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Mulching - nature's own blanket protection against water loss. Only deserts in nature don't have mulching to protect them.

## 1. Benefits

- Reduces evaporation by up to 70 %. Potential savings are greatest in hot, dry climates or during dry periods.
- Reduces weeds. Weeds prefer barren soil because they are pioneer plants. When mulch is applied, the site is unsuitable for weeds to thrive.
- Insulates the soil against extreme temperature changes. Mulches keep the soil cool in summer and warm in winter, protecting bulbs and plant roots.
- Helps prevent compaction. Water is less available to the plant in compacted soil because the plant needs to work harder at retrieving it and often this leads to smaller, less efficient root systems and smaller plants.
- Organic mulches encourage earthworm activity. Earthworms digest old plant material making it available to the plant again. As they tunnel through the soil, the soil is aerated and water can move into the soil.
- Slows down rain water evaporation. If water is allowed more time to soak into the soil, more water will be available to the plant.
- Less soil is carried off by fast flowing water into rivers, polluting them with silt and depleting the land.
- Organic mulches improve the soil structure as they decompose, making the soil more loose and friable. This improves water penetration as well as water holding capacity.
- Mulch also helps prevent crusting of the soil surface (this inhibits absorption of water into the soil.)

## 2. Tips for mulch application:

- Composted and partially decomposed organic mulches are the most inexpensive and environmentally beneficial options available to the gardener. Almost any biodegradable organic product can be used.
- Green plant materials which could cause a nitrogen deficiency e.g. lawn clippings can be used directly in the garden with confidence as long as the first layer is well decomposed. Do not dig it into the soil. Earthworms thrive when green plant material is added to the mulch blanket. Earthworms are often harmed by chemical fertilizers, so be sensitive when selecting nitrogen fertilizers for replacing nitrogen losses during the decomposing of plant matter.
- Non composting types of mulches e.g. large bark nuggets and stone varieties are useful where no cultivating is to be done. Be aware that the bigger the aggregate the bigger the potential air entry site would be for evaporation to take place. This could be compared to the effectiveness of a loosely crocheted blanket compared to a closely woven type blanket.
- Walk-on type mulches are useful on informal pathways that develop through the garden bed. By mulching these pathways that are normally hard, hot and cause glare, you reduce the temperature and evaporation, slow run-off water so it can flow off the path and onto neighbouring plants, and alleviate compaction.
- The decorative value of mulching is very effective in introducing texture, variety and interest to the garden. Stone types and large bark chips are mostly used for this purpose. A gravel path can successfully link formal paved areas to the garden with less visual glare than straight paving. Should visitors use a gravel path, an early approaching sound can be heard as the gravel moves under the feet.
- Dormant areas in the highveld garden are an unavoidable fact. Mulching over dormant ground covers lightly with bark nuggets gives an interesting visual change, neatens the bed and beautifies these sections. An interplanting

of winter bulbs thrives and looks most attractive in these mulched flower beds. In spring, the ground cover is protected from the winter cold and bounces back quickly to cover the bark more than an unprotected area of plants.

- A neat appearance is very important when using mulch. Poorly placed mulch on top of plants damages them and gives an untidy finish. Make sure that leaves are swept off pathways and lawns and then packed down under plants as mulch. Shake fallen tree leaves off the top of smaller plants and pack them below.
- Create water traps by grading the land so as to channel water back into the garden. Mulching in these water courses and water traps help slow down and holds the water to allow for penetration to occur.
- Organic mulches such as straw, grass clippings, pine needles, leaves, bark chips and wood chips should be spread  $\pm 4$ cm deep over the soil surface.
- Mulches which contain viable seed will encourage uncontrolled and often undesirable germination.
- Always pat loose leaves down under plants. Loose leaves could blow back into the garden. If the leaves are too light to use in a mulch application, partially decompose them in your compost heap.
- Never allow leaves fallen from trees above to remain on top of plants as this will make the garden untidy.
- Soak the ground well if possible before applying any mulch or when applying irrigation because mulches do have a screening effect which soaks up and traps water before it reaches the soil.
- Mulching of potted containers is as important as mulching your garden beds. It is here that water savings can also be made. The aesthetic value of mulching in containers adds great value to the visual attractiveness of the container.
- Monitor watering needs of mulched areas by gently scraping back mulch and checking soil moisture under the mulch. If the area is moist, no watering is required.
- All new plantings whether they are annuals, perennials, bulbs, trees or shrubs must be mulched.

### 3. What to do with fallen leaves

- All fallen leaves can be used.
- They encourage the presence of earthworms which will aerate and compost the soil.
- Birds such as Shrikes, Hadidas and Robins are attracted and thus forage in the mulch.
- Provide mulch.
- Protect plants sensitive to frost such as begonias, bulbs etc.
- Use pine leaves (needles) around acid loving plants.
- Do not dig leaves in; allow them to settle on their own.
- By the end of December most, if not all of the leaves that fell in autumn will be worked naturally into the soil.
- Layer should be 5cm - 10cm deep around perennials and shrubs and 1-3cm around annuals.
- Leaves create a natural forest effect.
- Large quantities of leaves allowed to remain on dormant grass under trees create a wonderful woodland feeling. Remove just before spring.
- In very windy areas pat them down to prevent them from being blown away. This is not applicable in most gardens.
- For excess leaves, let them decompose slightly on the compost heap.
- Lawn clippings can be used in the same way as leaves for mulch. Kikuyu is known to germinate from the seed in the clippings so, partially decompose them before use.

### 4. Perennials and groundcovers as mulches

- Mulch can be a living entity. Grass, perennials or ground covers are examples of living mulch.
- These living mulches will help to protect the soil and offer many of the advantages of mulch.
- Such advantages include temperature insulation, less weeding, water infiltration and improvement and soil erosion control etc.

### Encouraging fauna

- Wild life can establish itself in the undergrowth (ground covers under shrubs).
- These could include mongoose and lizards.
- Birds such as Shrikes, Hadidas and Robins are attracted to forage in the undergrowth.
- Periwinkle (*Vinca* spp) is a very suitable ground cover in a forest floor type setting.
- Large urban properties will attract field mice which in turn attract owls.
- Larger undisturbed islands of planting are needed for successful fauna introduction.

### Correct positioning

- Sun versus shade: Ground covers must be chosen to suit their micro climate.
- Spacing. Large spaces in-between perennials will expose large amounts of soil. This exposed soil will lose water through evaporation from the hot surface, so aim for small spacing between plants.

### Temperature insulation

- Ground covers are successful soil temperature insulators.
- This is most valuable to other plants as they use less water due to the lower soil temperatures.

## **5. Mulching types and their pros and con's:**

<b>MULCHING MATERIAL</b>	<b>WATER CONSERVATION ADVANTAGES</b>	<b>WATER CONSERVATION DISADVANTAGES</b>	<b>MOST EFFECTIVE DEPTH</b>
<b>MAN MADE:</b>			
Polyethelene film	<ul style="list-style-type: none"> <li>• Holds water in effectively</li> <li>• Can be used under other mulches</li> <li>• Thin, light, easily transportable</li> <li>• Works well on initial, installations</li> <li>• Holes can be punched in it to allow water into the soil</li> <li>• Best used under ground cover and in small shrub beds.</li> </ul>	<ul style="list-style-type: none"> <li>• Unsightly and must be covered or masked by other materials</li> <li>• Heat is increased</li> <li>• Does not allow water in easily</li> <li>• Labour intensive to install</li> <li>• Environmentally unfriendly - very slow to break.</li> </ul>	3 - 10mm (under other mulches)
Fibreglass	<ul style="list-style-type: none"> <li>• Lets water into the soil and holds it in</li> <li>• More attractive than film</li> <li>• Can be used on slopes.</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive</li> <li>• Labour intensive to install</li> <li>• Allows some weed through</li> <li>• Must be pegged down, mats when wet</li> <li>• Best used in small areas</li> <li>• Environmentally unfriendly - very slow to break down.</li> </ul>	1 - 2mm
Kraft paper	<ul style="list-style-type: none"> <li>• Keeps water in</li> <li>• Reflects sun if two sides are of different materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Doesn't let water in, must have holes punched in it to let water in</li> <li>• Labour intensive to install</li> <li>• Most effective on flat surfaces</li> <li>• Disintegrates in a year or two and must be replaced</li> <li>• Can be unsightly.</li> </ul>	5 - 10 mm
Newspaper	<ul style="list-style-type: none"> <li>• Keeps some water in, lets little in</li> <li>• Controls erosion</li> <li>• Can be incorporated into the soil as it weathers.</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term mulch</li> <li>• Disintegrates</li> <li>• Unsightly, dries out and blows, trashy</li> <li>• Not commercial but may be used on small areas for temporary mulch.</li> </ul>	20mm or less
<b>INORGANIC</b>			
Gravel	<ul style="list-style-type: none"> <li>• Lets water in very well, holds none itself, keeps water in the soil</li> <li>• Does not decompose, comes in a variety of sizes</li> <li>• Long lasting.</li> </ul>	<ul style="list-style-type: none"> <li>• Can be pushed down into the soil</li> <li>• Does not help the water holding capacity of the soil</li> <li>• Unsightly if used in too large an area.</li> </ul>	20 - 75mm
Crushed stone	<ul style="list-style-type: none"> <li>• Lets all of the moisture into the soil, holds none of it itself and keeps the water in the root zone.</li> </ul>	<ul style="list-style-type: none"> <li>• May change the soil chemistry when it breaks down</li> <li>• Can be very reflective if it is too white.</li> </ul>	20 - 75mm

Sand	<ul style="list-style-type: none"> <li>• Holds a lot of water itself, lets some water in but keeps in what is in the soil</li> <li>• Dries on the surface forming dust mulch</li> <li>• Eventually incorporates into the soil, improving its water holding capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Dries out quickly and blows away, erodes and runs off</li> <li>• Highly reflective</li> <li>• Somewhat unsightly</li> <li>• Tight, so not all water gets in.</li> </ul>	20 - 50mm
Decomposed granite	<ul style="list-style-type: none"> <li>• Holds a certain amount of water itself, allows water in, and holds water in the soil</li> <li>• Long lasting.</li> </ul>	<ul style="list-style-type: none"> <li>• Regionally available, a variety of colors are possible</li> <li>• Does disintegrate in a number of years</li> </ul>	20 - 75mm
Pumice	<ul style="list-style-type: none"> <li>• Holds some water in the pores but allows a great deal of water into the soil</li> <li>• Cools the soil</li> <li>• The most porous and the lightest of the inorganic mulches.</li> </ul>	<ul style="list-style-type: none"> <li>• Regionally available, in a variety of colors</li> <li>• Does break down in a few years</li> <li>• Does not integrate into the soil to improve the water holding capacity of the soil.</li> </ul>	20 - 75mm
<b>ORGANIC</b>			
Wood chips	<ul style="list-style-type: none"> <li>• Lets water in effectively, keeps some in the mulch layer, allows little out</li> <li>• Cools soil and keeps weeds down</li> <li>• Many sizes available but largest and smallest should be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>• Breaks down and disintegrates in a year or two depending on derivation and type</li> <li>• Small sizes require nitrogen if they break down too quickly.</li> </ul>	50 - 100mm
Sawdust	<ul style="list-style-type: none"> <li>• Lets water in slowly, holds a great deal itself, not all of it reaches the soil,</li> <li>• Helps the water holding capacity of soil as it disintegrates, and forms a barrier which compacts in time.</li> </ul>	<ul style="list-style-type: none"> <li>• Breaks down rapidly</li> <li>• Blows in the wind when it is dry, and crusts</li> <li>• Regionally available</li> <li>• Nitrogen must be added either to the soil or to the sawdust to avoid nitrogen depletion</li> <li>• Certain varieties are slower to disintegrate than others.</li> </ul>	20 - 75mm
Shredded bark	<ul style="list-style-type: none"> <li>• Binds the soil</li> <li>• Lets water in, holds it in the soil well, builds the moisture holding capacity of soil</li> <li>• Looser than wood chips, more open than sawdust.</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive</li> <li>• May compact in time</li> <li>• Can be unsightly and ineffective if applied in too thin a layer.</li> </ul>	50 - 100mm
Chunk bark	<ul style="list-style-type: none"> <li>• Coarse texture, large size lets more water in but does not hold water in as well as finer textured materials</li> <li>• Long lasting</li> <li>• Does not hold water in the mulch layer, but allows it to pass through.</li> </ul>	<ul style="list-style-type: none"> <li>• Fairly expensive</li> <li>• Not always available except on a regional basis</li> <li>• Breaks down slowly so is not able to improve soil texture.</li> </ul>	50 - 120mm

Pine needles	<ul style="list-style-type: none"> <li>• Loose, light, but binding</li> <li>• Lets in a lot of water, holds little and keeps some in, allows some to be transpired</li> <li>• Binds the soil</li> <li>• Does not break down.</li> </ul>	<ul style="list-style-type: none"> <li>• Regionally available</li> <li>• Acidic, settles and forms a mat</li> <li>• Lasts a short time</li> </ul>	20 - 75mm
Leaves/leaf mold	<ul style="list-style-type: none"> <li>• Lets some water in, keeps it in, holds the soil</li> <li>• Readily available in some areas, shredded is more compact and easier to use</li> <li>• Improves the water holding capacity of the soil.</li> </ul>	<ul style="list-style-type: none"> <li>• Can be a fire hazard</li> <li>• Regional availability</li> <li>• Mats and causes run off, dries and blows</li> <li>• Unshredded are difficult to handle.</li> </ul>	20 - 100mm
Lawn clippings	<ul style="list-style-type: none"> <li>• Readily available</li> <li>• Lets some water in, holds little itself</li> <li>• Inhibits transpiration and best used in small areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Best used dry, mats, heats</li> <li>• Offensive odour</li> <li>• Needs to be spread in thin layers</li> <li>• May contain weed seeds.</li> </ul>	20mm at a time
Straw	<ul style="list-style-type: none"> <li>• Easily lets water in</li> <li>• Cools the soil</li> <li>• Holds some water in the soil though not as much as other mulches</li> <li>• Good for temporary cover over grass seeding.</li> </ul>	<ul style="list-style-type: none"> <li>• Not always attractive</li> <li>• Will blow and scatter, will mat</li> <li>• Flammable</li> <li>• May contain weed seeds.</li> </ul>	50 - 120mm
<b>WASTE</b>			
Straw manure	<ul style="list-style-type: none"> <li>• Actually a waste product</li> <li>• Low level fertilizer, improves the water holding capacity of the soil</li> <li>• Dual use mulch which will be incorporated into the soil and have to be renewed each year.</li> </ul>	<ul style="list-style-type: none"> <li>• Needs to be aged or treated</li> <li>• Regionally available</li> <li>• Can have an unpleasant odor.</li> </ul>	50 - 100mm
Compost	<ul style="list-style-type: none"> <li>• Readily available on most sites</li> <li>• Can be made from waste generated on the site</li> <li>• Excellent method of incorporating organic matter into the soil</li> <li>• Improving its future water holding capacity, is average at letting water in, holds some itself</li> <li>• Is excellent at holding it in the soil.</li> </ul>	<ul style="list-style-type: none"> <li>• Needs to be stored and aged on or near the site</li> <li>• Unsightly, bulky, can have an unpleasant odour</li> <li>• Takes time to collect and compost, but costs little other than labour and storage</li> <li>• May contain weed seeds.</li> </ul>	50 - 100mm

**PEAT MOSS**

Sphagnum	<ul style="list-style-type: none"><li>• One of the best mulching materials</li><li>• Holds water in the soil very effectively, holds a great deal of water itself</li><li>• Is a superlative soil conditioner and can be worked into the topsoil each year and be replaced to improve the water holding capacity of the soil.</li></ul>	<ul style="list-style-type: none"><li>• Expensive</li><li>• Sheds water when dry</li><li>• May blow in windy sites</li><li>• May not let water in when it is wet</li><li>• Cannot easily be used on slopes as it erodes</li><li>• Best used in small confined areas</li><li>• Removal process could harm environment.</li></ul>	20 - 75mm
Bog	<ul style="list-style-type: none"><li>• Is much less expensive where it is regionally or locally available</li><li>• Holds water itself but is effective at holding water in the soil</li><li>• Lets water in slowly, and holds a great deal</li><li>• May not drift as much as sphagnum when dry.</li></ul>	<ul style="list-style-type: none"><li>• Not always weed free</li><li>• Can be bought in bulk, is somewhat coarser than sphagnum</li><li>• Not as uniform or predictable as to texture or quality</li><li>• Removal process could harm environment.</li></ul>	