TERRESTRIAL MACROPHYTES ASSESSMENT IN CAMP HIGHER GROUND, BAROTAC VIEJO, PROVINCE OF ILOILO, PHILIPPINES

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ABSTRACT

This study was conducted to establish baseline data on the terrestrial macrophytes in Camp Higher Ground (CHG), Brgy. San Nicolas, Barotac Viejo, Iloilo. Specifically, this study determined the terrestrial macrophyte level of plant community diversity measured in terms of species richness, species composition, and relative abundance, and determined the conservation status of plant species in the area as a logical step in protecting the threatened species from possible extinction. The assessment was done on September 2017 – January 2018 employing the descriptive survey method. Data were collected from the 1000m^2 sampling area composed of 10 quadrats each measuring 10 x 10 m^2. There were 123 plant species recorded that belong to 100 genera and 61 families. Results revealed that trees were 56.9%; shrubs, 13.8%; vines, 13.0%; herbs, 7.3%; ferns, 5.7%; and palms, 3.3%. Shannon-Weinner Diversity index for CHG was high (H'=3.867). Thirty-one, 31 (25.2%) macrophytes were categorized threatened. Among these, two were critically endangered: Agboi (*Mussaenda philippica* L.C. Rich.) and Bugauak morado (*Clerodendrum quadriloculare* (Blanco) Merr.). The endangered species were Duklitan (*Planchonella duclitan* (Blco.) Bakh. f.), Bahai (*Ormosia calavensis* Azaola), and Salingogon (*Cratoxylum formosum* Benth & Hooker). However, 30 (24.3 %) plant species were considered endemic. During

the conduct of the study, some forest clearing, wood harvesting, and minor charcoal-making operations were discovered which posed threats to this natural habitat especially of threatened and endemic macrophytes. Proper conservation program should be implemented by the CHG management to prevent further biodiversity loss.

Keywords: macrophytes, diversity, endangered, endemic, conservation

INTRODUCTION

The global society has started to recognize the importance of conserving biodiversity for humans are dependent on the basic products supplied by these natural resources like food, medicine, shelter, clean water, and a host of services (ASEAN Center for Biodiversity, 2010). Many people are still not fully aware of the enormous benefits that biodiversity offers to mankind, and why these significant changes in biodiversity remain a global nightmare.

Scientific assessment of the remaining biological resources for conservation and promoting public awareness on their intrinsic values are two measures to achieve the goal of protecting these natural gifts for both the present and future generations. The inventory of the Philippine biodiversity is far from being complete (Fernando, 2009) and any similar endeavor was being carried out in Camp Higher Ground (CHG) which will become a vital part of the regional and global crusade to prevent its rapid decline and extinction. This study, however, focused on the vegetation cover that plays a vital role on the microclimate and ecological productivity of this significantly small parcel of agro-forestry land.

In Western Visayas, a number of studies on the assessment of its vegetation were conducted and published, however, no similar study has been systematically done for CHG despite its built-in potential as an upland eco-tourism destination for the province. In 2010, Elefan and Guanzon made an assessment of Bulabog-Putian National Park (BPNP) in Dingle, Iloilo and has recorded 218 plant species. Initial survey was done

by Fuentes and Andraje (2008) and Gallaza (2009) recorded 313 plants species under 88 families. Meanwhile, Madulid (2000) found that forests in Northwest Panay were species rich and ecologically diverse area with high endemism and having numerous rare and threatened plant species of Dipterocarp trees. In Iloilo, studies on indigenous medicinal plants (Elefan, 2005), indigenous forest trees and shrubs (Elefan, 2004), and spermatophytes *(*Elefan, 2002) were conducted that contributed to the list of flora in this part of the region.

There were many inadequacies in our knowledge of the flora in many parts of the country (Fernando, 2009) and the data generated from this study would contribute significantly to the regional and global inventory which remained to be statistically low. This assessment was a logical attempt to contribute to the inventory of Philippine biodiversity and to serve as baseline for measuring future changes in the floristic composition in the area which can be relatively unique and serve as a basis of classifying it into another potential protected area. It is on this premise that the researchers had undertaken an assessment of the terrestrial macrophytes in Camp Higher Ground (CHG), Barotac Viejo, Province of Iloilo, Philippines.

Objectives of the Study

General objective: This study was conducted to assess the terrestrial macrophytes in Camp Higher Ground (CHG), Barotac Viejo, Iloilo, Philippines.

Specific objectives:

1. To assess the terrestrial macrophytes level of plant community biodiversity measured in terms of species richness, species composition, and relative abundance.
2. To identify and classify the different terrestrial macrophytes that thrives in the area.
3. To determine the conservation status of terrestrial macrophytes in the area as a logical step in protecting the threatened species from possible extinction.

Significance of the Study

An assessment of CHG biodiversity is a revelation of its natural richness that can eventually result to the discovery of new species that has never been recorded or uncovering endemic species that are otherwise threatened that should be protected and conserved which is the ultimate goal of this study. If ever CHG has unique biodiversity and physio-geographical features, then it can be recommended to be officially declared a protected area by the DENR. The stakeholders will formulate policies and guidelines to preserve and conserve the threatened, endemic species of the area.

CHG would be the area for field study especially for science/ Biology students dealing with taxonomy, pharmacology, terrestrial ecology and biodiversity.

The local people should know that every habitat, no matter how small and fragmented, is unique relative to other habitats in the world.

Scope and Limitations of the Study

Week-ends assessment of terrestrial macrophytes in the study area was carried-out in established only one 1000 m^2 sampling plots for at least five months from September 2017 to January 2018 although plant species in the vicinity in CHG were also recorded as supplementary data. The phenological observation on the flora was observed until January 2018. The duration of study covered both the rainy and dry months considering the differential responses of floral species to climatic variations. Bryophytes, sedges and grasses, except bamboo, however, were excluded in the data collection. Threatened Plants of the Philippines: A Preliminary Assessment. Asia Life Sciences Supplement, was used in the classification of threatened or endangered species by Fernando et al.,(2008). Grasses and sedges were not included in the study.

METHODOLOGY

Research Design

This study used the descriptive research design. This design was applied in identifying plant species present in each quadrat. Species features were used in their taxonomic classification and enumerations of species were used in the computation of index of diversity.

Plant Community Reconnaissance

A reconnaissance of the study area, a 27-hectare forested land located in Brgy. Baclayan, Barotac Viejo in the northern part of the Province of Iloilo was carried-out by foot-cruising the entire area and its periphery to fairly observe the distribution of plant species.

Sampling Plots

The modified quadrat method was adopted in sampling for floristic data. A 1000 m^2 transect was established along the vegetation gradient across the mountain contour. Ten quadrats were made, each measuring 10 x 10 meters, and 10 meters opposite each other were established along the transect.

Data Collection

Data collection was conducted by visiting the same established ten quadrats during weekends which started from September 2017 (part of the rainy season) until March 2018 (part of summer season) to particularly observe the phenology of the existing vegetation which was the effect of climatic condition on the behavior of plants such as budding and flower initiation. Inflorescence type was the major basis of determining plant relationships under Morpho-systematics. In every quadrant, the features of species were noted for taxonomic identification. Plant species were identified according to their accepted local, common, scientific and family names using valid taxonomic field guides, botanical keys, and taxonomic publications.

Photographs of plants were also taken for documentation purposes. Some unidentified species were referred to some experts such as from the DENR-Region 6 and the Co's Digital Flora of the Philippines.

Enumeration of plant species in each quadrant were recorded and were used in the determination of the following: (1) Species composition, (2) Species richness (S), (3) Relative abundance (P_i) (4) Biodiversity level and, (5) Conservation Status.

Data Analysis

The frequency and percentage distribution were the statistical tools used to describe the biodiversity status of the study area. Shannon-Weinner Diversity Index (H') (Begon, et al., 1990), was used to measure the level of biodiversity using the formula:

$$H' = -\sum_{i=1}^{S} P_i \ln P_i$$

Where: H = Shannon-Wiener Diversity Index

S = Species richness

P*i* = Proportion of total individuals in the *i*th species

The level of biodiversity was determined using the scalar rating below (Elefan and Guanzon, 2010):

Rating	**Description**
0.00 - 1.25	Very low
1.26 – 2.52	Low
2.53 - 3.77	Moderate
3.78 - 5.00	High

Determination of the conservation status was based on the DENR Department Orders issued in 2007 and 2017 containing the national list of threatened Philippine plants and the International Union Conservation Network (IUCN) Red List (2017-2018).

RESULTS AND DISCUSSION

Floral Composition and Vegetation Analysis of Camp Higher Ground

Assessment of the study area showed that it can be classified as a mixed second-growth forest ecosystem based on the existing floral composition and the physical environment. Shannon-Weinner Diversity Index (H') calculation has shown CHG to have a high diversity index (H'=3.867) with 123 plant species listed in the sampling plots. The CHG, a secondary forest ecosystem has high endemism and some of the premium wood quality endemic species of desirable economic value in the study area were included in the top 96 priority species declared by EDC (Energy Development Corporation) as "Trees of the Future" (Malabrigo Jr. et al, 2016). These include the threatened plant species Anang (*Diospyros pyyrhocarpa* Miq.), critically-endangered Bagauak morado or Saling uwak (*Clerodenderum quadriloculare* (Blanco) Merr.) and the vulnerable Antipolo (*Artocarpus blancoi* Merr.). Native quality timber species include Bitaog or Palomaria (*Calophyllum inophyllum* L.,), Anang (*Diospyros pyrrhocarpa* Miq.) and Balinghasai (*Buchanania arborescens* Blume). Typical to a secondary growth forest in the Philippines best native species include Taluto (*Pterocymbium tinctorium* Blanco), Amamali (*Leea*

aculeata Blume ex Spreng.), Batino (*Alstonia macrophylla*,Wall ex. G. Don), Niog-niogan (*Ficus pseudopalma* Blco.) and, Bani (*Pongamia pinna* (L.) Merr.). Remnants of the original forest were pioneering species of Binunga *(Macaranga tanarius* (L.) Muell. Arg.), Bagauak (*Clerodendrum minahasse* Teijsm. & Binn.), Tibig (*Ficus nota* (Blco). Merr.), Niog-niogan (*Ficus pseudopalma* Blco.), and Dalunot (*Pipturus arborescens* (Linn.) C.B. Rob.) Incidentally, there was a sporadic species of starapple (*Chrysophyllum cainito* L.) and kasoy (*Anacardium occidentale* L.). Along the edge of the sampling plots grew some pineapple plants (*Ananas comosus* L.) intentionally planted in the area. False bird-of-paradise (*Heliconia psittacorum* Linn. f.) ,Pandan or Bariw-bariw (*Pandanus copelandii* Merr.), Langkauas (*Zingiber zerumbet* (Linn). Sm.) Palmera (*Chrysalidocarpus lutescens* H. Wendell) and Mala-nipa (*Nypa* sp.) thrive luxuriantly being adapted under a cool and moisture-rich environment. Noted were some several fern species like Fan maiden hair fern (*Adiantum tenerum* Swartz), Bold Sword fern (*Nephrolepis* sp.), and the endangered species Forked Oak leaf fern (*Drynaria quercifolia* (L.) Sm.). Climbing fern species consisted of Nitong parang (*Lygodium microphyllum* (L.) Swartz,) and Nitong puti (*Lygodium circinatum* (Cav.) R.Br. wildly persist throughout the study area and the nearby thickets. Living on fallen tree stumps were Family Araceae species as climbing arum (*Philodendron* sp.) and creeping vine (*Cocculus* sp.). The most abundant climbers were Agpoi or Angel's wings (*Bauhinia integrefolia* Roxb.) and Katmon baging or Takinis (*Tetracera scandens* (Linn.) Merr.). Climbing Piperaceae family species noted were Litlit (*Piper interruptum* Opiz. var. *loheri* (C.DC.) Quis.) and Posayna (*Piper* sp.) with the only Family Vitaceae grapelike and edible species Bika (*Ampelocissus martini* Planch). One Poaceae species

known as Usiu or Climbing bamboo (*Dinochloa scandens* (Blume) O. Kuntze has been included being a prominent woody vine in the area. Based on published reports, Taluto (*Pterocymbium tictorium Blanco,* Family Sterculiaceae was considered to be a rare species. Family Dioscoriaceae was represented by Banayan (*Dioscorea* sp.), an otherwise edible climber growing in the wild.

Distribution of Plant Species among Families and Plant Groups in CHG

Results shows that out of 123 plant species surveyed, 70 (56.6%) (Appendix A) are trees then followed by shrubs, 17 (13.8%) (Appendix B) ; vines, 16 (13.0%) (Appendix C); herbs, 9 (7.3%) (Appendix D) ; ferns, 7 (5.7%) (Appendix E), and palms, 4(3.3%) (Appendix F).

Plant Families with the Highest Number of Genera and Species in CHG.

The highest number of genera was recorded under the family Fabaceae (9) which also registered the second highest number of species (9). Family Moraceae dominated by Genus *Ficus* obtained the highest (11) number of species and most of which have been reported as threatened in different categories like Hauli or Labnog (*Ficus septica* Burm), Isis (*Ficus ulmifolia* Lam.), Niog-niogan (*Ficus pseudopalma* Blco), and Pakiling (*Ficus odorata* Blco.). Other species reported as threatened include Antipolo (*Artocarpus blancoi* (Elm.) Merr) and Anubing *Artocarpus ovatus* Blanco. Families Apocynaceae, Arecaceae or Palm family,

Euphorbiaceae and Rubiaceae recorded an identical four (4) genera each.

Diversity Level of Different Plant Groups in CHG

Results showed that a total 1999 individuals counted, trees recorded a significantly highest relative abundance (N=1188), species richness (S=70) and diversity index (H'=3.16) categorized as moderate, shrubs (N=253, S=17) and, vines (N=306, S=16). Shrubs (H'=2.29) and vines (H'=1.59) herbs (H'=1.69) and, ferns (H'=1.73) were categorized as of low diversity indices. Palms (N=30; H'=0.99) registered the lowest relative abundance and a very low diversity index.

Conservation Status of Threatened Plant Species

The Conservation status of threatened plant species recorded from the sampling plots in CHG was primarily based on the official listings in the DENR DAO 2007 & 2017, International Union of Conservation of Nature (IUCN) Red List (2017-2018), Co's Digital Flora of the Philippines (2018) and Dalawis (2008) revealed that 31 (25.2%) out of 123 plant species recorded were classified threatened. Two were Critically Endangered (CR) namely Agboi (*Mussaenda philipica* L.C. Rich.), and Bugauak Morado (*Clerodendrum quadriloculare* (Blanco) Merr. Meanwhile, 6 (4.8%) and, 4 (3.3%) plant species were categorized as Lower Risk/least concern (LR/lc) and Other Threatened Species (OTS), respectively. Three (3) species were rare, namely Bitanghol (*Calophyllum blancoi* Pl.&Tr.), Bitongol (*Flacourtia rukam* Zoll. & Mor) and Taluto (*Pterocymbium*

tictorium Blco.). Only one Orchidaceae species was recorded as Ground orchid (*Habenaria* sp.).

Plant Endemism

In CHG, out of 123 plant species recorded, 30 (24.3 %) have been classified as endemic based on scientific reports. Of 30 endemic species, trees registered the highest level of endemism (80.0 %) having 24 species followed by shrubs (10.0%), vines (6.7%), and palms (3.3 %) with 3, 2, and 1 species each, respectively.

Observations of Human Activities

Throughout the entire study, it was observed that in some part of the CHG, there were minimal unfriendly forest clearing, minor charcoal-making, and wood harvesting activities. The area was inhabited by two households who served as caretaker of the area. There was no strict compliance of environmental protection and conservation in Camp Higher Ground.

CONCLUSIONS AND RECOMMENDATIONS

Camp Higher Ground has considerably high diversity index (H'=3.867) that is a home of 123 macrophytes with a relative abundance of 1, 999 dominated by trees (56.6%) some of which have high timber quality. Other species were classified as shrubs (13.8%), vines (13.0%), herbs (7.3%), ferns (5.7%), and palms (3.3%). A notable number of the recorded plant species were categorized as threatened (25.2%) of which three have been categorized as critically

endangered and therefore should be conserved. Endemism was considerably high (24.4%) and a few were found to be unique in the area.

Finding shows that since the study area is a private property and not yet classified as a protected ecosystem, some unfriendly forest clearing, minor charcoal-making, and wood harvesting activities have been observed. There was no strict compliance of environmental protection and conservation in Camp Higher Ground.

Based on these premises, the researchers recommend that:

(1)With the richness of plant species at Camp Higher Ground, the CPBC management should improve the conservation program to protect the natural habitat of a good number of threatened species and to prevent their possible extinction in the future. (2) Endangered and unique plant species should be propagated asexually and seed collection should be done as methods of *ex situ* conservation and re-establish them later to proliferate in their natural habitat.(3) It should also be considered as another potential area for community outreach activities to focus on ecosystem conservation and preservation.(4) Promote CHG as another potential botanical laboratory for the utilization of students, hobbyists, and professionals in the field of Botany and Ecology, and (5)) It is recommended that results of study on trees will be identified whether they are non-timber products with potential economic value, and, (6) Results of this study will be shared to the CPBC management with the coordination with the local government Brgy. Baclayan, Barotac Viejo, Iloilo to

impose strict policy on unauthorized activities like forest clearing, charcoal making and wood-harvesting or illegal cutting-down of big trees.

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APPENDIXES

Appendix A.
Shannon-Wiener Diversity Index of Trees in Camp Higher Ground, Barotac Viejo, Province of Iloilo, Philippines.

Common / Local Name	Scientific Name	Family	Ni	Pi	ln Pi	H'
Alagasi	*Leucosyke capitellata* (Poir.)Wedd	Urticaceae	47	0.0396	-3.229	-0.1279
Alahan	*Guioa koelreuteria* (Blanco) Merr	Sapindaceae	5	0.0042	-5.47	-0.023
Alibot-bot	*Ervatamia hexagona* (Merr.) Pich	Apocynaceae	5	0.0042	-5.47	-0.023
Amamali	*Leea aculeata* Blume ex Spreng	Leeaceae	27	0.0227	-3.783	-0.0861
Anabiong	*Trema orientalis* (L.) Blume	Ulmaceae	4	0.0034	-5.693	-0.0192
Anagas / Kamiring	*Semecarpus elmeri* Perk.	A Nacardiaceae	38	0.032	-3.442	-0.1102
Duklitan/ An-an	*Pouteria* duclitan	Sapotaceae	12	0.0101	-4.594	-0.0464
Anang	*Diospyros pyrrhocarpa* Miq.	Ebenaceae	17	0.0143	-4.246	-0.0608
Anonang	*Cordia dichotoma* Forst. f.	Boraginaceae	5	0.0042	-5.47	-0.023
Antipolo	*Artocarpus blancoi* (Elm.) Merr. Blco.	Moraceae	68	0.0573	-2.86	-0.1638
Anubing	*Artocarpus ovatus*Blanco	Moraceae	19	0.016	-4.135	-0.0662
Apatot/Rubia sp.	*Morinda citrifolia* Linn.	Rubiaceae	16	0.0135	-4.307	-0.0581
Bani	*Pongomia pinnata*(L.) Merr.	Fabaceae	1	0.0008	-7.079	-0.006
Bagauak puti	*Clerodendrum minahasse* Teijsm. & Binn.	Lamiaceae	11	0.0093	-4.681	-0.0434
Bagauak morado	*Clerodendrum quadriloculare* (Blco) Mer	Lamiaceae	7	0.0059	-5.133	-0.0303
Bahai	*Ormosia calavensis* Azaola	Papilionaceae	1	0.0008	-7.079	-0.006
Balighasai	*Buchanania arborescens* Blume	Anacardiaceae	64	0.0539	-2.92	-0.1575
Banai-banai	*Rodermachera pinnata* (Blco.) Seem	Bignoniaceae	3	0.0025	-5.981	-0.0151
Banato	*Mallotus philippinensis* Lamarck	Euphorbiaceae	8	0.0067	-5.000	-0.0337
Banawak	*Uvaria rubra* C.B. Rob.	Annonaceae	1	0.0008	-7.079	-0.006
Bangkal	*Nauclea orientalis* L.	Rubiaceae	2	0.0017	-6.386	-0.0108
Banlot/ Banhot	*Colona megacarpa (*Merr.) Burm	Tiliaceae	2	0.0017	-6.386	-0.0108
Batino	*Alstonia macrophylla* Wall. ex DC.	Araliaceae	21	0.0177	-4.035	-0.0714
Batwan	*Garcinia binucao* Blanco	Clusiaceae	2	0.0017	-6.386	-0.0108
Bignay pugo	*Antidesma* sp	Euphorbiaceae	7	0.0059	-5.133	-0.0303
Binayuyo/Inyam	*Antidesma ghaesembilla* Gaertn.	Euphorbiaceae	6	0.0051	-5.287	-0.0267
Binunga	*Macaranga tanarius* (L.) Muell. Arg.	Euphorbiaceae	15	0.0126	-4.371	-0.0552

Appendix A continuation

Common / Local Name	Scientific Name	Family	Ni	Pi	ln Pi	H'
Bitanghol	*Flacourtia rukam* Zoll. & Mor.	Flacourtiaceae	1	0.0008	-7.079	-0.006
Bitaog/ Palomaria	*Calophyllum inophyllum*	Clusiaceae	3	0.0025	-5.981	-0.0151
Bitongol	*Calophyllum blancoi*	Flacourtiaceae	22	0.0185	-3.988	-0.0739
Bugauak	*Evodia confusa* Merr.	Rutaceae	7	0.0059	5.133	-0.0303
Dita	*Alstonia scholaris*	Apocynacea	3	0.0025	-5.981	0.0151
Dulit	*Canarium hirsutum* Willd.	Burseraceae	3	0.0025	-5.981	-0.0151
Earpod wattle	*Acasia auricauliformis*	Fabaceae	1	0.0008	-7.079	-0.006
Hambabalod /Lisak	*Neonauclea bartlingii (*DC) Merr.	Clusiaceae	1	0.0008	-7.079	-0.006
Hauli /Labnog	*Ficus septica* Burm.	Moraceae	1	0.0093	-4.681	-0.0434
Hinlaumo	*Mallotus ricinoides* (Pers.) Muell.-Arg.	Euphorbiacea e	1	0.0008	-7.079	-0.006
Kalios/ Biri	*Streblus asper* Lour.	Moraceae	2	0.0017	-6.386	-0.0108
Kasoy	*Anacardium occidentale* L.	Anacardiacea e	1	0.0008	-7.079	-0.006
Kulatingan	*Pterospermum obliquum*	Sterculiaceae	3	0.0025	-5.981	-0.0151
Lanite	*Wrigthia pubescens* (Blco.) Merr.	Apocynaceae	1	0.0008	-7.079	-0.006
Mahogany large leaf	*Swietenia macrophylla* King.	Meliaceae	183	0.1542	-1.87	-0.2883
Mahogany, small leaf	*Swietenia mahogani* Jacq.	Meliaceae	266	0.2241	-1.496	-0.3352
Malabuho	*Sterculia oblongata* R. Br.	Sterculiaceae	3	0.0025	-5.981	-0.0151
Malaikmo	*Celtis philippensis*	Celtidaceae	2	0.0017	-6.386	-0.0108
Matang-ulang	*Siphonodon celastrineus* Griff.	Siphonodonta ceae	10	0.0084	-4.777	-0.0402
Murraya	*Murraya* sp.	Rutaceae	1	0.0008	-7.079	-0.006
Oringon/ tambis –like	*Cynometra luzoniensis* Merr.	Fabaceae	1	0.0008	-7.079	-0.006
Pagsahingin or Dulit	*Canarium asperum* Benth.	Burseraceae	29	0.0244	-3.712	-0.0907
Paguringon	*Cratoxyllum celebicum* Blume	Burseraceae	23	0.0194	-3.944	-0.0764
Pakiling	*Ficus odorata* Blco.	Moraceae	3	0.0025	-5.981	-0.0151
Pandan /Bariw-bariw	*Pandanus copelandii* Merr.	Pandanaceae	39	0.154	1.870	-0.2882
Pingka-pingkahan	*Oroxylum indicum* (L.) Vent.	Bignoniaceae	22	0.0185	-3.988	-0.0739
Pipi	*Actinodaphne dolichophylla*	Laureaceae	5	0.0042	-5.47	-0.023
Puso-puso	*Neolitsea vidalii Merr.*	Laureaceae	3	0.0025	-5.981	-0.0151
Rothmania	Rothemania sp.	Rubiaceae	1	0.0008	-7.079	-0.006
Saging- Saging	*Aegiceras corniculatum* (L.) Blco.	Myristicaceae	14	0.0118	-4.44	-0.0524
Saling - kugi	*Albizia saponaria* (Lour.) Blume	Fabaceae	2	0.0017	-6.386	-0.0108
Salinggogon	*Cratoxylum formosum* Benth & Hooker	Clusiaceae	20	0.0168	-4.083	-0.0688
Salong/ Almaciga	*Agathis philippinensis* Warb.	Araucariacea e	4	0.0034	-5.693	-0.0192
Starapple	*Chrysophyllum cainito Linn.*	Sapotaceae	1	0.0008	-7.079	-0.006

Appendix A continuation

Common / Local Name	*Scientific Name*	Family	Ni	Pi	ln Pi	H'
Tagpo	*Ardisia squamulosa* Presl.	Myristicaceae	25	0.0211	-3.86	-0.0813
Takinis	*Ficus cumingii* Miq.	Moraceae	16	0.0135	-4.307	-0.0581
Takip asin	*Macaranga grandiflora* (L.) Muell.- Arg.	Euphorbiaceae	32	0.027	-3.613	-0.0974
Talisay	*Terminalia catappa* L.	Combretaceae	23	0.0194	-3.944	-0.0764
Taluto	*Pterocymbium tictorium Blanco*	Sterculiaceae	3	0.0025	-5.981	-0.0151
Tibig	*Ficus nota* (Blco.) Merr.	Moraceae	5	0.0042	-5.47	-0.023
Tubli	*Derris elliptica* Roxb. Benth.	Fabaceae	2	0.0017	-6.386	-0.0108
Tul-an-tul-an	*Anacardium* sp.	Anacardiaceae	5	0.0042	-5.47	-0.023
			1188			H=3.157 Moderate

Appendix B

Shannon-Wiener Diversity Index of Vines in Camp Higher Ground, Barotac Viejo, Province of Iloilo, Philippines

Local / Common Name	Scientific Name	Family	Ni	pi	ln Pi	H'= 1.59
Agpoi /Angel's wings	*Bauhinia integrefolia (Roxb.)*	Fabaceae	51	0.17	-1.772	0.301
Baling-uai/ Alas-as	*Flagellaria indica* L.	Flagillariaceae	17	0.057	-2.8706	0.163
Banagan	*Smilax bracteata* Presl.	Smilacaceae	5	0.017	-4.0943	0.068
Bika	*Ampelocissus martini* Planch	Vitaceae	1	0.003	-5.7038	0.019
Burakan	Merremia peltata (L.) Merr.	Convolaceae	5	0.007	-5.0106	0.033
Butterfly pea	*Centrosema pubescens* L.	Fabaceae	5	0.007	-5.0106	0.033
Climbing arum	*Philodendron* sp.	Araceae	2	0.007	-5.0106	0.033
Climbing bamboo /Usiu	*Dinochloa scandens* (Blume) O. K.	Poacea	8	0.027	-3.6243	0.097
Creeping vine	*Cocculus sp.*	Menispermaceae	2	0.007	-5.0106	0.033

Appendix B continuation

Local / Common Name	*Scientific Name*	Family	Ni	pi	ln Pi	H'= 1.59
Katmon-baging	*Tetracera scandensT*(Linn.) Merr.	Dilleniaceae	166	0.553	-0.5918	0.327
Kudzu	*Pueraria montana* (Lour.) Merr.	Fabaceae	6	0.02	-3.912	0.078
Lagtang	*Anamirta cocculus* (L.) Wrigh	Menispermaceae	7	0.023	-3.7579	0.088
Litlit	*Piper interruptum* Opiz. (C.DC.) Quis.	Piperaceae	23	0.077	-2.5683	0.197
Malapipino	*Momordica* sp.	Cucurbiatceae	2	0.007	-5.0106	0.033
Posayna	*Piper* sp.	Piperaceae	1	0.003	-5.7038	0.019
Ubi-ubehan	*Dioscorea* sp.	Dioscoriacea	5	0.017	-4.0943	0.068
			306			H= 1.592 Low

Appendix C.

Shannon-Wiener Diversity Index of Shrubs in Camp Higher Ground, Barotac Viejo, Province of Iloilo. Philippines

Common /Local name	Scientific Name	Family Name	Ni	pi	ln Pi	H'
Aplas	*Ficus irisana* Elm.	Moraceae	1	0.004	-5.533	-0.0219
Baraw-baraw	*Blechum* sp.	Acanthaceae	5	0.02	-3.924	-0.0775
Bayan	*Memecylon* sp.	Melastomataceae	50	0.198	-1.621	-0.3204
Chinese Malunggay	*Breynia* sp.	Phyllantaceae	1	0.004	-5.533	-0.0219
Coronitas	*Lantana camara* L.	Verbenaceae	1	0.004	-5.533	-0.0219
Dalunot	*Pipturus arborescens* Linn	Urticaceae	2	0.008	-4.840	0.0383
Ficus	*Ficus* sp.	Moraceae	2	0.008	-4.840	-0.0383
Hagonoy	*Chromolaena odorata* (L.) R.M. King	Asteraceae	16	0.063	-2.761	-0.1746
Isis	*Ficus ulmifolia* Lam.	Moraceae	10	0.04	-3.231	-0.1277
Kahoy-dalaga/ Agboi	*Mussaenda philipicca* L.C. Rich.	Rubiaceae	21	0.083	-2.489	-0.2066
Kalot-kalutan/dalupang	*Urena lobata* L.	Malvaceae	4	0.016	-4.147	-0.0656

Appendix C continuation

Common /Local name	*Scientific Name*	Family Name	Ni	pi	ln Pi	H'
Kulot-kulotan	*Triumfetta rhomboidea* Jacq.	Malvaceae	4	0.016	-4.147	-0.0656
Malatungaw	*Melastoma malabathricum*	Melastomataceae	14	0.055	-2.894	-0.1602
Matang hipon	*Breynia rhamnoides* (Retz.) Muell.-	Euphorbiaceae	3	0.012	-4.435	-0.0526
Memecylon puti	*Tremycelonsp.*	Melastomataceae	10	0.04	-3.231	-0.1277
Niog-niogan	*Ficus pseudopalma* Blco.	Moraceae	58	0.229	-1.473	-0.3377
Shiral	*Microcos paniculata*	Tiliaceae	12	0.047	-3.048	-0.1446
			253			H=2.29 Low

Appendix D

Shannon-Wiener Diversity Index of Herbs in Camp Higher Ground, Barotac Viejo, Province of Iloilo, Philippines.

Common / Local name	Scientific Name	Family	Ni	pi	ln Pi	H'
East Indian arrowroot	*Tacca leontopetaloides* (L.)O. Kunt	Taccaceae	1	0.008	-4.7707	-0.04
False elephant's foot	*Pseudoelephantopus spicatus* Rohr	Asteraceae	2	0.017	-4.0775	-0.069
Ground orchid	*Habenaria* sp.	Orchidaceae	15	0.127	-2.0626	-0.262
Heliconia	*Heliconia psittacorum* Linn f.	Heliconiaceae	29	0.246	-1.4034	-0.345
Langkawas	*Zingiber zerumbet* (Linn). Sm	Zingiberaceae	2	0.017	-4.0775	-0.069
Luya-luyahan	*Curcuma sp.*	Zingiberaceae	37	0.314	-1.1598	-0.364
Payong-payungan	*Tacca palmate*	Taccaceae	4	0.034	-3.3844	-0.115
Pineapple	*Ananas camosus* L.	Bromelliaceae	25	0.212	-1.5518	-0.329
Wedelia	*Wedelia trilobata* (L.)A.S. Hitche	Asteraceae	3	0.025	-3.6721	-0.093
			118			H= 1.69 Low

Appendix E

Shannon-Wiener Diversity Index of Ferns in Camp Higher Ground, Barotac Viejo, Province of Iloilo, Philippines.

Local /Common Name	Scientific Name	Family	Ni	pi	lnPi	H"
Fan Maiden hair fern	*Adiantum tenerum* Swartz	Adiantaceae	20	0.192	-1.6487	0.317
Nitong parang	*Lygodium microphyllum* (Cav.) R. Br.	Schizaeaceae	15	0.144	-1.9363	0.279
Nitong puti	*Lygodium circinatum* (Burm.)Sw.	Schizaeasaceae	16	0.154	-1.8718	0.288
Oak leaf fern	*Drynaria quercifolia* (L.) Sm.	Polypodiaceae	10	0.096	-2.3418	0.225
Pteris sp	*Pteris* sp.	Pteridaceae	9	0.087	-2.4472	0.212
Pakong gubat	*Pityrogramma sp.*	Pteridaceae	1	0.01	-4.6444	0.045
Bold-sword fern	*Nephrolepis biseratta* (Sw.) Schott	Polypodiaceae	33	0.317	-1.1479	0.364
			104			H'=1.73 Low

Appendix F

Shannon-Wiener Diversity Index of Palms in Camp Higher Ground, Barotac Viejo, Province of Iloilo, Philippines.

Local / Common Name	Scientific Name	Family	Ni	pi	ln Pi	H'
Coconut	*Cocos nucifera* L.	Arecaceae	6	0.2	-1.60	0.322
Mala-NIPA	*Nypa* sp.	Arecaceae	1	0.033	-3.40	0.113
Palmera Palm	*Chrysalidocarpus lutescecens* H. Wendell	Arecaceae	4	0.133	-2.01	0.269
Takipan/ Fish Tail palm	*Caryota rumphiana* Mart	Arecaceae	19	0.633	-0.4568	0.289
			30			H'=0.99 Very Low