

## ***Mesembryanthemaceae***

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*Mesembryanthemaceae* is a family of the plant kingdom with perhaps the longest name (19 letters) with the relatively simple meaning of, “pistil in the middle.” It was formerly spelled *Mesembrianthemum*, with the meaning of “midday flower,” but as some bloom in the morning, afternoon and many at night, the name was changed. The family is composed of mostly succulent plants of which 99% are found in south or southwest Africa. The other one-percent are found in coastal areas of Australia, New Zealand, Mediterranean area, Canary Islands, and the western coasts of Chile and California.

Plants of the *Aizoaceae*, as many were first known, have been studied as long ago as 1652, and came into cultivation about then. Some who worked with these plants were Prof. Paul Hermann, Richard Bradley, Andrian Hardy Haworth, Alwin Berger, Dr. N. E. Brown, and Dr. H. M. Bolus.

Dr. Brown was one of the first to separate the large genus *Mesembryanthemum* into many smaller units. Dr. Bolus, Prof. K. Dinter, and later Prof. Dr. G. Schwantes carried on this division. Still later, workers in the field were Dr. Marloth, Prof. Nel (Lithops) Jacobsen, (Vol. 111, *A Handbook of Succulent Plants*, and the most recent English edition of his *Succulent Lexicon*), Volk, Prof. Desmond Cole (with his recent revision of the genus *Lithops*), and Rawe (with his revision of the genus *Conophytum*, which is going on right now in the *American Cactus and Succulent Journal*, Vol. XLVII, 1975).

Probably, though, we owe most of our present day knowledge to the grand old man of succulent collectors, Hans Herre, former curator for many years of the gardens at the University of Stellenbosch in South Africa. His many expeditions to the little known parts of South Africa increased the number of genera and species hitherto unknown. His book, *The Genera of the Mesembryanthemaceae*, printed in 1971, is a beautiful work of art as well as a tribute to his vast knowledge of these plants. His kindness to collectors everywhere (including the author) with information and many seeds is well known.

Another collector is Harry Hall, formerly of Kristenbosch, South Africa, who also gave of his time and seeds and plants.

Most of the *Mesembs.* (the shortened name most often used) are perennials with a woody rootstock and highly succulent leaves. There are a few annuals but most are of little importance and will not be discussed here. The family consists of roughly 125 genera and about 2,000 or more species.

Family characteristics are:

1. Showy petaloid staminoids, which means there are no true petals, but merely modified stamens that look like petals.

2. Interior ovary, meaning the ovary is below the stamens, pistil and other floral parts.
3. Hygrochastic capsule, meaning closed fruits (capsules) that open on wetting and close on drying. The kinetic energy of rain drops that propel them some distance from the plant ejects the seeds. Seeds start germinating rapidly, usually within 24 hours, and 98% of them will have germinated within one month. Seeds of the “fig marigold” (the common name) have a long viability, as much as ten years.
4. Gynaecium consist of three to many carpels, and also can be divided by pollen morphology and the number of chromosomes which is n-9. The family is divided into two sub-families according to the attachment of the seeds to the walls of the capsules.
5. Aptenioideae, meaning the seeds are attached to the central wall of the capsule. Genera in this sub-family are: *Aptenia*, *Dactyloopsis*, *Scletium*, and some 16 other genera with some annuals as well as perennials.
6. Ruschiodeae with the seeds attached to the basal as well as the outer wall of the capsule. This sub-family has those genera most collectors are in interested in, i.e., *Lithops Conophytums*, *Faucaria*, *Pleiospilos*, etc., and about 100 or more genera.

## GENERAL CULTIVATION

### 1. Soil

I use 1/3 pumice, 1/3 sand and 1/3 Baccto. Leaf mold is the other constituent most often mentioned, but is hard to find. I use a commercial potting mixture called Baccto which is put out by Michigan Peal, Box 66388, Houston, Texas 77006.

### 2. Pots

The square plastic pots are good and the small bonsai pots can be used. For the highly succulent genera, clay pots are best, with which I use just a slightly heavier soil mix. Drainage seems to be very important. When watered the water should not stand but drain through quickly. Mesembs. do not need repotting very often, as their demand on the mix is very slight. I repot mine every 3-5 years. Try to do the potting when they are in flower or showing new growth or new leaves.

### 3. Watering

In general, watering of most genera can be started in late August or early September when plants start to show flower buds or new leaves. For some species it varies, but most can usually be started at this time. When watering, give the plant a good soaking and then let it dry out. In Arizona, this takes about one week. When resting, beginning watering around the end of February or the first of March, the schedule is cut down to once every two weeks or once a month. With some of the highly succulent ones (see under individual genera) I use a 1 or 2 ounce rubber ear syringe and apply a little water to

the outer edge of the pot, just enough to keep the roots from drying out. I have also started to use a fogger attachment (Fogg-It Fine, IGPM; Fogg-It Nozzle Co., P. O. Box 16053, San Francisco, California 94116) on the garden hose. This gives a fine fog-like mist from which the plants obtain some moisture, much as in their homeland on the extremely arid west coast of South Africa.

Those planted out in the ground and established can take some supplemental water during our hot dry summer months before the monsoons of July and August arrive. If not sure, it is best to delay watering for at least a few days because a perfectly resting plant can go a long time without watering, and if watered too soon, it can turn into a gooey mess overnight.

#### 4. Position

In Arizona, it is best to give some shade during the hottest part of the day. In their homeland, they are often found in the shade of small rocks, grasses or where they can withdraw down into the soil with contractile roots. They will take considerable sun if actively growing, and the color of the leaves is better too.

#### 5. Fertilizer

Mesembs. can be grown without any fertilizer as they take so little out of the soil. When the new leaves start growing they utilize the water from the old outer leaves, which dry up and form a protective covering over the young leaves. At the start of the growing season, a solution of sodium phosphate, either mono or dibasic, using 3 grams to 1000 cc, can be applied at two week intervals for three or four times. This chemical has no nitrogen so no lush growth is produced, but it does help in forming new leaves and flowers.

#### 6. Pests

Sometimes red spider mites or root mealy bugs attack the Mesembs., but these can usually be controlled with one of the systemic sprays. Otherwise, de-pot the plant and cut the roots way back, then re-root in new soil in new pots or sterilized old ones. Occasionally birds and grasshoppers take a liking to some of the plants, but if you feed the birds and kill the hoppers, they are easily kept from doing too much damage.

#### 7. Air

Possibly this should come under the heading of position, but I believe it is of enough importance to be considered by itself. I have noticed over the years that if I am going to lose plants it usually occurs in August or September. This is the time of year that we have the hottest temperatures. The cold frame where I keep some plants in doesn't have a free flow of air. All things considered, this is the only thing I can think of that might cause the plants to rot. Especially since watering increases the moisture content of the air and bacteria and fungus can proliferate. It is true with Mesemb. seedlings that within two

or three days after germination, any cover used to aid in germination should be completely removed.

## CULTIVATION OF SOME INDIVIDUAL GENERA OF THE MESEMBRYANTHEMACEAE

In my collection, which started in 1949, I have over 25 genera and more than 200 species of Mesembs. The following notes are from observations made during that time. I must say that my losses have been more than my successes or at least my card file indicates this. It has been only in the last 10 years that my losses have come down considerably.

*Aloinopsis*: Dwarf tufted plants with tuberous rootstocks need a deeper pot. It flowers January through March. Growth starts around this time. Mine are planted out in the rock garden and have taken frost down to 14 degrees F. Here in Sierra Vista we have about 100 nights a year when it frosts as we are at 4,600 feet. We also have from 7-11 inches of snow a year.

*Argyroderma*: I have had very limited success with these plants. Growth and flowering season seem to start in the fall. Probably clay pots with a very porous soil mix should be used and watered only when new growth or flowers appear. By February, water should be in the form of mist or a small amount to the outer edge of the pot.

*Bergeranthus*: Flowers December through March and sometimes in the fall. Growth should be rested for a few months in winter.

*Bijlia*: Growth starts in October with flowers shortly after, and will take considerable water when growing. Needs a resting period starting in March.

*Cheiridopsis*: Flowers January through March. Growth can be off and on the year round especially with those in rock gardens. Those in pots usually start growing in October. Some plants hardy to 14 degree F.

*Conophytum*: Small succulent plants which can be cone-shaped (thus, the genus name), cylindrical with windows or bilobed. This lovely group should be more widely grown. I have 45 species in my collection from 10 to 1 year old. One clump of *C. minutum* has over 100 heads. These plants, overall, take heavier soil (equal parts) and more water. Flowers start appearing in the latter part of August, and usually are finished by the first part of November. Growth starts showing through all leaves around January and continues through March. Rest these plants for at least 6 to 8 weeks occasionally giving small amounts of mist or water to the outer edge of pot. Water heavily when growing. *Conophytums* do NOT do well planted in the ground.

*Dinteranthus*: This is one of my favorites as the plants look unreal as if carved out of stone. Flowers start appearing in the middle of August and continue through the first part of November. Use a soil mix of about three parts sand to one part Baccto. Plant in clay pots and under water at all times. I have four of the six species. Most of them live about

1-5 years with me, although one plant of *D. microspermus* I have had for seven years. At least one of the species, *D. puberulus*, grows well in the rock garden, and didn't freeze until the temperature went down to 6 degrees F. one night last winter. These are lovely plants well worth the effort to keep them alive. When my plants flower, I often take them to work (at the pharmacy). *Dinteranthus* always causes people to stop, look, and exclaim in wonder, "Are those really plants?"

*Faucaria*: An interesting genus of about 33 species with succulent leaves that have cartilaginous edges and often stout awl-shaped teeth along the margin that look like gaping jaws, hence, the genus name. Quite often *F. tigrina* or *F. tuberculose* are among the first Mesembs. a collector gets. Those in the rock garden start blooming in August and continue (in pots) into November. Growth starts any time after blooming and seldom are these plants lost to over watering. Most are hardy down to 14 degrees F., and some down to 6 degrees F.

*Fenestraria*: Flowers can appear from the end of August through January, but on average in November. Rest this plant from March onward for several weeks. It will take quite a bit of water when actively growing. Not cold hardy.

*Frithia*: *F. pulchra* is the only plant in the genus that is stem less with alternate windowed leaves and pretty reddish-purple flowers. Use plastic pots with equal parts of sand and Baccto, and then add some more sand. Place the base of the plant in a top dressing of pebbles so that it is not touching the soil. The two plants that I have had for the past five years have bloomed in the following months: May, June, August, October, November, and December. New leaves appear in January through March.

*Gibbaeum*: A genus of 21 species that, with me, has proven impossible to grow. The only member of this genus that I have had any success with at all is *G. heathii*. One plant that I raised from seed was in my collection for seven years. This was planted out in the rock garden. The following observations were made: Flowers appear in April, new leaves in January through April, except one time in September. It's hardy to 14 degrees F. I would like to know more about the cultivation of these plants, as most are outstanding in general appearance and flowers.

*Glottiphyllum*: Flowers appear September – December. New growth appears anytime after that. This genus appears at its best when potted in clay pots with a very porous soil mix (3 parts sand to 1 part Baccto). Watering should be kept to the very minimum. If watered too heavily these plants tend to lose their characteristic form and become leggy and unnatural in appearance. *G. oligocarpum*, is, in my estimate, one of the most beautiful plants that God made.

*Herreanthus*: *H. mereri* is the only plant in this genus. A lovely plant with *Argyroderma*-like epidermis and scented white flowers, that once open, remain open day and night for two weeks. Buds appear in late October and blooms from mid to late November.

*Lapidaria*: Another beautiful plant that is monotypic, i.e., only one species in the genus, is *L. margaretae*. Yellow flowers appear from the end of September – October. Porous soil, but plastic pots are okay. Keep water at a minimum. New leaves start showing from January – March.

*Lithops*: These interesting South African succulents have been cussed and discussed in great detail, even a whole book has been written about them. In my collection, I have 22 species, 7 varieties and 1 duplicate. *L. localis* (*L. terricolor*) raised from seed 21 years ago, has been planted out in the rock garden for the past 18 years. *L. salicola* and *L. turbiniformis* have been planted out in the ground for nine years. Along with others, they have withstood temperatures as low as 14 degrees F., and some even to 6 degrees F. Lithops can be planted in plastic pots with a porous soil mix, and watered heavily during their growing period, from August through February. Plants in pots should be planted higher than those in the ground. Those in the ground can be planted down to their leaf tops. Flowers appear from August – November, except *L. optica* var. *rubra* which flowers in December or January. These are very interesting and fascinating plants. For an up-to-date list of Lithops, see Dr. Desmond Coles' checklist in *Excelsia*, #3, December 1973.

*Mitrophyllum*: A very touchy genus. Use porous soil and plastic pots. Growth starts in September and is over by March 1. NO WATER AT ALL from March – September. The leaves can be fogged with a spray once every two or three weeks. I have three species, two for five years, and one for four years. Yet, they haven't flowered. The plants have an interesting type of leaf growth as they form two types of leaves each year (heterophylly). Difficult but worth the extra care they take.

*Nanthus*: Dwarf tufted plants with tuberous rootstocks. Use deep pots and somewhat porous soil. Water when new growth shows, usually in December – January. Flowers appear January – March. Easy plants if not over watered. This plant will take temperatures down to 14 degrees F.

*Oscularia*: Shrubby plant that is easy to grow. Grow in medium soil with lots of water from September – February. Tender below 25 degrees F.

*Stomatium*: Miniature plants that are highly succulent and somewhat resemble *Faucarias*. Flowers are straw-colored and open at night. Some have withstood temperatures of 14 degrees F. Easy to grow in medium soil mix and plastic pots. Growth starts in January and often continues right on through the summer.

*Titanopsis*: Short stemmed, very succulent perennials with spatulate leaves, the ends covered with pustules containing calcium. This plant, when withdrawn into the soil, greatly resembles tufts of limestone, among which it grows. Use porous soil, plastic pots and a minimum amount of water to keep them natural looking. Flowers appear December – March. New leaves appear in summer. I have had one plant of *T. calcarea*, raised from seed, for 23 years. It has done well in the rock garden for 20 years. This is a very interesting group of plants and quite hardy.

*Ophthalmophyllum* (also *Berrisfordia*): A highly succulent plant somewhat resembling *Lithops* on the one hand and *Conophytums* on the other. I have 5 species and 3 duplicates. Flowers start appearing in September and bloom through October, most are white, some diurnal, others nocturnal. New leaves appear in March. My favorite plant is *O. refescens* with its red windowed leaves and fragrant white nocturnal flowers. This plant of two heads, has won 4 blue ribbons and 1 red. Use clay pots, porous soil, and only water when blooming or showing new growth.

*Pleiospilos*: This plant blooms August - December. It is hardy to 14 degrees F, and of easy culture. *P. nelii* blooms in March, and is only hardy to 28 degrees F. Medium soil is needed, clay or plastic pots and lots of water when flowering or showing new leaves.

*Vanheeredia*: Very succulent plants of diversified leaf forms. I have two species in my collection. One, *V. divergens* looks like a fat *Cheiridopsis*, while *V. primosii* looks like a windowed leaf *Lithops*. Use plastic pots with porous soil and water only when flowering or showing new leaves. New leaves appear in March while flowers appear in May. *V. divergens* is hardy to 14 degrees F.

This covers some of the genera in my collection that I have personally watched over a period of years. I hope these notes will be of some use in the growing of these wonderful plants. A lot of TLC is needed, but is well worth it.

I would like to end this article with a quote that covers my feelings about these beautiful mimicry plants. It expresses my feelings about raising them and enjoying their diversity.

Psalm 96:12: "Let the field be joyful and all that is therein; then shall all the trees of the wood rejoice."

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