IDENTIFICATION AND BAMBOOS DIVERSITY (*POACEAE-BAMBUSOIDEAE*) AT SUB DISTRICT BANTUR MALANG

THESIS

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BIOLOGY DEPARTMENT
FACULTY OF SCIENCE AND TECHNOLOGY
THE STATE ISLAMIC UNIVERSITY
MAULANA MALIK IBRAHIM MALANG
2016

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THESIS

A Thesis Submitted to Faculty of Science and Technology, The State Islamic University of Malang in Partial Fulfillment for the Requirements for the Degree Bachelor of Science (S.Si)

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Malang, 30th of June 2016

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MOTTO

The meaning: *"Is one who is obedient to Allah, prostrating himself or standing (in prayer) during the hours of the night, fearing the Hereafter and hoping for the Mercy of his Lord (like one who disbelieves)? Say: "Are those who know equal to those who know not?" it is only men of understanding who will remember (i.e. get a lesson from Allah's Signs and Verses)* (Q.S. Az-Zumar: 9).

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I deserves the special mention for my beloved parents, not least for their unfailing support throughout during this work of thesis. Their support, pray and motivation on me till I always have a much power and spirit to complete this thesis, hope their tears and sweats will be rewarded with my success.

FOREWORD

بسم الله الرحمن الرحيم

All praises and thanks belong to Allah the Gracious and the Merciful to Whom we bow in sincerest gratitude for enabling me to complete this task. The honorific for the prophet Muhammad Shollallahu ‘alaihi wasallam who has brought us from the darkness to the lightness.

I deserves the special mention for all of people not least for their unfailing support throughout during this work of thesis. Their support, pray and motivation on me till I always have a much power and spirit to complete this thesis. These thanks are belong to:

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The main contents from this thesis are learning about the taxonomy of bamboo, how to identification the bamboos plants and also the diversity of bamboo, especially the bamboo at Bantur sub district Malang, the researcher expected that this thesis will increase the knowledge of the researcher and the readers about bamboo plant. It goes without any saying, however, that the responsibility for any mistake in the thesis is entirely mine,

Malang, 30th June 2016

Writer

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ABSTRAK

Hidayatullah. 2016. **Identifikasi dan Keanekaragaman Jenis Bambu (*Poaceae-Bambusoideae*) di Kecamatan Bantur Kabupaten Malang**. Skripsi. Jurusan Biologi. Fakultas Sains dan Teknologi, Universitas Islam Negeri Maulana Malik Ibrahim Malang. Supervisor I: Prof. Dr. Hj. Elizabeth Anita Widjaja, Supervisor II: Dr. Evika Sandi Savitri, MP, Supervisor III: Dr. H. Ahmad Barizi, MA.

Kata kunci: Identifikasi, Keanekaragaman, Bambu, Bantur.

Bambu merupakan tumbuhan yang termasuk ke dalam famili *Poaceae* dan sub famili *Bambusoideae*. *Poaceae* dikenal juga dengan nama *Graminae* atau rumput-rumputan. Kecamatan Bantur Kabupaten Malang merupakan satu diantara daerah yang memiliki jenis bambu yang cukup beragam. Identifikasi terhadap jenis-jenis bambu di Kecamatan Bantur Kabupaten Malang telah dilakukan berdasarkan karakter morfologi dan keragaman jenis bambu ditentukan berdasarkan distribusi jenis bambu di setiap desa Kecamatan Bantur Kabupaten Malang.

Penelitian ini dilakukan 2 bulan yaitu pada bulan September - Desember 2015, sampel diambil di Kecamatan Bantur Kabupaten Malang. Identifikasi, karakterisasi dan analisis data dilakukan di Herbarium Bogoriense, Bidang Botani, Puslitbang Biologi, LIPI Cibinong Bogor. Metode yang digunakan adalah deskriptif kualitatif, koleksi dilakukan menggunakan eksplorasi dan explorasi setiap lokasi ditentukan berdasarkan metode purposive sampling.

Hasil penelitian di Kecamatan Bantur Kabupaten Malang diperoleh 13 jenis dan 3 varietas bambu dalam 7 marga, yaitu *Bambusa blumeana* J.A. & J.H. Schult., *Gigantochloa atter* (Hassk.) Kurz, *Schizostachyum zollingeri* Steud., *Bambusa vulgaris* Schrad. ex Wendl., *Bambusa vulgaris var. striata* McClure, *Dendrocalamus asper* (Schult.) Backer ex Heyne, *Schizostachyum iraten* Steud., *Schizostachyum brachycladum* Kurz, *Gigantochloa apus* (J.A. & J.H. Schult) Kurz, *Thyrsostachys siamensis* Gamble, *Bambusa glaucophylla* Widjaja, *Bambusa vulgaris var. wamin* McClure, *Dinochloa matmat* S. Dransf. & Widjaja, *Fimbribambusa horsfieldii* (Munro) Widjaja, *Gigantochloa atroviolacea* Widjaja, and *Schizostachyum castaneum* Widjaja.

ABSTRACT

Hidayatullah. 2016. **Identification and Bamboos Diversity (*Poaceae-Bambusoideae*) at Sub District Bantur Malang.** Thesis. Biology Departement, Faculty of Science and Technology, The State Islamic University Maulana Malik Ibrahim Malang. Supervisor I: Prof. Dr. Hj. Elizabeth Anita Widjaja, Supervisor II: Dr. Evika Sandi Savitri, MP, Supervisor III: Dr. H. Ahmad Barizi, MA.

Key words: Identification, Diversity, Bamboo, Bantur

Bamboo is a plant that include into family *Poaceae* and subfamily *Bambusoideae. Poaceae* is also known as *Graminae* or grasses. Sub district Bantur, Malang is one of area that have the various of bamboo species. The identification of bamboo species at sub district Bantur, Malang is done according to morphology character and the diversity of bamboo species is determined by the distribution of each species of bamboo in each village at sub district Bantur Malang.

Fields studies were held at sub district Bantur Malang during 2 months from September till December 2015. Data analysis, identification and characterization were held at Herbarium Bogoriense, Botany Division, Research Center for Biology, LIPI Cibinong. This study is done mainly by using qualitative descriptive study, Bamboos species are collected at sub district Bantur Malang and then were described them. Collections were held by exploration method, and explore every location by purposive sampling technique.

The result of the research at sub district Bantur Malang was obtained 13 species and 3 variety of bamboo in 7 genera, they are *Bambusa blumeana* J.A. & J.H. Schult, *Gigantochloa atter* (Hassk.) Kurz, *Schizostachyum zollingeri* Steud., *Bambusa vulgaris* Schrad. ex Wendl., *Bambusa vulgaris var striata* McClure, *Dendrocalamus asper* (Schult.) Backer ex Heyne, *Schizostachyum iraten* Steud., *Schizostachyum brachycladum* Kurz, *Gigantochloa apus* (J.A. & J.H. Schult) Kurz., *Thyrsostachys siamensis* Gamble, *Bambusa glaucophylla* Widjaja, *Bambusa vulgaris var. wamin* McClure, *Dinochloa matmat* S. Dransf. & Widjaja, *Fimbribambusa horsfieldii* (Munro) Widjaja, *Gigantochloa atroviolacea* Widjaja, and *Schizostachyum castaneum* Widjaja

ملخص

هدا ية الله. ٢٠١٦. التحديد و التنوع الأنواع الخيزران (*Poaceae-Bambusoideae*) في منطقة بنتور, مالانج. بحث العلمي, قسم العلوم و التكنولوجي, كلية بيولوجي. جامعة مولانا مالك إبراهيم الإسلامية الحكومية بمالانج. المشرفة الأولي : الأستاذة إيليزابيته أنيت ودجاجي, الدكتور أفيك سندي سا فطري, الماجستير. المشرف الثاني الدكتور الحاج أحمد بارزي, الماجستير.

الكلمات الأسسية: التحديد, التنوع, الخيزران, بنتور

الخيزران هو المرعي الذي دخل في لأسرة *Poaceae* و الفصيلة *Bambusoideae*. فرقة *Poaceae* أيضا تعرف با لإسم *Graminae* أو فرقة الأبّ. منطقة بنتور, مالانج هي إحدي من منطقة التي لديها نوع من الخيزران التي هي متنوّعة جدا. التحديد إلي أنواع الخيزران في منطقة بنتور, مالانج قد تم ذالك علي أساس التوصيف المرفولوجي و التنوع الخيزران محدد من خلال توزيع كل نوع من الخيزران في كل قرية في منطقة بنتور, مالانج.

هذا البحث من نوع البحث النوعية و صفية مستندة علي عينة قصدية التي تشتمل علي الدراسة الأولية, الإستطلاع, مجموعات, إعداد العينات معشبة, التوصيف المرفولوجي و التوثيق.

و من نتائج البحث في منطقة بنتور, مالانج حصل عليها ١٣ نوع و نوعين من الخيزران في سبعة أجناس, هم *Bambusa blumeana* J.A. & J.H. Schult, *Gigantochloa atter* (Hassk.) Kurz, *Schizostachyum zollingeri* Steud., *Bambusa vulgaris* Schrad. ex Wendl., *Bambusa vulgaris var. striata* McClure, *Dendrocalamus asper* (Schult.) Backer ex Heyne, *Schizostachyum iraten* Steud., *Schizostachyum brachycladum* Kurz, *Gigantochloa apus* (J.A. & J.H. Schult) Kurz, *Thyrsostachys siamensis* Gamble, *Bambusa glaucophylla* Widjaja, *Bambusa vulgaris var. wamin* McClure, *Dinochloa matmat* S. Dransf. & Widjaja, *Fimbribambusa horsfieldii* (Munro) Widjaja, *Gigantochloa atroviolacea* Widjaja, and *Schizostachyum castaneum* Widjaja

CHAPTER I

PREFACE

1.1 Background

وَفَٰكِهَةً وَأَبًّا ﴿٣١﴾

The meaning of surah *'Abasa* 31 is: *And fruits and grasses.* (QS. *'Abasa: 31*).

The Tafsir of surah *'Abasa*: 31 is:

Fakihah includes every type of fruit. Ibn 'abbas said, "*Al-Fakihah* is everything that eaten ripe, and *Al-Abb* is what the earth growth that is eaten by grazing animals and not people". In one narration reported from him he said "it is the grass for the livestock animals." Abu Ubayd Al-Qasim bin Sallam reported from Ibrahim At-taymii that he said, "Abu Bakr As-Siddiq was asked about Allah's statement.

And he said, "what sky would shade me and what earth would carry me if I said about the Book of Allah that which I did not have knowledge of Him reference to what Ibn Jarir recorded from Anas, that he said, "Umar bin Al-Khattab recited" (Tafsir Ibn Kathir, Page 5475).

Surah 'Abasa: 31, explained about the benefits of fruits and grasses for human life, Allah SWT created everything has benefits, including trees and grasses which very useful for us. People can eat the ripe fruits for their health and energy. The grasses will be eaten by grazing animals, besides the grasses also very benefit for human. People can utilize the grasses for feeding their cattle. It meant that Allah did not create the grasses in vain, because although only grasses it can give much benefit for human life.

Grasses consists of a wide range of species and also has many benefit for human life. One of them is bamboo, which it also has a lot of benefits. There are many uses of bamboo from handicraft made by villagers such as ornaments, utensils and a most incredible variety of baskets and other container, bird cages, poultry case, musical instrument, to water pipes, bridges, house construction and fishing contraptions (Kurz, 1876; Wong, 1995).

General speaking, Bamboo can be used from the root to the leaf. Bamboo have used for carving, while the stem is usually used for building materials, bridges, handicraft, basket, furniture, agricultures and fishery's tools, household appliances, plumbing, paper, chopstick, toothpicks, skewers and so forth. While the bamboos stem also can be used for traditional bamboo musical instruments and modern bamboo musical instrument. (Widjaja, 2001).

Bamboos are part of the Poaceae (also called Gramineae), the family of grasses (Soderstrom 1981). Bamboo can grow at secondary forest and open woodlands, and also may grow at peoples garden and villages, so in this condition bamboo have a high enough diversity and abundance. Diversity of bamboo in the world have been recorded that there are 1.439 describe species and 115 genera (Bamboo Phylogeny Group, 2012).

Indonesia is one of country that has a high of bamboo diversity (Indrawan dkk, 2007; Suyamto, 2011). According to Widjaja (2015) Indonesia has 162 species of bamboo. In Java it is estimated that there were only 60 species. Among the species that found in Java, 16 species of also grow well in other islands; 26 species are introduced species, but 14 species of them only growth at Bogor

Botanical Garden and Cibodas, 9 species there were endemic of Java and there are 13 species which was planted at Botanical garden after relocation from other region. (Widjaja, 2001).

The diversity of bamboo in Indonesia especially at Java island become one proved of the greatness of God favors, as already written in the holy Qur'an surah Luqman: 10

خَلَقَ ٱلسَّمَٰوَٰتِ بِغَيۡرِ عَمَدٖ تَرَوۡنَهَاۖ وَأَلۡقَىٰ فِي ٱلۡأَرۡضِ رَوَٰسِيَ أَن تَمِيدَ بِكُمۡ وَبَثَّ فِيهَا مِن كُلِّ دَآبَّةٖۚ وَأَنزَلۡنَا مِنَ ٱلسَّمَآءِ مَآءٗ فَأَنۢبَتۡنَا فِيهَا مِن كُلِّ زَوۡجٖ كَرِيمٍ ١٠

The mean is: *He has created the heavens without any pillars that you see, and has set on the earth firm mountains lest it should shake with you. And He has scattered therein moving creatures of all kinds. And We send down water from the sky, and We cause (plants) of every goodly kind to grow therein in pairs* (Q.S. Al Luqman; 10).

The Tafsir of Surah Luqman: 10 (He has created the heavens without any pillar) Al-Hasan and Qatadah said, "it does not have any pillar, visible or invisible". The mountains which stabilize and lend weight to the earth, lest it should shake with its water. Allah has pleced throughout it all kinds of animals, the total number of whose kinds and colors is known to no one except the one Who created them. When Allah tells us that He is the Creator, He also reminds us that He is the Provider. (And We send down water from the sky, and We cause (plants) of every goodly kind to grow therein in pairs) meaning, every kind of good produce in pairs, i.e., they are beautiful to look at. Ash-Sha'bi said: "People are also produce of the earth, so whoever enters paradise is goodly and whoever enters Hell is vile" (Tafsir Ibn Katshir Vol 10: 3921).

According to the verse above, the summary is that allah has created the variety of creator in pairs no one has been created alone in this world. He also created the various of good plants which are very useful for all His creator. Similar with bamboo which is included to the type of plants also have many benefits.

Although scientific data about the distribution, description of Bamboos species in Java island are available, there are some area which has not been explored very well and it is possible that a new species may be found. This is proved by *Schizostachyum* sp. which is collected at Sub District Leuwiliang, Bogor, this species suspected as a new species (Widjaja, 2001). Beside that a new species may be found at Sub District Bantur Malang.

Based on the results of the preliminary study on April 2015 at Sub District Bantur, it was discovered that there are *Schizostachyum* sp. This species is suspected very similar to *Schizostachyum castaneum* Widjaja from Tabanan district, Bali. This species was an endemic bamboo of Bali and it is included as sacred bamboo by Balinese. Because of that, it is thought to have a links between Balinese community with the Javanese society, especially at South Malang (result of interview, 2015).

Based on the above data, the importance of information and scientific data about the potential bamboo including the diversity bamboo species at a region become necessary. The aim of this study is to identify, to describe bamboo found at Sub District Bantur, Malang which also needed to be recorded.

1.2 Formulation of Problem

Based on the background, the formulation of the problem at this research is:

1. What bamboos species grow at Sub District Bantur, Malang?
2. How many bamboos species grow at Sub District Bantur, Malang?
3. How is the description bamboos species grow at Sub District Bantur, Malang?

1.3 Purpose of Research

The Purpose of this research is:

1. To know bamboos species grow at Sub District Bantur, Malang.
2. To know the total of bamboos species grow at Sub District Bantur, Malang.
3. To know the description species of bamboos grow at Sub District Bantur, Malang.

1.4 Benefits of Research

The benefits of research are as follows.

1. Scientific data bamboo at Sub district Bantur, Malang will be available
2. Basic information on taxonomic bamboo at Sub district Bantur, Malang; especially for *Schizostachyum* sp. and *Dinochloa* sp. will be provided.

1.5 Limitation of Problem

Limitation of the problem is as follows.

1. Research conducted in the Sub District Bantur Malang.
2. Identification the bamboo species in the Sub District Bantur Malang
3. Describe all species including variety found in the locality based on morphological characters.

4. Identification method used with literature such us (Holtum, 1958; McClure; 1966; Widjaja, 1987; Widjaja, 1997; S. Dransfield & Widjaja, 1995; Widjaja, 2001; Widjaja, 2005; Wong, 1995; Wong, 2004), and study comparison with specimen herbarium at Herbarium Bogoriense, Botany Division, Research Center for Biology-LIPI, Cibinong Science Center (CSC), Cibinong, West Java.

CHAPTER II

LITERATURE REVIEW

2.1 Islamic Perspective

Allah Said in Qur'an Surat Al A'laa ayat 4-5

وَٱلَّذِىٓ أَخۡرَجَ ٱلۡمَرۡعَىٰ ۝٤

(And who brings out the pasturage,) meaning all types of vegetation and crops.

فَجَعَلَهُۥ غُثَآءً أَحۡوَىٰ ۝٥

(And then makes it dark stubble,) ibn 'Abbas said, Dried up and altered, "it has been that Mujahid, Qatadah and Ibn Zayd, all made similar statement.

The meant of surah Al-A'laayat: 4-5.

And who brings out the pasturages. And makes it dark stubbles.

The tafsir of surah Al-A'laa 4-5 explained about the various vegetations and plants in this world which has been created by our God Allah SWT, Allah can creat all of kind of plants with easily and then He also can made all of vegetation and plants dried up, rot and altered.

Allah has created the various plants for all of His creature, and His creature include plants and even grasses was created for their own benefits. As we know plants was very helpful for human life and also for the animals. Similarly with bamboo which include in grasses family, bamboo also has many benefits, and people was utilized bamboo for along times ago.

2.2 The General Classification of Bambusoideae

The Bambusoideae is the larger subfamily of grasses, because Bambusoideae consist of its number of genera, such as *Anomochloa, Bambusa, Glaziophyton*, *Oryza* and *Streptochaeta*. Among those of 'Bambusoid affinity',

similar genera are comprised as tribes. One of them can clearly grouped as a woody bamboo. According to Clayton & Renvoize (1986) and Watson (1990) the woody bamboo is classified under the tribe Bambuseae or Bambusoidae (Chapman, 1997). The diversity of the woody bamboo is based mainly on morphological characters. Figure 2. 1 shown the classification of Clayton & Renvoize (1986) which showed a diversity morphologically, therefore a similiar genera is grouped into the tribes. This classification is proposed by Clayton & Renvoize (1986). Few years later, Watson (1990) proposed new classification as shown on Figure 2.2. The main differences on both classification are Watson has divided the Bambusoideae into 2 super tribe, Oryzodae and Bambusodae. The supertribe Bambusodae consists of tribe Bambuseae, Guadelleae and Puelieae.

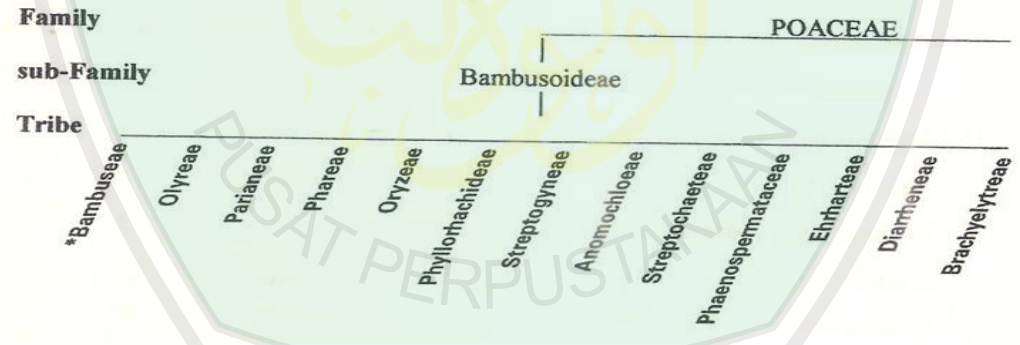


Figure 2.1 Classification of Bambusoideae according to Clayton & Renvoize (1986) (In Chapman, 1997).

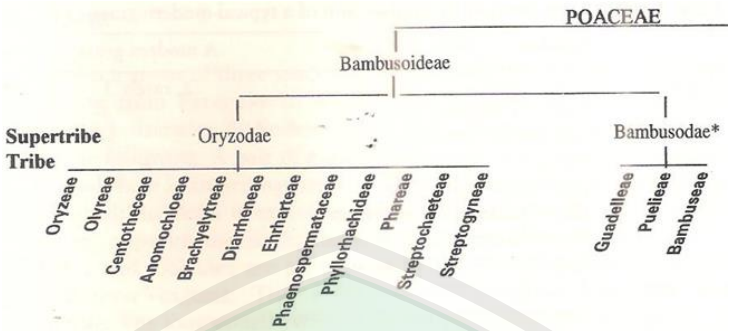


Figure 2.2 Classification of Bambusoideae according to Watson (1990) (Chapman, 1997).

In both scheme Bambuseae or Bambusodae represent only the woody bamboo while the other tribes belong to herbaceous bamboo. According to Sungkaew et al (2009) there are three tribes reflecting three main lineages of Bambusoideae, that are Arundinarieae (temperate woody bamboos 533 species), Bambuseae (tropical woody bamboos784 species) and Olyreae (herbaceous bamboos, 122 species), as shown on Table 1.

Table 1. The diversity of Bambusoideae in the world

Taxon	Number of genera	Number of species
Arundinarieae	**28**	**533**
Bambuseae	**66**	**784**
Neotropical	19	377
Arthrostylidiinae	14	172
Chusqueinae	1	160
Guaduinae	5	45
Paleotropical	47	407
Bambusinae	28	264
Hickeliinae	8	33
Melocanninae	10	88
Racemobambosinae	1	22
Olyreae	**21**	**122**
Buergersiochloinae	1	1
Parianinae	2	36
Olyrinae	18	85
Total for subfamily	**116**	**1,439**

According to Cronquist 1981) and Undang (2011), this is the classification of bamboo

Divisi: Magnoliophyta

Class: Liliopsida

Sub Class: Commelinidae

Ordo: Poales

Family: Poaceae

2.3 The Morphology of Bamboo

2.3.1 Rizhome

Rizhome is a basic organ of the bamboo plant. The rhizome of bamboo has been described as a segment, complex subterranean system (Holttum, 1958; McClure, 1966; Dransfied & Widjaja, 1997). There are two basic types of rhizome: pachymorph (sympodial) and leptomorhp (monopodial). In Indonesia, the rhizome of bamboos mostly has a pachymorph rhizome system. This rhizome has short internodes and short neck, and every rhizome has buds that will continue to grow and become shoot then become the culm (Widjaja, 2001, Fig. 2.3).

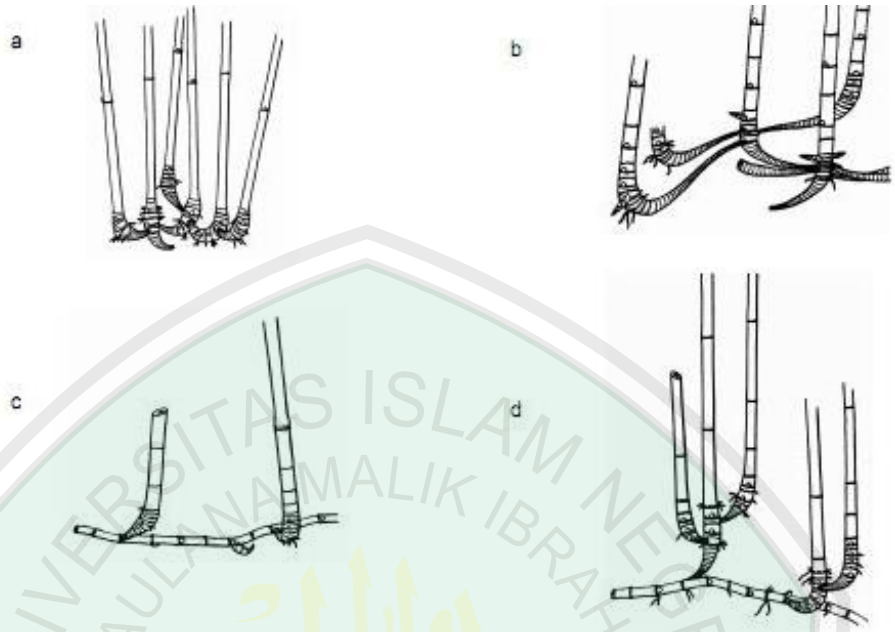


Figure 2.3 Four major forms of rhizome and culm growth: a. Pachymorph (Short-necked); b. Pachymorph (Long-necked); c. Leptomorph (Culm-Single) and Leptomorph (Culm-tillering) (Stapleton, 1997).

2.3.2 Shoots

The young shoots (called Rebung in Indonesia) is a new bamboo culm grow from the bud of rhizome of old culm. It consists essentially of short, massive little-differentiated stem packed with food-material and protected by numerous two-ranked overlapping rigid sheath (Holttum, 1958). Shoots can be used to distinguish the bamboo species because it indicates the color characteristics at the apex and the hairiness of the sheath which is typical for each species. In some species, shoots were covered by white wax for example on *Fimbribambusa horsfieldii* or velvety hairs like *Dendrocalamus asper*. Shoots always covered by sheath that grew elongated following the extension of the segments. (Widjaja, 2001).

Figure 2.4 New shoot (Rebung) grow from the bud of the old culm. Sheaths on the mature culm decidous (Holttum, 1958).

2.3.3 Culm

The habit of culm varies from strictly erect, erect with pendulous tips, or ascending, through broadly arched or scrambling, and from nearly straight to strongly zig zag (McClure, 1966; Fig. 3). There are several genera that grow climbing such as *Dinochloa* and there is also a growing scrambling for example *Fimbribambusa.*

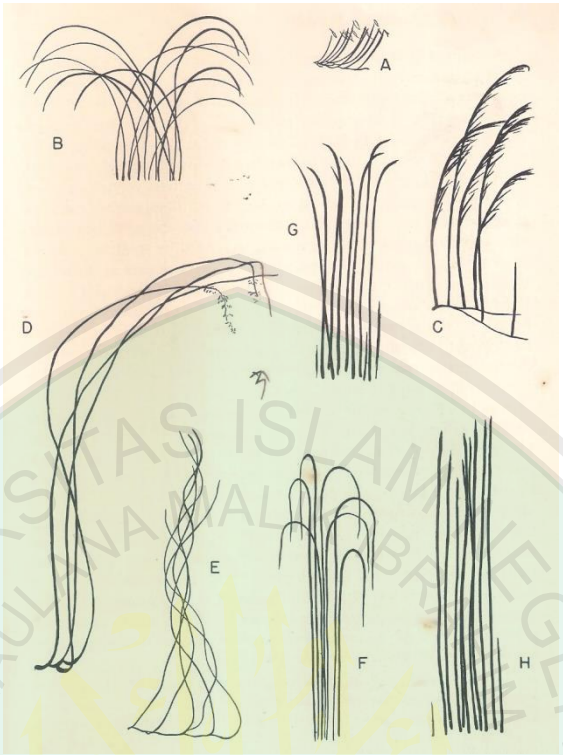


Figure. 2.5 Selected example of culm habit, illustrated diagrammatically; a.*Sasa palmata*; b. *Sinocalamus beecheyanus*; c. *Phyllostachys nigra*; d. *Schizostachyum hainanense;* e. *Dinochloa scandens*; f. *Sinocalamus affinis*; g. *Bambusa textilis*; h. *Arundinaria amabilis*. From MacClure and Li (1941: Fig. 1)

The culm consists of several internode and nodes. Some species have a long internode like *Schizostachyum iraten* and others have short, for example in *Bambusa vulgaris, Bambusa blumeana*. The internode is usually glabrous or smooth, or rough and hairy when young. On the other hand, several species have different diameters. For example, *Dendrocalamus asper* has the largest diameter followed by *Gigantochloa* and *Bambusa* which have medium diameter. On another genera such as *Schizostachyum* there are medium diameter as *Schizostachyum brachycladum,* and small diameter on *Schizostachyum zollingeri* and *Schizostachyum iraten* (Widjaja, 2001). The diameter of culms, the thickness of the walls, the length of the internodes, the prominence of nodes, all at the breast

height are also important characters to be used on the identification (Holttum, 1958).

Nodes at the culm have varied, for example; some bamboo covered by aerial roots, such as on *Dendrocalamus asper*. While on *Dinochloa*, its nodes are often covered by sheath scar that left and very rough. The sheath scar is a narrow, transverse, circumference trace, the locus of abscission of a sheath proper. Furthermore, the nodes of *Fimbribambusa horsfieldii* has fimbril grow on the girdle of the sheath (Widaja, 2001).

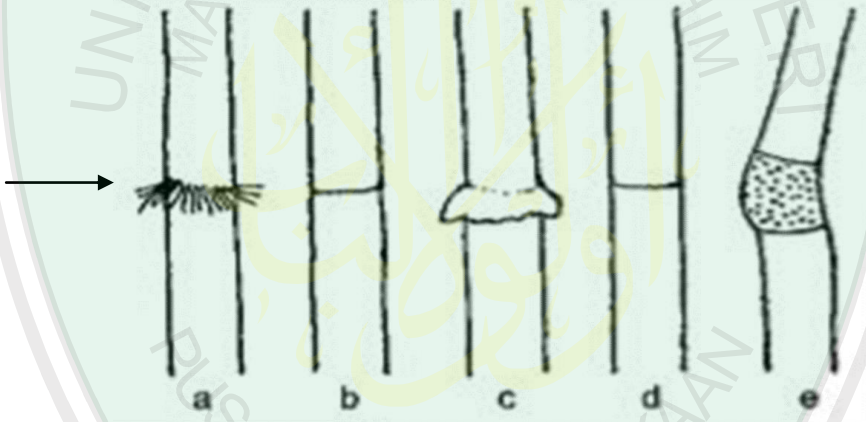


Figure 2.6 Nodes: a. with aerial roots; b. without aerial roots; c. with fimbril; d. without fimbril; e. with sheath scar

2.3.4 Culm-sheaths

Culm- sheaths are modification of leaves, and have the same parts as leaves, but the part are proportionally different and of somewhat different structure (Holttum, 1958) (Fig 2.7 &2.8). According to Widjaja (2001) culm-sheaths consist of the blades, auricles and ligule of culm sheath. The blades occurred at the apex of the culm sheath and sessile, whereas the auricles found on the apex

margin of the sheath proper and ligule found at the sheath apex, between the two auricle inner part of the sheath apex.

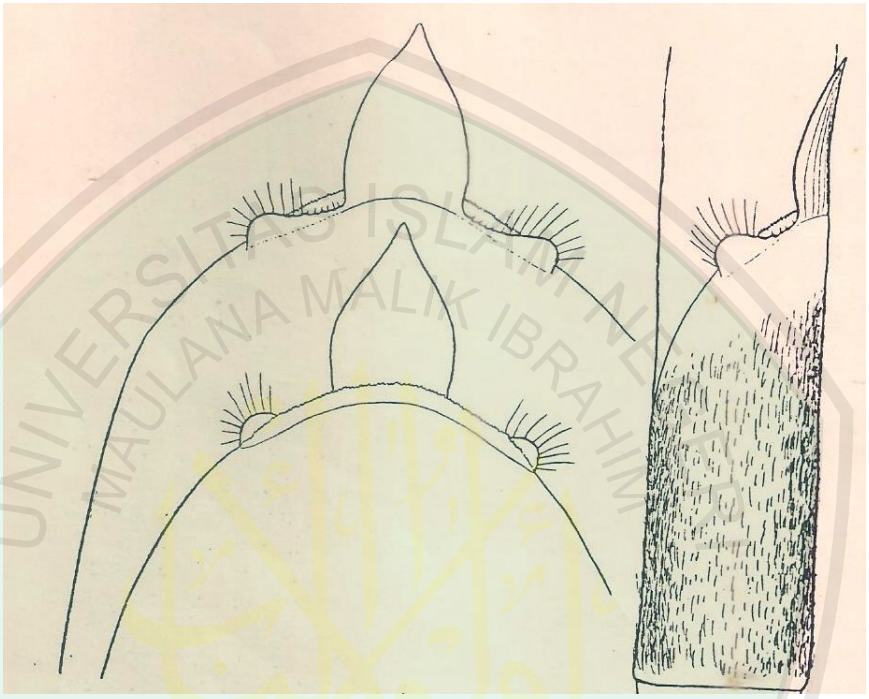


Figure. 2.7 On right, generalized drawing of a culm-sheath in natural position, the top of a sheath is more or less narrowed, and carries the blade (called by Gamble the imperfect blade). The line of junction of sheath with blade is usually quite distinct (in a few cases it is not detectable externally), and when the blade is old usually broken. The line of junction is sometimes almost horizontal, but more often it is upcurved, the middle highest with irregular serrate, or dentate margin which called ligule. There are two lobes at the end of each apex which called auricle. Some auricles have bristle other glabrous (Holtum, 1958).

There are two kinds of the culm sheath: 1. Persistent means that the culm sheath never fall off until the culm mature enough (like *Gigantochloa apus*). 2. culm sheath which is caducous (like *Dendrocalmus asper*) means the culm sheath fall as soon as the culm elongated. This characters is including called deciduous (like *Dinochloa*). Where the culm sheath not directly fall although the culm has

elongated., And Lately deciduous (like several species of *Gigantochloa*) where the culm sheath lately fall of after the culm elongated. The blades of several bamboo species are erect (like *Schizostachyum brachycladum*), deflexed (*Gigantochloa apus*) and spreading (*Fimbribambusa horsfieldii*) (Fig. 2.8). Auricles and ligule are an important characters that can be used to distinguish species or even genera, sometime with or without bristles, ligule varies from entire, denticulate or serrate.

Figure 2.8 Position of culm-sheath: a. erect; b. spreading; c. deflexed; d. reflexed. (Widjaja, 2001).

2.3.5 The Branch complement

Branches can be used as an important characteristic for distinguishing of bamboo genera. In general, *Bambusa, Dendrocalamus* and *Gigantochloa*, has one dominant lateral branch which is bigger than the others. On the other hand, *Schizostachyum*, has subequal branches system, and *Dinochlo*a have several branches, one dominant branch usually dormant and will develop as big as the main culm when the culm was cut off.dormant.

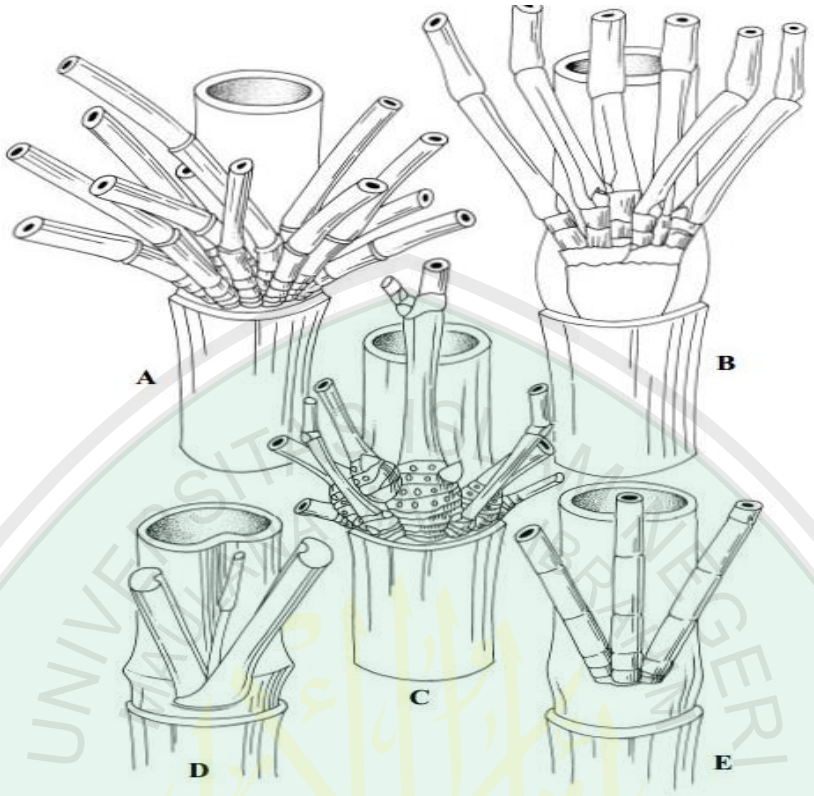


Figure 2.9 Branches: A. *Holttumochloa;* B. *Schizostachyum*; C. *Bambusa*; D. *Phyllostachys*; E. *Chimonobambusa* (Wong, 2004).

2.3.6 Leaves and leaves sheath

Leaves have parallel veins like grasses, and every leaves have mid rib. The leaves can be wide and long (such at *Neololeba atra*), but there is also a small and narrow leaves like *Bambusa multiplex*. The leaves was connected with sheath by long or short petiole. The leaves sheath have two ear which called auricle, this auricle can be rounded, lobed like, folded out or inconspicuous. Each auricle may have bristle or glabrous. Ligule is found at the inside of the sheath, in some species the ligule may long or short, margin entire, serrate or irregular, with bristle or glabrous (Fig. 2.10).

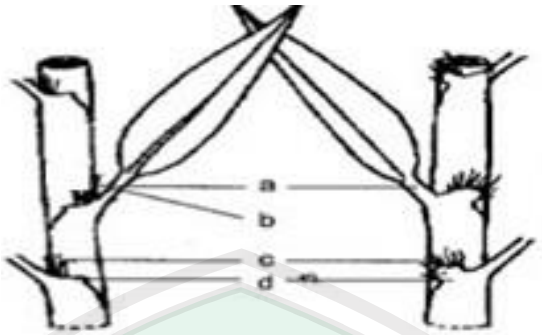


Figure 2.10 Each leaves sheath: a.petiole; b. ligule; c. bristles; d. auricles (Widjaja, 2001).

2.3.7 Inflorescences

Bamboo as giant grass has a similar inflorescences. Each inflorescence consist of many spikelet which arranged in two rows basically, but some species has a cluster spikelet. Some species has rachilla on its spikelet (such as *Bambusa*), others sessile (such as *Gigantochloa*). Each spikelet may consist of bud in each spikelet, so it is called as pseudospikelet. Others which do not have bud is called spikelet. The pseudospikelet consists of 2-3 glumme or bract to protect the spikelet. Then there are 1-few floret which may have rachilla or sessile. Each floret protected by lemma and palea, lodicule absent or present, 6 anthers, filament free or as tube, 1 style, 1 – 3 stigmas. Anthers may yellowish or magenta in colour (Fig. 2.12).

Figure 2.11 Diagram showing basic structure of a spikelet (left) and a pseudospikelet (right). Dark dots represent flower structures inner to the palea; b, bracts protecting buds (dark structures with double-barred tips) that potentially repeat the structure of the pseudospkelet; g. Glume; l. Lemma; p. Palea; r, rachilla; t. Vestigial terminal flower. On the main axis, bb is the bracts subtending the spikelet or pseudospikelet, and pr is the prophyll or specialized initial bract of the rachilla (Wong; 2004).

There are two different kind of inflorescence, i.e. indeterminate and determinate inflorescence.

1. The indeterminate inflorescences

According to McClure (1966): an indeterminate bamboo inflorescence is one the course of whose development is prolonged indefinitely by the progressive elaboration of its bracts. A separate “grand period of growth is initiated and completed, independently, in each flowering axis of each successive order of branches. Each flowering axis is spikelet like in appearance and it terminates in a

spikelet. However, its basal part is a very short rachis, clothed with lemma like bracts, each of which subtends a prophyllate branch bud instead of a flower. Because of that, this spikelet is called as pseudospikelets. The bud at the base of a pseudospikelet may continue its expansion to develop into new axes and their appendages.

2. The determinate inflorescence

A determinate bamboo inflorescence is one the course of whose development is strictly limited to a single "grand period of growth" that encompasses the elaboration of the whole complement of branches of a solitary rachis. Terminal growth ceases in all branches of the inflorescence within limited time. Each branch terminates in a conventional spikelet; no meristem remains afterward in the form of dormant lateral buds. (McClure 1966)

CHAPTER III

RESEARCH METHODS

3.1 Research Plan

This study is done mainly by using qualitative descriptive study. Bamboos species are collected at sub district Bantur Malang and then were described them. Collection was held by exploration method, and explore every locations (Rugayah, Widjaja, Praptiwi 2004) by purposive sampling technique.

Each field work is done by interviewing and involving local people who know about the different of bamboo. So that, this research conducted by two main objects. Firstly, to explore and collect bamboos in the study area, secondly is the local communities who will be interviewed and helping to show where to find bamboo at each location (Widjaja, 2005).

3.2 Time and Place

Fields studies was held at Bantur subdistrict, Malang during 2 months from September till December 2015. Data analysis, identification and characterization was held at Herbarium Bogoriense, Botany Division, Research Center for Biology, LIPI Cibinong.

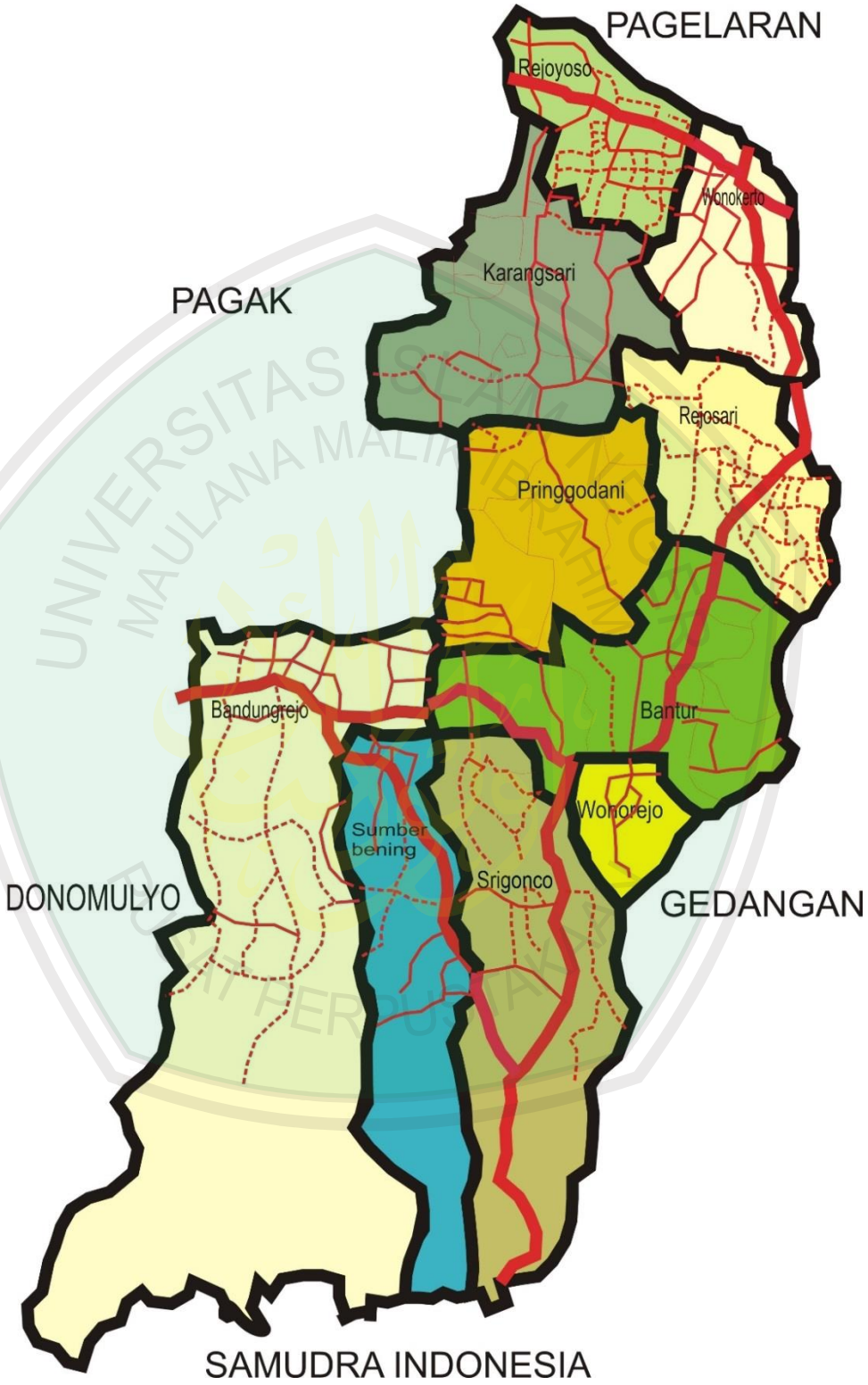


Figure 3.1. Bantur subdistrict, Malang. (www.bantur.malangkab.go.id , accessed on 15th of january 2016).

3.3 Tools and Materials

3.3.1 Tools

The tools used in this research are digital camera, identifications of bamboos books, stationary, scissors, ropes, papers, cardboards, plywood and woods.

3.3.2 Materials

The materials are used in this research are bamboo specimens obtained from subdistrict Bantur Malang

3.4 Research Procedurs

3.4.1 Preliminary Studies

Preliminary Studies was held before taking field work, with the aim is to know the location and knowing the species of bamboo accordance to the local name. Then determined the position where to be observed. Data will be collected from this area, determined track, survey the variation of bamboo and then make collections and identifications. The locality of the survey area was obtained from the information by the local community at Bantur. Any bamboos which have a different local name are collected and after arriving at the Herbarium Bogoriense LIPI Cibinong, the identification will be held by using the references and specimens kept at the Herbarium Bogoriense. Therefore, there is possibility of some species with different local names are included in the same species. On the other hand, it is possible if specimens with same local name but it is included in the different species.

3.4.2 Collection Activity

Collection activity was done to collect the sample which it will be used as a specimens for further researchers or for another researcher (Rugayah, Widjaja, Praptiwi, 2004). The reseach areas are included: Wonokerto village, Rejoyoso, Rejosari, Karangsari, Wonorejo, Pringgodani, Bantur, Srigonco, Sumber bening village.

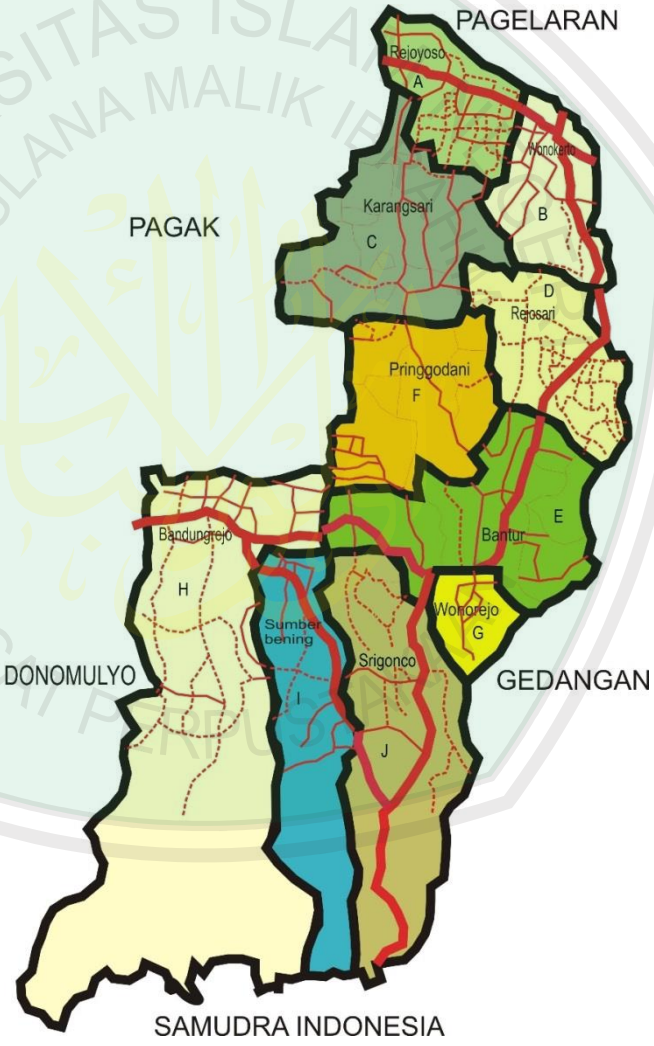


Figure 3.2: the collection points A. Rejoyoso Village, B. Wonokerto Village C. Karangsari Village, D. Rejosari Village, E. Bantur Village, F. Pringgodani Village, G. Wonorejo Village, H. Bandungrejo Village, I. Sumber bening Village, J. Srigonco Village. (www.bantur.malangkab.go.id, Accessed at 15 January 2016).

3.4.3 Preparing specimen herbarium

Rhizome are rarely collected because heavy and bulky. The important part of bamboo for identification which is obtained from shoots or sheaths attached to the shoot till the trunk when the shoot elongated. Culm sheath was prepared from the young culm or shoot. Shoot should be cut about 30 cm from the shoot tip. It is expected that the culm sheath of the shoot is still complete with auricle, bristle, ligule as well as blade position.

Information on stem or culm is required to get the information on its diameter at height breast and the internode length. Branches are very important to get the detail information or small cutting from the complete branches. The branches may be subequal or one dominant branch followed by smaller branches.

Some leaves collected which were attached to branches will be folded up in the newspaper. It is expected that the leaves should be have leaf sheath which may show its auricle, with or without bristle, ligule with bristle or without bristle (Rugayah, Widjaja, Praptiwi, 2004) (Fig.3.3).

Bamboo flowering is very rare, however, its vegetative characters can be used to identify the genera and even species. Therefore, to do the identification, the complete collection is neccessary.

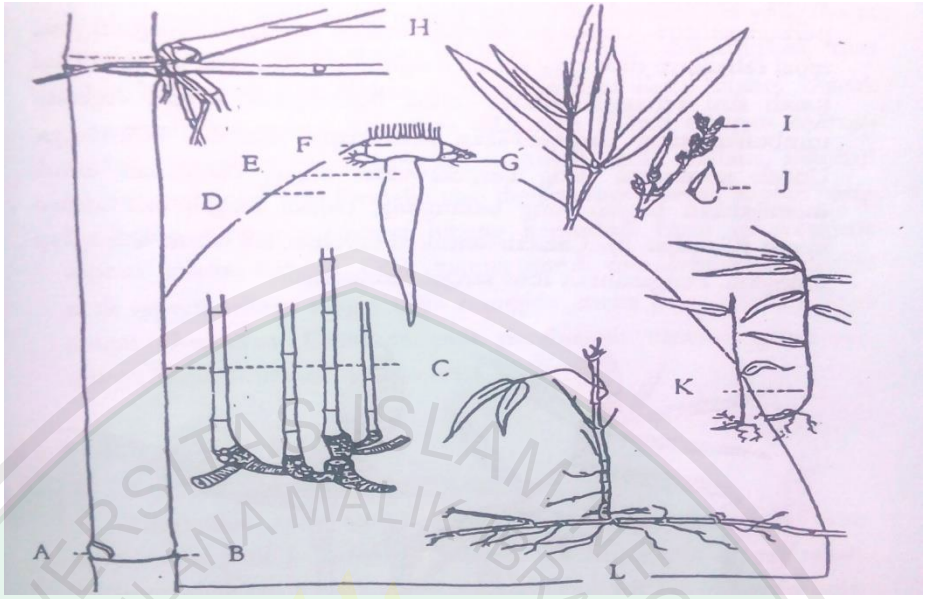


Figure 3.3 The important parts of bamboo for Herbarium collection. A. Buds, B. Nodes, C. Culm, D. Sheaths, E. Blades, F. Ligula, G. Auricle, H. Branches, I. Inflorescene, J. Floret, K. Germination, L. Rhizome Root.

3.4.4 Morphologhy Characterization

Characterization and identification of bamboo was held at Herbarium Bogoriense LIPI, which is based on comparison with bamboo specimens in the Herbarium Bogoriense and using the existing of Library reference (Holttum, 1958; McClure, 1966; Widjaja, 1997; Wong, 1995;).

3.4.5 Documentation

Documentation is very important activity in research studies, because all of collected data at the collection time must be documented to avoid from losing. Data documentation can be done at fieldwork and laboratory. (Rugayah, Widjaja, Praptiwi, 2004).

3.5 Data Analysis

The data obtained from the observation were analyzed descriptively. The results of analysis compared with the literature (Holttum, 1958; McClure; 1966; Widjaja, 1987; Widjaja, 1997; Dransfield & Widjaja, 1995; Widjaja, 2001; Widjaja, 2005; Wong, 1995; Wong, 2004), and study comparison with specimen herbarium at Herbarium Bogoriense Botany Division Research Center for Biology-LIPI Cibinong Science Center (CSC), Bogor, West Java.

BAB IV

RESULT AND DISCUSSION

4.1. The Bamboos species at Sub district Bantur Malang

Based on the specimens collected at Sub district Bantur, Malang. It is recorded that there are 13 species of 7 genera bamboo and 3 variesties found (Table 4.1). There are 7 genera found i.e. 3 species of Bambusa and 3 varieties of Bambusa, 1 species of Dendrocalamus, 1 species of Dinochloa, 1 species of Fimbribambusa, 3 species of Gigantochloa and 4 species of Schizostachyum and 1 species of Thyrsostachys.

During this study the description of each species will be described and the identification keys of each genera and species is elaborated. The locality detail of each species including its elevation and its coordinate point, local name, uses, and the important notes is described below:

Table. 4.1 Species of bamboo at Sub District Bantur, Malang.

No	Genus	Species	Local name/ Vernacuar name
1.	Bambusa	1. *Bambusa blumeana* J.A. & J.H. Schult. 2. *Bambusa glaucophylla* Widjaja 3. *Bambusa vulgaris* Schrad. ex Wendl. 4. *Bambusa vulgaris* var. striata McClure 5. *Bambusa vulgaris* var. wamin McClure	1. Pring Ori 2. Pring Hias 3. Pring Ijo 4. Pring Kuning 5. Pring Budha
2.	Dendrocalamus	1. *Dendrocalamus asper* (Schult.) Backer ex Heyne	1. Pring Betung
3.	Dinochloa	1. *Dinochloa matmat* S. Dransf. & Widjaja	1. Pring Jalar/embong
4.	Fimbribambusa	1. *Fimbribambusa horsfieldii* (Munro) Widjaja	1. Pring Jalar/embong
5.	Gigantochloa	1. *Gigantochloa atroviolacea* Widjaja 2. *Gigantochloa apus* (J.A. & J.H. Schult.) Kurz 3. *Gigantochloa atter* (Hassk.) Kurz	1. Pring Ireng 2. Pring Tali 3. Pring Legi/ Jawa
6.	Schizostachyum	1. *Schizostachyum iraten* Steud. 2. *Schizostachyum brachyladum* Kurz 3. *Schizostachyum zollingeri* Steud. 4. *Schizostachyum castaneum* Widjaja	1. Buluh Talang 2. Buluh Talang 3. Pring Rampal 4. Buluh Talang
7.	Thyrsostachys	1. *Thyrsostachys siamensis* Gamble	1. Pring Jepang

Identification Key of the Bamboos Genera at Sub District Bantur, Malang.

Identification key of each genera and species is showed bellowed. Most of the identification is followed Widjaja publication in 1997 and 1987. Beside that book by Wong (2004), Holttum (1958) is also used.

Identification key to the Bamboos Genera.

1. a. Culm climbing to scrambling…….....2

   b. Culm erect.…….……3

2. a. Culm climbing, scar sheath rough at the node, dominant branch dormant it will develop when the main culm is cut off….. ……...…*Dinochloa*

   b. Culm scrambling, without scar sheath but have fimbril or patella on the node base, dominant branch develop not dormant……...*Fimbribambusa*

3. a. Culm erect, branches subequal, tip pendulous……..…*Schizostachyum*

   b. Culm erect, branches one dominant with others smaller, tip not very pendulous…….4

4. a. The young culm with or without scattered hairs, bearing aerial root on the lower culm……..5

   b. The young culm often covered by brown velvety hairs or white wax, bearing aeral root on the lower culm which is very short up to the mid culm ……..…*Dendrocalamus*

5. a. Culm zigzag not straight, branches may appear from the lower culm……Bambusa

   b. Culm straight, branches appear only on the mid culm upward…….6

6. a. Internode short, leaves small, culm sheath papery, thin……..…*Thyrsostachys*

   b. Internode long, leaves big, culm sheath charteceous, thick…..…..*Gigantochloa*

4.2 Bamboo Description

Bambusa Schreber

Sympodial, **Culms** erect to slightly zigzag; internode shorter each the mid culm and nodes without aerial roots. **Branches** usually grow above the ground with one dominant lateral branch and several smaller branches. **Culms sheaths** covered with dark brown hairs, auricles lobe-like and bristly on the margin, sometime glabrous; Blades erect spreading to deflexed, triangular with a broad base. **Leaves** glabrous, with or without longitudinal white stripes, with or without small lobe auricle, mostly glabrous.

Key to Bambusa Species

1. a. Branching at the culm with spines……*Bambusa blumeana*

b. Branching at the culm without spines……...2

2. a. Culm more than 5 cm in diameter, zigzag, sometimes drum like, auricle lobe like, outward, with bristle, leaves green sometimes with yellow strips…….*Bambusa vulgaris*

    a. Culm yellow with green strips, leaves green sometimes with yellow strip……...*Bambusa vulgaris* var. *striata*

    b. Culm green without strips, leaves green …….....i

        i. Culm internode very short producing drum like.....*Bambusa vulgaris* var *wamin*

        ii. Culm internode straight……*Bambusa vulgaris* (var *vulgaris*)

b. Culm less than 3 cm in diameter, culm sheath auricle rounded, without bristle, leaves green with white strip……*Bambusa glaucophylla*

1. *Bambusa blumeana* J.A. & J.H. Schult

Arundarbor blumeana (Schult.) Kuntze. Revis. Gen. PI. 2: 761 1891

Arundarbor pungens (Blanco) Kuntze. Revis. Gen. PI. 2: 761 1891

Bambusa blumeana var. luzonensis Hack. Allg. Bot. Z. Syst. 21: 127 1915

Bambusa pungens Blanco. FI. Filip. 270 1837

Bambusa spinose Blume ex Nees. Flora 8:580 1825

Bambusa stenostachya Hack. Bull. Herb. Boissier 7: 725. 1899

Bambusa teba Miq. FI. Ned. Ind. 3:418 1857

Ischurochloa stenostachya (Hack). Sci. Educ. (Tokyo) 15(6): 68 1932

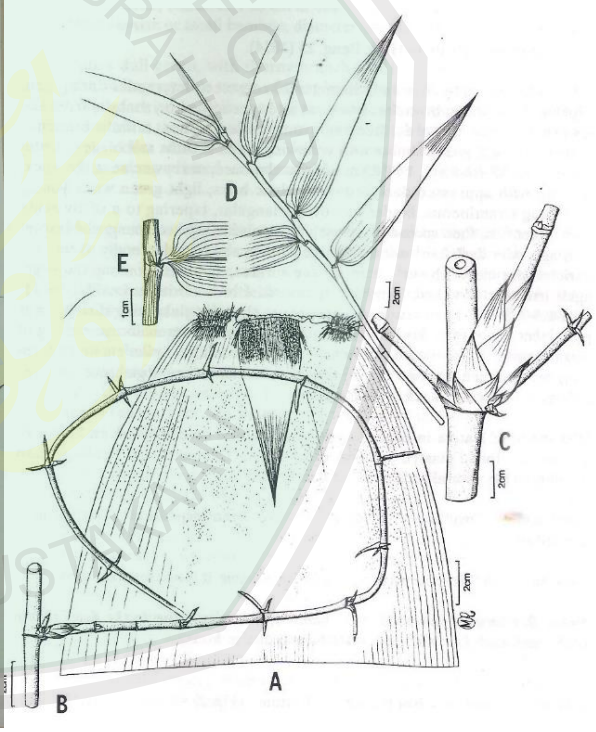
Schizostachyum durie Rupr. Mėm. Acad. Imp. Sci. Saint-Pėtersbroug, Sėr. 6, Sci. Math., Seconde Pt. Sci. Nat. 5: 136 1839.

Rhizome sympodial, **Clump** erect and compact, **Shoots** orange, covered by brown hairs. **Culms** straight to slightly zigzag, cylinder, when young with white-wax, and spread brown hairs; old culm green, glabrous; internodes 20-30 cm long, 6-9 cm diameter; walls 8-18 mm thick., nodes without aerial roots; developing spines at the nodes when the branching developed. **Branches** just above the ground and one dominant primary branch with several smaller secondary branches, branching with spines. **Culm sheaths** deciduous, covered by brown to black hairs, basal 18 cm width; auricles lobe-like and wrinkled, 3 mm high, bristle 12 mm; ligule low rim, 3 mm high, bristle 3 mm; culm sheath blade 7 X 0.5 cm, broadly to narrowly lanceolate, erect on the lower culm, the upper part

blade reflexed. **Leaves** 9-16.5 x 0.9-2 cm, petiole 4 mm long, green, glabrous; auricles 1 mm high, glabrous; ligule serrate, 2 mm high, bristles 2 mm. **Inflorescences** not seen.

- **Vernacular Name:** Pring Ori
- **Distribution:** This species grown in all villages at Sub District Bantur Malang.
- **Habitat:** This species grown in garden, along the river bank, garden. Altitude 23.5 - 30 m asl,

Fig. 4.1 (1) *Bambusa blumena* J.A. & J.H. Schult., A. Culm sheath, B. Shoots, C. Leafy branch, D. Basal spiny branch (Researcher Documentation).



(2) *Bambusa blumena*, A. Culm sheath, B. Basal spiny branch, C. Mid-culm branch complement, D. Leafy branch, E. Leaf sheath, detail. (From fresh material) (Dransfield and Widaja, 1995).

(3) Field figure of *Bambusa blumeana;* A. Branching with spines, B. Leaves, C. Culm pale green (Researcher Documentation).

2. *Bambusa glaucophylla* Widjaja

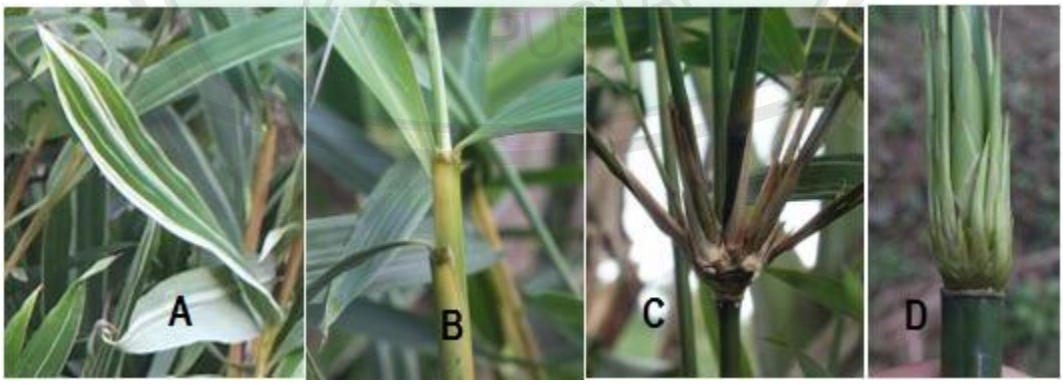
Bambusa sp., Holtum, Gard. Bull. Singapore 16:71. 1958.

Bambusa variegate Hort., non Miq. Wong, Bamboos Pen. Mal.: 104. 1995.

Rhizome sympodial. **Clump** erect and compact, **Shoot** green, glabrous or covered by brown hairs. **Culms** straight to slightly zigzag, green, with erect tips., internodes 15-25 cm long by 1.5- 2 cm diameter; walls 5-7 mm thick, nodes without aerial roots. **Branches** just above the ground and one dominant lateral branch with some smaller branches. **Culm sheaths** easily deciduous, covered by brown to black hairs, basal 3 cm width; auricles rounded with slightly curved outward, 2 mm high, glabrous; ligule entire, 1 mm high, glabrous; blade 5.5 X 0.5 cm; erect, triangular, base narrow. **Leaves** 6.5-12 x 0.6-0.9 cm, glabrous, green with longitudinal white stripes; auricles rounded with outcurved, 1 mm high, glabrous; ligule entire, 1 mm high, glabrous. **Inflorescences** not seen.

- **Vernacular Name:** Pring hias
- **Distribution:** This bamboo grown in Wonokerto and Rejoyoso.
- **Habitat:** gardens or fences and 365.76 m asl

Fig 4.2 (1) *Bambusa glaucophylla* Widjaja., A. Culm sheaths, B. Branches, C. Leaves (Researcher Documentation).



(2) Field figure of *Bambusa glaucophylla* Widjaja., A. Leaves green with white strip, B. leaves sheath, C. Branches un subquel, D. Nodes (Researcher Documentation).

3. *Bambusa vulgaris* Schrad. ex Wendl.

Bambusa vulgaris Schrad. Coll. PI. 2: 26 1808.

Bambusa vulgaris Nees. FI. Afr. Austral. III. 462 184.

Bambusa vulgaris var. Stand. Cycl. Hort. 1: 448 1914.

Bambusa vulgaris var. *latiflora* Balansa. J. Bot. (Morot) 4: 30 1890.

Bambusa vulgaris var. *striata*. (Lodd. Ex Lindl). Ann. Roy. Bot Gard. (Calcutta) 7:44 1896.

Bambusa vulgaris f. *vittata*. (Rivière & Rivière) McClure. Fieldiana, Bot. 24 (2): 60. 1955.

Bambusa vulgaris var. *vittata*. Rivière & C. Rivière. Bull, Soc. Natl. Acclim. France III, 5: 640 1878.

Bambusa vulgaris f. *waminii* T. H. wen. J. Bamboo Res. 4 (2): 16. 1985.

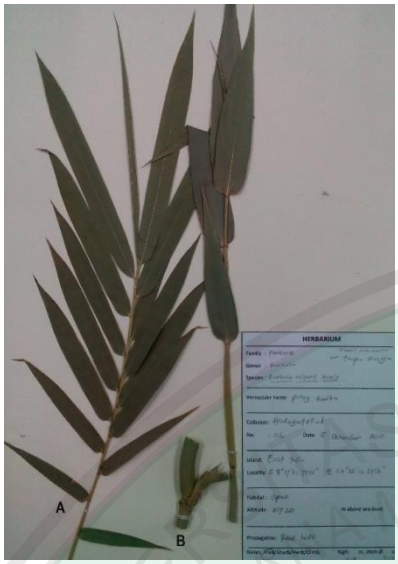
Rimpang sympodial, **Clump** erect and slightly loosely, **Shoots** green, covered by brown to black hairs., **Culms** straight, slightly zigzag, cylinder, or drum-like, green to yellow with green strips, glabrous, internodes 25-40 (6.5-10) cm long, 5-8 cm diameter; walls 6-18 mm thick., nodes without aerial roots. **Branch** just above the ground, one dominant primary branch with several smaller secondary branches. **Culm sheaths** deciduous easily, at apex is covered by brown to black hairs, wide at the bottom 20 cm; auricles rounded with slightly curved outward, 1 mm high, bristles 3 mm; ligule entire, 3 mm high, without bristles; blade with 7 cm long and 0.5 cm wide, erect, triangular, base narrow. **Leaves** 9.4-25 x 0.8-3 cm, stem 4 mm long, green, glabrous; auricles 1 mm high, glabrous, bristles absent; ligule entire, 1 mm high, bristles absent. **Inflorescences** unseen.

- **Vernacular Name: green variety:** Pring Ijo; yellow variety: pring kuning; Drum like variety: pring budha.
- **Distribution**

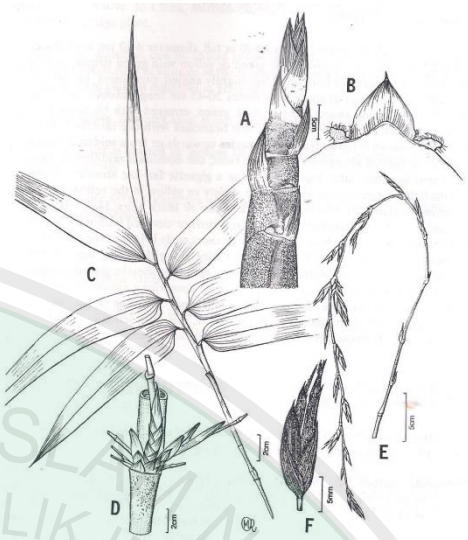
This green variety grow in 7 villages, there are Bantur, Rejosari, Wonokerto, Bandungrejo, Pringgodani, Wonokerto, Karangsari and Rejoyoso. Yellow variety grow in villages, there are Bantur, Rejosari, Wonokerto, Bandungrejo, Pringgodani, wonokerto and karangsari. The drum like variety grow in one village, it is Bantur Village

Habitat: Open areas at the altitude c. 300 – 350 m asl (green variety) and up to 400 m asl for yellow variety and the drum like variety grow at 200 – 250 m asl. in the garden.

Fig. 4.3 (1) *Bambusa vulgaris*; A. Culm sheath, B. Branches, C. Leaves (Researcher Documentation). **(2)** *Bambusa vulgaris* var. Striata; A. Culm sheath, B. Shoot, C. Leaves, D. Branches (Researcher Documentation).



(3) *Bambusa vulgaris* var. wamin McClure., A. Leaves, B. Branches (Researcher Documentation).



(4) *Bambusa vulgaris*, A. Culm shoot; B. Culm sheath, inner (adaxial) side of upper part; C. Leafy branch; D. Branch complement; E. Flowering branch; F. Spikelet (Dransfield and Widjaja, 1995).

(5) Field figure of *Bambusa vulgaris;* A. Shoot, B. Culm green, C. Leaves sheath, D. Leaves (Researcher Documentation).

(6) Field figure of *Bambusa vulgaris* var. Striata; A. Shoot, B. Leaves, C. Branches, D. Culm yellow (Researcher Documentation).

Dendrocalamus nees

Sympodial, Culms erect, branch above the middle of the culm with one dominant primary branch and several smaller secondary branches. Culm sheaths usually covered pale to dark brown hairs, auricles lobe-like and bristly on the margin, sometime glabrous; blade deflexed, usually triangular with a narrow base, Inflorescences indeterminate. Pseudospikelet with short rachilla; glumme, acuminate, with hairs on margin; lemma mucronate, with hairs on margin; palea acute with hairs on margin, two-keeled; lodicule absent; ovary pubescent; stylus with hairs; stigma white, singular; filament white; anther 6, yellowish.

Key Identification of Dendrocalamus Species

1. Culm base with aerial roots, covered by velvety brown hairs when old many lichen found in the culm …….....*Dendrocalamus asper*

***Dendrocalamus asper* (Schult.) Backer ex Heyne**

Arundarbor aspera Rumph. Herb. Amboin. Auctuar. 96-103 1755.

Arundarbor bitung (Schult.) Kuntze. Revis. Gen. PI. 2: 761 189.

Arundo aspera (Schult.f.) Oken. Allg. Naturgesch. 3(1): 422 1841.

Arundo piscatorial Lour. FI. Cochich. 55 1790.

Bambusa aspera Schult.f. Syst. Veg. 7: 1352 1830.

Bambusa bitung Schult.f. Syst. Veg. 7: 1354 1830.

Dendrocalamus flagellifera Munro. Trans. Linn. Soc. London 26: 150 1868.

Gigantochloa aspera (Schult.) Kurz. Indian Forester 1: 221 1876.

Schizostachyum bitung (Schult.) Steud. Syn. PI. Glumac. 1: 332 1854.

Rhizome sympodial, **Shoots** black, covered by brown velvety hairs. **Clump** erect and compact. **Culms** straight with pendulous tips, cylinder, dark green, internodes 35-45 cm long, 10- 15 cm diameter; walls 25 mm thick, when young covered with velvety brown hairs and drop off when older. Old culm above 3 years old, covered by lichens, so look like white spotted, nodes with aerial roots from culm base to apex of the culm in old culm. **Branches** above the mid culm with one dominant primary branch with some smaller branches. **Culms sheath** absent not seen. **Leaves sheath** sometimes with black to white hairs; auricles rounded and out curved, 1 mm high, glabrous; ligule entire, 1 mm high, glabrous; **Leaves** 27-38 x 2.5 - 8 cm, glabrous, green. **Inflorescences** pseudospikelets 9-12 mm long, with 1 fertile floret, rachilla glabrous, 1 mm long; glumma acuminate, with hairs on margin, 2 mm long; lemma with hairs on margin, mucronate, 4-5 mm long; palea acute with hairs on margin, 5-6 mm long, two-keeled; lodicule absent; ovary pubescent; stylus with hairs, 1 mm long; stigma white, singular; filament white; anther 6, yellowish with 3.5-4.5 long.

Vernacular Name: Pring Betung.

Distribution: This bamboo grown in 7 villages, there are Bantur, Rejosari, Bandungrejo, Pringgodani, Wonokerto, Karangsari and Rejoyoso.

Habitat: Open areas and 350-375 m asl

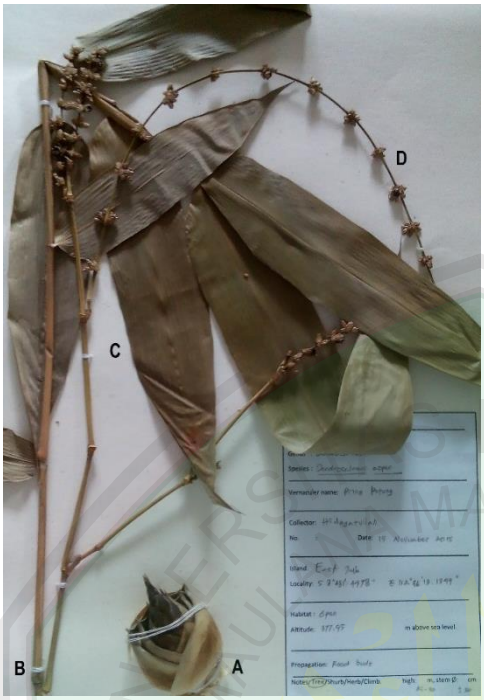
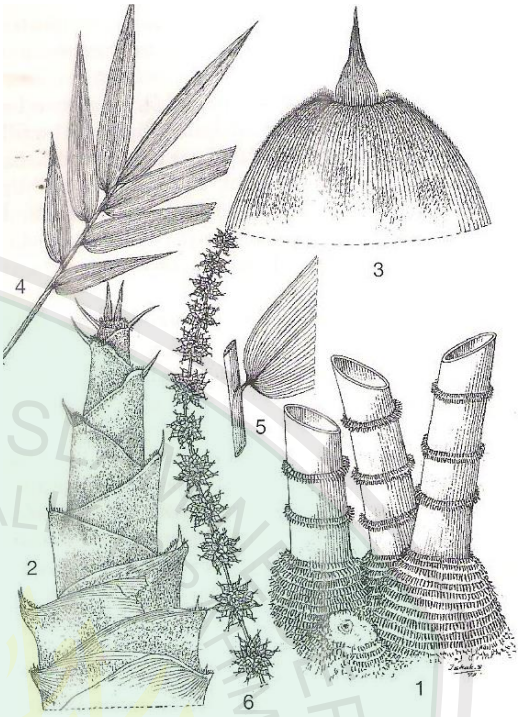


Fig. 4.4 (1) *Dendrocalamus asper;* A. Shoot, B. Branches, C. Leaves, D. Flowering (Researcher Documentation).



(2) *Dendrocalamus asper;* 1. Habit culm bases; 2. Young shoot; 3. Culm leaf (abaxial side); 4. Leafy branch; 5. Base of leaf; 6. Flowering branch (Dransfield & Widjaja, 1995).

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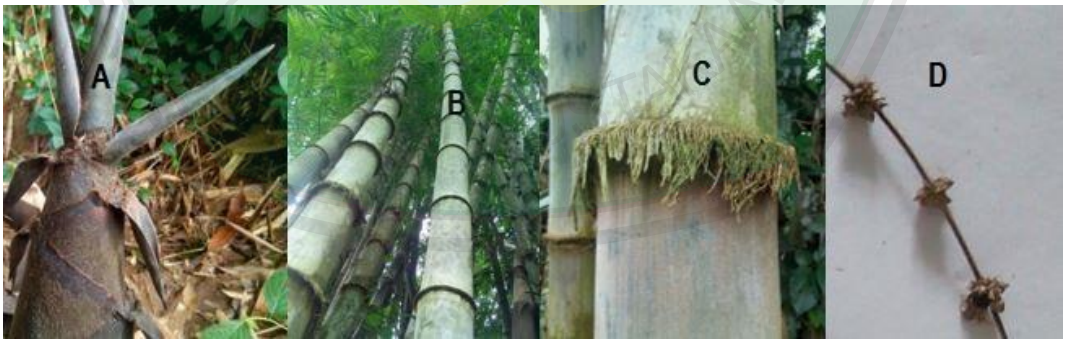


(3) Field figure of *Dendrocalamus asper*, A. Shoot, B. Culm with areal roots, C. Nodes, D. Inflorescences (Researcher Documentation).

Dinochloa Buse

Sympodial, Culms climbing and zigzag, usually internodes rough and swollen at the nodes., Branches with one dominant branch dormant and bigger with another branches, when the main culm cut off, dominant branch develop as large as the main culm. Culm sheaths usually covered white wax, auricles present or absent; leaves of culm sheath erect to deflexed, blades broadly ovate to ovate-lanceolate.

Key Identification of Dinochloa Species

1. Pseudospikelet up to 3.5 mm long, bract 1 mm long, buds 3 with less than 1 mm long, rachilla 2 mm, 1 fertile, glumme glabrous; lemma glabrous, acuminate; palea glabrous, un distinct keels it; ovary present, stylus glabrous, lodicule absent, stamen 2 up to 6, anther yellowish……..*Dinochloa matmat*

Dinochloa matmat S. Dransf. & Widjaja

Rhizome sympodial. **Clump** climbing and uncompact. **Shoots** green, covered by white wax. **Culms** climbing, cylinder, rather rough, lumen small almost solid; internodes 10-15 cm long, 6-15 mm diameter; nodes with rough scar sheath. **Branches** with one dominant branch dormant and bigger than another branch, when the main culm cut off, the dominant branch develop as large as main culm. **Culm sheaths** caducous, covered by white hairs on the base which easily shed, wide at the basal 4 cm; auricles absent; ligule entire, 1 mm high, glabrous; blade with 3 cm long and 0.5 cm wide, erect, triangular. **Leaves** 8.5-13.5 x 2-3 cm, petiole 1 mm long, green, glabrous; auricles absent, glabrous; ligule entire, 1 mm high, glabrous. **Inflorescences** Pseudospikelet up to 3.5 mm long, 1 fertile,

Glumae up to 1.5 mm long, acute, glabrous; lemma 3 mm long, acuminate, glabrous; palea 3.5 mm long, undistinct keels, ovary glabrous, stylus 2 mm long, stigma singular, lodicule absent, filament 3 mm long, white, glabrous; anther 6, 1.5 mm long, yellowish and glabrous.

Vernacular Name: Pring jalar/embong.

Distribution: This species grown at Srigonco and Sumber bening villages.

Habitat: Secondary forest.

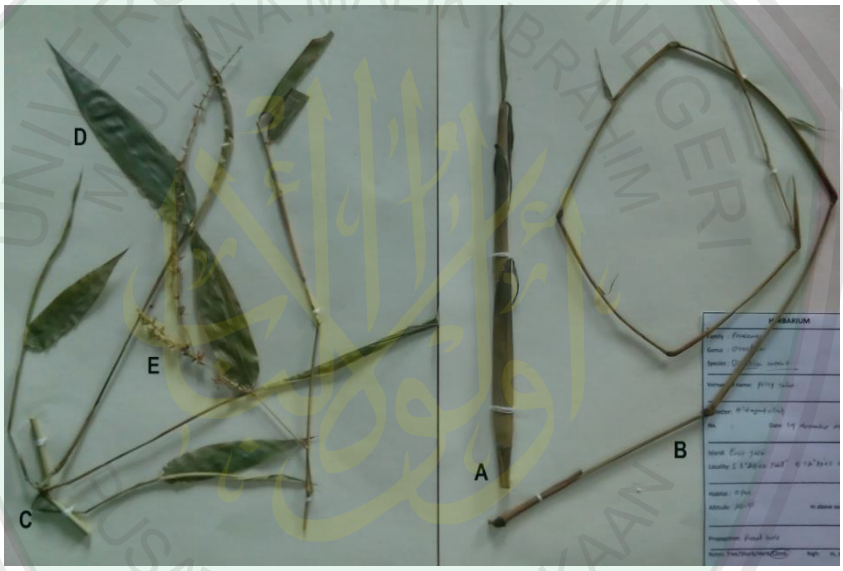
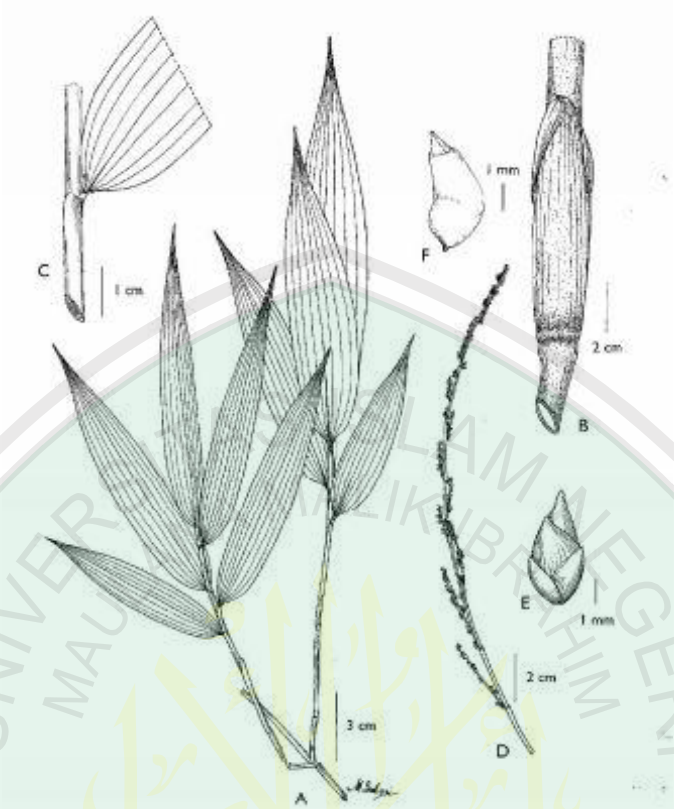
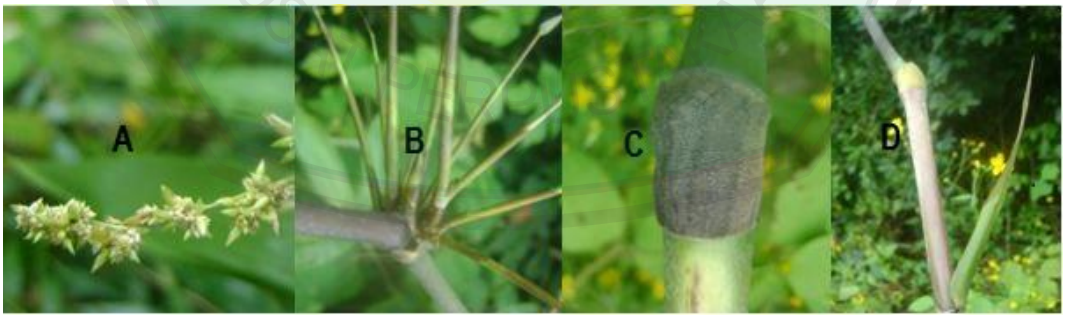


Fig. 4.5 (1) *Dinochloa matmat* S. Dransf. & Widjaja., A. Shoot, B. Culm, C. Branches, D. Leaves, E. Flowering (Researcher Documentation).



(2) *Dinochloa matmat*. A. leafy branches; B. Culm sheath; C. Base of leaf blade; D. Part of inflorenscence; E. spikelet; F. fruit; A, C-F from var Kriten & Pleyte Sa, B. from Widjaja 6692. Drawn by M. Subari (Widjaja & Dransfield, 2000).



(3) Field figure of *Dinochloa matmat*., A. Inflorescences, B. Branches with dormant bud, other smaller branches, C. Nodes not swollen, scar sheath, D. Internodes (Researcher Documentation).

Fimbribambusa Widjaja

Sympodial, shoots light green to dark green and covered by white wax, glabrous. Culms erect when young, when older taller and then scrambling to another tree nearby. The branches has one dormant and dominant branch bigger with another branch at each node, when the main culm cut off, the dormant bud developing as large as the main culm; nodes with a short patella. Culm sheaths auricles horn-like; bristle short to long; blades spreading to deflexed. Leaves glabrous with auricles horn-like and with bristle.

Key Identification of Fimbribambusa Species

1. Blades of culm sheath spreading to deflexed, auricles horn-like, bristles short to long, ligule entire, glabrous and the node at the culm with patella ……..…..... *Fimbribambusa horsfieldii*.

***Fimbribambusa horsfieldii* (Munro) Widjaja**

Rhizome sympodial. **Clump** scrambling and uncompact on the base, **Shoots** green, covered by white wax. **Culms** erect to scrambling, cylinder; internodes 10-15 cm long, 6-15 mm diameter; nodes with short patella; the culm tips scrambling over nearby trees. **Branches** with one dominant branch bigger than another branch, sometime dormant, when the main culm cut off, the dormant branch developing as large as the main culm. **Culm sheaths** deciduous; auricles 2 mm, horn like, bristle few; ligule entire, 1 mm high; blade 5 x 0.5 cm, spreading to deflexed, triangular, basal narrow. **Leaves** 7-23 x 1.2-4.8 cm, petiole 3 mm

long, green, glabrous, auricles 3 mm long, horn like, bristles few; ligule up to 2 mm high. **Inflorescences** unseen.

Vernacular Name: Pring jalar/embong (Bantur).

Distribution: This species grown at Srigonco and Sumber Bening villages.

Habitat: Secondary forest and 26.53 m asl

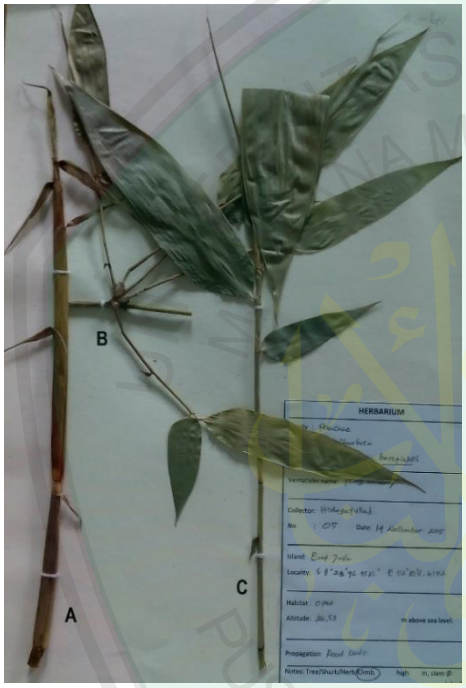
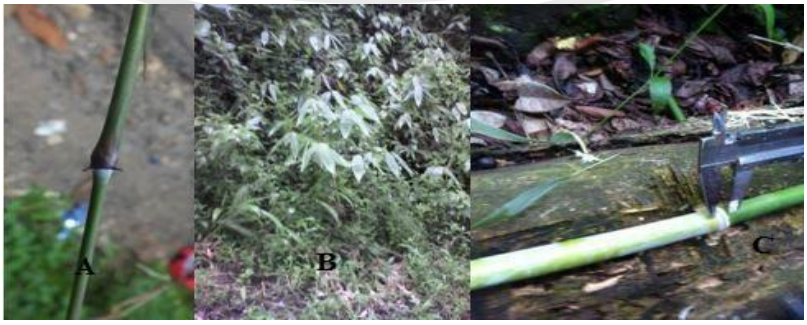


Fig. 4.6 (1) *Fimbribambusa horsfieldii* (Munro) Widjaja; A. Shoots, B. Branches, C. Leafy branch. **(2)** *Fimbribambusa horsfieldii* (Munro) Widjaja; A. Leaves, B. Flowering (Widjaja, 1995).



(3) Field figure of *Fimbribambusa horsfieldii* (Munro) Widjaja; A. Nodes, B. Leaves, C. Culm and Internode

Gigantochloa Kurz ex Munro

Sympodial, **Culms** erect., basal internode shorter than the mid culm, the basal culm found aerial roots and mid culm without aerial roots. **Branches** borne on the middle culm with one dominant primary branch and several smaller secondary branches. **Culms sheath** mostly caducous with covered by brown to black hairs, auricles present, with or without bristle, except *G. apus* which have persistent culm sheath, blade mostly deflexed, usually triangular to narrow base. Inflorescences Pseudospikelet with rachilla, glabrous; glumma present; lemma present, lemma longer than gulmae; palea two-keeled, apex rounded; lodicules 3 present or absent; ovary obovoid with pubescent at the apex; stylus singular, white; stigma singular; filament united or fused into tube; anther 6.

Key Identification of Gigantochloa Species

1. a. Culm green purplish, shoots green with orange at the apex…*Gigantochloa atroviolacea*

b. Culm pale green to green, shoots green ……..……..……...2

2. a. Culm sheath caduceus, culm green…….,,,, *Gigantochloa atter*

b. Culm sheath appressed, culm pale green……..…*Gigantochloa apus*

1. *Gigantochloa apus* (J.A. & J.H. Schult.) Kurz.

Arundarbor apus (Schult.) Kuntze. Revis. Gen. PI. 2: 761 1891.

Bambusa apus Schult.f. Syst. Veg. 7: 1353 1830.

Gigantochloa kurzii Gamble. Ann. Roy. Bot. Gard. (Calcutta) 7:65 1896.

Oxytenanthera apus (Schult.) E.G. Camus. Bambusėes 145 1913.

Schizostachyum apus (Schult.) Steud. Syn. PI. Glumac. 1: 332 1854.

Rhizome sympodial, **Clump** erect and compact, **Shoots** green, covered by brown and black hairs. **Culms** straight, cylinder, pale green, glabrous, pnedulous tips, internodes (32-47.8) X (5-13) cm diameter; walls 6-13 mm, nodes without aerial roots. **Branch** above the ground and one dominant primary branch bigger than another branch. **Culms sheaths** absent; **Leaves** 12-23 x 2.4-3.7 cm, petiole 5 mm long, green, glabrous; auricles small, rounded, 1 mm high, bristles absent; ligule entire, 2 mm high, bristles absent. **Inflorescences** unseen.

Vernacular Name: Pring tali.

Distribution: Grown in Bantur, Bandungrejo, Karangsari, Wonokerto, Wonorejo villages. **Habitat:** Open areas at altitude 350 – 400 m asl

Fig. 4.7 (1) *Gigantochloa apus* (J.A. & J.H. Schult.) Kurz., A. Leafy branch, B. Each Flowering (Researcher Documentation). **(2)** *Gigantochloa apus.*, 1. Habit; 2. Young shoot; 3. Culm leaf (abaxial side); 4. Leafy branch; 5. Base of lea; 6. Flowering branch (Dransfield and Widjaja, 1995).

(3) Field figure of *Gigantochloa apus*., A. Shoot, B. Leaves, C. Branches, D. Leaves sheath (Researcher Documentation).

2. *Gigantochloa atroviolacea* Widjaja

Gigantochloa atter var. nigra Gamble. Ann. Roy. Bot. Gard. (Calcutta) 7:61 1896 (p.p)

Rhizome sympodial, **Clump** erect and compact, **Shoots** green to orange at the apex, covered by brown to black hairs., **Culms** straight, cylinder, dark green to black, glabrous, internodes 32-47 cm long, 5-7 cm diameter; walls 6-7 mm thick; nodes without aerial roots. **Branches** above the ground and one dominant primary branch bigger than another branch. **Culms sheath** caducous, covered by spread brown to black hairs, basal 31 cm; auricles rounded, 3 mm high, bristles 4 mm; ligule denticulate, 2 mm high, bristles 2 mm; blade 8.3 x 2.8 cm, deflexed, triangular, base narrow. **Leaves** 17-27 x 3-5 cm, petiole 5 mm long, green, glabrous; auricles 1 mm high, bristles absent; ligule denticulate, 2 mm high, bristles absent. **Inflorescences** unseen..

Vernacular Name: Pring item

Distribution: Grow in Pringgodani village

Habitat: Garden at altitude 300 – 350 m asl

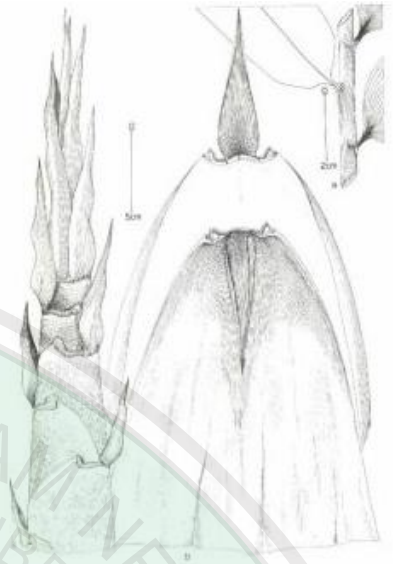


Fig. 4.8 (1) *Gigantochloa. atroviolacea* Widjaja., A. Shoots, B. Culm sheath, C. Branches, D. Leaves. (Researcher Documentation).

(2) *Gigantochloa atroviolacea* Widjaja. 1. Habit; 2. Culm leaf (abaxial side); 3. Leafy branch; 4. Base of leaf; 5. flowering branch (Dransfield and Widjaja, 1995).

(3) Field figure of *G. atroviolacea* Widjaja., A. Shoot, B. Culm, C. Leaves, D. Branches (Researcher Documentation).

3. *Gigantochloa atter* (Hassk.) Kurz.

Gigantochloa atter var. nigra Gamble. Ann. Roy. Bot. Gard. (Calcutta) 7:61 1896 (p.p)

Rhizome sympodial. **Clump** erect and compact. **Shoots** green, covered by spread brown hairs., **Culms** straight, cylinder, green, glabrous with pendulous tips, internodes (30-45) X (5- 9) cm diameter; walls 6-7 mm. **Branches** above the ground and one dominant primary branch bigger than another branches. **Culms sheath** caducous, covered by brown to black hairs; auricles rounded slightly curved outward, 5 mm high, bristles absent; ligule entire, 1 mm high glabrous, wide at the bottom 21.5 cm; blade 17.4 X 4 cm, deflexed, triangular, narrow bases. **Leaves** 6-12 x 1.2-2 cm, stem 4 mm long, green, glabrous; auricles small, 1 mm high, bristles absent; ligule entire, 2 mm high, bristles absent. **Inflorescences** pseudospikelets 9-10 mm long, spikelet 6-8 long with fertile floret 3 or 4; glumma, mucronate with brown cilia on margin, 2-3 mm long; lemma acuminate, with brown hairs on margin, 4-5 mm long; palea acuminate with two-keeled, brown ciliate on margin, shorter than lemmas; lodicule absent; ovary pubescent; stylus 5.5 mm long; stigma white, singular; filament united or fused into tube, anther 6, yellowish 5 mm long.

Vernacular Name: Pring Legi and Pring Jawa.

Distribution: All village at Sub district Bantur

Habitat: Open areas at altitude 350 -375 m asl

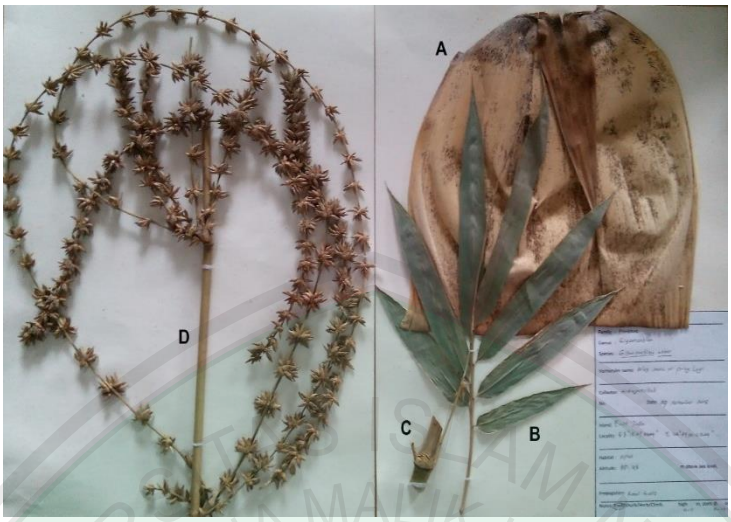


Fig. 4.9 (1) *Gigantochloa atter;* A. Culm sheath, B. Leaves, C. Branches, D. Flowering (Researcher Documentation).

(2) *Gigantochloa atter;* A. Leaves, B. Shoots, C. Culm sheath, D. Flowering (Widjaja, 1987).

(3) Field figure of *Gigantochloa atter;* A. Shoot, B. Branches, C. Leaves, D. Flowering (Researcher Documentation).

Schizostachyum Nees

Sympodial, Culms erect and, branch above the ground or above the middle of the culm with subequal branches. Culm sheaths with covered by pale to brown hairs, auricles present, with bristle sometime glabrous; blade erect to reflexed, usually triangular with a broad base. Leaves green, glabrous; auricles inconspicuous or small, bristle, ligule short, with or not bristles.

Key Identification of Schizostachyum Species

1. a. Culm sheath blade erect……..2

   b. Culm sheath blade deflexed ,……...*Schizostachchyum iraten* Steud
2. a. Culm sheath pubescent at the base, densely covered by brown hairs, culm sheath blade narrow at the base.....*Schizostachyum castaneum* Widjaja

   b. Culm sheath glabrous at the base, covered by dark brown to light brown, culm sheath blade broad at the base……3
3. a. Culm sheath blade triangular, shorter than half of the sheath, auricles rounded, big with many bristle…….....*Schizostachchyum zollingeri* Steud.

   b. Culm sheath blade triangular, more than half of the sheath, auricle rounded, small with few bristle ……..*Schizostachchyum brachyladum* Kurz.

1. *Schizostachyum brachyladum* Kurz

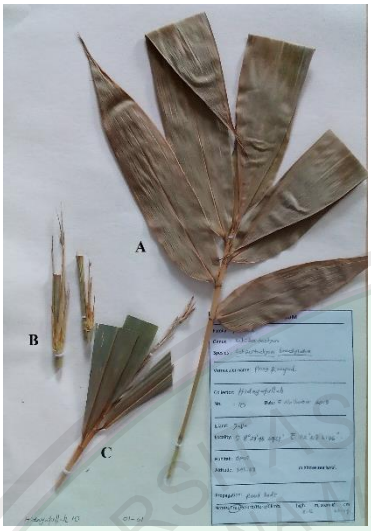
Schizostachyum *brachyladum* var. auriculatum Holttum. Gard. Bull. Singapure 16: 147 1958.

Rimpang sympodial, **Clump** erect and compact with curved tips, **Shoots** green covered by brown hairs. **Culms** straight with curved tip, cylinder, green, glabrous; internodes 35-45 cm long, 6-9 cm diameter; walls only 4 mm thick., nodes without breath of roots. **Branch** borne the mid culm with subequal branches. **Culm sheaths** deciduous hardly, covered by brown hairs, wide at the bottom 20 cm; auricles small and rim-like, 3-5 mm high, bristles up to 7 mm long; ligule entire, 1 mm high, glabrous; blade 6 x 5 cm, erect, triangular, base narrow. **Leaves** 13-27.8 x 3-4.9 cm, petiole 5 mm long, green, glabrous; auricles 1 mm high, bristles 8 mm long; ligule entire, 1 mm high, bristles absent. **Inflorescences** pseudospikelets 13-18 mm long, rachilla with hairs, 2 mm long; lemma, acute-mucronate, with hairs at the margin apex, 9-10 mm long; palea with hairs at the margin apex, bifid tips, 7-13 mm long, palea slightly longer than lemmas; lodicule 3 with ciliate at the margin apex; ovary glabrous; filament 4 mm long, white; anther 6, yellowish or brownish with 3 mm long.

Vernacular Name: Buluh Rampal

Distribution: Grow to 7 villages, such as Srigonco, Bandungrejo, Bantu, Pringgodani, Rejosari, Wonokerto, Karangsari.

Habitat: Open areas and 325-350 m asl.



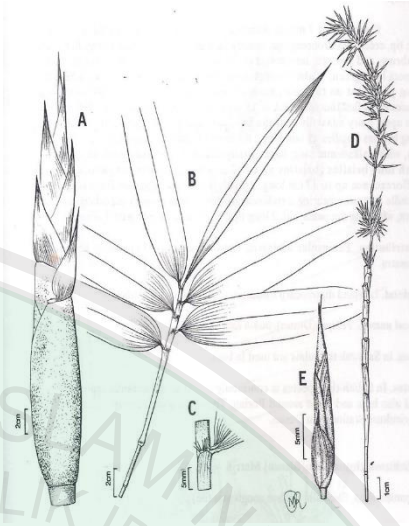


Fig. 4.10 (1) *Schizostachyum brachycladum***,** A. Leave; B. Branches; C. Flowering branch (Researcher Documentation). **(2)** *Schizostachyum brachycladum***,** A. Culm shoot; B. Leafy branch; C. Leaf sheath, detail; D. Flowering branch; E. Pseudospikelet (Dransfield and Widjaja, 1995).

(3) Field figure of *Schizostachyum brachycladum*., A. Shoot, B. Branches, C. Leaves, D. Flowering (Researcher Documentation).

2. *Schizostachchyum castaneum* Widjaja

Rhizome sympodial, **Clump** erect and compact. **Shoots** green with densely brown hairs. **Culms** straight with curved tip, cylinder, green, glabrous; internodes 45-60 x 4-5 cm diameter; walls up to 3 mm thick., nodes without aerial roots. **Branches** borne the mid culm with subequal branches. **Culm sheaths** deciduous tardily, covered by brown hairs, slightly pubescent at base, 14 cm at the base; auricles extending along the sheath apex up to the blade base, 2 mm high,

bristles 10 mm; ligule denticulate, bristles absent; blade 14 x 3 cm, erect, concave, ovate-oblong and base broadly triangular, but narrow than the sheath apex, adaxial slightly hairs. **Leaves** 21-27.8 x 4.5-5 cm, petiole 5-10 mm long, green, glabrous; auricles curved outward, 1 mm high, bristles 2 mm long; ligule denticulate, 1 mm high, bristles 5 mm. **Inflorescences** pseudospikelets 17-19 mm long, rachilla glabrous, 1 mm long; glumme hairs at the margin apex, acute, 5 x 2 mm wide,; lemma, acuminate, with hairs at the margin apex, 10 x 5 mm wide; palea with hairs at the margin apex, bifid tips, 12 x 3 mm wide, palea slightly longer than lemmas; lodicule absent; ovary glabrous; filament 3 mm long, white; anther 5 yellowish with 2.5 mm long.

Vernacular Name: Buluh Talang

Distribution: Grow onlyat Srigonco village.

Habitat: Secondary forest

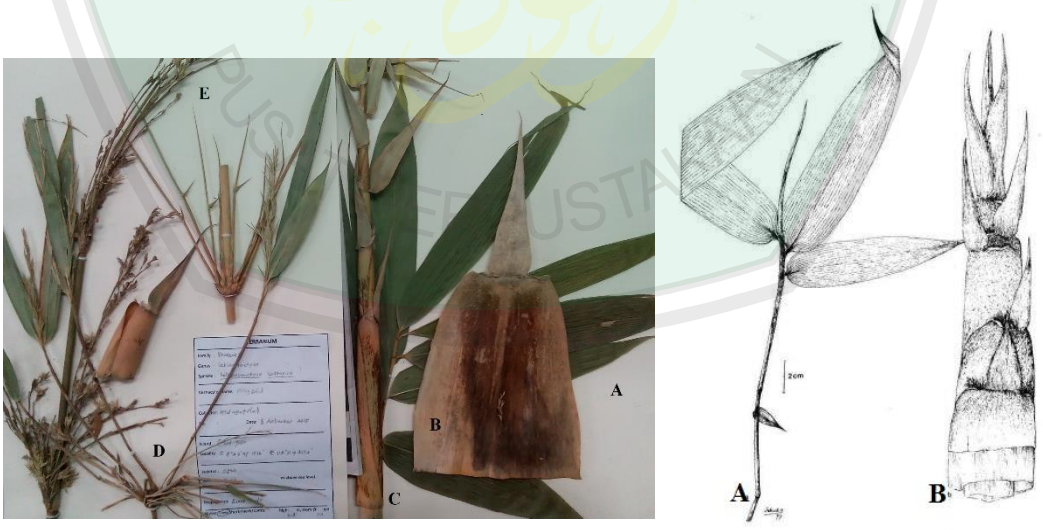


Fig. 4.11 (1) *Schizostachyum castaneum***,** A. Leaves, B. Culm-sheath, C. Shoots, D. Branches, E. Flowering (Researcher Dokumen tation). **(2)** *Schizostachyum castaneum***,** A. Leaves, B. Culm-sheath (Widjaja, 1987).

(3) *Schizostachyum castaneum*., A. Leaves, B. Shoots, C. Culm-sheath (Researcher Documentation).

(4) Field figure of *Schizostachyum castaneum*., A. Shoot, B. Branches, C. Leave culm-sheath, D. Flowering (Researcher Documentation).

3. *Schizostachyum iraten* Steud.

Rhizome sympodial, **Clump** erect and compact, **Shoots** light green covered by brown hairs. **Culms** straight with curved tip, cylinder, green, slightly hairy on the stem; internodes 50-75 cm long, 3-5 cm diameter; walls only 5 mm thick., nodes without breath of roots. **Branch** borne the mid culm with subquel branches. **Culm sheaths** hardly deciduous, covered by pale brown hairs, wide at the bottom 11.5 cm; auricles rim-like, 3 mm high, bristles up to 4 mm long; ligule denticulate, 1 mm high, bristles 1 mm; blade 13 x 2.3 cm wide, erect, triangular, base narrow. **Leaves** 14.7-22 x 2-3 cm, petiole 3 mm long, green, glabrous;

auricles inconspicuous, bristles 4 mm long; ligule entire, 1 mm high, bristles absent. **Inflorescences** pseudospikelets 12-20 mm long, rachilla with hairs, 1-2 mm long; lemma, acuminate-acumen short, glabrous, 8-9 mm long; palea glabrous, bifid tips, 11-13 mm long, palea slightly longer than lemmas; lodicule 3 with ciliate at the margin apex, 1.5 mm long; ovary glabrous; filament 4 mm long, white; anther 6 yellowish or brownish with 4.5 mm long.

Vernacular Name: Buluh Talang.

Distribution: Grow at several villages, such us Srigonco, Sumber bening, Bandungrejo, Pringgodani, Rejosari, Wonokerto, Karangsari.

Habitat: Open areas

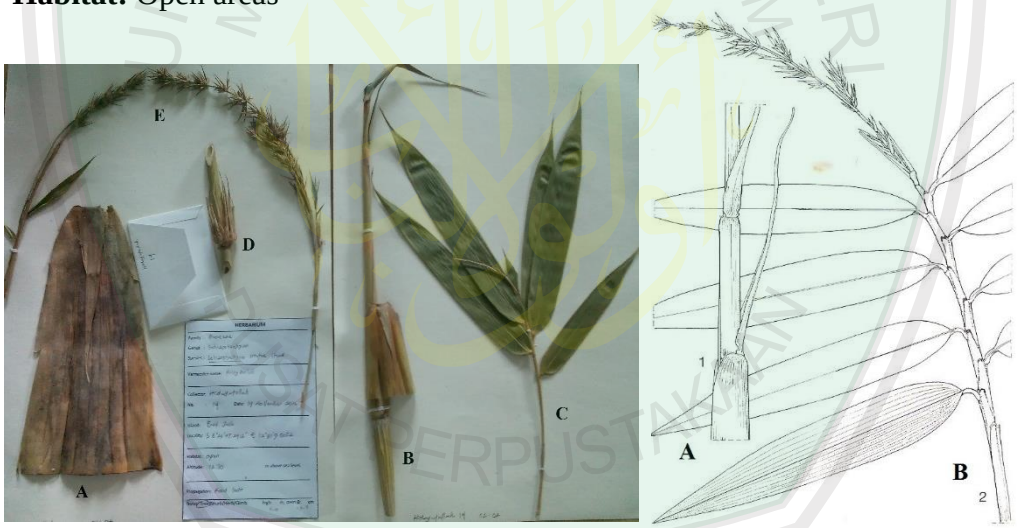
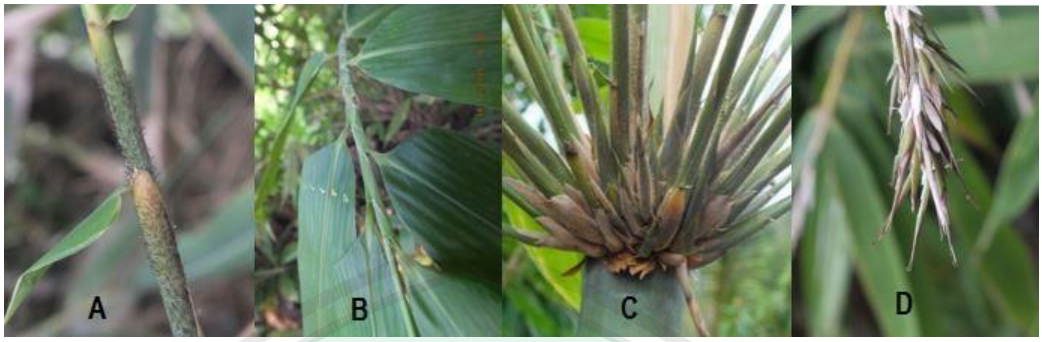


Fig. 4.12 (1) *Schizostachyum iraten***,** A. Culm-sheath, , B. Shoots, C. Leaves, D. Branches, E. Flowering (Researcher Documentation). **(2)** *Schizostachyum iraten***,** A. Shoots, B. Flowering Leafy. (Dransfield and Widjaja, 1995).



(3) *Schizostachyum iraten*; A. Shoot, B. Leaves, C. Branches, D. Flowering (Researcher Documentation).

4. *Schizostachyum zollingeri* Steud.

Schizostachyum zollingeri var. *longispiculatum* (Munro) E. G. Camus. Bambusėes 173 1913.

Rhizome sympodial, **Clump** erect and compact. **Shoots** green with brownish tip, covered by brown hairs. **Culms** straight with pendulous tip, cylinder, green, glabrous; internodes 35-40 cm long, 2-8 cm diameter; walls up to 5 mm thick., nodes without aerial roots. **Branches** borne in the mid culm with subequal branches. **Culm sheaths** deciduous lately, covered by brown hairs, basal 19 cm; auricles rounded, 5 mm high, bristles 5.5 mm; ligule entire, very small, bristles absent; blade 5.8 x 5.7 cm, erect, triangular, base wider but not covered the sheath apex. **Leaves** 15-27.8 x 1.5-3.4 cm, petiole 4 mm long, green, glabrous; auricles 3 mm high, bristles 8 mm long; ligule entire, 2 mm high, bristles 2 mm. **Inflorescences** pseudospikelets 9-16 mm long, rachilla glabrous, 1.5-2 mm long; 3 floret, lemma acuminate, with hairs at the margin apex, 6-7 mm long; palea with hairs at the margin apex, bifid tips, 8-9 mm long, palea slightly longer than

lemmas; lodicule present, 3; ovary pubescent; filament 4 mm long, white; anther 6 yellowish, 3 mm long.

Vernacular Name: Buluh Talang

Distribution: Grow all villages, except Wonokerto village and also grow at secondary forest.

Habitat: Open areas

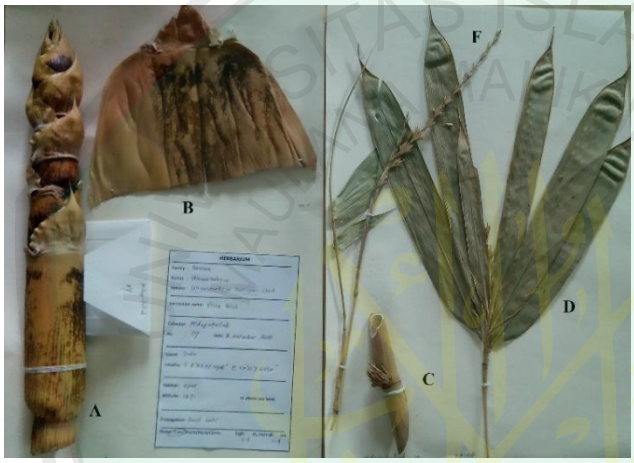
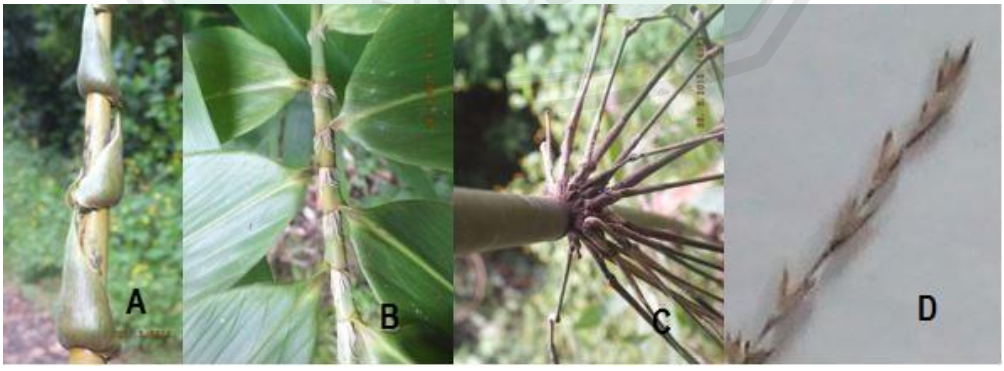


Fig. 4.13 (1) *Schizostachyum zollingeri*; A. Shoots, B. Culm-sheath, C. Branches, D. Leaves, E. Flowering branch (Researcher Documentation). **(2)** *Schizostachyum zollingeri***,** 1. Habit; 2. Young shoot; 3. Culm leaf (abaxial side); 4. Leafy branch; 5. Base of leaf; 6. Flowering branch (Dransfield and Widjaja, 1995).



(3) Field figure of *Schizostachyum zollingeri*, A. Shoot, B. Leaves, C. Branches, D. Flowering (Researcher Documentation).

Thyrsostachys Gamble.

Sympodial, shoots pale green to purplish, glabrous. Culms erect, branches borne above the middle of the culm with one dominant primary branch and one several secondary branches and usually several smaller branches from its base. Culm sheaths auricles inconspicuous, glabrous, ligule entire, glabrous; blades erect. Leaves pale green, glabrous with auricles inconspicuous, glabrous, ligule entire, glabrous.

Key Identification of Thyrsostachys Species

1. Auricles of culm sheath inconspicuous, glabrous, ligule entire up to 1 mm high, blades erect……..... *Thyrsostachys siamensis* Gamble.

Thyrsostachys siamensis Gamble.

Arundarbor regia (Munro) Kuntze. Revis. Gen. 2: 761 1891

Bambusa regia Thomson ex Munro. Trans. Linn. Soc. London. 26: 116 1868.

Thyrsostachys regia (Munro) Bennet. Indian Forester 114: 711 1988.

Rhizome sympodial, **Clump** erect and compact, **Shoots** pale green to purplish, glabrous. **Culms** straight with erect tips, cylinder, pale green, glabrous; internodes 25-30 cm long, 4-5 cm diameter; walls 20 mm thick., nodes without aerial roots. **Branches** borne the mid culm and one dominant primary branch and several secondary branches and several smaller branch from its node. **Culm sheaths** persistent, covered by white hairs, at the base 9 cm; auricles inconspicuous, glabrous; ligule entire, 1 mm high, glabrous; blade base 1.5 x 1 cm, erect, triangular. **Leaves** 6.5-12 x 0.6-1 cm, petiole 2 mm long, green,

glabrous; auricles 1 mm high, glabrous; ligule entire, 1 mm high, bristles absent.

Inflorescences unseen.

Vernacular Name: Pring Jepang.

Distribution: This species grown in Srigonco, Sumber bening, Bandungrejo, Wonorejo and Karangsari villages. **Habitat:** garden

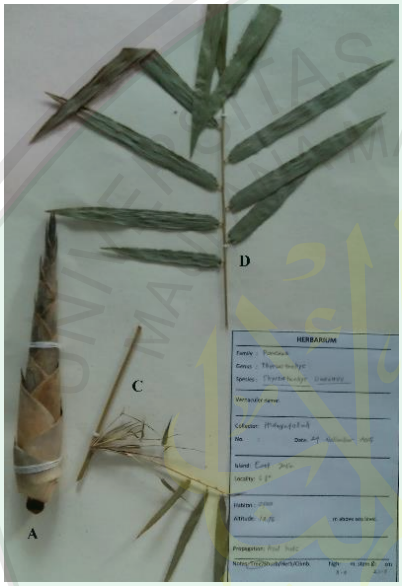


Fig. 4.14 (1) *Thyrsostachys siamensis* A. Shoots, B. Leaves; C. Branches (Researcher Documentation).

(2) *Thyrsostachys siamensis***,** 1. Habit; 2. Part of culm with culm leaf; 3. Culm leaf (abaxial side); 4. Leafy branch; 5. Base of leaf; 6. Flowering branch. (Dransfield and Widjaja, 1995).

(3) Field figure of *Thyrsostachys siamensis;* A. Culm, B. Soot, C. Internodes, D. Branches (Researcher Documentation).

4.3 The Bamboos at Sub District Bantur Malang.

Bantur community are be able to recognize bamboo as an evidenced from their knowledge on the local name from each species. However, they recognized three *Schizostachyum* as one local name buluh talang *S. castaneum, S. iraten, S. zollingeri.* It seems that they classified buluh talang as species under the genus *Schizostachyum,* without divided them into the species level. Furthermore, the local people also called all the climbing or scrambling bamboo as pring jalar (which means climbing) or pring embong. On the other hand, taxonomist identified them as two species, that is *D. matmat* and *F. horshfieldii*. Beside that they have two different names for *Gigantochloa atter* as pring Jawa and pring Legi. According to Sastrapradja (1997), bamboo has a very close relationship with the social and cultural life of community as well the rural community in Indonesia. Because of that bamboo is always used daily by the local community either in the daily life as well as in the cultural ceremony such as during the child birth, circumsission, death ceremony etc,

The Bantur community has already cultivated bamboo from along time ago, although the bamboo cultivation only planted in the gardens, or in the river bank, and also for bordering between the garden. The most cultivated bamboo by Bantur community are *Bambusa* (*Bambusa blumeana* J.A. & J.H. Schult., *Bambusa glaucophylla* Widjaja, *Bambusa vulgaris* Schrad. ex Wendl.), *Dendrocalamus* (*Dendrocalamus asper* (Schult.) Backer ex Heyne), *Gigantochloa* (*Gigantochloa apus* (J.A. & J.H. Schult.) Kurz, *Gigantochloa atter* (Hassk.) Kurz). Those species can not be separated from way of life of the community,

because it can be used for simple building materials near the house or in the paddy fields, and other needs such as chicken case, goat case and others. Widjaja (2001) has also mentioned that among the bamboo species in Java, the most bamboo usage for the rural community is *Gigantochloa*.

Except the cultivated bamboo, there are some wild bamboo grow in Banttur subdistrict. It was varied from the genus *Dinochloa* which grow in the secondary forest (*Dinochloa matmat* S. Dransf. & Widjaja*)*, genus *Fimbribambusa* (*Fimbribambusa horsfieldii (*Munro) Widjaja.), genus *Schizostachyum* (*Schyzostachyum. castaneum* Widjaja, Schizostachyum iraten Steud. And *Schzostachyum zollingeri* Steud.). There is also a species that grows wild after once cultivated by Bantur society as genus *Gigantochloa (Gigantochloa atter* (Hassk.) Kurz).

4.2 The distribution of bamboo species that grows at sub district Bantur on comparison of each village.

No	Species	10 Villages										Total
		A	B	C	D	E	F	G	H	I	J	
1	*Bambusa blumeana* J.A. & J.H. Schult	1	1	1	1	1	1	1	1	1	1	10
2	*Bambusa glaucophylla* Widjaja	0	0	0	0	0	0	0	1	0	1	2
3	*Bambusa vulgaris* Schrad. ex Wendl.	0	0	1	0	1	1	1	1	1	1	7
4	*Bambusa vulgaris var.* striata McClure	0	0	1	0	1	1	1	1	1	0	6
5	*Bambusa vulgaris wamin* McClure	0	0	0	0	1	0	0	0	0	0	1
6	*Dendrocalamus asper* (Schult.) Backer ex Heyne	0	0	1	0	1	1	1	1	1	1	7
7	*Dinochloa matmat* S. Dransf. & Widjaja	1	1	0	0	0	0	0	0	0	0	2
8	*Fimbribambusa horsfieldii* (Munro) Widjaja	1	1	0	0	0	0	0	0	0	0	2
9	*Gigantochloa atter* (Hassk.) Kurz	1	1	1	1	1	1	1	1	1	1	10
10	*Gigantochloa apus (*J.A. & J.H. Schult) Kurz	0	0	1	1	1	0	0	1	1	0	5
11	*Gigantochloa atroviolacea* Widjaja	0	0	0	0	0	1	0	0	0	0	1
12	*Schizostachyum iraten* Steud.	1	1	1	0	0	1	1	1	1	0	7
13	*Schizostachyum brachyladum* Kurz	1	0	1	0	1	1	0	1	1	0	6
14	*Schizostachyum zollingeri* Steud.	1	1	1	1	1	0	1	1	1	1	9
15	*Schizostachyum castaneum* Widjaja	1	0	0	0	0	0	0	0	0	0	1
16	*Thyrsostachys siamensis* Gamble	1	1	1	1	0	0	0	0	1	0	5

Explanation 4.2. A. Srigonco; B. Sumber bening; C. Bandungrejo; D. Wonorejo; E. Bantur; F. Pringgodani; G. Rejosari; H. Wonokerto; I. Karangsari; J. Rejoyoso. (1= present and 0= absent).

Based on the table 4.2 it is known that *Bambusa blumeana* J.A. & J.H. Schult., and *Gigantochloa atter* (Hassk.) Kurz, grow widely in the Batur subdistrict. Then followed by *Schizostachyum zollingeri* Steud., *Bambusa vulgaris* Schrad. ex Wendl., *Bambusa vulgaris* var. striata McClure., *Dendrocalamus asper* (Schult.) Backer ex. Heyne, *Schizostachyum iraten* Steud., *Schizostachyum brachycladum* Kurz, *Gigantochloa apus (*J.A. & J.H. Schult) Kurz and *Thyrsostachys siamensis* Gamble.

The bamboo species with minimum distribution is *Bambusa glaucophylla* Widjaja., *Bambusa vulgaris* var. wamin McClure, *Dinochloa matmat* S. Dransf. & Widjaja, *Fimbribambusa horsfieldii* (Munro) Widjaja, *Gigantochloa atroviolacea* Widjaja, and *Schizostachyum castaneum* Widjaja.

4.4 Bamboo in the Islamic Perspective

أَلَمْ تَرَ أَنَّ ٱللَّهَ أَنزَلَ مِنَ ٱلسَّمَآءِ مَآءً فَسَلَكَهُۥ يَنَٰبِيعَ فِى ٱلْأَرْضِ ثُمَّ يُخْرِجُ بِهِۦ زَرْعًا مُّخْتَلِفًا أَلْوَٰنُهُۥ ثُمَّ يَهِيجُ فَتَرَىٰهُ مُصْفَرًّا ثُمَّ يَجْعَلُهُۥ حُطَٰمًا ۚ إِنَّ فِى ذَٰلِكَ لَذِكْرَىٰ لِأُو۟لِى ٱلْأَلْبَٰبِ ﴿٢١﴾

The mean of surah Az-Zumar: 21 *" see you not Allah sends down water (rain) from the sky, and causes it to penetrate the earth, (and then makes it to spring up) as water-springs, and afterward thereby produces crops of different colourrs, and afterward they wither and you see them turn yellow; then He makes them dry and broken pieces. Verily, in this a Reminder for men of understanding*" (QS. Az-Zumar: 21).

Allah send down the rain with many benefit for us, Allah send down the water and it settles in the earth, then He causes it to flow wherever He wills, and He causes springs, great and small, to flow as needed, then from the rain Allah

brings forth crops of different colors, i.e. different kinds of forms, tastes, scents, benefits etc. (Tafsir Ibnu Katshir Vol 10, 4357)

Allah can grow various species of plants, crops and herbages with variety of flavor, contents, colors and benefits. Allah has a great power, He can do everything and make anything with easily, if only that He says to it, “Be” and “it is”. Allah also can make the palnts and crops broken, dark stubble and rot with easy.

أَوَلَمۡ يَرَوۡاْ إِلَى ٱلۡأَرۡضِ كَمۡ أَنۢبَتۡنَا فِيهَا مِن كُلِّ زَوۡجٖ كَرِيمٍ ۝٧

The Meaning: *“ Have they not looked at the earth, how many of every noble species have We caused to grow therein ”* (QS. Asy-Syu’ara: 7).

Allah Has command us to give much attention and learn about the earth, and do the research to all of what exist in this earth from the small thing like microba, virus and ants till the big creatur like the mountain, vegetables, tree and the other because all of things in this world has been ccreated with their own benefits that can be utilized by human.

Bamboo which include the kind of tree also has many benefits for people daily activity life also for another creature, people must to give attention and make a research about bamboo because they have various genera, species and also benefits. Till people can utilize bamboo for maximals in their activity, the research of bamboo species at Bantur subdistrict success in found, identification, knowing and description, hope it can be useful data for us.

Allah commanded us to keep the earth and forbid us to do mischief on earth, because if human being destroy the earth, all of things that exist in this earth will be destroyed too, and would harm humans, Allah said in the Holy Qur'an : "And make no mischief on the earth" (al-Baqarah: 11) by research and attention to the earth human will be able to maintain, preserve, develop and exploit the earth and it contents such as plants and animals with maximal.

وَهُوَ ٱلَّذِىٓ أَنزَلَ مِنَ ٱلسَّمَآءِ مَآءً فَأَخۡرَجۡنَا بِهِۦ نَبَاتَ كُلِّ شَىۡءٍ فَأَخۡرَجۡنَا مِنۡهُ خَضِرًا نُّخۡرِجُ مِنۡهُ حَبًّا مُّتَرَاكِبًا وَمِنَ ٱلنَّخۡلِ مِن طَلۡعِهَا قِنۡوَانٌ دَانِيَةٌ وَجَنَّـٰتٍ مِّنۡ أَعۡنَابٍ وَٱلزَّيۡتُونَ وَٱلرُّمَّانَ مُشۡتَبِهًا وَغَيۡرَ مُتَشَـٰبِهٍ ۗ ٱنظُرُوٓاْ إِلَىٰ ثَمَرِهِۦٓ إِذَآ أَثۡمَرَ وَيَنۡعِهِۦٓ ۚ إِنَّ فِى ذَٰلِكُمۡ لَأٓيَـٰتٍ لِّقَوۡمٍ يُؤۡمِنُونَ ﴿٩٩﴾

Allah also said at Surah Al-An'am : 99 which the meaning is:

" *And it is He Who sends down water from the cloud; and We bring forth therwith every kind of growth; then We brong forth with the green foliage wherefrom We produce clustered grain. And from the date palm, out of its sheaths, come from bunches hanging low. And We produce therewith gardens of grapes, and the olive and the pomegranate-similar and dissimilar. Look at the fruit thereof when it bears fruit, and the ripening thereof. Surely, in this are signs for a people who believe* " (Q.S. Al-An'am : 99).

Allah explain about the role of rain for the earth, Allah also has created the rain with it's benefits such as for people daily needs (for wash, drink and cook) beside rain also can growth the vegetation, and the various trees in this word such as grapes, olive, pomegranate etc. From the rain Allah can grow many thing in this world, with the various colors, favour, shapes, differents sizes and benefits,

and which show their own morphologhy character, with the morphology characteristic people can groups the plants and herbages into their own groups.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

5.1 CONCLUSIONS

The conclusions of this research is:

1. The bamboo species at Sub District Bantur, Malang is *B. blumeana*., *B. vulgaris.*, *B. vulgaris var.* striata., *B. vulgaris wamin.*, *B. glaucophylla*., *D. asper*., *D. matmat.*, F. *horsfieldii*., *G. atroviolacea.*, *G. atter.*, *G. apus.*, *S. iraten.*, S. *zollingeri.*, *S. brachyladum.*, *S. castaneum*., *T. Siamensis*
2. The bamboo species at Sub District Bantur, Malang is 14 species from 7 genera.
3. The description species of bamboo at Sub District Bantur, Malang is *B. blumeana* have the special character (culm with spines)., *B. vulgaris var.* striata (leaves green sometimes with yellow strip)., *B. vulgaris wamin* (Culm internode very short producing drum like)., *B. vulgaris* (Culm internode straight)., *B. glaucophylla* (leaves green with white strip)., *D. asper* (Culm base with aerial roots)., *D. matmat* (culm climbing)., F. horsfieldii (culm erect to scrambling)., *G. atroviolacea* (culm green purplish)., *G. atter* (culm sheath caduceus, culm green)., *G. apus* (culm sheath appressed, culm pale green)., *S. iraten* (Culm sheath blade deflexed)., *S. castaneum* (Culm sheath pubescent at the base)., S. *zollingeri* (auricles rounded, big with many bristle)., *S. brachyladum* (auricle rounded, small with few bristle)., *T. Siamensis* (Auricles of culm sheath inconspicuous).

5.2 SUGGESTIONS

The suggestions of this research is

1. Continued research the exploration of species bamboo especially forest in the district Malang.
2. Continued research the species of bamboo based on anatomical and molecular character especially to *S. castaneum* Widjaja.
3. Continued research utilization of bamboos species at District Malang.

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APPENDIX

Matrix of Bamboo

Nama Jenis	Nama Lokal	Akar Rimpang	Rumpun Bambu		Rebung			
		Simpodial	Tegak	Rapat/tidak Rapat	Warna rebung	Warna bulu pada rebung	Sebaran bulu pada rebung	Lilin pada rebung
***Bambusa blumeana* J.A. & J.H. Schult**	Pring Duri/Ori	Simpodial	Tegak	Padat	Hijau Jingga	Coklat kehitaman	Merata (Tertutup)	Tidak ada
***Bambusa vulgaris var* striata McClure**	Pring Kuning	Simpodial	Tegak	agak renggang	Hijau	Coklat kehitaman	Merata	Tidak ada
***Bambusa glaucophylla* Widjaja**	Pring Hias	Simpodial	Tegak	Padat	Hijau	Coklat kehitaman	Tidak merata	Tidak ada
***Bambusa vulgaris* Schrad. ex Wendl**	Pring Ampel	Simpodial	Tegak	agak renggang	Hijau	Coklat kehitaman	Merata (Tertutup)	Tidak ada
***Gigantochloa atroviolacea* Widjaja**	Pring Ireng	Simpodial	Tegak	Padat	Hijau jingga	Coklat kehitaman	Merata	Tidak ada
***Gigantochloa apus* (J.A. & J.H. Schult) Kurz**	Pring Tali	Simpodial	Tegak	Padat	Hijau	Coklat kehitaman	Merata	Tidak ada
***Thyrsostachys siamensis* Gamble**	Pring Jepang	Simpodial	Tegak	Padat	Hijau keunguan	Tidak berbulu	Tidak berbulu	Tidak ada
***Fimbribambusa horsfieldii* (Munro) Widjaja**	Pring Jalar/Embong	Simpodial	Menjalar		Hijau	Coklat putihan	Merata	ada
***Gigantochloa atter* (Hassk.) Kurz**	Pring Legi	Simpodial	Tegak	Padat	Hijau keunguan	Coklat kehitaman	Merata	Tidak ada
***Dendrocalamus asper* (Schult.) Backer ex He**	Pring Petung	Simpodial	Tegak	Padat	Hijau keunguan	Coklat kehitaman	Rata (Tertutup)	ada (Beledu)
***Bambusa vulgaris wamin* McClure**	Pring Budha	Simpodial	Tegak	Padat	Hijau	Coklat	Tidak merata	tidak ada
***Dinochloa matmat* S. Dransf. & Widjaja**	Pring Jalar/Embong	Simpodial	Tegak		Hijau	coklat keputihan	Merata (Tertutup)	Kadang ada
***Schizostachyum iraten* Steud**	Buluh Talang	Simpodial	Tegak	pat dengan ujung melengku	Hijau	Kecoklatan	Merata	Tidak ada
***Schizostachyum brachyladum* Kurz**	Pring Rampal	Simpodial	Tegak	Padat	Hijau kecoklatan	Kecoklatan	Merata	Tidak ada
***Schizostachyum zollingeri* Steud**	Buluh Talang	Simpodial	Tegak	pat dengan ujung melengku	Hijau kecoklatan	Kecoklatan	Merata	Tidak ada
***Schizostachyum castaneum* widjaja/ sp**	Buluh Talang	Simpodial	Tegak	pat dengan ujung melengku	Hijau	Kecoklatan	Merata	Tidak ada

Buluh Bambu												
Diameter buluh	Panjang ruas	Ketebalan dinding	Lilin buluh		Cara tumbuh buluh	Bentuk buluh	Tipe Buku Buluh				Karakter permukaan bulu	
			Tua	Muda			Akar udara	tanpa akar udara	fimbril	Lampang buluh	Tua	Muda
			Bulu/Tidak berbulu	Bulu/Tidak berbulu								
6- 9 cm	20-30 cm	8- 18 mm	Tidak ada	ada lilin	Tegak	Silinder	tidak ada	Bawa ke atas	Tidak ada	tidak ada	Gundul	Licin keras
5-7 cm	25-40 cm	6-17 mm	Tidak ada	Tidak ada	Tegak	Silinder	(Di Bagian Baw	Bagian atas	Tidak ada	tidak ada	Gundul	Licin halus
1.5-2 cm	15- 25 cm	5-7 mm	Tidak ada	ada (Tersebar)	Tegak	Silinder	tidak ada	Bagian atas	Tidak ada	tidak ada	Gundul	Licin halus
5 - 8 cm	25-40 cm	7-18 mm	Tidak ada	Tidak ada	Tegak	Silinder (Berbiku-biku)	(Di Bagian Baw	bawa keatas	Tidak ada	tidak ada	Gundul	Licin halus
5- 7 cm	32-47 cm	6-7 mm	Tidak ada	tidak ada	Tegak	Silinder	Ada	Hingga ke atas	Tidak ada	tidak ada	Gundul	Licin keras
4-10 cm	20-53 cm	5-13 mm	Tidak ada	tidak ada	Tegak	Silinder	tidak ada	Hingga ke atas	Tidak ada	tidak ada	Gundul	Licin
4-5 cm	25-30 cm	10-20 mm	Tidak ada	ada	Tegak	Silinder	tidak ada	Hingga ke atas	Tidak ada	tidak ada	Gundul	Halus
3-4 cm	25-27 cm	3 mm	Tidak ada	ada lilin	Menjalar	silinder	tidak ada	Tidak ada	ada	tidak ada	Gundul	Halus
5-9 cm	30-45 cm	6-7 mm	Tidak ada	tidak ada	Tegak	Silinder	tidak ada	Hingga ke atas	Tidak ada	tidak ada	Gundul	Licin
10-15 cm	35-40 cm	25 mm	Tidak ada	ada (Tersebar)	Tegak	silinder	Ada	Hingga ke atas	Tidak ada	tidak ada	rdapat Lun	Keras
4-5 cm	7-10 cm	9- 10 mm	Tidak ada	tidak ada	Tegak	menggembung	tidak ada	ada	Tidak ada	tidak ada	Gundul	Keras
10- 17 mm	13- 15 cm	5mm	Tidak ada	ada	Menjalar	Silinder	tidak ada	Tidak ada	Tidak ada	Ada	Gundul	Halus
3-5 cm	50-75 cm	3 mm	tidak ada	cin putih dibawa	tegak	Silinder	tidak ada	ada	tidak ada	tidak ada	Gundul	Halus
6-10 cm	40-50 cm	4 mm	tidak ada	ada tapi ada bul	tegak	Silinder	tidak ada	ada	Tidak ada	tidak ada	Gundul	Halus/Licin
2- 8 cm	35-40 cm	5 mm	Tidak ada	ada	tegak	silinder	tidak ada	ada	Tidak ada	tidak ada	Gundul	Halus
4-5 cm	45-60 cm	3 mm	tidak ada	ada	Tegak	silinder	tidak ada	ada	Tidak ada	tidak ada	Gundul	Halus

Percabangan				Pelepah Buluh																				
Cabang yang dominan	Pertumbuhan cabang ketika buluh terpotong	Letak cabang dari permukaan tanah	Duri cabang	Aurikel							Ligula						Sifat duun pelepah buluh	Bagian bawah duun pelepah buluh	Sifat pelepah buluh			Lebar pelepah bagian bawah	Lebar duun pelepah	Bulu duun pelepah	Warna bulu duun pelepah	Apendiks
				ada/tidak	bentuk	warna	tinggi	buluk ke jur aurikel			ada/tidak	bentuk	warna	Tinggi	buluk ke jur ligula				Mudah Luruh	Terlambat luruh	Menempel					
								ada/tdk	warna	tinggi					ada/tidak ad	warna	tinggi									
ada	Tidak terjadi Penubahan	Di permukaan tanah	Tidak ada	Ada	Membulat keluar	Coklat Hitam	3 mm	ada	Coklat Hitar	12 mm	ada	menggerigi	Coklat Cera	3 mm	ada	Coklat Berni	3 mm	tegak	Menyempit	Mudah luruh	0	0	18 cm	P : 7 cm L : 3	ada	Coklat	Tidak ada
ada	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada	ada	Membulat keluar	Coklat pekat	10 mm	ada	Coklat Emas	5 mm	ada	Rata	Coklat	2 mm	tidak ada	tidak ada	tidak ada	tegak	Melebar	Mudah luruh	0	0	14 cm	P : 4.3 L 3.2	ada di pinggir basal	coklat emas	Tidak ada
ada	Tidak terjadi Penubahan	Di Permukaan tanah	Tidak ada	Ada	Membundar keluar	Coklat	1-2 mm	tidak ada	tidak ada	tidak ada	ada	Rata	Coklat	1 mm	tidak ada	tidak ada	tidak ada	tegak	Menyempit	Mudah luruh	0	0	3 cm	P : 5.5 L: 0.5 cm	ada dibagian basal	Coklat	Tidak ada
ada	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada	Ada	Membulat keluar	Hitam	8 mm	Ada	Coklat Emas	6 mm	ada	Rata	Coklat hitam	3 mm	tidak ada	tidak ada	tidak ada	tegak	Melebar	Mudah luruh	0	0	20 cm	P : 4 cm L : 4 cm	ada	Coklat emas	Tidak ada
ada (lateral)	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada	Ada	Membulat	Kecoklatan Pekat	3 mm	Ada	Coklatan co	4 mm	Ada	Menggerigi	coklat	2 mm	ada	dat keputih	2 mm	Terlekuk balik	Menyempit	Mudah luruh	0	0	31 cm	P : 8.3 cm L :2.8	Ada	Coklat Mengkilat	Tidak ada
ada (lateral)	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada																							
ada	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada	ada	Datar	Coklat		tidak ada	tidak ada	tidak ada	ada	rata	Coklat	1 mm	tidak ada	tidak ada	tidak ada	tegak	Mudah Rusak	0	terlambat luruh	0	9 cm	P :1.5 L : 1	ada dpinggir basal	Coklat cerah	tidak ada
ada	terjadi perubahan	di permukaan tanah	Tidak ada	ada	Seperti tanduk	coklat hijau	2 mm	tidak ada	tidak ada	tidak ada	ada	Rata	Coklat	2 mm	ada	dat keputih	0.5-1 mm	Terlekuk terbalik	Menyempit	Mudah luruh	0	0	0.7 cm	P:5 L:0.5	tidak ada	tidak ada	Tidak ada
ada (lateral)	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada	ada	Membulat keluar	Coklat	5 mm	tidak ada	tidak ada	tidak ada	ada	menggergaji	coklat	4 mm	tidak ada	tidak ada	tidak ada	terlekuk balik	Menyempit	Mudah luruh	0	0	21. 5 cm	P : 17. 4, L : 4 cm	ada dibagian tengah	coklat	tidak ada
Ada (lateral)	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada																							
ada	Tidak terjadi Penubahan	uh dari Permukaan tana	Tidak ada																							
ada	terjadi perubahan	uh dari Permukaan tana	Tidak ada	tidak ada	tidak ada	tidak ada	tidak ada	tidak ada	tidak ada	tidak ada	ada	rata	coklat	2 mm	tidak ada	tidak ada	tidak ada	terlekuk balik	Menyempit	Mudah luruh	0	0	2 cm	P : 3, L: 0.5 cm	ada dibagian tengah	coklat	tidak ada
Sama	Sama	Sama	Sama	ada	tidak tampak	Coklat		ada	putih	4 mm	ada	menggergaji	coklat	1 mm	ada	putih	1 mm	terlekuk balik	Melebar	0	terlambat luruh	0	11.5 cm	P: 13, L:2.3 cm	tidak ada	putih	tidak ada
Sama	Sama	Sama	Sama	ada	Kecil	Coklat	3 mm	ada	Putih	7 mm	ada	rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	Tegak	Melebar	0	terlambat luruh	0	20 cm	P:6, L: 5 cm	ada	coklat	Tidak ada
Sama	Sama	Sama	Sama	ada	Membulat	coklat putih ada urat	5 mm	ada	putih	5.5 mm	ada	rata	coklat	angat kec	tidak ada	tidak ada	tidak ada	tegak	Melebar	0	terlambat luruh	0	19 cm	P : 5.8, L: 4.7 cm	ada	coklat	tidak ada
Sama	Sama	Sama	Sama	ada	membulat keluar	coklat keputihan	2 mm	ada	putih	8- 10 mm	ada	rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	tegak	Mudah Rusak	mudah luruh	0	0	14 cm	P: 14 cm, L : 3 cm	ada	coklat	Tidak ada

Daun																					Bunga
Lebar daun	Permukaan daun atas	Permukaan daun bawah	Tepi Daun	Warna daun	Panjang tangkai daun	Aurikel							Ligula								
						ada/tidak	bentuk	warna	tinggi	buku kejur aurikel			ada/tidak	bentuk	warna	tinggi	buku kejur ligula				
										ada/tdk	warna	tinggi					ada/tidak ada	warna	tinggi	Tidak ada	
P: 9 x L: 0.9 { } P: 16.5 x L : 2	Gundul	Gundul	Berbulu	Hijau	4 mm	ada	Datar	Coklat	1 mm	Tidak ada	tidak ada	tidak ada	ada	mengerigi	coklat	2 mm	ada	Coklat mengklat	2 mm	Tidak ada	
P: 14 L : 1 # P: 22, L: 3 cm	Gundul	Gundul	Gundul	Hijau	5 mm	ada	Melengkung keluar	coklat pekat	1 mm	Tidak ada	tidak ada	tidak ada	ada	Rata	Coklat	2 mm	tidak ada	tidak ada	tidak ada	Tidak ada	
P : 12 L : 0.9 { } P : 6.5 x L: 0.6	Gundul	Gundul	Gundul	Hijau dgn irisan putih	5 mm	ada	Melengkung keluar	Coklat	0.8 mm	Tidak ada	tidak ada	tidak ada	ada	Rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	Tidak ada	
P: 9.4 L : 0.8 { } P:25 L: 3.5	Gundul	Gundul	Gundul	Hijau	4 mm	ada	Melengkung keluar	Coklat kekuningan	1 mm	Tidak ada	tidak ada	tidak ada	ada	Rata	Coklat	1 mm	tidak ada	tidak ada	tidak ada	Tidak ada	
P: 17, L: 3][P: 27, L: 5	Gundul	Gundul	Berbulu	Hijau Cerah	5 mm	ada	Menggelombang	Coklat	1 mm	Tidak ada	tidak ada	tidak ada	ada	menggerigi	Coklat	2 mm	tidak ada	tidak ada	tidak ada	Tidak ada	
P: 12 x L:2.4 { } P: 23 x L : 3.7 cm	Gundul	berbulu	Gundul	hijau	2 mm	ada	melengkung keluar	coklat	1 mm	Tidak ada	tidak ada	tidak ada	ada	rata	coklat	0.5-1 mm	tidak ada	tidak ada	tidak ada	Tidak ada	
P : 12 L : 0.9 { } P: 6.5 x L: 0.6	Gundul	Gundul	ulu dibagian tepi pa	Hijau redup	2 mm	ada	Menggelombang	Coklat	1 mm	tidak ada	tidak ada	tidak ada	ada	rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	Tidak ada	
P : 23 x L : 4.8 } { P : 7 x 1.9 :	Gundul	Gundul	tidak berbulu	Hijau	3 mm	ada	Melengkung Keluar	Coklat	3 mm	Tidak ada	tidak ada	tidak ada	ada	menggerigi	Coklat	2 mm	ada	Coklat	0.2- 1 mm	Tidak ada	
P : 6 L: 1.5 # P: 19 L: 2 cm	Gundul	Gundul	tidak berbulu	hijau	4 mm	ada	datar	coklat	0.6 -1 mm	Tidak ada	tidak ada	tidak ada	ada	rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	ADA	
P : 16, L: 3.5 # P: 30, L: 5.5 cm	Gundul	Berbulu	berbulu	hijau	4 mm	ada	datar	coklat	1 mm	Tidak ada	tidak ada	tidak ada	ada	rata	coklat	2 mm	ada	coklat	1-2 mm	ADA	
P: 10.5, L : 2 # P: 15, L: 2.5 cm	Gundul	Gundul	tidak berbulu	hijau	1 mm	ada	melengkung keluar	coklat putih	1 mm	ada	putih	7 mm	ada	menggeringi	coklat	2 mm	tidak ada	tidak ada	tidak ada	ADA	
P : 8.5, L: 2# P: 13.5, L:3 cm	Gundul	Gundul	tidak berbulu	hijau	1 mm	tidak ada	tidak ada	tidaka ada	tidak ada	tidak ada	tidak ada	tidak ada	ada	rata	coklat	2 mm	tidak ada	tidak ada	tidak ada	ADA	
P: 14.7, L : 2 # P : 22, L: 3 cm	Berbulu	tidak berbulu	erbuli sangat ke	hijau	3 mm	ada	melengkung keluar	coklat	2 mm	ada	putih	4 mm	ada	rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	ADA	
P: 13, L : 3 # P: 27, L: 4.9 cm	tidak berbulu	berbulu rata	tidak berbulu	hijau	5 mm	ada	melengkung keluar	coklat	1 mm	ada	coklat emas	8 mm	ada	rata	coklat	1 mm	tidak ada	tidak ada	tidak ada	ADA	
P: 18, L : 1.5 # P: 27.8, L: 3.4 cm	tidak berbulu	ada bulu di tulang daunnya	tidak berbulu	hijau	5 mm	ada	melengkung keluar	coklat	3 mm	ada	coklat putih	8 mm	ada	rata	coklat	2 mm	ada	coklat putih	2 mm	ADA	
P: 21, L : 4.5 # P: 27, L: 5 cm	tidak berbulu	tidak berbulu	tidak berbulu	hijau	5-10 mm	ada	datar	coklat	1 mm	ada	coklat putih	2 mm	ada	enggeringi sesuai bul	coklat	1 mm	ada	coklat putih	5 mm	ADA	

HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Schizostachyum brachycladum* Kurz**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Bantur, .

Latitude : 112" 31'08. 61 E
Longitude : 8" 23'46. 67 S
Altitude : 245

Habitat : Open area

Collector(s): Hidayatullah

No. Day1 **Date :** 5/11/2015

Local Name : Pring Rampal

Habit :

Notes : Auricles of culm sheath small and rim-like

Determinated By Hidayatullah **Date :** 22/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Gigantochloa atroviolacea* Widjaja**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Wonorejo, .

Latitude : 112" 64'15. 45 E
Longitude : 8" 19'50. 60 S
Altitude : 231

Habitat : Open area

Collector(s): Hidayatullah

No. Day3 **Date :** 10/11/2015

Local Name : Pring Item

Habit :

Notes : Culm dark and black

Determinated By Hidayatullah **Date :** 15/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Schizostachyum zollingeri* Steud.**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Pringgodani, .

Latitude : 112" 30'16. 23 E
Longitude : 8" 20'47. 05 S
Altitude : 20

Habitat : Open area

Collector(s): Hidayatullah

No. Day2 **Date :** 8/11/2015

Local Name : Buluh Talang

Habit :

Notes : Shoots green with brownish, covered by brown hairs

Determinated By Hidayatullah **Date :** 22/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Schizostachyum iraten* Steud.**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Wonokerto, .

Latitude : 112" 31'09 50 E
Longitude : 8" 23'47. 29 S
Altitude : 18

Habitat : Open area

Collector(s) Hidayatullah

No. Day4 **Date :** 14/11/2015

Local Name Buluh Talang

Habit

Notes : Culm-sheath erect, triangular, base narrowly, abaxially glabrous

Determinated By Hidayatullah **Date :** 23/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Dinochloa matmat* S. Dransf.&Widjaja**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Srigonco, .

Latitude : 111" 33'45 04 E
Longitude : 7" 23'42. 76 S
Altitude : 26

Habitat : Secondary forest

Collector(s): Hidayatullah

No. Day5 **Date :** 14/11/2015

Local Name : Pring Jalar/Embong

Habit : Climbing

Notes : Culms climbing

Determinated By Hidayatullah **Date :** 23/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Fimbribambusa horsfieldii* (Munro) Widjaja**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Sumberbening, .

Latitude : 111" 30'08. 61 E
Longitude : 7" 25'90. 45 S
Altitude : 25

Habitat : Secondary forest

Collector(s): Hidayatullah

No. Day6 **Date :** 14/11/2015

Local Name : Pring Jalar/Embong

Habit : Scrambling

Notes : Culms scrambling

Determinated By Hidayatullah **Date :** 15/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Dendrocalamus asper* (Schult.) Backer ex Heyne**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Bandungrejo, .

Latitude : 112" 56'13. 18 E
Longitude : 8" 28'01. 44 S
Altitude : 337

Habitat : Open area

Collector(s): Hidayatullah

No. Day7 **Date :** 15/11/2015

Local Name : Pring Petung

Habit :

Notes : Young culm covered with velvety brown hairs and old culm with lichens-like., Culms sheath absent

Determinated By Hidayatullah **Date :** 24/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Bambusa glaucophylla* Widjaja**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Karangsari, .

Latitude : 112 35'40. 21 E
Longitude : 8" 18'51. 65 S
Altitude : 265

Habitat : Open area

Collector(s) Hidayatullah

No. Day8 **Date :** 21/11/2015

Local Name Pring Hias

Habit

Notes : Young culm with white wax, leaves with white strips

Determinated By Hidayatullah **Date :** 15/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

Thyrsostachys siamensis Gamble

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Rejoyoso, .

Latitude : 112" 34'06. 53 E
Longitude : 8" 20'70. 36 S
Altitude : 112

Habitat : Open area

Collector(s): Hidayatullah

No. Day9 **Date :** 24/11/2015

Local Name : Pring Jepang

Habit :

Notes : Shoots pale green to purplish, glabrous

Determinated By Hidayatullah **Date :** 16/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

Gigantochloa apus (J.A & J.H Schult.) Kurz

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Bantur, .

Latitude : 112" 23'35.21 E
Longitude : 8" 16'75.64 S
Altitude : 291

Habitat : Open area

Collector(s): Hidayatullah

No. Day10 **Date :** 27/11/2015

Local Name : Pring Tali

Habit :

Notes : Culm sheath absent; Inflorescences unknown.

Determinated By Hidayatullah **Date :** 16/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

Gigantochloa atter (Hassk.) Kurz

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Rejoyoso, .

Latitude : 112" 34'86. 62 E
Longitude : 8" 18'27. 22 S
Altitude : 351

Habitat : Open area

Collector(s): Hidayatullah

No. Day11 **Date :** 29/11/2015

Local Name : Pring Jawa/Legi

Habit :

Notes : Shoots green, covered by spread brown hairs

Determinated By Hidayatullah **Date :** 25/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

Bambusa vulgaris Schrad. ex Wendl.

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Bandungrejo, .

Latitude : 112" 33'14.74 E
Longitude : 8" 17'16. 56 S
Altitude : 329

Habitat : Open area

Collector(s) Hidayatullah

No. Day12 **Date :** 5/12/2015

Local Name Pring Ijo

Habit

Notes : Culm light green

Determinated By Hidayatullah **Date :** 18/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

Bambusa vulgaris* Schrad. ex Wendl. *var striata McClure

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Sumber Bening, .

Latitude : 112" 33'40. 40 E
Longitude : 8" 17'36. 18 S
Altitude : 282

Habitat : Open area

Collector(s): Hidayatullah

No. Day13 **Date :** 7/12/2015

Local Name : Pring Kuning

Habit :

Notes : Shoots green, covered by brown to black hairs., culm yellow with green strips Inflorescences unknown.

Determinated By Hidayatullah **Date :** 17/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

Bambusa vulgaris* Schrad. ex Wendl. *var wamin McClure

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Bandungrejo, .

Latitude : 112" 32' 16. 89 E
Longitude : 8" 17'51. 75 S
Altitude : 217

Habitat : Open area

Collector(s): Hidayatullah

No. Day 14 **Date :** 30/12/2015

Local Name : Pring Budha

Habit :

Notes : Culm < 5 m, culm-sheath absent., Inflorescences unknown.

Determinated By Hidayatullah **Date :** 17/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Bambusa blumeana* J.A & J.H Schult.**

Locality: Java, Jawa Timur, Kab. Malang, Kec. Bantur, Desa Srigonco, .

Latitude : 112" 35'16. 10 E
Longitude : 8" 20'52. 76 S
Altitude : 235

Habitat : Open area

Collector(s): Hidayatullah

No. Day 15 **Date :** 31/12/2015

Local Name : Pring Ori

Habit :

Notes : Shoots green to became orange, covered by brown hairs., young culm white-wax

Determinated By Hidayatullah **Date :** 18/02/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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HERBARIUM BOGORIENSE (BO)
PUSLIT BIOLOGI – LIPI, BOGOR, INDONESIA

POACEAE

***Schizostachyum castaneum* Widjaja**

Locality: Java, Jawa Timur, Kab. Malang, Kec. bantur, Desa Sumber Bening, .

Latitude : 111" 40'08. 09 E
Longitude : 7" 20'12. 40 S
Altitude : 20

Habitat : Secondary forest

Collector(s) Hidayatullah

No. Day 16 **Date :** 31/12/2015

Local Name Buluh Talang

Habit

Notes : Culm sheath easily broken, young culms with white to brownish scattered hairs, with a whitish ring below the nodes

Determinated By Hidayatullah **Date :** 1/3/2016

Duplicates sent to BO
Please notify Herbarium Bogoriense of new identification of this specimen

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RESEARCH LETTER PERMISSION FROM RESEARCH CENTER FOR BIOLOGY-LIPI CIBINONG SCIENCE CENTER (CSC), BOGOR, WEST JAVA.

LEMBAGA ILMU PENGETAHUAN INDONESIA
(INDONESIAN INSTITUTE OF SCIENCES)
PUSAT PENELITIAN BIOLOGI
(RESEARCH CENTER FOR BIOLOGY)
Cibinong Science Center, Jl. Raya Jakarta - Bogor KM. 46 Cibinong 16911
Telp. (+62 21) 87907636 - 87907604, Fax. 87907612
Website: www.biologi.lipi.go.id

SURAT KETERANGAN TELAH MELAKSANAKAN PENELITIAN/PKL
NO. : 566 /IPH.1.01/KS02.03/III/2016

Kepala Bidang Botani, Pusat Penelitian Biologi-LIPI menerangkan dengan sebenarnya bahwa :

Nama Lengkap	: Hidayatullah
Tempat/Tgl. Lahir	: Sumenep, 15 Juli 1992
Status	: Pelajar/**Mahasiswa S1**/S2/S3/Peneliti/Lainnya*)
NIM	: 11620075
Nama Sekolah/Perguruan Tinggi/Lembaga	: State Islamic University (UIN) Maulana Malik Ibrahim Malang

Telah melaksanakan Penelitian/PKL di Bidang Botani Pusat Penelitian Biologi-LIPI dari tangggal 14 Februari 2016 sampai dengan 14 Maret 2016. Dibawah bimbungan Sdr. Prof. Dr. Elizabeth A. Widjaja dengan Topik :

" Identification of Bamboos (Poaceae-Bambusoideae) at Sub district Bantur Malang "

Demikian surat keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Cibinong 8 Maret 2016

Yang Menerangkan,

Kepala Bidang Botani
Puslit Biologi-LIPI,

Dr. Joeni Setijo Rahajoe
NIP. 196706241993032004

RESEARCH LETTER PERMISSION FROM DISTRICT MALANG

KABUPATEN MALANG

PEMERINTAH KABUPATEN MALANG
BADAN KESATUAN BANGSA DAN POLITIK
Jalan KH. Agus Salim No. 7 Telp. (0341)366260 Fax. 366260
MALANG - 65119

SURAT KETERANGAN
Nomor : 072/ 992 /421.205/2015
Untuk melakukan Survey / Research / Penelitian / KKN / PKL / Magang

Menunjuk : Surat dari Dekan Fak.SAINS DAN TEKNOLOGI No;Un.3.6/TI.oo/ /2015
Tanggal;3 Des 2015 Perihal:Ijin

Dengan ini kami **TIDAK KEBERATAN** dilaksanakannya kegiatan **Penelitian dan Pen** oleh :

Nama / Instansi	:	HIDAYATULLAH/Mhs.UIN Malang
Alamat	:	Jl.Gajahyana 50 Malang
Thema/Judul/Survey/Research	:	Izin Pengambilan sampel dan Penelitian
Daerah/tempat kegiatan	:	Daerah Kecamatan Bantur Kab.Malang
Lamanya	:	1 Bulan
Pengikut	:	-

Dengan Ketentuan :
1. Mentaati ketentuan - ketentuan / Peraturan yang berlaku
2. Sesampainya ditempat supaya melapor kepada Pejabat setempat
3. Setelah selesai mengadakan kegiatan harap segera melapor kembali ke Bupati Malang Cq. Kepala Badan Kesatuan Bangsa dan Politik Kabupaten Malang ;
4. Surat Keterangan ini tidak berlaku apabila tidak memenuhi ketentuan tersebut di atas

Malang, 08 Desember 2015
KEPALA BADAN KESBANG DAN POLITIK
KABUPATEN MALANG
Idiologi HANKAM WASBANG

PEMERINTAH KABUPATEN MALANG
BADAN KESATUAN BANGSA DAN POLITIK

BUDIANTO HERMAWAN SH.MSi
PEMBINA
NIP : 19671204 199303 1 007

TEMBUSAN :
Yth.
1.Sdr. Dekan Fak.SAINS DAN TEKNOLOGI UNMER MALANG
2.Sdr. Camat Bantur Kab.Malang
3.Sdr. Mhs/Ybs
4.Arsip

PEMERINTAH KABUPATEN MALANG
KECAMATAN BANTUR
JL. Raya Bantur Nomor 1460 Telepon (0341) 841240
Email : bantur.malangkab.go.id – Website : http://bantur.malangkab.go.id
BANTUR 65179

Bantur, 15 Desember 2015

Nomor : 072/429 /35.07.03/2015
Sifat : Penting
Lampiran : -
Hal : IJIN **SURVEY**

Kepada :
Yth. Sdr. Kepala Desa
se Kecamatan Bantur
di
Bantur

Berdasarkan Surat Kepala Badan Kesbang dan Politik Kabupaten Malang tanggal 8 Desember 2015 Nomor : 072/992/421.205/2015 perihal Surat Keterangan melakukan Ijin Survey/Ijin Penelitian yang diberikan kepada :

Nama : HIDAYATULLAG / Mhs. UIN Malang
Alamat : Jl. Gajayana 50 Malang
Thema : Izin Pengambilan Sampel dan Penelitian Karakterisasi dan Pemanfaatan Jenis-jenis Bambu di Kecamatan Bantur Kabupaten Malang
Tempat Kegiatan : 10 Desa se Kecamatan Bantur
Lamanya : 1 Bulan

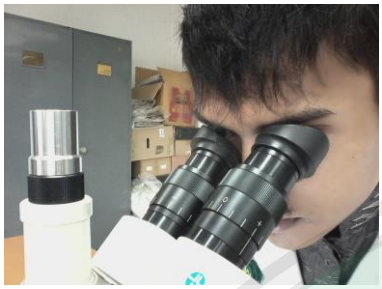
Sehubungan dengan hal tersebut diatas maka pada prinsipnya kami tidak keberatan dengan kegiatan sebagaimana tersebut diatas sepanjang memenuhi segala ketentuan yang tercantum dalam surat keterangan Kepala Badan Kesbang dan Politik Kabupaten Malang . ***Selanjutnya mohon bantuan Saudara untuk membantu dan memfasilitasi kelancaran kegiatan dimaksud .***

Demikian untuk menjadikan maklum dan atas bantuan serta kerjasamanya disampaikan teima kasih .

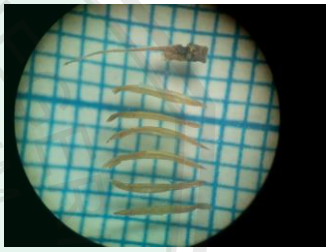
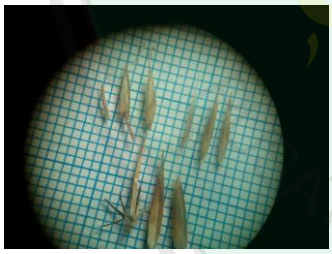
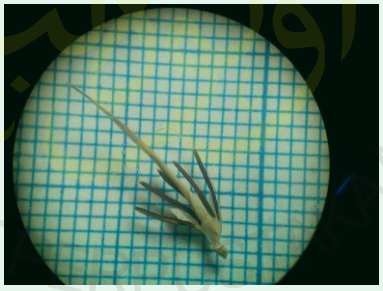
CAMAT BANTUR

Drs. TRISULAWANTO,M.Si
Pembina
NIP. 196910121989031002

RESEARCH ACTIVITY






EVIDENCE OF CONSULTATION

RELIGIONS DEPARTEMENT
THE STATE ISLAMIC UNIVERSITY OF MALANG
FACULTY OF SAINS DAN TEKNOLOGI
BIOLOGY DEPARTMENT
Jl. Gajayana 50 Malang- Telp (0341) 551354, Fax (0341) 572533

EVIDENCE OF CONSULTATION

Name : Hidayatullah
NIM : 11620075
Faculty/Department : Saintek/Biology
Supervisor 1 : Dr. Evika Sandi Savitri, M.P
Thesis's Title : Identification and Bamboos Diversity (*Poaceae-Bambosideae*) At Sub district Bantur Malang

NO.	Date	Material Consulting	Sign
1.	August 2015	Chapter I, II, III	
2.	August 2015	ACC Chapter I, II, III	
3.	March 2016	Result data	
4.	April 2016	Chapter IV	
5.	April 2016	ACC Chapter IV	
6.	April 2016	Chapter V	
7.	April 2016	ACC Chapter V	

Malang, 20th June 2016

Acknowledged
Head of Biology Department

Dr. Evika Sandi Safitri, MP
NIP.197410182003122002

RELIGIONS DEPARTEMENT
THE STATE ISLAMIC UNIVERSITY OF MALANG
FACULTY OF SAINS DAN TEKNOLOGI
BIOLOGY DEPARTMENT
Jl. Gajayana 50 Malang- Telp (0341) 551354, Fax (0341) 572533

EVIDENCE OF CONSULTATION

Name : Hidayatullah
NIM : 11620075
Faculty/Department : Saintek/Biology
Supervisor 2 : Dr. Ahmad Barizi, M.A
Thesis's Title : Identification and Bamboos Diversity (*Poaceae-Bambosideae*) At Sub district Bantur Malang

NO.	Date	Material Consulting	Sign
1.	March 2016	Chapter I, II Islamic perspective	
2.	April 2016	ACC Chapter I, II Islamic perspective	
3.	April 2016	Chapter IV Islamic perspective	
4.	April 2016	ACC Chapter IV Islamic perspective	

Malang, 20th June 2016

Acknowledged
Head of Biology Department

Dr. Evika Sandi Safitri, MP
NIP. 197410182003122002