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Study on Vertical and Lateral Leaching of Nitrate from a Wheat Field in China

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Abstract: Vertical and lateral leaching of nitrate from a wheat field was studied through one season in a field in China by applying increasing amount of N fertilizers (e.g. 90, 180, 270 and 360 kg ha^{-1}). Results showed that nitrate leaching was the dominating way of nitrate loss from wheat land during the first two month after sowing seeds. After irrigation, the nitrate concentration in the leachate of 30 cm soil layer was higher than that of 60 cm, while the concentration of nitrate leaching at the five N treatments through the two depth soil layer came into the same level with the value of 13.48 mg l^{-1} to 27.91 mg l^{-1} for 30 cm soil layer and 16.48 mg l^{-1} to 28.65 mg l^{-1} for 60 cm soil layer, respectively. As the plot scale (20 m^2) concerned, the amount of nitrate loss varied from 101.13 mg l^{-1} to 209.35 mg l^{-1} for 30 cm and from 123.63 mg l^{-1} to 214.89 mg l^{-1} for 60 cm. Peak nitrate concentration was 3.47 mg l^{-1} during the third rainfall event. However, nitrate losing by lateral leaching in subsoil was less than that by vertical leaching. At the position that has 0.5 m distances from one side of each plot, the highest nitrate concentrations in lateral leachate among the plots was 10.75 mg l^{-1} and only has 13.43 mg l^{-1} the highest lose amount value. By comparison of nitrate concentration in two position of 0.5 m and 1.5 m from one side of each plot, it was not easy for nitrate that transported by lateral leaching from wheat land, in that, nitrate horizontal movement potential in shallow subsoil could be negative. Based on these results, it was suggested that the nitrate vertical leaching had a greater pollution potential to water body than the lateral leaching during the wheat growth period in the fields.

Key Words: Wheat field, nitrate, vertical leaching, lateral leaching, horizontal movement potential, China

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