

# GERMINATION CHAMBERS

## Do Sweat the Small Stuff

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Fair Field Flowers

It's January, your greenhouse is icy cold and you have 20 flats of early crops to start, preferably at 70 degrees. Or it's late March, the weather outside won't settle, and there is no room anywhere for that next succession of plugs to be sprouted. Or, maybe it's August, 100 degrees in the shade, 140 in the greenhouse, and you still have one last round of starts to get going. Wouldn't it be great to have a place set aside, just for that purpose, that delivers perfect results absolutely any time of the year? Well, I do, and you can too.



Chamber with view of thermostat and water supply

Germination chambers, or sweat chambers as they are sometimes called, are simply compact controlled environments for sprouting seeds (known as Stage 1 in the growth of plants), providing the constant temperature and humidity that the majority of the seeds we use require. They deliver amazingly fast, uniform and predictable results every time. Set at 70F, my chamber reliably achieves uniform germination as follows: achillea and calendula 2 days, amaranthus, gomphrena, helianthus and zinnia 3 days, celosia and dianthus 4 days, snapdragons 5 days. You will save on seed costs, greenhouse space and fuel outlays, and quickly wonder how you ever got along without one.

The essential elements of a germination chamber are a submersible heat source with temperature control, a water source, insulation, suitable shelving for your plug trays, and access – some sort of door. You may wonder about light. Don't seeds need light to germinate, or in some cases dark? Not to worry. The light

needed to trigger germination in most cases is so minimal and transitory as to be almost unavoidable. And the dark? Well, that's why we cover seeds, isn't it? Once germinated, your trays are immediately removed from the chamber. It is definitely not for growing on (unless it's yeast you're growing – my chamber is fantastic for raising bread dough).

Got a few thousand bucks worth of spare change burning a hole in your pocket? For \$2300 to \$4500, you can have a professionally designed, fully assembled, wheel-mounted germination chamber delivered to your door, ready to connect to a water source and to plug in. If that fits your budget and your production system (number and size of your trays), it is the easy way to go. You will likely be happy with the results and should see a quick return on your investment. If you are cheap like me, however, and have the skills or can fake it, you will want to build your own. The cost of materials for mine was in the neighborhood of \$450.



Thermostat sensor

If you are even cheaper than that, I have heard of very rudimentary chambers constructed around a stock water immersion heater/de-icer but you would have to assure it does not have a built-in thermostat that typically cycles off at 40 degrees (I found one that claims to have an 80 degree upper limit).

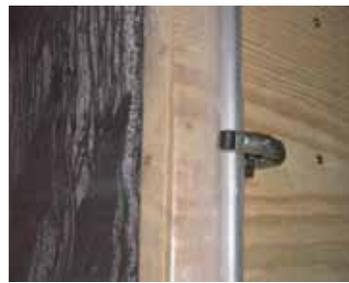
Consider first where your chamber will be located. It can literally be anywhere that you have a spare 10 square feet or so, but some spots are better than others. Ideally, you'll position it efficiently in the flow of your production from seeding to growing on. Then there's the water source and an outlet for power. One other consideration is what to do with the inevitable puddle of condensate. For tha

that problem a floor drain is ideal, but you could also buy or fashion a deep drip pan to catch the moisture. Last is the issue of excess sun. If a spot in your greenhouse or tunnel works best, you will need additional insulation to prevent the chamber from overheating.

My chamber is located in my basement, where all of my seeding and initial growing on is done (about 80,000 plugs in a typical season), a matter of a few steps between each of the operations there. No direct sun, so no overheating issues. It is next to a floor drain, where the plug trays are watered in after sowing, so no water source or water disposal issues. Measuring 32" X 48" X 80", it is sealed to use minimal materials, to fit around a stainless steel evaporator pan, and to accommodate 33 Speedling plug trays or 44 chain pot trays at a time. Since all my trays are rigid, I need nothing more than pairs of rods for shelving, in this case 3/4" PVC water pipe (non-corroding), stiffened with 1/2" electrical conduit inserted inside, capped with PVC caps, and held up by a



100 tray chamber with roll-up door



Latch detail

single stainless steel screw in each end. For flimsier trays, like most 1020 inserts when used alone, you would need welded wire, expanded metal or plastic grid shelving. Just keep corrosion in mind. The goal in any case is maximum exposure of all sides of the trays to the warm moist air.

The box itself is made of 2" foamboard insulation, top, bottom, back and sides. Only the two sides are covered in 3/8" exterior plywood, glued on, for rigidity and shelf support. The interior is lined with polyethylene sheeting to make cleaning and sanitizing easier, and the door is nothing more than a flap of the same poly, taped along the "hinge" edge, reinforced along the "latch" edge with a piece of metal conduit, and latched with a pair of screen door snubbers.

The evaporator pan, of course, along with a suitable thermostat, is the key component of a germination chamber. I purchased mine (about \$320) from a chamber manufacturer, complete with a 1000W, 120V heating element (\$20 purchased separately) and a float valve (\$3.00) for automatic water makeup. This option is still available provided, I was told, that they have orders for at least ten units pending. You could also have your local welding shop

build one for you, or, if you're the sort of person comfortable playing with a toaster in the bathtub, by all means make one yourself. Just be aware that the sticker shock of the cost of a ready-made unit is much less permanent than the other kind.

Likewise for the thermostat. While I cobbled mine together from separate components, for safety, peace of mind and very little additional cost (about \$40), you can purchase a ready-made portable thermostat with an extended sensor and a "piggyback" plug. The extended sensor is necessary because you want the thermostat located outside of the chamber, but the temperature controlled on the inside.

Last, a bi-metal probe thermometer (\$13), similar to a meat thermometer, is important for monitoring the actual temperature and accuracy of the thermostat.

Whatever approach you take for your chamber, from the tricked-out Lexus to the rusted-out microbus on blocks, the most important ingredient for its success is you. Germination chambers need unflinching daily attention, if for only a few minutes, ideally twice a day. It's a short check list to be covered:

- 1. Temperature** – Too high? Too low? Tweak the thermostat.
- 2. Water level** – Is the heating element completely submerged? It will burn out instantly if left high and dry. Always have a spare on hand for that inevitable day that the float sticks from lime buildup or the neighbors' kid shuts off the wrong side of the wye at the faucet.
- 3. What's sprouting** – it is imperative that you get a germinated tray out and into high light ASAP. A half day too long in the dark will produce very rapid etiolation, spindly worthless seedlings unable to hold up their own heads. Even better, you should develop careful records of your own results in your germinator and remove trays just before they are due to emerge.
- 4. Stage 2** – Place your sprouted trays in high light and continued warm temperatures until all cells have completely emerged. You do have a Stage 2 area, don't you? No? Then that's a subject for another day.



Chamber with six Speedling trays

#### Sources

**Complete units:** <http://sezsd.com/>

<http://www.carolinagreenhouses.com/page/page/1689188.htm>

<http://www.hummert.com/ProductList.aspx?C=42A&Title=Propagation%20>

#### Equipment:

**Evaporator pan assembly:** <http://sezsd.com/> (group order – 10 units)

**Portable thermostat:** <http://www.kkcontrols.com/pothwse.html>

#### Float valve assembly:

<http://www.grainger.com/Grainger/wwg/search.shtml?searchQuery=2X768&op=search&Ntt=2X768&N=0&GlobalSearch=true&sst=subset>

#### Probe thermometer:

<http://www.grainger.com/Grainger/wwg/search.shtml?searchQuery=2A625&op=search&Ntt=2A625&N=0&GlobalSearch=true&sst=subset>