Exploration and Identification of Spermatophyta Plants Division that are potentially can be used for Medicine at Evergreen Forest taman Nasional Baluran Indonesia

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Abstract—Indonesia is a country that has so many various floras. Nowadays Indonesia has more than 300,000 kinds of floras. More than 8000 kinds of plant belong to medicinal plants. WHO (World Health Organization) has stated about 80% of the population is still dependent on medicinal plants. Based on the Agriculture Ministry of Indonesia, the potential of medicine sales from 2010 to 2015 continues to increase. This is caused by the demand for medicine in 2010 reached 10 trillion rupiah. In 2015 is estimated to reach 20 trillion. Based on the Ministry of Agriculture (2007), traditional medicinal plants are not worth as much as the value of medicinal drugs, but the high value in demand for traditional medicine increases the value of traditional medicine sales from 2 trillion rupiah in 2003 to 7.2 trillion rupiah. The high number of needs is not equal with the production capacity of medicinal plants. This is showed if Indonesia still importing medicinal materials with considerable value whereas in Indonesia has so many medicinal materials especially from tropical forests of Indonesia. The absence of utilization of Indonesia's tropical forests is one of the factorsto do the research entitled Exploration and Identification of Spermatophyta Plants Division That Are Potentially Can Be Use for Medicine at Evergreen Forest Taman Nasional Baluran Indonesia. This Research conducted by using transect line method along the 100 meters enter the forest from the edge of the forest. The results from the exploration are found 22 types of medicinal plants which are included in 12 families and all of the medicinal plants can be use for medicine. The parts of the plants that can be utilized as a medicine are roots, leaves, flowers and even bark. From the parts of the medicinal plant leafs are the most potential parts for medicine. There are some various ways in utilizing medicinal plants starting with boiled, chewed, crushed and even mixed with other ingredients.

Keywords—identification, Medicinal plants, Spermatophyta Division, Evergreen Forest.

I. INTRODUCTION

Indonesia is a country that has so many various floras. Nowadays Indonesia has more than 300,000 kinds of flora. More than 8000 kinds of plant are medicinal plants and has utilized by the people as a traditional medicine (Rahmawati, 2004). WHO (World Health Organization) has stated about 80% of the population is still dependent on medicinal plants that can be roots, wood, rhizomes or other plant parts. According to the National Socioeconomic Survey in 2001, 57.7% of Indonesians had self-treatment without medical assistance and 31.7% of Indonesians using traditional medicine. The other used other medicine. The meaning of Medicinal plants is a natural resource that can be used to treat a disease, herbal medicine or cosmetics. Medicinal plants has minimum side effect for our body. It is useful for medical field and it increases the utilization in commercial field. Based on the Ministry of Agriculture of Indonesia, the potential of medicine sales until 2015 reached 20 trillion rupiah in the domestic market and 16 trillion rupiah in export markets. The growth of agroindustry market of medicinal plants in 2010 reached 10 trillion rupiah and increased up to 11 trillion rupiah in 2011 and in 2012 to 12.35 trillion rupiah. This number indicates an increase in the number of demand of medicinal plants from year to year. The demand for this medicinal plant comes from traditional medicinal plants and modern medicine. Based on LIPI (2003) in the Ministry of Agriculture (2007), although traditional medicine demand is not as high as
modern medicine demand, but the increase of traditional medicinal plants demand in the country has increased in high amount. This can be seen in the data shown in 2003; the demand of traditional medicinal plants from 2 trillion rupiah increase up to 7.2 trillion rupiah in 2010. The high demand of medicinal plants causes the value of trade increasing. It is predicted to continue increasing. It can be a good chance for Indonesia to develop agro-industry in foreign markets. Based on WHO data, 80% of the world's population depends on traditional medicine and 20% of world's population use modern medicine. The modern medicines that marketed in the world made from medicinal plants in the tropics (KLH, 2014).

The high number of needs is not equal with the production capacity of medicinal plants. This is showed if Indonesia still importing medicinal materials from another country with considerable value. The number of budget that has spent on medicine from abroad US $ 160 million every year LIPI (2003) in the Ministry of Agriculture (2007). Whereas the potential trade from medicinal plants originating from Indonesia's forest areas, especially tropical forests is estimated to reach US $ 1 trillion (Kompas, 2010). Based on that statement there are still many medicinal plants from the tropical forest area which has many types of flora and vast area that can be utilized to plant medicinal plant and preserving the potential plants as medicine. Therefore, a study conducted in one of Indonesia's tropical forests entitled "Exploration and Identification of Spermatophyte Plants Division That Are Potentially Can Be Use for Medicine at Evergreen Forest Taman Nasional Baluran Indonesia".

II. RESEARCH PROCEDURE

a. Research Design

The design of this research conducted by using transects line. The transect method is a method which is done by drawing the transect line by using the rope and then doing the research on the sample which passed by the transect line. The location of the transect line was located at Hm 81 to Hm 91 located on the road that runs from Batangan-Bekol. The sampling area was divided in to 6 spots 3 spots are on the left of the forest and the other 3 spots are on the right side of the forest. Each spot was chosen randomly. Rope was used as a tool to draw a transect line along 100 meters from the edge of the forest. From these area along 100 meters in transect lines the writers did the observation about Spermatophyte plants which included observation of plant habitus, photographing plant samples, and plant sampling which used for herbaria production purpose.

b. Plant Sampling

The Spermatophytadivision plant sampling was done in Evergreen forest Taman Nasional Baluran between Hm 81 to Hm 91 road from Batangan to Bekol. As a method, the plants sampling was done by using rope 100-meter in length for transect line starting from the edge of forest into the forest. In that transect line, the observation of Spermatophyta plant was done includes observation of plant habitus and plant sampling for herbarium purposes for further identification. It also photographed samples of plants to see the parts of plants more detail. The Samples are taken during the dry season.

c. Plants Identification

The plants identification is done by describing plants from exploration result which includes morphological observations of stem organs, leaves and reproductive apparatus includes flowers and fruits. From the result of description the writer identify the plant by matching with the identification book to obtain the species name of the plant. Plants that have not been identified will send to LIPI Purwodadi - Pasuruan for further identification. After recognizing the name of the species of the plant from exploration result then conducted a study of literature to determine the efficacy of medicine produced from these plants.

d. Herbarium Production

Herbarium production is purposed for preservation of plant samples from Evergreen Forest Baluran Indonesia National Park to avoid damage at the time of identification in LIPI Purwodadi-Pasuruan. There are the steps that should do:
- Taking a plant samples’ parts completely from the root until flower. If the plant belongs to tree habitus you can use branch which has leaf and flower as herbarium sample.
- Pack the plant samples by using paper
- Give a label for each plant samples.
- Put in to herbarium press then tied with raffia rope.

III. RESULT AND DISCUSSION

Based on the results of research conducted by researcher at Evergreen Forest Baluran Indonesia National Park that used plot method, the researcher found 22 species of Spermatophyta plants which are listed in the table as follows.
| No | Species                  | Family                | Local Name     | Benefit                                                                                   |
|----|--------------------------|-----------------------|----------------|-------------------------------------------------------------------------------------------|
| 1  | Aglaia sp.               | Meliaceae             | -              | Anthelmintic, Can be use as medicine for Malaria, dysentery (Tukiranet et al, 2008), Anticancer (Ahmad et al., 2010) |
| 2  | Aglaia argentea Blume.   | Meliaceae             | Langsat        | Digestion, cure colon cancer, fever, malaria and insect bites (Nugroho, 2015)                |
| 3  | Asystasianemorum Ness.   | Achantaceae           | Kembanggeni    | Treat cough and chest pain (Hidayat, 2015: 202). Treat ulcers and fever (Singh, 2006: 86). |
| 4  | Azima sarmentosa Blume.  | Salvadoraceae         | Sokdoy         | Anti scorpion’s poison (Uawonggul, 2005).                                                 |
| 5  | Biden pilosa L.          | Asteraceae            | Ketul          | Treating bladder, kidney, abdominal pain, urinary infection, hepatitis, and rheumatism (Burtolomeet et al., 2013). |
| 6  | Capparis spp.            | Capparidaceae         | -              | Treating paralysis, rheumatism, abdominal pain, skin diseases, spleen, kidney, liver disease, and prevent scorpion stings (Rivera, 2013). |
| 7  | Capparis micracantha DC. | Capparidaceae         | kencuran        | Treat cancer and tuberculosis (Fernquest, 2012)                                             |
| 8  | Clerodendrum inerme(L.)  | Lamiaceae             | Gambir         | Treat poisoning, itching and rheumatism (Van Valkenburg, J.L.C.H et al., 2015).             |
| 9  | Cordia oblique Willd.    | Boraginaceae          | Kendal, nunang | Treating diarrhea, fever, dysentery, headache, stomach pain, cough medicine, and skin diseases such as ringworm (Van Valkenburg, J.L.C.H et al., 2015). |
| 10 | Coripha utan Lam.        | Arecaceae             | Gebang         | Treat diarrhea, cough, dysentery and injuries (Nasution, 2015).                               |
| 11 | Desmodium gangeticum (L.) DC. | Leguminosaceae     | Daunpicah      | Treat ulcers and burns, treat diarrhea and dysentery, asthma, tuberculosis, and treat flatulence (Singh, 2015). |
| 12 | Gloriosasuperba L.       | Colchicaceae          | Kembangsungsang | Treat gout, diuretics, rheumatism (Winarno et al., 2010). To treat skin diseases, skin, cardiovascular. |
| 13 | Kleinhovia hospita Linn. | Sterculiaceae         | Timanga        | Treat liver cancer and decrease cholesterol (Imaniyah, 2014).                              |
| 14 | Lantana camara L.        | Verbenaceae           | tembelekan     | Treating asthma, gonorrhea, ulcers, deman, tuberculosis, rheumatism, and swelling (Yuliani, 2013). |
| 15 | Neonauclea calyclina     | Rubiaceae             | Anggerit       | Treat bone fractures and kidney                                                             |
Merr. disease (Silalahl, 2015).

|   | Species                                      | Family       | Common Name | Description                                                                 |
|---|---------------------------------------------|--------------|-------------|-----------------------------------------------------------------------------|
| 16 | Randiadiomerorum Lam.                      | Rubiaceae    | Madana      | Heals wounds, tumors, worms, skin diseases, and antibacterial activity      |
| 17 | Randiaspinosa (Thunb.)                     | Rubiaceae    | Timuntahil  | Treating diarrheal diseases, inflammation, tumors, ulcers, dysentery, and   |
|    |                                            |              |             | stomach (Singh, 2010)                                                       |
| 18 | Schleicheraeoleosa (Lour.)                 | Sapindaceae  | Kesambi     | Treat eczema, scabies, cancers and inflammation of the ear (Okan, 2015)    |
| 19 | Streblus asper (Lour.)                     | Moraceae     | Serut       | Treat fever, dysentery, toothache, stomachache, and urinary disorders       |
|    |                                            |              |             | (Taweekchaisupapong, 2015)                                                  |
| 20 | Strychnos lucida Lam.                      | Leguminaceae | Bidaralaut  | Treat rheumatism, stomachache, ulcers, ringworm, inflammation of the skin   |
|    |                                            |              |             | purulent, overcoming blood sugar and anti-inflammatory (Gusmailina, 2015)   |
| 21 | Synedrellanudiflora (Linn.) Gaertn.        | Asteraceae   | Legetan     | Heals bleeding wounds, headache, earache, stomachache, and rheumatism       |
|    |                                            |              |             | (Sumi et al., 2011)                                                         |
| 22 | Thunbergiafragrans Roxb.                   | Achantaceae  | White lady  | Treating external wounds (Samuel et al., 2010).                             |

The plants which were found consisted of 22 species and 15 genus that are Meliaceae, Salvadoraceae, Capparidaceae, Rubiaceae, Lamiaceae, Boraginaceae, Arecaceae, Leguminosaceae, Sapindaceae, Moraceae, Sterculiaceae, Verbenaceae, Achantaceae, Asteraceae, Cholcicaceae. All species which obtained belongs to trees, there are rarely found plants which belong to shrubs. This is because the Evergreen Forest is dominated by trees. When sampling time the weather is so hot and dry but the plants is still survive in extreme environments. It is about 22 plants found that belong to herbal medicine because each plant content materials that can cure or prevent disease. The medicinal material can be derived from its leaves, roots, flowers and even bark example Aglaia argentea plant whose bark is used to treat from insect bites. From all of the plant samples the parts which are the most commonly use for medicinal materials are leaves. There are some various ways in utilizing medicinal plant such as boiled, chewed, crushed and even mixed with other ingredients so there is a mixture between the two materials and it is made the benefits more complementary.

IV. CONCLUSION

1. The plants which were found consisted of 22 species and 15 genus that are Meliaceae, Salvadoraceae, Capparidaceae, Rubiaceae, Lamiaceae, Boraginaceae, Arecaceae, Leguminosaceae, Sapindaceae, Moraceae, Sterculiaceae, Verbenaceae, Achantaceae, Asteraceae, Cholcicaceae.

2. The medicinal material can be derived from its leaves, roots, flowers and even bark.

3. From all of the plant samples the parts which are the most commonly use for medicinal materials are leaves. There are some various ways in utilizing medicinal plant such as boiled, chewed, crushed and even mixed with other ingredients.

REFERENCES

[1] Ahmad A, Hanapi U dan firdaus Z. 2010. Isolasi Metabolit Sekunder Dari Fraksi Ekstrak Etil Asetat Daun Melochia umbellate Yang Aktif Terhadap Larva Udang Artemia Salina Leach. Indonesia chemica acta.

[2] Bartolome, A.P., Irene, M.V., dan Wen-Chin Yang. 2013. Biden pilosa L. (asteraceae): Botanical Properties, Traditional Uses, Phytochemistry, and
Pharmacology. Evidence-Based Complementary and Alternative Medicine.

[3] Bendra, Atika. 2012. Uji Aktivitas Antioksidan Ekstrak Daun Premna oblongata Dengan Metode DPPH dan Identifikasi Golongan Senyawa Kinia Dari Fraksi Teraktif. Skripsi. Depok: Universitas Indonesia.

[4] Departemen Pertanian. 2007. ProspekdanArah Pengembangan Agribisis Tanaman Obat Edisi Kedua. Jakarta: Departemen Pertanian.

[5] Fernquest, Jon. 2012. WildMedicinal Plants Paper(www.bangkokpost.com) [diunduh tanggal 19 Desember 2015].

[6] Ghosh D., Thejomoorthy P., Veluchamy. 1983. Anti-inflammatory and analgesic activities of oleanolic acid 3-β- Glucoside (RDG-1) from Randia dumetorum (Rubiaeae). Indian J. Pharmacol. Vol 4. Hal 31-340.

[7] Gusmailina, dan Sri Komarayati. 2015. Eksplorasi potensi senyawa organik kayu ular (Strychnos lucida) sebagai sumber biofarmaka. Pros sem nas masy biodiv indon. Vol I (7). ISSN: 2407-8050. Hal 1741-1746.

[8] Hidayat, S., dan Rodame, M.N. 2015. Kitab Tumbuhan Obat. Jakarta: AgriFlo (Penebar Swadaya Group).

[9] Imaniyah, Nurul. 2014. Tahongai Tanaman Khas Kalimantan Timur. (www.academia.edu) [diunduh tanggal 20 Desember 2015].

[10] Kementerian Lingkungan Hidup. 2014. Peluncuran Buku Status Kekinian Keanekearagaman Hayati Indonesia.http://Menlh.go.id/peluncuranbuku-status-kekinian-keanekaragahan-hayati-Indonesia/. [Diaksestanggal 27 April 2015].

[11] Kompas. 2010. Keanekearagaman Hayati. Optimalkan Potensi 1 Triliun Dollar AS.http://nasion.al.kompas.com/read/2010/09/29/21336 1762/Optimalkan.Potensi.1.triliun.Dollar.AS. Diaksestanggal [27 April 2015].

[12] Nasution, RE dan Ong, HC. 2015. Fibre plants(http://www.proseanet.org/) [diunduh tanggal 20 Desember 2015].

[13] Nugroho, 2015. Manfaat dan Khasiat Buah Langsat. (www.http://nurhidayat.lecture.uob.ac.id/) [Diunduh tanggal 19 Desember 2015].

[14] Oken, 2015. Kesambi. (www.warintek.ristek.go.id) [diunduh tanggal 20 Desember 2015].

[15] Rahmawaty. 2004. Study Keanekearagaman Mesofauna Tanah di Kawasan Hutan Wisata Alam Sibolangit. Skripsi. Sumatera Utara: Program StudiManajemenHutan, Fakultas Pertanian Universitas Sumatera Utara.

[16] Rivera, D., Incencio C., Obon C dkk. 2003. Review Of Food and Medicinal uses Of Capparis L. Sub Genus Capparis (Capparaceae). Econ Bot.

[17] Samuel, J.K., dan B. Andrews. 2010. Traditional Medicinal Plant Wealth Of Pachalur And Periyur Hamlets Dindigul District, Tamil Nadu. Indian Journal Of Traditional Knowledge. Vol IX (2). Hal 264-270.

[18] Silalahi, Marina dkk. 2015. Local knowledge of medicinal plants in sub-ethnic Batak Simalungun of North Sumatra, Indonesia. Biodiversity. Vol XVI (1). ISSN: 1412-033X. Page 44-54.

[19] Singh, A. 2006. Compendia Of World’s Medicinal Flora. Boca Raton: CRC Press.

[20] Singh, Navneet K dkk. 2010. Randia spinosa (poir.): ethnobotany, phytochemistry and pharmacology -a review. International Journal of Pharmaceutical Sciences Review and Research. Vol IV (1). ISSN 0976 – 044X.

[21] Singh, Suman, Neha Parmar dan Bhupesh Patel. 2015. A review on Shalparni (Desmodium gangeticumDC.) and Desmodium species (DesmodiumtiriflorumDC. &Desmodium laxiflorumDC.) – Ethnomedicinal perspectives. Journal of Medicinal Plants Studies. Vol III (4). ISSN 2320-3862. Hal 34-43.

[22] Setyowati, Francisca Murti. 2010. Etnofarmakologi Dan Pemakaian Tanaman ObatSukuDayak Tunjung DiKalimantanTimur. Media Ltbang Kesehatan. Vol XXV (3).

[23] Sumi, W., K.N. Ting., T.J. Kho., dan K.H. Lim. 2011. Antibacterial And Antioxidant Activities Of Synedrella nudiflora (L) Gaertn. (Asteraceae). Journal Of Complementary And Integrative Medicine. Vol VIII (1). Hal 1-13.

[24] Taweechaisupapong, Suwemol. Role of Streblus asperin Systemic and Oral Health: An Overview. Review article. Khon Kaen University, Amphur Muaeng, Khon Kaen Thailand.Uawonggul, Nanthawun dkk. 2005. Screening of plants acting againstHeterometrus laoticus scorpion venom activity on fibroblast cell lysis. Online Journal.

[25] Tukiran., Prima A, Suyatno dan Kuniyoshi S. 2008. A Long Chain Alcohol And Two Sterol Compounds From The Hexane Extract Of Stem Bark Of Aglaia Odorata Lour. (Meliaceae). Indo J Chem. Vol VIII (3). Hal 431-436.
[26] Valkenburg, Van J.L.C.H. and Bunyaphraphatsara, N. 2015. *Medicinal and poisonous plants* 2(http://www.proseanet.org/) [diunduh tanggal 19 Desember 2015].

[27] Winarno M., dan Dian Sundari. 2010. Uji Toksisitas Sub Kronik Ekstrak Daun Kembang Sungsang (*Gloriosa superba* L.) Terhadap Fungsi Ginjal Tikus Putih. *Buletin Penelitian Kesehatan.* Vol XXXVIII (4). Hal 186-191.

[28] Yuliani, S. 2013. *Chapter II Deskripsi Tanaman Tembelekan.* (www.repository.usu.ac.id) [diunduh tanggal 20 Desember 2015].