The Study of community knowledge on biodiversity in Mount Ungaran

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The Study of community knowledge on biodiversity in Mount Ungaran

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Abstract. Mount Ungaran has abundant of biodiversity potential on the remaining natural forest including flora and fauna. The objective of this research was to know the community knowledge on biodiversity in Mount Ungaran for support biodiversity conservation. The study was conducted on May-August 2019 in two villages, Ngesrepbalong and Banyuwindu, Preliminary data collection included 6 (six) components and 61 person had been interview as a informants.The results were analyzed quantitatively and qualitative description. The results of preliminary research from interviews and Googleforms showed that taxa were the best known to successive respondents sequently : flora (100%), butterfly (98,41%), bird (96.83%), mammal (93,65), dragonfly (90.48%), frog/toads (82.53%), and reptile (73.02%). These results indicate that the flora group is easily recognized by the respondents, while the reptiles are a less well-known group. Many flora groups are well-known because the flora is widely used by people such as the species of pine, orchid, and fern. Nevertheless, more than 70% of respondents apparently did not know that of the several species (47 species) were protected species. Respondents only know 6 (six) protected species and especially from fauna groups, including javanese hawk eagles, whreated hornbill, langurs, porcupines, anteaters, and python.

1. Introduction

Mount Ungaran, Central Java, has been designated as an important area for birds (Important Birds Area or IBA) in Indonesia, especially in Central Java by Bird Life International [1] and also as the Alliance for Zero Extinction (AZE). Previous research conducted by Rahayuningsih et al [2-3] stated that some areas on Mount Ungaran experience various threats that can disrupt the existence of several species, such as habitat fragmentation, illegal logging, land conversion from forest functions to oil palm, tea, quinine, cloves and coffee. And also they have probleme for hunting and trading of flora and fauna around Mount Ungaran. and conversion also results in the fragmentation of habitats that were previously united as a unified habitat into separate and isolated habitat fragments. This condition will result in the interruption of gene flow between populations that live in these fragmented habitats [4]. The existence of flora and fauna of Mount Ungaran must be protected, preservation, and suistanable use from extinction.

The flora and fauna of Mount Ungaran includes biodiversity that directly and indirectly provides food, clothing, genetic resources, energy, water and life support systems for the sustainability of the lives of current and future generations. Besides that, it also provides the benefits of education and the development of science and technology. Conservation of biodiversity in Mount Ungaran, especially forest areas, is not only the responsibility of the government, but the role and involvement of universities and the community is also very important. Considering that it is irreplaceable and has a

very important position and role for human life, conservation efforts of Mount Ungaran species are an obligation for all of institution concerned and also the community.Considering that it is irreplaceable and has a important position and role for human life, the effort to conserve the species of Mount Ungaran is absolutely necessary and is the duty of all parties. Management of the area requires information about the potential and problems in the area. The problem is that the information needed is often limited or even not available. To fulfill this need, a research / survey program was conducted. The limitations of experts and field staff as well as the availability of funds and other supporting facilities often become obstacles for implementation. Even more so if the research program is on a large area and a long-term monitoring program. The same problem faced is how to collect data effectively.

The decline in the quality of biodiversity in Indonesia has become a phenomenon which should receive top priority. How much loss of heart is difficult to know with certainty. One reason is that it requires long-term research and monitoring. While the research conducted is still constrained by cost, time, and the small number of researchers. Overcoming this biological problem, researchers in developed countries have utilized trained volunteers (citizen scientists) by utilizing Web-based internet technology to collaborate to conduct research [5]. This condition also occurs in Mount Ungaran, Central Java, which still has biodiversity in areas with forests the remaining natural. The threats that occur in Gunuung Ungaran, area, limited time, cost, and human resources are the main problems in biodiversity conservation efforts at Mount Ungaran. Citizen Science is perhaps the most important new trend in the scientific world, this allows people to collaborate on scientific studies regardless of their background [6]. Therefore the citizen science model was subsequently adopted to be developed at Mount Ungaran in Central Java as an effort to support the Mount Ungaran biodiversity database and information that can be used by the public and policy makers.

2. Methods

2.1 Theoretical approach

The study was conducted for 5 (five) months starting in April-Augst 2019. Data collection was carried out using literature studies and assessed objectively, systematically and quantitatively to obtain appropriate conclusions [7-8].The topics studied are related to citizen science, conservation, biodiversity, technology, and other topics related to papers.

This study uses a quantitative approach. Quantitative approach is a research approach that primarily uses paradigm mapping to develop science and uses research strategies such as survey activities that require statistical data. This research uses descriptive analysis method by distributing surveys to explore information from respondents, with the following research procedures 1) preparation and study of literature, 2) developing research instruments, 3) dissemination and questionnaire collection, 4) conducting analysis studies.

2.2 Location

The research location is at Mount Ungaran S 70 12 'E 110020' by taking several research station points, including Ngesrepbalong, Banyuwindu, Kalisidi, Sumber rahayu, Gogik, and Gondang villages. Materials needed in this study include, 1: 25,000 scale topographic maps, stationery and field notes, field manuals, and research instruments, research tools used include Kompas Sunto (directional pointer), Garmin-12 GPS, cameras, recorder, LCD, camcorder., research tools used include Kompas Sunto (directional pointer), Garmin-12 GPS, cameras, recorder, LCD, camcorder.

2.3 Analysis

Data collection methods needed in this research are questionnaire and documentation study. The type of questionnaire used in this study was a closed or structured questionnaire, namely a questionnaire whose alternative answers had been provided using a Likert scale. The answer choices consist of 2 choices, namely: 1 = yes 2 = No, The questionnaire documentation uses Google Form as an assessment tool. Google Form does not require respondents to have a Google account or Google Group. Questionnaire forms that have been responded by respondents will be collected automatically

in the Google Sheet application sheet. Data analysis was performed based on a qualitative description of the results of the data processing of the criteria assessment instrument.

3. Results and Discussions

Biodiversity conservation efforts in Mount Ungaran, Central Java, have been carried out by various competent parties in the region, such as Perhutani (State-Owned Enterprises in the form of a Public Company that has the authority to manage forest resources), the Dinas LHK Central Java (Environmental and Forestry Department Central Java)), BKSDA Central Java (Central Java Nature Resource Conservation Center), as well as from communities around Mount Ungaran. However, these efforts have not yet yielded satisfactory results. Based on previous studies, there are still a variety of threats that can affect and reduce the quality of biodiversity. In addition to the limitations of human resources and funds, the limited data or scientific information on various biodiversity in Mount Ungaran, both protected and unprotected, is not yet available in full and is not understood by the surrounding community. One way to overcome these limitations is through a citizen science approach to scientific research and biodiversity conservation in Indonesia. Equally important is the potential of this approach to be used in increasing the understanding, awareness and participation of community members in biodiversity conservation.

The citizen science approach at Mount Ungaran in 2019 is a preliminary study in further examining the involvement and role of the community around Mount Ungaran. This research was used as the beginning of making a biodiversity database, especially at Mount Ungaran. It starts with conducting direct interviews with the community around Mount Ungaran and through a goole form questionnaire that can be accessed by several related parties. The interview instruments and the goole form were divided by gender, age, occupation, and education with a total of 62 respondents. The instruments include domicile, involvement in environmental organizations/communities /observers, activities that have been carried out, and taxa of animals and plants that they know about. Besides that, the instrument also presented threats on Mount Ungaran, and actions or conservation efforts. In this study the taxa presented was taxa that were generally recognized by the respondents, birds, mammals, frogs/ oads, reptiles, dragonflies, and butterflies. The taxa display presented to the respondents is in the form of a photo and the photo given the name of the taxa, this is to facilitate the respondent to recognize the taxa in a question.

The results of preliminary research from interviews and Googleforms showed that taxa that were the best known to respondents were the flora, butterfly, bird, mammal, dragonfly, frog/toad, and reptile group (Table 1). These results indicate that the flora group is easily recognized by the respondents and utilized, while the reptiles are a less well-known group. Many flora groups are well-known because the flora is widely used by people such as the species of pine and angsana (Figure 1). Nevertheless, more than 70% of respondents apparently did not know that the several species (47 species) were protected species. Respondents did not know 6 (six) of the species was protected from fauna groups, including javanese hawk eagles, whreathed hornbill, langurs, porcupines, anteater and pythons.

Table 1. The percentage of taxon that is generally known by respondents

No	Taxon	Percentage(%)
1	Flora	100
2	Butterly	98.41
3	Bird	96.83
4	Mamalia	93.65
5	Dragon Fly	90.48
6	Frog/Toad	82.53
7	Reptile	73.02

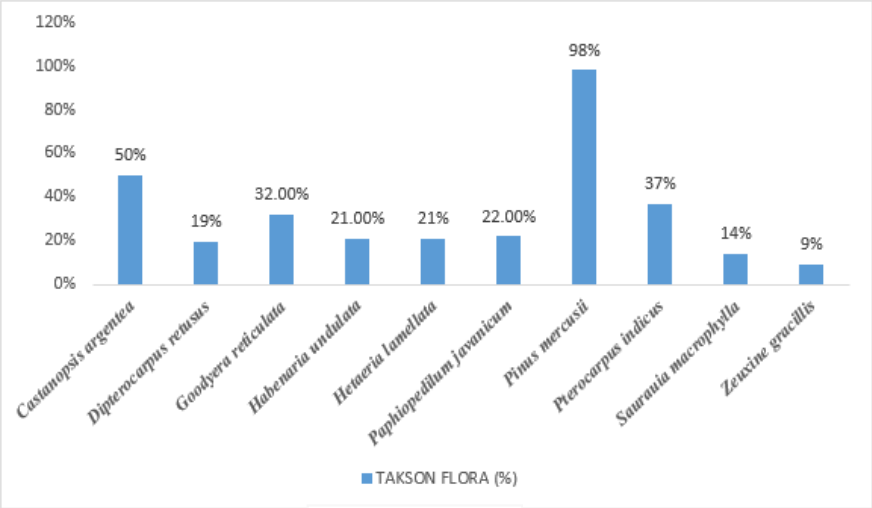

Figure 1. The flora recognized and familiar in Mount Ungaran community

The results of each taxon analysis show for the dragonfly group, the best known type is *Vestalis luctuosa*, while *Drepanosicta spatulifera* (Figure 2).

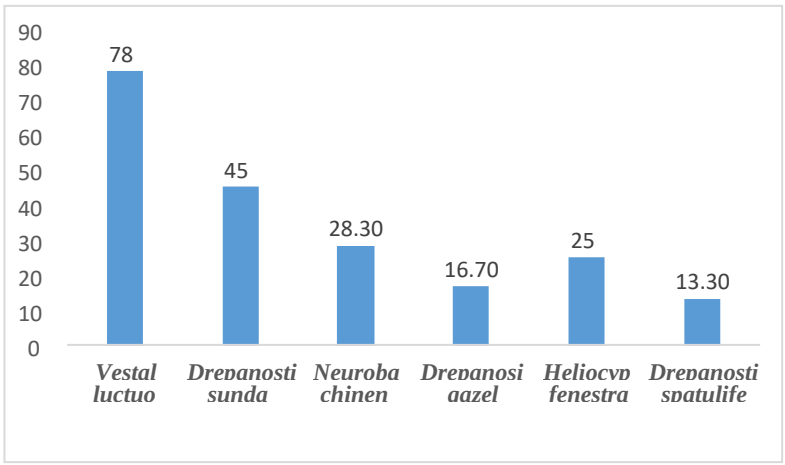

Figure 2. Dragonfly species are known to the community

The best known butterfly group is *Mycalesis sudra* (85.5%), while *Lampides boeticus* is the least known in general (31%) (Figure 3).

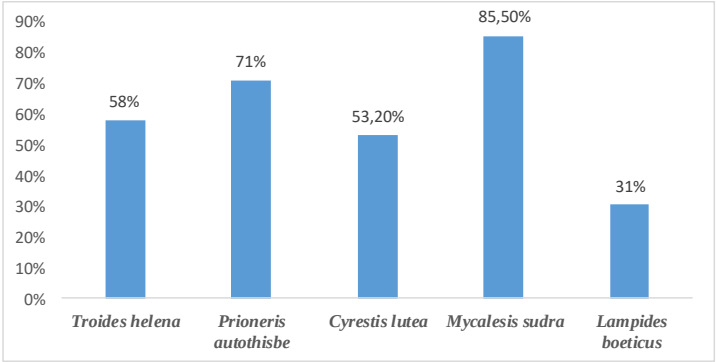

Figure 3. Butterly species are known to the community

From the Amphibia (Figure 4), the best known of community is *Huaia masonii* (55.70%). The status of frog species is vulnerable in the IUCN category, but the community does not know that the status.

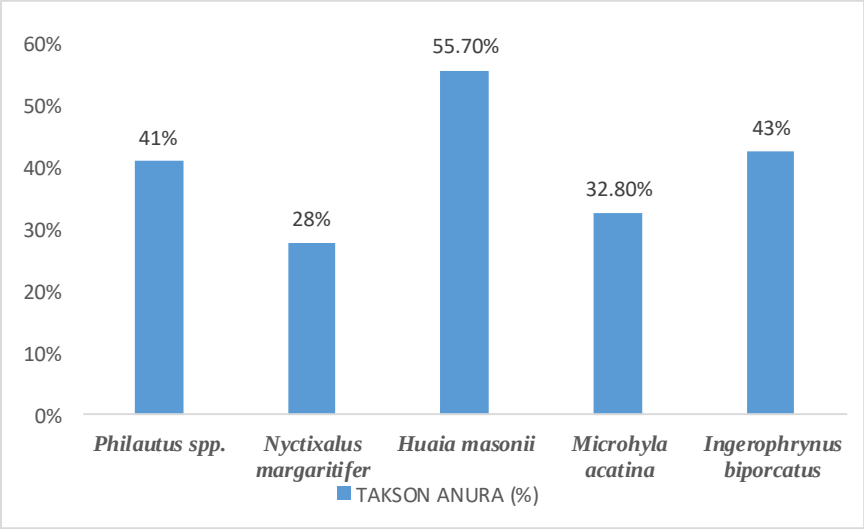

Figure 4. Anura species are known to the community

From Figure 5, *Python reticularis* (reticulated pythons) is a species of reptile that is commonly known by respondents (70.30%). According to them this speccies that is easily recognized among other Reptile groups. Even so, the community did not know that this species was protected.

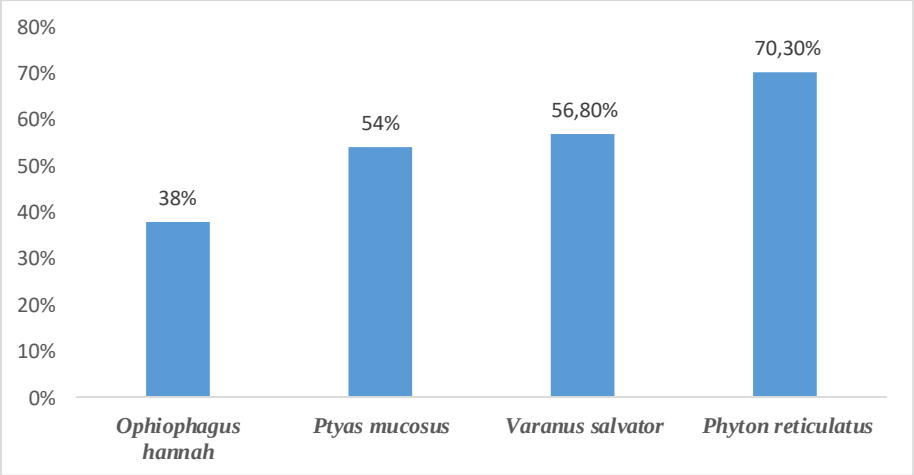

Figure 5. Reptile species are known the community

On the Bird groups, the best known species are the whreathed Hornbill, Owl, Java sparrow and Javanese Hawk Eagle. According to respondents who have done activities in Mount Ungaran and its surroundings, they found some of these species still in the nature. Respondents stated that their presence indicates that the environment in Gunung ungaran still looks good and supports the existence of these birds (Figure 6). Indirectly this research is part of citizen science, because in this activity is a collaboration between researchers and the community in data collection, learning science, understanding interaction on new knowledge, and awareness of the importance of conservation efforts [9]. Citizen science program is an effective process of educating the general public because they are biased information is important and previously they did not know [10-11].

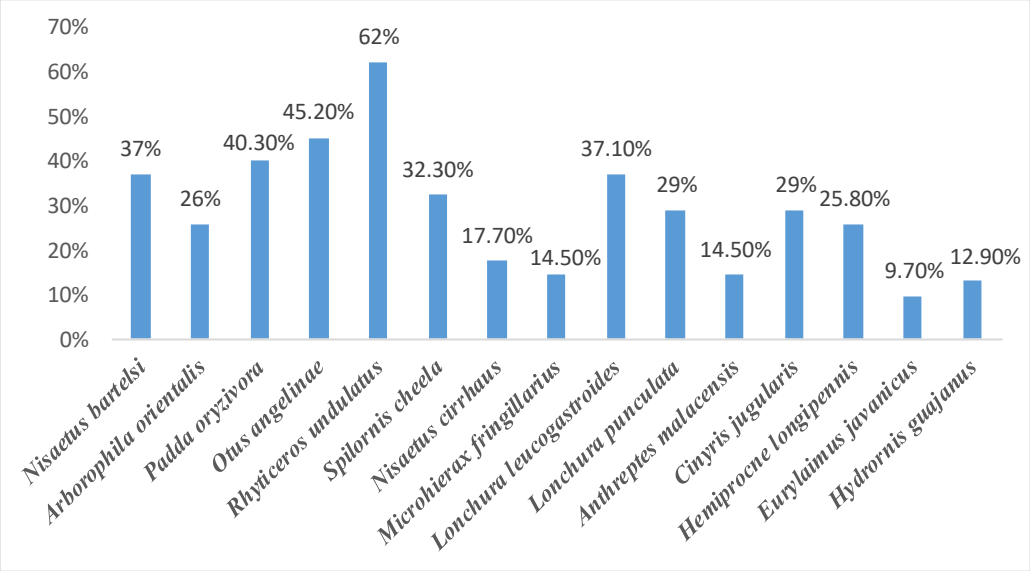

Figure 6. Bird species are known the community

Mount Ungaran still has natural forest areas, so that several species of mammals, both terrestrial and aboral, can still be found. The results of the analysis of the respondents showed that most of the respondents were aware of the existence of several species mammals. The best known species of mammals by respondents were the Three-striped Ground Squirrel (*Lariscus insignis*) and the Langur Monkey or Javan Lutung (*Trachypiteus auratus*) (Figure 7). Both species are arboreal species, so they are more easily seen by humans. Lutung is often seen in groups and foraging in several species of trees that are bearing fruit such as *Ficus* sp and is often competent foraging with fruit-eating birds such as golden bones. As with other taxon groups, most respondents do not know that these species are protected by Indonesian law, IUCN or CITES. Javan Langur are listed as vulnerable on the IUCN Red List. Populations are decreasing due to human activities, such as habitat loss, hunting, and the illegal pet trade [12]

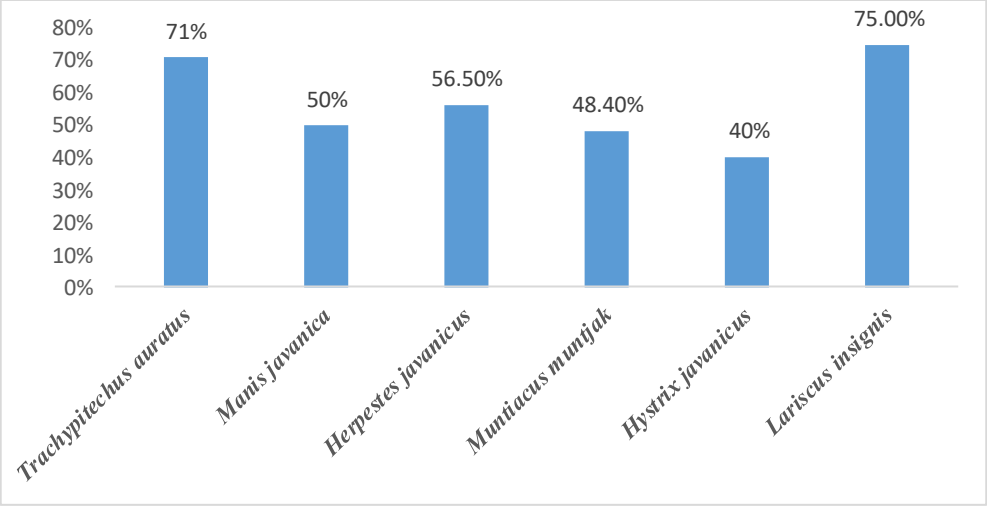

Figure 7. Mammals species are known community

Community stated that almost all of them (75%) often saw the occurrence of illegal hunting in the Mount Ungaran and surrounding areas, but they rarely reported the incident to the authorities. This is

because they do not know that some of the species hunted are included in the protection status. Even though in some villages, Village rules has banned hunting, in reality there are still frequent cases of hunting and some illegal trade both flora and fauna. For the fauna group, some are sold in living conditions and some are sold in the form of game meat. While for flora, according to them some are sold and some of them are collected at home. The results of respondents regarding whether they need information in the form of socialization of protected biodiversity and whether they agree if these species are protected and preservation, about 98% of respondents agree. These results indicate the existence of community awareness to preserve nature, so that people really need information about biodiversity, status, and how to preserve it. They also stated that they needed biodiversity information through official sources on line. Monitoring of biodiversity is an essential part, allowing goverments and civil society to identify problems, and solutions. The loss of biodiversity is impoverishing our world biologically, the loss of local and indigenous ecological knowledge is impoverishing socio-culturally [13-15].

4. Conclusions

Taxa the best known by respondents were flora, butterfly, bird, mammal, dragonfly, frog/toad, and reptile. These results indicate that the flora group is easily recognized by respondents, while the reptiles are a less well-known group. The results of respondents regarding whether they need information in the form of socialization of protected biodiversity and whether they agree if these species are protected, about 98% of respondents agree. These results indicate the existence of community awareness to preserve nature, so that people really need information about biodiversity, status, and how to preserve it.

Acknowledgments

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References

[1] Rahayuningsih M, Nugroho E K 2013 *IJESD* **5** 492
[2] Rahayuningsih M, Nugroho E K, Erni S 2015 *IJESD* **6** 474
[3] Rahayuningsih M, Kartijono N E, Retnaningsih A 2017 *Biodiversitas* **18** 1130
[4] Wisnubhadra, Yuda P, Triatmaja Y H 2014 *National seminar of Indonesia Information system*
[5] Soen V, Tine H 2016 *Young academy position papers-**nr 2***
[6] Afrianto W B, Siti K N 2017 *National Biodiversity Proceeding* **6**
[7] Haradhan M 2018 *JEEP* **7** 23
[8] Hammarberg K, Kirkman M, and de Lacey S 2016 *Hum. Reprod* **31** 498
[9] Chandler M, Bebber D P, Castro S, Lowman M D, Muoria P, Oguege N, Rubenstein D I 2012 *Front Ecol Environ* **10** 328
[10] Marshall N J, Kleine D A, Dean A J 2012 *Front Ecol Environ* **10** 332
[11] Oberhauser K, LeBuhn G 2012 *Front Ecol Environ* **10** 318
[12] Rahmawati et al 2013 *The 3rd International Conference on Biological Science* 2013 (The 3rd ICBS-2013)
[13] Florence RS, Shane love T A 2019 *Asian J of Ethnobiology* **2** 21
[14] SecadesC, O'Connor B, Brown C,Walpole M 2014 *A review of current approaches and future opportunities for tracking progress towards the Aichi biodiversity targets. Technical Series No.72*
[15] Shankar A, Anne L, Warwick H H S 2018 *PLoS ONE* **13** 1