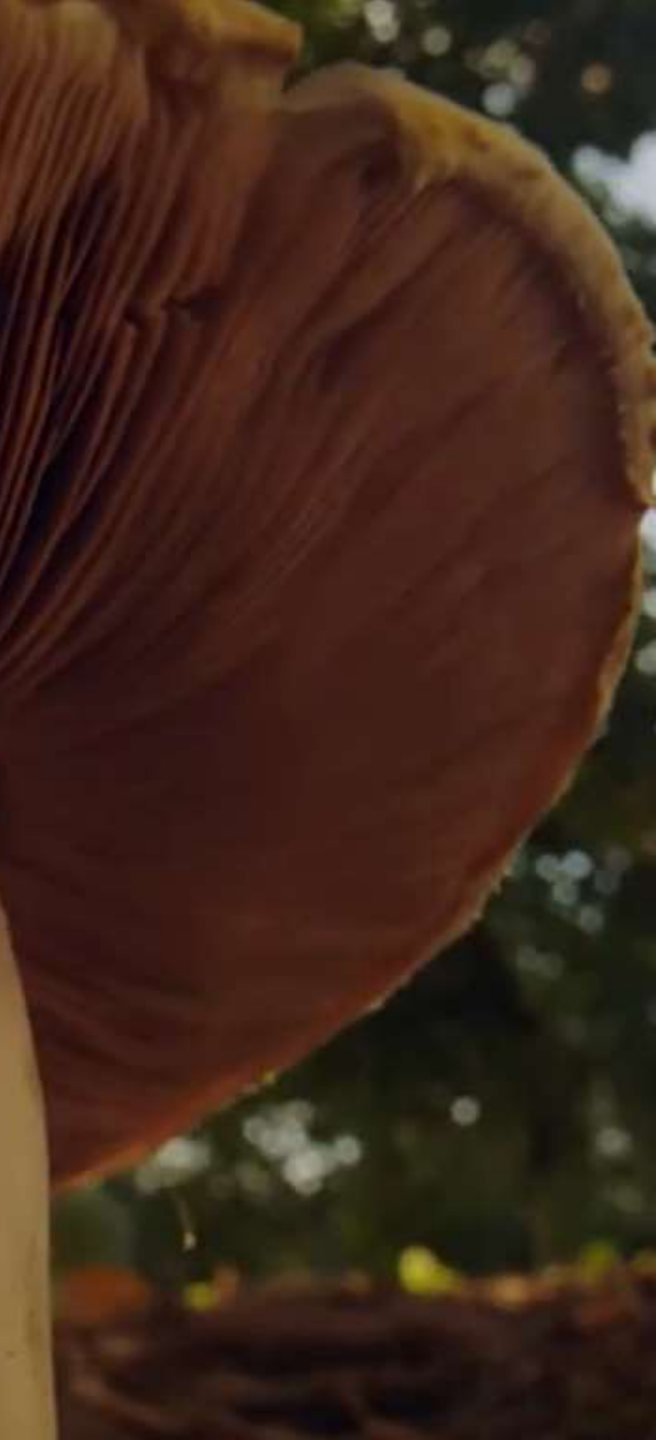

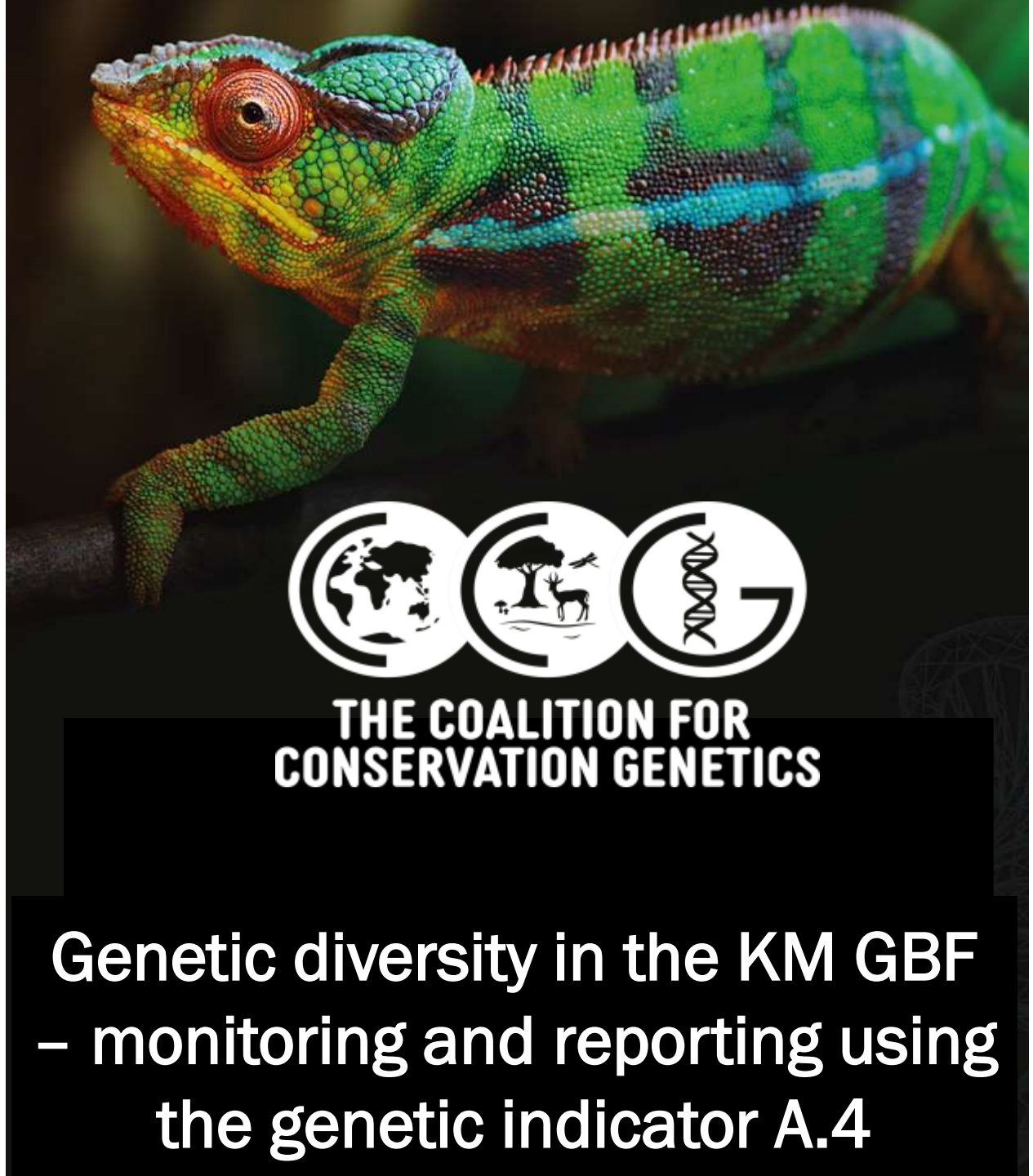

THE COALITION FOR CONSERVATION GENETICS

Genetic diversity in the KM GBF – monitoring and reporting using the genetic indicator A.4

Dr. Roberta Gargiulo
Royal Botanic Gardens, Kew
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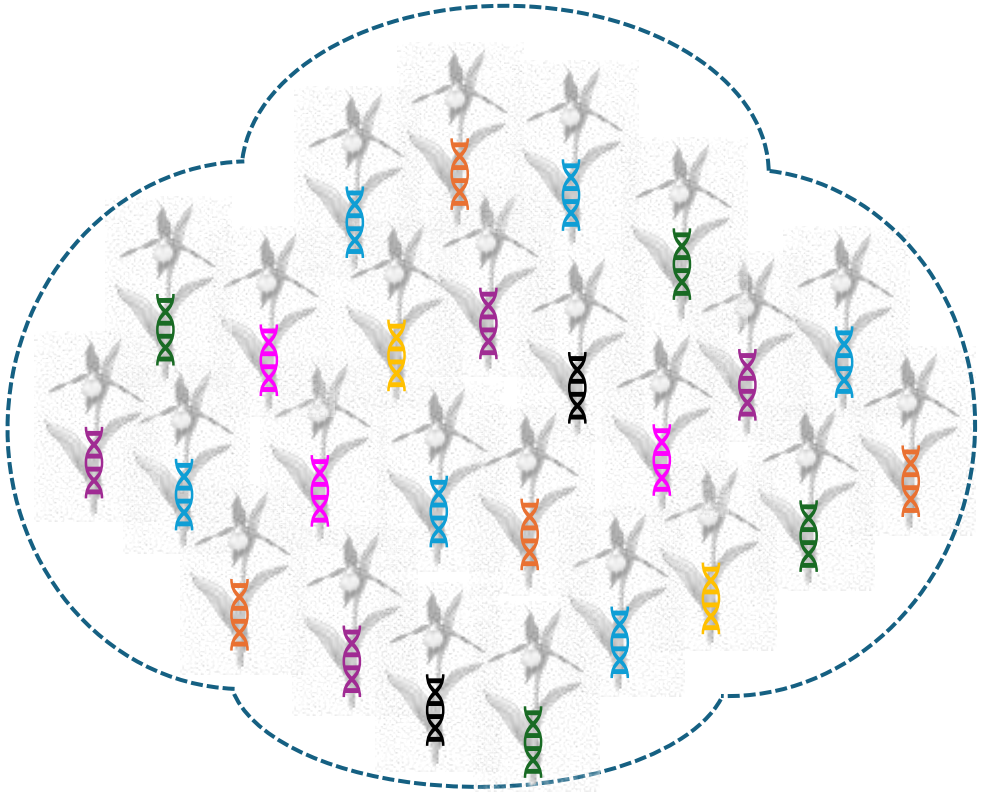
Royal Botanic Gardens Kew

Infraspecific genetic diversity is vital...

HIGH GENETIC DIVERSITY

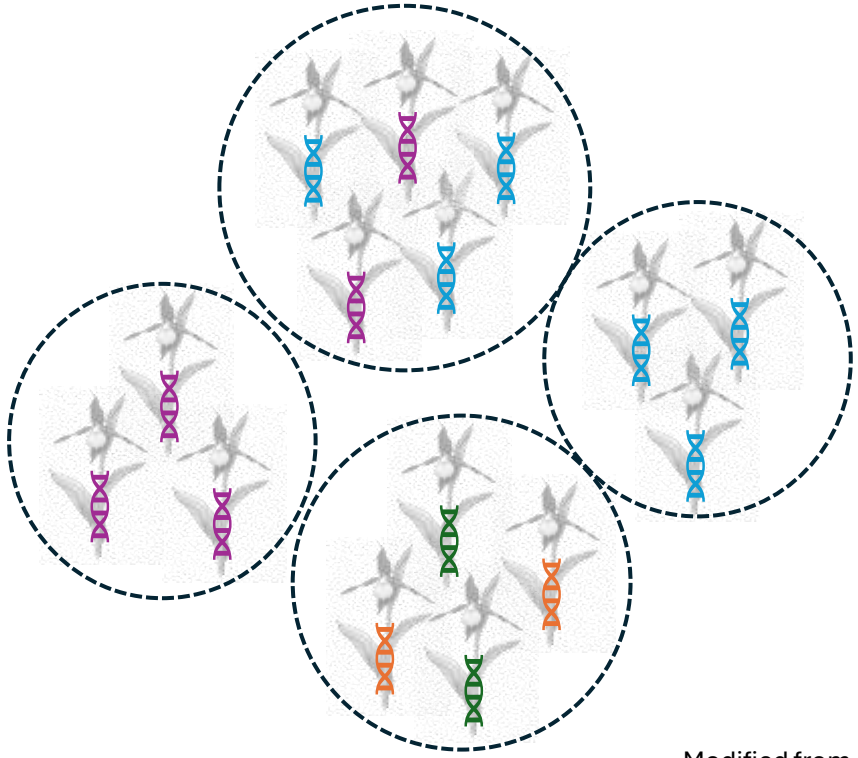
Large populations retain high genetic diversity



High adaptive capacity
Potential for long-term survival
High resilience

LOW GENETIC DIVERSITY

Small, isolated populations lose genetic diversity



Modified from Jerker Lokrantz/Azote

Lower adaptive capacity
Weak potential for long-term survival
Low resilience

to maintain and restore → the genetic diversity
within and between populations → of native, wild and domesticated species
to maintain their adaptive potential →

- do not lose, *and* perform actions to benefit – connectivity, supplementation
- two components of genetic diversity: inbreeding and rate of adaptation, maintain option value
- emphasizes the end goal, so populations and species adapt to a changing environment

Genetic diversity goals and targets have improved, but remain insufficient for clear implementation of the post-2020 global biodiversity framework

Sean Hoban[1,2] · Michael W. Bruford[3] · Jessica M. da Silva[4,29] · W. Chris Funk[5] · Richard Frankham[6] · Michael J. Gill[7] · Catherine E. Grueber[8] · Myriam Heuertz[9] · Margaret E. Hunter[10] · Francine Kershaw[11] · Robert C. Lacy[12] · Caroline Lees[13] · Margarida Lopes-Fernandes[14] · Anna J. MacDonald[15] · Alicia Mastretta-Yanes[16,17] · Philip J. K. McGowan[18] · Mariah H. Meek[19] · Joachim Mergeay[20] · Katie L. Millette[21] · Cinnamon S. Mittan-Moreau[22] · Laetitia M. Navarro[23] · David O'Brien[24] · Rob Ogden[25] · Gernot Segelbacher[26] · Ivan Paz-Vinas[5] · Cristiano Vernesi[27] · Linda Laikre[28]

Slide credit: Sean Hoban

Genetic diversity in policy

Convention on Biological Diversity

CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY
Fifteenth meeting – Part II
Montreal, Canada, 7-19 December 2022

Goal A
(By 2050) [...] The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.

Target 4
Ensure urgent management actions [...] to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential...[...]

Table 1. Headline indicators for the Kunming-Montreal Global Biodiversity Framework

A. Goal/ Target[4]	Headline indicators[5]
A	A.1 Red List of Ecosystems A.2 Extent of natural ecosystems A.3 Red List Index A.4 The proportion of populations within species with an effective population size > 500
4	A.3 Red list Index A.4 The proportion of populations within species with an effective population size > 500

How to estimate Ne?

With genetic data

Sampling of a population

Genetic analyses

-> **Ne**

Without genetic data

effective population size (Ne)

Ne/Nc ratio

all mature individuals (Nc)

The Ne can be approximated as a ratio of Nc
(0.10 for most spp)

Frankham 1995, Palstra & Ruzzante 2008, Frasier & Ruzzante 2012, Frankham et al 2019, Hoban et al 2020, 2021

Slide credit:
The Coalition for Conservation Genetics

How to estimate Ne?

With genetic data

Sampling of a population

Genetic analyses

-> **Ne**

(no idea of what N_e means in fungi...)

Without genetic data

effective population size (Ne)

Ne/Nc ratio

all mature individuals (Nc)

Plants with complex life-history traits…

mated as a ratio of Nc

nost spp)

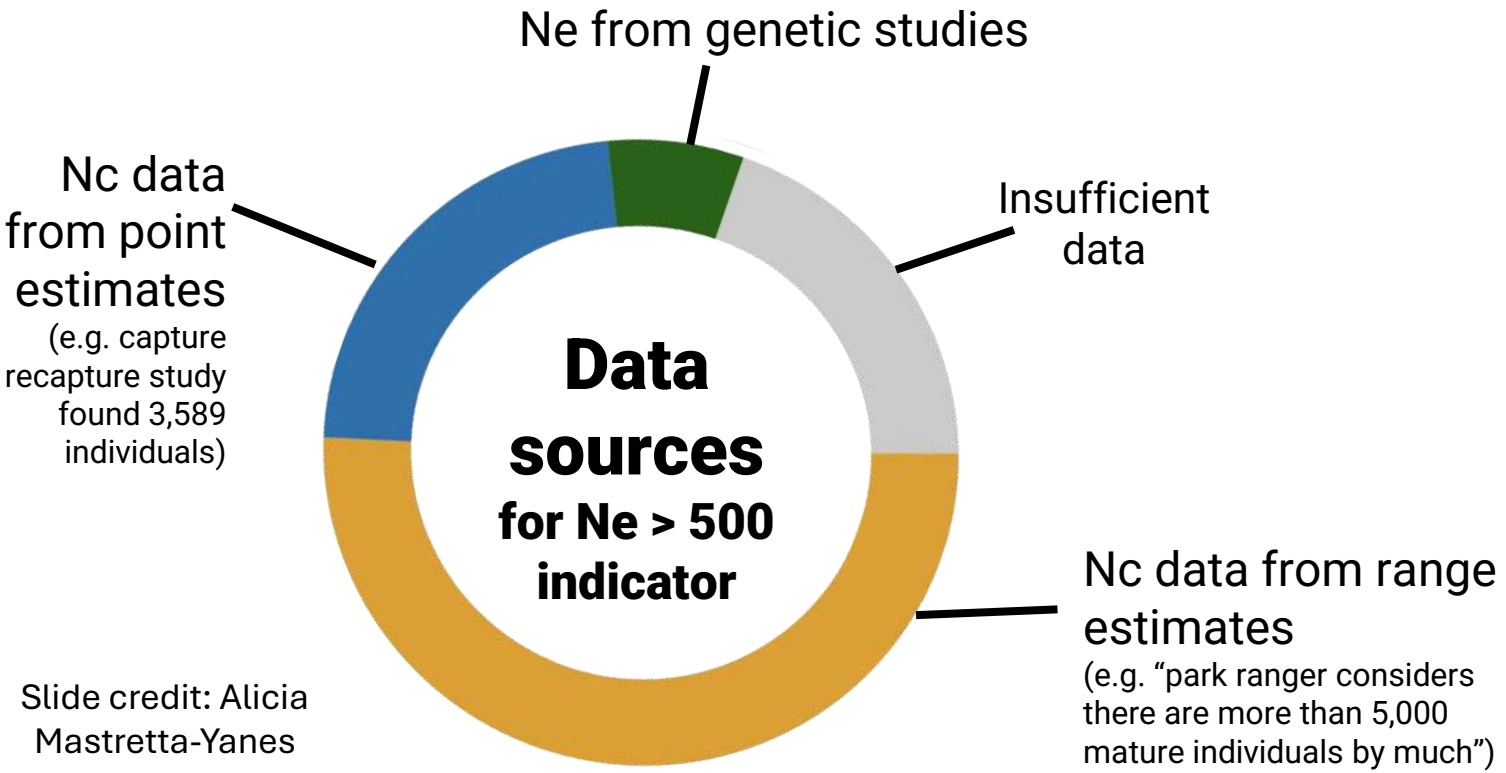
& Ruzzante 2008, Frasier & Ruzzante 2012,
al 2019, Hoban et al 2020, 2021

A multinational, multispecies effort

For: 50-100 species per country

Working with biodiversity agencies

Collaborative, participatory process of 50+ people



Slide credit: Alicia Mastretta-Yanes

Alicia Mastretta-Yanes

Jessica da Silva

Conservation Letters: https://doi.org/10.1111/conl.12953

Ecology Letters: https://doi.org/10.1111/ele.14461

Resources and guidelines now available

Policy brief in several languages

Guideline materials

Scientific paper

Slide credit: Alicia Mastretta-Yanes

Genetic diversity among and within populations is vital for survival and must be maintained

Target 4 also covers maintaining and restoring Genetic Diversity between and within populations, to maintain their adaptive potential.

The Coalition for Conservation Genetics is at COP16 to help you with this! They can help guide NBSAPs, plan actions and policy, design monitoring and reporting mechanisms, and build capacity to achieve the KMGBF together.

COP16 COLOMBIA

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CONSERVATION GENETICS SPECIALIST GROUP