



Hydrochemical state of some fish ponds from the Republic of Moldova and Romania

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AIM OF THE STUDY. Identification of the water quality in the six fish ponds from the Republic of Moldova and two ponds from Romania, according to the content of main ions and mineralization, nutrient content and chemical oxygen demand.

RESULTS. According to the classification proposed by O.A. Alekin, water from the fish ponds Moldovanca, Morozeni, Garla and Fagadau, taking in account the main ions, is characterized by the index S^{Na}_{II} (sulfate class, sodium group, type II); the water of the Călugăr, Dușmani, Dracșani and Podu Iloaiei ponds - C^{Na}_{II} (hydrogenocarbonate class, sodium group, type II).

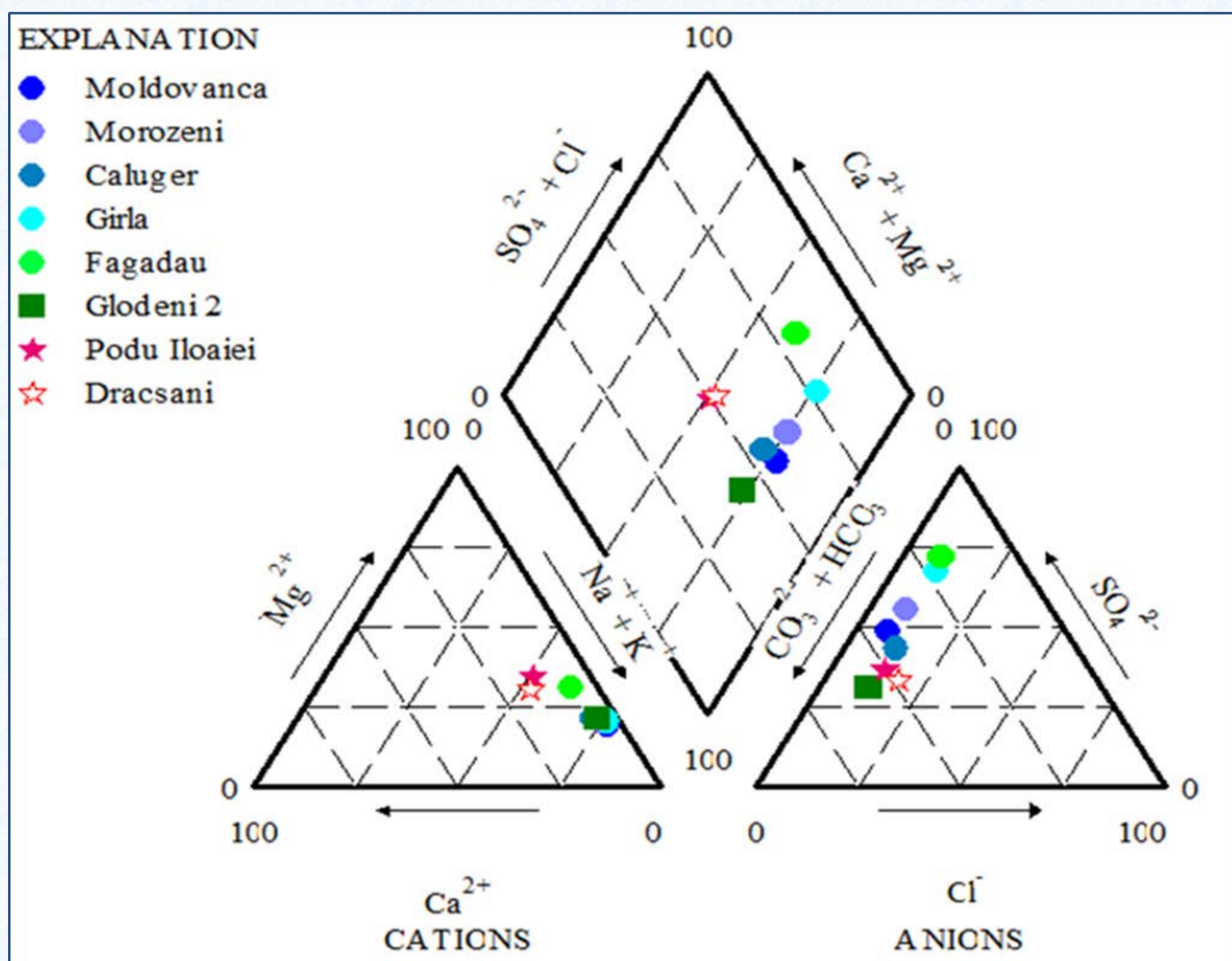


Fig.1 Types of pond water according to the Piper diagram

In summer, due to the shortage of atmospheric precipitation and high temperatures, an increase of water mineralization of up to 4-6 g/l was recorded, for example, in Garla (4.1 g/l) and Fagadau (5.7 g/l) ponds, but no decrease in fish productivity was noticed. Nevertheless, such mineralization is unfavourable for cyprinid larvae and first-year juveniles. Water mineralization and hardness of Dracsani and Podu Iloaiei ponds are suitable for obtaining of fry of freshwater fish and rearing of table fish.

The permanganate chemical oxygen demand (CODMn) and bichromate chemical oxygen demand (CODCr) in the investigated fish ponds exceeded the maximum allowable limits (MAL) for fish ponds. Such ponds need some ameliorative measures, in order to maintain CODMn and CODCr within the MAL for pisciculture waters: CODMn – maximum 30 mgO₂/l and CODCr – maximum 100 mgO₂/l (Bunele practici în piscicultură în contextul schimbărilor climatice: Ghid practic pentru producătorii agricoli, 2021)

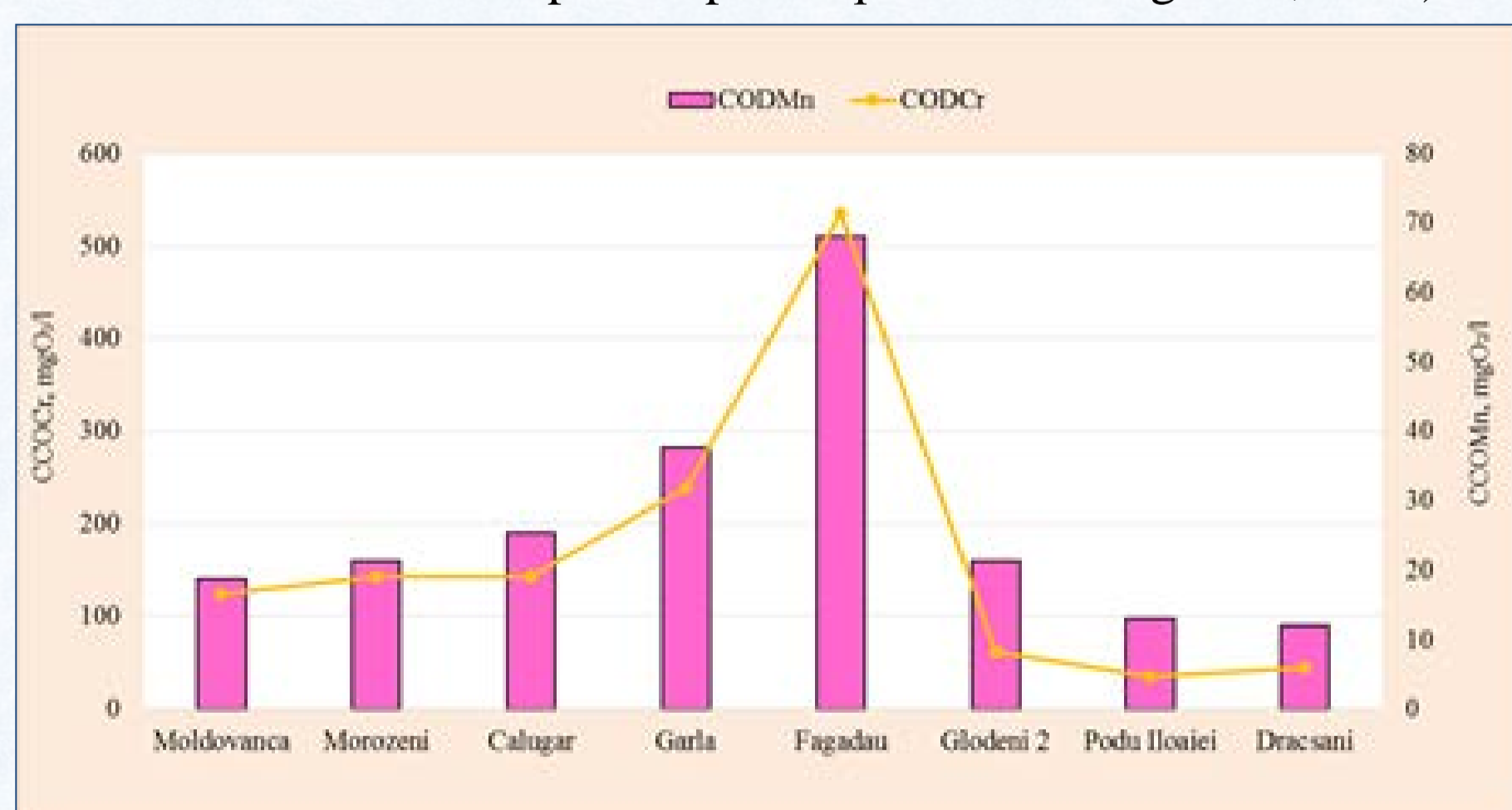


Fig. 2 Permanganate (CODMn) and bichromate (CODCr) chemical oxygen demand in samples of pond water

CONCLUSIONS. The results of the investigations showed that according to the thermal regime, mineralization and nutrient content the waters in most of ponds are favorable for fish rearing, but in summer the gas regime, including biochemical and chemical oxygen demand, becomes a limiting factor, especially in ponds with high density of fish.

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METHODOLOGY. The investigations on the chemical composition of waters from fish ponds have been carried out in 2021 by using accepted in hydrochemistry methods and ISO standards, as well as stationary and portable laboratory equipment.

Determination of pH in field conditions was performed using the special portable equipment Consort C5030 (UK) and of dissolved oxygen – with Analysenmesstechnik GmbH MS08 (Germany). Also, the nutrient content was determined in field conditions by spectrophotometric methods using the Colorimeter Spectroquant Multy (Germany). Titrimetric methods were used to determine the main ions in laboratory conditions, using automatic burettes Pellet and digital burettes Solarus. Values of chemical oxygen demand were obtained by titrimetric methods, after boiling and catalytic oxidation of the water sample.



Collection and primary handling of water samples

Location of the investigated fish pond: Republic of Moldova, Falesti district - ponds Moldovanca, Morozeni, Calugar, Garla, Fagadau, Glodeni district - pond Dusmani, Romania - Botosani county, Dracsani and Iasi county, Podu Iloaiei.

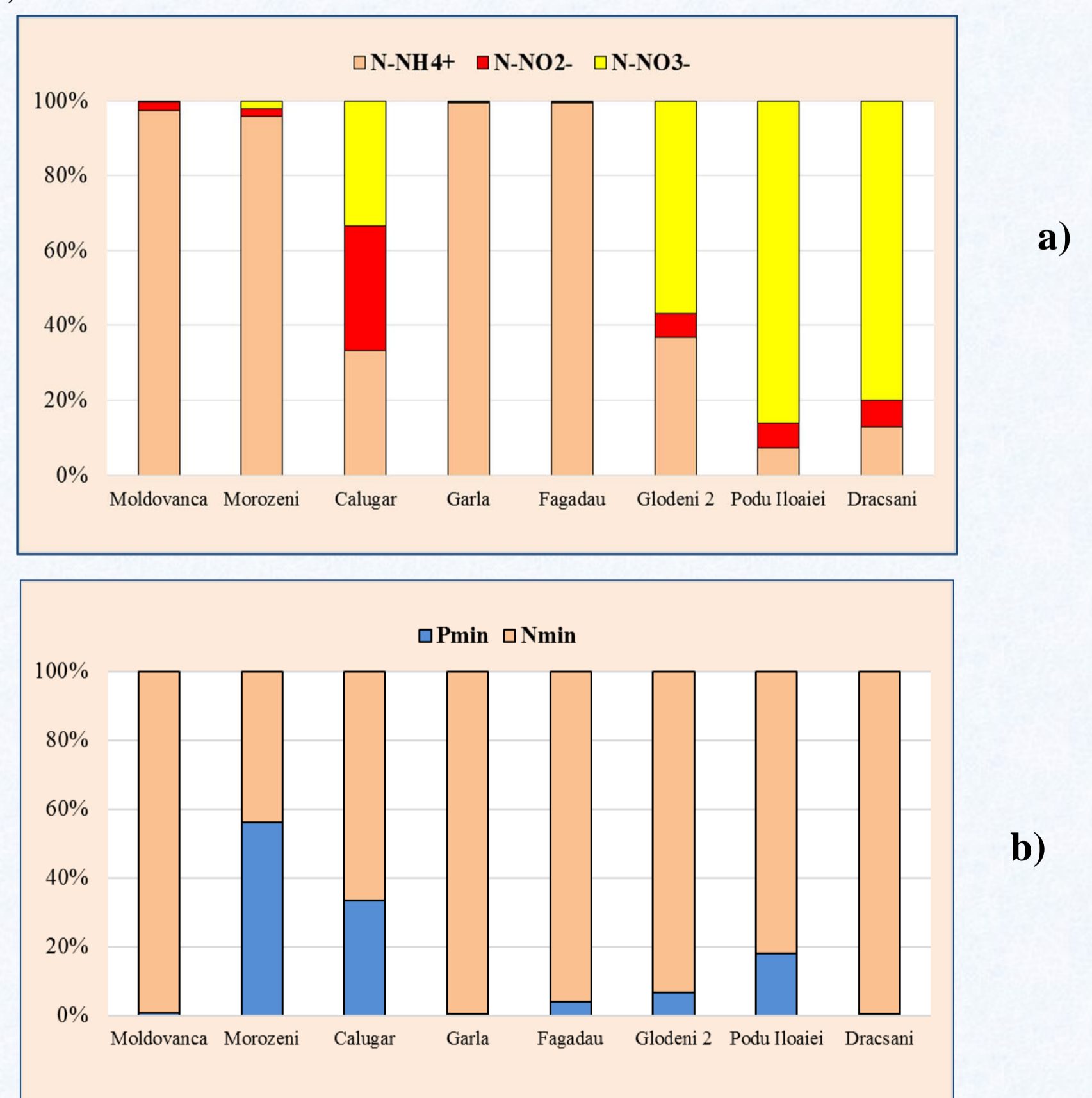


Fig. 3 Ratio between the a) different forms of nitrogen compounds – ammonia, nitrite and nitrate and b) mineral forms of phosphorus and nitrogen in water of fish ponds

In some ponds, due to the imbalance in the gas regime, of the ratio between nitrogen and phosphorus compounds, the algal blooms are observed. Such periods are characterized by the change of pH values, decrease of the water saturation with oxygen, which can also cause the fish death.