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EXPERIMENTS IN CULTURE METHODS OF FRESH WATER SPONGES

Zoology 232 - Dr. Eggleton

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Experiments In Culture Methods Of Fresh Water Sponges

The main emphasis of this work was planned to be on the feeding of fresh water sponges, but the gemmules, to a great extent, did not germinate.

With the exception of Experiment Number 30, the gemmules (of Spongilla lacustris) were collected by Dr. Frank E. Eggleton at Base Line Lake in Livingston County, Michigan, on November 8, 1939. They were found attached to marl concretions on a shoal in 10 to 50 centimeters of water. Examination of about one hundred sponge specimens taken from the same habitat on October 19, 1939, showed no gemmules present.

The gemmules remained in Dr. Eggleton's possession for two days and were given to the writer Novemeber 10, 1939. All gemmules were placed in a finger bowl and left on a window ledge over night. During the night the water containing the gemmules froze quite solidly, thawing out the nest day. The gemmules were then divided and placed in separate containers - small dishes because of lack of aquaria.

The results of the individual experiments are as follows:

1. Gemmules and piece of live sponge were placed in finger bowl and put in ice box. In four days the live sponge had disintegrated. On November 29, 1939, the gemmules were divided to form experiments 11, 12, and 13:

    11. Few gemmules and some marl in Stender dish with distilled water. Dish also contained a small piece of old sponge skeleton. On January 24, gemmules began germinating. On Feb-

ruary 26, the sponge was about 2 mm in length. It grew no larger but gradually disintegrated.

12. Gemmules and marl in Stender dish. Sponge germinating January 15. Doubled its size in one week (about 3 mm). Began to disintegrate January 24. Few grains of sugar added. By June 1, the gemmules were no longer good and the dish was full of algae and mold.

13. Gemmules in Stender dish and distilled water. By January 24, there were many Ostracods. Small sponge growth on February 12 (about 1 mm) Two grains of rice added February 26. Ostracods clustered on rice, sponge about same. By June 1, the sponge had disintegrated and the Ostracods had died out. The gemmules (which had not germinated) were still good.

2. Gemmules on marl stone, placed in finger bowl. Dish left on window ledge of office until November 29. Water in dish froze many of the nights. Gemmules divided on November 29 into dishes 10, 16, 17, and 18.

10. Gemmules placed in bottom of 16" testube, and placed near window. Continual supply of slow-running water. On Jun 1, gemmules had not germinated but were still good.

16. Gemmules in Stender dish with distilled water Small growth showed February 12. Two small growths on February 26. Gradually disintegrated.

17. Gemmules in Stender dish. Two drops of peroxide added at intervals of about 3 or 4 days. Too much peroxide. Gemmules gone December 8.

18. Gemmules in Stender dish. Five drops of peroxide added at intervals. Too much. Gemmules gone December 4.

3. Gemmules in finger bowl and placed in dark drawer. Fungus appeared on gemmules. Water changed frequently. Some gemmules transferred to dish 19 on November 29. Others transferred to dish 29 on January 24. Dish taken from dark on February 12. Small sponge growth on February 26. Disintegrated.

19. Gemmules in Stender dish in distilled water. No germination. Gemmules still good June 1. Mold covering gemmules.

29. Gemmules in Stender dish with plant-growing chemical. No germination. Gemmules still good June 1. Algae and mold present.

4. Gemmules in finger bowl and placed in dark drawer. Two drops peroxide added at intervals of two days. November 20, gemmules to dish 20. Put in light January 24, and some gemmules transferred to dishes 21, 22, 25, 26, 27, and 28. No change by June 1, gemmules still good. Algae present.

20. Gemmules in Stender dish. One drop peroxide added at intervals. No germination.

21. Gemmules in dish with sand and water. Four hydra placed in water. Hydra died out by Feb.12.

No germination by June 1. Algae present.

22. Gemmules in Stender dish with water and few grains of sugar. Much mold but no germination.

25. Gemmules in Stender dish with water, sand, and few grains of flour. No germination. By June 1, the gemmules were covered with algal growth.

26. Gemmules in Stender dish with water, sand, two grains rice and small drop of Co. HCL. Results same as #25.

27. Gemmules in amoeba culture and with a small bit of cornstarch. No germination. Junel, there was much white mold present.

28. Gemmules and two grains rice in Stender dish. Gemmules still good June 1. One small sponge growth present. Mold in water.

5. Gemmules in finger bowl on window ledge. Left until November 29. Gemmules to dishes 14 and 15. Gemmules black.

14. Gemmules in Stender dish. Still good, but black in color, June 1.

15. Gemmules in Stender dish. Peroxide added at intervals. Gemmules still good June 1. No germination.

6. Gemmules in finger bowl and left on shelf in office. Small sponge growth present January 24. Disintegrated. Gemmules still good June 1. Algae present.

7. Gemmules in distilled water in finger bowl on shelf. No germination. Much algae present.

8. Gemmules in finger bowl with some marl and old piece of sponge. Peroxide (2 drops) added at intervals of three days. Ostracods noticed in culture December 16. Two groups of sponges noticed January 15 , one about 8 mm x 2 mm. Some green color present (others were white). Still growing January 24. One grain of rice added. New growths showing. By February 12, large pieces about 10 x 5 mm. Six other sponge growths present. By June 1, all had disintegrated.

9. Gemmules in distilled water in 16" testube. Air bubbled rapidly through glass tube. No germination. Gemmules still good Junel.

30. Gemmules collected by the writer at Base Line Lake on ~~May~~ April 28 in 24 inches of water near same spot as those collected by Dr. Eggleton. In all the territory covered these were the only gemmules found. The following facts are af particular interest: (1) these gemmules were of a bright green color, unlike the other brown ones, (2) the resulting sponge growth was also rich in green color (probably zoochlorella) and (3) all gemmules were still in the old parent skeleton. These gemmules were placed in two large evaporating dishes with marl concretions and with plenty of air bubbling through the water. In one week the tree pieces were germinating. Piece number 1 grew to 15 mm in diameter, losing a little of its size by June 1. Piece number 2 retained its size of 5 mm until Junel. Piece number 3 (of about 8 mm) gradually disintegrated in a heavy rice culture.

From the results of these studies the fore-going conclusions may be drawn:

1. Water in small dishes is not enough since Hydra could not live in such a container.
2. Decrease in size and lack of growth of sponge might indicate lack of food or insufficient amount of food.
3. Bacteria may be harmful to the living animal since microscopic examination of disintegrating (but still alive) sponge showed much bacteria and diatoms.

It is also interesting to note that the best germinating took place in the presence of marl.