

Living Stones: *Lithops*



Lithops karasmontana spp. *bella* on a hill outside of Aus, Namibia.

Lithops are small, interesting plants from southern Africa that are relatively easy to grow indoors. The first *Lithops* was discovered by William John Burchell in 1811 during a botanical expedition in southern Africa. During his travels in the Northern Cape Province, he found a strange looking brown stone with a fissure across the surface near the town of Prieska. On closer inspection, this strange-looking stone turned out to be a succulent plant. These plants, in the plant family Mesembryanthemaceae (Aizoaceae), were named for their stone-like appearance: *lithos* (=stone) and *opsis* (=like). Local Afrikaans names for these plants in areas where lithops are known include *beeskloutjie* (cattle hoof), *skaappootjie* (sheep hoof) or *perdeklou* (horse's hoof), for their resemblance to miniature hoofprints. In their native

habitats in Namibia and South Africa, *Lithops* have evolved to blend in so well with their surroundings – looking just like the sand and stones they live among in shape, size and color – that they can be quite difficult to spot, even for those with a trained eye and years of experience.

Lithops (the word is both singular and plural, and both the scientific name and a common name) are found in arid regions in widely separated, sparsely populated colonies. The average rainfall in areas where *Lithops* occur is generally less than 20", with most of the rain coming in spring and fall. Some species occur in areas with an annual rainfall of 4" or less, and a few rely on mist or fog as their main source of moisture. They are found growing in many diverse habitats, on quartz grit or gravelly flats, stony ridges and hills of sand, decomposed granite, quartzite, shale, schist and limestone. The vast majority of *Lithops* species occur in the Nama Karoo and succulent Karoo and are especially common along the Orange River valley in the Northern Cape that runs between Namibia and western South Africa.



Typical *Lithops* habitat, southern Namibia.



Lithops are masters of camouflauge: *L. herrei* on a white quartz outcropping near the NAMDEB operation at Auchos, Namibia.



Lithops are able to survive in these dry areas because of their capacity to store water, with almost the entire plant devoted to this function. Each individual plant consists of two succulent leaves fused together in the shape of an inverted cone (although some species will produce multi-headed plants). The fissure at the top of the plant is the division between the two leaves. There is no stem; the taproot joins abruptly at

the base of the leaves. The thick leaves can store enough water for the plants to survive for months without rain. In periods of drought (almost all the time) they shrivel and shrink below the soil level.

These small, nearly stemless succulents are partially subterranean. In habitat the plants only grow from ½-1 inch high and from 1-3 inches wide, and they grow flush with the ground. Staying small and keeping a low profile helps minimize the effect of the intense heat and sunlight where they live. But this also presents a problem of getting light to the photosynthetic apparatus of the leaf cells (chlorophyll) that are underground. To solve this dilemma, the wide leaf tips have windowed cells that allows light into the inner portion of the leaf, where it is diffused before reaching the chlorophyll, which is scattered along the interior leaf margins.



Lithops generally grow flush with the ground in habitat.

There are at least 37 species (new species continue to be discovered) and numerous varieties (145+) of *Lithops*; all look quite similar to each other, differing mainly in the shape, markings, color and texture of the body. They come in a variety of subtle colors of gray, brown, rust, green and pink. There is considerable variation in the patterns of dots, lines or patches on the upper surface that help them to mimic their surroundings. There may also be dimples or indentations where the markings appear. The markings may heavily cover the leaf surface, or the windows may cover most of the leaf surfaces.



A variety of Lithops species and cultivars (L-R): *L. dorotheae*, *L. aucampiae* 'Jackson's Jade', *L. optica* 'Rubra', *L. verruculosa*, *L. karasmontana* 'Mickbergensis', *L. otzeniana* 'Aquamarine', and *L. fulviceps* var *lactinea*.

Most *Lithops* flower during autumn and early winter, producing daisy-like yellow, pale orange or white flowers with many petals. The flowers open in the afternoon of sunny days and close again in late afternoon. The flowers emerge from the fissure between the leaves. Some flowers are scented. They range in size from roughly ½ to 1½ inches, depending on the species and conditions.



***Lithops* flower buds emerge from between the leaves (L and LC) and start to open (RC) the daisy-like flowers (R).**

Lithops are self-sterile, so must be pollinated to produce seed. The seed is held inside a hydrochastic, 4-8 chambered fruiting capsule, which only opens when moistened, exposing the tiny seeds. In nature, falling rain drops splash out the seeds to a distance of an inch to up to a few feet from the parent plant. Once the capsule dries, it closes again, protecting any seeds remaining until the next rain.



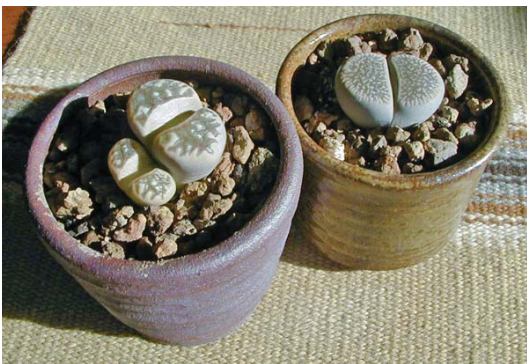
After the plant flowers, it goes into a period of dormancy during which at least one new body develops. In the spring the plants start to reabsorb the old leaves as the new ones develop. Eventually the new body pushes out from the fissure between the old leaves. The fissure of the new leaves forms at about 90 degrees to the old fissure. Eventually, the old leaves wither away to a dry, papery sheath on the side of the new body. Many plants will also divide at this time, to produce more than one leaf pair so that a single body gradually becomes a small cluster.

After the flowers fade (L), a chambered fruit capsule remains (C) which opens when moistened (R).



After flowering, a new pair of leaves develop (L), pushing up between the old leaves (second from left and LC), as the old leaves start to wither (RC). A plant may also divide at this time, producing two pairs of leaves (second from R and R), leaving a papery sheath around the new leaves (R).

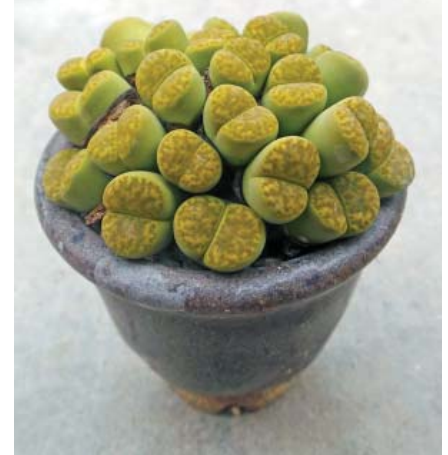
Cultivation of Lithops as Houseplants



Lithops are popular novelty houseplants.

to quench their thirst.) Their health in cultivation depends on sufficient bright light, good soil drainage and proper watering.

Because they thrive in low humidity, need infrequent watering and care, and are relatively easy to grow, *Lithops* are popular novelty houseplants. With their small size and slow, compact growth these plants do not take up much room. *Lithops* are long lived – up to 40 or 50 years. It is quite possible to keep a plant in the same pot for 10 or 20 years. *Lithops* are non-toxic to humans or pets. (There are even some references to African children eating these plants as a means



Lithops can remain in a small pot for many years.

Lithops can be grown successfully on a sunny windowsill (although a greenhouse is preferred) where they receive about 4 or 5 hours of direct sunlight during the early part of the day, and partial shade during the afternoon. Usually a southern window is the best location;

an unobstructed eastern exposure is a good alternative. If a plant does not receive enough sunlight it will begin to grow slender and elongated, lean to one side to receive more light, lose coloration and turn greenish, and will eventually die if better conditions are not provided. But be cautious about moving a plant abruptly to brighter light – it could get sunburned and be fatally injured.



Lithops need a well-drained planting medium and look nice topdressed with gravel or stones.

Lithops require well-drained soil, much the same as cactus. Add sharp sand, perlite, decomposed granite or other gritty material that will help improve drainage to regular houseplant potting mix, or use special cactus potting mix. These plants have an extensive root system, which means they need a larger pot than the plant size would indicate. Pots that are about 3 to 5 inches deep – with drain holes – are recommended to allow the roots adequate room to grow. Place the top of the plant just slightly above the surface of the soil, rather than at the soil surface as would occur in nature. Many growers topdress with gravel or surround the plant with stones to give a more natural appearance.

Lithops have a yearly cycle of growth, and it is essential to water only during certain stages and to keep the soil dry at other stages of their growth. Over-watering is the chief cause of early demise. Too much water and they rot or produce new bodies at the wrong time of year. Too little water and they become stunted. How often you water depends on how quickly the potting medium dries out. In general, drench the plant and leave it to dry out completely (probably 1-2 weeks). Then wait a couple more days before watering again. If in doubt....don't! It is best to water in the mornings so that the excess water evaporates and the upper layers of soil dry out fairly quickly. Some general guidelines for watering (but this may vary somewhat by species):

- Water from late spring into summer.
- When the plant goes dormant in the summer, stop watering. If the plant really shrivels, give just enough water to restore the firm appearance of the plant, but only water until about the top one-half inch of the soil is moistened.
- Resume watering in late summer-early fall, when the plants resume growth and bloom. The first sign of growth is when the fissure between the leaves begins to separate in preparation for flowering.
- *Lithops* should be left totally dry throughout winter and spring. Stop watering to allow the old leaf pair to dry out and the new pair develop. By early spring the new body should be visible. Watering can be resumed once the remains of the old body are completely shriveled and dry. If water is given too soon, the old leaves will try to continue to grow and the plant will not develop properly. Remember, the old leaves should totally dry up as the new leaves are growing.

Fertilize *Lithops* sparingly and use a low nitrogen, high potassium type.

Lithops can tolerate very high temperatures as long as there is plenty of fresh air. Never allow the plants to freeze.

Seed and plants of all species and many cultivars are today available from specialist succulent nurseries. They grow



Lithops can be grown from seed.

quickly from seed, and can be expected to flower in 3 to 4 years under optimal conditions. Sow the seeds during the summer in sandy medium, covering with a very thin layer of fine sand. Water the tiny seeds gently so they aren't displaced. Place the container in a warm sunny spot, keeping them moist but not soggy. The first seeds should germinate in a few weeks (but germination may be spread out over a long period of time, with stragglers taking as long as a year). Once the seedlings are developing rapidly, reduce watering so that the top ¼" of medium dries out, but the lower medium stays moist. Don't water too much, as excessive watering during this period may cause damping off of the seedlings. When the plants are 2-3 months old, start letting them dry out completely for a few days between waterings, and gradually increase the length of the drying time. The young plants can be transplanted when they are about a year old.

Lithops can also be propagated by dividing a multi-headed plant. Lift the plant, carefully cut through the roots and replant them immediately.

– Susan Mahr, University of Wisconsin - Madison



Weavings with lithops designs, by Karakulia Weavery, Swakopmund, Namibia.

Additional Information:

- Lithops – basic information at <http://www.lithops.net/lithop7.htm>
- A guide to the cultivation of Lithops – basic information; also a separate page of good links, at <http://www.lithops.info/>
- Flowering Stones – on Yahoo! Groups, to find information, chat with group members, see pictures, and more at <https://groups.yahoo.com/neo/groups/Lithops-SA/info>
- Achim Hecktheuer's Lithops Site – lots of photographs and distribution maps at <http://www.mesembs.com/lithops/>

Selected Reference Books:

- *Lithops: Flowering Stones* by D. T. Cole. 1988. Acorn Books, Randburg, South Africa (2nd Edition, with N. Cole in 2005, Cactus & Co., Italy)
- *Lithops: Treasures of the Veld* by S. Hammer and C. Barnhill. 1999. British Cactus and Succulent Society (2nd Edition, 2010)