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Landscape-Scale Simulation of Pesticide Behavior in River Basin due to Runoff from Paddy Fields Using Pesticide Paddy Field Model (PADDY)

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A landscape-scale simulation model (PADDY-Large) based on PADDY was developed for predicting pesticide concentrations in drainage canals and rivers due to runoff from paddy fields. Based on the irrigation systems used in agrohydrology, a rice-producing area was classified into a “field plot”, “farm block”, “district”, and “river basin” and pesticide behavior was estimated focusing on the main drainage canals in the “district” area. To validate the model, a surveillance of pesticide residues was carried out in a rice-producing area. Herbicide concentrations in a main drainage canal in the area increased in early May, reached a maximum in mid May, and declined to below detection limits by early July. The correlation between simulated and observed concentrations of a herbicide mefenacet in the main canal were obtained by considering actual pesticide use and environmental conditions in the rice-producing area.

Keywords:

environmental fate, pesticides, paddy, river basin, runoff, simulation model



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