

A Wind Barrier for KZN Coastal Gardens

There is a trick to designing a windscreen that both deflects the wind upwards and over the barrier and slows air movement by filtering it through the foliage.

How many of you recall frustrating outdoor lunches of wind-tossed salad and wind-whipped strawberries and cream? Sheltered patios rank high on our list of garden essentials. Imagine then, a reader's dilemma, where she battles some days just to open her front door such is the strength of a coastal gale. While the focus of this article is on shelterbelts for coastal gardens, the broad design principles are the same everywhere.

But, firstly, it helps to understand the issue:

Wind as a problem:

- Wind can scorch and shred leaves and break brittle branches.
- Forceful, consistent wind affects plant growth.
- Strong winds can cause plants to sway excessively, pulling and tugging on their roots.
- Topsoil is lost from uncovered soils.
- Wind increases water loss from plants and soils through evaporation causing plant stress.
- Plant choice is limited, and this reduces floral and thus animal diversity.
- Wind can limit our enjoyment of the garden.

Windbreak benefits:

- They're essential for water-wise gardens, helping to reduce water loss from soils, lawn and containers.
- Plant and animal diversity increases in wind-protected areas.
- They encourage outdoor living, helping to reduce stress levels and improve our interaction with nature.
- Wind barriers contribute to lessening the need for air-conditioners and heaters.

Windbreak challenges:

- A living screen is not a quick-fix solution as plants take time to grow
- Plant choice is critical and limited.

So, why then grow a barrier when one can quickly build one with bricks or wooden planks?

Solid, impermeable barriers like walls abruptly force the wind up and over, resulting in an equally fast descent in the form of strong damaging, unpleasant eddies on the lee side, just where you've

placed your favourite bench or bulbs. A solid structure also blocks cooling summer breezes creating a stifflingly hot spot.

A plant screen, on the other hand, deflects and slows down the wind by both filtering it through the foliage, and directing it upwards in a way that does not cause turbulence on the protected side of the barrier.

- The trees and shrubs absorb some of the energy using frictional drag as the air moves through, over and around them.
- They deflect the wind to a higher level.
- Foliage deflects the wind in random directions.

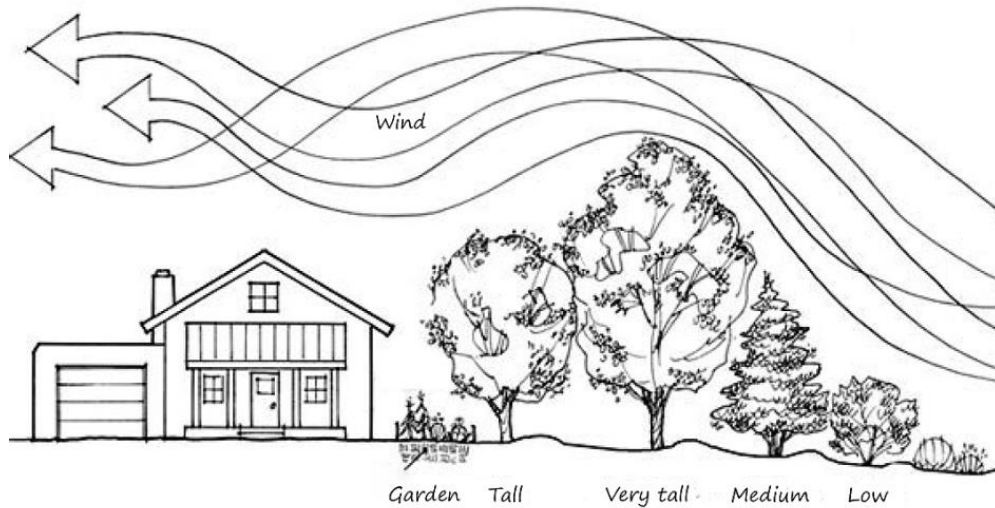
Windbreak design:

Nature's guidelines. In nature, plants in wind-torn areas grow in dense intermingling groups made up of a variety of species, heights and growth forms – trees, large and small shrubs, perennials, grasses and climbers. The foliage barrier formed is a permeable one with gaps through which the wind flows. Plants lean on each other, usually with the strongest rooted and densely-leaved species growing on the windiest edge.

Man-made guidelines: Hurricane studies show that trees growing in groups survived the winds better than an individual or widely spaced trees. They define a group as 5 or more trees, each growing within 3 m of each other, with a staggered placement rather than planted in rows.

(Ref: Wind and Trees: Lessons Learned from Hurricanes¹ Mary L. Duryea and Eliana Kampf from University of Florida Extension; <http://edis.ifas.ufl.edu/pdffiles/FR/FR17300.pdf>)

(Sketch and design on following pages)



How to plant the windbreak: See above sketch

- Orient the wind barrier perpendicular to the wind you want to block.
- Begin by planting low-growing groundcovers into the prevailing wind – on the side of the garden from which the wind comes. Even this ground-level layer will begin to slow down the wind.
- Behind this, add small shrubs (1m and below) and perennials that will begin the process of pushing the upward.
- The next barrier layer consists of medium to large shrubs planted close together to provide a strong structure of support. The wind now also moves through the plant barrier, slowing as it goes.
- Your final layer is a mixed group of trees of varying heights that will once fully grown, provide the barrier at canopy height. Tree trunks and branches are very effective in slowing and re-directing the wind.
- Once the trees provide shade, plant shade-loving shrubs and perennials.
- Don't forget to include mostly evergreens in order to protect against both summer and winter winds.

Tips:

- Protect new plants with small, temporary wind barriers, like a shade cloth screen; these may be unattractive, but they do help the permanent plants to grow strong and healthy – and faster than without this protection.
- Mulches are essential to prevent moisture loss. Use heavy mulches like wood chips or rough (partially decomposed) compost.
- Consider successional planting: Plant wild grasses and fast-growing between the young trees and shrubs knowing they will die off as the growing plants shade them out. This foliage cover will slow the wind better than a mulch layer, again improving growing conditions.

- Adequate root space is critical for strong root development: Pavements, buildings, driveways, as well as shallow soils, all restrict root development.

Plant characteristics:

Reader, Joy's, comment that the wind is so strong it strips the Toad tree of all leaves, highlights the importance of correct plant choice:

- Small leaves: won't be shredded by strong winds. Large leaves catch the wind like a parachute, pulling them down and tearing them.
- Plants with flexible stems that move with the wind; plants with rigid, brittle stems and branches easily snap in strong winds.
- Thick, glossy leaves with a waxy layer that protects plants from excessive water loss.
- Leathery leaves too tough to shred that also act as wind deflectors.
- Choose water-wise species. Plants with grey and hairy leaves are protected by the hairs from drying out as the shade and trap moisture. The grey deflects the heat of the sun keeping the plant cool.

Choosing plants:

Wind as a constant presence in coastal gardens, shouldn't be underestimated as one of the most limiting factors affecting plant selection.

Trees: Choose trees with even, balanced form and a single leader. Read our article on how to plant and stake trees.

Shrubs: Look for nursery plants with compact growth and multiple stems. Keep pinching out the tips to encourage bushy growth.

Grasses: Grasses are some of the most wind-resistant plants around, and most require little watering. They can even serve as miniature windbreak plantings helping to protect the shrubs and trees in their early growth phase.

Groundcovers: choose compact plants without too much woody growth.

The following are examples of natural groupings: *Mimusops caffra*, *Euclea natalensis*, *Apodytes dimidiata*, *Brachylaena discolor*, *Protorhus longiflora*, *Acacia karroo* and *Sideroxylon inerme*. Once grown, add *Capparis species*, *Carissa*, and *Grewia*.

Further inland on hilly slopes one finds *Harpephyllum caffrum*, *Searsia chirindensis* and *Protorhus longifolia*.

See extensive plant list below.

<p><u>Trees:</u></p> <p>Fast-growing: Acacia karroo Bersama lucens Deinbolia oblongifolia Drypetes natalensis Euclea natalensis Ficus lutea Hibiscus tiliaceus Mimusops caffra Mimusops obovata Protorhus longifolia Psydrax obovata Strelitzia nicolai Syzigium cordatum</p> <p>General: Allophylus natalensis Apodytes dimidata Brachylaena discolor Clerodendrum glabrum Crassula ovata Dodonaea viscosa Eugenia capensis Ficus burtt-davyii</p>	<p>Harpephyllum caffrum Maytenus procumbens Milletia grandis Trichilia dregeana Phoenix reclinata Searsia nebulosa Sideroxylon inerme Tarchonanthus species</p> <p>Deciduous: Croton sylvaticus Erythrina lysistemon Ficus natalensis</p> <p>Shrubs: Aloe arborescens Acokanthera species Aloe thraskii Barleria obtusa Bauhinia tomentosa Carissa macrocarpa Chrysanthemoides monilifera Crassula ovata</p>	<p>Gardenia thunbergia Grewia occidentalis Rhoicissus digitata - climber Strelitzia reginae Tecomaria capensis</p> <p><u>Groundcovers:</u> Aptenia cordifolia Arctotheca calendula Asystasia gangetica Bulbine frutescens Carpobrotus dimidiatus Cotyledon orbiculata Diets grandiflora Dimorphoteca fruticosa Gazania rigens Lampranthus species</p> <p><u>Wild grasses:</u> Eragrostis spp. Setaria megaphylla Sporobolus africanus</p>
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