《环境与卫生科学杂志》

Journal of Environment and Health Science

ChengZhu Science™

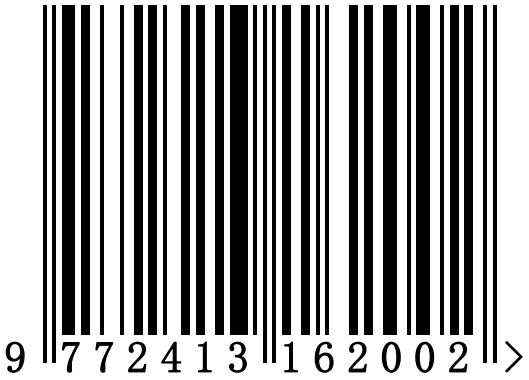
江西省诚筑环保工程有限公司主办

2021 年 02 月刊物/Serial in Feb, 2021

出版人： 刘焕 四季出版有限公司

Publisher: Liu Huan, SI JI PUBLISHING COMPANY LIMITED

ISSN 2413-1628



Article 5. Daily Notes on Natural Conservation

Author: Liu Huan (1983-), Master of Science (First Class Honours, 2009), The University of Auckland.

DOI:10.58473/JEHS0006 Retrieval from official database: www.crossref.org

Latest revised on 07/02/2024.

A viewpoint to Invasive Species VS. Exotic Species on 07/04/2020:
As warned by Biodiversity conservation guidelines issued from UN Biodiversity International Organization, it is not to introduce exotic species into native ecosystem, which may become invasive species. For the well-maintained ecosystem, introducing exotic species by human disturbance usually is considered to be detrimental. However, with the natural environmental change in the long term, the community of indigenous specie goes through natural succession process, which is replaced by exotic species. Sometimes these exotic species is introduced by other animals (such as birds with migrated habits) as well. This is the reasonable natural selection process driven by the inter-species competitions, because the purpose of biodiversity conservation is not due to the mercy nature. However, human disturbances in terms of introducing exotic species is not allowed in most cases.

However, for the restoration of degraded or deforestation ecosystem, if the indigenous species can hardly maintain the functions of native ecosystem due to the environmental change in regional or global scales, introducing exotic species is an alternative to restore the ecosystem. In this case, the biomass production and the ecosystem functions (such as prevention of soil erosion or reserving rainwater) are the primary principles for the restoration.

A viewpoint to Gene Conservation VS. Gene Pollutants on 07/04/2020
For the gene diversity conservation, it is to maintain the genetic purity in the population of a dominant variety as the first criterion. If the sub-population of dominant genetic variety is sustainable and plays a role in significant ecology functions at the local scale, the introducing exotic gene materials from minor genetic sub-populations becomes a gene pollutant; However, if the dominant genetic population faces endangered status due to natural environmental change or it is degraded as not to maintain significant ecology functions, inter-varieties hybridization would be the right conservation practice.

For the existing minor status sub-populations of genetic varieties, if the genetic similarities in this minor sub-populations of genetic variety is lowered than that in dominant variety, which means that the genetic purity of minor sub-populations is degraded compared with dominant sub-populations, this minor sub-populations may be unsustainable populations. The minor sub-populations may go towards genetic

purity due to intra-species competitions under environmental change. However, reserving the minor genetic varieties in gene pool is also essential to genetic conservation.

Why this becomes gene pollutant? On 07/04/2020

For the example of environmental adaptiveness, the genome traits of specific environmental adaptiveness (such as wide and deep root system in a specific soil condition) is sustainable when the genetic similarity maintains genetic purity in a sub-population. In this case, any hybridization will lead to gene traits loses in this specific environmental adaptiveness, which is invasive gene materials by exotic disturbance.

Why defined as genome traits? On 07/04/2020

In this paper, genome traits is defined as the set/sum of quantitative gene sequences expressed as environmental adaptiveness traits of the same qualitative nature, in response to certain ranges of environmental gradients. By this definition, the genome traits is not sensitive to normal and gradual environmental changes, which also indicates that the bio-marker at chromosome level is the optimal one for the genetic breeding of natural conservation. In comparison, gene sequencing would be applicable only on the selection of economic traits for agriculture breeding.

Economic gene traits VS. Conservation Genetics on 10/04/2020

The economic gene traits usually does not consider the self or natural reproduction ability (sustainability in population reproduction) in a population. The extreme case is the clone creatures without any sexual reproduction nature. The most common economic hybridization variety is the hybrid rice, which only relies on the artificial breeding of seeds for ongoing cultivation in farmland. For the economic gene traits, gene/DNA sequencing technology is utilized for gene traits selection.

However, for the conservation of genetics, the sustainability in natural reproduction within a population unit is one of the primary/compulsory selections for gene traits, which is different from economic traits selection. In comparison and contrast, natural traits of environmental adaptiveness is similar to economic traits of environmental adaptation (such as tolerance against drought stress), but they are not totally identical, because the self/natural reproduction traits of a population must be taken into considerations in conservation biology, whereas the economic traits of environmental adaptation can be the hybrid variety without self reproduction needs in a natural population. The later one can be selection by specific gene sequences expressed as environmental adaptation, but the conservation biology should only adopt the bio-marker at chromosomes level (fluorescence DNA probe techniques is advised to increase the accuracy as pointed out in my previous journal article) which is more suitable for the calculations by classical Mendelism inheritance.

A viewpoint to article doi: 10.1111/rec.13197 on 15/05/2020

The ‘ōhi‘a seedlings is the hybridized cultivar which specifically is selected for the resistance againt Rapid ‘ōhi‘a Death (ROD) [3]. However, the findings that competition from exotic plants and exotic feral ungulate damage leads to more mortality in seedlings than ROD disease reveals that the gene trait selection of resistance against Rapid ‘ōhi‘a Death (ROD) would result in the lose in other gene traits of environmental adaptiveness. This is the consequences commonly existing in gene engineering --- the selection of a specific gene trait would lead to the lose of other gene traits as compensation nature due to the linkage effects of the whole genome pool. My another article has also reported this compensation mechanism on the basis of ‘plasticity’ of yield components in crop species breeding [4].

A viewpoint on peatland restoration on 29/09/2020

The regeneration solutions of peatlands is to drain the wetlands which is about to dry out in UN Environment paper [2]. However, the restoration of anaerobic microbial community in peatlands would be also essential as concurrent solution, playing the key role in biomass decomposition or carbon consumption in wetlands.

References:

[1].搜狗百科，共享百科全书/Sogou Baike, Creative Commons.
[2].https://bit.ly/333EMYF
[3].Stephanie G. Yelenik,Kylle Roy (2020), Successful restoration of Metrosideros polymorpha (‘ōhi‘a) is possible in forest sites with active Rapid ‘ōhi‘a Death infections. Restoration Ecology, Volume 28, Issue5. https://doi.org/10.1111/rec.13197
[4].Liu Huan. (2021). Article 7. Metabolomics (1) --- The Systematic Chemistry Fingerprints Between Genotype and Phenotype and its Application on the Conservation Genetics. Journal of Environment and Health Science (ISSN 2314-1628), 2021(02). https://doi.org/10.58473/JBS0005