The Royal Golden Cocoon of Java: Cricula Trifenestrata (Indonesia)

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Abstract

Indonesia is a country blessed with multifarious natural resources, including the notorious "pest" namely the Cricula Trifenestrata wild silkworms.

Although there is no Cricula Trifenestrata wild silkworms in Japan, the advance science and technology to uncover the potential of Cricula Trifenestrata wild silkworms' golden cocoons utilization as various crafts, textile and health products have been discovered by Japanese scientists since 1988.

However, despite the advance science and successful initiative, (for more than 35 years) Cricula Trifenestrata wild silkworms are still labelled as "pests" in Indonesia and the rest of the world.

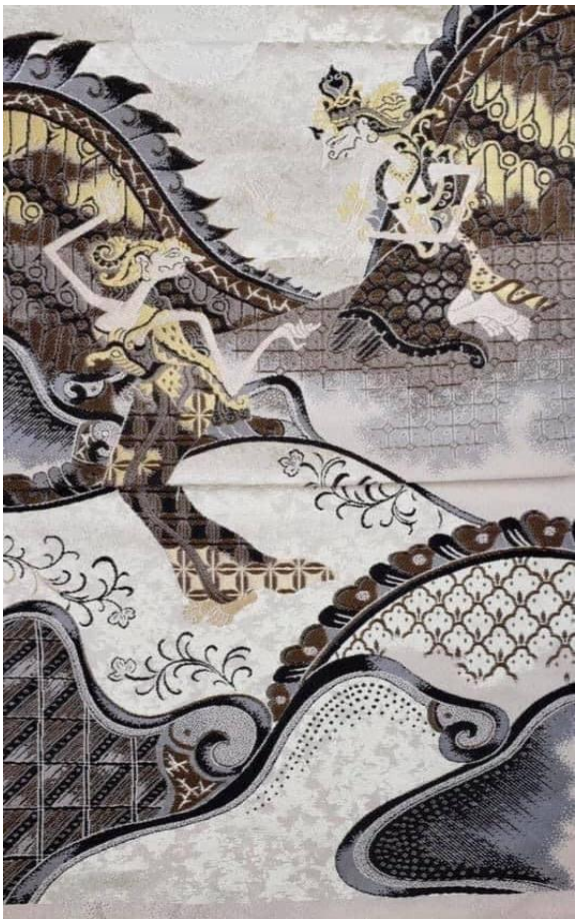
Massive (online and offline) disinformation and misinformation (intentional or/ and unintentional) happening at local, regional, national and international level is hindering the access and participation in scientific knowledge and its applications for sustainable development (especially in developing countries).

"The Royal Golden Cocoon of Java: Cricula Trifenestrata" is a successful initiative that showcases the possibility of international collaboration and open science that utilises a new healthy biomaterial to create an inclusive zero-emission, climate crisis mitigation and inclusive nature-based solution for post-covid19 economic recovery business model at grassroots level (through the utilization of Cricula Trifenestrata wild silk golden cocoons) founded and supported by the Royal Family of Yogyakarta since 1990s.

Amiable diplomatic relationship between Yogyakarta and Kyoto as Sister Provinces since 1985 (SDG 17) has allowed the international collaboration and scientific exchange to realize the Cricula Trifenestrata "pests" utilization. This successful initiative has evidently showcased the possibility of international collaboration and open science to create an inclusive, zero-emission industry (with minimum investment; SDG 2 and 11) at grassroots level and afforestation while revitalising land biodiversity.

By collaborating with Professor Dr Hiromu Akai (Wild Silk Scientist) and Mr Hidenori Nakanishi (Royal Wild Silk Crafts Master), the Royal Family of Yogyakarta is the pioneer (in Indonesia) in utilising the Cricula golden cocoons into export quality wild silk yarns and crafts, which has high demand in the Japanese market who understand and appreciate Cricula wild silk as a superior and healthy material.

Photo 1. Premium 'obi' made of Cricula Trifenestrata and Attacus Atlas wild silk yarn from Royal Wild Silk



Source: Mr Hidenori Nakanishi, Master Royal Wild Silk Artist and Craftsman of https://miyabiori.jp/

The utilization of Cricula Trifenestrata golden cocoon is a proven case that "pest" can be beneficial for all; supported with progressive research and open science. When “pest” is no longer “pest,” this will reduce the usage of noxious pesticides that is bad for water and Earth (SDG 13).

This is also a new economic opportunity for pesticides researchers and industries. We need to create an economic value for change. We need to create solutions to the root and cause of pesticides runoff and contamination through better “pests” research and understanding. “Pests” when studied through new research approaches (for example: Nanobiotechnology) can be beneficial for human kinds and Earth.

Initial Experiences and Challenges (1990s)

- There was a lack of knowledge on Cricula Trifenestrata as a beneficial insect, hence the massive culling with excessive use of noxious pesticides.
- Fast-crop cultivation has created arid land prone to extreme weather events such as erosion, floods and landslides, which endangers the rural residents as well as a Javanese cultural landscape, namely the Imogiri Royal Tomb in Yogyakarta, Indonesia
- Child marriage was a problem in the rural villages where there was a lack of access and capacity for a sustainable economic support system (especially for women).
- The possibility of the loss of a unique species (Cricula Trifenestrata wild silk moth) as part of a healthy ecosystem.

Innovations: The Economic Value of Cricula Trifenestrata Wild Silkworm - the “Pest”

The cocoons of the Saturniidae wild silkworms are filled with 0.1- 0.8 micron small pores; first discovered by Professor Dr. Hiromu Akai in 1988 with a scanning electron microscope. Cricula Trifenestrata is one of the wild silk moths that belongs to the Saturniidae family which has the highest number of pores (only 2nd to the protected Agama Miley Madagascar wild silk moth) and occurred in abundance.

Unlike the domesticated (non-porous) Bombyx Mori silk yarn, porous wild silk yarn has excellent heat retention, lighter texture, higher and wider range of UV cut, as well as bacteriostatic and hypoallergenic properties; the potential "healthy silk" of the future.

Photo 2. Packages of Cricula Trifenestrata wild silk golden cocoons sold as art and craft material in Jakarta, Indonesia.



Source: Personal collection.

Therefore, Cricula Trifenestrata wild silk golden cocoons can be utilized as sustainable and biodegradable materials which is healthy for human and the environment, for example:

Textile. Cricula Trifenestrata wild silk yarns and textile have the properties of anti-UV radiation & antimicrobial. Link: https://pat.intellectual-info.com/bio-mori/books-science/18819/

Cosmetic. Cricula Trifenestrata wild silk proteins are natural, non-allergen ingredients with higher and wider range of anti-UV radiation & excellent antioxidants; great for healthy skin. Link: https://cocon-cosme.jp/

Pharmacy. Cricula Trifenestrata wild silk golden cocoons’ pigment is rich with Lutein; a type of carotenoid pigment contained in the cornea of the eye, effective against cataract (patented in 2008). Link: https://patents.google.com/patent/JP2008138158A/en

Sustainable Implementation

Photo 3. Sri Sultan Hamengku Buwono X, Royal Crown Princess Mangkubumi of Yogyakarta and Professor Dr. Hiromu Akai in Cricula Trifenestrata wild silk moths' natural habitat rehabilitation in Imogiri, Yogyakarta, Indonesia. 19th January 2008.



Source: Royal Silk Foundation, founded and owned by the Royal Family of Yogyakarta.

In the 1990s, the Royal Family of Yogyakarta has successfully elevated the livelihood of local villagers in Yogyakarta, Indonesia, especially the rural women who are trained and employed as export quality wild silk spinners. With their skills to earn an income, they regain identity and confidence as a human being. When these women gain a sense of belonging and empowerment in the community; mothers have the voice and capacity in the family to protect themselves and their children from early or child forced marriage (SDG 6).

Professor Dr. Hiromu Akai's pioneering knowledge on the health benefits of porous wild silk cocoons, a potential biomaterial with higher level of antimicrobial & wider range of anti-UV characteristic compared to the non-porous domesticated Bombyx Mori silk, has created an inclusive, zero-emission business model and transformed Cricula Trifenestrata wild silkworms' labelling; from "pest" to healthy wild silk producers.

As the rural villagers understand the value of Cricula Trifenestrata wild silk golden cocoons, they begin to protect Cricula Trifenestrata wild silk moths' natural habitat by active tree planting, resulting in biodiversity restoration of an otherwise arid land that belongs to the Royal Family of Yogyakarta, as well as the conservation of the Javanese cultural landscape; the Imogiri Royal Tomb in Yogyakarta, Indonesia.

Maturity Level

We are pleased to have the blessing from the Royal Family of Yogyakarta, to further disseminate this good practice and accelerate global climate crisis mitigation, with the creation of a premium art book: "The Royal Golden Cocoon of Java - Cricula Trifenestrata"; showcasing the Royal Wild Silk Arts that have created and supported the economic value of the Cricula Trifenestrata 'pest' since 1990s.

"The Royal Golden Cocoon of Java: Cricula Trifenestrata" is also an officially curated (by panels of experts) and registered as:

- UN Good Practice (2nd Call 2019) #SDGAction30981
- UN Acceleration Actions (2022) #SDGAction48294
- UN Water Action Network (2023) #SDGAction49210
- UN Conscious Fashion and Lifestyle (2023) #SDGAction49141
- UN SDG Summit Acceleration (2023) #SDGAction53224

Conclusions

There are approximately 160,000 species of moths in the world, many of these moths create unique cocoons; these are abundant natural resources awaiting for collaborative research and development for the benefit of all. It is a basic human rights to have access to applicable biodiversity knowledge and veritable information, in order to achieve optimum health and living condition for all.

Cricula Trifenestrata wild silk moths are distributed throughout different regions, we need open science in order to have qualitative and quantitative exchange of information and knowledge for the progressive health benefits for all, leaving no one behind.

Collaboration across cultures, regions and nations is paramount as wild silk moths live in various regions of the world. Therefore, It is paramount to have trustworthy channels of communication between multinational stakeholders across sectors, cultures and languages, in order to prevent disinformation and exploitation of local natural resources.

Presently, we are actively looking for a global SDG driven commercial (premium) artbook PUBLISHER with strong global distribution channels to mobilize and catalyse change for the good of all.

We are looking forward to create global awareness of this good practise, with the hope to replicate this

practice globally, hence mitigating climate crisis and eradicating poverty in times of multiple crises.

It is a basic human rights to have access to applicable knowledge and veritable information; for fair access and benefit sharing of local natural resources for the good of ALL.

Cricula Trifenestrata Wild Silk Moths' Natural Habitat Afforestation in Yogyakarta, Indonesia; GPS coordinates: -7.9348431914577935, 110.40235126180919

Acknowledgments

Thank you Professor Dr. Hiromu Akai (Founder and Honorary President of the Japanese Society for Wild Silkmoths) for the kind interview and invaluable insights of the world of wild silk moths, especially the Cricula Trifenestrata wild silk moth and her beneficial golden cocoons.

Thank you Her Royal Highness Crown Princess Mangkubumi of Yogyakarta for the humble support.

Thank you for supporting the dissemination of knowledge and science for the good of all:

- Ms. Alexandra Xanthaki (UN Special Rapporteur in Cultural Rights)
- Ms. Rina Kuusipalo (Human Rights Officer at United Nations Office of the High Commissioner for Human Rights)
- Ms. Eline Nieboer (Nature Based Solutions Platform)
- Mr. Gil Ribeiro (Explorer.land by OpenForests)
- RESTOR: An open data platform enabling the global restoration movement
- Global Landscapes Forum
- IUCN
- ICCROM
- PANORAMA Solutions for a Healthy Planet

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