

INORGANIC NITROGEN COMPOUNDS AND NITROGEN LOAD

IN THE EUTROPHIC LAKE MARYUT

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Inorganic nitrogen compounds were estimated in the water of the eutrophic lake Maryut. The average ammonia concentration was 3.17 mg N/l, nitrite was 0.025 mg N/l and nitrate 0.019 mg N/l. Seasonal variations are discussed. The total nitrogen load carried to the lake was found to be 47.85 mg/l/year, which is a very high value.

Lake Maryut is a closed, brackish water lake situated to the south of Alexandria. The lake receives untreated sewage and industrial wastes, signs of eutrophication are clear.

Dissolved ammonia was generally present in high concentration in the water of lake Maryut, the average for the whole lake was 3.17 mg N/l. This high ammonia content, especially in the polluted parts reaching 4.87 mg N/l for surface water and 5.10 mg N/l for bottom water is correlated with oxygen deficiency. The distribution of ammonia in the different seasons is correlated with water temperature, amount of sewage and industrial wastes, oxygen content, utilization by algae and bacterial reduction of nitrates, being high in winter, decreasing in spring getting high in summer to reach maximum readings in autumn. Lake Maryut has a higher nitrite content than many egyptian lakes, the annual average for the polluted parts is 0.044 mg N/l, decreasing to 0.022 mg N/l in the unpolluted parts.

The seasonal distribution of nitrite is nearly the same as that of ammonia. Nitrates, on the other hand, proved to be lower in lake Maryut than in other egyptian lakes with an annual average of 0.019 mg N/l - NO₃.

The progressive reduction in nitrate concentration in lake Maryut waters during the last years reflects the increased pollution problem and increased reducing conditions on the lake bottom.

The nitrogen loadings discharged to lake Maryut is calculated through :

1. Domestic sewage : according to VAN VURAN (1948), the overall dry weight of excrement contains 14.0 mg/cd nitrogen. If we take the population density in the area surrounding lake Maryut as equal to about 275 000 inhabitants, the quantity of nitrogen discharged into the lake from domestic sewage per day equals 3.85 ton, i.e. 1405 ton/year.
2. From industrial wastes : Qalaa drain is the main source through which industrial wastes enter the lake. The drain discharge is 200.159×10^3

m³/year. The total inorganic nitrogen content of Qalaa drain water is 6.068 mg N/l. The quantity of total inorganic nitrogen discharged from Qalaa drain is equal to 1214.564 ton.

Thus, the total amount of nitrogen introduced to lake Maryut from domestic sewage plus industrial wastes is 2619.814 ton.

Each square meter of the surface area of the polluted part of the lake receives 74.85 mg/m²/year.

Considering the mean depth of the lake as one meter, the annual loading is equal to 74.85 mg/l/year. This is a higher value than that given by THOMAS (1955) for the eutrophic Greifensee being 31.10 mg/l/year, and by EDMONDSON (1961) for the strongly eutrophic lake Vanbesa being 48.7 mg/l/year.

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