COLLEGE OF FORESTRY AND NATURAL RESOURCES
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Thesis
Forest Biological Science
2024

Title:	**Ecological Assessment of Vegetation through Site Inventory and Remote Sensing from Inactive Mining in Mogpog, Marinduque.**
Author:	**Alto, Kim Clamor**
Adviser:	**Pampolina, Nelson M.**
Stream:	**Environmental Forestry**
Access:	**Restricted**
Type:	**Thesis**
Abstract/Executive Summary:	Post-mining activities is a challenge in rehabilitation of affected ecosystem in the country, requiring vegetation assessment as basis for restoration. This is the case in Barangay Capayang, Mogpog, Marinduque where local community is at risk after mining. Hence, this study attempted to investigate the vegetation surrounding mining area in support of local comprehensive land use plan. A modified belt transect (200 m each) was established across all vegetations (T1-mangrove forest, T2-Acacia auriculiformis- secondary growth, T3-coconut farm, T4-agricultural area). Alternate along transect were five quadrat each for canopy (10x10m), intermediate (3x3m), and undergrowth (1x1m) layers. Plant morpho-taxonomy and biometrics (DBH, height) were determined to compute ecological (density, frequency, dominance, importance value) and diversity indices (Shannon and evenness). Vegetation cover was classified to identify land conversion to forest over time using ENVI and ArcMap. Plant survey and GIS-generated data were integrated to analyze the ecological condition of vegetation around this inactive mining. Land cover of barangay (445 has) had six vegetation types (mangrove forest, young- secondary, agroforest, acacia stand, coconut farm, agricultural area), comprising 78 species, 65 genera, and 37 families across layers. Mangrove forest was dominated by Rhizophora apiculata while A. auriculiformis was abundant in secondary growth with succession of Antidesma ghaesembilla in undergrowth; Cocos nucifera represented coconut canopy with grass-shrubs beneath.

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	Diversity index was low in mangrove to moderate in secondary forest and coconut farm. Plant conservation categories were mostly least concern with two endangered (Pterocarpus indicus, Shorea contorta) and two vulnerable (Ficus ulmifolia, Sandoricum koetjape). The ecological succession progresses reflected from low vegetation coverage in 1988 with additional 127 hectares in 2018-based on satellite imagery. This could possibly be brought by previous rehabilitation and natural dispersal of seeds. However, further ecological studies supported by high-spec drones are necessary to provide better understanding of the total dynamics of the ecosystem to sustain local rehabilitation and restoration efforts."
Title:	**Nursery Growth Response of Bitaog (Calophyllum Inopyllum L.) on Mycorrhiza-Amended Copper Soil From Lepanto Mining Site, Mankayan, Benguet, Philippines**
Author:	**Ayson, Mark Joey Silonga**
Adviser:	**Pampolina, Nelson M.**
Stream:	**Environmental Forestry**
Access:	**Restricted**
Type:	**Thesis**
Abstract/Executive Summary:	Rehabilitation of mine tailings in the country is a challenge to improve soil quality and increase biodiversity particularly on copper-rich soil from pine forest in Mankayan Mountain Province. It is hypothesized that specific mycorrhizal fungi coexist with pines where undergrowth forest plants can be sourced of planting materials with inoculation of local mycorrhizas. This is the purpose of the study to investigate nursery response of an undergrowth species where soil was amended with mycorrhizas. Initially, transects were first established across benguet pine forest in mountainous watershed ecosystem to assess diversity of undergrowth following quadrat sampling technique. Ectomycorrhizal fungi were collected beneath for descriptive characterization while endomycorrhizas were isolated through wet sieving technique to prepare the inoculant. Mine soil was prepared for chemical analysis and sterilized as potting medium for seed box and pot experiments. Calophyllum inophyllum L. was used to represent undergrowth and determined nursery response to mined-out soils inoculated with mycorrhizal treatments (MykoVam, natural soil) using growth, survival, and association as parameters. Diversity analysis revealed 32 families of undergrowth forest plants under

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	pine forest represented by genus Calophyllum. Five kinds of basidiomycetous ectomycorrhizas and three genera of endomycorrhizas were morphologically described, identified and served as inoculant. Nursery growth of C. inophyllum L. (Bitaog) to a mined-out soil amended with MykoVam and natural soil yielded the highest survival rate that significantly improved root growth after 50 days (p< 0.01206). Shoot length significantly increased after 50 days (p < 003123) though no significant difference was observed across soil treatments. Sampled fine roots of C. inophyllum also showed formation of mycorrhizas indicating association. Raising indigenous trees in copper soil with mycorrhizas can improve growth and survival in nursery condition which are important before outplanting seedlings during mining rehabilitation.
Title:	**Population Viability Analysis and Modeling of Columbidae in Ursula Island Game Refuge and Bird Sanctuary (UIRBS) Bataraza, Palawan**
Author:	**Buenavides, Jesse Vincent Depra**
Adviser:	**Lobite, Neil Jun S.**
Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	The Ursula Island Game Refuge and Bird Sanctuary is an important bird area according to the BirdLife International. It serves as the home for threatened and range-restricted species such as Ducula bicolor, Ducula pickeringii, and Caloenas nicobarica, which are classified by the IUCN as Least Concern (LC), Vulnerable (VU), and Near Threatened (NT), respectively. No studies have been conducted to test the population viability of the mentioned species. The general objective of the study is to conduct a population viability analysis (PVA) and population modelling of D. bicolor, D. pickeringii, and C. nicobarica across different management scenarios on Ursula Island Game Refuge and Bird Sanctuary (UIGRBS), Bataraza, Palawan. A population viability analysis or PVA was conducted to determine the response of a population with their current living conditions (baseline scenario) and across different management scenarios namely habitat protection, habitat degradation and rat infestation scenario. The PVA revealed that in the next 50 years, given the habitat and population parameters remain constant, the three species would remain extant. However, in the habitat degradation

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	model and rat infestation model, it was found that the three species were expected to become extinct. Lastly, in the habitat protection model, it was found that the three species will not face extinction and had a faster population growth rate as compared to the baseline model. The habitat and population characteristics directly affect the survivability of a species' population throughout time. The further protection of UIGRBS can be met through the proclamation of the site as protected area through legislation. Therefore, further research is recommended to protect and conserve the Columbidae of UIGRBS
Title:	**Aboveground Phenology Of Tectona Philippinensis and its Associated Vegetation In Lobo, Batangas**
Author:	**Cahinde, Carl Daniel Damayo**
Adviser:	**Hernandez, Jonathan O.**
Stream:	**Environmental Forestry**
Access:	**Restricted**
Type:	**Thesis**
Abstract/Executive Summary:	This study aimed to investigate the phenological patterns, leaf flushing, flowering, fruiting, seed maturity, and leaf falling in Tectona philippinensis Benth. & Hook.f, giving valuable information on its adaptation to changing climatic conditions. A plotless inventory of tree individuals was undertaken from predetermined observation points from January 2016 to December 2017 in Lobo, Batangas. A total of 443 individuals were identified based on population density. Leaf flushing peaked from May to June. Flowering peaked in August and fruiting in September. Seed maturity peaked in October and leaf falling in December. It was discovered that increased rainfall and temperature caused earlier occurrences of phenological events such as leaf flushing and flowering. Moreover, moderate temperatures and humidity levels have shifted the timing of fruiting, seed maturity, and leaf falling. These findings suggest that along with changing climatic patterns causes shifting in phenological patterns of tree species as evidenced by changes from year 2016 to 2017 data. Recommendations include long-term monitoring programs aimed at tracking phenological patterns over extended periods, conducting species-specific studies, and incorporation of remote sensing technologies.
Title:	**Tree Species Diversity of an Ultramafic Forest in Sitio Caiholo, Mt. Bahile, Puerto Princesa City, Philippines**

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Author:	**Dela Cruz, Edwin Catos**
Adviser:	**De Castro, Ma. Ellenita G.**
Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	The study assessed and determined the tree species diversity and noteworthy floral species of Sitio Caiholo. Mt. Bahile. Puerto Princesa City. Philippines. The study used a 2-km modified belt transect method wherein nine 20-20 meter quadrats were established. To account for the maximum possible number of species in the area, an opportunistic sampling was also carried out to identify species outside the established plots. Results showed that the area harbors a total of 40 tree species belonging to 36 genera and 29 families. Tree diversity is relatively low with a n ' value of 2.38. Two newly documented in the island of Palawan were also recorded namely Eugenia cf. tulanan, Merr., and Terminalia foetidissima Griff. The study also documented some local and national endemic species namely Swintonia acuta, Engl., Colona longipetiolato Merr Decaspermum blancol S. Vidal, Discocalyx palawanensis Elmer ex Merr, Eugenia cf. inaequisepala Merr.. Tristaniopsis littoralis (Merr.) Peter G. Wilson & J.T. Waterh, and Xanthostemon speciosus Merr. Apparently, majority of the documented species were listed as "threatened" under the IUCN Red List (2023- 1) and the Updated List of Threatened Philippine Plants and Their Categories (DAO No. 2017-11). With this preliminary information, it is highly recommended that an immediate conservation effort be put in place to safeguard the remaining population of the unique Philippine native, endemic and threatened plants in the area.
Title:	**Spatial Distribution and Regeneration Patterns of Selected Dipterocarp Species in a Long-term Ecological Research Plot in Mount Makiling Forest Reserve**
Author:	**Firmalino, Eduardo II Parulan**
Adviser:	**Maldia, Lerma SJ**
Stream:	**Production and Industrial Forestry**
Access:	**General Public**

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Type:	**Thesis**
Abstract/Executive Summary:	Regeneration pattern provides significant insights on ecosystem resilience and species coexistence across various succession and life stages. Shorea contorta and Parashorea malaanonan are two of the highly-valued species in the Philippines because of their ecological and economic importance. The study aimed to investigate the spatial distribution and regeneration patterns of S. contorta and P. malaanonan within the two-hectare Long Term Ecological Research plot in Mt Makiling Forest Reserve. Trees of the studied species with greater than or equal to 10 cm dbh in the LTER plot were located. The coordinate points were mapped under the topographic features of the area using QGIS 3.36.2. Fifty sampling plots measuring 1 x 1 m were utilized to record the number of S. contorta and P. malaanonan regenerations. A total of 33 tree individuals were recorded; thirty-two were identified as P. malaanonan, while only one was S. contorta. A greater number of trees were thriving in 0-18% slope ranges with elevations of 420 to 460 meters above sea level. Nine dbh classes were classified, and the 12 to 34 cm range contains 16 individuals. Only regenerations (24) of P. malaanonan were identified, suggesting an absence of potential mother trees of S. contorta within and beyond the LTER plot. The regression analysis between the numbers of adult trees and regenerations were not statistically significant ($p > 0.05$). This result indicates that other factors such as the number of present mother trees, level of fertility, dispersal agents/limits, and precipitation, among others, may influence the recruitment of regenerations in the plot. The study provides insights into how the two species may influence structural changes of the plant community in the LTER plot over time.
Title:	**Comparative Analysis of the Habitat Conditions and Morphological Variations of Barbourala busuangensis Taylor and Noble in Streams of Victoria-Anepahan Mountain Ranges, Palawan**
Author:	**Gabinete, Mike Allen Gonzales**
Adviser:	**Balatibat, Juancho B.**
Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**

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Abstract/Executive Summary:	The Philippine flat-headed frog (Barbourula busuangensis) is an endemic species in Palawan and is recognized as one of the world's most primitive frogs. Traditionally, this species has been associated with fast-flowing streams in Palawan's lowland forests. However, recent explorations in the Victoria-Anepahan Mountain Ranges (VAMR) revealed that these frogs also inhabit stagnant to slow-flowing streams. In response to this, a comparative study was conducted in the Buhawi River's tributary and mainstem within VAMR to analyze: 1) habitat conditions; 2) morphological variations; 3) correlations between environmental conditions and morphology; and 4) recommend conservation strategies. The study established 1-kilometer transects at both sites, collecting 10 frog samples from each. Morphometric measurements focused on 15 characteristics, and habitat conditions were analyzed based on physical and biological parameters. The data were examined using descriptive statistics and regression analysis. Findings showed significant environmental differences between the mainstem and tributary. The mainstem featured an open canopy, affecting water temperature, and was wider, deeper, more rapid, less elevated, and had coarser substrates compared to the tributary. The tributary and the mainstem share similar conditions in terms of pH level and riparian features. Furthermore, the tributary is more diverse in terms of tree species and insects present. Despite these differences, both environments were generally in good condition. Morphologically, frogs in the mainstem exhibited greater snout-vent lengths, likely due to the fast-flowing conditions. There was an inverse relationship between elevation and morphological measurements and a direct relationship between water depth and morphological measurements. These correlations suggest that environmental conditions significantly influence frog morphology. Thus, the study recommended conservation strategies, including habitat preservation, ongoing research and monitoring, and public education, to protect VAMR's forests and streams, which currently lack legal protection. Implementing these strategies is essential to safeguarding unique habitats and the primitive Philippine flat-headed frog.
Title:	**Distribution and Abundance of Skink (Reptilia: Squamata: Scincidae) Along Elevational Gradients in Mount Makiling Forest Reserve, Philippines**
Author:	**Gecalao, Zyra Nicole Pia**
Adviser:	**Balatibat, Juancho B.**
Stream:	**Environmental Forestry**

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Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	This study examined the distribution and abundance of skinks at different elevations in Mount Makiling Forest Reserve, Philippines, where Pitfall trapping occurred at three elevations: low (<300m), mid (300-600m), and high (>600m), with two (2) plots per elevation. Each plot contained 10 traps spaced Im apart. Data collection occurred from November 2 to December 2, 2023. The findings revealed that, with increasing elevation, species richness, abundance, and distribution decrease. Moreover, at all MMFR sampling sites, 56 individuals from 8 skink species were recorded. Parvoscincus luzonensis, observed at low elevation, is notably a new record in MMFR. Statistical analyses indicated a clear connection between elevation, distribution, and abundance of skinks, as revealed by higher trapping success (7.83%) at low elevations. Nevertheless, mid-elevations (1.5%) and high elevations (0.67%) implied potential declines in the distribution and abundance of species. Despite differences, mid and high elevations maintain consistent species effort (both at 0.5%), highlighting elevation-specific dynamics. Overall, this emphasizes the importance of skinks in the ecosystem with the need to protect and preserve these creatures for future generations. Lastly, it is recommended to conduct wet and dry observation to assess the impact of climate and weather on skink distribution and abundance.
Title:	**First Report of Leaf Spot Caused by Neopestalotiopsis and Calonectria Species on Areca ipot (Arecaceae) Seedlings in Luzon, Philippines**
Author:	**Mastrili, Romana Alyssa Doblada**
Adviser:	**Ata, Jessa P.**
Stream:	**Production and Industrial Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	Areca ipot Becc. (Arecaceae), a Philippine endemic species, is categorized as endangered primarily due to habitat loss. In December 2022, a severe outbreak of a new leaf spot disease was observed on A. ipot seedlings in the Laguna-Quezon Land Grant nursery. To establish the causal agent/s of leaf spot disease on A. ipot seedlings, this study aimed to characterize the morphological

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	and molecular features of the pathogen/s and prove pathogenicity following the Koch's postulates. The macro- and microscopic morphological features varied between isolates and were classified into two morphotypes. Morphotypes 1 and 2 were identified as Neopestalotiopsis sp. and Calonectria sp., respectively. PCR amplification and sequencing of three gene regions: internal transcribed spacer, translation elongation factor 1-alpha, and ß-tubulin were performed. Basic Local Alignment Search Tool (BLAST) analysis showed that morphotype 1 exhibited 98.84 - 100% similarity to different species of Neopestalotiopsis whereas morphotype 2 exhibited 98-100% similarity to varying species of Calonectria. To prove pathogenicity, two pure cultures of Neopestalotiopsis and Calonectria representative isolates were inoculated onto healthy detached leaves and seedlings of A. ipot. Lesions were observed on inoculated leaves in both inoculation assays whereas the control leaves and seedlings remained asymptomatic. The pathogens were successfully reisolated from the infected leaves, completing Koch's postulates. This is the first report of Neopestalotiopsis sp. and Calonectria sp. causing leaf spot on A. ipot in the Philippines. The pathogens also caused disease in other Areca species. This will be useful in the development of effective disease management strategies for the conservation of Philippine endangered species.
Title:	**Avian Diversity Assessment in Molawin Watershed of Mount Makiling Forest Reserve (MMFR), Philippines**
Author:	**Mendoza, Jean Grace Canlapan**
Adviser:	**Balatibat, Juancho B.**
Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	The Philippines, one of the world's most biologically diverse countries, has rich tropical rainforests threaten by deforestation. This study examines avifaunal diversity in Molawin Watershed of the Mount Makiling Forest Reserve (MMFR), focusing on species richness, evenness, endemicity, diversity indices, abundance, distribution, ecological roles, t-test analysis, and conservation status. The survey identified 46 bird species from 15 orders and 31 families, with Passeriformes being the most represented. The White-browed Shama was the most abundant species across all sampling sites. The morning survey showed

	higher species richness due to its eating habits, nocturnal activity, and environmental conditions. Abundance data showed a range from common species like Orange-bellied Flowerpeckers and White-browed Shama and to rare species like Luzon Hornbill and Philippine Serpent-Eagle. Twenty of the recorded species are Philippine endemic, and 26 are indigenous, emphasizing the significance of endemism for conservation efforts and biogeographic patterns. Plot 2 had the highest species diversity while Plot 3 showed a decrease in diversity from morning to afternoon. The overall diversity index was 3.077, indicating a significant avifaunal richness. Evenness values varied, with Plot 2 being the highest. The t-test for Shannon-Wiener indices (t = 0.039813) suggested no significant difference between the diversity indices at different times. Birds play crucial roles in predation, seed dispersal, and scavenging, highlighting their importance in ecosystem functioning. Based on IUCN Conservation status, 20 species are categorized as Least Concern, and two species are Near Threatened, thus underscoring the need for targeted conservation efforts. The study highlights the diversity ecological significance of indigenous and endemic avian species and the need for conservation efforts.
Title:	**Morpho-Anatomical Characterization of Selected Nickel Hyperaccumulator Plants in Two Types of Ultramafic Soils in Palawan Island**
Author:	**Ortega, John Vincent Quitain**
Adviser:	**De Castro, Ma. Ellenita G.**
Stream:	**Production and Industrial Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	Hyperaccumulators are plants capable of accumulating specific metals within their living tissues hundreds or thousands times higher than “normal” plants without showing any signs of phytotoxic stress (Reeves 2003; van de Ent et al. 2012; Castañeres & Lojka 2020: De Castro et al., 2000). In this study, Brackenridgea forworthy Elmer (Furtado) and Phyllanthus balgogi Petra Hoffm. & A.J.M. Baker, both considered as Philippine nickel hyperaccumulators were subjected to detailed observation to elucidate their unique morpho-anatomical characteristics. Representative individuals of the test species growing in two different ultramafic formations in Palawan island (e.g.. Magarwak Highlands within Puerto Princesa City and Mr.

	Bulanjao in Rio Tube, Bataraza) were collected during the dry and wet season of Year 2023. In the field, morphological features were carefully observed giving particular attention to the laminar features (e.g.. leaf size and thickness). Results showed a prominent variation in the leaf morphology of both species with thicker cuticle layers but narrower leaf blades present in Magarwak Highlands, PPC compared to those observed in Mt. Bulanjao, Bataraza across seasons. These findings can be partly attributed to the diversity of the floral species and stocking pattern because the Dulanjao site is in undisturbed secondary forest with closed canopy. A closer observation of the anatomical structure revealed that for both species, Magarwak Highlands, PPC produced thicker roots, stem and leaf tissues especially during the dry season with the exception of P belgoot roots. Given these findings, it was evident that both of the test species produced specific adaptive structures if subjected to marginal environmental conditions. It is highly recommended that future works be done to relate the ecophysiology, phenology, and edaphic factors to have a better understanding of the hyperaccumulation potential of our native and endemic species for their potential use in ecological restoration of areas contaminated with unwanted metals.
Title:	**Establishing a Baseline for Tree Conservation Assessing the Growth Performance of Threatened Tree Species at UPLB-EDC Binhi Biodiversity Park**
Author:	**Parañaque, Levana Rae Valencia**
Adviser:	**Malabrigo, Pastor L., Jr.**
Stream:	**Production and Industrial Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	The study aimed to establish a baseline data for tree conservation and assess the growth performance of threatened native tree species at UPLB-EDC BINHI Biodiversity Park. A 100% inventory was conducted and growth parameters such as DBH (Diameter at Breast Height), TH (Total Height), and MH (Merchantable Height) were measured during the data collection process. Out of the 409 originally planted seedlings, 310 (75%) managed to survive after almost 9 years. The results revealed that out of the original 50 species planted, 69 species survived, while 42 (52%) had instances of mortality. Shorea contorta stood out having a diameter growth rate of 2.04 cm/year, an average

	diameter increment of 18.4 cm, and a maximum DBH of 25 em. Meanwhile, Koompassia excelsa was the top performer in terms of height growth rate with a value of 1.77 m/year, an average of 15.94 m increment, and a maximum of 181 m. The statistical analysis revealed that both diameter and height measurements were highly significant factors within the dataset. The p-values for both variables were exceptionally low. The diameter measurements had a p-value of 8.53647-35, which was interpreted as statistically significant and demonstrated that there were substantial differences in the diameter values across the samples. Similarly, the height measurements had a p-value of 1.84375E-32, also an exceptionally low value. This likewise indicated that there were significant variations in the height values within the dataset. The extremely low p-values for both the diameter and height variables provided evidence that the biometric measurements differed meaningfully across the samples. This also suggested that these were important parameters to consider when analyzing the characteristics of the species in the study. The establishment of the baseline data created an important reference point for future study and conservation. These efforts would not only help recover biodiversity, but also address broader environmental and climatic issues.
Title:	**Endomycorrhizal Fungi and Leaf Spot Occurence in Non-operational Copper Mine Site at Capayang, Mogpog, Marinduque, Philippines**
Author:	**Policarpio, Mhel Angelo Cuevas**
Adviser:	**Pampolina, Nelson M.**
Stream:	**Environmental Forestry**
Access:	**Restricted**
Type:	**Thesis**
Abstract/Executive Summary:	Studies on vegetation, endomycorrhiza, and foliar pathogenic fungi were conducted between 2017 and 2020 on an ex mine at Barangay Capayang, Mogpog, Marinduque. The purpose was to assess vegetation and investigate endomycorrhizae and pathogenic fungi along the mine site. Three 200-meter transects and nine (9) sampling plots (10x10 m) were established randomly across vegetation. Plants were identified morphologically while isolated endomycorrhizae and pathogens were described and classified. Vegetation types consisted of reforestation, agroforest ecosystem, and secondary forest,

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	dominated by Acacia auriculiformis A. Cunn ex Benth., Cocos nucifera L., and Alstonia scholaris (L.) R. Br., respectively. Endomycorrhizal genera Acundospora, Gloux, and Cigaspora were isolated from the rhizosphere of host plants. Isolates of Aspergillus spp. Pestalotiopsis sp. Meliola sp, and Fusarium sp. were visibly causing leaf spot disease. Plant composition across the non-operational mine varied with endomycorrhizas where plant diseases were observed. The leaf spot infection rate is greater for trees and climbers compared to herbs However, further examination of the dynamics of association can enlighten possible links to explain ecological succession and strategize mining rehabilitation in the area. Keywords: vegetation analysis, endomycorrhiza, leaf spots, ecological succession, mining
Title:	**Assessment of Parasite Diversity in Wildlife Trade in Cartimar, Pasay City, Philippines**
Author:	**Quidayan, Louise Andrea Briones**
Adviser:	**Lobite, Neil Jun S.**
Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	The Philippines is dealing with a thriving wildlife trade, displayed by the Cartimar market, which may pose a public health risk due to zoonotic parasites. This study looks into the presence of these parasites in traded wildlife, intending to close a critical knowledge gap and inform zoonotic disease prevention measures. This study aimed to assess and understand the presence and diversity of parasites with zoonotic potential from traded wildlife in Cartimar, Pasay City. Fecal samples from different wildlife species were collected and analyzed using fecalysis. Other data were gathered through informant interviews, and site observations to evaluate the associated risk factors and implications for wildlife and public health. The findings identified a number of potential parasite vectors among illegally traded wildlife. Eight of twelve samples tested positive for parasites, with avian and reptile species having the highest number of zoonotic parasites found. Hookworms were the most common parasite, appearing in 30.77% of the samples. raising concerns about animal-to-human disease transmission. This research underscores the urgency for targeted interventions and

	stricter policies to safeguard both public health and the well-being of wildlife populations.
Title:	**Habitat Analysis of Skink (Reptilia: Squamata: Scincidae) in Low and High Elevations of Mt. Makiling Forest Reserve, Philippines**
Author:	**Revilar, Randy Ogwan**
Adviser:	**Balatibat, Juancho B.**
Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	Habitat is crucial to all species where they live, reproduce, and gather for foods. The study was conducted for one-month in Mt. Makiling Forest Reserve to assess the habitat of the skinks at low and high elevations through quadrat sampling and to record the available niches of the skinks (Scincidae) in the area. Pitfall traps were also set up to determine the species that inhabits the sites. The abundance of bushes with decayed organic matter including leaves and twigs from trees, piles of debris, decaying logs, tree hollows, and tall trees in low elevations with buttresses were found in the area as skink habitats. The traps were placed near large trees and rotting logs which are the resting spots had captured more individuals of skinks. In contrast, high elevation has litterfall, nevertheless, the litterfall depth is shallow compared to low elevation. In conclusion, the findings reveal that more species and individuals are present in lower elevation than higher elevation where the vegetation is more diverse compared in high elevation, respectively. Parvoscincus abstrusus appeared as dominant species in low elevation while Brackmelex kadwa appeared as dominant species in high elevation. It is suggested to conduct further studies at some areas in MMPR and in different season to assess their population status and trend.
Title:	**Biology and Molecular Taxonomy of the Great Mormon Butterfly (Papilio memnon Linnaeus) (Lepidoptera: Papilionidae) on Pomelo (Citrus maxima (Burm.) Merri) in Marinduque, Luzon, Philippines**
Author:	**Reyes, Jean Laurence S.**
Adviser:	**Aguilon, Dianne Joy D.**

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Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	Papilio memnon or the Great Mormon Butterfly is widely distributed in Asia and reared in butterfly farms in Marinduque, Philippines to supply its demand globally. Inconsistencies were found in the available literature describing this species. Hence, there is a need to conduct a study focusing on its biology and molecular taxonomy to help address possible misidentification with kindred species and build a database of knowledge on P. memnon. This study aims to focus on the life cycle duration, morphology, and species verification using the using the COI of the Great Mormon Butterfly collected in Marinduque, Philippines. Comparisons of the life stage duration of dry and wet season cohorts of Papilio memnon showed that the first larval instar and pupal stage are significantly shorter in the dry season than in the wet season. This difference may be attributed to the altered metabolic process of larval feeding and the emergence of Papilio memnon pupa in lower temperatures, slowing down metabolic rate and thereby taking a longer time to transition to the next life stage. Key morphological features observed in P.memnon throughout its life cycle include a yellow to pale brown egg; a cream to brown appearance and an orange osmeterium across all larval instars and the presence of a saddle-shaped portion in its dorsal side which fades at the fourth instar; emergence of two white eye spots at fifth instar; a green-yellow to brown-white pupa with a cephalic horn; and sexual dimorphism in adults. Molecular analysis of the DNA extracted from the thoracic legs of four variegated forms and five light forms was used to confirm species verification through BLAST and BOLD Systems. The sequences of COI of P. memnon from Marinduque got a 100% identity with Papilio memnon in the BOLD Systems database. In addition, no nucleotide variation was observed between and among the variegated and light forms.
Title:	**Modeling Habitat Sustainability and Distribution of the Endangered North Philippine Hawk-Eagle (Nisaetus philippensis) and Its Response to Climate Change**
Author:	**Vergara, Jomari Diola**
Adviser:	**Lobite, Neil Jun S.**
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Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	Climate change is one of the major causes of disruption in the geographical distribution of various species. Species Distribution Models (SDMs) are commonly used by researchers to assess the effects of environmental factors on species' distributions. This study aims to model the current and future distribution of Nisaetus philippensis in Luzon. Species occurrences and 21 bioclimatic and biophysical variables were used to predict the distribution of N. philippensis. The study utilized the Global Climate Model (GCM) MIROC6 under two emission scenarios (RCP 2.6 and RCP 8.5) to model the future distribution of N. philippensis for the years 2041-2060 (2050s). Eight variables were found to be influential to the distribution of N. philippensis namely Bio4, Bio7, Bio12, Bio16, Bio18, Bio19, land cover, and elevation. The models showed that suitable areas for N. philippensis will decline under both future climate change scenarios. The rate of suitable habitat loss under RCP 8.5 is higher compared to RCP 2.6, which aligns with expectations since RCP 8.5 represents a more extreme scenario. Projections also identified the island of Mindoro as a potential future sanctuary for N. philippensis. The findings of this study provide insights into how climate change may affect the future distribution of N. philippensis.
Title:	**Taxonomic and Functional Diversity of Anura and Chiroptera Across Forest and Agroforest Ecosystems of the Makiling Forest Reserve, Philippines**
Author:	**Villabeza, Rijeanne De Belen**
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Stream:	**Environmental Forestry**
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Type:	**Thesis**
Abstract/Executive Summary:	Agricultural expansion is one of the primary drivers of biodiversity loss in the tropics, leading to homogenization of the landscape and increased habitat fragmentation. Considering this ecological crisis, agroforestry is increasingly recognized as a promising strategy that balances diversified production while maximizing ecosystem services and reducing environmental impacts. Despite an increasing number of studies showing that

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	agroforestry systems can contribute to the conservation of tropical biodiversity, there are still few studies in the Philippines that tackle the biodiversity values of agroforestry systems compared to those of intact forests in multiple biodiversity dimensions (taxonomic and functional). This study aims to assess the taxonomic and functional diversity of frogs as bioindicator taxa across the lowlands of the Mt. Makiling Forest Reserve. Frogs were sampled using a visual encounter survey. Species richness, abundance, and Shannon diversity were used for analyzing taxonomic diversity, while functional richness, functional divergence, and beta diversity were used for functional diversity analysis. Results showed that the agroforest ecosystem holds a comparable species richness of frogs with that of the forest. Species composition and abundance do vary between the two ecosystems. The two most abundant species in forests are Kaloula conjuncta and Limnonectes woodworthi, which are forest- associated species, while the most abundant species in agroforestry are Fejervarya vittigera and Rhinella marina, which are disturbance-tolerant species, with the latter being invasive. Agroforestry contains comparable functional diversity with that of the forest, although variation in ecological traits can be observed; and the functional beta diversity of frogs between the two ecosystems is overlapping. The main findings of this study highlight the ecological importance of the agroforestry system in harboring a taxonomic and functional diversity of frogs comparable to that of forests. This implies that agroforestry can be used to conserve frog diversity in fragmented landscapes.
Title:	***In Vitro* and *In Vivo* Analyses of the Efficacy of Different Control Agents Against a Wood-Decay Fungus**
Author:	**Yap, Karl Angelo Cantilero**
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Stream:	**Environmental Forestry**
Access:	**General Public**
Type:	**Thesis**
Abstract/Executive Summary:	Fungal pathogens cause decay in wood, which can lead to huge economic losses when left uncontrolled. Thus, it is crucial to formulate efficient and effective control strategies, which can help minimize losses and avoid resistance to antifungal agents. However, limited information is available regarding the proper management of specific wood rot fungal pathogens and, even more so, the alternatives to fungicides for the promotion of

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	integrated pest management. This study tested the efficacy of commercially available lavender essential oil, Trichoderma inoculant, and fungicides (benomyl and mancozeb) at different concentrations to determine the best options against a white rot fungus, Schizophyllum commune. In vitro analysis revealed that lavender essential oil at 10 drops/100ml, was at par with commercially available fungicides. It showed 100% mycelial growth inhibition similar to different concentrations of benomyl (1 g/L and 5.625 g/L) and mancozeb (5.625 g/L). Trichoderma inoculant showed promising inhibitory effect with a 79.8% inhibition at 3.125 g/L. concentration and 86.3% inhibition at 5.625 g/L concentration. However, in vivo analysis showed no significant difference between the selected treatments (5.625 g/L. mancozeb, 1g/L benomyl, 5.625 g/l. Trichoderma, and lavender essential oil at 10 drops/100mt.) for the soil block test. Trichoderma inoculant and mancozeb showed the most promise as control agents for wood decay, limiting weight loss the most across all treatments with blocks having 13.42% and 13.95% weight loss, respectively, compared to the control blocks having 17.61% weight loss. Samples treated with benomyl and lavender essential oil had higher weight losses than Trichoderma inoculant and mancozeb at 15.56% and 15.87%, respectively. This study serves as a basis for further analyses to further evaluate the inhibitory effect of control agents against other wood decay pathogens. These results will aid in the formulation of effective strategies for the control of wood rot fungal pathogens in the Philippines.