

G-BiKE: a network of researchers and practitioners harnessing genomic biodiversity knowledge for resilient ecosystems

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Genomic Biodiversity Knowledge for resilient Ecosystems



Genetic Variation - key to adapting to environmental change

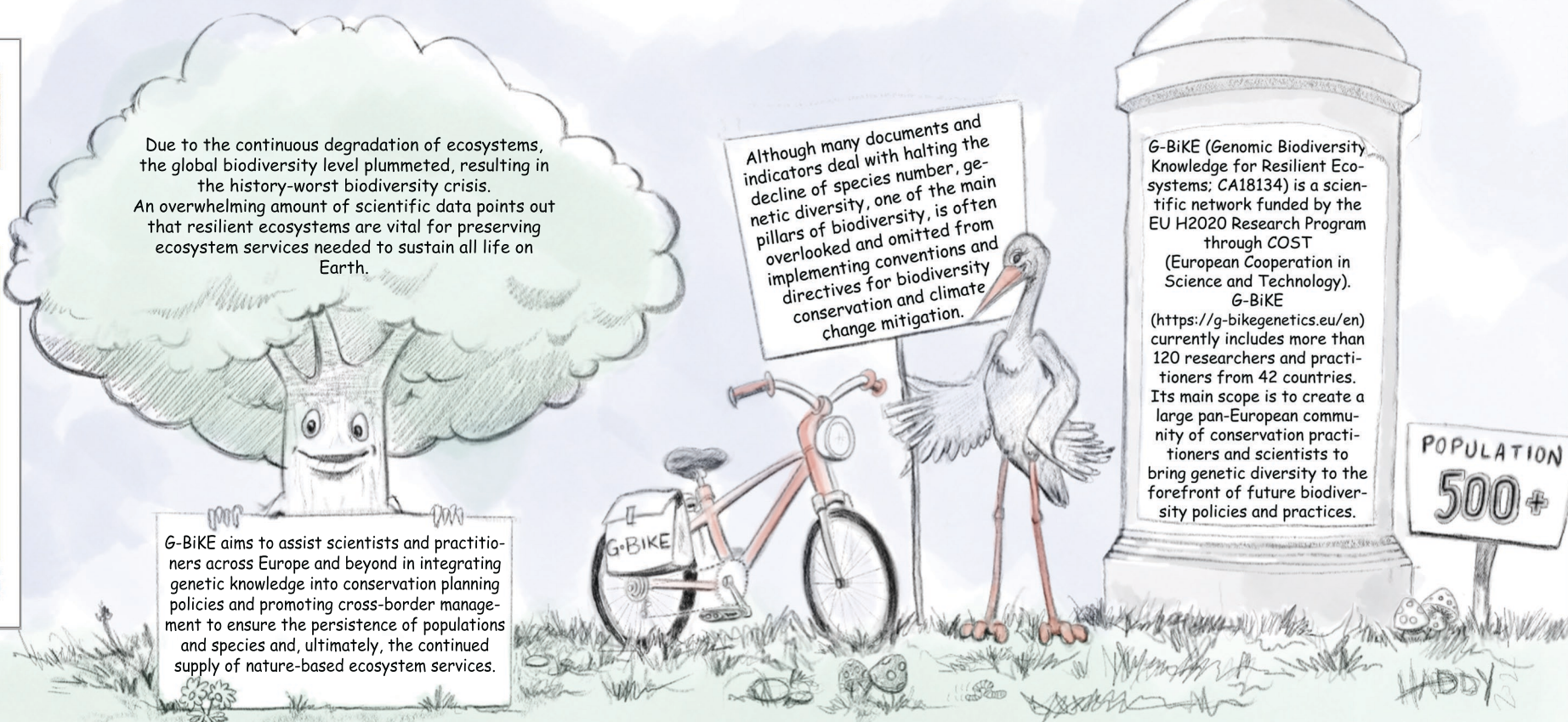
Main Findings

- Humans depend on ecosystems. We need to act and stand guard against the loss of biodiversity caused by human activities and climate change, also for our own sake.
- Genetic diversity is variation at the DNA level. Genetic diversity is the basis of biological differences, both between species and among individuals of the same species.
- Because of genetic diversity, some individuals are better suited to survive and reproduce in certain conditions, and will be favoured by natural selection.
- Genetic diversity increases the probability of species survival, especially during environmental change. Genetic diversity is therefore crucial to the resilience of ecosystems and the production of ecosystem services.
- Populations that are small and isolated rapidly lose genetic diversity. Therefore, management should focus on enlarging and connecting populations above critical thresholds, to retain the capacity to adapt genetically to change.
- Measuring and monitoring genetic diversity enables us to better evaluate species health, genetic variation and the exchange of genetic variation across different populations (gene flow) to improve the management of biodiversity and natural resources.

Key Recommendations

- Preventing more extinctions and safeguarding ecosystems requires immediate and comprehensive action.
- Conserve and restore genetic diversity to sustain the viability of species and ecosystems and increase their resilience to climate change.
- Implement genetic methods for analysing and monitoring genetic variation in species of special concern for ecosystem services or conservation. These important conservation tools provide science-based information to managers and policy makers.
- Improve species conservation programmes so they safeguard and strengthen genetic diversity. Plants and animals have adapted to their environments for several hundreds of years, and their genetic adaptations make it more likely that they will survive environmental changes.
- Modify guidelines for national reporting on the EU Habitats Directive, Birds Directive, Marine Strategy Framework Directive and Water Framework Directive to explicitly recommend that genetic diversity and gene flow in species are assessed and monitored wherever it is relevant.

Photo: Adaptive colour variation among European pool frogs (Pelodytes lessonae). Dark individuals (outermost individuals, from northern Europe) hear up more easily than light-coloured individuals (central, from Southern Europe), which is advantageous in cold regions. (photo: Per Sjögren-Gulve).



G-BiKE aims to assist scientists and practitioners across Europe and beyond in integrating genetic knowledge into conservation planning policies and promoting cross-border management to ensure the persistence of populations and species and, ultimately, the continued supply of nature-based ecosystem services.

Genetic diversity targets and indicators proposed for the CBD post-2020 Global Biodiversity Framework

POLICY BRIEF

To accompany: Hoban et al. 2020. Genetic diversity targets and indicators in the CBD post-2020 Global Biodiversity Framework must be improved. *Biological Conservation*. <https://doi.org/10.1016/j.biocon.2020.108654>

Executive Summary

Genetic diversity goals and metrics to assess genetic diversity (indicators) in the post-2020 biodiversity framework must be improved to prevent the implausible loss of biodiversity and to meet the Convention on Biological Diversity (CBD) targets. Genetic diversity within all species must be conserved, measured, and monitored using appropriate metrics. Suitable for the post-2020 framework, we propose a genetic Goal with a recommended Action Target, and suggest three new genetic indicators, plus changes to current CBD indicators.

Background

Genetic diversity contributes to supporting human society and the life support systems of the biosphere. It is decreasing globally due to human actions. This diversity enables species to adapt, maintains ecosystem services (e.g. water filtration, food), and is essential to ensure the resilience of species and ecosystems to climate change. The "zero draft" of the CBD's post-2020 framework follows the 2011-2020 CBD strategy to conserve biodiversity, for which few targets have been met. Maintaining genetic diversity is recognised in the post-2020 strategy as one of five primary 2050 goals. However,

- The CBD's zero draft Goal for genetic diversity is weak and unclear (Galbraith et al. 2020; Scleroglou 2020).
- There is no 2030 Action Target for genetic diversity.
- Current CBD genetic diversity indicators neglect most wild species as they are restricted to domesticated species and their wild relatives. Wild species are essential to ecosystem integrity and services, especially under climate change.
- The current indicators are also inadequate to sufficiently monitor changes in genetic diversity.

Proposed indicators

To meet global conservation goals, we propose that genetic diversity within all species needs to be conserved, measured, and monitored using appropriate metrics.

We propose three new indicators for the post-2020 CBD framework, to be used in addition to modifications to the current CBD's zero draft indicators. One indicator alone is insufficient for monitoring progress towards the CBD genetic diversity goal. These indicators:

- Are applicable to all species.
- Are available immediately.
- Are scalable, thus, can be calculated locally, regionally, or globally.
- Can be aggregated across species and among different taxonomic groups.
- Do not require genetic data (Indicator 1, 2).

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"Available in 33 languages"



"Available in 7 languages"

