

Graft of seedlings on *Selenicereus*

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Introduction

The graft of *Gymnocalycium* is not an absolute necessity. A great part of the species of this South American genus grows perfectly well on its own roots. Merely a couple of species with carrot roots sometimes arouse on our (my) culture conditions the impression, as though nature provided the plants with a good water reservoir and an effective carriage organ on gravel-like and rocky subsoil, and put them in the position to pull the aboveground body into the underground in case of aridness - but sometimes you can't help the impression that such roots are obstructive for brisk growth.

Now it is surely not a goal of nature to produce large quantities of biomass of the relatively small and steady genus *Gymnocalycium* within a short period of time. The collector however certainly wants good growth and plentiful annual blossoms. A further desire would be to quickly obtain adults and flowerable plants from sowings of new or rare specimen.

For the latter reason in particular, I began four years ago to graft in each case 3-4 seedlings of a sowing portion or a genus respectively on *Selenicereus grandiflorus*. The remainder of the seedlings has to be content with its own roots.

Rearing of the seedlings

The general procedure of the sowing and/or further treatment of seedlings is described in almost every book about cacti and is therefore not covered here.

For my breeds, I use 5.5 cm deep salad bowls from the supermarket and a substrate consisting of 50% sieved, coarse-grained sand and 50% normal, sieved flower earth containing turf.

The mixture is stewed for 90 minutes with 180°C in the baking-oven in a closed container.

They are sown after the cooling, then watered and afterwards the containers are locked with the respective well closing covers.

The sowing in my case takes place in October with usually outstanding germinating rates.

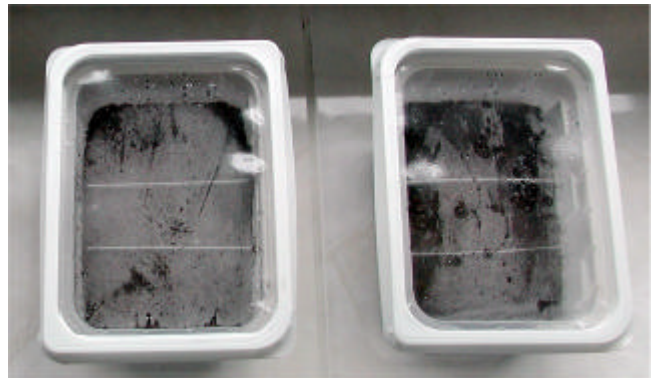


fig. 1 Sowing shells.

Preparation of the grafting stocks

The mother plants for the scion production of *Selenicereus* are located in balcony boxes. To have the offshoots grow as straight as possible, they are tied to a backup frame.

The balcony boxes are kept evenly damp in period of growth and are fertilized to a degree of 0,2% every three weeks, using normal flower fertilizer - the goal, after all, is, to produce offshoots which are as long and sturdy as possible.



fig. 2 Rearing of the *Selenicereus* grafting stocks in the balcony box.

About at the end of March of the following year the branches of *Selenicereus* are cut back to approx. 5 cm. The 'harvested' offshoots are dissected into sections about 15 cm in length and put upright into flower pots for self-healing of the cuts. Confusion of top and bottom side should be avoided, of course. After 3-4 weeks the cuts healed. At the end of April the scions are planted

into pots which contain the same -but unsifted- mixture used at the sowing, the scions being placed approx. 5 cm deep into the earth. Stewing does not take place. Afterward they are thoroughly watered.

Further four weeks later scions have filled with water and individual upper areoles start to sprout. From this time on the grafting stocks are ready for the graft. Since I only have room to set up fresh graftings for 20 scions at a time, 20 scions of *Selenicereus* are potted and brought to sprout in each case in bi-weekly intervals. Thus also the graft takes place every two weeks.

The graft

Just as the sowing, the procedure of the graft is regularly described in botanic literature, so further explanations should not be necessary.



fig. 3 *Gymnocalycium prochazkianum* (STO 1581) grafted in first week of August 2002, photograph taken at the beginning of June 2003, in a 7 cm pot.

One can already graft few days old seedlings. It worked for me however to leave the seedlings some time for strengthening the fabric. With somewhat older seedlings one also better recognizes the central cylinder, which has to be in contact with the one in the grafting socket. The seedlings already have 5-10 areoles at this point and do not require any more finger acrobatics when setting the cuts with a razor blade. After the graft the seedlings are lightly weighted and

kept at not less than 23°C to achieve a fast connation. For this the grafts can even be placed quite darkly (i.e. no sun; set it up in a room, not in a cellar), which they do in my case due to available space.



fig. 4 *Gymnocalycium denudatum* (AP 939) grafted in first week of August 2002, photograph taken at the beginning of June 2003, 3.5 cm diameter, the easternmost *G. denudatum*.

After 7 days the 'weights' are removed and after further 7 days the grafts are brought into the sunny greenhouse, making room for the next round of grafts. At the time when the plants are put into the greenhouse the first of the thorns on the vertices of the *Gymnocalyciums*, which are somewhat flattened by the weights, have already straightened up again. The creation of new thorns then indicates the successful graft. With this procedure I achieve a growth rate of more than 95%. The graft only fails when the central cylinder of the grafting stock was not connected properly.



fig. 5 five weeks old graft of *G. spec.* from Illisca, La Rioja in Argentina (STO 204), 1 cm diameter.

So far no incompatibilities between seedling and grafting stock were determined.

In case the graft succeeded, a proper growth explosion begins. If the grafting stocks are too short, there is lesser growth of the seedling because of a smaller surface of assimilation. Stocks which are too long reduce the overall crop of scions and unbalance them in their stand, while not further accelerating their growth.

Selenicereus has proven its worth as a grafting stock. The stocks are easy and quick to grow and even the regions at the bottom of the more than 1 meter long sprouts of a year are not wooden and might be used for the grafts. The plant is very robust as well.

The annual grafting period ends between the end of July and the beginning of August. Later plants only come into sprout between the end of August and beginning of September, and slowly stop growing during September. These grafts are not worthwhile any more.

Demounting the grafts

When the desired size of the grafts has been reached, the *Gymnocalyciums* are cut off from their stocks.



fig. 6 Completed graft of *G. sutterianum* aff. (STO 1587) with 4 cm diameter; for wound healing attached to an Erlenmeyer flask.

Approximately 1.5 cm of the *Selenicereus* grafting stock remain at the head. This residue grows new, efficient roots after the cut has healed, thus considerably shortening the amount of time until the graft itself starts to grow again.



fig. 7 Remaining residue of *Selenicereus* at the graft of *G. sutterianum* aff. (STO 1587), San Luis, Argentina.

If the grafting stock is completely removed the graft is forced to develop roots. The period of time until growth resumes is usually substantially greater than that of the remaining residue of *Selenicereus*. Surprisingly, newly rooted former grafts on their own roots (not those of *Selenicereus*) often still grow considerably better than their ungrafted brethren. The grafts have to be removed since *Selenicereus* does not pose a suitable continuous stock.

Though the ribs of the grafting stock fill up and the body becomes circular with further growth of the head, it is not a beautiful sight and the pots would have to be provided with supporting bars due to the increasing size of the grafts. In my case, the grafts are removed as soon as they reach approx. 4 cm in diameter; I only use grafting as means of accelerating youth development.

All of the seedlings grafted between the middle of May and the end of June usually reach this size within the same year. A couple of early-blooming species already bloom in summer. The remaining plants have to be hibernated. For this purpose, the grafts remain at at least 5°C completely(!) dry in the greenhouse until next spring, preferably placed on one of the warmer trays. Individual nights at only 3°C are tolerated.



fig. 8 Completely healed cut. This former graft may be potted.

The following spring becomes somewhat problematic for the grafts. Sometimes already in February the refined plants strongly dry out due to spring sun. Then the watering has to be undertaken carefully in order not to overly damage the dehydrated plants. When there are further cold weather periods the grafting stocks begin to rot out of the pot. The only helpful strategy then, is to cut the *Gymnocalyciums* in due time and to proceed with new rooting as described earlier on.

Shade and natural ventilation might help to prevent dehydration but you also have to develop a keen sense for this critical phase.

Later development of the grafts

In 5th Year after the first graft of seedlings on *Selenicereus* it can be estimated that older plants which have been grafted in their youth do not show overall problems. Seed carriers in particular profit from an efficient root system and are able to nourish various blooms and fruits. Even watering mistakes are easily forgiven.

The hibernation of former grafts under my conditions represents no problem as well. Plants with *Selenicereus* roots come quite quickly into sprout in the spring and stand the winter temperatures of 5°C. The species characteristic appearance of the plants does usually not suffer as long as they receive lots of sun. However, some normally small species usually grow substantially larger than their root-genuine colleagues.



fig. 9 Three years old former graft of *G. bruchii* var. *niveum* (WR 727).



fig. 11 *G. hossei* var. *ferox* (STO 11). Four years old graft of immaculate beauty in a 12 cm pot.



fig. 10 *G. baldianum* (P 127) and *G. erinaceum* (P381) look very similar when grafted.



fig. 12 *G. marsoneri* (P 230). Four years old graft in a 10 cm pot.

The comparison of the grafted plants with their root-genuine brothers and sisters clarifies the difference in size.



fig. 13 *G. catamarcense* (STO 1399), four years old graft. Seedling on its own roots standing in a 7 cm pot.



fig. 14 *G. erolesii* four years old graft.