone rock, contains a higher humus and iron content and is more retentive of moisture and applied fertilisers.

Soil preparation on the Quindalup dune system is necessary and an improvement of the Spearwood system recommended.

Control measures

Sandblast can be partially controlled by the extensive use of ground covers, but this affords protection only from loose sand on the owner's block. As damage can still come from council or reserve land, some type of barrier is necessary. This can take the form of a fence or by planting resistant trees or shrubs which also provide protection from wind and salt.

Fences should not be complete barriers as these tend to cause turbulence on the lee side. A 60:40 per cent barrier is the most effective and can consist of brick, timber, tea-tree, palm or other material. If trees and shrubs are preferred they should be selected from Group 1. The best protection is afforded by strategically planting in groups or as a shelter belt to protect select areas or the whole block. With group planting the full blast is taken by the frontal trees with decreasing foliage damage on the rest of the group.

Moisture is nearly always available from scheme or underground water supplies in seaside areas. If the salt content is high the water should be applied to the base of the trees in heavy applications at weekly or fortnightly intervals. This prevents salt accumulation in the surface soil. In the case of holiday homes, the trickle method of irrigation can be used to supply moisture requirements to the plants while the owner is absent. Sandy soils do not possess the ability to retain moisture or fertiliser and when artificial manures are applied, the dissolved nutrients are carried in a concentrated form to the root zone, where damage may result. Further moisture leaches any remaining nutrients quickly through the sand profile. The addition of loam, humus or both to a sandy soil has a buffering effect on applied fertiliser, as these ingredients have the ability to attract nutrients. This reduces the immediate concentration in the root zone and nutrients are available to the plant over an extended period.

Soil preparation

The improvement of the soil structure can be accomplished by incorporating loam, local peat, pestmoss, animal manure, lawn cuttings, sawdust, seaweed or other similar materials either singularly or in combination with the sand. The material and quantity used depends largely on availability and cost.

When loam is used to improve soil fertility it should preferably be a sandy loam and some form of humus material should also be included. Heavy or clay loams are to be avoided as the small particles which comprise these mediums tend to separate from the coarse sand grains creating two undesirable soil types.

Animal manures, local peat and peatmoss, although expensive, are ideal mediums for improving the soil structure, and can be used in conjunction with other materials to reduce costs. Fowl manure, due to its high nitrogen

content should be used sparingly and is best incorporated with peat, lawn cuttings, sawdust or seaweed which require nitrogen for the process of decomposition.

Lawn cuttings are not easily obtainable when a property is in the initial stages of development, but are frequently procurable at no cost from bowling greens, tennis courts or other venues of recreation. The cuttings from bowling greens are usually high in nutrients due to frequent fertilising and can be applied in quantity without the addition of a nitrogenous manure.

Sawdust is a cheap source of humus material and can be used in large amounts to improve soil fertility. Due to its high nitrogen requirements during decomposition a good dressing of fowl manure or blood and bone should be used in conjunction.

Seaweed is frequently the most readily available source of humus and can be used in unlimited quantities. It is important to wash all salt deposits from the seaweed prior to incorporation in the soil and nitrogen should be added as in the case of sawdust.

When preparing leached sands for planting, the size of area and depth to which preparation should be made depends on the type of garden envisaged and material and finance available.

The easiest method of preparation is to thoroughly mix the material available to a depth of 30 cm over the area to be planted for garden. If sandy loam or cladium peat is used a minimum layer of 8 cm would be necessary; depending on garden size this method can be quite expensive and it may be necessary to use one of the cheaper humus materials such as sawdust. In this case a 10-15 cm layer should be used plus a liberal supply of fowl manure or blood and bone.

Lawn cuttings or other vegetable matter is difficult to obtain in sufficient quantity to use as an overall soil improver and on decomposing it contributes only a very small quantity of humus. This material is used to advantage in combination with sandy loam or peat or in bulk quantity for individual sites. When raw vegetation is used allowance should be made for subsidence of the prepared area as the material decomposes.

Where large areas such as caravan parks or exposed building sites are being prepared, care should be taken that the disturbance of the soil does not encourage erosion from strong winds. Under these circumstances it may be necessary to restrict the size of the area prepared at one time or to use bitumen sprays or winter rye grass to stabilise the soil.

Where trees or large shrubs are to be planted further preparation of the site one metre square and 60-75 cm deep is necessary. In the few areas where the slightly more fertile Spearwood dune system intrudes preparation can be restricted to the immediate site and the one metre square hole 60-75 cm deep prepared.

Lawns should not be allowed to encroach past the edge of the prepared area until the tree has reached a desirable size, otherwise the rate of growth will be inhibited.

All prepared sites should receive an application of a balanced fertiliser at one large handful per square metre prior to planting.

It is not advisable to plant large trees such as the Norfolk Island Pine on the highly leached Quindalup sands unless an extensive area is prepared. If site preparation only is done the tree will grow well for a while then stagnate. If the whole garden area, as explained earlier, is enriched to 30 cm the roots will penetrate this region and a reasonable tree will be established.

Where finance or material restricts the extent to which the fertility can be increased, an alternative method is to prepare the one square metre by 60-75 cm deep hole for each individual shrub or tree and extend the area as material becomes available. For this purpose lawn clippings, weeds, seaweed or garbage can be used plus a few handfuls of a balanced fertiliser.

If indigenous ground cover and shrubs are being used for landscape it is only necessary to prepare the sites where trees are to be planted. However, a slight lifting in the humus content will be reflected in the more lush growth of the indigenous plants.

Plant selection and after-care

A medium-sized plant is the optimum choice. It should be bushy and healthy and not too large for the pot in which it is growing. This latter condition usually denotes a pot bound root system. Very small, advanced or spindly specimens are undesirable.

All growth should be retained in the early years even though a tree is the final goal. The additional foliage area thickens the trunk, hastens growth and promotes more stability in the plant. Once well established the lower branches can be removed as required.

Protection from wind is necessary in the early stages of growth and can be provided by a semi-circular shield on the windward side. Solid barriers or total enclosures are undesirable.

Sarlon cloth or open hessian with a wire mesh background gives satisfactory results. It should be positioned 60 cm from the tree and be approximately 1·5 m in height. Three solid stakes will give satisfactory support.

Staking

Single stakes alongside a plant provide support for a limited period only and tend to create a weakness in the plants stem. Once the plant becomes bushy or the growth extends past the limits of the stake the stake becomes ineffective. The use of stay ropes in three directions allows movement of the trunk without damage to the tree. This movement encourages the production of anchor roots by the plant and helps in its stability.

Ties should be checked regularly to ensure that there is room for stem expansion and a material used that will not cut into the bark.

GROUP 1

Plants suffering little damage under the most exposed conditions

TREES

Botanical Name	*Common Name*	*Approx. Height (metres)*	*Description*
Araucaria heterophylla (formerly *excelsa*)	Norfolk Island Pine	30	Tall symetrical branching tree with high aesthetic qualities.
Casuarina equisetifolia	Horse-tail Tree	10	Narrow pendulous branching form of the sheoak.
Cocos nucifera	Coconut Palm	20	Elegant palm grown mainly in tropical areas. Should be adaptable to seaside conditions north of Perth.
Lagunaria patersonia	Norfolk Island Hibiscus	10	Grey-green densely foliaged tree with pink flowers.
* *Melaleuca lanceolata*	Rottnest Tea-tree	5	Dense green bushy tree. Tends to suffer damage on the windward side in extremely exposed positions. When planted in groups the outside trees only are affected.
Olea europaea	Common Olive	7	Hardy slow growing tree. Hybridised varieties should not be planted.
Metrosideros tomentosa	New Zealand Christmas Tree	10	Bushy deep green foliaged tree carrying masses of red bottlebrush flowers in early summer. An erratic flowerer under Western Australian conditions.

SHRUBS

Botanical Name	*Common Name*	*Approx. Height (metres)*	*Description*
Acokanthera spectabilis	Winter Sweet	3	Attractive foliaged plant with clusters of fragrant white flowers followed by large black toxic berries.
Alyxia buxifolia	Sea Box	2	Small white flowered shrub with thick oval glossy leaves.
Atriplex isatidea	Salt Bush	2	Attractive grey foliaged plant.
Baeckea linifolia		2	White flowered shrub with fine pine like foliage.
* *Beyeria viscosa*	Pink Wood	2	Rounded shrub with insignificant yellow flowers.
Calocephalus brownii		0·5	Small shrub with grey leafless stems and yellow flowers.
Centaurea cineraria	Dusty Miller	1	Attractive perennial with dense white fuzzy divided leaves and purple flowers.
Chrysanthemum fruitescens	Marguerite	1	Perennial with masses of daisy like flowers. Available in a range of colours.
Coprosma baueri	Mirror Plant	2	Dense shiny green foliaged plant. Variegated forms are also available.
Cordyline australis	Cabbage Treee	2	Long narrow green palm-like leaves carried on a single stem.
Cordyline purpurea		2	Purple foliaged form of above.
Dodonaea viscosa var. *purpurea*	Hop Bush	2	Purple foliaged shrub with inconspicuous flowers followed by winged fruits.
* *Dodonaea aptera*		2	Green foliaged form of above.
Eleagnus pungens variegata		2	Green leaves with cream margins, silvery beneath and dotted with brown scales, fragrant white flowers followed by red berries.
Euonymous japonicus		1	Compact shrub with attractive small oval foliage. Two variegated forms are mainly grown, one with central and the other marginal variegations.
* *Guichenotia ledifolia*		0·5	Spreading low shrub with mauve flowers.

Botanical Name	*Common Name*	*Approx. Height (metres)*	*Description*
Hardenbergia alba		1	Vigorous shrub with large oval dark green leaves and white flowers in the winter months.
Hebe andersonii	Veronica	1	Attractive foliaged plant with spikes of lavender blue flowers.
Hebe speciosa "imperialis"		1	Spikes of crimson flowers.
Leptospermum laevigatum	Coastal Tea-tree	4	Hardy, dense, small foliaged shrub with white flowers.
Metrosideros tomentosa variegata		5	Attractive cream margined form of the New Zealand Christmas Tree.
Metrosideros tomentosa picturata		5	Central variegated form of the New Zealand Christmas Tree.
* *Nitraria schoberi*		2	White flowered shrub with red fleshy fruit.
* *Olearia axillaris*		1·5	Attractive grey foliaged shrub with small white daisy flowers.
Phormium tenax	New Zealand Flax	1	Long tough sword-like leaves rising from a tuberous base. Green, purple and variegated forms are available.
* *Pimelia ferruginea*		1	Attractive foliaged plant with masses of pink flowers in spring.
Podalyria sericea		2	Rich silky grey, oval foliaged shrub with pink pea flowers.
Pittosporum crassifolium		3	Thick silvery green round foliage. Small sweetly scented chocolate coloured flowers.
Pittosporum crassifolium variegatum		2	Variegated form of above.
Pittosporum tobira variegata		3	Attractive shrub with greenish white flowers, variegated foliage.
Raphiolepis umbellata	Indian Hawthorn	3	Shiny green oval foliaged dense shrub with clusters of fragrant white flowers in spring followed by blue berries.
* *Rhagodia* species		1	Tough grey foliaged plants, insignificant flowers and red berries.
Rosmarinus officinalis	Rosemary	1	Aromatic small blue flowered shrub with grey green foliage.
* *Spyridium globulosum*		2	Compact attractive foliaged shrub with insignificant flowers.
Westringia rosmarinifolia		2	Attractive grey foliaged shrub with white flowers over a long period.
* *Westringia rigida*		1	Similar to above with green foliage.

GROUND COVER

Botanical Name	*Common Name*	*Description*
* *Arctotheca populifolia*		Attractive greyish-white rosettes of foliage and small yellow daisy-like flowers.
Arctotis stoechadifolia	African Daisy	Silver grey foliaged perennial with violet-tipped white ray flowers and violet centres.
Limonum	Statice	Dwarf perennials with narrow persistent leaves in tufts, flowers mainly pink or blue.
* *Carpobrotus aequilaterus*	Pig Face	Succulent prostrate herb with cream to yellow flowers August to November. Variety *edulus* has yellow or rose purple flowers.
Coprosma kirkii		Forms a dense mat of shiny green foliage.
Galenia secunda		Semi-prostrate succulent herb with white flowers.
Gazania		Colourful low-tufted perennial available in red, white, orange or yellow.

Botanical Name	*Common Name*	*Description*
Hibbertia scandens		Strong hardy climber with dark green foliage and yellow buttercup flowers.
* *Kennedia exima*		Prostrate herb with scarlet flowers.
* *Kennedia macrophylla*		Red flowered form.
* *Kennedia nigricans*		Black, yellow-blotched flowers.
Mesembryanthemum		Colourful bright spring flowering succulent, available in a wide range of colours.
Myoporum parviflorum		A hardy, fast growing ground cover with white flowers. A number of leaf forms are available.
Oenothera drummondii		Attractive bright yellow flowering herb.
Parthenocissus quinquefolia	Virginia Creeper	Strong deciduous creeper with bright red autumn foliage. Prefers moist situations.
* *Scaevola crassifolia*		Succulent foliaged ground cover with mauve flowers.
Sedum		A large group of succulents available in a variety of colours.
Sempervivum		A large group of succulents available in a variety of colours.
* *Tetragonia* species		Attractive succulent foliaged herbs with yellow insignificant flowers.
Trachelospermum jasminoides	Star Jasmine	Evergreen climbing shrub with fragrant white flowers.

GROUP 2

Plants suitable for growing in positions which receive some protection, e.g. behind the second line of dunes from the ocean, sheltered bays or inlets

TREES

Botanical Names	*Common Name*	*Approx. Height (metres)*	*Description*
* *Agonis flexuosa*	Willow Myrtle	9	Narrow leaved pendulous tree with small white flowers.
Cupressus arizonica	Arizonica Cypress	9	Handsome, upright blue-grey foliaged conifer.
Cupressus macrocarpa		12	Green foliaged horizontally branched conifer, also available in a golden form.
* *Eucalyptus platypus* var. *heterophylla*	Coastal Moort	6	Well formed, fast growing bushy tree.
* *Eucalyptus lehmanii*	Bushy Yate	6	A small bushy tree carrying large masses of greenish white flowers.
Ficus rubiginosa	Rusty Fig	12	Deep green foliaged tree with rusty reverse. A variegated form is also available.
* *Melaleuca leucadendra*		6	Upright tree with spikes of creamy white bottlebrush flowers.
Pinus halepensis	Aleppo Pine	20	Hardy upright pine of symmetrical growth.
Pittosporum phylliraeoides	Native Willow	3	Light green foliaged pendulous tree with orange fruit.
Tamarix aphylla	Tamarisk	7	Hardy tree with dull grey needle-like foliage.
Quercus ilex	Holm Oak	18	Tough leathery foliaged tree.

SHRUBS

Botanical Name	*Common Name*	*Approx. Height (metres)*	*Description*
Acacia species *cyclops* *cyanophylla* *heteroclita* *rostellifera*	Wattles	2-4	Attractive fast-growing shrubs or small trees with an average life of 10-15 years.

Botanical Name	*Common Name*	*Approx. Height (metres)*	*Description*
Aucuba japonica variegata	Gold Dust Tree	1	Handsome shrub with variegated foliage. Requires shade.
Buddleia madagascariensis		2	Strong-growing shrub with terminal panicles of orange-yellow flowers.
Correa alba		1	Compact semi-erect shrub with white to pink trumpet flowers.
Cortaderia	Pampas Grass	2	Perennial grass with attractive plumes, pink and white forms.
Cotoneaster horizontalis		0·5	Deciduous flat-growing shrub with small dark green leaves and red berries.
Cotoneaster serotina		3	Attractive pendulous shrub with bunches of red berries in autumn.
Cytisus proliferus		4	Fast-growing soft foliaged shrub with white pea-shaped flowers.
* *Diplolaena dampieri*		1	Hardy shrub with pendulous orange bottle-brush-like flowers.
Escallonia species		2	Attractive foliaged shrubs with attractive wax-like bell-shaped flowers, pink and red.
Melaleuca nesophylla		3	Large attractive bushy shrub with terminal pinky mauve pom-pom flowers in summer.
* *Myoporum insulare*	Boobyalla	3	Dense fast-growing drought resistant shrub.
Nerium myrtifolia	Oleander	4	Hardy attractive shrub available in a wide range of colours.
Polygala myrtifolia var. *grandiflora*		2	Compact shrub with rich purple pea-shaped flowers over a long period.
Psoralea pinnata	Blue Broom	3	Fast-growing shrub with lavender blue pea-shaped flowers.
Rhamnus argenteo variegata	Buckthorn	3	Evergreen hardy shrub with glossy leaves, margined creamy white.
Russelia juncea	Coral Bush	1	Attractive pendulous, almost leafless shrub with tubular red flowers for most of the year.
Spartium junceum	Spanish Broom	3	Green stemmed leafless shrub carrying yellow pea-shaped flowers in early summer.
Tamarix pentandra	Tamarisk	2	Needle foliage and bright pink large racemes of flowers.
Viburnum suspensum		2	Hardy attractive foliaged evergreen shrub with small white to pink flowers followed by orange red berries.
Vinca rosea	Periwinkle		Attractive low growing herbs with pink or white flowers throughout summer. Can be treated as annuals.

* Plants marked with an asterisk are W.A. natives.