Hermetosphere journal

11th October 2021
–
3rd January 2022

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10d

Hermetosphere journal

Week 1 - 11th October 2021

Observation after one week:

After nearly one week the roots of the plants connected to the lava pellets (p. 2 + 4).
the plants leaves start to become more stalks and "strong".
these leaves also seem to grow a bit since planting, but the changes are all in all just minimal.
the white woodlice can't be seen since putting them into the hermetosphere, because they're just active in darkness. They also seem to do their "job", because as you can see in picture 1.a) they started to eat the "unhealthy" / dead ends of the pteris leaves.

1 - Pteris

2 - Tradescantia zebrina (zebra herb)

Week 2 - 18th October 2021

Observation after two weeks:

From week 1 (11th Oct. 2021) there were big changes in the hermetosphere.
The biggest and most obvious change is: there are a lot of water droplets inside of the "glasses walls" - meaning that water started to condense. With the "help" of that water, sunlight and CO_2, glucose and O_2 will be produced. In order to these procedures, photosynthesis can take place.
If glucose and O_2 is produced, there's automatically a cellular respiration taking place which produces water and CO_2.
These facts clearly show that there are very important cycles in the hermetosphere which can also be found identically in the biosphere to make processes/systems/cycles etc. work properly.
Also the roots became way bigger than last week (p. 2, 4, 5, 6).

Week 3 - 25th October 2021

Observation after three weeks:

The changes were rather small from last week (18th Oct. 2021).
Picture 3 shows how much condensation is on the glasses wall (how much water condensed). In comparison to that, the glass is "cleaned" in picture 4.
Every single week the roots of each plant are growing and they also become thicker (→ "stronger") as shown in picture 3, 4 and 5.
In picture 1 and 4 you can see that the pteris fern still gets eaten by the white woodlice (which still aren't and won't be seen → expl. update week 1).
Picture 2 shows that the pteris started to develop little hair in the roots' area. Also picture 2 shows the few little hair which start to develop on the zebra herbs' leaves edges.
The zebra herb's new little leaves, which appeared for the first time in last weeks update (18th Oct. 2021), grew pretty much and they will (of course) continue to grow (→ How long will it take them to grow as big as the glass?)
Not only the zebra herb developed new leaves, the pteris fern did as well (p. 7.2).

Week 4 - 1st November 2021

1


2


5

3

4

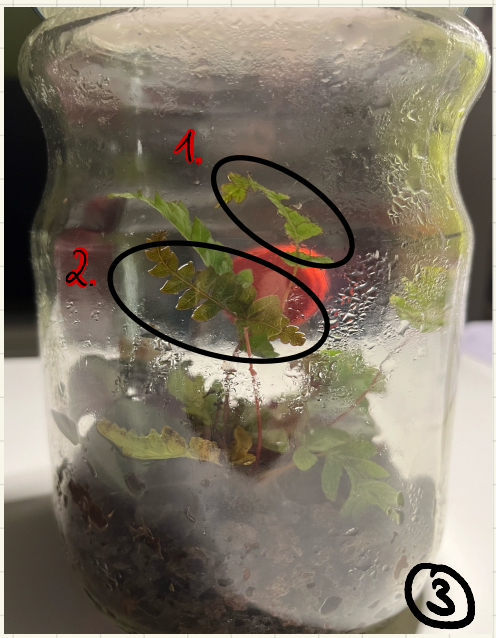

6

Observation after four weeks:

As well as in week three (25th Oct. 2021) there weren't that big or drastic changes. Nearly everything stayed the same or developed as much as it did the weeks before.
I can watch every single week how much the plants roots grow and it's fascinating how "strong" they become (p. 3, 4, 5).
Not only last week (25th Oct. 2021) the plants / leaves started to develop little hairs, they did this week as well. Especially the zebra herb has got hairs on almost every single leave. Those which were there already became even thicker. The same is true for the roots and stems of the pteris. You can clearly see that in picture 7. 2/3.
The pteris "new" leaves in picture 2.2 also grew pretty much from last week on. One of its leaves seems to wilt unfortunately. (→ Will the woodlice decompose that leave? If yes, how long will it take?)
Nevertheless the white woodlice are definitely active which is shown in picture 1, because they still eat the wilt / dead parts of the pteris fern.

7

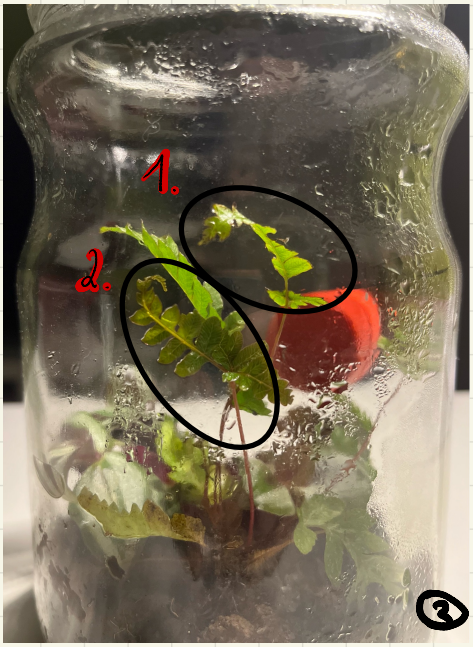
Week 5 - 8th November 2021



Observation after five weeks:

As last week (1st November 2021), the pteris leave in picture 4.1, rots pretty much. The difference is big. The change of the pteris is also visible in picture 3.1. The "new" leaves grow and grow. Also picture 3.2 shows that the white woodlice are active all the time, but why is the one leave in picture 4.1 still there if the woodlice are supposed to be active? (Aren't there enough woodlice anymore? Do they just eat parts of it and need time?) Picture 5 shows that there are fewer little hairs on the zebra herbs leaves and the zebra herb has lost it's purple color on the leaves surface. But the leaves are still purple on the undersurface (p. 1 + 5.3). The fifth picture also shows that the roots are still growing and further developing.
The woodlice where also active on a zebra herbs leave, because there's a hole in one of the leaves.
On the glasses "walls" are a lot of water droplets (condensed water) which means that the cycle of the hermetosphere is working properly.

Week 6 - 15th November 2021



Observation after six weeks:

the hypothesis of last week (8th November 2021) has been refuted since picture 5 shows that the pteris leave, which rots, gets smaller because there are more outlines of the one leave than the actual leave. Picture 1.1 and 4 clearly show that the zebra herbs has is purple color JUST on the underside. It's astonishing how a plant can lose it's color partly. Picture 1.2 and 6.1./2. show the persistent growth of the plants roots. Not only the roots are growing, the "new" pteris leaves as well (p. 3.2).
the hole which the woodlice left behind on a zebra herbs leave hasn't changed since last week.

Week 7 - 22nd November 2021

Observation after seven weeks:

Also in the 7th week, the woodlice are very active, especially when looking at the pteris fern (p. 3.1, 4, 6).
The hole in the zebra hasta' leave seems to be a bit bigger.
The zebra hasta developed billel hairs on every single leave in week 3 to 4, but now it seems to lose it's little hairs.
Picture 3.2 shows that the leave which rots, turned almost completely brown. The second picture portrayls the enormous growth of the roots - those reach up to the surface of the lava pellets.

Week 8 - 29th November 2021

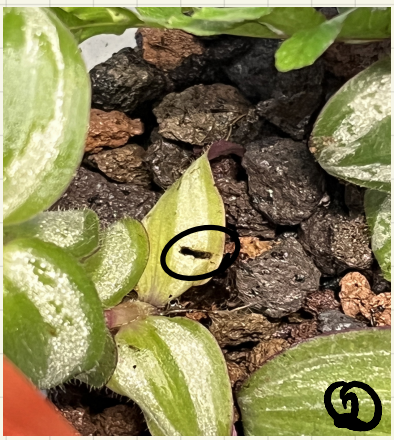
Observation after eight weeks:

Picture 1, 2 and 6.1./2. show one of the biggest changes within the last weeks: the zebra hasta leaves are almost all losing their silvery shimmer. Some are losing it "partly", like just a little roundish spot in the middle, but others lose up to the half of their "shimmer" (p. 8).
In picture 1 you can see that the leaves of the pteris which got eaten by the woodlice before, are now "recovering", because just picture 7 shows that there's just a quarter of one leaves got eaten in the past days - meaning that the woodlice were probably not that active.
Picture 5.1/2 shows that the roots reach up to the glasses "walls" and they stick to it with very little "branches".

INFO → week 9 - 11

Since there
were just
very little
changes
between week
eight and twelve,
I decided to
put in a break.
Because of that,
there's a bigger
and better contrast
to what happened
within 28 days.

Week 12 - 27th December 2021



Observation after twelve weeks:

This weeks observations show that the zebra haste is continuously losing it's silver shimmer and not just pastly, but extensively on each leave (it looks like it's "washed" away.
Picture 3 and 4 show that the pteris still gets eaten by the woodlice and the bitten corners get darker. Not only those corners or edges get darker, but the holes edges of the zebra haste' leave does as well (p. 2).
In picture 5 and 7 it's visible that the roots grow and grow.
Picture 5: now the roots don't only reach up to the lava pellets surface, but also to the glasses bottom. Picture 7.2: there are more and more branches of the roots and p. 7.1 shows a long branch with very small branches / hairs.
Last but not least the 6th picture shows the one leave of the pteris which rots. From week to week there is less and less over of it, so that there are also more outlines left than in week 6 for example. The single leaves of it seem to be some kind of "sea trough" or at least thinner in their structure.

Week 13 - 3rd January 2022

Observation after thirteen weeks:

The 13th week doesn't really show changes, it rather shows further developments of the hasmetosphere. From the outside the 2nd picture shows the "build up" of water on the glasses wall, but if you turn it 180 degrees, there isn't any "build up" on this side. The loss of the zebra herbs silvery shimmer increased from week 12 (p. 1, 9, 10). When looking at picture 4 and 8, the same leave is shown, but just from another perspective (→ is the zebra herb also losing its purple color from the underside as well or is it the matter of light (reflection)?). Nevertheless picture 5 portrays the "recovement" of the pretty eaten pteris, whereas the leave on picture 6 rots from week to week that it's even more "transparent" than last week (27th Dec. 2021). It's the same case for the zebra herbs' leave on picture 12, since the hole "rots" from the inside, the one leave itself becomes dilapidated. Picture 11.1 shows a new "spot" of the woodlice on the pteris which got pretty dark. Besides that, not everything in this developing jar has to be negative: the roots are and will be growing further (p. 7, 11.2). Picture 9 and 10 also show very new leaves of the zebra herb. The one on picture 9 is rather "light/transparent" and in comparison to that the one on picture 10 has a big of purple on the "edges".

Answering questions

1. How does a hermetosphere generally need to be constructed?

↳ First of all the hermetosphere has to be a closed apparatus in order to work in an "artificial" way. Since it is closed, all cycles like the photosynthesis and the cellular respiration will take place "artificially" and not how it is normally in nature.
But to make this processes work, not only plants are needed, but also other living organisms which are animals and in this case (white) woodlice.
Those two living organisms will interact with each other and make the system "hermetosphere" work in a proper way.
Besides the system and processes there has to be a "material" which could replace the soil in which the plants will grow.
Furthermore you have to remember that this project is "artificial" and the only living organisms are the woodlice and plants (for ex. plenis fern and zebra herb). With soil which contains nutrients and possibly fungus, it wouldn't be completely "artificial", so it's recommended to use lava pellets.
An effect could also be when taking a photo and removing the lid (→(0)).

2.c. Speculate how/why the system "hermetosphere" could become instable?

↳ The system "hermetosphere" could become instable, because it's seen as an "artificial ecology system". In reality that isn't really true, since the hermetosphere still needs light for taking places processes.
Without light, especially sunlight, all material cycles in that systems wouldn't work and everything would die in it.
As mentioned in 1., other factors besides the plants and woodlice could affect the "artificiality" of the project "hermetosphere".

3. Comparison of hermetosphere and biosphere

↳ As said in 1. and 2.c., a hermetosphere is rather an "artificial" system. In comparision to that a biosphere is a natural system since it's a space on earth where life is possible.
Some factors which are involved in the biosphere, aren't in the hermetosphere, just like other living organisms.