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DIVERSITY AND DISTRIBUTION OF NITO PLANTS (LYGODIUM SP.) AT THE ATI ANCESTRAL DOMAIN AT BAROTAC VIEJO, ILOILO

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Abstract

This study focused on determining the diversity and distribution of Lygodium sp. on the 900-hectare verdant forest land of Nagpana, Barotac Viejo, Iloilo. The researcher utilized the transect and quadrat sampling and tally technique for the determination of the diversity index, richness, evenness and distribution of Lygodium sp. The sampling was carried out in eight (8) different study areas with equivalent coordinates. Within each site, a 3000-meter transect was laid in the approaches of the central part of the total sampling area. Each site is divided into down, middle and uphill elevations. At every elevation, a ten by ten (10x10) meter quadrat was laid along the transect; at downhill, (0 m.); middle hill, (1500 m.); and uphill (3000 m.). All individual Lygodium species on each quadrat was counted and identified. Taxa of Nito plants were identified through researcher references. Three (3) species were recorded (L. japonicum, L. circinnatum and L. flexuosum) and 57,932 individuals were sampled in eight (8) study areas. In addition, these three species are common in all study areas. The diversity index and evenness did not vary from downhill, middle hill and uphill. This indicates that all species were evenly distributed in all study areas. Nito species should be further studied since it provides livelihood to the people in the Aeta community, specifically in terms of sustainability.

Keywords: Lygodium sp., diversity index, richness, evenness and distribution, and Aeta Community

1. INTRODUCTION

The Nito vine (Lygodium) is a richly colored tropical vine belonging to fern family. It grows as a secondary forest cover clinging to trees and rocks. It grows abundantly and is a common vine that can be found in Sitio Nagpana, Lipata, Barotac Viejo, Iloilo.

The Aeta community of Sitio Nagpana lies in Barangay Lipata, 12 kilometers from the Poblacion of Barotac Viejo. Indigenous crafts made from processed Nito are popular among indigenes. The Nagpana Nito Weavers Group that was established in 2005 uses Nito to produce beautiful baskets, hats, bags, coin purses, place mats, coasters, bracelet and even rings. Nito processing has been traditionally a source of income of the community. Tabletops and furniture accessories made from Nito as main materials are even exported. Nito-weaving in particular is the Aeta community's primary means of increasing income (Mann, 2012), since Nito vine is extremely important to the production of their indigenous crafts. The researchers conducted this study to help the Aeta community determine whether there is an enough amount and distribution of the Nito vines and its varieties present across 938 hectares forestland that could sustain the community.

2. OBJECTIVES

The purpose of this study was to determine the diversity and distribution of Nito plants (Lygodium sp.) at the Ati ancestral domain at Barotac Viejo, Iloilo. Specifically, it aimed to achieve the following:

1. to determine the diversity indices of Lygodium sp. at Nagpana, Barotac Viejo, Iloilo;
2. to determine the richness and evenness of Lygodium sp. at Nagpana, Barotac Viejo, Iloilo; and
3. to determine the distribution of Lygodium sp. at Nagpana, Barotac Viejo, Iloilo.

3. METHODOLOGY

This study utilized quantitative research design to determine the diversity index, richness, evenness and distribution of Lygodium sp. in the ancestral domain of Nagpana, Barotac Viejo, Iloilo.

The study was conducted on eight different study areas of 900-hectare forestland of Nagpana, Barotac Viejo, Iloilo.

The researchers utilized transect and quadrat sampling and tally technique for this study.

Researchers asked permission to conduct a fieldwork at Nagpana, Barotac Viejo, Iloilo by sending a communication letter. Upon approval, researchers asked for assistance of two (2) knowledgeable local guides in the said community.

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The sampling was carried out in eight (8) different study areas with equivalent coordinates. Within each site, a three thousand (3000) meters transect was laid in the approaches of the central part of the total sampling area. Each site was divided into down, middle and uphill elevations. At every elevation, a ten by ten (10x10) meter quadrat was laid along the transect; at downhill, (0 m.); middle hill, (1500 m.); and uphill (3000 m.). All individual Lygodium species on each quadrat was counted and identified. Taxa of Nito plants were identified through researches own references. Sampling lasted for almost a week.

Diversity can be explored at several different scales from number of species per unit area to genetic diversity. For this study, we focused on species diversity.

Species diversity is described by two components: richness and evenness. Richness is the number of species present in an area or in a community, whereas evenness (E) specifies the abundance of each species in a community. Evenness provides information on whether a community is dominated by one or more species or whether the species within the community are represented by approximately equal numbers (Booth et al. 2010).

In this study, we calculated the species diversity indices using Shannon-Weiner Diversity Index (H') formula. Thus, $H' = (-p_i)(\ln p_i)$, where $p_i = n_i/N$, n_i = number of the ith species, and N = total number of individuals of all species in the community.

The values of H' were calculated by summing all the -pi (ln pi) values for each elevation.

Then using the calculated values of H', Evenness was calculated using Evenness (E) formula. Thus, $E = H'/\ln S$, where S = species richness (i.e., total number of species present).

Richness was visually estimated from a small set of data; for evenness, values of zero indicate that the community is extremely uneven (dominated by one specie), whereas a value of one indicates that the community is absolutely even (maximum diversity exists, no one specie dominates).

Frequency is the simplest and most popular method of measuring abundance. Whereas frequency (F) is the proportion of sampling units (e.g., quadrat; field) that contains the species. Thus $Fi = \Sigma Zi/n$ is the formula utilized. Fi = frequency value for species i; ΣZi = number of sampling units with species i present; and n = total number of sampling units surveyed.

Distribution of Lygodium specie in each study area was computed by dividing the number of individual Lygodium species counted in each quadrat by the total number of Lygodium sampled in study area.

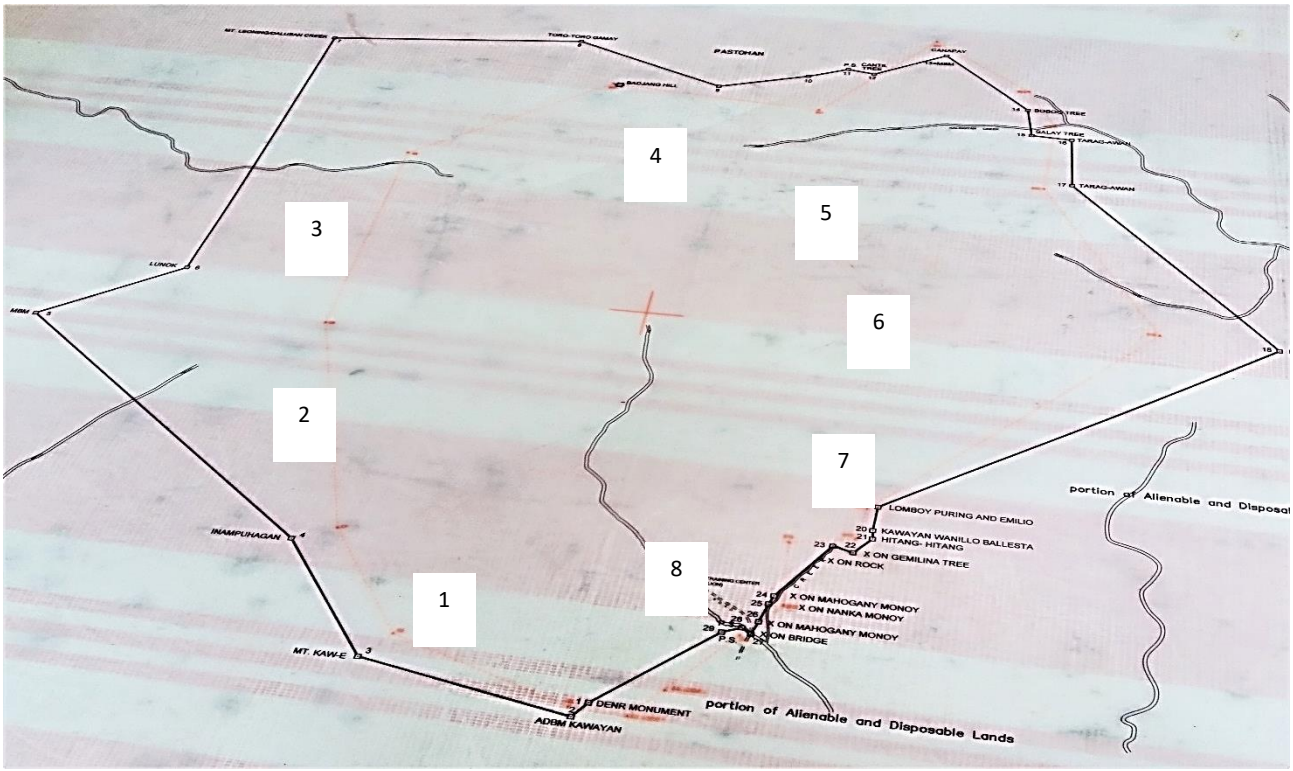

Figure 1 Study Site

Source: Original Plan of Ancestral Domain as surveyed for ATI ICC

4. RESULT AND DISCUSSIONS

Species Abundance

Three (3) species were recorded (L. japonicum, L. circinnatum and L. flexuosum) and 57932 individuals were sampled in eight (8) study areas. In addition, these three species are common in all study areas.

In Study Area 1, 5168 individual species were sampled. In downhill, 840 were L. japonicum; 431, L. circinnatum; and 200, L. flexuosum. In middle hill, 800, L. japonicum;

602, L. circinnatum; and 403, L. flexuosum. In Uphill, 790 were L. japonicum; 700, L. circinnatum; and 401, L. flexuosum.

In Study Area 2, 6025 individual species were sampled. In downhill, 500 were L. japonicum; 352, L. circinnatum; and 301, L. flexuosum. In middle hill, 1000 were L. japonicum; 605, L. flexuosum; and 501, L. circinnatum. In Uphill, 1091 were L. japonicum; 891, L. flexuosum; and 782, L. circinnatum.

In Study Area 3, 9513 individual species were sampled. In downhill, 890 were L. japonicum; 750, L. circinnatum; and 552, L. flexuosum. In middle hill, 1378 were L. japonicum; 1090, L. flexuosum; and 840, L. circinnatum. In Uphill, 1992 were L. japonicum; 1088, L. flexuosum; and 930, L. circinnatum.

In Study Area 4, 8769 individual species were sampled. In downhill, 1100 were L. japonicum; 805, L. circinnatum; and 802, L. flexuosum. In middle hill, 1255 were L. japonicum; 838, L. flexuosum; and 837, L. circinnatum. In Uphill, 1372 were L. japonicum; 901, L. flexuosum; and 855, L. circinnatum.

In Study Area 5, 6560 individual species were sampled. In downhill, 840 were L. japonicum; 780, L. circinnatum; and 540, L. flexuosum. In middle hill, 848 were L. japonicum; 790, L. circinnatum; and 542, L. flexuosum. In Uphill, 855 were L. japonicum; 810, L. circinnatum; and 550, L. flexuosum.

In Study Area 6, 8832 individual species were sampled. In downhill, 990 were L. japonicum; 890, L. flexuosum; and 800, L. circinnatum. In middle hill, 1110 were L. japonicum; 1010, L. circinnatum; and 986, L. flexuosum. In Uphill, 1040 were L. circinnatum; 1000, L. circinnatum; and 1000, L. flexuosum.

In Study Area 7, 9117 individual species were sampled. In downhill, 955 were L. circinnatum; 805, L. flexuosum; and 740, L. japonicum. In middle hill, 1080 were L. circinnatum; 970, L. japonicum; and 840, L. flexuosum. In Uphill, 1590 were L. japonicum; 1135, L. flexuosum; and 995, L. circinnatum.

In Study Area 8, 3948 individual species were sampled. In downhill, 400 were L. japonicum; 390, L. circinnatum; and 120, L. flexuosum. In middle hill, 650 were L. japonicum; 470, L. flexuosum; and 401, L. circinnatum. In Uphill, 600 were L. circinnatum; 509, L. japonicum; and 400, L. flexuosum.Table 1 shows the data.

Table 1 Lygodium Species Richness and Abundance in Different Study Area

Study Area	Downhill			Middle hill			Uphill			Total
	j	c	f	j	c	f	j	c	f	
1	840	431	200	800	602	403	790	700	401	5168
2	500	352	301	1000	501	605	1091	782	891	6025
3	890	750	552	1378	840	1090	1992	930	1088	9513
4	1100	805	802	1255	837	838	1372	855	901	8769
5	840	780	540	848	790	542	855	810	550	6560
6	990	800	890	1110	1010	986	1000	1040	1000	8832
7	740	955	805	970	1080	840	1590	995	1135	9117
8	400	390	120	650	401	470	509	600	400	3948
Total										57932

Note: j = japonicum
c = circinnatum
f = flexuosum

Species Diversity

In study area 1, there were a diversity index of 0.951 and evenness of 0.865 in downhill. In middle hill, a diversity index of 1.062 and evenness of 0.966. In uphill, a diversity index of 1.061 and evenness of 0.965.

In study area 2, there were a diversity index of 1.074 and evenness of 0.977 in downhill. In middle hill, a diversity index of 1.053 and evenness of 0.958. In uphill, a diversity index of 1.089 and evenness of 0.991.

In study area 3, there were a diversity index of 1.078 and evenness of 0.980 in downhill. In middle hill, a diversity index of 1.076 and evenness of 0.980. In uphill, a diversity index of 1.039 and evenness of 0.946.

In study area 4, there were a diversity index of 0.8 and evenness of 0.728 in downhill. In middle hill, a diversity index of 1.079 and evenness of 0.981. In uphill, a diversity index of 1.073 and evenness of 0.976.

In study area 5, there were a diversity index of 1.082 and evenness of 0.986 in downhill. In middle hill, a diversity index of 1.081 and evenness of 0.983. In uphill, a diversity index of 1.079 and evenness of 0.982.

In study area 6, there were a diversity index of 1.095 and evenness of 0.992 in downhill. In middle hill, a diversity index of 1.097 and evenness of 0.998. In uphill, a diversity index of 1.099 and evenness of 1.0.

In study area 7, there were a diversity index of 1.093 and evenness of 0.995 in downhill. In middle hill, a diversity index of 1.091 and evenness of 0.993. In uphill, a diversity index of 1.076 and evenness of 0.979.

In study area 8, there were a diversity index of 0.991 and evenness of 0.902 in downhill. In middle hill, a diversity index of 1.078 and evenness of 0.981. In uphill, a diversity index of 1.086 and evenness of 0.988. Table 2 shows the data.

Table 2 Diversity Indices and Evenness in Different Elevations at each Study Area

Study Area	Downhill		Middle hill		Uphill	
	H'	*E*	*H'*	*E*	*H'*	*E*
1	0.951	0.865	1.062	0.966	1.061	0.965
2	1.074	0.977	1.053	0.958	1.089	0.991
3	1.078	0.980	1.076	0.980	1.039	0.946
4	0.8	0.728	1.079	0.981	1.073	0.976
5	1.082	0.986	1.081	0.983	1.079	0.982
6	1.095	0.992	1.097	0.998	1.099	1.0
7	1.093	0.995	1.091	0.993	1.076	0.979
8	0.991	0.902	1.078	0.981	1.086	0.988

Note: H' = Diversity Index,
E = Evenness

Distribution

In study area 1, there was a percent distribution of 28% in downhill, 35% in middle hill and 37% in uphill.

In study area 2, there was a percent distribution of 19% in downhill, 35% in middle hill and 46% in uphill.

In study area 3, there was a percent distribution of 23% in downhill, 35% in middle hill and 42% in uphill.

In study area 4, there was a percent distribution of 31% in downhill, 33% in middle hill and 36% in uphill.

In study area 5, there was a percent distribution of 33% in downhill, 33% in middle hill and 34% in uphill.

In study area 6, there was a percent distribution of 30% in downhill, 35% in middle hill and 34% in uphill.

In study area 7, there was a percent distribution of 27% in downhill, 32% in middle hill and 41% in uphill.

In study area 8, there was a percent distribution of 23% in downhill, 39% in middle hill and 38% in uphill. Table 3 shows the data.

Table 3 Distribution of Nito plant at each Study Area

Study Area	Downhill	Middle hill	Uphill
	%	%	%
1	28	35	37
2	19	35	46
3	23	35	42
4	31	33	36
5	33	33	34
6	30	35	34
7	27	32	41
8	23	39	38

Note: The total number of Nito plants at each study area was the base used in computing all percent.

5. CONCLUSIONS

Based on the findings the following conclusions were drawn:

1. Three species of *Lygodium* (*L. japonicum*, *L. circinnatum* and *L. flexuosum*) were found in all Study Areas at Nagpana Ancestral Domain.
2. Species richness is equal on all Study Areas at Nagpana Ancestral Domain
3. Diversity exists, no one species in each Study Area dominates.
4. *Lygodium* species are evenly distributed in all elevations of each study area.

6. RECOMMENDATIONS

In light of this research findings and conclusions advanced, the following recommendations are offered:

1. For the Nagpana Community. To preserve the diversity and abundance of Lygodium species, the community needs to be educated on sustainable farming techniques and sustainable forest management.
2. More research should be geared towards the factors that may affect the diversity and abundance Lygodium species in this area as this will help in the management of these vegetation.

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