Inventory and biodiversity medicinal plants of dayak tomun society in lopus village Lamandau regency central Kalimantan

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Abstract. Dayak Tomun was one of Dayak tribe lived in the area of Lamandau Regency of Central Kalimantan. Knowledge of medicinal plants of Dayak Tomun society retrieved from ancestral knowledge or their ancestors. The absence of documentation from the study of the knowledge of medicinal plants, then the Dayak Tomun to do Ethnobotany studies. This research aim was examined deeper knowledge and utilization of Dayak Tomun society on the medicinal plant. The method used was the semi-structured interview and participatory observations involving the six key informants of the profession as a shaman. Results of the study were found that 73 species and 69 genera, 43 family medicinal plants with the dominant family (9.59%) were the Zingiberaceae. Part of the medicinal plants that have most frequencies used by Dayak community Tomun is a leaf (38.38%), mixed with the boiled way (50%) and consumed with the drink (41.10%). The tradition of processing and utilization of medicinal plants by the Dayak Tomun society is important to apply and further preserved, so the local wisdom of the traditional medicine will remain awake.

1. Introduction
Indonesia is a country that has a diversity of plants as much as 9600 plants which some 400 tribes in Indonesia utilization plants. Indonesia has one of the largest of the tribe biodiversity from the entire country from Sabang until Merauke. Tribes in Indonesia depend on the natural resources in the life of a day-day [1]. One of the regions in Indonesia that has the diversity of tribal communities is the Isles of Borneo.

Borneo has biodiversity plants on forest vegetation in abundance. The number of potential plants to serve as a source of drugs. Many societies are living in Kalimantan forest area that the harnesses her everyday plants to treat disease [2]. One of the Kalimantan provinces has an abundance of plant medicines are potentially Central Kalimantan.

Central Kalimantan is an area that has the potential to support plants biodiversity of traditional community knowledge. Utilization of plant community characteristics makes the Dayak tribe in Borneo [3]. Local communities in Central Kalimantan has a wide utilization of plants for everyday life, especially for local communities living in forest areas [4]. The tribe that settled lives come within the forests of Central Kalimantan, one of which is the Dayak Tomun.

Dayak Tomun is the community's traditional Dayak of Borneo settled on the forest area in the region of Central Borneo Lamandau Regency. Dayak Tomun society has local knowledge of the
natural environment, such as the utilization of herbs for medicinal [5]. Dayak Tomun society has local knowledge inherited by the ancestors of hereditary, the development of the times will be reduced. This is because of a lot of the next generation who are affected by the modernization culture [6].

Local knowledge in the utilization of medicinal plants on a Dayak Tomun society in the Lamandau has never been examined, documentation and inventoried. The thing that makes the local knowledge will disappear. Therefore, activities regarding medicinal plants inventoried in Dayak Tomun society especially in the Lopus Village should be examined, so that the hope retrieved database and knowledge regarding the types of plants that can be used as medicinal plants.

2. Method and Material
2.1. Study area
Research conducted on Lopus Villages in Delang District, Lamandau Regency of Central Kalimantan. The process of researching January-March 2018. In the geographical location is set on research on latitude 1 ° 37 ' 56.90 "S and longitude 111 ° 2 ' 24.29 " E (Figure 1).

2.2. Data collection
The process to get the data of the research done through the activities of collected type and number of inventory. The data will be retrieved by first determining the key informants from the Dayak Tomun society in the village of Lopus. Key informants were determined by purposive sampling method. Key Informant of Dayak Tomun society has criteria which are believed as one of the treatments in the Tomun Dayak. Key informant retrieved as many as seven shamans (moalap or poalap). Logging activities and an inventory of medicinal plants were done with a semi-structured interview [7] and the participatory exploration [8] by involving key informant.

2.3. Data analysis
The results of the observation data collection will be analyzed in qualitative descriptive by identifying, determination and an inventory of the types of medicinal plants are used. The overall result will be in tabulation, presentation and discussed by comparing the existing literature.
3. Results and Discussion

3.1 The diversity of types of medicinal plants

Based on the observations obtained as many as 73 plant species with 69 genera and 43 species of that family are used within the Dayak Tomun society in the Lopus Villages (table 1.). These kinds of medicinal plants found in the area of the Dayak Tomun society in the village of Lopus can be said to overflow because of the many plants that could potentially be discovered as a cure.

Types of plants local Dayak community Tomun obtained also have the same types of plants are utilized and found on the other Dayak communities. On Dayak Kendayan society, Daro', Bukat and Iban in West Kalimantan and South Kalimantan Dayak medicinal plants the same type utilized by the Dayak Tomun society encompasses plants Tinospora crispa L., Kaempferia galanga, Morinda citrifolia L., Justicia gendarussa, Lansium domesticum, Carica papaya, Agerantum conyzoide, Psidium guajava L., and Eurycoma longifolia Jack [9, 10].

On medicinal plants that are used in the general Dayak Tomun in the Lopus Village also found the kinds of plants that enter into the category of a red list of the IUCN and CITES, among others, Eusideroxylon zwageri Teijsm. & Binn. And Eurycoma longifolia Jack. Kayu ulin plant (Eusideroxylon zwageri Teijsm. & Binn.) in the entry in the category of vulnerable [11], while pasak bumi (Eurycoma longifolia Jack) fall into the category of threatened plants [12].

Table 1. The number of types of medicinal plants in Tomun in the Lopus Village of Dayak Society

| Local Name | Scientific Name | Genera | Family | Benefit (as a medicine) | Part of Plants |
|------------|----------------|--------|--------|-------------------------|---------------|
| 1. Petikalo/Topus | Achasma coccineum (Blume) Valeton | Achasma | Zingiberaceae | Influenza, diarrhea, toothache | Leaf, root, fruit |
| 2. Jerangau | Acorus calamus L. | Acorus | Araceae | Abdominal diseases, headache, witchcraft | Leaf, stem |
| No. | Name  | Scientific Name | Family       | Uses                                                                 |
|-----|-------|-----------------|--------------|----------------------------------------------------------------------|
| 3.  | Kating Kambing Keladi Keladi Kulang Kulit/Sengkulit Kayu Panas | *Ageratum conyzoides* (L.) L. | Asteraceae | Wound medicines for diseases (tawar), sawan or convulsions in infants, toddlers and children. (Leaf) |
| 4.  | Pulai | *Alocasia zebrina* Schott ex Van Houtte | Araceae | Witchcraft diseases (tawar) (Root) |
| 5.  | Nenas | *Alpinia galanga* (L.) Wild. | Zingiberaceae | Postpartum medicines (sembrani) (Root) |
| 6.  | Pulai | *Alstonia scholaris* Linn | Apocynaceae | Postpartum medicines (sembrani) (Root) |
| 7.  | Nenas | *Ananas comosus* (L.) Merr. | Bromeliaceae | Toothache (Root) |
| 8.  | Pinang | *Areca catechu* L. | Arecaceae | Postpartum medicines (sembrani) (Fruit) |
| 9.  | Teras Mentawa | *Artocarpus anisophyllus* Miq. | Moraceae | Sawan (kepuhunan) people died (Bark) |
| 10. | Kapoak | *Artocarpus elasticus* Reinw. ex Blume | Moraceae | Sawan (keouhunan) people died (Stem) |
| 11. | Kesumba | *Bixa orellana* L. | Bixaceae | Postpartum medicines (sembrani) (Leaf, root) |
| 12. | Sambang | *Blumea balsamifera* (L.) DC. | Asteraceae | Malaria (Leaf) |
| 13. | Kayu Walah | *Bromheadia finlaysonia* (lindley) Miq. | Orchidaceae | Cancer medicines (Leaf, stem) |
| 14. | Cabai Rawit | *Capsicum sp* | Solanaceae | Toothache (Root) |
| 15. | Pepaya | *Carica papaya* L. | Caricaceae | Toothache (Root) |
| 16. | Honah (Tukas) | *Caryota mitis* Lour. | Rutaceae | Itch medicines (Root) |
| 17. | Ketepang | *Cassia alata* L. | Caesalpiniaeae | Fungal infections of the skin (Leaf) |
| 18. | Bura | *Chromolaena odorata* (L.) R.M.King & H.Rob. | Asteraceae | Wound medicines for toddlers and children (Leaf) |
| 19. | Kembang Raya | *Clerodendrum japonicum* (Thunb.) Sweet | Verbenaceae | Fever for toddlers and children (Leaf) |
| 20. | Kayu Ulat | *Coniogramme fraxinea* (D. Don) Diels Back. | Polypodiaceae | Itch medicines (Root) |
| 21. | Sesabung | *Cordyline fruticosa* | Liliaceae | Fever for toddlers and children (Leaf) |
| 22. | Tetabai | *Costus speciosus* J.Koenig Sm. | Zingiberaceae | Postpartum medicines (sembrani), (Leaf, stem, root) |
fever for toddlers and children, farm animal diseases

23. Jangkut Curculigo capitulata Curculigo Amaryllidaceae Itch Root
24. Kasai Curcumula Domestica Val. Curcumula Zingiberaceae Abdominal diseases Rhizome
25. Sarai Cymbopogon citratus (DC.) Stapf Cymbopogon Poaceae Sprains Leaf, stem, root
26. Totanjan Dianella nemaferosa Lam. Dianella Liliaceae Postpartum medicines (sembrani) Leaf, root
27. Simpur Dillenia excelsa (Jack) Martelli ex Gilg. Dillenia Dilleniaceae Wound medicines Bark
28. Bomban Donax cannaeformis (G.Forst) K. Schum Donax Maranthaceae Eye diseases Leaf
29. Genguho Drynaria rigidula Bedd. Drynaria Polypodiaceae Postpartum medicines (sembrani) Tuber
30. Pasak Bumi Eurycoma longifolia Jack Eurycoma Simarubaceae Fever, malaria Root
31. Kayu Ulin Eusideroxylon zwageri (Teijsm. & Binn.) Eusideroxylon Lauraceae Sawan (keouhunan) people died Stem
32. Akar Kuning Fibraurea chloroleuca Miers Fibraurea Menispermaceae Hepatitis Root
33. Krayo Ficus stricta (Miq.) Miq. Ficus Moraceae Itch medicines Root
34. Seloban Geunsia pentandra (Roxb.) Merr. Geunsia Verbenaceae Cancer medicines Leaf
35. Hohidup Justicia gendarussa Burm.f. Justicia Acanthaceae Postpartum medicines (sembrani) Leaf, root
36. Cokur Kaempferia galanga L. Kaempferia Zingiberaceae Caker sores, fever for toddlers and children, farm animal diseases Rhizome, leaf
37. Sesabi Macan Lactuca virosa L. Lactuca Araceae Wart infection on the skin Leaf
38. Lansap Lansium domesticum Correa Lansium Meliaceae Itch medicines Bark
39. Kayu Angin Mallotus paniculatus (Lam.) Mull. Arg. Mallotus Euphorbiaceae Headache Leaf
40. Kapuyembun Mapania cuspidata (Miq.) Uittien Mapania Cyperaceae Postpartum medicines (sembrani) Root, stem
41. Kelonudu Melastoma malabathricum L. Melastoma Melastomataceae Cancer medicines, toothache, diarrhea Leaf, bark, root
42. Bongkah Merremia peltata (L.) Merr. Merremia Convolvulaceae Toothache, itch medicines Root, leaf
| No. | Name                      | Scientific Name                     | Family          | Uses / Conditions                                                                 | Part Used  |
|-----|---------------------------|-------------------------------------|-----------------|-----------------------------------------------------------------------------------|------------|
| 43  | Kayu Malu                 | *Mimosa pudica* L.                  | Mimosa Leguminosae | Insomnia, treat trance (kepuhunan)                                                | Root       |
| 44  | Lalangsap Temuni          | *Monstera adansonii* Schott         | Monstera Araceae | Diarrhea, diarrhoea (membocor)                                                    | Leaf       |
| 45  | Mengkudu                  | *Morinda citrifolia* L.             | Morind Rubiaceae | Cough medicines, tonsillitis                                                       | Root, fruit|
| 46  | Pisang Raya, Jembakah Anak Hantu | *Musa acuminata Colla* Musa Musaceae | Myrmecodia Rubiaceae | Diseases of internal organs, disease, treat trance (kepuhunan)                    | Tuber      |
| 47  | Kayu Kumis                | *Orthosiphon aristatus* (Blume) Miq.| Orthosiphon Lamiaceae | Kidney diseases, urogenital diseases, treat trance (kepuhunan)                    | Leaf, root |
| 48  | Pohon Rokok Mentawala Sirih | *Phrynium villosum* Miq. Phrynium Maranthaceae | Caker sores, toothache | Caker sores, digestive, abdominal diseases                                           | Leaf, root |
| 49  | Tumbak Malo, Jambu Pasir  | *Polygonatum biflorum* (Walter) Elliot | Polygonatum Liliaceae | Toothache, disentry, abdominal diseases                                              | Root       |
| 50  | Bebaro                    | *Psychotria viridis* Ruiz & Pav.    | Psychotria Rubiaceae | Postpartum medicines (sebrani)                                                     | Leaf       |
| 51  | Sadawa Manuk Sengkubak    | *Pterandra rostrata* M. P. Nayar     | Pterandra Melastomaceae | Caker sores                                                                        | Root       |
| 52  | Kayu Guam Trantang Langit | *Scorodocarpus borneensis* (Bal.) Becc. | Scorodocarpus Olacaceae | Headache, sawan (kepuhunan), people died                                            | Leaf       |
| 53  | Karlompi                  | *Shorea koordersii* Brain-Dis        | Shorea Dipterocarpaceae | Reproduce breast milk                                                               | Leaf       |
| 54  | Kayu Haro                 | *Solanum ferox* L.                  | Solanum Solanaceae | Smallpox (lambai), toothache                                                       | Ribber, root|
| 55  | Terung Bomban Teluncur Klakai | *Stachyphrynium parvum* (Ridl.) Holtum | Stachyphrynium Stachyphrynaceae | Toothache                                                                         | Root       |
| 56  | Menterung                 | *Stenochlaena palastris* (Burn.f.) | Stenochlaena Blechnaceae | Ulcer (pulung), abdominal care                                                      | Root       |
| 57  |                         |                                     |                 |                                                                                   |            |
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|   |   |   |   |   |
|---|---|---|---|---|
| 65. | Tatulo | Gradner | *Strombosia javanica* | Olaceae | Canker sores, itch medicines | Leaf, root |
| 66. | Sambang Layang | Taraxacum campylodes | Taraxacum | Araceae | Wart infection | Leaf |
| 67. | Keringking | *Tectaria herpetocaulos* Holttum | Tectaria | Tectariaceae | Postpartum medicines (*sembrani*) | Root |
| 68. | Putar Ali | *Tinospora crispa* (L.) Hook. F & Th. | Tinospora | Menispermacaeae | Fever, malaria | Stem |
| 69. | Balaban | *Tristaniopsis whiteana* (Griff.) Peter G. Wilson & J. T. Waterh | Tristaniopsis | Myrtaceae | Sawan (*kepuhunan*) people died, measles diseases (*tombo balaban*) | Stem, bark |
| 70. | Jerangau Air | *Vallisneria americana* Michx. | Vallisneria | Hydrocharitaceae | Sawan | Leaf |
| 71. | Jahe | *Zingiber officinale* Rosc. | Zingiber | Zingiberaceae | Reproduce breast milk | Rhizome |
| 72. | Kunyit Hantu | *Zingiber zerumbet* (L.) Roscoe ex Sm. | Zingiberaceae | Itch medicines | Root |
| 73. | Indaigandi | *Zizyphus calophylla* Wall. | Zizyphus | Rhamnaceae | Eye diseases | Leaf, root |

Types of medicinal plants found in the dominance by the family Zingiberaceae is seven kinds of medicinal plants with the percentage of 9.59% (Table 2). The family of Zingiberaceae generally has aromatic compounds that characterize each type in its utilization by local people [13]. Types of plants in the Family such as *Zingiber officinale* Rosc., *Achasma coccineum*, and *Curcuma domestica* is a potential plant is used as a medicinal plant and is found as well as in cultivated in the courtyard of the community Dayak [14, 9, 15].
Figure 2. Species medicinal plants of distribution within the identified familia in Dayak Tomun in the Lopus Village of Lamandau Regency Central Kalimantan

3.2 The biodiversity of plants parts, preparation, and presentation of the medicinal plants

The observations obtained have done that part leaves of plant organs, many used as a medicinal herb in traditional Dayak community Tomun in the village of Lopus. As much as 36.36% of 38 kinds of medicinal plants are used (Figure 3).

Head in the manufacture of a medicinal herb in traditional Dayak Tomun society many do with boiling. The process of boiling on a Dayak Tomun society obtained as much as 50% (Figure 4 a) The process of boiling one common effort undertaken by the community in traditional medicine [16]. The technique of boiling carried out because it would be more effective to bioactive compounds so that spending will maintain the benefits of a more lasting potion [17].

Results in preparation for the manufacture of medicinal plant herb is consumed with how to drink the amount of 41.10% (Figure 4 b). The consumption of drugs by the way drunk will give you the benefits of a more effective through absorption in the digestive system and streamed into the bloodstream [18] in addition to the Dayak Tomun in the Lamandau lots using the process taken in the consumption of medicinal herb, in Dayak Kendayan, Daro, Bukat, and Iban in West Kalimantan, presenting in a way taken by society to treat disease fever or malaria [8].
Figure 3. The amount of use of an organ or part of the medicinal plant's Dayak Tomun society in the Lopus Village

Based on the results of the research of the process of inventory of the utilization of different types of Dayak Tomun society in medicinal plants retrieved that logging type medicinal plants, as well as its utilization, need to be done. Traditional medicine in Dayak Tomun has a unique relationship with the culture of the people. Knowledge of a specific type of plants used as medicine is based on the results of the interaction of humans with the environment. Another reason the importance of digging about logging type of medicinal plants is the abundance of the variety of diseases afflicting the community, making the odds of the existence of the opportunity to seek other types of medicinal plants.

Also, the utilization of medicinal plants by the Dayak Tomun society in the Lopus Villages can benefit regarding the economy if society can offer it wisely and well and by the local wisdom of the community. Such forest, as well as plant species contained in it have the values important to the community as part of the cultural identity of the Dayak Tomun society.

4. Conclusion
Results of the study showed the Dayak Tomun society in the Lopus Village know and utilized as many as 73 species of medicinal plants which are composed of 69 genera and 43 families. The group, most types of medicinal plants found on the family Zingiberaceae, is seven species of medicinal plants with a percentage of 9.59%. Part of the leaf on a whole lot of mixed types of medicinal plants as a medicinal herb in traditional is the percentage of 38.38%. The preparation of a medicinal herb in traditional Dayak Tomun much done by the method of boiling as much as 50% and results of the consumed to drink as much as 41.10%. Utilization of medicinal plants in Tomun in the village of Dayak society Lopus describes the level of interaction between society and the forest for their life.

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References
[1] Setyowati F M, Riswan S, Susiarti S, 2005. *J. Tek. Ling. P3TL-BPPT* 6 3 502-510
[2] Caniago I. & Siebert  S F 1998. *Indonesia. Economic Botany* 52 3 229-250
[3] Suryadana I G P 2005 *Journal of Tropical Ethnobiology* 21 65-87
[4] Herianto H, Kusuma Z, Nihayati E, and Prayogo C, 2018. *Journal of Tropical Life Science* 8 2 130–143
[5] Dey N P H and Djumaty B L, 2016. *Advances in Social Science Education and Humanities Research* 84 630-634
[6] Bodeker G 2000. Indigenous Medical Knowledge: The Law and Politics of Protection: Oxford Intellectual Property Research Centre Seminar in St Peters College 25th January 2000 Oxford
[7] Martin G J .1995. *Ethnobotany A People and Plant Conservation Manual* (London Chapman and Hall)
[8] Yusro F, Mariany I, Diba F, and Ohtani K. 2014. *Kuroshio Science* 8 1 33–38
[9] Mulyoutami E, Rismawan R, and Joshi L. 2009. *Forest Ecology and Management* 257 10 2054–2061
[10] Mulyoutami E, Rismawan R, and Joshi L. 2009. *Forest Ecology and Management* 257 10 2054–2061
[11] International Union for the Conservation of Nature (IUCN) 2017 *IUCN Red List of Threatened Species* [www.iucnredlist.org](http://www.iucnredlist.org) Retrieved 2018-07-06.
[12] CITES 2017 Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora Appendices I II and III [http://www.cites.org/index/html](http://www.cites.org/index/html) Retrieved 15 August 2018
[13] Hartanto S, Sofiyanti N, and Artikel I 2014 An Ethnobotanical Study of Zingiberaceae Based on Local Wisdom in Pangean District of Kuantan Singingi Riaau *Biosaintifika* 6 2 123-132.
[14] Meliki, Linda R, & Lovadi I. 2013. *Protobiont* 2 3 129-135
[15] Wakhidah A Z .2017. *Journal of Biological Diversity* 18 1 65–72
[16] Deeba F 2009 Documentation of Ethnoveterinary Practices in Urban and Peri-Urban Areas of Faisalabad Pakistan *Thesis* University of Agriculture Faisalabad Pakistan
[17] Megersa M, Asfaw Z, Kelbessa E, Beyene A, and Woldeab B 2013. *Journal of Ethnobiology and Ethnomedicine* 9 68
[18] Maroyi A. 2013. *Journal of Ethnobiology and Ethnomedicine* 9 31