

Probabilistic ecological risk assessment of eleven paddy herbicides

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Abstract. Probabilistic ecological risk assessment of 11 herbicides, commonly used in Japanese paddy fields was conducted. The effect assessment was based on species sensitivity distribution (SSD). The acute EC50 values of standard toxicity tests for aquatic primary producers were collected from available literatures and then fitted into lognormal distributions. Predicted environmental concentration (PEC) was calculated using an environmental model defined by the Ministry of Environment, Japan. The regional variations of PEC were quantified using Monte Carlo analysis. A joint probability curve was derived by comparing SSD and PEC distribution, and the area under the curve was defined as expected potentially affected fraction (EPAF) for quantitative risk index. The highest EPAF was 6.2% for bensulfuron-methyl.

Key Words: Pesticide, Species sensitivity distribution, Expected potentially affected fraction, Uncertainly