

## Understanding and Managing your Garden's Microclimates

---

As we search out a cosy spot in the winter garden or a respite from the summer heat, or even as we mull over the placement of our new plant purchases, we are hunting out the unique microclimates of our garden space. Our general climate is governed by the region we live in: coastal, mountains, Highveld plateau, east or west coast, for example, each with their specific rain seasons, day/night temperatures, frost incidence, windy days, air composition (salty or dusty), altitude, and so on. Within your boundary fence though are a multitude of micro-climates influenced by passing roads, buildings, neighbours trees, slope and aspect of each bed. In nature, a plant germinates and grows where conditions best suit its needs, its habitat, but within our gardens they rely on us to position them correctly. This ensures a less stressed plant and a more efficient garden overall as it reduces the need to use valuable water resources, particularly in our dry winters. Most problems experienced by gardeners are a result of incorrect plant placement!

Many factors influence micro-climates: some we can manipulate to our benefit, others we either have to live with or find ways to mitigate their influence. It is worth taking the trouble though because even the smallest change in conditions can have a significant impact.

### How to assess your garden's microclimates:

Take a walk around your garden, and you will notice how the temperature varies as you move around from sun to shade, top to bottom of the slope and that some areas are windy while others are more protected. Take note of the following and mark them down; this knowledge will give you a blueprint of your various garden conditions.

### Checklist:

1. **Sun and shade:** when do the various sections of the garden receive the sun – in the morning or afternoon, all day, dappled or partial shade/sun, and for how many hours? Many full sun species and grassland species need at least 6 hours of sun a day.
2. **Are these areas dry or moist?** It may be a dry shade under a tree with thirsty roots or a thick canopy. A full sun area around a garden tap will be moist. Sloping ground in hot sun will be dry.
3. **Position and size of trees:** large evergreen trees on the east side of the house block out the morning sun which in summer may not be an issue, but you may want this sun in winter. Beds under these trees will receive morning sun but may get the late afternoon sun. Evergreen trees on the west side will create beds with morning sun but afternoon shade, and it will be cooler in winter. Do neighbours trees and buildings cast shade or channel wind?
4. **Depth of shade:** thick evergreen trees cast a darker shade and light, or sparse canopied trees have brighter shade conditions. Deciduous trees allow in the winter sun which can be quite harsh. Even many evergreen trees shed a lot of leaves, allowing a lot more sun in during winter. Buildings cast a denser shade than most trees.

5. **Light conditions:** is there any reflected light off light coloured walls, paving and water surfaces? Bright light levels can be a problem for some plants, increasing the amount of heat they have to cope with. Reflected light can improve conditions in shade increasing the number of plants that will grow here. Trees with high canopies let in more light than those with low canopies.
6. **Overhead foliage or obstacles:** Foliage can block a significant amount of rainfall as do overhanging eaves or other structures. These create drier microclimates under them.
7. **Watch your garden through the changing seasons:** sun and shade boundary lines will change from summer to winter. In winter the elevation of the sun is lower in the sky, the sun may not shine over the tree canopies until much later in the morning, and the sun's low elevation allows it to reach further into shady areas in winter.
8. **How much hard landscaping do you have?** Heat radiates off paving and walls warming the area around them. In a hot climate, plants will need to cope with this extra heat, but it can be used to the advantage of plants in cold areas. Dark coloured walls absorb and give off more heat than light coloured walls. Tar and gravel can get very hot, increasing the temperature and water evaporation of the area close by.
9. **Water features:** streams, ponds and other water features will cool and moisten the surrounding air.
10. **What areas are exposed to summer and winter winds and what areas are protected?** Can these protected areas get too hot in summer without a cooling breeze blowing through?
11. **Do you have sloping ground and by how much does it slope? Is the top of the slope exposed?** Where do the sun and shade fall? In winter, in particular, you will notice the cooling air as you walk down the slope.
12. **Does runoff drain into or away from your beds?** Do you lose this valuable water source down the stormwater drain?
13. **Are certain plants water hogs?** Do they have shallow or deep root systems? How much will they compete with new plants for water? They could create drier conditions for other plants to cope with.
14. **Aspect:** north facing areas are usually hotter than south facing, for example.
15. **Soil type** – dry, sandy soils don't retain water for long. Clay soils can retain it for too long causing root rot in plants requiring dry conditions.
16. **Maintenance:** do you keep your soils well mulched to retain moisture and keep soil temperatures even?

### **Micro-climate practicalities and possible mitigation**

**General note:** compost is a natural food source that adds nutrients to the soil. But, without knowing the current nutrient levels of your soil, how will you know how much organic matter to add? Test your soils first using a simple soil testing kit available at hardware stores and online - you could find you only need to add a small handful of compost to each planting hole, or none at all. The best method of soil amendment for permanent plant beds is via a top dressing of mulch (compost/ rough organic matter from the garden). Vegetables are strong feeders so here, add compost to the planting holes, and top-dress.

**Dry slopes:** moisture levels can be improved by planting groundcovers and perennials with strong root systems to help to retain the soils, the Asparagus and Agapanthus families for example. Flat-growing groundcovers are also a good choice; they slow down the movement of the water, allowing it time to settle and soak in. Swales and terraces across the contour of the slope are also very effective at slowing down the water.

**Dry soils:** Keep soils covered with a thick organic mulch layer to reduce evaporation. Soil organisms will work it into the soil helping to improve moisture levels; keep topping it up. Dense matting groundcovers and perennial are a living mulch option. Slope paving, driveways, pathways, lawn, so water runs off into these beds.

**Moist soils:** The best option is wetland/bog species. Blanket the soil with rough organic matter that will help to aerate the soil and improve drainage as it is worked in by organisms.

**Dry shade:** If the roots of trees and larger shrubs reduce the amount of water available for the other plants, build raised beds to lift the plants away from the roots giving smaller plants a chance to use the water first before it gets sucked up by the larger roots.

**Dry wall beds:** Use plants for dry soils (sun or shade), add a little organic mix to the soil and keep the soils well covered with an organic mulch layer and dense matting groundcovers to hold in the moisture. The groundcovers will constantly add fallen leaves to act as mulch and eventually break down into more humus.

**Dense (compact), poorly drained soils:** this is often shown by a thin layer of moss on the ground. Plant with moisture-loving plants: options include wetland/bog plants for sun or shade-loving ferns, or build a raised bed and fill with friable soils. Matching plants to current conditions is usually the most successful option and requires fewer resources to implement.

**Frost:** Use walls and tree canopies to create protective pockets in which to plant the more tender varieties. Don't plant frost-tender species in the lowest areas of the garden where frost incidence is higher; the best position for them is under the protective canopy of a low, evergreen tree, or against a north facing wall where the day's warmth will warm up the surrounding air for a few hours after the sun sets.

**Exposed areas:** These sections of the garden will be open to all the elements – hard, driving rain, prevailing winds, both hot and cold, channelled winds up streets and between buildings, and hot, drying sun. In addition, exposed areas cool down faster at night time. The plant palette for this tough situation is probably quite limited. The soils will need to be covered at all times. A screen of shrubs and trees will filter and deflect the wind and help to lower or raise temperatures; on the protected side of the screen a larger variety of plants to thrive. This permeable screen, rather than a solid wall, allows in a cooling summer breeze without which this spot could be just too hot in

humid climates like Durban. Strong winds can shred leaves and snap branches, so choose species with smaller leaves and flexible stems and branches.

**Low-lying areas** are often cooler and moister than elsewhere in the garden as cold air moves downwards and water pools here through gravity. They are also less exposed to the wind. If this area is in full sun, it could be very humid and would be a perfect spot for wetland or high water needs species. If it is in shade, moisture-loving ferns will thrive. It will be one of the coolest spots in summer and the best place to position a bench to hide away from the intense February heat. In winter though, the cold air will have you searching out the sunnier upper reaches of your garden. Plants needing warm shade could battle in this situation.

**All day sun:** dry soils, high temperatures and bright light conditions usually characterise this situation. Local water wise, full sun species are the best choice. Succulents, plants with small leaves that reduce transpiration, grey-leaved plants, grasses and grassland wildflowers will all thrive here.

**Shady, cool and moist:** there is less moisture loss from the soils and plant leaves, and winter temperatures are colder than other situations. Light conditions are lower so choose full shade lovers. Plants that struggle in low light will tend to etiolate (grow lanky with increased space between nodes) and won't flower well if at all.

**Dappled shade:** this is full shade through the day but with spots of sun that shine through gaps in the canopy like harsh spotlights. These change with the sun's movements through the day and plants growing here will get a little direct sunlight at some point. In summer these spots can act like spotlights, hot and intense. Plants happy with partial shade (either morning or afternoon) should manage in dappled shade.

#### **Aspect:**

The north side of the house is hotter and drier. Moisture loss from soils and plant leaves is highest. Plants in these situations will need to cope with full sun all year round. Up against the house, they will also need to cope with reflected light off the walls and if under the eaves, significantly less rainfall.

The south side of the house is shadier and cooler and during the rainy season may never dry out. Moss is common here. A good spot for high water needs shade lovers.

The west side of the house receives morning shade but will get the intense afternoon sun. The gardener is faced with a couple of choices: either plant shade trees to cool down the area or plant water wise, full sun species as they will be the only ones to cope with this hot sun. The soils may well be drier too.

The east side of the house gets morning sun (if there are no trees to shade it) but areas close to the house will lose the sun early on so full shade lovers will be the best choice. Beds down the eastern boundaries of the garden can get the late hot afternoon sun. Semi-shade plants could work well in this area.

Transition zones: morning shade and afternoon sun - plant sun lovers here as they can cope with the intensity of the afternoon sun. Morning sun and afternoon shade will take semi-shade plants. While many succulents need hot sun for most of the day, you will find some that will take partial shade.

**Summer rainfall:** place winter rainfall plants very carefully. If they need dry soils in summer, plant them in raised beds to lift them high above the water table, and make sure soils drain well. Just be aware that many out-of-area species will battle in the high humidity of the KZN coast or the Highveld frost.

**Winter rainfall:** be aware of where you position summer rainfall plants: they require water during their hottest season – their main growth period - and could show signs of water stress in a dry summer.

**Small pointers:**

Even within the same garden bed, two plants of the same species may show differences:

- If one aloe is shaded slightly by a larger shrub, it may flower later than its neighbouring siblings.
- A plant with less air movement around it may die off while the same species alongside it, surrounded by fewer plants, grow quite happily.
- Temperature and light conditions influence growth: In my garden, the timeline for winter leaf drop of five Flat crown species differs by a couple of weeks as does new spring growth, influenced by the varying temperatures and the amount of sun and water they receive.

For your garden to thrive with limited input, a little research beforehand will pay dividends! While many plants hate being moved around once planted, is there any point to keeping a plant in that position if it is not doing well? Don't be afraid to move a struggling plant – it will soon tell you when it is happy. And, using this checklist gives you the best chance to match plant to place.