
EcosystemImpact: Simeulue Songbird Conservation Progress Report

October 2022



1. Introduction

The projects discussed in this report work to save Simeulue's most threatened songbird species from extinction. The current focus species include Barusan shama (*Copsychus [malabaricus] melanurus*) and Simeulue hill myna (*Gracula religiosa miotera*). There are four subspecies of Barusan shama, with the Simeulue Barusan shama (*Copsychus melanurus hypoliza*) being the focus of this project. Barusan shama are variably recognised as a species due to a distinct morphology and restricted range (Eaton et al. 2016; Rheindt et al., 2019), with Rheindt et al. (2019) stating in their paper *The extinction-in-progress in the wild of the Barusan Shama*, that Barusan shama are 'likely to [be] extinction [sic] in the wild on all islands except Siberut' (p.33). Simeulue hill myna are a genetically and morphologically highly distinct population within the hill myna complex that may well warrant endemic species-level recognition, yet which are equally threatened with extinction (Švejcárová, 2017; Ng et al., 2020).

2. Project Progress

2.1. Aviary Developments

Both the Simeulue hill myna holding and breeding aviaries have been completed as of 13th October 2022. The aviaries consist of five holding rooms with a capacity to house 10 individuals, and three larger breeding rooms with the capacity to house six individuals, with the target being three hill myna breeding pairs. We anticipate that the smaller holding hill myna aviaries will double up as breeding aviaries for Barusan shama. The two new aviary blocks are within the EcosystemImpact grounds, located besides the existing Barusan shama breeding aviary block – Figure 1 below.



Figure 1. Both new aviaries along with the existing Barusan shama aviary.

The hill myna holding aviary rooms are 2m wide, 2.5m deep and 3m tall. The hill myna breeding aviary rooms are 3m wide, 4m deep and 4.5m tall. From discussions with a number of experts in songbird breeding, including Jochen Menner Curator of Birds at Prigen Conservation Breeding Ark, and Bayu Wirayudha CEO Friends of the National Parks Foundation, although the holding aviaries are unlikely to produce breeding success, they will be large enough to house pairs. Between the two aviary blocks a water tank and irrigation system has been developed, with each room having a bird bath – see Figures 2 and 3 below.

The aviaries are within the existing EcosystemImpact garden, where, in anticipation of hill myna arrival, fruits such as papaya, banana, guava and mango have been planted to provide free local food. The EcosystemImpact grounds are guarded by security from 7pm to 7am and have CCTV surveillance.



Figure 2. Simeulue hill myna breeding aviary, showing new water container.



Figure 3. Simeulue hill myna breeding aviary from the front, with garden structure in the foreground.



Figure 4. Inside of aviary rooms, perching incomplete and will be planted with potted plants and trees.

2.2. Government Relations and Permit Progress

Over the last 12-18 months, the EcosystemImpact team have been in communication with Indonesia's government sector for Conservation and Natural Resource Management (BKSDA), who are responsible for providing permits to house and breed songbirds. Barusan shama remain classed as white-rumped shama (*Copsychus malabaricus*) and are not protected under Indonesian law. Therefore, it is not illegal to possess Barusan shama. However, in order to become an officially recognised breeder, a permit from provincial level BKSDA and supported by the provincial and local level Environment Sector (DLH), needs to be granted. EcosystemImpact's Barusan shama breeding permit has been in process for around a year, although more intensively recently with the hiring of Ayu, the new bird focused Field Officer, and a recent increase in attention and action from BKSDA and DLH.



Figure 5. BKSDA, DLH and EcosystemImpact meeting in the EcosystemImpact office.

The paperwork for the Barusan shama breeding permit is now complete with BKSDA and DLH representatives having recently visited Simeulue to collect data on each of EcosystemImpact's existing birds, carryout checks of the facilities and planned reintroduction location. The trip was a success with both BKSDA and DLH speaking highly of the facilities, bird health and breeding success to date. A fieldtrip was taken to Linggam Island, the proposed first reintroduction site for the captive bred Barusan shama (see Figure 6 below). During the field visit, BKSDA and DLH collected location data and surveyed the location for reintroduction suitability; to be submitted with the final proposal with data from EcosystemImpact's own vegetation and insect surveys – see report sections 2.3.1 and 2.3.2 below.



Figure 6. Field trip to Linggam Island, the proposed first reintroduction site for *Barusan shama*.



Figure 7. Meeting between BKSDA, Simeulue law enforcement and EcosystemImpact.

Simeulue hill myna are classed as common hill myna (*Gracula religiosa*) under Indonesian law which are a protected species, and therefore gaining a permit to breed the species requires BKSDA

cooperation and agreement at local, provincial and central level. During the recent visit to Simeulue, meetings were held with local law enforcement agencies to develop support for the Simeulue hill myna breeding project and permits. Within Aceh, good relationships with government organisations such as BKSDA, DLH and law enforcement agencies are incredibly important and can be highly influential in gaining wider support and permits. Once the breeding permit has been fully processed, EcosystemImpact will send a number of birds to SOCP The Haven’s Sumatran songbird breeding project, in order to develop a second captive breeding population of Barusan shama.

2.3. Linggam Reintroduction

At just under 40 hectares, Linggam Island is a small island located 1.2 kilometres off mainland Simeulue, and is included in the Nasreuhe Village area, Central Simeulue. The island consists of a semi-natural coconut plantation leased and managed by PT. Green Enterprises Indonesia (āluān¹), and is therefore a secondary forest vegetation community. Through an EcosystemImpact led bird survey in June 2021, Linggam was highlighted as one of the most promising potential release sites for Barusan shama.

Linggam island is known to have been within the historical range of both Simeulue hill myna and Simeulue Barusan shama. Islands are considerably easier to guard than mainland forest locations greatly reducing the poaching threat and, as Linggam is currently leased by āluān, there is a team of āluān staff constantly posted on the island. We are in the process of developing a community ranger project, employing members of local communities as conservation rangers and law enforcement agents to monitor and collect data on the released birds.

2.3.1. Insect Species and Food Availability Survey

In order to collect data on Linggam Islands insect diversity, we carried out insect surveys during the month of August 2022. Barusan shama are insectivores, meaning it is essential to know the natural insect food availability before the reintroduction of shama onto the island. Supplementary feeding of mealworms and crickets will be used during the reintroduction process in order to increase the likelihood of survival (Widyaningsih, 2008). The main aims of the survey were:

- Collect data on the diversity of invertebrate species on Linggam Island.
- Test naturally occurring species found on Linggam on EcosystemImpact’s Barusan shama captive breeding population in order to discover food species diversity and preference.

¹ āluān is a sustainable organic coconut oil producer based on Simeulue which operates in partnership with EcosystemImpact. āluān is able to work with communities to provide livelihood solutions through sustainable job creation. In cooperation with EcosystemImpact, small holders which supply āluān enter into conservation agreements which enforce environment and wildlife friendly agricultural practices.

Invertebrate animal data collection was carried out at eight predetermined location points across the island on an existing route which will later become a ranger patrol and monitoring bird route after the release. Figure 8 below, shows a map of Linggam Island along with the data collection points. The red dotted line is the observation transect, the purple point is the ranger camp and the blue points are the eight data collection location points.

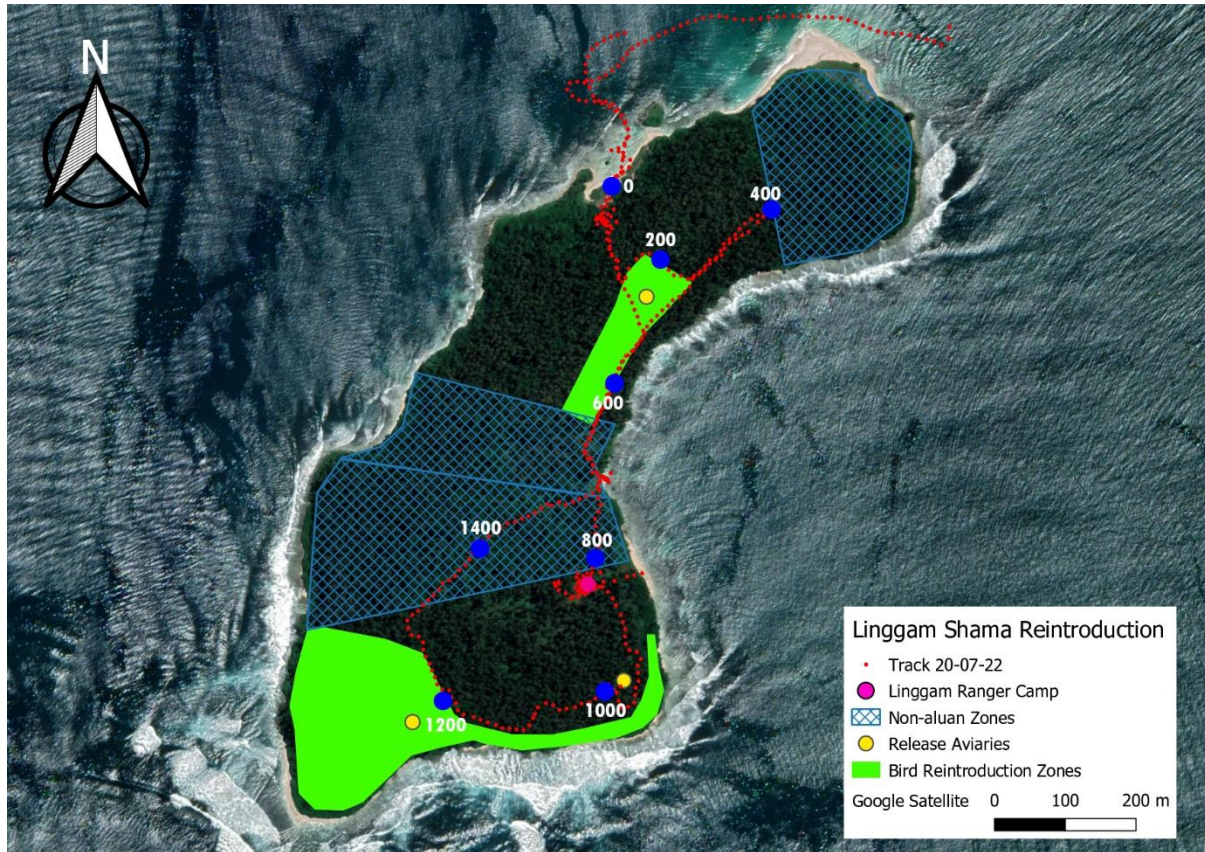


Figure 8. Map of Linggam Island showing vegetation sample plot locations.

Experimental feeding of naturally occurring species found on Linggam was carried out on EcosystemImpact’s captive breeding population. At the time of feeding, the time was calculated using a stopwatch in order to determine the reflex of the bird to the presence of the food item that had been provided, with the response recorded being eaten or not eaten.

The diversity index was calculated based on the Shannon-Weaner diversity index formula and the species evenness index was calculated using the Pielou formula (Odum, 1996). The results from the data collection show that we found 31 invertebrate species from two phyla, six classes, 15 orders.

- Phyla: Arthropoda and phylum Annelida.
- Class diversity: Insecta, Arachnida, Melacostraca, Diplopoda, Chilopoda and Oligochaeta.

- Orders found: Hymenoptera, Blatodae, Orthoptera, Hemiptera, Isoptera, Decapoda, Spirostreptida, Haplotaxida, Archaeognatha, Diptera, Dermaptera, Araneae, Scorpiones, Isopoda and Chilognatha.



Figure 9. All found and identified invertebrate species shown by order.

The results of the diversity value of the overall invertebrate species (Figure 10 below) show a high diversity, with a score value of 3.212. We believe this to be because – in accordance with our vegetation survey, see report section 2.3.2. below - Linggam Island has a collection of suitable habitats to support invertebrate species. The high diversity of invertebrates is also in part likely to be because of the island wide absence of pesticide spraying due the aluan and the islands organic certification. The evenness value, shown above in Figure 10 below, of 0.935 represents a high level of evenness due to its closeness to 1. This indicates that invertebrate species are distributed evenly across each survey location which will provide crucial as a food resource for the released Barusan shama.

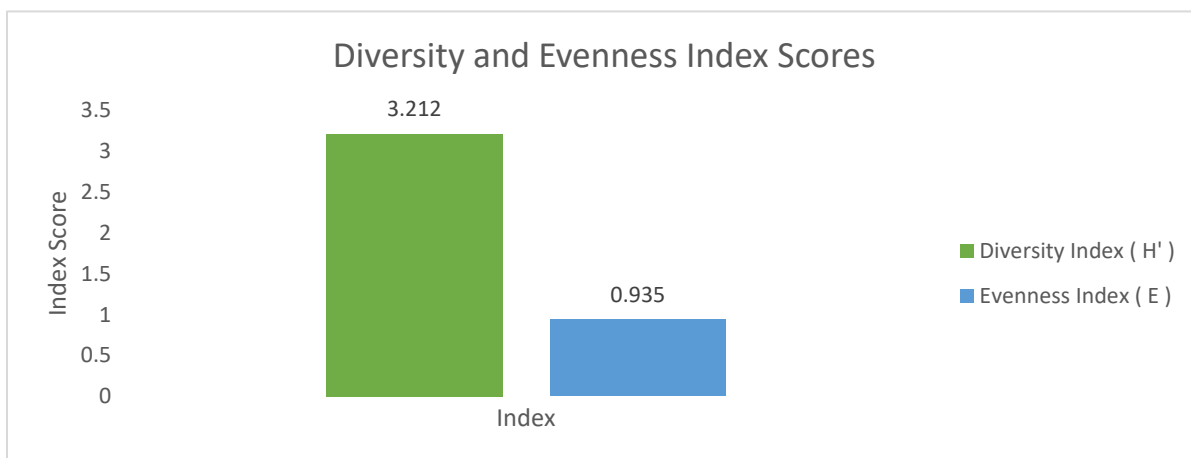


Figure 10. Invertebrate Animal Diversity and Evenness Index scores for Linggam Island.

Based on the results from our ongoing monitoring of the Barusan sham captive breeding population, we carried out the experimental feeding in cages where parent birds had two chicks. This was because these conditions show less sign of stress to the birds when feeders enter the cages. The invertebrate species provided to the shama were those that we found on Linggam and consisted of 2 phyla, Arthropoda and phylum Annelida. There were 16 species of invertebrate used in the experimental feeding, of which only one species was not eaten – outlined below in Table 1 below.

Table 1. Results from the Experimental Shama Feeding

| No | Phylum | Class | Order | Scientific Name | Common Name | Eaten | Not Eaten |
|----|------------|--------------|----------------|----------------------------------|---------------------------|---------------|-----------|
| 1 | | | Blatoda | <i>Macrotermes gilvus</i> | Laron termite | • | |
| 2 | | | | <i>Blatta orientalis</i> | Cockroach | • | |
| 3 | | | | <i>Solenopsis sp</i> | Red ant | • | |
| 4 | | | Hymenoptera | <i>Camponotus pennsylvanicus</i> | Black ant / Carpenter ant | • | |
| 5 | | Insecta | | | <i>Monomorium minimum</i> | Black ant | • |
| 6 | | | | Orthoptera | <i>Caelifera sp</i> | Grass hopper | • |
| 7 | | | | | <i>Gryllus mitratus</i> | Cricket | • |
| 8 | | | Isoptera | <i>Coptotermes curvignathus</i> | Termite | • | |
| 9 | Arthropoda | | | | <i>Sanurus indecora</i> | Cashew hopper | • |
| 10 | | | Archaeognatha | <i>Machiloides banksi</i> | Flee | | • |
| 11 | | Diplopoda | Spirostreptida | <i>Spirostreptus sp</i> | Millipede | • | |
| 12 | | Arachnida | Araneae | | Spider | • | |
| 13 | | Chilophoda | Chilognatha | <i>Trigoniulus corallinus</i> | Centipede | • | |
| 14 | | Melacostraca | Decapoda | <i>Liocarcinus vernalis</i> | Land crab | • | |
| 15 | | | Isopoda | <i>Oniscidea Latreille</i> | Woodlice | • | |
| 16 | Annelida | Oligochaeta | Haplotaxida | <i>Lumbricina sp</i> | Worm | • | |

2.3.2. Vegetation Survey

Data collection for tree and vegetation structure was carried out on Linggam Island for 3 days between 22-24 August 2022. Vegetation data collection will support and determine the use of trees and vegetation by Barusan shama. We divided vegetation data collection into two groups, tree and shrubs based on the recorded trunk or stem diameter. Vegetation data retrieval was achieved using a combination of transect and the quadratic methods (Fahrul, 2008). We carried out vegetation data collection at eight location points following the designated transect line. This path will later become an observation and ranger patrol data collection route after the reintroduction of Barusan shama onto Linggam Island. Of the eight points, there were three locations that were close to the planned construction locations of the pre-release aviaries. Figure 8 above shows a map of Linggam Island, key features of the island and infrastructure related to the reintroduction of Barusan shama.

The purpose of our vegetation survey was:

- A. To understand the diversity of vegetation and structure on Linggam Island.
- B. To understand the types of trees and vegetation structure that will be used by Barusan shama after their release on Linggam Island.

The focus of the survey was to collect data on trees and shrubs. Although Barusan shama carryout activities throughout a variety of vegetation levels, from ground level to canopy, our aim was to work out the health and diversity of vegetation structures which are most required for Barusan shama survival after release. Therefore, we collected data on vegetation abundance across possible Barusan shama uses, including shelter, rest and foraging for food.

We recorded all data in tabulation and carried out data analysis. Shannon-Wiener diversity index (H') was used to work out species diversity. Important Value Index (IVI) was calculated based on the sum of all values of density (D), relative density (RD), frequency (F), relative frequency (RF) dominance (Do) and relative dominance (RDo). IVI was used to determine the type and level of dominance of plant species across Linggam Island. Shannon-Wiener index was used to determine categorise of vegetation diversity (see Figure 11 below):

- $H' \leq 1$ = Low diversity
- $1 < H' < 3$ = Medium diversity
- $H' \geq 3$ = High diversity

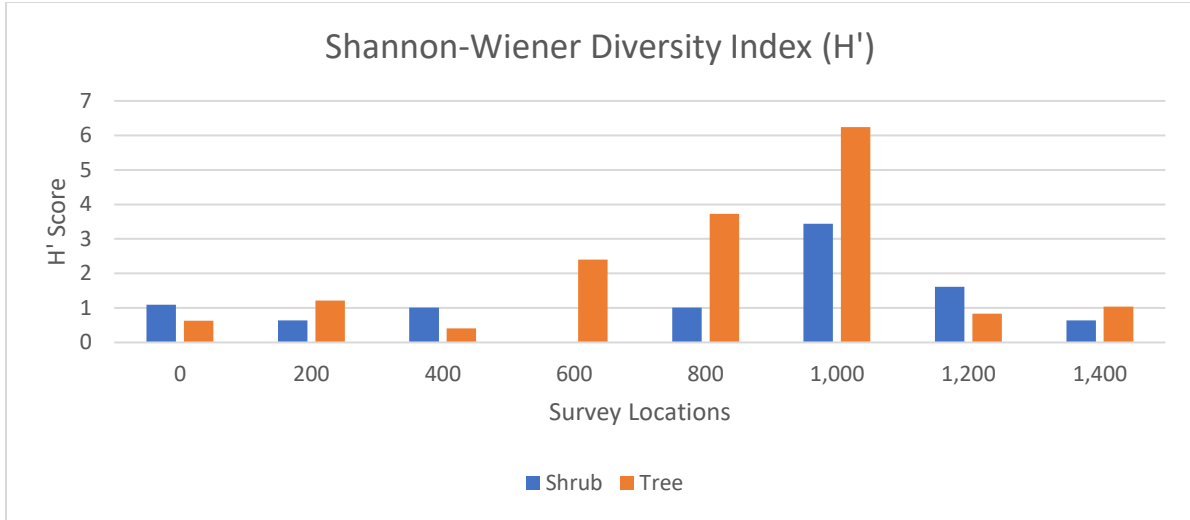


Figure 11. Tree height and trunk diameter Shannon-Wiener diversity index (H') at each transect sampling location.

The highest recorded tree species diversity was recorded at sample location 6 at 6.238 and the lowest diversity being recorded at sample location 3 with a value of 0.410. For the shrub species diversity data, the highest value was recorded at the sample location 6, with a value of 3,442 and the lowest value being at sample location 4 due to the large number of coconut palms and high level of clearing greatly reducing diversity. Three of the vegetation data collection locations were close to the planned locations of the pre-release aviaries: sample location 2 at 200 m; sample location 6 at 1,000 m and sample location 7 at 1,200 m. These locations ranked amongst the highest locations for tree and shrub species numbers (see Figure 12 below), and, when the results from our insect surveys are also taken into account (see section 2.3.1. above), our data would suggest that these locations are well suited to the reintroduction of Barusan shama.

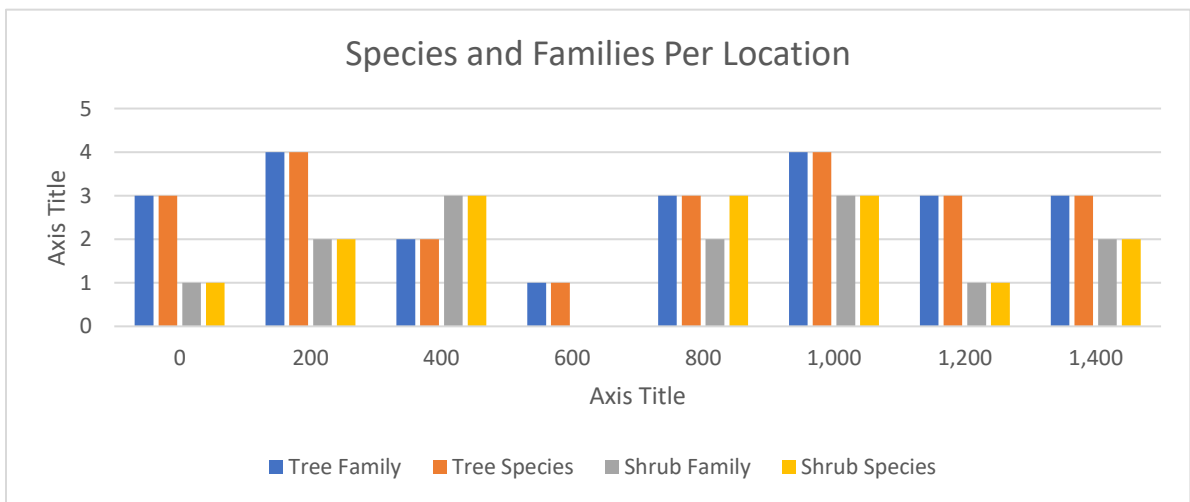


Figure 12. Vegetation species and families at each sample location.

2.3.3. Linggam Island Infrastructure Developments

As Linggam Island will be the first location for the reintroduction of EcosystemImpact's captive bred Barusan shama, along with the location of a community ranger project to protect the released birds, a ranger camp and pre-release aviaries are required. As Linggam had an existing shelter for coconut collectors, over the last two months EcosystemImpact has renovated the shelter to make it suitable as a ranger camp – see Figure 13 below – with individual bedrooms, a separate kitchen, washroom and toilet. Figure 8 above shows the three proposed locations for the pre-release aviaries. The pre-release aviaries have been designed and materials sourced, with materials now needing to be purchased and shipped to Linggam, with the building of the aviaries being scheduled to start of the in mid-November 2022.



Figure 13. The renovated Linggam Island Ranger Camp.

3. Conclusion

With the completion of the two new Simeulue hill myna aviary blocks; the completion of Linggam Island vegetation and insect surveys; the renovation of the Linggam Island Ranger Camp; crucial relationships with BKSDA, DLH and Simeulue law enforcement made through Simeulue field visits and meetings; and positive developments in gaining the breeding permits, the last six-to-three months have seen progress being made across EcosystemImpact's songbird conservation projects. Our aim is to continue this progress to complete the breeding permit by the end of

November and to continue to develop the positive relationship with BKSDA and DLH; to have obtained our first Simeulue hill myna by the end of 2022; build the pre-release aviaries on Linggam Island by the end of 2022; train the rangers and implement the Linggam community ranger team and patrols by February 2023; and release two pairs of EcosystemImpact captive bred Barusan shama onto Linggam by March 2023.

4. References

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