

APPLICATION OF THE ECOLI BACTERIA MODEL IN PREDICTING FECAL COLIFORMS IN SURFACE RUNOFF

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Abstract.

Models are tools used by environmental managers for planning purposes. The ECOLI model is a tool developed for that purpose. The ECOLI model is a biological model capable of simulating continuously *E. coli* density on land and subsequently *E. coli* concentrations in surface runoff during rainfall events. This model can be used to predict the nonpoint source input of *E. coli* into the receiving water bodies. Since fecal coliform is a common water quality indicator and water quality standards are frequently based on fecal coliforms instead of *E. coli*, a fecal coliform prediction model would be extremely useful for the accounting of fecal coliforms input into the receiving waters. However, the applicability of the ECOLI model in simulating fecal coliform has yet to be verified. In this study, the ECOLI model predicted fecal coliform concentrations were compared with the fecal coliform data collected from field studies conducted in the Agricultural Experimental Station in Louisiana, U.S.A.. The result of the comparison indicated that the ECOLI model predicted the decay of the fecal coliform well following the first manure applications of 1996. However, there was an increase in departure from the observed fecal coliform concentrations following the second to the fourth manure applications. Possible causes of the difference between the predicted and observed concentration could be regrowth of fecal coliforms and the competitive advantage of the fecal coliforms in reapplied manure compared to fecal coliforms in the first-time applied manure. More studies need to be conducted to investigate the decay of fecal coliforms in soils reapplied with manure. The ECOLI model can be applied for predicting fecal coliform concentrations in runoff in Malaysia if modifications are made and the model field-tested.

Introduction

Contamination of surface water by harmful microorganisms is a potential health risk to individuals exposed to this water. One of the sources of fecal contamination of surface water is animal waste. For economic reasons, land application and disposal of animal waste is a common practice for farmers. Therefore, efforts must be taken to protect the water resources.

Models are essential tools in designing and developing waste and water management systems for satisfying both environmental and agricultural goals. Without the use of computer models, considering the factors and systems or components involved,