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TOPIC (choose preferred topic)

- Forum Herbulot
- Systematics
- Ecology
- Conservation
- Evolution

BIOGRAPHY (maximum 85 words):

PhD Anna Suuronen is ecologist and environmental scientist focused on biodiversity issues. She got her masters in ecology from University of Turku in 2011 and PhD from the University of Jyväskylä in 2017. Dissertation subject was ecological and social impacts of photovoltaic solar power plants and optimization of their locations in Northern Chile. After parental leave, she started her work at Finnish environmental institute (Syke) in 2021 focusing on statistical ways to describe species abundance trends, distributions, and estimates on biodiversity loss.

CO-AUTHORS

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ABSTRACT

1. **Title:** Outbreak probabilities of macro-moth species in warming high latitudes

2. **Keywords (5 max)**

Outbreaks, climate change, macro-moths, forest pests

3. **Abstract (maximum 250 words):**

The forest damages caused by moths and their outbreaks might change with climate warming. Here we focus on 7 macro-moth species that are considered as potential forest pest species in Finland. Four of them are polyphagous spring-feeding defoliators of deciduous trees and shrubs: Autumnal Moth (*Epirrita autumnata*), Winter Moth (*Operopthera brumata*) Northern Winter Moth (*Operopthera fagata*) and Scarce Umber (*Agriopsis aurantiaria*). Two species are monophagous on conifers Pine Beauty Moth (*Panolis flammea*) and Bordered White Moth (*Bupalus piniarius*), and one is coniferous preferring polyphagous species Black Arches (*Lymantria monacha*, Linnaeus, 1758). Our aim was to test if we can predict outbreaks of these species with logistic regression and define whether phenological phenomena or climatic variables explain outbreaks.

With the changing climate outbreaking species are moving towards northern regions. Autumnal Moth related outbreaks are normal phenomena in Northern Finland that occur repeatedly every 8-11 years. In our study, small values (i.e. cold summers) of growing degree day sums increased the probability of outbreaks with 3 other deciduous foraging species and warming environment might reduce outbreak events in the north. Species that have previously caused outbreaks might have already lost some of their potential to do so, meanwhile species with southern distribution are spreading towards the north. In our study, we discovered that all the studied species benefit from droughts. Also, temperature play a significant role in predicting outbreaks of moth species in high latitudes.