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Types of fauna species at Central Bicol State University of Agriculture

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Abstract

This study provides a comprehensive inventory of faunal species at the Central Bicol State University of Agriculture (CBSUA) Pasacao Campus to establish baseline data for biodiversity conservation and environmental management. Utilizing a descriptive and quantitative research design, the study employed direct field observations, transect walks, opportunistic sampling, and photographic documentation across diverse habitats, including forested areas, grasslands, agricultural zones, and built environments. Collected data were analyzed to classify species by taxonomic group, ecological status (native or introduced), and conservation status according to the IUCN Red List and local biodiversity records. The findings revealed a diverse assemblage of fauna, encompassing insects, amphibians, reptiles, birds, and mammals. Insects emerged as the most abundant group, with most recorded species identified as native and categorized under "Least Concern" status. Variations in species distribution across different habitat types underscore the critical role that natural and semi-natural areas play in sustaining local biodiversity. By highlighting the campus as a vital haven for local fauna, the study emphasizes the necessity of continuous biodiversity monitoring and proactive habitat management. The findings provide significant implications for environmental education, suggesting that campus-based biodiversity assessments can serve as a 'living laboratory' for enhancing student engagement in biology. Ultimately, these results serve as a foundational reference for future ecological research, conservation planning, and environmental education initiatives within the university and the broader community.

Keywords: biodiversity, fauna species, origin of fauna, conservation status, habitat types

Types of fauna species at Central Bicol State University of Agriculture

1. Introduction

The Philippines is globally recognized as one of the world's megadiverse countries, hosting an exceptional variety of flora and fauna despite its relatively small land area (Posa et al., 2008; Mallari et al., 2016). This remarkable biodiversity is largely attributed to the nation's tropical climate, complex geological history, and archipelagic structure, which created unique ecological niches and fostered high levels of endemism (Sodhi et al., 2010; Myers et al .,2000). As a result, the Philippines supports thousands of animal species, many of which are found nowhere else on Earth, underscoring the country's importance as a biodiversity hotspot. Fauna refers to the complete assemblage of animal life occurring within a defined area, including both invertebrates such as insects, mollusks, and crustaceans and vertebrates, such as mammals, birds, reptiles, amphibians, and fishes. The diversity of fauna in an area is shaped by a combination of abiotic factors (e.g., temperature, humidity, topography, and habitat structure) and biotic interactions, including competition, predation, and symbiosis (Moura et al., 2021). Additionally, anthropogenic influences—such as habitat alteration, pollution, and the introduction of invasive species—significantly influence faunal distribution and abundance (Gonzalez et al., 2020).

Faunal communities are integral to ecosystem functioning. Animals serve as pollinators, predators, prey, seed dispersers, decomposers, and ecosystem engineers, performing ecological roles essential to maintaining ecological stability and facilitating natural processes such as nutrient cycling, seed germination, and population control (Donoso et al., 2020). The loss or decline of faunal species can therefore trigger cascading effects that diminish ecosystem productivity and resilience. They also support environmental impact assessments, protected-area planning, and conservation policy development (Marine Faunal Species Inventory for the Indian EEZ: Necessity and Significance, 2022). Stuart L. Pimm et al.,2014, reported that tropical regions remain highly vulnerable to species extinction, stressing that continuous faunal documentation is essential for detecting biodiversity loss and guiding effective conservation strategies.

The Central Bicol State University of Agriculture (CBSUA) Pasacao Campus, located in Sta. Rosa del Norte, Pasacao, Camarines Sur, spans approximately 4.2 hectares. Despite its relatively small area, the campus includes a variety of microhabitats such as landscaped vegetation, open fields, shade trees, and nearby riparian zones that can support a diverse assemblage of fauna. The presence of both cultivated and naturally regenerating plants creates habitat opportunities for insects, birds, reptiles, and small mammals. However, due to increasing human activities such as infrastructure development, landscaping modifications, and agricultural practices, the faunal composition of the campus may be experiencing shifts that remain undocumented.

As a host institution for the Bachelor of Science in Environmental Science (BSES) program, CBSUA Pasacao emphasizes the importance of ecological research and environmental stewardship. Environmental science, as an interdisciplinary field, investigates the natural environment and human impacts through scientific methodologies. Conducting a faunal inventory within the campus aligns with the program's objectives by enabling students to engage in field-based biodiversity research, develop taxonomic skills, and contribute to local conservation initiatives.

Despite the ecological significance of faunal diversity in academic landscapes, there remains limited scientific documentation specifically concerning the fauna of CBSUA Pasacao Campus. Establishing a baseline inventory is essential for understanding the current status of local biodiversity, identifying species requiring conservation attention, and guiding ecological management practices within the campus. Such data can also support future research, learning exercises, and campus-wide environmental programs. Thus, this study aims to document and assess the fauna present within CBSUA Pasacao Campus, identify their habitat associations, determine their ecological and conservation status, and generate science-based recommendations for biodiversity conservation and

campus sustainability**.**

Statement of the Problem - The Central Bicol State University of Agriculture (CBSUA) Pasacao Campus lacks a comprehensive inventory of fauna species within its grounds. Understanding the composition, and distribution of animal life in the area is essential for biodiversity conservation and ecological planning. This study aims to address this gap by documenting and assessing the fauna species present on campus.Specifically, the study seeks to answer the following questions: 1)What fauna species are present within the CBSUA Pasacao Campus? 2)What are the habitat types observed for these species within the campus? 3) What is the origin of the documented species, including whether they are native, endemic, introduced? 4) What is the conservation status of each identified species based on national or international conservation listings? 5)What infographic material can be designed to concisely present the CBSUA Pasacao Campus faunal findings as a permanent visual reference for school?

Objectives of the Study - The objective of this study is to conduct an inventory of fauna species within the Central Bicol State University of Agriculture (CBSUA) Pasacao Campus to serve as a baseline for biodiversity conservation and ecological planning. Specifically, this study aims to: 1) Identify and document the fauna species present within the CBSUA Pasacao Campus. 2) Determine the habitat types where these species are found. 3) To categorize the identified species based on their scientific classification and their origin (e.g., native, endemic, introduced). 4) To categorize the identified species based on their conservation status. 5) Provide a infographic material can be designed to concisely present the CBSUA Pasacao Campus faunal findings as a permanent visual reference for school.

Significance of the Study - The study documenting the fauna (animal species) of the CBSUA Pasacao Campus holds distinct and valuable benefits for multiple stakeholders from campus leaders to global conservation efforts.

- **Students and Educators.** This inventory creates a localized, living laboratory. Students gain vital, hands-on data for thesis work and field research. Educators receive current, relevant materials to integrate local biodiversity into the curriculum, improving the quality of environmental education.

- **CBSUA Administration.** The study provides the scientific baseline necessary for responsible land management. This data directly informs decisions on campus development, ensuring infrastructure minimizes damage to animal habitats. The inventory also boosts the campus's reputation, aiding its pursuit of research grants and conservation partnerships.

- **Environmental Agencies and Researchers.** The study fills a crucial regional data gap, offering a baseline for environmental agencies to monitor changes, assess development impacts, and locate wildlife corridors. Researchers benefit from comparative data essential for future long-term studies on species dynamics and environmental change.

- **Local Community.** The inventory fosters community awareness and pride in local natural heritage. Knowing the campus wildlife encourages responsible stewardship, helps mitigate human-wildlife conflict, and can potentially support local eco-tourism or other nature-based livelihood initiatives.

- **Policy Makers and Extension Workers.** The research delivers evidence-based data for effective policy. Policy Makers can use the findings (e.g., threatened species locations) to designate protected zones and integrate conservation into local ordinances. Extension Workers utilize this data to create targeted outreach programs for sustainable resource use and wildlife protection among community members.

- **Global Biodiversity Goals.** On a broader scale, the study contributes to global environmental commitments such as the United Nations Sustainable Development Goal 15: Life on Land, and the Kunming-Montreal Global Biodiversity Framework, which both underscore the urgency of conserving terrestrial ecosystems and halting biodiversity loss.

Scope and Limitation - This study focuses on the identification and documentation of fauna species within the Central Bicol State University of Agriculture (CBSUA) Pasacao Campus. It covers various animal groups, including mammals, birds, reptiles, amphibians, and insects found on the campus during the research period from year 2025. The study also examines the habitat types within the campus where these species are commonly observed and estimates their relative abundance. Data collection will be conducted through field observations, direct sightings, and interviews with knowledgeable personnel. The study is limited to fauna species present within the geographical boundaries of CBSUA Pasacao Campus only. It excludes species found outside the campus or in areas not accessible during the study period. Seasonal variations and migratory species may not be fully accounted for due to the limited duration of the study. The research focuses on visible and detectable fauna, and does not include microscopic or cryptic species that require specialized equipment or methods for identification.

Theoretical Framework - Niche Theory. A fauna inventory is, at its core, an empirical description of the filled niche spaces within the CBSUA Pasacao ecosystem, it answers the question of which species have successfully established their ecological roles in that specific location. Niche Theory is the framework that allows researchers to move beyond simply listing species to understanding the underlying habitat requirements and resource partitioning that determine the makeup of the entire community. Without this theoretical lens, the inventory is just raw data; with it, the data becomes a vital map of the local selective pressures and species-environment interactions, especially when considering findings which emphasize the unique local expression of the niche. This inventory will provides the direct evidence for applying Niche Theory by detailing the presence and abundance of specific fauna across the Pasacao landscape. The resulting species list is not just a census; it represents a comprehensive set of successful ecological strategies adapted to the local climate, vegetation, and resources. Future researchers will use the inventory to determine how each species survives (its niche), which then allows for conservation plans to focus on protecting the critical habitats and resources identified as essential for maintaining those local niches.

This will establish the initial population structure and genetic canvas upon which Evolutionary Dynamics operate. The raw counts and distribution data collected serve as the fundamental benchmark against which all future evolutionary change must be measured. For species found in small or isolated numbers, the inventory data is immediately necessary to assess the conservation risk. Therefore, the inventory is the starting condition required to test hypotheses about how natural selection, drift, and random events shape the Pasacao fauna over time. The inventory's quantification of species richness and relative abundance is the exact type of data required to test the assumptions of Neutral Theory. By providing the full list of species and their numbers, the study enables researchers to mathematically analyze whether the biodiversity patterns in Pasacao are best explained by purely random processes like ecological drift or by the predictable, niche-based processes.

Conceptual Framework - The conceptual framework of this study is anchored on the Input–Process–Output (IPO) model, which provides a systematic approach in identifying and analyzing the types of fauna species present at the Central Bicol State University of Agriculture (CBSUA) Pasacao Campus. In the input phase, essential resources and preliminary activities are utilized to gather accurate and reliable data, including the conduct of field surveys, the use of species identification tools such as field guides and mobile applications, and the deployment of sampling equipment like cameras, and data sheets; these components ensure that comprehensive raw data about fauna species are properly collected from various habitats within the study area. The process phase follows, wherein the collected data undergo a series of analytical procedures, starting with fauna identification to verify species accurately, followed by systematic data recording to organize observations, and ecological significance within the campus; this phase is crucial as it transforms raw field data into meaningful scientific information. Finally, the output phase presents the results of the study in the form of the creation of a large-format infographic chart—specifically a printed tarpaulin or permanent signage—serves as the primary tangible output of the fauna research conducted at the CBSUA Pasacao Campus. This material functions as a bridge between technical environmental data and community awareness, turning a scientific inventory into a public educational resource.

Definition of Terms - This section provides definitions of key terms used throughout the study to ensure clarity and a common understanding of concepts related to flora inventory and biodiversity assessment.

- **Baseline Data-** In this study, it specifically pertains to the initial records of fauna species gathered within the CBSUA Pasacao Campus, which will be used to guide future ecological monitoring and conservation efforts.
- **Biodiversity Conservation-** In this study, it refers to the proposed recommendations and actions aimed at maintaining and protecting the faunal diversity within the CBSUA Pasacao Campus.
- **Direct Sightings-** Direct sightings refer to the visual observation of organisms in their natural habitat without the use of indirect evidence or capture methods (Sutherland et al., 2020). In this study, it specifically denotes the actual visual encounters of fauna species by researchers during fieldwork at CBSUA Pasacao Campus.
- **Documentation-** Documentation is the systematic recording of observations, data, and findings using written, photographic, or digital means for analysis and reference (Creswell & Creswell, 2018). In this study, it refers to the written, photographic, and tabulated records of fauna species and their habitats within the CBSUA Pasacao Campus.
- **Ecosystem Health-** In this study, it describes the state of the CBSUA Pasacao Campus environment as reflected by the diversity and abundance of fauna species present.
- **Ecosystem Resilience-** In this study, it refers to the capacity of faunal populations within CBSUA Pasacao Campus to adapt to environmental changes and sustain their ecological roles.
- **Fauna-** In this study, it specifically includes all observable animal species found within the CBSUA Pasacao Campus during the research period.
- **Faunal Identification -** In this study, it refers to the compiled and documented list of animal species identified and recorded through field observation and surveys conducted at CBSUA Pasacao Campus.
- **Field Observation-** Field observation is a research method that involves directly studying and recording organisms in their natural environment (Creswell & Creswell, 2018; Sutherland et al., 2020). In this study, it refers to the systematic recording of fauna species by researchers across different habitats within CBSUA Pasacao Campus.
- **Species Identification-** In this study, it refers to the classification of fauna observed in CBSUA Pasacao Campus using field guides, taxonomic keys, and expert consultation.
- **Transect Walk-** In this study, it refers to the method of walking along designated lines within CBSUA Pasacao Campus to systematically record and identify fauna.

2. Methodology

This section outlines the overall research design and methods employed to achieve the study's objectives. It includes the Research Design, Research Method, Data Gathering Procedure, and Statistical Treatment of Data used in the documentation and assessment of flora species within CBSUA Pasacao Campus.

Research Design - This study utilized a descriptive research design, which is standard practice for biodiversity assessments and ecological inventories. This non-experimental approach was chosen because the primary goal was to systematically observe, record, and analyze the existing faunal characteristics of the CBSUA Pasacao Campus without manipulating any variables. campus. By focusing on what exists at the time of the study, this methodology provides a crucial, verifiable baseline inventory of the campus's fauna diversity, establishing foundational data essential for future ecological monitoring and conservation planning.

Research Method - The study employed a field-based observational method as its core research approach,

which was crucial for ecological and biodiversity inventories. This method involved researchers conducting direct, on-site assessments across the CBSUA Pasacao Campus to gather real-time data on faunal presence and distribution. This enabled the systematic collection of qualitative data by directly identifying, classifying, and recording various species without altering the natural environment. To ensure high accuracy and data consistency, essential tools such as field notebooks, species identification guides, and digital cameras were utilized. The observational method was specifically chosen for its effectiveness in generating reliable baseline data for the ecological documentation and assessment objectives of the study.

Data Gathering Procedure - The faunal identification was conducted using a highly structured, one-day Rapid Assessment Protocol (RAP) across primary Habitat Zones of the CBSUA Pasacao Campus. The Rapid Assessment Protocol (RAP) served as a systematic diagnostic tool used to categorize habitats as natural, modified, or impacted by evaluating qualitative environmental health and anthropogenic influence (Bersot et al., 2015). This flexible framework provided a robust basis for documenting biodiversity within the structured university landscape (Guimarães et al., 2017). To facilitate accurate species identification, the research utilized the iNaturalist platform, leveraging its crowdsourced biodiversity database to verify the taxonomic classification of recorded campus fauna. The procedure was scheduled to capture peak activity periods for different faunal groups. Data collection began at dawn (05:00-08:00) with Avifauna Point Counts conducted at the Secondary Growth and Open Fallow Grounds. By utilizing point counts, the study systematically documented key avian species such as the Yellow-vented Bulbul, providing critical data on how these birds distributed themselves across the various micro-ecosystems of the campus.

The late morning (08:00-11:00) employed Visual Encounter Surveys (VES) in the Fallow Grounds and Manicured Gardens to target insects and diurnal species. Habitats such as garden plots, leaf litter, and building perimeters were systematically surveyed via VES, a globally recognized method for effectively documenting herpetofauna across diverse settings (Tiberti et al., 2022). The midday hours were dedicated to the Time-Constrained Search (TCS), an intensive method for cryptic herpetofauna (amphibians and reptiles) within the Drainage/Water Sources and Utility/Storage Areas. This methodology enhanced sampling efficiency by utilizing fixed durations to document biodiversity in complex ecosystems where traditional surveys might have been impractical (González-Duarte & Megina, 2020).

The mist net technique and spotlighting were executed from dusk until 23:00, retracing routes near water sources and dense Secondary Growth to survey night-active species. Mist netting functioned as a specialized technique for safely capturing birds and bats that significantly enhanced inventory accuracy by detecting cryptic species (Stoleson et al., 2016; Polanco et al., 2015). To create the map, georeferenced data was captured in the field with Geo Cam Free, which embedded coordinates directly into photos. A Garmin device was used to record precise waypoints, which were then exported as KML or GPX files. These files were imported into Google Earth Pro to visualize field data against satellite imagery. For professional-grade analysis, the Manifold app (Release 8 or 9) was used to link datasets, leveraging its high-speed engine to handle spatial databases.

Statistical Treatment of Data - The statistical treatment of data for this study employed descriptive statistics to systematically organize and interpret the biological characteristics of the identified species. To analyze the type of fauna, frequencies were utilized to determine the taxonomic richness of the CBSUA Pasacao Campus, allowing for a clear identification of dominant groups such as insects, invertebrates, and arachnids. This was achieved by tallying the number of species within each taxonomic class and calculating their relative proportion against the total population of 24 species, providing a quantitative baseline for the campus's biodiversity.

The ecological and conservation status of the fauna were further analyzed through categorical classification and qualitative synthesis. Species were grouped based on their functional roles—including predators, detritivores, and herbivores—to provide insights into the trophic structure and nutrient cycling processes within the human-altered landscape. Simultaneously, each species was cross-referenced with the IUCN Red List of Threatened Species, with data summarized into categories such as Least Concern or Not Evaluated. These statistical methods

ensured that qualitative observations were transformed into a structured summary, facilitating a comprehensive assessment of the campus's overall biological profile and conservation value.

3. Result and Discussion

A human-altered landscape, also known as an anthropogenic landscape, refers to a natural environment that has been significantly modified by human activities such as urbanization, infrastructure development. These landscapes are characterized by habitat fragmentation, the introduction of non-native plant species, and constant human disturbance, which shift the ecological balance away from a pristine state. The CBSUA Pasacao Campus serves as example of a human-altered landscape, as it functions as a mosaic of man-made habitats. Because the original forest cover was replaced or managed for institutional use, the campus now supports a specific community of generalist and synanthropic, which are organisms that have adapted to live near human activity and infrastructure. Insects make up the largest portion of this biodiversity, as they can exploit small ecological niches created by gardens, and waste areas. Anthropogenic landscapes like the CBSUA Pasacao Campus sustain resilient, fast-reproducing species that capitalize on resources such as artificial lighting and standing water. The survey documented a diverse assemblage of 24 species—including insects, birds, amphibians, reptiles, and various invertebrates—that have successfully occupied the niches provided by the campus's mixed habitats. By utilizing landscaped vegetation, agricultural plots, and built structures, these organisms form a complex ecosystem adapted to the specific conditions of a human-modified environment.

Table 1
The Identified Fauna species within CBSUA-Pasacao Campus

	Common Name	Scientific Name	Ecological Status	Conservation Status	Type of fauna	Habitat Type
Ants and Wasp	Black carpenter ant	*Camponotus pennsylvanicus*	Native	(NE) Not Evaluated	Insect	orchards or urban structures
	Orange gaster	*Oecophylla smaragdina*	Introduced	(LC) Least Concern	Insect	
	Wasp	*Brachymeria podgorica*	Introduced	(LC) Least Concern	Insect	gardens, forests
Beetle and Bug	Mealybugs	*Planococcus citri*	Introduced	(LC) Least Concern	Insect	suburban gardens
	Ladybug	*Coccinella septempunctata*	Introduced	(LC) Least Concern	Insect	Tropical and subtropical ecosystems
Bird	Yellow vented bulbul	*Pycnonotus goiavier*	Introduced	(LC) Least Concern	Bird	Semi-Open Landscapes.
Butterfly and Moth	Five Ring Butterfly	*Ypthima baldus*	Native	(LC) Least Concern	Insect	semi-open environments
	Cocoa tussock moth	*Orgyia definita*	Introduced	(LC) Least Concern	Insect	forested and suburban habitats
Dragonflies	Blue Dasher	*Pachydiplax longipennis*	Introduced	(LC) Least concern	Insect	
	Green Darner	*Anax junius*	Introduced	(LC) Least Concern	Insect	freshwater bodies
	Indonesian red-winged dragonfly	*Neurothemis terminate*	Introduced	(LC) Least Concern	Insect	
Frog	Asian Common Toad	*Duttaphrynus melanostictus*	Native	(LC) Least Concern	Amphibian	gardens and forests
Flies and Mosquito	blue bottle fly	*Calliphora vomitoria*	Introduced	(NE) Not Evaluated	Insect	moist, nutrient-rich microhabitats.
	Crane Fly	*Tipulidae*	Native	(LC) Least Concern	Insects	moist, nutrient-rich microhabitats.
	fruit fly	*Bactrocera dorsalis*	Native	(LC) Least Concern	Insect	Vegetated areas, orchards, and grasslands.
	Stilt Legged	*Mimegralla soeruleifrons*	Native	(LC) Least Concern	Insect	
	Mosquito	*Culicidae*	Native	(LC) Least Concern	Insect	tropical and subtropical areas
Lizard	The marbled water monitor	*Varanus marmoratus*	Endemic	(LC) Least Concern	Reptiles	freshwater habitats
Snail	Asian Tramp Snail	*Bradybaena similaris*	Native	(LC) Least Concern	Invertebrate	gardens, agricultural lands, and vegetated areas
	Giant African snail	*Achatina fulica*	Introduced	(LC) Least Concern	Invertebrate	forests, gardens, agricultural areas,
	Common	*Parasteatoda*	Introduced	(VU) Vulnerable	Arachnid	buildings, gardens, and

Spiders	House spider	*tepidariorum*				sheltered outdoor areas
	Giant Wood Spider.	*Nephila pilipes*	Introduced	(NE) Not Evaluated	Arachnid	tropical forests, gardens, and vegetated areas
Worm and Millipede	Hammerhead Worm	*Bipalium kewense*	Introduced	(LC) Least Concern	Invertebrate	gardens, forests
	greenhouse millipede	*Oxidus gracilis*	Introduced	(LC) Least Concern	Millipede	moist habitats

3.1 Ants and wasp

The study at CBSUA Pasacao Campus identified three significant Hymenoptera: the native Black Carpenter Ant (*Camponotus pennsylvanicus*) and Weaver Ant (*Oecophylla smaragdina*), alongside the introduced wasp Brachymeria podagrica.The Black Carpenter Ant (*Camponotus pennsylvanicus*) and Weaver Ant (*Oecophylla smaragdina*) are specialized arboreal insects that exploit different botanical niches for nesting. While carpenter ants excavate protective galleries within the structural integrity of wood, weaver ants utilize silk to bind thick tropical foliage into complex external nests (Mackay, 2019; Exélis et al., 2025). Both species demonstrate significant adaptability, successfully transitioning from native forests into human-altered landscapes—such as orchards and urban structures—that mimic their natural nesting substrates. While the ants contribute to nutrient cycling and arboreal pest suppression as native generalist predators, the wasp—locally classified as Vulnerable—provides specialized bio-control by regulating disease vectors associated with filth-borne pathogens (Schuster & Sivakumar, 2024; Marchiori, 2022). Together, these species form a vital predatory guild that stabilizes the campus ecosystem by managing both agricultural pests and public health risks. The presence of native Black Carpenter Ants and Weaver Ants confirms a functional ecosystem capable of self-regulation and nutrient recycling, indicating sufficient habitat complexity. Meanwhile, the introduced wasp B. podagrica enhances sanitary ecology by providing a non-chemical solution for managing disease-carrying flies near refuse areas. Ultimately, these findings demonstrate that such small-scale insects provide essential ecosystem services that safeguard both the university's agricultural assets and public health.

3.2 Beetle and Bug

The fauna inventory at CBSUA Pasacao Campus identified two significant species representing the orders Coleoptera and Hemiptera: The Ladybug (Coccinella septempunctata) and the Mealybug (*Pseudococcus longispinus*). The Seven-spotted Lady Beetle (*Coccinella septempunctata*) is a highly mobile predator that thrives in suburban gardens, driven primarily by the abundance of aphids essential for its survival and larval development. To locate prey, the species employs a sophisticated detection system that tracks volatile chemical signals released by plants under aphid attack (Ahmad & Zahid, 2024). Beyond foraging, these habitats provide critical microhabitats—such as leaf litter and stone structures—that offer the thermal regulation and shelter necessary for successful overwintering and aestivation. Both are introduced species classified as Least Concern (LC). The Ladybug serves as a natural biological control agent by predating on aphids, though its limited presence during the survey may suggest competition or habitat loss (Majerus, 2021). In contrast, the Mealybug is a notorious agricultural pest that feeds on plant sap, causing chlorosis, growth retardation, and the spread of sooty mold. Field observations noted high concentrations of mealybugs on ornamental shrubs within humid, shaded campus microclimates, where their feeding activity resulted in visible plant damage. Identifying the Mealybug pinpoints the source of physiological damage to ornamental flora, establishing a baseline for proactive phytosanitary management. Conversely, the Ladybug inclusion emphasizes the role of beneficial insects in natural pest suppression; their observed scarcity suggests an ecological imbalance that may necessitate human intervention. Ultimately, these findings frame campus biodiversity as a functional network where the presence of key predators serves as a critical indicator of environmental stability and the effectiveness of integrated pest management strategies.

3.3 Bird

The Yellow-vented Bulbul (*Pycnonotus goiavier*) was recorded on the CBSUA Pasacao Campus as an introduced species with a conservation status of Least Concern. Originally native to southern Thailand, Cambodia, and Vietnam, this bird has demonstrated significant environmental adaptability by expanding its range into regions like Laos (Duckworth, 2015). The Yellow-vented Bulbul (*Pycnonotus goiavier*) is a resilient, opportunistic generalist that favors semi-open habitats like coastal scrubs, orchards, and urban gardens over dense forests. These environments provide the essential structural gaps required for its diverse foraging on fruits, nectar, and insects, while low bushes offer ideal nesting sites (Birds of the World, 2020). The Yellow-vented Bulbul (*Pycnonotus goiavier*) serves as a key frugivore on the CBSUA campus, providing the critical ecological service of seed dispersal. By consuming fruits from trees such as Ficus nota, these birds facilitate plant expansion across diverse habitats, acting as a natural catalyst for floral regeneration (Cancio & Rodriguez, 2024). This behavior underscores the importance of the campus's green spaces in maintaining local biodiversity through avian-led reforestation.

3.4 Butterfly and moth

The inventory at the CBSUA Pasacao Campus identified two distinct Lepidopterans: the introduced Tussock Moth (*Orgyia definita*) and the native Philippine Five-ring Butterfly (Ypthima stellera). The Common Five-Ring (*Ypthima baldus*) thrives in semi-open transition zones, such as forest edges and urban parks, where a mix of sun and shade supports its thermal and moisture needs. Its presence in the open green spaces of the CBSUA–Pasacao Campus indicates that the campus offers the specific micro-habitats and diverse edge vegetation necessary for essential behaviors like thermoregulation and hydration (Fishpool & Tobias, 2020). While the Tussock Moth is a highly adaptable generalist often found in urban green spaces and bark crevices, the Philippine Five-ring is a native species that favors disturbed agricultural landscapes. Despite its presence in human-altered areas, research suggests Y. stellera is relatively rare and occupies a specific ecological niche that may be sensitive to significant habitat shifts (Mangaoang & Mohagan, 2019). The documentation of these Lepidopterans is fundamental, as they serve as primary bioindicators of floral diversity and environmental health. The Tussock Moth illustrates active herbivory and trophic interactions with campus vegetation, while the presence of the rare Philippine Five-ring suggests that the university's grasslands still support the specific host plants required for its survival. By identifying these species, the research highlights the campus's role as a refuge for both resilient introduced insects and specialized native butterflies. Collectively, these findings provide a baseline for monitoring how landscaping and agriculture affect the pollinator-herbivore balance, ensuring the preservation of the campus's trees and grasslands.

3.5 Dragonflies

The faunal identification at the CBSUA Pasacao Campus identified three Odonata species that serve as vital indicators of aquatic and terrestrial health: the Green Darner (*Anax junius*), the Blue Dasher (*Pachydiplax longipennis*), and the Indonesian Red-winged Dragonfly (*Neurothemis terminata*). These dragonfly species—the Blue Dasher (Pachydiplax longipennis), Green Darner (Anax junius), and Indonesian Red-winged Dragonfly (Neurothemis terminata)—serve as ecological indicators for the CBSUA–Pasacao Campus. Their life cycles depend on healthy freshwater habitats where aquatic plants provide essential sites for egg-laying and larval development (Suhling et al., 2016; Dijkstra et al., 2020). Both the Green Darner and Blue Dasher are highly mobile predators known for controlling mosquitoes and orchard pests, while also acting as biological indicators of wetland quality. The introduced Indonesian Red-winged Dragonfly utilizes specialized visual adaptations to efficiently hunt larger prey within the campus's ponds and drainage systems (Duong, 2017; Deb et al., 2019). Collectively, these dragonflies form a predatory guild that stabilizes the campus ecosystem through effective natural pest regulation. The inclusion of these dragonflies is fundamental, as they serve as sensitive bioindicators of the campus's freshwater quality and overall environmental integrity. Because dragonflies require specific aquatic conditions for their nymphal development, the presence of A. junius, P. longipennis, and N. terminata suggests that campus drainage systems and water features are healthy enough to support complex life cycles. Their

documentation confirms an active biological control system where dragonflies naturally suppress disease-carrying mosquitoes and agricultural pests, reducing the need for chemical intervention. Additionally, the coexistence of native and introduced odonates highlights the campus's resilience as a habitat capable of supporting diverse species within human-managed water sources.

3.6 Frog

The Asian Common Toad (*Duttaphrynus melanostictus*) was documented at the CBSUA Pasacao Campus with a Native and Least Concern (LC) status. This ranking reflects its broad distribution across Asia and the Philippines, as well as its high adaptability to both forested and human-modified environments (IUCN, 2022). The Asian Common Toad (Duttaphrynus melanostictus) is a highly adaptable amphibian whose presence on the CBSUA–Pasacao Campus highlights the area's ability to provide the essential moisture, shaded cover, and standing water required for its terrestrial survival and aquatic reproduction (Mohanty & Measey, 2019). However, despite its stable global population, the species remains highly sensitive to localized environmental stressors. Factors such as air and water pollution, along with the degradation of breeding sites like canals and pools, pose significant risks to its survival (IUCN, 2022). As primary predators of ground-dwelling invertebrates, these organisms serve a vital role in maintaining the ecological equilibrium of the environment (Narins et al., 2018). By preying on ants, beetles, and termites, the species exerts a natural pressure that regulates insect density, ensuring the campus ecosystem functions in accordance with established biological expectations.

3.7 Flies and Mosquito

The faunal survey at the CBSUA Pasacao Campus identified a diverse Diptera assemblage, including the Oriental Fruit Fly (*Bactrocera dorsalis*), Crane Fly (Family Tipulidae), Bluebottle Fly (*Calliphora vomitoria*), Stilt-legged Fly (Family Micropezidae), and Mosquitoes (Family Culicidae). Most are native species classified as Least Concern (LC). The Blue Bottle Fly (Calliphora vomitoria) and Crane Fly (Tipulidae) serve as critical decomposers on the CBSUA–Pasacao Campus, utilizing damp waste zones and leaf litter to facilitate nutrient recycling and sustain soil health (Amendt et al., 2017; Petersen, 2019). Similarly, the Oriental Fruit Fly (Bactrocera dorsalis) and Stilt-Legged Fly (Mimegralla coeruleifrons) exploit the campus's diverse vegetation for reproduction and protection, contributing to the ecosystem as both nutrient cyclers and essential prey (Marshall, 2017; Vargas et al., 2018). The Oriental Fruit Fly is a prolific breeder in orchards, while Crane Flies and Mosquitoes rely on the campus's moist, shaded habitats and standing water (Harbach, 2015). The Stilt-legged Fly is noted for its unique ant-mimicry, whereas the introduced Bluebottle Fly serves a critical role in decomposition and forensic entomology (Marchiori, 2022). Together, these taxa represent a wide functional spectrum, acting as agricultural pests, disease vectors, decomposers, and primary prey for larger campus predators.

3.8 Lizard

The marbled water monitor (*Varanus marmoratus*),was recorded on the CBSUA Pasacao Campus with an Ecological Status of endemic and a Conservation Status of least concern. The Marbled Water Monitor (*Varanus marmoratus*) is a large Philippine endemic that thrives near freshwater habitats and mangroves, where it hunts fish, small animals, and carrion. Its presence on the CBSUA–Pasacao Campus confirms the availability of aquatic resources and dense vegetation essential for the survival of this opportunistic predator (Luna & Rausell-Moreno, 2024). Large and noticeable, the Marbled Water Monitor (*Varanus marmoratus*) is an endemic species of the Philippines that is especially prevalent on a number of islands in Luzon. Despite the IUCN's current classification of the species as Least Concern, threats like human encroachment, hunting pressure, and its capture for the illicit pet trade put its population in constant danger (de Miranda, 2017). The significance of the monitor as a well-known, endemic Philippine predator found in the Luzon region is established by this study, significantly increasing the campus's conservation value. Additionally, it highlights the potential role of the CBSUA Pasacao Campus as a protective refuge for this delicate species by mentioning threats from human encroachment and the illegal pet trade.

3.9 Snail

The faunal inventory at the CBSUA Pasacao Campus identified two significant terrestrial gastropods: the Asian Tramp Snail (Bradybaena similaris) and the Giant African Snail (Achatina fulica). The Asian Tramp Snail (Bradybaena similaris) and Giant African Snail (Achatina fulica) are land mollusks that thrive in the warm, humid, and vegetation-rich environments of the CBSUA–Pasacao Campus. While B. similaris flourishes in moist gardens and agricultural patches (Hajian-Forooshani et al., 2020), the larger A. fulica acts as a generalist herbivore that spreads rapidly in tropical zones with abundant organic debris and plant resources (Yu et al., 2024; Alogna et al., 2025). Together, their presence confirms that the campus provides the high moisture levels and dense greenery necessary to support diverse malacofauna.While the Asian Tramp Snail is Native to the region and classified as Least Concern, it is globally regarded as a pervasive invasive species and a vector for parasites affecting humans and livestock (Serniotti et al., 2019). Campus observations confirm its preference for damp micro-habitats like garden soil and potted plants. In contrast, the Giant African Snail is an Introduced species from East Africa that thrives in human-disturbed environments. The documentation of these gastropods is central to the study, as they serve as primary indicators of how human-altered landscapes facilitate the establishment of resilient and potentially invasive taxa. By identifying these species, the research characterizes the campus as a dynamic mosaic of man-made habitats where adaptable native and introduced species dominate the ecological balance. Furthermore, including B. similaris and A. fulica bridges biological documentation with institutional management by establishing a baseline for public health and agricultural risks. These findings emphasize that a "Least Concern" or "Introduced" status does not negate a species' ecological impact; instead, it underscores the university's responsibility to manage these synanthropic organisms to maintain a safe and stable environment.

3.10Spiders

The faunal identification at the CBSUA Pasacao Campus identified two spiders with contrasting ecological profiles: the Giant Wood Spider (*Nephila pilipes*) and the Common House Spider (*Parasteatoda tepidariorum*). The Common House Spider (Parasteatoda tepidariorum) and Giant Wood Spider (Nephila pilipes) represent two distinct hunting strategies found on the CBSUA–Pasacao Campus, where they play a vital role in regulating insect populations. While P. tepidariorum thrives in both buildings and gardens by spinning irregular cobwebs to capture mosquitoes and flies (Nyffeler & Birkhofer, 2017), N. pilipes utilizes the campus's dense greenery to anchor expansive circular orb-webs designed for larger flying prey (Kuntner et al., 2019). The presence of both species underscores a robust ecosystem characterized by high insect density and the diverse structural supports—from man-made structures to tropical foliage—necessary for these predatory arachnids to flourish.The Giant Wood Spider is a Native species of Least Concern that typically inhabits rainforests; however, in modified landscapes like gardens, it often adapts by building smaller webs, which may reduce its overall fitness (Wijerathna et al., 2019). The inclusion of these arachnids is vital, as they serve as physical bioindicators of habitat quality and the campus's functional trophic structure. The Giant Wood Spider (N. pilipes) signals environmental stability and a healthy insect biomass, as its large webs require substantial high-energy prey to sustain its size. Meanwhile, the Common House Spider (P. tepidariorum) highlights the campus as a human-designed micro-ecosystem, where artificial structures provide niches for natural pest suppression.

3.11Worm and Millipede

The faunal survey at the CBSUA Pasacao Campus identified two soil-dwelling invertebrates that define the ground layer's decomposition and predatory dynamics: The Greenhouse Millipede (*Oxidus gracilis*) and the Hammerhead Worm (*Bipalium kewense*). Both are Introduced species with a conservation status of Not Evaluated (NE). The Greenhouse Millipede acts as a primary detritivore, specializing in the breakdown of decaying plant litter and wood within the campus’s managed landscapes. In contrast, the Hammerhead Worm is a specialized predator that thrives in moist, organic-rich environments, where it preys on earthworms essential for soil health (Justine et al., 2020). Together, these organisms illustrate a subterranean ecology where introduced species drive

both nutrient cycling and the regulation of soil-dwelling populations. The identification of Greenhouse Millipede (*Oxidus gracilis*) and the Hammerhead Worm (*Bipalium kewense*), is a critical finding that reinforces the classification of the campus as a human-altered landscape. The Greenhouse Millipede provides physical evidence of active nutrient cycling, confirming that the campus's managed gardens are successfully recycling nitrogen and phosphorus through leaf litter decomposition. Conversely, the presence of the Hammerhead Worm introduces an ecological concern, as its predation on earthworms may threaten the long-term soil quality of agricultural and garden zones. By documenting these species, the research highlights how campus biodiversity is shaped by cosmopolitan taxa that follow human activity. This baseline data is essential for monitoring the balance of soil organisms, ensuring that the benefits of detritivores are not compromised by invasive predators that target vital soil-health engineers.

4. Findings

The biological inventory of the CBSUA Pasacao Campus reveals an ecosystem heavily dominated by the class Insecta, which comprises 15 of the 24 identified species. This prevalence highlights the high adaptability of insects to human-altered landscapes, where they thrive alongside a smaller presence of arachnids and other invertebrates. In contrast, larger or more specialized fauna—such as birds, reptiles, and amphibians—are significantly less common, each represented by only a single species. This distribution suggests that the current campus environment favors resilient, generalist organisms while presenting greater survival challenges for more sensitive or specialized wildlife. The campus's ecological balance is further defined by a high proportion of introduced species, which outnumber native fauna nearly two-to-one and include only one documented endemic species. This indicates that the managed vegetation and human activity on campus create a favorable niche for non native or invasive species, potentially placing pressure on indigenous wildlife through resource competition. While the majority of these inhabitants are classified as Least Concern, the presence of a vulnerable species and several Not Evaluated organisms underscores the need for careful monitoring. Ultimately, the man-made gardens serve as critical urban oases, acting as the primary biological centers that sustain the campus's remaining biodiversity.

5. Conclusion

The CBSUA–Pasacao Campus functions as a specialized, human-altered habitat that favors small, particularly insects—at the expense of specialized vertebrate fauna. The current ecosystem reflects a simplified trophic structure where the original natural forest has been replaced by infrastructure, leaving human-managed gardens as the sole biological hubs for survival. These man-made green spaces are now the primary determinants of the campus's biodiversity, serving as vital refuges for the remaining wildlife in a fragmented landscape. While the campus supports a high degree of common species classified as Least Concern, it is increasingly characterized by an ecological imbalance where introduced, non-native species dominate. This transformation suggests that the campus acts more as a corridor for hardy, cosmopolitan invaders than as a primary habitat for unique Philippine biological heritage. However, the presence of vulnerable and endemic species indicates that these grounds still hold significant conservation value; the survival of these sensitive organisms depends entirely on how human landscaping and environmental management are maintained in the future.

Recommendations - To strengthen the ecological health of the CBSUA–Pasacao Campus, the university should transition toward a Green Corridor and Habitat Enrichment strategy. By prioritizing the planting of native trees and shrubs, the campus can create specialized niches that provide food and nesting resources for underrepresented groups like birds, reptiles, and endemic fauna. This approach fosters a more competitive environment for indigenous species to flourish alongside introduced ones. Additionally, the university should implement Habitat Patch Management by preserving undisturbed leaf-litter layers and creating small wetland zones, which are essential for the survival of amphibians and sensitive soil dwelling invertebrates. Beyond physical landscaping, the community must adopt nature-friendly policies and active preservation habits. This includes establishing designated Buffer Zones to minimize human foot traffic high-biodiversity areas and avoiding the use of harmful chemical sprays that threaten beneficial pollinators. Students and staff are encouraged to participate in

garden protection and pollinator-friendly practices, such as allowing wildflowers to grow in select areas. Based on the recorded fauna inventory, it is recommended that Science teachers develop localized instructional materials (SIMs) that use campus-specific species to make ecology more relatable to students. Finally, integrating regular biodiversity monitoring into the campus curriculum will ensure that these conservation efforts are data-driven,helping to track the long-term recovery of the campus's most vulnerable biological inhabitants.

Practical Educational Implications **-**Since International Journal of Research Studies in Education is an education-focused journal, this study must clearly explain the practical educational implications of its findings. The documentation of fauna species within the Central Bicol State University of Agriculture Pasacao Campus is important not only for biodiversity conservation but also for improving teaching, learning, and campus environmental management. The presence of different animal species shows that the campus serves as an ecological learning space where education and environmental protection work together. These findings provide useful knowledge that can support academic instruction, student learning, and institutional planning. For teachers and educational practitioners, the study provides localized learning materials using actual fauna species found within the campus. This makes lessons in biology, ecology, and environmental science more practical and meaningful. Teachers can also use the findings for field activities, species observation, and outdoor learning to improve student engagement. For students, the study increases awareness of local biodiversity and encourages environmental responsibility. It helps them understand the importance of protecting species found within their own campus. Students also develop important scientific skills such as observation, classification, and species identification through direct learning experiences. For school administrators and institutional planners, the findings provide a basis for responsible campus development and land management. Protecting green spaces, vegetation, and water sources helps preserve animal habitats and supports biodiversity. This creates a healthier and more sustainable learning environment for everyone.

The study also supports environmental policies and extension programs of the university. The infographic output can serve as a permanent educational reference for students, visitors, and the local community. This helps promote awareness of biodiversity conservation and strengthens the institution's role in environmental education. The study shows that preserving fauna species within the campus is important for both ecological balance and quality education. It strengthens environmental learning, supports sustainability, and helps the university produce environmentally responsible students and future professionals.

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