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LAND-USE TYPE OF CATCHMENT VARYING NITROGEN CYCLE IN AN ENDANGERED SALMON INHABITED STREAM

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Abstract

The survival of Formosan landlocked salmon has been threatened by the change of habitat ambience. Because of the potential toxicity of nitrite (NO_2^-) and ammonium (NH_4^+) to salmonid fisheries, we studied the evolution of nitrogen compound distributions in stream water and their relationship with ambient abiotic factors. The water was sampled at five sites surrounded with various land-use types in bi-monthly intervals for seven years. The results indicated that a high NO_2^- concentration occurred in summer, especially in the Yushan Stream (Site # 5), which borders intensive agricultural farms. By contrast, a high NH_4^+ concentration typically occurs from winter to early spring, even though the Taoshanshi Stream (Site # 1) is surrounded by a primitive forest. Multiple stepwise regression analyses indicated that, in Site # 5, the accumulation of NO_2^- positively correlated with NO_3^- concentration, C/TIN ratio, and temperature ($p < 0.05$), which could be attributed to the domination of dissimilatory nitrate reduction to ammonium (DNRA). In Site # 1, the statistical regression model revealed that NH_4^+ elevation positively correlated with DO ($p < 0.05$) and negatively correlated with temperature ($p < 0.1$), suggesting the suppression of nitrification by low temperature.

Key words: ammonium, catchment, endangered salmon, land-use, nitrate, nitrite

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