MESEMBRYANTHEMUMS AND THE PROBLEMS OF THEIR CULTIVATION

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The collection of the Mesembryanthemaceae is the largest specialized collection of the Hamburg Botanic Garden. It has been set up for the research needs of a group of systematists at the Institute of General Botany, which forms one administrative unit with the garden. The team consists of Professor Ihlenfeldt, Dr Hartmann and myself together with a technical assistant and several undergraduate students, and we are concentrating chiefly on the morphological and taxonomic problems in this interesting group of succulent plants.

The Mesembryanthemaceae as a family was created by splitting up the old Linnean genus Mesembryanthemum into a considerable number of smaller genera. This was begun by N.E. Brown after his retirement from Kew and continued by G. Schwantes in Kiel in Germany and by Mrs Bolus in Cape Town. Originally a subgroup of the Aizoaceae, the Mesembryanthemaceae is now generally considered to be a family in its own right. Nearly 2,500 species have been described so far, the majority of the 1,445 by the late Mrs Bolus within a period of thirty years. Though being one of the larger families of the Angiosperms, the Mesembryanthemaceae (for convenience sake usually abbreviated to Mesems) have a very restricted distribution; all but perhaps a dozen species are confined to South-West and South Africa.

The Mesems are rather uniform in their basic morphological features - decussate leaves, dichasia, showy polyandric flowers, mostly with a pentamerous capsule, etc. - but they show an extraordinary variability as regards to life forms, which range from small shrublets and articulated stem succulents to cluster forming or dwarf leaf succulents as well as to annual herbs. They are
cultivated either because of their interesting habit - like the so-called flowering stones Lithops or Argyroderma - or for their showy flowers. Another point of interest is the unique mode of dissemination, they are rain ballists, utilizing one of the most complex fruit structures of the plant kingdom.

Generally speaking, the knowledge concerning this group is poor, and the taxonomy is in a state of utmost confusion. There are several reasons for this only a few of which can be mentioned here: restricted distribution in a largely inaccessible habitat; a high degree of morphological variability; the fact that most species are self-incompatible, so that the early European investigators had no fruits available and either neglected or over-emphasised the diagnostic value of the character; the most important fact was however that many of the students of this group were gifted amateurs but without sufficient scientific background, so an unduly large number of ill-founded taxa have been created. The publications of Jacobsen stabilized at least some of the major nomenclatural problems, but the basic taxonomic work has still to be done.

Our aim, therefore, is to attain a solid basis for a revised classification of the family, the emphasis of our studies lying on morphology and evolutionary biology. It is obvious that this cannot be done with herbarium material alone, let alone the fact that succulents give usually very poor herbarium specimens. Collection trips have been undertaken in 1969, 1971, 1972 and 1974, on which we made about 2,500 collections of Mesems. We try to get samples from every known locality with at least three living plants to be taken to Hamburg - additional voucher specimens are usually left at Stellenbosch Botanic Garden - and a lot of further material like mass gatherings of capsules and dried or bottled plant material is also obtained.

The collection now covers an area of 200 m² (250 square yards) with approximately 7,000 pots containing one to several specimens. At the moment it is distributed over three small glasshouses, but there is a new glasshouse under construction where we will have 300 m² available, so there is still some room for expansion.

It is of course impossible to try and have such a collection for the whole family, and so we concentrate on few groups only, especially the Western Cape Province genera. Even the major taxa of the Mesems have a distinct geographical distribution, and the following sub-tribes of the Ruschiioideae are endemic to this region: Mitrophyllinae, Dorotheanthinae and Leipoldtiinae. Also the sub-family Mesembryanthemoideae has its centre of diversity here, and it is these four groups we have under study. They represent about forty genera with nearly 450 species, that is one-fifth of the hitherto described ones. A list of genera held in cultivation can be obtained on request, but I think I do not need to list them here.