



South - Eastern
Mediterranean Sea
Project



The depletion of nutrients in water



We had build several TerrAqua following the instructions.



The students worked at this experiment with two parallel cases, which were under observation for 6 weeks (the experiment itself started in the moment the seeds germinated, on 19th February).

At first, there were three plants in each pot. The experiments consisted in giving different quantities of nutrients to each plant and despite the proportionality of the first week growth, some plants dried after some time.



Both parallel works were made of 6 bottles, built following the TerrAqua Column model, which were given different quantities of nutrients (1, 5 and 10 grams), added differently (in soil and normally).



- The first case (E1) implied the presence of aquatic plants in the water.
- The second one (E2) was supposed to let the plants grow in the upside of the columns without any aquatic plants to be placed in the bottom level.

The normal conditions of the simulated laboratory were the proper light (as a mixture between low-powered natural light and artificial compensatory one) and the temperature of the room that admitted variations between 21 and 27 Celsius degrees (21 - 27°C). Also, the plants were given the proper quantity of water, depending on the condition of their soil, so the experiment didn't suffer any changes because of it.





The proportionality of the plants' height has maintained for all of the 6 weeks (when it comes to E1) and for only 1 week (in the case of E2), which indicates that the aquatic plants influenced the growth.



A huge difference also appeared while using the TDS Adwa AD31, which indicating, among the 6 weeks, values starting with 200 ppm to 600 ppm (last week of E1) and more than 2000 ppm (E2).

However, it's important to mention that the E2 plants grew faster (after a week, they were over than 4 cm, when the E1 plants were under this value).

Regarding E2, the differences between bottles appeared really quickly (the bottles to be received nutrients in soil had thinner plants, which grew slowly, so the difference between the medium height of the higher plants and the lower ones exceeded 5 cm).

On another hand, a capital observation students made is the fact that the number of "survivors" was a big difference between E1 and E2. Only two bottles kept the plants alive in E1 (the 1 g columns) which means that the others dried (at different times), while the E2 made it with the complete bottles (each one had at least a plant alive) on the second week of April.



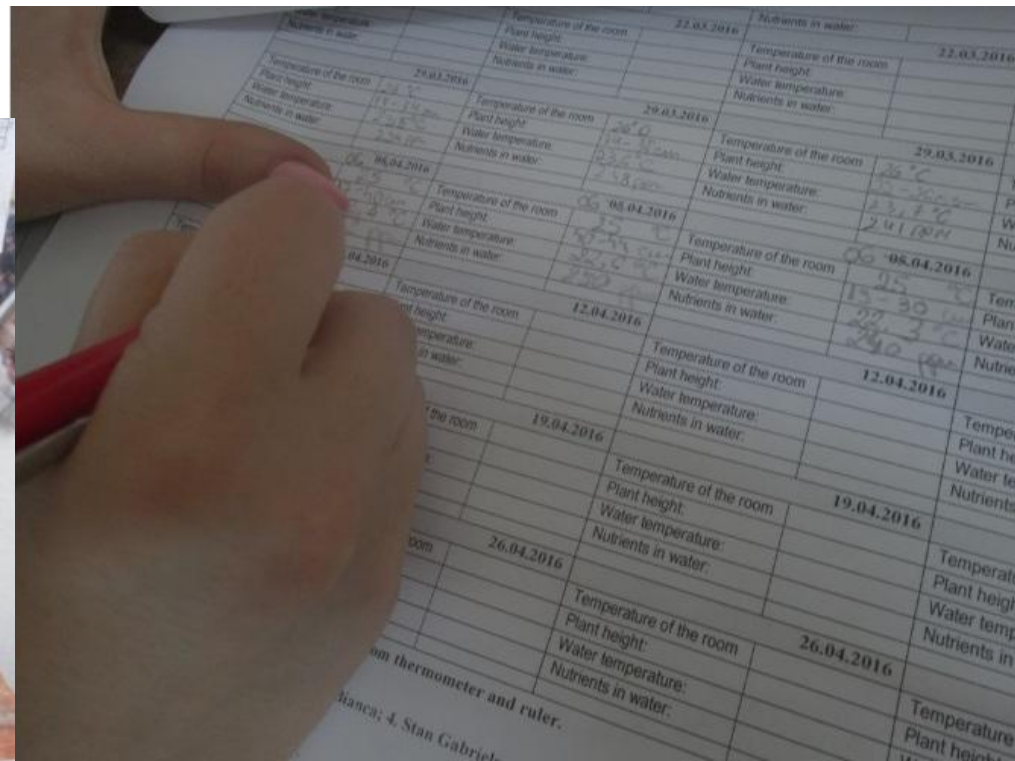
It seems that *Vallisneria americana* had a really important impact on the experiment E1, because its existence kept in balance all the plants and the values of nutrients in water as well.



Leaves' dimensions are truly important when investigating a plant's evolution while applying nutrients in a certain quantity. During a month, it have been made measurements every week and noted along with the temperature of the room and the plant's height, the length and the width of the biggest and the smallest leaf for each pot.

It is remarkable that leaves followed a normal pace of growth and evolved proportionally from week to week .





It is important to mention that this experiment was possible to be done for only 2 of 6 bottles because the rest of the plants dried as a result of the abundance of nutrients used (5 and 10 g per week).

Also, between the two pots to study, for the one to apply 1 gram of nutrients in soil the leaves grew a little bit slower than the other one, but the differences of growths decreased: after a week of observations, the difference between the two pots in what seems leaves' dimensions was 1-1.2 cm both for the width and the length. At the final of the 4-weeks-observation, the differences were negligible - about 0.3-0.5 cm.

Errors:

- They were measured different leaves from week to week which triggers to unusual differences of dimensions for the minimum and (the) maximum length and width;
- Another thing that could be an important cause of the strange dates is the variation of temperature (from 21°C to 26°C).



Thank you for your attention!

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