



## RESEARCH PAPER

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## Checklist of invasive and food related plants in Katipunan, Arakan, North Cotabato

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### Abstract

Invasive plants were mostly considered as non-native species that had a high competing ability against the native plant species in the country and they become one problem in our ecosystem, especially in our protected areas. This study aimed to survey the invasive plants and forest forage plants found in Katipunan, Arakan. A simple transect methods were employed started from the low elevation to higher elevation. Six families were identified namely: Araceae, Asteraceae, Fabaceae, Piperaceae, Poaceae and Verbenaceae which some members were considered invasive. Also five families from the Tracheophyta and one family in Pteridophyta that were food related forest plants or forest forage plants, namely: Araceae, Arcaceae, Pandanaceae, Rosaceae, Zingiberaceae and one belonging from Pteridophyta the Marattiaceae. Most invasive plants were characterized as high adaptive to new environments and high reproductive ability. Aside from that having specialized stems like in *Colocasia esculenta*, allows them to propagate so fast asexually in different habitat types. Urbanization and high anthropogenic activities were high contributing factor for the increasing population of invasive species. But looking in to its potential usage of these plants may be a potential solution as to control their population.

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## Introduction

The Philippines is one of the megadiverse country and global biodiversity hotspot in both flora and fauna. In the country, there were 9,555 taxa of native plants, 618 taxa of introduced and 10,173 taxa of cultivated plants (Pelsner *et al.*, 2011). Introduced or non-native plants were usually referred to weeds or exotics that could either be introduced purposely or accidentally into the habitat within the past 400 years. Notes on introduced plants included in Merrill's Flora of Manila published in 1912 revealed that 50% of the 1,007 species listed had been introduced by man, of which half are spontaneous non-indigenous plants, while the other half were cultivated. Alarmingly, 334 species, about a third of the plants in the Flora of Manila, have been brought into the country fairly recently, wherein, 242 were deliberately introduced and 92 were introduced accidentally. According to National Invasive Species Information Center (NISIC), stated these plants have high adaptability to new habitats would grow aggressively and with high reproductive capacity (Richardson, 1998; IFAS, 2017). According to Pimentel *et al.* (2005), invading alien species could cause great damage and moreover 42% species threatened or endangered. McKinney (2002) stated that urbanization is another factor that influences the increasing population of

invasive species and decreases the number of native plants. In addition, Jose *et al.* (2009) and Florencia and Coladilla (2006) reported that forests are one of the ecosystems most seriously affected by biological invasions. Many people who introduce Invasive Alien Species (IAS) into new habitats are unaware of their adverse effects, such as their significant impact on development, their effect on sustainable livelihood, food security and provision of essential ecosystem services and dynamics (Kunwar, 2003). This affects the distribution of forest forage plants which are an important source of food for forest animals and indigenous people. This study aimed to provide a checklist of invasive plant species and food related native species found in Katipunan, Arakan Valley, North Cotabato.

## Materials and methods

### Site

Katipunan is one of the areas within the Arakan Valley of North Cotabato near the boundary of Marilog District and estimated 2.7 km away from Davao City. It is located 7°25' N and 125°14' E with an estimated elevation of 3525 ft or 1,074.2 m. The area is composed of mostly agroecosystem, adventure parks and some lower montane forest fragments (Fig. 1).



**Fig. 1.** Katipunan area showing the some forest fragments in yellow circle (Google Earth, 2016).

*Sampling*

Before sampling, I asked the permission to enter the area because the land was privately owned. Simple

transect walk was conducted starting from Point 1 to Point 3 (Fig. 2). Plant samples were collected and photodocumented.



**Fig. 2.** Showing the sampling points within the transect (Google Earth, 2016).

*Collection, processing, and identification of specimens*

Plant samples collected must have all the parts (stem, roots, leaves, flower and fruit) if possible and pressing the plant intact. All specimens were processed using the wet method (Hodge, 1947). Herbarium specimens were deposited at the Central Mindanao University Herbarium (CMUH). Species identifications were based on the specimens deposited at CMUH and were performed by consulting the following monographs,

floras, and other publications: Copeland (1958- 1961); Zamora and Co (1986) and digitized plant specimens available in Global Plants on JSTOR.

**Results and discussion**

There were 6 known families of plants that were categorized as invasive and non-native to our country these were; Araceae, Asteraceae, Piperaceae, Poaceae and Verbenaceae as shown in Table 1.

**Table 1.** Checklist of invasive and non-native plants found in the area and its potential use.

| Family      | Scientific name      | Common name                  | Origin  |
|-------------|----------------------|------------------------------|---|
| Araceae     | <i>C. esculenta</i>  | Taro; Gabi                   | Myanmar; Bangladesh                             |
| Asteraceae  | <i>C. odorata</i>    | Hagonoy; Siam weed           | North America                                   |
|             | <i>E. scaber</i>     | Dila-dila                    | India and Mexico                                |
|             | <i>T. procumbens</i> | Burikat; Coat Buttons        | Central America                                 |
| Fabaceae    | <i>M. pigra</i>      | Makahiya;<br>Sensitive Plant | Present in all temperate and tropical countries |
| Piperaceae  | <i>P. aduncum</i>    | Buyo-buyo                    | West Indies                                     |
| Poaceae     | <i>P. vulgaris</i>   | Common Reed; Tambo           | Present in all countries                        |
| Verbenaceae | <i>L. camara</i>     | Baho-baho                    | West Indies                                     |

Among the top 6 invasive species recorded in the Philippines, *Chromolaena odorata*, and *Lantana camara* which were identified by Joshi (2006) and *Mimosa pigra* ranked as the tenth worst weed in the world (Cronk and Fuller, 2014). *Colocasia esculenta* is a fast growing plant that has been intentionally introduced in many tropical and subtropical regions to be used as a food crop and animal fodder, and had subsequently escaped from cultivated areas into natural areas where it becomes invasive (CABI, 2017). *C. odorata* is invasive due to its effective short and long distance dispersal, no known enemies or biological control; it attracts other insects that could

pest other plants and high reproductively. But exploring the potentials of *C. odorata*, some studies stated that it was used in most traditional medicines for wound healing, anti-malarial and anti-inflammatory effects of the leaf extracts (Nurul *et al.*, 2004).

In Malaysia, they used the leaves into livestock feed to improve the yolk color of the chicken eggs (Fasuyi *et al.*, 2005). Another explored potential of *E. scaber* in the field of medicine which could inhibit hepatocyte apoptosis or liver cell death in liver regeneration (Tsai *et al.*, 2013).

**Table 2.** The food related plants found in the area.

| Family        | Scientific name                | Common name    | Plant use   |
|---------------|--------------------------------|----------------|---|
| Araceae       | <i>C. esculenta</i>            | Taro; Gabi     | The corm is edible when cooked.   |
| Arecaceae     | <i>Calamussp.</i>              | Rattan         | It is a good source of raw material for furniture, at the same time it contains a starchy component found in a young stem. It is also provides potable water by trimming the ends of the long stem (Melanie, 2017). |
|               | <i>Caryota sp.</i>             | Palm           | The flower shoots for its juice which could be taken raw or boiled to create sweet syrup.   |
| Marattiaceae  | <i>Angiopteris palmiformis</i> | Giant Fern     | Young frond could be cooked.  |
| Pandanaceae   | <i>Pandanussp.</i>             | Pandan         | The fleshy ripe fruit of the <i>Pandanus</i> could be eaten by boiling until tender.  |
| Rosaceae      | <i>Rubusrosifolius</i>         | Wild Raspberry | Ripe fruit is edible.   |
| Zingiberaceae | <i>Hornstedtia conoidea</i>    | Tagbak         | The fruit is edible   |

Aside from the invasive plant species, there were six families of vascular plants which could be a forage plants or source of food (Table 2). Forage plants are naturally present in the wild and usually source of food indigenous people and wild fauna.

This is one of the ecological services provided by our forest ecosystem (Turner and Turner, 2004). In the table below it also shows the provisions of each plant species.

**Conclusion**

High anthropogenic activities had greatly influenced the spread of invasive plant species. Most of the invasive plants commonly are aggressive, competitive, fast growing, high adaptability to new environments and high reproductive ability.

This leads them to become noxious and troublesome in our ecosystem. Several strategies of minimizing or controlling their population through manual eradication, introduction of organic chemicals, looking for their possible biological controllers that may cause another secondary problem.

It would be possible that to explore their biochemical properties whose active agents may be useful not only in the field of medicine but also in other field like agriculture, ecology and horticulture. Other invasive species act as pioneering species in succession like the *P. andactum*, that slowly dies out when the ecosystem reached to secondary succession or become complex. Some animals like the herbivore birds were able to adapt the presence of these invasive plant species as one of their food items. I would like to recommend that more exploration of the use of the plants.



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### References

**Center for Agriculture and Bioscience International (CABI).** 2017. Invasive Species Compendium. [www.cabi.org](http://www.cabi.org)

**Chauhan BS, Johnson DE.** 2008. Germination ecology of two troublesome Asteraceae species of rainfed rice: Siam weeds (*Chromolaena odorata*) and coat buttons (*Tridax procumbens*). *Weed Science*, **56(4)**, 567-573.

**Copeland EB.** 1961. Fern Flora of the Philippines. Manila: Manila Bureau of Printing, **3**, 555 p.

**Cronk QC, Fuller JL.** 2014. *Plant invaders: the threat to natural ecosystems*. Routledge.

**Fasuyi AO, Fajemilehin SOK, Omojola AB.** 2005. The egg quality characteristics of layers fed varying dietary inclusions of Siam weed (*Chromolaena odorata*) leaf meal (SWLM). *International Journal of Poultry Science*, **4(10)**:752-757.

**Hodge WH.** 1947. The use of alcohol in plant collecting. *Rhodora* **49**: 207-210.

**Holtum.** 1959a. Gleicheniaceae. *Flora Malesiana*, Series **2(1)**, 1-36.

### Institute of Food and Agricultural Science

**(IFAS).** 2017. Non-native Invasive Plant—An Introduction University of Florida. [Plants.ifas.ufl.edu/manage/why-manage-plants/non-native-invasive-plants-an-introduction](http://Plants.ifas.ufl.edu/manage/why-manage-plants/non-native-invasive-plants-an-introduction)

**Joshi RC.** 2006. Invasive alien species (IAS): concerns and status in the Philippines. In Proceedings of the International Workshop on the Development of Database (APASD) for Biological Invasion. FFTC, Taichung, Taiwan, China (1-23 P).

**Kunwar K.** 2003. Taxonomy and diversity of liana and vines in forest fragments of southern Togo. *Revue De Ecologie Terre Vie.* **57**, 3-18.

**Lansdown RV.** 2015. *Phragmites australis*. The IUCN Red List of Threatened Species 2015:e.T164494A79857020. <http://dx.doi.org/10.2305/IUCN.UK.2015.RLTS.T164494A79857020.en>

**Melanie.** 2017. Top Ten Forage Plants.

**McKinney ML.** 2002. Urbanization, biodiversity, and conservation: the impacts of urbanization on native species are poorly studied, but educating a highly urbanized human population about these impacts can greatly improve species conservation in all ecosystems. *Bioscience*, **52(10)**, 883-890.

**Nurul Huda AK, Mamat AS, Effendy AWM, Hussin ZM, Hasan SMZ.** 2004. The antimicrobial effect of *Chromolaena odorata* extract on Gram-positive bacteria. In: Animal health: a breakpoint in economic development? The 11th International Conference of the Association of Institutions for Tropical Veterinary Medicine and 16th Veterinary Association Malaysia Congress, 23-27 August 2004, Petaling Jaya, Malaysia, 342-343.

**Pelser PB, Barcelona JF, Nickrent DL.** 2017. Co's Digital Flora of the Philippines. [www.philippineplants.org](http://www.philippineplants.org)

**Pimentel D, Zuniga R, Morrison D.** 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological economics*, **52(3)**, 273-288.

**Richardson D, Pysek P, Rejmanek M, Barbour M, Panetta FD, West C.** 1998. Naturalization and invasion of alien plants: concepts and definitions. Rondebosch (South Africa):Institute for Plant Conservation, Botany Department, University of Cape Town.

**Tsai CC, Wu JP, Lin YM, Yeh YL, Ho TJ, Kuo CH, Huang CY.** 2013. The effect of *Elephantopus scaber* L. on liver regeneration after partial hepatectomy. Evidence-Based Complementary and Alternative Medicine.

**Turner NJ, Turner SE.** 2004. Food, forage and medicinal resources of forests. Encyclopedia of Life Support Systems, 1-41.

**Westbrooks RG, Elpee RE.** 1988. Federal noxious weeds in Florida. In Proceedings of the 42nd Annual Meeting of the Southern Weed Science Society. 316-321.

**Zamora PM, Co LL.** 1986. Guide to Philippine Flora and Fauna. Economic Ferns, Endemic Ferns, Gymnosperms. Quezon City, Philippines: Ministry of Natural Resources and University of the Philippines Natural Resource Center. 382 p.

**Zimdahl RL.** 1983. Where are the principal exotic weed pests. Exotic Plant Pests and North American Agriculture, 183-217.