

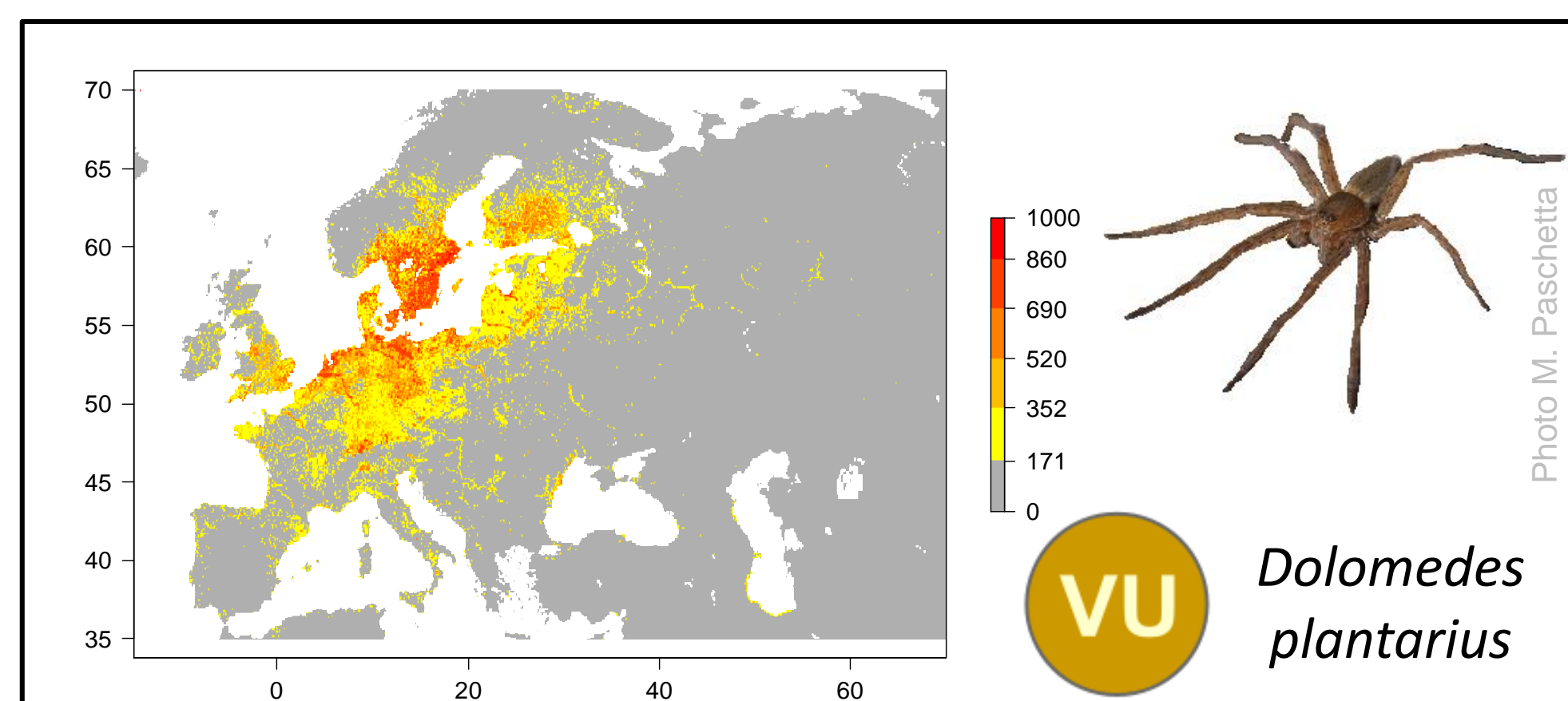
The **virtualspecies** R package: generation of virtual species distributions to test species distribution models

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Context

1 Species distribution models (SDMs)
widely applied in conservation / climate change studies



E.g., vulnerability of
threatened species
to climate change

New models and techniques developed
→ **Need testing, validation and comparison**

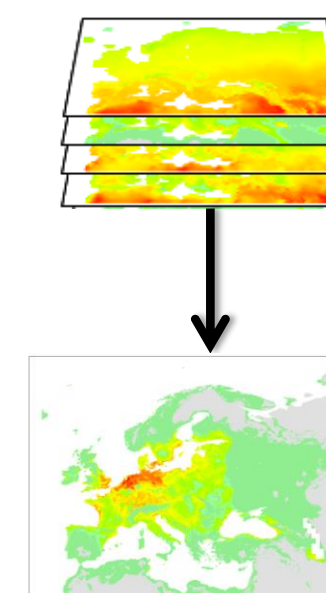
2 Test, validation and comparison of SDMs
can be done with

Empirical data



Issues:
Confounding factors
e.g. sampling bias

Virtual species simulations



Environmental variables
e.g. temperature,
precipitations
Simulation of a virtual
species distribution

Issues: Often too simplistic
e.g. only a few variables used
& sometimes misleading

Objective

**Provide a methodological framework to generate virtual
species distributions with increased ecological realism,
to improve validations of SDMs**

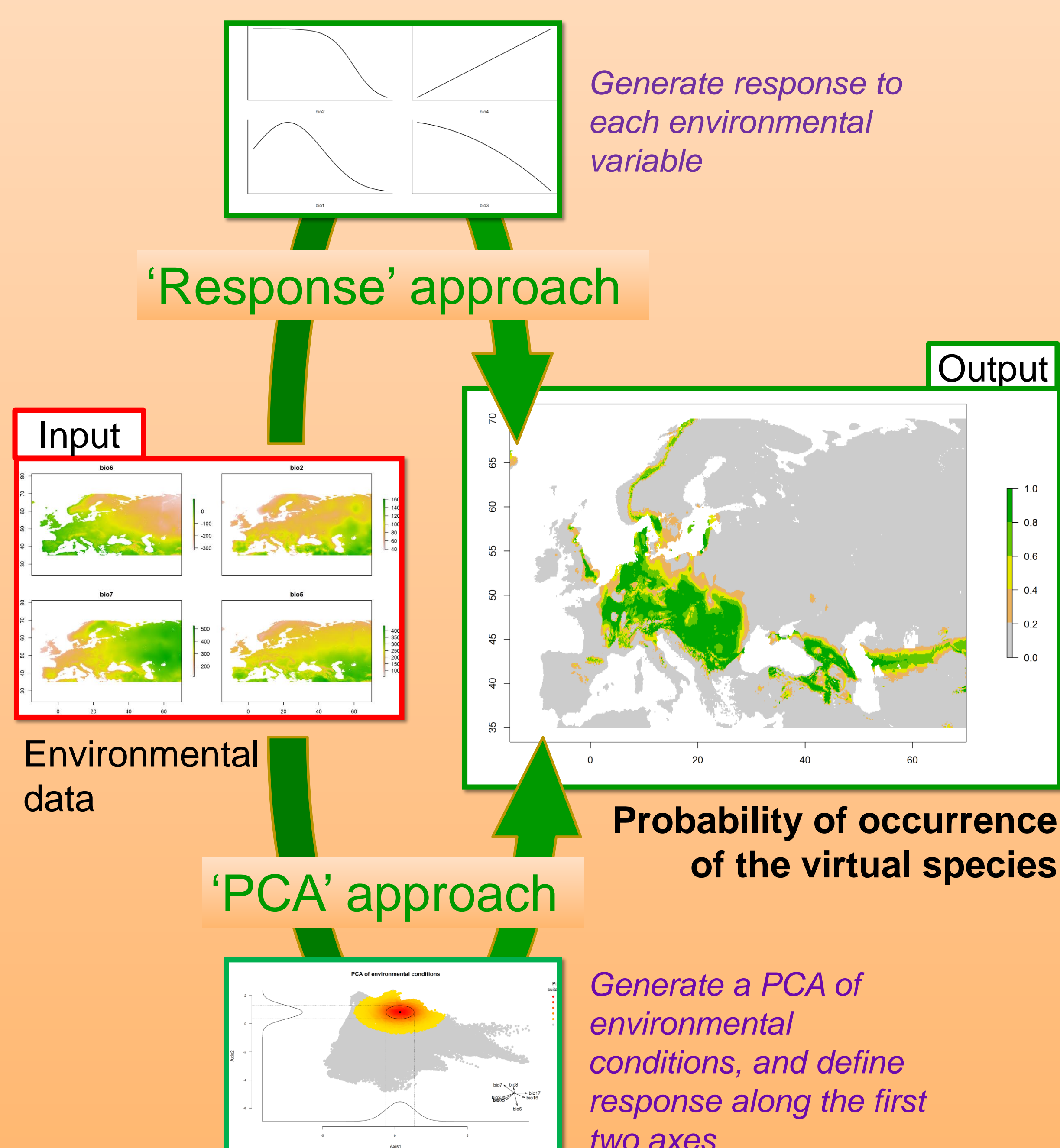
Approach

Development of an R package of the
simulation framework with recent advances in
virtual species distribution modelling

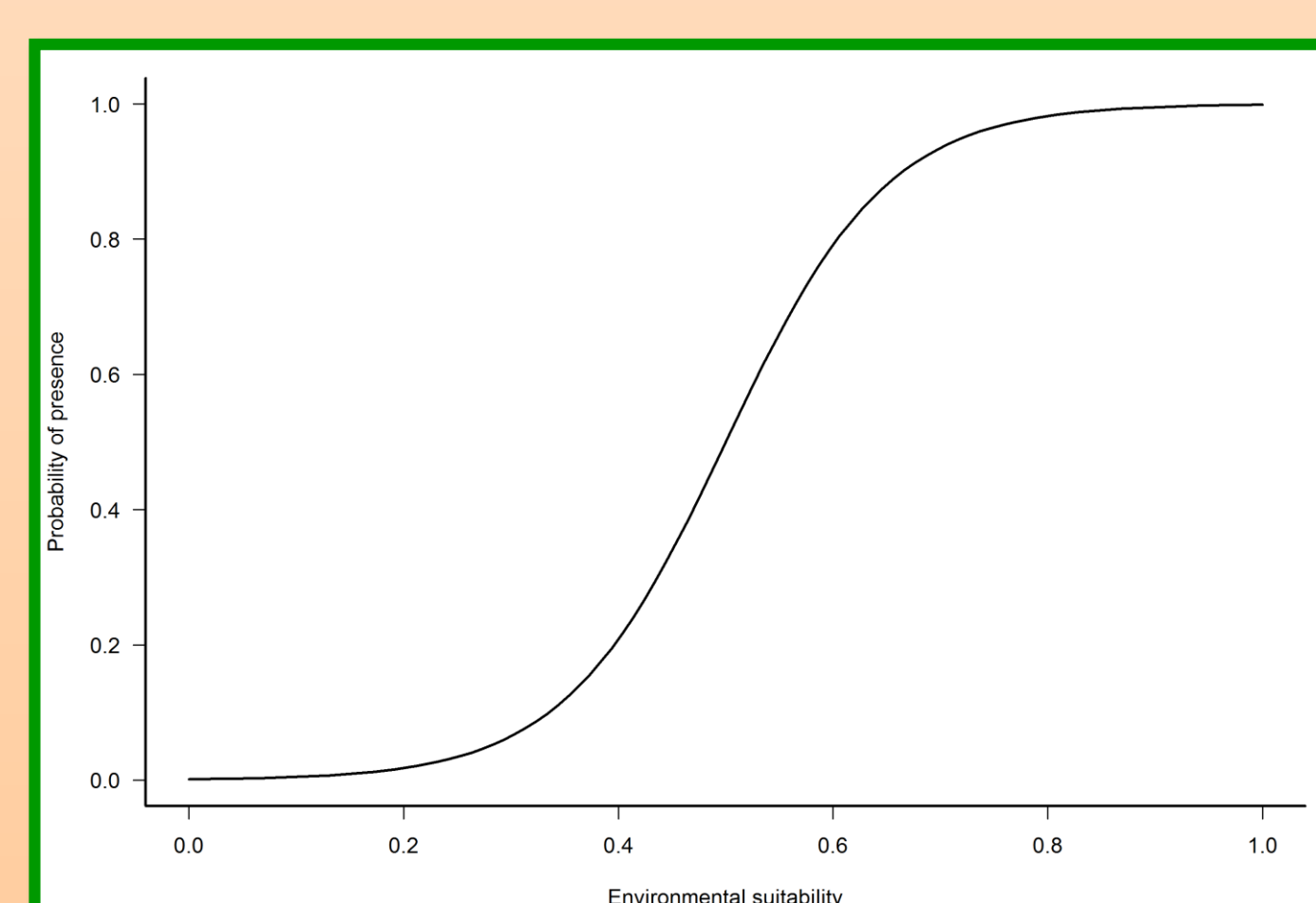


Framework

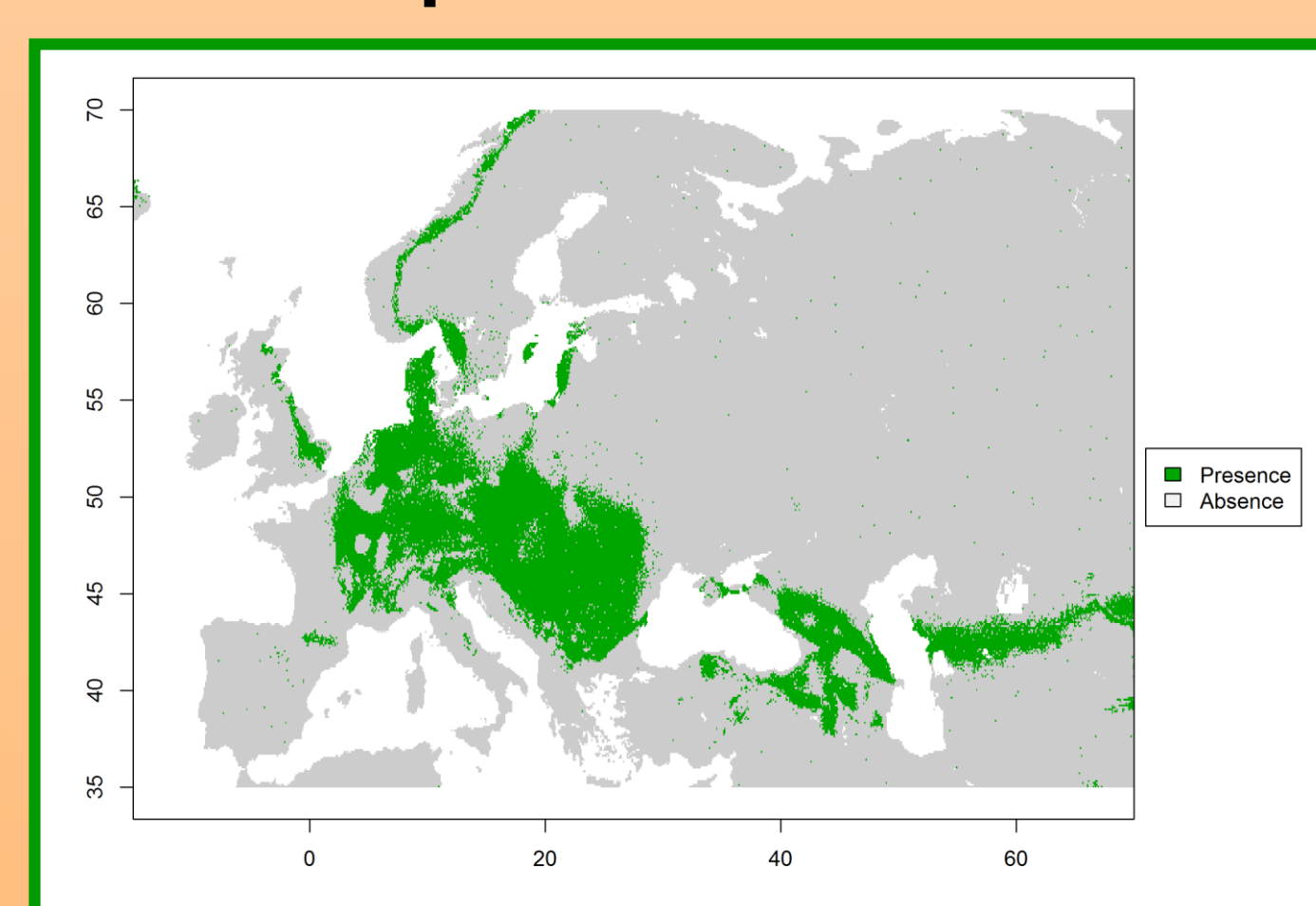
1. Simulate species response to
environmental data



2. Convert into
presence-absence



**Probabilistic conversion
into presence-absence**

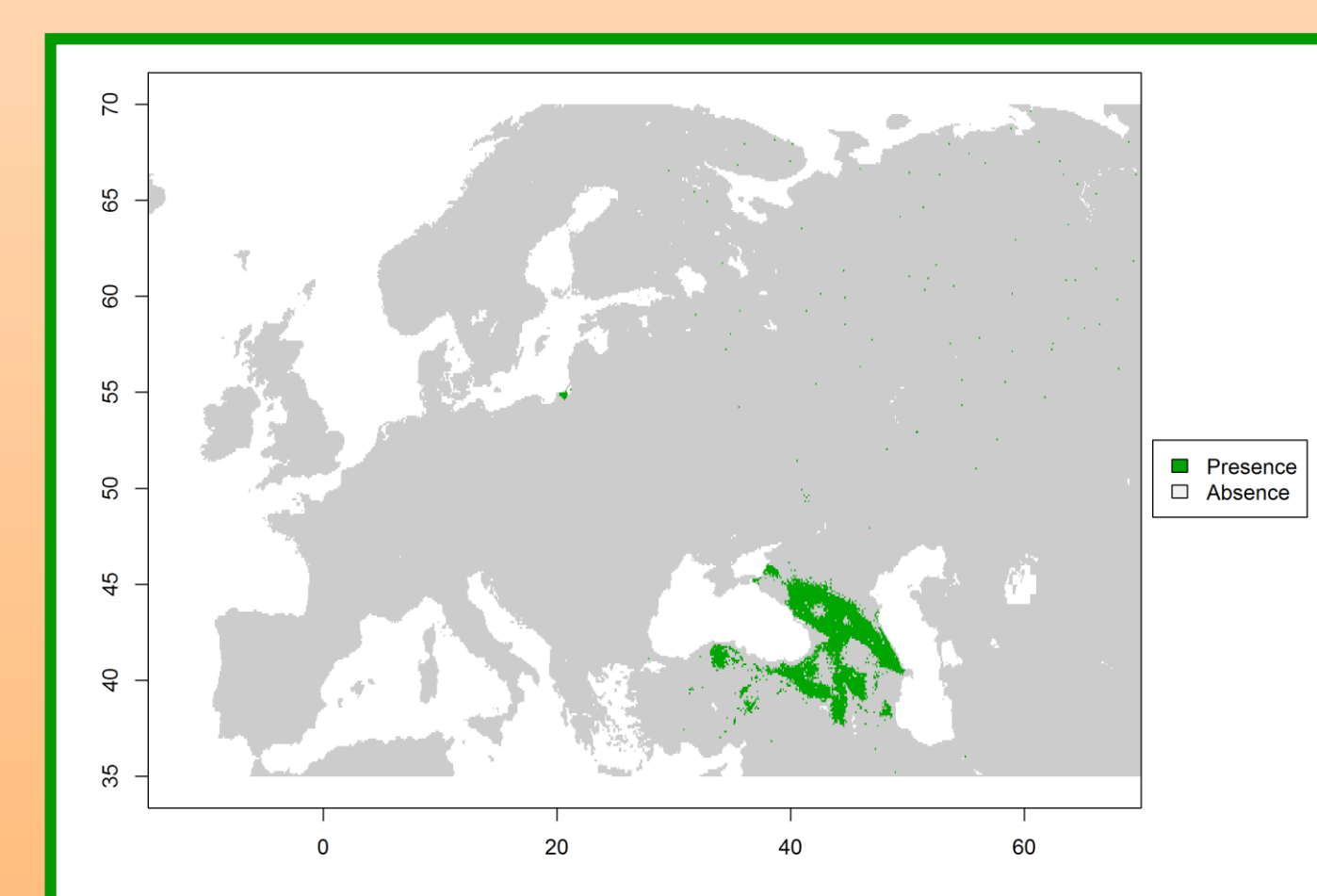


Presence-absence map

The conversion can be
automatically adjusted according
to the desired species prevalence

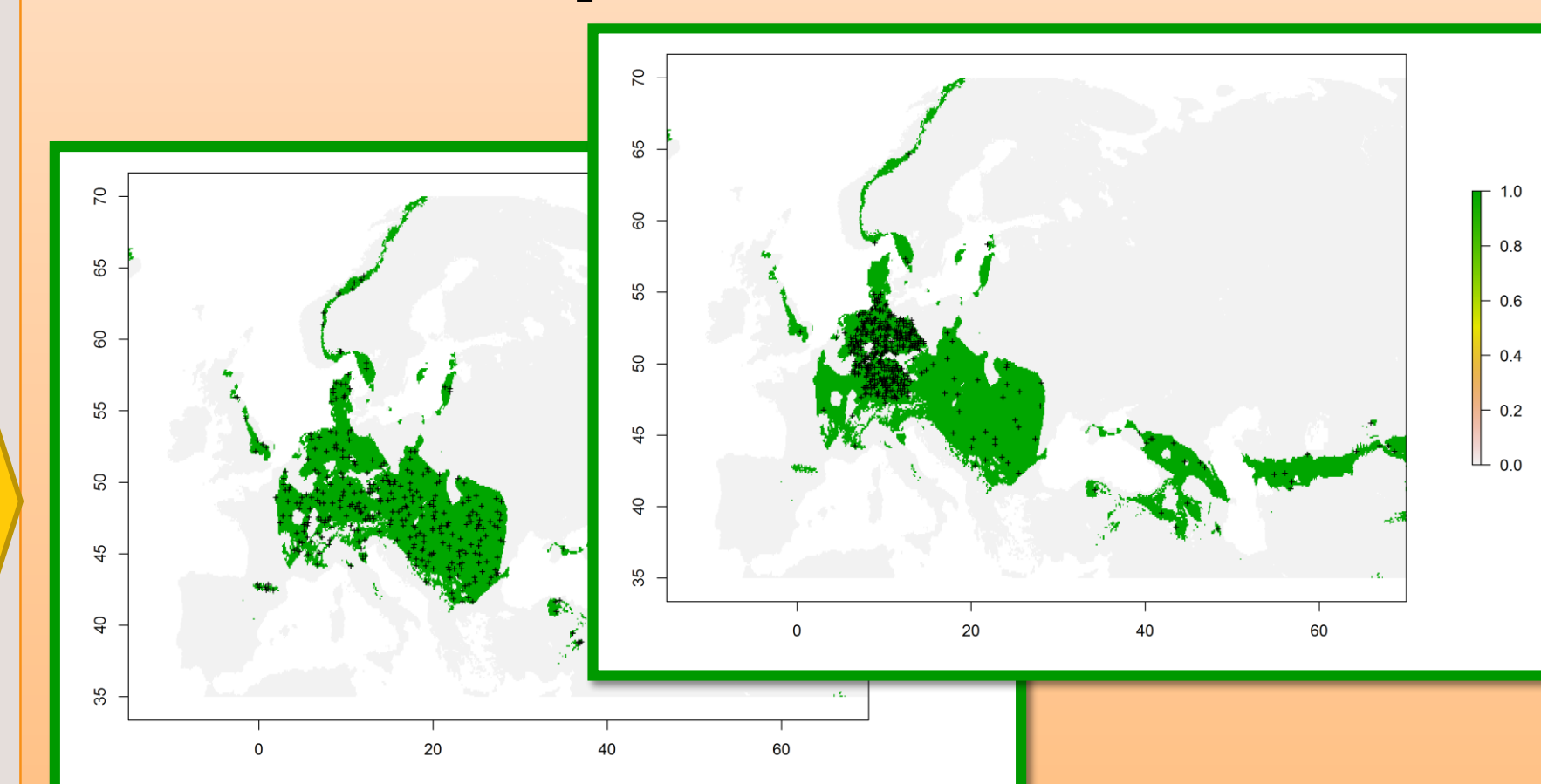
3. Introduce a distribution
bias

Facultative step



Simulation of distribution biases such as
dispersal limitations

4. Sample occurrences



Unbiased sampling

Biased sampling

Simulation of realistic sampling biases

A function allows randomising these two steps

The **functions** are **designed to be very flexible**,
and thus provide a fine control over each simulation parameter.

Summary

Sound, standardised, flexible and easy-to-use framework

Implemented in the **virtualspecies** R package

Available on the CRAN:
<http://cran.r-project.org/package=virtualspecies>

A complete tutorial is available at:
<http://borisleroy.com/en/virtualspecies>

or scan this QR code:

