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ONLINE ISSN : 1881-4212

PRINT ISSN : 0915-499X

Bulletin of the Institute of Tropical Agriculture, Kyushu University

Vol. 29 (2006) , No. 1 pp.105-118

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An information-theoretic approach for model selection in habitat preference evaluation of Japanese medaka (*Oryzias latipes*)

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Abstract: In keeping with the growing concern over sustainable development, there is an increasing need for clearer goals and applicable techniques to achieve ecological conservation and restoration. To accomplish nature-oriented planning and management, it is essential to understand the ecology and habitat requirements of target species. In this study, we applied the information-theoretic approaches of the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to identify the best model and most significant factor which can explain the habitat selection of Japanese medaka (*Oryzias latipes*). A fuzzy preference intensity model (FPIM), i.e. a hybrid model of simplified fuzzy reasoning and a genetic algorithm, was introduced to evaluate the habitat preference of the fish. The present result suggests that the lateral cover ratio is the most significant factor governing the habitat preference of the fish, and the FPIM that considers the four factors of water depth, current velocity, lateral cover ratio, and percent vegetation coverage has the best prediction ability among the candidates.

Keywords: Information criterion, fish habitat, physical environment, habitat preference model, habitat assessment

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Shinji Fukuda, Kazuaki Hiramatsu and Shuji Okushima 2006 An information-theoretic approach for model selection in habitat preference evaluation of Japanese medaka (*Oryzias latipes*) . *Bull. Inst. Trop. Agr., Kyushu Univ.* **29**: 105-118 .

JOI JST.JSTAGE/bit/29.105

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