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Editor-in-Chief

Prof. Tim Coulson

University of Oxford

Dear Editor,

We are pleased to send you our latest manuscript entitled "***IPM²: Towards better understanding and forecasting of population dynamics***", ~~that~~ we submit for publication ~~as a letter to~~ Ecology Letters.

Models of population dynamics often ~~either~~ aim to forecast population size to perform population viability, or to address ~~question in~~ eco-evolutionary dynamics. We believe ~~that one should serve the other.~~ Populations are composed of individuals and individuals often respond differentially to environmental changes. To better forecast population dynamics, we ~~therefore need to~~ understand how individuals react to environmental changes, and how this ~~is translated to the level of the population~~.

Existing population models either assume that all individuals react ~~identical~~ to environmental changes or do not properly scale up to the population level. ~~For understanding~~ the evolution of quantitative traits, we ~~need to~~ test hypotheses while ~~keeping~~ predictions of population dynamics ~~close to reality~~ but ~~data at the~~ population level are rarely included when addressing ~~question~~ at the individual level. This ~~can lead a model to miss~~ demographic processes for which no individual data have been

improve the ability to test more complex ecological and evolutionary hypotheses, as well as

~~and evolutionary~~

~~test ecological hypotheses,~~

will ~~help our tests of hypotheses in ecology and evolution~~ to become more powerful

~~and our predictions to become more accurate and so more relevant for~~

~~and~~ improve the accuracy of population forecasting

~~management.~~ to aid management programs.

This work has not been published nor ~~is it~~ submitted elsewhere. All co-authors have read and approved the submitted version of the manuscript. Furthermore, this manuscript has not appeared on the ~~Web~~ internet in another form of electronic publication. ~~They also all agree with~~ It also adheres to the Ecology Letters publication policies.

We ~~are~~ looking forward to hearing from you soon about the suitability of our work for publication in Ecology Letters.

On behalf of all the authors,

Yours sincerely,

collected, and to bias our conclusions. That is why we developed a novel class of model, the integrated integral projection model that combines an integral projection model with an integrated population model. This model allows the prediction of demographic rates that depend on individual drivers, environmental variables and population responses at the same time. In the submitted paper, we introduce this new model and assessed its performance. We also assessed the performance of the two individual models to illustrate advantages of the new model. We show that when individual and environmental variables interact, only the new model was able to estimate accurately demographic rates, population size and the dynamics of the individual trait within a population. We applied this model to the data collected in 12 populations of barn swallows throughout Switzerland. We show that the new model was the only one that was able both to include the mechanisms at the individual level and to predict the Swiss population index of barn swallow gathered from an independent dataset very successfully. We believe that our novel integrated integral projection model will be of major interest to a large audience of ecologists because it