# Clivia Cultivation

Growing *Clivias*is not difficult if you remember a few basic rules relating to potting media, watering, feeding, light and temperature and pests and diseases.Below are a series of articles written by experts on various aspects of Clivia Culture

**Growing media**
**© Copyright Mark Laing. Used with permission.**Six species of Clivia are endemic to South Africa, the most commonly grown being Clivia miniata, which is now cultivated all around the world. In Europe, it is grown as an indoor pot plant. Their natural habitat is on South-facing slopes, under trees, and often on top of rocks. They are semi-epiphytic plants (“air plants”), living above ground with their roots in leaf litter, deriving their nutrients from the humus, as the leaf litter decomposes. Their large white roots provide an amazing “sponge”, giving Clivias excellent drought tolerance and nutrient storage. We need to recreate these soil conditions if we are to optimize their growth.

When we cultivate Clivias away from their natural environment, several key elements need to be considered:

1. Clivias do not like to be planted into soil. Their roots are not designed for living in soil, so they often rot off, leaving only the surface roots alive. They stay alive but flower poorly.

2. Clivia roots have a requirement for lots of oxygen around the roots. They hate “wet feet” and waterlogging. Heavy clay soils or heavy growing media are bad for their cultivation.

3. Tall pots drain more than short pots. The height of the pot or the bag determines its drainage capacity, as a factor of the porosity of the medium used.

4. Drainage requires a physical connection from the bottom of the pot onto soil or a capillary mat. If the pot is in the air, then a waterlogged bottom layer (a perched water table) will occur: the medium in the pot will act like a sponge and will not release water out of its bottom layer unless there is capillary action sucking water away from it. So do not put gravel or polystyrene chunks at the bottom of pots; keep it all one medium. Place Clivia pots onto a layer of sand or onto capillary mats. Do not leave them up in the air or on bricks.

5. When we mix media with different particle sizes, the result is called a matrix. What happens is that the small particles fill the pore spaces of the big particles, making a dense mixture. This is the secret of concrete: sand particles fill the spaces between gravel chunks, and the cement then binds them in place. Drainage from pure sand, or pure gravel is high. But when they are mixed in the right ratio, drainage is reduced to very little. So the principle is that when we mix particles sizes of a growing medium, we reduce oxygen content and drainage, and increase water-holding capacity. If we add sand to a bark medium, we make it heavier, with less oxygen and it drains LESS well. Remember that Cliva are VERY dependent on a high oxygen content in its growing medium.

6. Sand is not all the same. It depends upon what rocks it came from originally: quartzite, granite, dolerite, etc. In general, quartzite sand is the best to use because it has the right chemical and physical properties. What one needs to avoid using is river sand derived from a decomposing rock such as granite. These decomposing sands usually have lots of fine particles that clog up a medium, and when sourced from a river, often carry diseases and nematodes (eelworm). Whatever sand is used in a growing medium, it is important to sieve out all the fine particles (< 0.25 mm), using the coarser particles for growing purposes.

7. Composts and growing media are not all the same. What one is looking for in a perfect growing medium is;

(a) A physically and chemically stable medium (it must not decompose or break down or collapse or compost further)

(b) A good water holding capacity

(c) A good oxygen content, hence good drainage (air-filled porosity).

(d) A good cation exchange capacity (CEC) (how much fertilizer the medium absorbs and then releases to the plants).

Consider the main options in artificial growing media in South Africa:

1. Composted pine bark

This medium is derived from fresh pine bark. A large pile of this is chopped up into large chunks, lime, nitrogen and water are added, and a composting process is started. Every week for 6-12 weeks, the pile is turned upside down to re-oxygenated it, and is re-watered. The pile heats up to 60-70°C each week until composting is completed. In the process, the bark is degraded to a lignin core, the biodegradable cellulose and hemicellulose being decomposed by bacteria and fungi. The result is a black, odourless medium with excellent physical and chemical properties: physically stable, no toxins, good drainage and oxygen content, and a good CEC. It is also completely free of plant diseases and nematodes. An inadequately composted pine bark will still be a bit reddish, will often smell of pine and will still get hot when in a pile. Plants grow poorly in inadequately composted pine bark media.

A range of different particle sizes (coarseness) is available, which allows one to pick and choose according to the crop. Mature Clivia prefer a coarse medium, often marketed as a coarse potting mix. But a seedling mix is useful for growing out Clivia seed.

2. Vermiculite

This medium is derived from a mica from Phalaborwa, which is heated till the mica “pops” like popcorn. It is widely used in the USA as a growing medium. However, it is problematic as it has a very high pH of around 9.0 which is far too high for most plants, and it decomposes, compacting into a dense, oxygen deprived medium. It is not suitable for use with Clivias.

3. Perlite

This medium is derived from a rock that is heated till it puffs up, like popcorn. It has a very high porosity and drainage, and is excellent for cuttings. Clivias grow well in it but their irrigation and fertilization has to be managed very carefully because the perlite holds very little water or nutrients.

4. Polystyrene balls

These are often added to growing media. However, they add nothing, and may result in a more dense and compact medium with poorer drainage.

5. Coir peat or Coco peat

This is a medium derived from the outer husk of coconuts. It has excellent water holding capacity but it drains poorly. It can be useful to add to a composted pine bark medium to increase water retention, by adding 10-30% by volume to a composted bark medium. Do not use more than 30% or waterlogging problems may occur.

6. Sphagnum peat

Again, it has excellent water retention but poor drainage. It can be useful in mixtures.

7. Mushroom compost

This is not a good growing medium as it is derived from straw, so every bit of it will be decomposed by bacteria and fungi. The effect is that what starts out as a nice fluffy medium soon becomes a heavy, waterlogged medium. Use it to mulch lawns, etc.

8 Chicken litter

This is a poor growing medium as it is based on wood shavings or sawdust, both of which decompose rapidly. It is excellent as a mulch for lawns and gardens.

9. Wood shavings and sawdust

Again, this is a poor option for a growing medium because the particles decompose, breaking down into smaller and smaller particles, getting denser and denser, shutting out all oxygen. Another problem is that, as the bacteria and fungi break down the wood, they “steal” fertilizer from plants, so the plants always look sickly and yellow. It can be used for a single crop of cucumbers or tomatoes grown hydroponically in bags, but should not be used for a perennial crop like Clivia.

10. Bagasse

This is a poor growing medium as it is all cellulose and decomposes constantly. It also has a high salt content. Avoid it as a growing medium for any crop.

11. Topsoil

Soil is a terrible medium to put into a pot. Without earthworms to lighten the soil, and make for aeration and drainage, the soil compacts into a dense, hard “brick” Adding sand or any other medium does not help: it just makes a dense “concrete”, and the clay in the soil binds it all together like a cement. Topsoil may also carry plant diseases.

12. Garden compost

This is usually derived from leaves and other organic matter. It is excellent to mulch with but does not work well as a basic growing medium.

The worst medium I have seen used was made up of sand, sawdust and topsoil in equal portions. Once it had been in a pot for a month, it made excellent bricks for the building industry! And the Clivia roots died of waterlogging and lack of oxygen.

In South Africa we are fortunate in having an excellent growing media industry based on composted pine bark. If the composting has been conducted properly, and the right grade of medium is chosen, then any potted plants will prosper in composted pine bark. Clivias are best when grown in a large pot or bag, in a coarse potting mix. Alternatively, they can be put on top of the ground and then covered with a coarse potting mix, to simulate their natural conditions. They will survive if planted into soil, but their growth and flowering will be reduced.

Fertilization for Clivias may be in the form of slow release fertilizer granules or dilute liquid fertilizers applied regularly, or both. Their nutrient requirements appear to be simple, and they respond well to most general fertilizers. Keeping the N:K ratio (nitrogen to potassium) at 1:1 or 1:2 will ensure good flowering. Too much nitrogen on its own results in lots of leaves and little flowering.

If you want to know more about growing media, there is a superb Australian book, which is highly relevant to our conditions: Handreck, K. A. and Black, N.D. (1994) Growing media for ornamental plants and turf. University of New South Wales Press, Sydney.

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