THESIS WRITING GUIDELINES FOR BACHELOR AND POSTGRADUATE PROGRAMS IN BIOLOGY

DEPARTMENT OF BIOLOGY

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

UNIVERSITAS BRAWIJAYA

MALANG

2022

ACKNOWLEDGMENTS

Praise and gratitude be to Allah SWT for His grace and blessings because after going through a long process and time, the Biology Department of FMIPA, Universitas Brawijaya finally established a Final Paper Writing Guidelines.

Because of the wide variation of writing formats in different universities and scientific journals, this book is established to guide lecturers and students of Biology Department to make sure the students are writing their final paper in an identical format. The establishment of this book refers to several books, namely:

1. Day, R.A. (1998). How to write & publish a scientific paper. Arizona: Oryx Press.
2. Buku Pedoman Penulisan Skripsi. (1995). FMIPA. Universitas Brawijaya. Malang.
3. Pedoman Penulisan Tesis dan Disertasi. (1999). Program Pascasarjana. Universitas Brawijaya. Malang.
4. Thomas, L.E. (2001). Guide for Citing Bibliographic References. Ogden: Rocky Mountain Research Station.

Recommendations, recommendations, and criticisms from the readers are very welcome to improve the next edition. Hopefully, this writing guidelines book is useful for the entire academic community of Biology Department of Mathematics and Natural Sciences Faculty.

Malang, January 2022

The Author

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UNDERGRADUATE THESIS WRITING GUIDELINES

CHAPTER I
INTRODUCTION

1.1 Definition

Undergraduate Thesis is a final paper for undergraduate students in the form of a scientific publication constructed based on the result of a research (experiment/survey) which weighs 6 credits. An Undergraduate Thesis is written by a Biology Department student of Mathematics and Natural Sciences (MIPA) Faculty, Universitas Brawijaya (UB) as the materials of the final examinations and as a requirement to obtain the Bachelor of Science degree/diploma.

1.2 Purpose

The aims of this Undergraduate Thesis Writing Guidelines are:

1. to guide and help the students as they are writing or compiling their undergraduate thesis, and
2. to give uniformity in the undergraduate thesis guidance by advisors for the students.

1.3 Steps of Writing an Undergraduate Thesis

The steps that all students have to go through while writing their undergraduate thesis with the guidance from their advisors are:

1. write an undergraduate research proposal script,
2. conduct an undergraduate research proposal seminar,
3. conduct the research,
4. conduct a research result seminar,
5. propose the undergraduate thesis script approved by the advisors to be tested in the undergraduate thesis examination,
6. submit the undergraduate thesis script that has been revised and approved by advisors and Study Program Chairman to the study program and faculty.

CHAPTER II
SECTIONS OF AN UNDERGRADUATE THESIS

The undergraduate thesis written by undergraduate students from Biology Department consists of three sections namely the Opening, Main, and Final sections (Table 1).

Table 1. Undergraduate Thesis Sections and Their Contents

Sections	Contents
Opening	Title Page Cover APPROVAL PAGE STATEMENT PAGE UNDERGRADUATE THESIS USE GUIDELIENES ABSTRACT ABSTRACT ACKNOWLEDGMENT TABLE OF CONTENTS LIST OF TABLES LIST OF ILLUSTRATIONS LIST OF APPENDICES LIST OF SYMBOLS AND ABBREVIATIONS
Main	CHAPTER I INTRODUCTION CHAPTER II LITERATURE REVIEW CHAPTER III RESEARCH METHODS CHAPTER IV RESULTS AND DISCUSSION CHAPTER V CONLUSIONS AND RECOMMENDATIONS
Final	REFERENCES APPENDICES

The undergraduate thesis is printed on 80 gram A5 (14.8 x 21 cm_2) HVS paper. From introduction to appendices are printed double-sided. There is no need to put a divider page to separate sections or contents. Every section or content is started on a new page. The font used is Times New Roman size 11 with a single space. The pages are chosen in form of pages: Mirror Margin, so the positions of odd page numbers are different from the even pages. Typing margin: top, bottom, and outer borders are 1.5 cm, while the inner border is 2.5 cm. The script page space is filled fully according to the border/justified alignment except for new paragraphs, mathematic equations, lists, tables, illustrations, or special items.

CHAPTER III
THE OPENING SECTION OF AN UNDERGRADUATE THESIS

3.1 Cover

The cover of an undergraduate thesis is printed on a blue soft cover. All words are written in uppercase except for the word ‘by’, scientific names or symbols typed in lowercase in alphabetical order on the printed cover as follows.

1. Undergraduate thesis title,
2. The phrase ‘UNDERGRADUATE THESIS’
3. Author's name, written in full in uppercase without contraction as written in the diploma, above the name write the word ‘by’,
4. The author's student registration number, without ‘NIM’ (Nomor Induk Mahasiswa/student registration number) written,
5. UB logo in pentagon as shown below, with the size of 3 x 3 cm^2:

6. The organization the author is under, which is: BIOLOGY DEPARTMENT, MATHEMATICS AND NATURAL SCIENCES FACULTY OF UNIVERSITAS BRAWIJAYA, MALANG, and arranged downwards symmetrically,
7. The completion year for the undergraduate thesis is the submission year of the undergraduate thesis which has been approved by advisors and Study Program Chairman, and is written below the word ‘MALANG’,
8. On the spine of the undergraduate thesis, write the author's name, the phrase 'UNDERGRADUATE THESIS’ and the completion year.

The example of the cover page can be found in Appendix 1a.

3.2 Title Page

The title page consists of the same writing as the cover page, plus the sentence about the purpose of why the undergraduate thesis is written, which is: ‘As one of the requirements to obtain the Science Bachelor degree in Biology Department’. The sentence is written under the phrase ‘UNDERGRADUATE THESIS’ with the font requirement as shown in Appendix 2a.

3.3 Approval Page

The approval page consists of the phrase ‘UNDERGRADUATE THESIS APPROVAL PAGE’, the undergraduate thesis title, the author's name, the author's student registration number (without ‘Student Registration Number’ written), examination process and graduation information, arranged downwards symmetrically. The undergraduate thesis title, the author's name and student registration number are written as they are written on the cover page. The

examination process and graduation information is written as follows: ‘Has been examined before the Board of Examiners on ..... and is declared eligible to obtain the Bachelor of Science degree in Biology Department.’ The words ‘Approved by’ are written underneath, followed by the Name, Employee Number, and signature of Advisor I on the left, and Advisor II on the right, written on the same line position. If there is only one advisor, then the advisor's name, employee number, and signature are written in the middle of the line. The words ‘Acknowledged by’ are written underneath, followed by the Study Program Chairman’s name, Employee Registration Number, and signature written in the center of the line. The example can be found in Appendix 3a.

3.4 Statement of Originality

The statement page consists of the author's statement that is binding over their writing. The example can be found in Appendix 5a.

3.5 Undergraduate Thesis Use Guideline Page

This page is to inform and remind the writer of the procedure of usage and citation of the undergraduate thesis as a reference according to the general scientific etiquette. The example can be found in Appendix 7a.

3.6 Abstract

An abstract is a short yet thorough description of an undergraduate thesis. An abstract consists of research identity and research content. Research identity consists of title, author’s name, advisor name without their titles, and the organization and submission year of the undergraduate thesis. Research content consists of the purpose of the research, research Methods, research results, and conclusion, ended with keywords. The keywords are written in lowercase except for the first letter of names and are written alphabetically. The maximum numbers of keywords are five.

The title is typed bold and the first letter of each word is written in uppercase except for conjunctions. Species names, chemistry compounds, genes, and other names unlisted in the Great Dictionary of the Indonesian Language are written in italics. The author’s and advisors’ names are written on separate lines with the organization name and the submission year of the undergraduate thesis. For name with more than two words, only the initials of middle name(s) should be written. An abstract is purely the product of the author’s thoughts, hence any citation (reference) from other people is not allowed. Research background and purpose are extracted from ‘Introduction; chapter, research Methods is extracted from ‘Research Methods’ chapter, research result is extracted from ‘Results and Discussion’ chapter’, and conclusion is extracted from ‘Conclusion and Recommendations’ chapter. The abstract is written in two languages: Indonesian and English, each should be one page long, consisting of a paragraph of 250-300 words, written with single space. The example can be found in Appendix 8 and 9.

3.7 Acknowledgment

The acknowledgment consists of a brief description of the purpose of writing the undergraduate thesis, and expressing gratitude. The acknowledgment is written with single space, with the length of maximum one page, and must not contain scientific content. The

writing month and year in the acknowledgment should be the same with the submission date. Names should be written formally and in full (not nicknames) and with academic titles (if any). The example can be found in Appendix 10.

3.8 Table of Contents

This page consists of list of titles (starting from abstract to appendices) and sub-chapter titles with their page numbers, typed in order according to its page numbers, not ending in full stops, and typed in single space, except for inter-chapter and other information that should be written in double space. The word 'Page' is written right-aligned, only the first letter is in uppercase, not bold, and is four spaces away from the phrase 'TABLE OF CONTENT'. The pages before the abstract page (cover, title pages, approval page, statement page, and undergraduate thesis use guidelines) are not included in the table of contents. The words 'ABSTRACT', 'ACKNOWLEDGMENT', 'LIST OF TABLES', 'LIST OF ILLUSTRATIONS', 'LIST OF APPENDICES', 'REFERENCES', 'APPENDICES', and sub-chapter titles are written in bold uppercase.

Sub-chapter titles are written in lowercase, except for the first letter of the words that are not conjunctions. For titles that need more than one line, the second line is started under the first letter of the sub-chapter title. Page numbers before CHAPTER I are written in lowercase Roman numbers (example: iii, iv, v, and so on) while other page numbers are written in Arabic numbers (examples: 1, 2, 3, and so on). Page numbers are written right-aligned under the 'Page' column. The chapter title or sub-chapter title and the page number are connected with '.....'. The example can be found in Appendix 11.

3.9 List of Tables

List of column consists of three columns, namely: table number, table title, and page. On the 'table number' column, only the numbers are written, without the word 'table'. Table number (starting right at the left border of the page) and page number (written on the right border of the page) are written in Arabic number. Table title is placed between table number and page number, written in all lowercase except for the first letters of the words that are not conjunctions. On the top of page column, write 'Page', not bold. The spaces between table titles are two spaces. If the table title is more than one line, then the space between the lines is one space. The table title and the page number are connected with '.....'. The example can be found in Appendix 12.

3.10 List of Illustrations

The writing/typing mechanism of the list of illustration is the same of the list of tables. The example can be found in Appendix 13.

3.11 List of Appendices

The list of appendices consists of appendices in form of tables and illustrations. The writing/typing mechanism of the list of appendices is the same of the list of tables or list of illustration. The example can be found in Appendix 14.

3.12 List of Symbols and Abbreviations

The list of symbol and abbreviation pages consist of symbols/quantities and abbreviations of terms used in the writing. The abbreviations used are those that are commonly applicable. The list is made in two columns. The first column consists of symbols or abbreviations, while the second columns consists of the descriptions/explanations of the abbreviations or symbols

on the first column. The abbreviations are written in Latin alphabetical order. If symbols are written in Greek letters, the writing should also be in Greek alphabetical order (examples: alpha, beta, delta, gamma). The descriptions in the second column are all written in lowercase. The example can be found in Appendix 15.

CHAPTER IV
THE MAIN SECTION OF AN UNDERGRADUATE THESIS

4.1 Introduction

This chapter consists of research background, research questions, research purpose, and research significance.

4.1.1 Background

Research background consist of the explanations of reasons why the problems in the research are interesting, important, and necessary to be the subject of a research. The position of the problem is also elaborated in a wider scope of problems. The originality of the research is expressed by showing that the problems discussed are not yet solved by previous researchers, or stated firmly the differences between the current research conducted by the author and previous researches done by other researchers.

4.1.2 Research questions

Research questions in undergraduate thesis consist of the problems discussed and are written in the form of questions. Research questions consist of parameters and variables used in the research.

4.1.3 Research purposes

Research purpose states specifically the aims of the research according to the research questions. Research purpose is written in the form of statements.

4.1.4 Research significance

Research significance explains the significance of the research results for the growth of science and technology, civilization and welfare of the human race.

4.2 Literature Review

Literature review consists of things related to the research topic and hypothesis (if any). Literature review is necessary in forming a frame of ideas based on existing theories in drawing a hypothesis. Theories that become the basis of every topic are discussed in literature review. Besides, the author can present the result of previous researches related to the current research conducted as well as showing that the problems in the previous researches have not been solved entirely. The literature used should be new and taken from the original source (such as textbooks, handbooks, journals, magazines, the internet, and others). Laboratory work instructions and handouts/articles without ISBN are not allowed to be used as references.

Hypothesis (if any) consists of a brief explanation drawn from the literature review and temporary answers to the research questions. The truth is proved through the research.

4.3 Research Methods

This chapter consists of explanation of the time and place of the research, research design, research steps, variables, data gathered, and data analysis. The research materials and tools do not need to be written in a separate sub-chapter, but have to be written in the research steps. Research Methods consists of these items written in order.

1. Research time and place explains the time and location/laboratory/organization where the research takes place. If the research is conducted on the field, the area of the location has to be elaborated: geographic location, landscape, height, rainfall, land use, and time and season during the research.
2. Research steps consist of thorough and detailed descriptions of the steps taken during the research, including the type of data and data gathering Methods. To make it easier to understand, the author can also use flowchart other than description. Research step subtitle should be customized with the work Methods applied without writing the subtitle 'work Methods' (example: subtitle 'DNA isolation'). This can be found in Appendix 14 where sub-chapter title 3.2. is not 'Work Methods' but research steps that are going to be taken, which are 'SDS PAGE and Western Blotting'.
3. Research design explains the approach strategy taken to gain answers to the research questions and research purpose.
4. Data analysis consists of thorough descriptions of the data processing Methods in order to draw a conclusion. If there is a statistic analysis, the author needs to mention the level of accuracy and computer software used.

4.4 Results and Discussion

This chapter consists of the results of the research in form of data and explanations, and the discussion written not in a separate subtitle. The research data can be presented in several forms, such as: tables, illustrations, graphs, maps or photos, and are placed as close as possible to the description of the data and their discussion. Choose the most informative form of data. Every datum in the description or appendix has to be presented/explained in form of sentences. Discussion on the results can be a qualitative or quantitative theoretical discussion, or statistic. References or literature included to support the research results can be facts with similar results, or even with results opposite to the result of the current research, and has to have supporting theoretical explanations.

4.5 Conclusions and Recommendations

Conclusion and recommendations have to be presented in different sub-chapters.

1. A conclusion is a brief and clear statement extracted from the results and discussion which proves the truth of the hypotheses (if any), answers the research purpose, and is closely related to the research questions.
2. Recommendations should start with a sentence that becomes the basis or the reason why the recommendations have to be delivered. The recommendations presented have to be based on the facts written in the results and discussion chapter. Recommendations should not be normative, but have to consider three things: a) Methods improvement, b) necessary further research, and c) the significance of the research result.

CHAPTER V
THE FINAL SECTION OF AN UNDERGRADUATE THESIS

5.1 References

Every title of a book, article, journal, and other literature published and cited in the undergraduate thesis should be written in a list called references. In undergraduate thesis, postgraduate thesis, dissertation, and research reports, those titles still have to be written in the references albeit not being published. Literature material in form of unpublished reference and information from personal communication do not need to be included in the references. Laboratory work instructions, classroom notes, and information source without ISBN cannot be used as a reference. The example can be found in Appendix 16. Some types of literature that can be included in the references are:

1. A text book which is a scientific writing published with indefinite time interval, written by one or several authors or a team of editors. Example: *Animal Physiology, Plant Cell Development, Ecology, Molecular Biology of the Cell,* and *Spectrometric Identification of Organic Compound.*
2. A journal which is a scientific magazine consisting of scientific writing published by a professional publisher professional association. Example: *Journal of Fertility and Sterility, Plant Cell Physiology Phytopatology, Carcinogenesis, Science,* and *Cancer Research.*
3. A journal review consists of an article extracted from various research articles in a branch of science. Example: *Botanical Review, Biological Review,* and *FEMS Microbiology Review.*
4. A periodical which is a scientific magazine published periodically by an institution and consists of research results that have been conducted.
5. A yearbook which is a book of facts and statistical data of a year published by an institution.
6. A bulletin which is a short scientific writing published periodically, consisting of notes or scientific instructions for an operational activity. Example: HPT Bulletin.
7. An annual review which consists of reviews of published literature. Example: *Annual Review of Microbiology, Annual Review of Biochemistry,* and *Annual Review of Plant Physiology.*
8. Proceeding, Example: Prosiding Forum Komunikasi Ilmiah Pemanfaatan Pestisida Nabati, *Proceeding of the 198 Annual Meeting of the International Research Group on Wood Preservation.*
9. A reference which consists of article titles discussing certain branch of science.
10. Undergraduate Thesis, Postgraduate Thesis, Dissertations, and Research Reports. The eligibility of the scientific work is determined by the advisors.
11. Websites and CD-ROM. Example: E-books, Tutorials, Wikipedia, personal blogs. Articles from websites that do not have the name of the author or institution cannot be used as a reference.

5.2 Appendices

In this part, additional information needed in the writing process of the undergraduate thesis is presented. Common appendices can be included in tables or illustrations, like examples of an equation. Every appendix has to have its own title and the writing mechanism is the same as the writing mechanism for titles and tables. If there is only one table or one illustration in one appendix, the title of the table or illustration is used as the title of the appendix. If there are several tables and/or several illustrations in one appendix, the title of the appendix is adjusted to the tables or illustrations in the appendix. Every table or illustration in the appendices is numbered. The table numbering system for the Appendices is started with LT (example: LT1, LT2). The image numbering system for the Appendices is started with LG (example: LG1, LG2).

CHAPTER VI
UNDERGRADUATE THESIS DOCUMENT SUBMISSION

After the undergraduate thesis examination and the student is declared graduated but still has to do the revision, the deadline for the revision is as follows:

1. The maximum revision deadline is two weeks from the undergraduate thesis examination.
2. If the student fails to submit a bound document of the revised undergraduate thesis in two weeks period, the grade will be reduced by one level.
3. If the student fails to submit a bound document of the revised undergraduate thesis after one month, they will have to undergo another examination.
4. If the student fails to submit a bound document of the revised undergraduate thesis after two months, they will have to conduct a new research with a new topic and a new title.

SECTION II
POSTGRADUATE THESIS WRITING GUIDELINES

CHAPTER I
INTRODUCTION

1.1 Definition

Postgraduate Thesis is a final paper for postgraduate students in the form of a scientific publication constructed based on the result of a research (experiment/survey) which weighs 12 credits. A Postgraduate Thesis is written by a Biology Department student of Mathematics and Natural Sciences (MIPA) Faculty of Universitas Brawijaya (UB) as the materials of the final examinations and as a requirement to obtain the Master of Science degree/diploma.

1.2 Purpose

The aims of this Postgraduate Thesis Writing Guidelines are:

1. to help the students as they are writing or compiling their postgraduate thesis, and
2. to give uniformity in the postgraduate thesis guidance by advisors for the students.

1.3 Steps of Writing an Postgraduate Thesis

The steps that all students have to go through while writing their postgraduate thesis with the guidance from their advisors are:

1. write a postgraduate research proposal script,
2. conduct an postgraduate research proposal seminar,
3. conduct the research
4. conduct a research result seminar
5. propose the postgraduate thesis script approved by the advisors to be tested in the postgraduate thesis examination,
6. submit the postgraduate thesis script that has been revised and approved by advisors and Study Program Chairman to the study program and faculty.

CHAPTER II
SECTIONS OF A POSTGRADUATE THESIS

The postgraduate thesis written by postgraduate students from Biology Department consists of three sections namely the opening, main, and final sections (Table 2).

Table 2. Postgraduate Thesis Sections and Their Contents

Sections	Contents
Opening	Title Page Cover APPROVAL PAGE ADVISOR AND EXAMINER TEAM ORGANISATION STATEMENT OF POSTGRADUATE THESIS ORIGINALITY POSTGRADUATE THESIS USE GUIDELINES CURRICULUM VITAE SUMMARY ACKNOWLEDGMENT TABLE OF CONTENTS LIST OF TABLES LIST OF ILLUSTRATIONS LIST OF APPENDICES LIST OF SYMBOLS AND ABBREVIATIONS
Main	CHAPTER I INTRODUCTION CHAPTER II LITERATURE REVIEW CHAPTER III RESEARCH METHODS CHAPTER IV RESULTS AND DISCUSSION CHAPTER V CONLUSIONS AND RECOMMENDATIONS
Final	REFERENCES APPENDICES

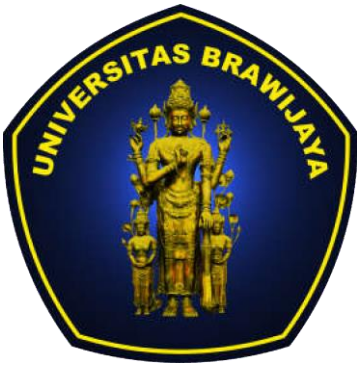
The postgraduate thesis is printed on 80 gram A4 (29.6 x 22 cm^2) HVS paper. From introduction to appendices are printed double-sided. There is no need to put a divider page to separate sections or contents. Every section or content is started on a new page. The font used is Times New Roman size 12 with 1.5 space. The pages are chosen in form of pages: Mirror Margin, so the position of odd page numbers are different from the even pages. Typing margin: the top, bottom, and outer borders are 2.5 cm, while the inner border is 3 cm. The script page space is filled fully according to the border/justified alignment except for new paragraphs, mathematic equations, lists, tables, illustrations, or special items.

CHAPTER III
THE OPENING SECTIONS OF A POSTGRADUATE THESIS

3.1 Cover

The cover is printed on a light green hardcover. All words are written in uppercase except for the word ‘by’, scientific names or symbols typed in lowercase according to the descending order on the printed cover as follows.

1. Postgraduate thesis title,
2. The phrase ‘POSTGRADUATE THESIS’,
3. Author's name, written in full in uppercase without abbreviation as written in the diploma, above the name write the word ‘by’,
4. The author's student registration number, without ‘NIM’ (Nomor Induk Mahasiswa/student registration number) written,
5. UB logo in pentagon as shown below, with the size of 4 x 4 cm.



6. The organization the author is under, which is: BIOLOGY MASTERS PROGRAM, BIOLOGY DEPARTMENT, MATHEMATICS AND NATURAL SCIENCES FACULTY, UNIVERSITAS BRAWIJAYA, MALANG and arranged downwards symmetrically,
7. The completion year for the postgraduate thesis is the submission year of the postgraduate thesis which has been approved by advisors and Study Program Chairman, and is written below the word ‘MALANG’,
8. On the spine of the postgraduate thesis, write the author's name, the phrase 'POSTGRADUATE THESIS’ and the completion year.

The example of the cover page can be found in Appendix 1b.

3.2 Title Page

The title page consists of the same writing as the cover page, plus the sentence about the purpose of why the postgraduate thesis is written, which is: ‘As one of the requirements to obtain the Science Master degree in Biology Department’. The sentence is written under the phrase ‘POSTGRADUATE THESIS’ with the font requirement as shown in Appendix 2b.

3.3 Approval Page

The approval page consists of the phrase ‘POSTGRADUATE THESIS APPROVAL

PAGE', the postgraduate thesis title, the author's name, the author's student number (without 'NIM' written), examination process and graduation information, arranged downwards symmetrically. The postgraduate thesis title, the author's name and student number are written as they are written on the cover page. The examination process and graduation information is written as follows. 'Has been examined before the Board of Examiners on ..... and has been declared eligible to obtain Master of Science degree in Biology Department.' The words 'Approved by' are written underneath, followed by the Name, Employee Number, and signature of Advisor I on the left, and Advisor II on the right, written on the same line position. The words 'Acknowledged by' are written underneath, followed by the Master of Biology Study Program Chairman's name, Employee Number, and signature written in the center of the line. The example can be found in Appendix 3b.

3.4 Advisors and Examiners Committee Organization

The example can be found in Appendix 4a.

3.5 Statement of Originality Page

This page consists of the author's statement that is binding over their writing. The example can be found in Appendix 5b.

3.6 Curriculum Vitae

The example can be found in Appendix 6a.

3.6 Postgraduate Thesis Use Guideline Page

This page is to inform and to remind the writer of the procedure of usage and citation of the postgraduate thesis as a reference according to the general scientific etiquette. The example can be found in Appendix 7b.

3.7 Summary

A summary is a brief yet thorough presentation of the entire postgraduate thesis presented in maximum of two pages and written with single space. A summary consists of research identity and research content. Research identity consists of title, author's name, advisor name without their titles, and the organization and submission year of the postgraduate thesis. A summary contains the research problems, research purpose, research Methods, research result, and conclusion.

The title is typed bold and the first letter of each word is written in uppercase except for conjunctions. Species names, chemistry compounds, genes, and other names unlisted in the Great Dictionary of the Indonesian Language are written in italics. A summary is purely the product of the author's thoughts, thus any citation (reference) from other people is not allowed. Research background and purpose are extracted from 'Introduction; chapter, research Methods is extracted from 'Research Methods' chapter, research result is extracted from 'Results and Discussion' chapter, and conclusion is extracted from 'Conclusion and Recommendations' chapter. The summary is written in two languages: Indonesian and English, each written on separate pages, with single space. The example can be found in Appendix 8b and 9b.

3.8 Acknowledgment

The acknowledgment consists of a brief description of the purpose of writing the undergraduate thesis, and expressing gratitude. The acknowledgment is written with single space, with the length of maximum one page, and must not contain scientific content. The month and the year in the acknowledgment should be the same with the time of the postgraduate thesis submission. Names should be written formally and in full (not nicknames) and with academic titles (if any). The example can be found in Appendix 10.

3.9 Table of Contents

This page consists of list of titles (starting from summary to appendices) and sub-chapter titles with their page numbers, typed in order according to its page numbers, not ending in full stops, and typed in single space, except for inter-chapter and other information that should be written in double space. The word 'Page' is written right-aligned, only the first letter is in uppercase, not bold, and is four spaces away from the phrase 'TABLE OF CONTENT'. The pages before the summary page (cover, title pages, approval page, statement page, and postgraduate thesis usage guidelines) are not included in the table of contents. The words 'SUMMARY', 'ACKNOWLEDGMENT', 'LIST OF TABLES', 'LIST OF ILLUSTRATIONS', 'LIST OF APPENDICES', 'REFERENCES', 'APPENDICES', and sub-chapter titles are written in bold uppercase.

Sub-chapter titles are written in lowercase, except for the first letter of the words that are not conjunctions. For titles that need more than one line, the second line is started under the first letter of the sub-chapter title. Page numbers before CHAPTER I are written in lowercase Roman numbers (example: iii, iv, v, and so on) while other page numbers are written in Arabic numbers (examples: 1, 2, 3, and so on). Page numbers are written right-aligned under the 'Page' column. The chapter title or sub-chapter title and the page number are connected with '.....'. The example can be found in Appendix 11.

3.10 List of Tables

List of column consists of three columns, namely: table number, table title, and page. On the 'table number' column, only the numbers are written, without the word 'table'. Table number (starting right at the left border of the page) and page number (written on the right border of the page) are written in Arabic number. Table title is placed between table number and page number, written in all lowercase except for the first letters of the words that are not conjunctions. On the top of page column, write 'Page', not bold. The spaces between table titles are two spaces. If the table title is more than one line, then the space between the lines is one space. The table title and the page number are connected with '.....'. The example can be found in Appendix 12.

3.11 List of Illustrations

The writing/typing mechanism of the list of illustration is the same of the list of tables. The example can be found in Appendix 13.

3.12 List of Appendices

The list of appendices consists of appendices in form of tables and illustrations. The writing/typing mechanism of the list of appendices is the same of the list of tables or list of

illustration. The example can be found in Appendix 14.

3.13 List of Symbols and Abbreviations

The list of symbol and abbreviation pages consist of symbols/quantities and abbreviations of terms used in the writing. The abbreviations used are those that are commonly applicable. The list is made in two columns. The first column consists of symbols or abbreviations, while the second column consists of the descriptions/explanations of the abbreviations or symbols on the first column. The abbreviations are written in Latin alphabetical order. If symbols are written in Greek letters, the writing should also be in order of the Greek alphabets (examples: alpha, beta, delta, gamma). The descriptions in the second column are all written in lowercase. The example can be found in Appendix 15.

CHAPTER IV
THE MAIN PART OF A POSTGRADUATE THESIS

4.1 Introduction

This chapter consists of research background, research questions, research purpose, and research significance.

4.1.1 Background

Research background consist of the explanations of reasons why the problems in the research are interesting, important, and necessary to be the subject of a research. The position of the problem is also elaborated in a wider scope of problems. The originality of the research is expressed by showing that the problems discussed are not yet solved by previous researchers, or stated firmly the differences between the current research conducted by the author and previous researches done by other researchers.

4.1.2 Research questions

Research questions in postgraduate thesis consist of the problems discussed and are written in the form of questions. Research questions consist of parameters and variables used in the research.

4.1.3 Research purposes

Research purpose states specifically the aims of the research according to the research questions. Research purpose is written in the form of statements.

4.1.4 Research significance

Research significance explains the significance of the research results for the growth of science and technology, civilization and welfare of the human race.

4.2 Literature Review

Literature review consists of things related to the research topic and hypothesis (if any). Literature review is necessary in forming a frame of ideas based on existing theories in drawing a hypothesis. Theories that become the basis of every topic is discussed in literature review. Besides, the author can present the result of previous researches related to the current research conducted as well as showing that the problems in the previous researches have not been solved entirely. The literature used should be new and taken from the original source (such as textbooks, handbooks, journals, magazines, the internet, and others). Practical instructions and lecture dictates/articles instructions and handouts/articles without ISBN are not allowed to be used as references.

4.2.1 Concept frame

Concept frame can be a research concept frame or a theory concept frame. Basically, a 'concept' is an understanding of a phenomenon which is a basic element of a thinking process. A research concept frame includes: frame of mind, hypothesis. This frame could be a summary of literature review which support or is against the theory around the research questions. The gaps between the results of previous researches are also explained, so the topic needs to be further researched. The description of concept frame or frame of mind typically leads to the hypothesis and can be written in a narration or a flowchart.

A concept frame can also be a theoretical study about the factors engaged in the parameter being observed. Other than that, a concept frame is used to show the position of a research towards the entire ongoing mechanism.

4.2.2 Hypothesis

Hypothesis (if any) consists of a brief explanation drawn from the literature review and temporary answers to the research questions. The truth is proved through the research.

4.3 Research Methods

This chapter consists of explanation of the time and place of the research, research design, research steps, variables, data gathered, and data analysis. The research materials and tools do not need to be written in a separate sub-chapter, but have to be written in the research steps. Research Methods consists of these items written in order.

1. Research time and place explains the time and location/laboratory/organization where the research takes place. If the research is conducted on the field, the area of the location including geographic location, landscape, height, rainfall, land use, and time and season during the research, must be elaborated.
2. The operational frame is written in form of descriptions of research steps and in form of flowcharts.
3. Research steps consist of thorough and detailed descriptions of the steps taken during the research, including the type of data and data gathering Methods. To make it easier to understand, the author can also use flowchart other than description. Research step subtitle should be customized with the work Methods applied without writing the subtitle 'work Methods' (example: subtitle 'DNA isolation'). This can be found in Appendix 15 where sub-chapter title 3.2. is not 'Work Methods' but research steps that are going to be taken, which are 'SDS PAGE and Western Blotting'.
4. Research design explains the approach strategy taken to gain answers to the research questions and research purpose. If every research step has a different research background, then the design can be written in the beginning of the sub-chapter of each research step.
5. Data analysis consists of thorough descriptions of the data processing Methods in order to draw a conclusion. If there is a statistic analysis, the author needs to mention the level of accuracy and computer software used. If every research step has a different data analysis, then the analysis can be written in the beginning of the sub-chapter of each research step.

4.4 Results and Discussion

This chapter consists of the results of the research in form of data and explanations, and the discussion written not in a separate subtitle. The research data can be presented in several forms, such as: tables, illustrations, graphs, maps or photos, and are placed as close as possible to the description of the data and their discussion. Choose the most informative form of data. Every datum in the description or appendix has to be presented/explained in form of sentences. Discussion on the results can be a qualitative or quantitative theoretical discussion, or statistic. References or literature included to support the research results can be facts with similar results, or even with results opposite to the result of the current research, and has to have supporting theoretical explanations.

4.5 Conclusions and Recommendations

Conclusion and recommendations have to be presented in different sub-chapters.

1. A conclusion is a brief and clear statement extracted from the results and discussion which proves the truth of the hypotheses (if any), answers the research purpose, and is closely related to the research questions.
2. Recommendations should start with a sentence that becomes the basis or the reason why the recommendations have to be delivered. The recommendations presented have to be based on the facts written in the results and discussion chapter. Recommendations should not be normative, but have to consider three things: a) Methods improvement, b) necessary further research, and c) the significance of the research result.

CHAPTER V
THE FINAL SECTION OF A POSTGRADUATE THESIS

5.1 References

Every title of a book, article, journal, and other literature published and cited in the postgraduate thesis should be written in a list called references. In thesis, postgraduate thesis, dissertation, and research reports, those titles still have to be written in the references albeit not being published. Literature material in form of unpublished reference and information from personal communication do not need to be included in the references. Laboratory work instructions, classroom notes, and information source without ISBN cannot be used as a reference. The example can be found in Appendix 16. Some types of literature that can be included in the references are:

1. A text book which is a scientific writing published with indefinite time interval, written by one or several authors or a team of editors. Example: *Animal Physiology, Plant Cell Development, Ecology, Molecular Biology of the Cell,* and *Spectrometric Identification of Organic Compound.*
2. A journal which is a scientific magazine consisting of scientific writing published by a professional publisher professional association. Example: *Journal of Fertility and Sterility, Plant Cell Physiology Phytopatology, Carcinogenesis, Science,* and *Cancer Research.*
3. A journal review which consists of an article extracted from various research articles in a branch of science. Example: *Botanical Review, Biological Review and FEMS Microbiology Review.*
4. A periodical which is a scientific magazine published periodically by an institution and consists of research results that have been conducted,
5. A yearbook which is a book of facts and statistical data of a year published by an institution.
6. A bulletin which is a short scientific writing published periodically, consisting of notes or scientific instructions for an operational activity. Example: HPT Bulletin.
7. An annual review which consists of reviews of published literature. Example: *annual Review of Microbiology, Annual Review of Biochemistry,* and *Annual Review of Plant Physiology.*
8. Proceeding, Example: Prosiding Forum Komunikasi Ilmiah Pemanfaatan Pestisida Nabati, *Proceeding of the 198 Annual Meeting of the International Research Group on Wood Preservation.*
9. A reference which consists of article titles discussing certain branch of science.
10. Postgraduate Thesis, Dissertations, and Research Reports. The eligibility of the scientific work is determined by the advisors.
11. Websites and CD-ROM. Example: eBooks, Tutorials. Wikipedia and articles from websites that do not have the name of the author or institution cannot be used as a reference.

5.2 Appendices

In this part, additional information needed in the writing process of the postgraduate thesis is presented. Common appendices can be included in tables or illustrations, like examples of an equation. Every appendix has to have its own title and the writing mechanism is the same as the writing mechanism for titles and tables. If there is only one table or one illustration in one appendix, the title of the table or illustration is used as the title of the appendix. If there are several tables and/or several illustrations in one appendix, the title of the appendix is adjusted to the tables or illustrations in the appendix. Every table or illustration in the appendices is numbered. The numbering system for tables in the Appendices is started with LT (example, LT1, LT2). The numbering system for tables in the Appendices is started with LG (example, LG1, LG2).

CHAPTER VI
POSTGRADUATE THESIS DOCUMENT SUBMISSION

After the postgraduate thesis examination and the student is declared graduated but still has to do the revision, the deadline for the revision is as follows:

1. The maximum revision deadline is two weeks from the postgraduate thesis examination.
2. If the student fails to submit a bound document of the revised undergraduate thesis in two weeks period, the grade will be reduced by one level.
3. If the student fails to submit a bound document of the revised undergraduate thesis after one month, they will have to undergo another examination.
4. If the student fails to submit a bound document of the revised undergraduate thesis after two months, they will have to conduct a new research with a new topic and a new title.

SECTION III
DISSERTATION WRITING GUIDELINES

CHAPTER I
INTRODUCTION

1.1 Definition

The final assignment of doctorate students is called a dissertation, a piece of scientific writing based on a research project's findings (experiment/survey), which has 32 credits. A dissertation is written by a Doctoral Program student of Biology Department of the Faculty of Mathematics and Natural Sciences of Universitas Brawijaya as a material for seminar of findings, quality test, dissertation-final test, and a requirement to obtain Doctoral degree/diploma.

1.2 Purpose

The Dissertation Writing Guidelines was created for the following objectives:

1. to help students to write or compile their dissertations, and
2. to organize the dissertation writing supervision by supervisors to the students.

1.3 The Steps of Writing a Dissertation

The steps that students must do in order to write a dissertation in consultation with the supervisors are as follows:

1. compile a dissertation research proposal manuscript,
2. conduct a dissertation research proposal/eligibility exam,
3. make revisions according to the suggestion of the promoter and the examiner team,
4. conduct the research,
5. conduct a research result seminar,
6. draft a dissertation for the eligibility exam,
7. do a closed examination,
8. submit the dissertation manuscript that has been revised and approved by the supervisors and the Head of the Study Program to the department and faculty.

CHAPTER II
THE SECTIONS OF DISSERTATION

The dissertation prepared by the Biology Doctoral Program students consists of three sections, namely the opening, main, and final sections (Table 3).

Table 3. Dissertation's Sections and The Contents.

Sections	Contents
Opening	Title Page Cover APPROVAL PAGE COMPOSITION OF PROMOTERS AND EXAMINERS TEAM DECLARATION OF ORIGINALITY OF THE DISSERTATION USAGE GUIDELINES OF THE DISSERTATION BIOGRAPHY SUMMARY SUMMARY ACKNOWLEDGMENT TABLE OF CONTENTS LIST OF TABLES LIST OF ILLUSTRATIONS LIST OF APPENDICES LIST OF SYMBOLS AND ABBREVIATIONS
Main text (type 1)	CHAPTER I INTRODUCTION CHAPTER II LITERATURE REVIEW CHAPTER III RESEARCH METHODS CHAPTER IV RESULTS AND DISCUSSION (including General Discussion if any) BAB V CONCLUSIONS AND RECOMMENDATIONS
Main text (type 2)	CHAPTER I INTRODUCTION CHAPTER II REVIEW OF LITERATURE CHAPTER III RESEARCH PHASE 1 CHAPTER IV RESEARCH PHASE 2 CHAPTER V RESEARCH PHASE 3 (each research chapter consists of introduction, Methods, results and discussion, conclusions and recommendations) HAPTER VI GENERAL DISCUSSION HAPTER VII GENERAL CONCLUSION
Final	EFERENCES PPENDICES

The dissertation final assignment must be written on 80 gram A4 (29.6 x 22 cm2) HVS paper. From introduction to appendices are printed double-sided. There is no need to put a divider page to separate sections or contents. Every section or content is started on a new page. Text must use *Times New Roman* font, size 12, and must be in 1.5 space. The pages are chosen in form of pages: *Mirror Margin*, so the positions of odd page numbers are different from the even pages. *Typing margin*: top, bottom, and outer margin is 2.5 cm, while the inner margin is

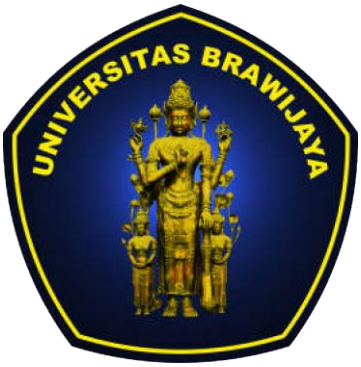
3 cm. Manuscript text must be justified between the margins, except for new paragraphs, mathematics equations, lists, tables, figures, or special contents.

CHAPTER III
OPENING SECTION OF DISSERTATION

3.1 Cover

Dissertation cover must be printed with black hardcover. All words must be in capital except the words: ‘by’, name, or scientific symbols printed with lower case according to the descending order on the printed cover.

1. Dissertation title;
2. The word ‘DISERTATION’;
3. Author’s name must be written full in capital without any abbreviation as written in the diploma, above the name write the word ‘by’;
4. Author’s student registration number, without ‘NIM’ (Nomor Induk Mahasiswa/student registration number) written;
5. UB logo in pentagon as shown below, with the size of 4 x 4 cm.



6. Dissertation’s publishing institution: BIOLOGY DOCTORAL PROGRAM, DEPARTMENT OF BIOLOGY, FACULTY OF MATHEMATICS AND NATURAL SCIENCES, UNIVESITAS BRAWIJAYA, MALANG, arranged symmetrically downward;
7. The completion year of the dissertation is the submission year of the dissertation manuscript which has been approved by supervisor and Head of Study Program, and is written below the word ‘MALANG’;
8. Author’s name, the word ‘DISSERTATION’, and dissertation completion year are printed on the back cover;

The example of the cover page can be found in Appendix 1c.

3.2 Title Page

The dissertation title page consists of the same writing as the cover page, plus the sentence about the purpose of why the dissertation is written, which is: 'As one of the requirements to obtain a Doctorate in Biology'. The sentence is written under the phrase ‘DISSERTATION’ with the font requirement as shown in Appendix 2c.

3.3 Approval Page

The approval page contains the words ‘DISSERTATION VALIDATION PAGE', title of the dissertation, author's name, student registration number (without 'NIM’ written), a description

of the examination implementation and graduation, which arranged downward symmetrically. The title of the dissertation, name and student registration number of the author is written in accordance with what is on the cover page. Information about examination and graduation are written as follows: 'Has been defended before the Panel of Examiners on ..... and is declared eligible for a Doctorate in Biology degree'. The word 'Approved' is put underneath followed by the name, employee registration number, and signature of the Promoter written in the middle of the line and Co-Promoter I is written on the left and Co-Promoter II is written on the right at the same row. The words 'Acknowledged by' are written underneath, followed by the Study Program Chairman's name, Employee Number, and signature written in the center of the line. The example can be found in Appendix 3c.

3.4 Promoters and Examiners Lineup

The example can be found in Appendix 4b.

3.5 Dissertation Statement of Originality Page

Declaration page contains dissertation author's declaration that is binding to the work. The example can be found in Appendix 5c.

3.6 Curriculum Vitae

The example can be found in Appendix 6b.

3.5 Dissertation Usage Guidelines Page

This page is to inform and remind the writer of the procedure of usage and citation of the dissertation as a reference according to the general scientific etiquette. The example can be found in Appendix 7c.

3.6 Summary

A summary is a brief yet thorough presentation of the entire postgraduate thesis presented in maximum of two pages and written with single space. A summary consists of research identity and research content. Research identity consists of title, author's name, advisor name without their titles, and the organization and submission year of the postgraduate thesis. A summary contains the research problems, research purpose, research Methods, research result, and conclusion.

The title is typed bold and the first letter of each word is written in uppercase except for conjunctions. Species names, chemistry compounds, genes, and other names unlisted in the Great Dictionary of the Indonesian Language are written in italics. A summary is purely the product of the author's thoughts, thus any citation (reference) from other people is not allowed. Research background and purpose are extracted from 'Introduction; chapter, research Methods is extracted from 'Research Methods' chapter, research result is extracted from 'Results and Discussion' chapter, and conclusion is extracted from 'Conclusion and Recommendations' chapter. The summary is written in two languages: Indonesian and English, each written on separate pages, with single space. The example can be found in Appendix 8c and 9c.

3.7 Acknowledgment

The acknowledgment contains a brief description of the purpose of the dissertation, and acknowledgment. The acknowledgment is written with single space, with the length of maximum one page, and must not contain scientific content. The month and the year in the acknowledgment should be the same with the time of submission of the dissertation manuscript. Names should be written formally and in full (not nicknames) and with academic titles (if any). The example can be found in Appendix 10.

3.8 Table of Contents

This page consists of list of titles (starting from summary to appendices) and sub-chapter titles with their page numbers, typed in order according to its page numbers, not ending in full stops, and typed in single space, except for inter-chapter and other information that should be written in double space. The word 'Page' is written right-aligned, only the first letter is in uppercase, not bold, and is four spaces away from the phrase 'TABLE OF CONTENT'. The pages before the summary page (cover, title pages, approval page, statement page, and postgraduate thesis usage guidelines) are not included in the table of contents. The words 'SUMMARY', 'ACKNOWLEDGMENT', 'LIST OF TABLES', 'LIST OF ILLUSTRATIONS', 'LIST OF APPENDICES', 'REFERENCES', 'APPENDICES', and sub-chapter titles are written in bold uppercase.

Sub-chapter titles are written in lowercase, except for the first letter of the words that are not conjunctions. For titles that need more than one line, the second line is started under the first letter of the sub-chapter title. Page numbers before CHAPTER I are written in lowercase Roman numbers (example: iii, iv, v, and so on) while other page numbers are written in Arabic numbers (examples: 1, 2, 3, and so on). Page numbers are written right-aligned under the 'Page' column. The chapter title or sub-chapter title and the page number are connected with '.....'. The example can be found in Appendix 11.

3.9 List of Tables

List of column consists of three columns, namely: table number, table title, and page. On the 'table number' column, only the numbers are written, without the word 'table'. Table number (starting right at the left border of the page) and page number (written on the right border of the page) are written in Arabic number. Table title is placed between table number and page number, written in all lowercase except for the first letters of the words that are not conjunctions. On the top of page column, write 'Page', not bold. The space between table titles are two spaces. If the table title is more than one line, then the space between the lines is one space. Table titles and page numbers are connected with '.....'. The example can be found in Appendix 12.

3.10 List of Illustrations

The writing/typing mechanism of the list of illustration is the same of the list of tables. The example can be found in Appendix 13.

3.11 List of Appendices

The list of appendices consists of appendices in form of tables and illustrations. The writing/typing mechanism of the list of appendices is the same of the list of tables or list of illustration. The example can be found in Appendix 14.

3.12 List of Symbols and Abbreviations

The list of symbol and abbreviation pages consist of symbols/quantities and abbreviations of terms used in the writing. The abbreviations used are those that are commonly applicable. The list is made in two columns. The first column consists of symbols or abbreviations, while the second column consists of the descriptions/explanations of the abbreviations or symbols on the first column. The abbreviations are written in Latin alphabetical order. If symbols are written in Greek letters, the writing should also be in order of the Greek alphabets (examples: alpha, beta, delta, gamma). The descriptions in the second column are all written in lowercase. The example can be found in Appendix 15.

CHAPTER IV
MAIN SECTION OF DISSERTATION

4.1 Introduction

This chapter consists of research background, research questions, research purpose, and research significance.

4.1.1 Background

Research background consist of the explanations of reasons why the problems in the research are interesting, important, and necessary to be the subject of a research. The position of the problem is also elaborated in a wider scope of problems. The authenticity of research is expressed by showing precisely that the problem at hand has never been solved by previous researchers, or by expressing the difference between researches conducted by the author and researches that has been conducted by previous researchers.

Doctoral students must be able to discuss previous studies related to the dissertation plan. Things that have not been resolved or become weaknesses in previous research and place the dissertation plan as one of the potential solutions that have not been done before so that it can become "novelty"/new findings of dissertation research.

4.1.2 Research questions

The problem statements in a dissertation contain problems to be researched and are stated in interrogative sentences. Research questions consist of parameters and variables used in the research.

4.1.3 Research purposes

Research purpose states specifically the aims of the research according to the research questions. Research purpose is written in the form of statements.

4.1.4 Research significance

Research significance explains the significance of the research results for the growth of science and technology, civilization and welfare of the human race.

4.2 Literature Review

Literature review consists of things related to the research topic and hypothesis (if any). Literature review is necessary in forming a frame of ideas based on existing theories in drawing a hypothesis. Theories that become the basis of every topic are discussed in literature review. Besides, the author can present the result of previous researches related to the current research conducted as well as showing that the problems in the previous researches have not been solved entirely. The literature used must be new publications and as far as possible taken from the original source (for example, textbooks, handbooks, journals, magazines, the internet, etc.). Practical instructions and lecture dictates/articles instructions and handouts/articles without ISBN are not allowed to be used as references.

Hypothesis (if any) consists of a brief explanation drawn from the literature review and temporary answers to the research questions. Truth shall be proven through the research conducted. Hypothesis is written at the end of the literature review.

4.2.1 Concept frame

Concept frame can be a research concept frame or a theory concept frame. Basically, a ‘concept’ is an understanding of a phenomenon which is a basic element of a thinking process. A research concept frame includes: frame of mind, hypothesis. This frame could be a summary of literature review which support or is against the theory around the research questions. The gap between the results of previous researches is also explained, so the topic needs to be further researched. The description of concept frame or frame of mind typically leads to the hypothesis and can be written in a narration or a flowchart.

A concept frame can also be a theoretical study about the factors engaged in the parameter being observed. Other than that, a concept frame is used to show the position of a research towards the entire ongoing mechanism.

2.2.2 Hypothesis

Hypothesis (if any) consists of a brief explanation drawn from the literature review and temporary answers to the research questions. The truth is proved through the research.

4.3 Research Methods

This chapter consists of explanation of the time and place of the research, research design, research steps, variables, data gathered, and data analysis. The research materials and tools do not need to be written in a separate sub-chapter, but have to be written in the research steps. Research Methods consists of these items written in order.

1. Time and place of research, describes the time of research and the location/laboratory/institution where the research was carried out. Research carried out in the field must be explained that the research areas include: geographic location, landscape, altitude, rainfall, land use, socio-demographic conditions of the population/community, as well as the time and season when the research was carried out.
2. The operational framework is written in a description of the research steps and in a flow chart
3. The research steps are written with a complete and detailed description of steps taken in conducting the research, including the type of data and how to collect it. Flow chart can also be used to present the research steps to make it easier to be understood. Subtitles of the research steps are adjusted to the methods done without writing the subtitle 'methods' (for example: the subtitle 'DNA isolation'). This can be seen in Appendix 15 where the title of sub-chapter 3.2 is not ‘Methods’, but rather the exact research step that will be conducted: ‘SDS PAGE’ and Western Blotting.
4. Research design describes the approach strategy that will be taken to obtain answers to the problem statements and research objectives. If each step/stage of research has a different research design, then the design can be written at the beginning of the sub-chapter of each research step.
5. Data analysis contains a complete description of how the data is processed in order to get conclusions. If there is a statistical analysis, it is necessary to mention the level of accuracy and the computer software used. If each step/stage of the research has a different data analysis, the data analysis can be written at the end of the sub-chapter of each

research step.

4.4 Results and Discussion

This chapter consists of the results of the research in form of data and explanations, and the discussion written not in a separate subtitle. The research data can be presented in several forms, such as: tables, illustrations, graphs, maps or photos, and are placed as close as possible to the description of the data and their discussion. Choose the most informative form of data. Every datum in the description or appendix has to be presented/explained in form of sentences. Discussion on the results can be a qualitative or quantitative theoretical discussion, or statistic. Reference or literature included to reinforce the research results can be facts with similar results, or even contradictory to the results obtained, and must be accompanied by supporting theoretical explanations.

4.5 Conclusions and Recommendations

Conclusions and recommendations should be stated in different subsections.

1. A conclusion is a brief and clear statement extracted from the results and discussion which proves the truth of the hypotheses (if any), answers the research purpose, and is closely related to the research questions.
2. Recommendations should start with a sentence that becomes the basis or the reason why the recommendations have to be delivered. The recommendations written must be based on the facts presented in the results and discussion chapter. Recommendations should not be normative but must consider three things, namely: a) method improvement, b) further research that needs to be done and c) utilization of research results.

CHAPTER V
FINAL SECTION OF DISSERTATION

5.1 References

Each book title, article, journal, and other literature that has been published and has been cited in compiling a dissertation must be written in a list called a references. Especially for dissertations, dissertations, and research reports, even though they are not published, they must be included in the references. Library materials in the form of unpublished references and information on the results of personal communication are not included in the references. Practical instructions, lecture notes and sources of information that do not have a publishing license (ISBN) may not be used as references. The example can be found in Appendix 16. Some types of literature that can be included in the references are:

1. A text book which is a scientific writing published with indefinite time interval, written by one or several authors or a team of editors. Example: *Animal Physiology*, *Plant Cell Development*, *Ecology*, *Molecular Biology of the Cell*, and *Spectrometric Identification of Organic Compound*.
2. Journals are scientific magazines that contain scientific writings published by professional publishers of professional associations. Example: *Journal of Fertility and Sterility, Plant Cell Physiology Phytopatology, Carcinogenesis, Science,* and *Cancer Research*.
3. A journal review consists of an article extracted from various research articles in a branch of science. Example: *Botanical Review, Biological Review* and *FEMS Microbiology Review.*
4. *Perodical* is a scientific magazine published regularly by an institution that contains the results of research that has been carried out.
5. A yearbook which is a book of facts and statistical data of a year published by an institution.
6. A bulletin which is a short scientific writing published periodically, consisting of notes or scientific instructions for an operational activity. Example: HPT Bulletin.
7. An annual review which consists of reviews of published literature. Example: *annual Review of Microbiology, Annual Review of Biochemistry* and *Annual Review of Plant Physiology*.
8. Proceeding, Example: Prosiding Forum Komunikasi Ilmiah Pemanfaatan Pestisida Nabati, *Proceeding of the 198 Annual Meeting of the International Research Group on Wood Preservation.*
9. A reference which consists of article titles discussing certain branch of science.
10. Dissertation, and Dissertation and Research reports. The eligibility of the scientific work is determined by the advisors.
11. Websites and CD-ROM. Example: eBooks, Tutorials. Wikipedia, personal blogs, articles on websites without author's name and the institution must not be used as a reference.

5.2 Appendices

In this section, information or additional matters required in the preparation of the dissertation are presented. Common appendices can be included in tables or illustrations, like examples of an equation. Every appendix has to have its own title and the writing mechanism is the same as the writing mechanism for titles and tables. If there is only one table or one illustration in one appendix, the title of the table or illustration is used as the title of the appendix. If there are several tables and/or several illustrations in one appendix, the title of the appendix is adjusted to the tables or illustrations in the appendix. Every table or illustration in the appendices are numbered. The numbering system for tables in the Appendices is started with LT (example, LT1, LT2). The numbering system for tables in the Appendices is started with LG (example, LG1, LG2).

CHAPTER VI
DISSERTATION MANUSCRIPT SUBMISSION

After the dissertation examination and the student is declared graduated but still has to do the revision, the deadline for the revision is as follows:

1. The maximum revision limit is one month from the time of the dissertation examination.
2. If the student fails to submit a bound document of the revised dissertation in two weeks period, the grade will be reduced by one level.
3. If the student fails to submit a bound document of the revised dissertation after two months, they will have to undergo another examination.
4. If the student fails to submit a bound document of the revised dissertation after three months, they will have to conduct a new research with a new topic and a new title.

SECTION III
FINAL ASSIGNMENT WRITING PROCEDURES

CHAPTER I
INDONESIAN LANGUAGE STYLE AND TYPING STYLE

1.1 Indonesian Language Style

The language used is enhanced Indonesian Spelling System while "Abstract" is written in two languages, Indonesian and English. Sentence used must be formal, containing subject, predicate, and object, followed by adverb. One paragraph must consist of a minimum of two sentences. The terms used are Indonesian terms or those that have been standardized. If foreign terms must be used, the terms must be italicized. Every word must be written correctly and consistently. Passive voice is preferred because the use of personal pronouns (I, I, we, we, etc.) is not allowed. The word “I” in Acknowledgment in the foreword must be replaced with “the author” and must only be written under "Malang, month ... year...". Note that:

1. Conjunctions (such as 'sehingga' and 'sedangkan') and abbreviations (such as pH, DNA), numbers and chemical formulas must not be used to start a sentence. If a sentence must start with a number, the number must be written in letters as a word (example: Five pieces instead of 5 pieces.....).
2. Prepositions like 'on' are not allowed to be put in front of a subject.
3. The use of the words 'dimana' and 'dari' which is treated like where and of in English is not allowed.
4. The prefixes 'ke' and 'di' should be distinguished by prepositions 'ke' and 'di'. Examples: *diambil, ditulis, kepada, ke dalam, ke bawah, di sana, di dalam,* and *di luar.*
5. Punctuations (comma, colon, semicolon, etc.) must be used appropriately. Between punctuation and the following letter are separated by 1 (one) tap/letter/space.

1.2 2 Typing Text/Description

1.2.1 Font type and size

Everything written in this final assignment must use Times New Roman (font size refers to chapter II in each section). Font size for tables, images and descriptions are adjusted especially on the cover page and title page, the research title should be typed with a maximum font size of 20. Italics are used for certain purposes, such as writing the name of a species or foreign words.

1.2.2 Line spacing

"Chapter" and "chapter title" are typed at the center of the line with single space. Table titles, figure headings, table contents, abstracts, table lists, lists of figures, list of attachments, captions of figures and tables are written in one spacing. Chapter titles and descriptions or between chapter titles and sub-chapter titles are two spaces apart. Description and the following sub-chapter title, between the lines in the description, sub-chapter title and sub-chapter title, and sub-chapter title and description are one and a half spaces apart. Example: Appendix 14.

1.2.3 Space filling

Space on each page of the manuscript must be filled completely. This means typing must start from the left edge to the right edge, and there should not be any blank spaces, except because of an adjustment in the number of lines in a paragraph.

1.2.4 Paragraph

One paragraph must consist of a minimum of two sentences. A new paragraph begins at the 5th tap from left margin. The last line of a paragraph should not be typed on the next page. Writing a new paragraph at the bottom of the page must contain at least the first two lines of the paragraph.

1.2.5 Chapter titles, sub-chapter titles, and sub-chapter titles

The determination of the writing of chapter titles, sub-chapter titles, and sub-chapter titles is as follows:

1. Chapter titles are preceded by the designation of the chapter sequence written in roman numerals (eg CHAPTER I, CHAPTER II, and so on) with centered indentation. On the next line 'chapter title' is centered, using capital letters, in bold, and without a period. The designation of the chapter sequence and the chapter title is separated with one space. The example can be found in Appendix 14.
2. Sub-chapter titles starts from the left edge, preceded by numbering according to the chapter number sequence, in bold, and without a period. Sub-chapter titles are written in lowercase, except for the first letter of the words that are not conjunctions. The first sentence after the title of the chapter is the beginning of a new paragraph. The example can be found in Appendix 14.
3. Sub-chapter titles starts from the left edge, preceded by numbering according to the chapter number sequence. The title of the sub-chapter is in bold, capitalized first letter only without a period. The example can be found in Appendix 14.

1.2.6 Numbers, symbols, chemical formulas, and units

1. Integers less than 10 must be written in letters, while numbers ten or more should be written with numbers, except for the numbers in table, figure, and appendix numbers contained in the description. For example, two silvers, 10 replicates, and 14 samples. In a series consisting of numbers less and more than ten, numbers are used. For example, a treatment uses doses of 0, 4, 8 and 10 mg/BW. All numbers at the beginning of a sentence are written in letters. For example, "One hundred millimeters of water added to .....".
2. Numbers and units of measurements are written with a single space and expressed in numbers and unit abbreviations (for example: 3.5 mg), unless the unit is not preceded by an amount (eg 'leaf dry weight is expressed in grams').
3. Writing long series of numbers is written as short as possible by changing the units (example: 2,500,000 to 2.5 million, $5x10^{-6}$ m to 5 µm).
4. The decimal point in fractions is a comma not a period except in Abstract. Example: 13,5 cm not 13.5 cm.

5. International System of Units must be used with commonly applicable abbreviations. The number and its unit are separated by one space. Example: 2.13 cm not 2.13cm.
6. Numbers, symbols or chemical formulas located at the beginning of a sentence must be written in letters, for example: Twenty millimeters of distilled water added to ... and so on. Dissolved calcium chloride .... and so on.

1.2.7 Page numbering, list of tables and list of figures

1. The page numbers at the beginning of the thesis must use small Roman numerals (i, ii, iii, and so on) and written at the bottom of the page, symmetrical to the right and left edges. Page numbering starts from the cover page and its writing starts from the statement sheet to the table of contents.
2. Page number on a chapter title page of the main section and the final section of the thesis must use Arabic numerals and written with the mirror margin one centimeter from the bottom edge of the paper.
3. Table, figure, and appendix numbering is in Arabic numerals without adding the chapter number. Example: Table 1.

1.2.8 Equations

Equations that are mathematical formulas, chemical reactions, and others that will be used for further descriptions are numbered in Arabic numerals. The equation serial number consists of one number, as in the example below.

$$CaSO_4 + K_2CO_3 \longrightarrow CaCO_3 + K_2 SO_4 \qquad (3)$$

1.2.9 Downward breakdown

The details are ordered downward by using numbers placed in front of the details. Example: The aims of this Undergraduate Thesis Writing Guidelines are:

1. provides convenience ..... etc.
2. provides uniformity..... etc.

CHAPTER II
CITATION AND REFERENCES WRITING

2.1 Citation in Description

Scientific information included in the description may come from published and unpublished scientific works and personal communications. A reference citation in the description is written as follows:

1. Only author's last name used when cited in a description. If there are two authors for the reference, the last names of both authors are included and are associated with the symbol '□'. If there are more than two people, the first author's last name is included followed by the abbreviation 'et al.' This must be used consistently for literatures written in Indonesian and foreign languages.
2. Author's name at the beginning of a sentence. Example: "According to Untung (1993) the natural control mechanism applies to all organisms so that there created ....." or "Untung (1993) stated that natural control mechanisms .....".
3. Author's name at the end of a sentence. Example: "This assumes that certain natural enemies favor a certain plant composition (Albertcht, 1998)."
4. Citing two authors. Example: "This structure causes detergents to have emulsifying properties (Fesssenden & Fessenden, 1982)." or "Sawyer & Carty (1978) using common supporting materials, namely ....."
5. Citing more than two authors. Example: "Altieri et al. (1981) found that this could increase ..." or "This assumes that certain natural enemies favor a particular plant composition (Altieri et al., 1981)."
6. The name of the institution used as the author of a reference from an institution that does not mention the name of the author, written at the end of the sentence instead of the beginning. Example: "..... was produced in 2008 (Balitkabi, 2010)." instead of "According to Balitkabi (2010) ..... produced in 2008."
7. Refers to two or more literary sources (arranged chronologically by year). Example: "According to Heywood (1976) and Shuka & Mirsa (1979) the study of kinship is part of a systematic study." or "..... caused by the reaction of polyphenol compounds to quinones which are brown in color (Harisuseno, 1974; Bidwell, 1976; Wareing & Philips, 1976)."
8. A statement or information referred from an article that is quoted in another literature. Example: "..... forwarded to the right organs as an active response, for example in the form of behavior (Atkins, 1978 in Wahyuni, 1998)". This should be avoided whenever possible because this implies that the author does not read Atkins' original writing. If this must be done, Wahyuni's name should be included in the references, not Atkins.
9. References obtained from unpublished materials are unpublished references. This kind of references is not listed in references. Example of writing: "The biggest component of coconut oil is ..... (Suwarno, unpublished)."

10. Personal communication. Example of writing: “According to Sumarmi ..... (Personal communication, 2010).” This kind of references is not listed in references. This should be avoided as much as possible because it is difficult to justify.

2.2 Listing References

References are in one spacing. If the writing of the reference is more than one line, then the first line starts right at the left border while the next line starts at the sixth tap from the left edge (Appendix 15).

1. References are arranged alphabetically based on the first author's family name.
2. The order of listing the references is as follows:
   a. Journal: Author’s name. publication year. Article title (in upright letters). The journal name (using official abbreviation, Appendix 15), in italics. Vol:page. Example:
      Corey, E.J. & A.K. Long. 1978. Computer assisted synthetic analysis performance of long-range for stereoselective olefin synthesis. *J. Org. Chem.* 43:2208-2216.
      Sieg, C.H. 1997. The mysteries of a praire orchid. *Endangered Spec. Bull*. 22(4):12- 13.
   b. Book: Author’s name. Publication year. Book title (in bold). Volume. Print/published edition (if any). Publisher’s name. Publisher’s city. Title of text books and unpublished references (undergraduate theses, theses, dissertations, manuscripts, and research reports) are written in lowercase except the first letter in the first word/name of person/name of species/place name are written in capital letters, all in bold. Example:
      Bruce, A. 2010. **Biology molecular of the cell**. Second edition. Prentice Hall. Baltimore.
      Reynolds, C.S. 2006. **Ecology of phytoplankton**. Cambridge Univ. Press. Seiten.
   c. Reference containing several articles collected by the editor: Article author’s name. publication year. Article title (written the same as article titles in several journals). the word 'in' Name of editor the word '(Ed.)'. Book title (first letter of each word is written in capital except for conjunctions). Publisher’s name. Publisher’s city. The word 'p'.article page. Example:
      Wink, M. & O. Schimmer. 2010. Molecular modes of action of defensive secondary metabolite. in M. Wink (Ed.). **Annual plant reviews, functions and biotechnology of plant secondary metabolites**. Blackwell Publ. Ltd. Singapore. p. 21-161.
   d. Translated reference: Name of the original author, publication year of the original work, title of translation, volume, edition, word ‘Translation’, name of translator, year of translation, name of translation publisher and city. The name of the translator that has two or more words is not reversed. If the year of publication of the original book is not included, ‘Without year’ must be added. Example:
      Kimball, J.W. 1983. **Biologi**. Volume 2. Fifth edition. Translation E. Nugroho, Z.S. Bystami & I. Darmansjah. 1995. Jakarta: UI Press.

e. Reference without author's name before the year of publication is written with the name of the institution, not anonymously. Example:

CSIRO. 1983. Soybean respond to controlled waterlogging. in R. Lehane (Ed.) **Rural research**. Dickson: The Science Communication of CSIRO's Bureau of Scientific Services.

Universitas Negeri Malang. 2000. **Guidelines for writing scientific papers:** Undergraduate thesis, thesis, dissertation, articles, papers, research reports. Fourth Edition. Universitas Negeri Malang. Malang.

f. Reference that are proceedings, undergraduate theses, theses, dissertations, and abstract collections. Example:

Read, E.L., Tovo-Dwyer A.A., Chakraborty A.K. 2012. Stochastic effects are important in intrahost HIV evolution even when viral loads are high. *PNAS 109 (48) 19727-19732*

Nurlaila. 1998. **Prevalensi *Salmonella* yang terbawa oleh lalat di Tempat Pembuangan Sampah Akhir (TPA) Supit Urang Kodya Malang dan Junrejo Kotatif Batu**. Department of Biology, Faculty of Mathematics and Natural Sciences Universitas Brawijaya. Malang. Undergraduate thesis.

Sulistyo, E. 1998. **Adaptasi padi gogo terhadap naungan: pendekatan morfologi dan fisiologi**. Pascasarjana Institut Pertanian Bogor. Bogor. Postgraduate Thesis.

Butcher, E. 1983. **Studies of interference between weeds and peas**. PhD Dissertation. Univ. of East Anglia.

g. Reference from online journal. Example:

Hansen, L. 1999. Non-target effects of Bt corn pollen on the monarch butterfly (Lepidoptera: Danaidae). http://www.ent.iastate.edu/entsocl,ncb99/prog/abs/D81.html. Accessed 12 February 2001.

Griffith, A.I. 1995. Coordinating family and scholl : Mothering for schooling policy analysis archives (Online). Vol 3. No. 1. http://oalm.ed.asu.edu/epaa. Accessed 20 January 2000.

3. How to write author's name.

If the author's name has two or more syllables, the last name is written followed by a comma, the abbreviation of the first, middle name, and so on, all of which are given a period. A name that is followed by an abbreviation, is assumed that the abbreviation becomes one with the syllable that is in front of it. Example: William D. Ross Jr. written as Ross Jr.,W.D. Degrees does not need to be listed. First names of all authors are abbreviated.

Full Name	Reversed to
H. van Den-Brink	Van Den-Brink, H.
P. van Vliet	Van Vliet, P.
Ali Abdel-Aziz	Abdel-Azis, A.
Ali Ibn-Saud	Ibn-Saud, A.
Kees de Vries	De Vries, K.

A, van der Haar	Haar, A. Van der
H. zur Horst-Meyer	Horst-Meyer, H. Zur
Carl von Schmidt	Schmitd, Carl von
Mario dos Santos	Santos, Mario dos
B.C. Sen Gupta	Sen Gupta, B.C.
A.D. Das Gupta	Das Gupta, A.D.
J. Le Beau	Le Beau, J.
V. du Bary	Du Bary, V.
Derek Keith Thomas	Thomas, D.K.

The writing of the first author's name is reversed, while the names of the other authors are not. If there are two authors, both authors are mentioned and are connected with the symbol '&'. If there are more than two people, all names must be written, connected with a comma (,) and the '&' symbol before the last author's name.

Example:

Keller, B. 1993. Structural cell.....etc.

Su, N.Y. & M. Tamashiro. 1987. An overview of the formosan .....etc

Weiser, R.L., S.J. Wallner, & J.W. Weddel. 1990. Cell wall and.....etc

Same author's name in more than one literature with different publication years. Example:

Nishitani, K. & R. Tominaga. 1992. Endo-xyloglucan transferase, a novel class of glycosiltransferase..... *J. Biol. Chem.* 268:25364-25368.

Nishitani, K. & R. Tominaga. 1997. The role of endo-xyloglucan transferase in the organization of plant cell walls. *Int. Rev. Cytol*. 173:157-206.

4. Same author in more than one literature with same publication year will be given a notation after the publication year (a, b, c, etc.) arranged in order of the month of publication. Example:

Dodeman, V.L. & G. Ducreux. 1996a. Isozyme patterns in zygotic and somatic embryogenesis of carrot. *Plant Cell Rep*. 16:101-105.

Dodeman, V.L. & G. Ducreux. 1996b. Total protein expression during induction and development of carrot somatic embryos. *Plant Sci*. 120:57-69.

5. Journal volume and page numbers are separated by a colon (:) without any space. Example:

Brewin, N.J. & L.V. Kardailsky. 1997. Legume lectins and nodulation by Rhizobium. *Trends Plant Sci. Rev.* 63:322-326.

CHAPTER III
TABLE WRITING AND FIGURES PRESENTATION

3.1 Table Writing

Tables can be displayed in manuscripts or appendices in the following conditions.

1. The table title is written above the table.
2. The order of the table in the table title is indicated by the word “Table” followed by the table number and a period is written before the table title.
3. Sub-chapter titles are written in lowercase letters, except for the first letter in each word and a word that is a name. Table titles do not end in periods. The title of the table with only one line is written at the middle of the row, while a title that consists of more than one line is written as left aligned, the second row and the next one spaced apart. The first word of the second line and so on is written just below the first letter of the table title.
4. The table is centered on the row. The title, table, and description must be written on one page.
5. The distance between the table title and the undergraduate thesis description before the table title or after the table is three spaces. The distance between the table title and the table is one and a half spaces.
6. The table caption is written below the table, typed in one spacing, one space from the table and three spaces from the undergraduate thesis description below.
7. Columns and rows in the table are properly titled, columns and rows are sufficiently separated by a clear distance without a line. Horizontal ‘borders’ on the table are only on the ‘heading’ and the bottom of the table. The vertical ‘borders’ do not have to be shown.
8. If the table width exceeds the paper width, the table can be placed following the paper length with the top of the table on the left edge. Page number is written at the bottom right of the page in landscape orientation.
9. If the table is included in the description, write ‘(Table 1)’, not ‘(Tab. 1)’.
10. For tables in the appendices, the numbering follows the table number in the main section of the thesis.
11. The author of the literature reference and the publication year are written right at the bottom right of the table with font size 10 for a table that comes from a reference.

3.2 Illustration Presentation

Charts, diagrams, graphs, maps and photos are called illustration, so there is no Chart 1, Diagram 1, Graph 1, Map 1, or Photo 1. Illustration can be displayed in manuscripts or appendices in the following conditions.

1. The illustration title is located below the illustration.
2. The order of the illustration in the illustration title is indicated by the word “Illustration” followed by the illustration number and a period is written before the illustration title.
3. Illustration titles are written in lowercase letters, except for the first letter in each word and a word that is a name. Illustration titles do not end with periods. Illustration titles consisting of one line are written in the middle of the row while illustration titles consisting of more than one line left aligned, the second line and so on are written with a single space. The

first word on the second line and so on is written just below the first letter in the figure title. Figure illustration should not contain image captions (Illustration title is what is written in the list of illustrations). Illustration titles don't have to start with "Illustration", "Histogram", "Graph", or "Photo". Example of the wrong illustration title: Illustration 1. Growth graph .....'.

4. The illustration is centered on the row. The title, illustration, and description must be written on one page.
5. The space between the illustration title and the undergraduate thesis description before the illustration title or after the illustration is three spaces. The distance between the illustration title and the figure is one and a half spaces. The distance between the illustration title and the undergraduate thesis description before the illustration and illustration title with thesis description is three spaces.
6. If an illustration has a caption, the illustration main title, namely the illustration title written on the list of illustration, must not contain the caption. Illustration captions are written after the title but do not start on a new line.
7. Illustration size (width and height) must be proportional (not too big or too small). If there is more than one illustration title for one illustration, the several illustration can be arranged so that the illustration seem symmetrical. Example: Appendix 16.
8. If the illustration width exceeds the paper width, the illustration can be placed following the paper length with the top of the illustration on the left edge. Page number is written at the bottom right of the page in landscape orientation.
9. The scale should be made so that it is easy to use for interpolation or extrapolation. The magnification of the objective/ocular lens on the microscope must be converted according to the magnification of the photo.
10. Information and units on the y-axis of a graph should be written as "rotated title" (MS Excel). The example can be found in Appendix 16.
11. If included in the description, it is written 'Illustration 1', not 'Ill. 1' or 'Ill. 1'.
12. The illustration in the appendices are numbered according to the numbering in the appendices.

REFERENCES

O'Connor, M. & F.P. Woodford. 1976. **Writing scientific papers in English.** An ELSE-Ciba Foundation Guide for Authors, New York: Elsevier.

Rumawas, F. & J. Koswara. 1985. **Scientific writing and presentation techniques.** Fakultas Pertanian, Institut Pertanian Bogor: Bogor

APPENDICES

Appendix 1a. Sample of Undergraduate Thesis Front Cover Page (dark blue paper)

5 cm

ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS IN URUG TRADITIONAL VILLAGE, URUG VILLAGE, SUKAJAYA SUB-DISTRICT, BOGOR MUNICIPALITY

UNDERGRADUATE THESIS

by
MUHAMMAD QAIS IZZUDDIN
105090104111003

BIOLOGY DEPARTMENT
MATHEMATICS AND NATURAL SCIENCES FACULTY
UNIVERSITAS BRAWIJAYA
MALANG
2014

MUHAMMAD QAIS IZZUDDIN UNDERGRADUATE THESIS 2014

Appendix 1b. Sample of Postgraduate Thesis Front Cover Page (light green paper)

5 cm

MORPHOLOGICAL VARIATION OF LEMPUK FISH (*Gobiopterus brachypterus)* IN LAKE RANUGRATI PASURUAN

POSTGRADUATE THESIS

by
MUHAMAD IMAM
0920901016

BIOLOGY MASTER PROGRAM
DEPARTMENT OF BIOLOGY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS BRAWIJAYA
MALANG
2011

POSTGRADUATE THESIS MUHAMMAD IMAM 2011

Appendix 1c. Sample of Dissertation Front Cover Page (black paper)

5 cm

YULIANI

DISSERTATION

2012

STUDY OF PHENOLIC COMPOUNDS FROM *Asteraceae* FAMILY IN DIFFERENT HABITATS AS A CONTROL AGENT OF *Spodoptera litura* (Fab.)

DISSERTATION

by
YULIANI
117090100111001

BIOLOGY DOCTORAL PROGRAM
DEPARTMENT OF BIOLOGY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS BRAWIJAYA
MALANG 2012

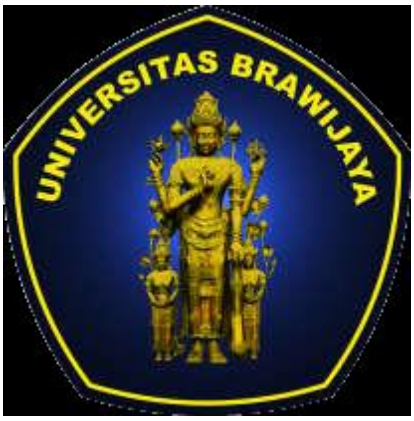
Appendix 2a. Sample of Undergraduate Thesis Title Page

IDENTIFICATION OF PARTIAL POLYMORPHISM OF BMPR-1B GENE IN BALI CATTLE (*Bos sondaicus*) USING PCR-RFLP METHOD

UNDERGRADUATE THESIS

Presented in partial fulfillment of the requirements for the Degree of Sarjana Sains (Bachelor of Science) in Biology

by
Since Afifah
0810910065



BIOLOGY DEPARTMENT
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS BRAWIJAYA
MALANG
2012

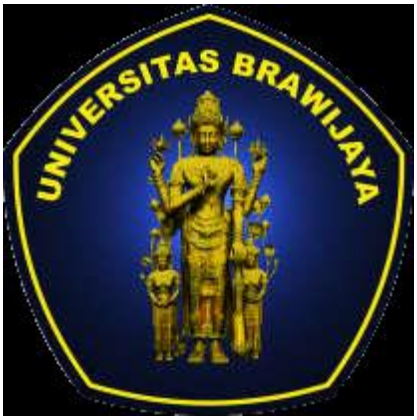
Appendix 2b. Sample of Postgraduate Thesis Title Page

EXPRESSION OF PARP1, BZLF1-EBV AND THE AMOUNTS OF NECROTIC CELLS IN NASOPHARYNGEAL CARCINOMA TISSUE

POSTGRADUATE THESIS

Presented in partial fulfillment of the requirements for the Degree of Magister Sains in Biology

by
Wahyu Nur Laili Fajri
106090101011005



BIOLOGY MASTER PROGRAM
DEPARTMENT OF BIOLOGY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS BRAWIJAYA
MALANG
2012

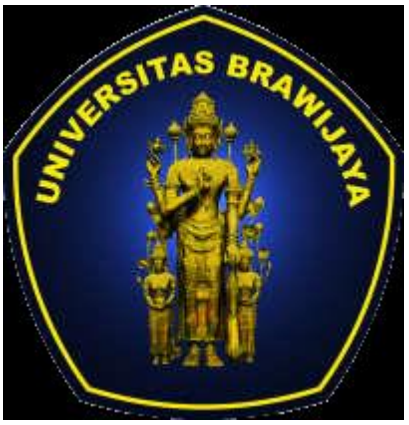
Appendix 2c. Sample of Dissertation Title Page

STUDY OF PHENOLIC COMPOUNDS FROM *Asteraceae* FAMILY IN DIFFERENT HABITATS AS A CONTROL AGENT OF *Spodoptera litura* (Fab.)

DISSERTATION

Presented in partial fulfillment of the requirements for the Degree of Doktor (Doctor) in Biology

by
YULIANI
117090100111001



BIOLOGY DOCTORAL PROGRAM
DEPARTMENT OF BIOLOGY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS BRAWIJAYA
MALANG
2012

Appendix 3a. Sample of Undergraduate Thesis Approval Page

UNDERGRADUATE THESIS APPROVAL PAGE

THE POTENTIAL OF LOCAL TREE DIVERSITY TO INCREASE CARBON STORAGE AT ARBORETUM AREA IN BROMO TENGGER SEMERU NATIONAL PARK

IVANA ODE LOLODATU
0810910051

Defended before the Board of Examiners
on 20 July 2012
and declared eligible for
the Degree of Sarjana Sains (Bachelor of Science) in Biology

Approved by
Advisor

Dr. Endang Arisoesilaningsih
NIP. 19590908 198903 2 001

Acknowledging
Head of Biology Bachelor Program
Faculty of Mathematics and Natural Sciences, Universitas Brawijaya

Rodiyati Azrianingsih, S.Si., M.Sc., Ph.D.
NIP. 19700128 199412 2 001

Appendix 3b. Sample of Postgraduate Thesis Approval Page

POSTGRADUATE THESIS APPROVAL PAGE

EXPRESSION OF PARP1, BZLF1-EBV, AND THE AMOUNTS OF NECROTIC CELLS IN NASOPHARYNGEAL CARCINOMA TISSUE

WAHYU NUR LAILI FAJRI
106090101011005

Defended before the Board of Examiners
on Friday, 3 August 2012
and declared acceptable for
the Degree of Magister Sains (Master of Science) in Biology

Approved by

Advisor	Co-Advisor
Dra. Fatchiyah, M.Kes., Ph.D	Dr. Sri Widyarti, M.Si.
NIP. 19631127 198903 2 001	NIP. 19670525 199103 2

Acknowledging
Head of Biology Master Program
Faculty of Mathematics and Natural Sciences, Universitas Brawijaya

Tri Ardyati, M.Agr., Ph.D.
NIP. 19671213 199103 2

Appendix 3c. Sample of Dissertation Approval Page

DISSERTATION APPROVAL PAGE

DEVELOPMENT OF PROTEIN MARKER FOR EARLY DETECTION OF EXOCRINE DAMAGE DUE TO AUTOIMMUNE DISORDER IN TYPE-2 DIABETES MELLITUS

ARIE SRIHARDYASTUTIE, S.Si., M.Kes.
117090100111012

Defended before the Board of Examiners
on ….. and declared acceptable for the Degree of Doktor (Doctor) in Biology

Approved by
Promoter

Prof. Dr. drh. Aulanni'am, DESS
NIP 19600903 198802 2 001

Co-Promoter I

Dra. Fatchiyah, M.Kes., Ph.D
NIP 19631127 198903 2 001

Co-Promoter II

Prof. dr. Djoko W. Soeatmadji, SpPD,KEMD
NIP 130 355 400

Acknowledging
Head of Biology Doctoral Program
Faculty of Mathematics and Natural Sciences, Universitas Brawijaya

Luchman Hakim, Ph.D.
NIP 19710808 199802 1 001

Appendix 4a Sample of Composition of Postgraduate Thesis Advisory and Examining Committee

COMPOSITION OF POSTGRADUATE THESIS ADVISORY AND EXAMINING COMMITTEE

Title of Postgraduate Thesis:

XPRESSION OF PARP1, BZLF1-EBV, AND THE AMOUNTS OF NECROTIC CELLS IN NASOPHARYNGEAL CARCINOMA TISSUE

Name	Wahyu Nur Laili Fajri
Student Registration Number	090101011005

VISORY COMMITTEE

Chair	Dra. Fatchiyah, M.Kes., Ph.D
Member	Dr. Sri Widyarti, M.Si.

AMINING COMMITEE

Examiner I	Ir. M. Sasmito Djati, MS
Examiner II	Widodo, Ph.D. Med.
Defense Date	3 August 2012

Appendix 4b Sample of Composition of Dissertation Advisory and Examining Committee

COMPOSITION OF DISSERTATION ADVISORY AND EXAMINING COMMITTEE

Title of Dissertation:

INDUCTION OF MUTATION USING MUTAGEN ETHYL METHANESULPHONATE (EMS) TO PRODUCE BRANCHING IN KENAF (*Hibiscus cannabinus* L.)

Name	Estri Laras Arumingtyas
Student Registration Number	0130100005

PROMOTER COMMITTEE

Promoter	Ir. Nur Basuki
Co-Promoter	Ir. Sujindro, MS
Co-Promoter	Prof. Sutiman B. Sumitro, SU., D.Sc.

AMINING COMMITEE

Examiner I	Ir. Nur Basuki
Examiner II	Ir. Sujindro, MS
Examiner III	Prof. Sutiman B. Sumitro, SU., D.Sc.
Examiner IV	Ir. Adji Sastrosupadi, MS, APU
Examiner V	Ir. Lita Sutopo
Examiner VI	Retno Mastuti, M.Ag.Sc., D.Ag.Sc.
Examiner VII	Prof. Dr. Aloysius Duran Corebima

Closed-Door Defense Date Saturday, 31 December 2005

Appendix 5a. Sample of Undergraduate Thesis Statement of Originality

STATEMENT OF ORIGINALITY

I, the undersigned:

Name : Ivana Ode Lolodatu

Student Registration Number : 0810910051

Department : Biology

Title of Undergraduate Thesis : The Potential of Local Tree Diversity to Increase Carbon Storage at Arboretum Area in Bromo Tengger Semeru National Park

Hereby declare that:

1. This undergraduate thesis is my own original work and contains no material previously written by any other person. The works cited in the References of this undergraduate thesis are solely used as references
2. If later it is proven that my Undergraduate Thesis contains plagiarized contents, I am willing to bear the legal consequences arising from such situation

I acknowledge that this statement is made without coercion of any kind

Malang, 20 July 2012
Author

(signature)

Ivana Ode Lolodatu
0810910051

Appendix 5b. Sample of Postgraduate Thesis Statement of Originality

STATEMENT OF ORIGINALITY

I hereby declare that, to the best of my knowledge, neither any part of this postgraduate thesis nor the whole of this postgraduate thesis has been submitted by any other person for a degree to any other University. I certify that this postgraduate thesis contains no materials previously written or published by any other person, except where due reference is made in the postgraduate thesis.

Should there are elements of plagiarism in this postgraduate thesis that can be proven, I agree to accept cancellation of my postgraduate thesis and my degree (MAGISTER). I also agree to face any legal action in accordance with the prevailing laws and regulations (Act Number 20 of 2003, article 2 and article 70).

Malang, 3 August 2012

Stamp duty	(signature)

Name : Wahyu Nur Laili Fajri
Student Registration Number : 090101011005

Appendix 5c. Sample of Dissertation Statement of Originality

DISSERTATION STATEMENT OF ORIGINALITY

I hereby declare that, to the best of my knowledge, neither any part of this dissertation nor the whole of this dissertation has been submitted by any other person for a degree to any other University. I certify that this dissertation contains no materials previously written or published by any other person, except where due reference is made in the dissertation.

Should there are elements of plagiarism in this dissertation that can be proven, I agree to accept cancellation of my dissertation and revocation of my degree (DOKTOR). I also agree to face any legal action in accordance with the prevailing laws and regulations.

Malang,

Stamp duty	(signature)

Name : Yuliani
Student Registration Number : 117090100111001

Appendix 6a. Sample of Postgraduate Thesis Curriculum Vitae

CURRICULUM VITAE

Born in Malang on 23 April 1988, Wahyu Nur Laili Fajri is the daughter of Suyono and Suhermin. Pursuing her education from elementary school until higher education in Malang, she graduated from high school in 2006, then continued her study in the Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Brawijaya, Malang starting in 2006 and completed her degree program in 2010 with an undergraduate thesis entitled "Characterization of Serum Proteome in Patients with Diabetes Mellitus using 2D-GE (Two-Dimensional Gel Electrophoresis)". For work experience, she was an assistant of Molecular Biological Analysis Techniques practicum for the Department of Biology, Faculty of Mathematics and Natural Sciences, UB and for Pharmacy Study Program, Faculty of Medicine, UB in 2010; an analyst at Universitas Brawijaya Central Laboratory of Life Sciences (LSIH-UB) in 2009-2011 and is currently working at UB Bioscience Laboratory.

Malang, August 2012

Author

Appendix 6b. Sample of Dissertation Curriculum Vitae

CURRICULUM VITAE

Born in Trenggalek, 18 August 1963, Estri Laras Arumningtyas is the daughter of Kamidjan and Siti Rochani. She graduated from high school in Trenggalek in 1982, then pursued her bachelor's degree in the Department of Agronomy, Faculty of Agriculture, IPB University and graduated in 1987. She then enrolled in a master's degree program in Plant Genetics in the Department of Plant Science, University of Tasmania, Australia and earned her degree in 1992. In addition, she also attended overseas non-degree training in mutation detection methods at the Laboratory of Biomolecular, Graduate School of Agricultural Sciences, Tohoku University, Sendai, Japan. Since 1988, she has been working as a civil servant in the Department of National Education, Faculty of Mathematics and Natural Sciences, Universitas Brawijaya, Malang.

Malang, January 2006

Author

Estri Laras Arumningtyas

Appendix 7a. Sample of Guidelines on Utilization of Undergraduate Thesis

GUIDELINES ON UTILIZATION OF UNDERGRADUATE THESIS

This undergraduate thesis is not published, but may be utilized by general public provided that the copyright remains vested in the author. This dissertation may be cited in references, but citation shall only be done with the author's permission and shall be carried out in accordance with the standard scientific referencing practices.

Appendix 7b. Sample of Guidelines on Utilization of Thesis

GUIDELINES ON UTILIZATION OF POSTGRADUATE THESIS

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Appendix 7c. Sample of Guidelines on Utilization of Dissertation

GUIDELINES ON UTILIZATION OF DISSERTATION

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Appendix 8a. Sample of Undergraduate Thesis Abstract in Indonesian

Formulasi Masker Alami Berbahan Dasar Bengkoang dan Jintan Hitam untuk Melembabkan dan Mengurangi Kerutan pada Kulit Wajah

Swaidatul M. A., Widodo, Sri Widyarti
Jurusan Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Brawijaya
2012

ABSTRAK

Penelitian ini bertujuan untuk mendapatkan formulasi masker pasta yang tepat dari campuran bubuk bengkoang, minyak jintan hitam, cokelat bubuk, dan madu, mengetahui pengaruh pemakaian masker alami terhadap kelembaban kulit wajah, dan mengetahui pengaruh pemakaian masker alami untuk mengurangi kerutan pada kulit wajah. Bahan yang digunakan untuk membuat formulasi masker alami ini adalah 2 gram bubuk bengkoang, 1 gram bubuk cokelat, 0.6 ml minyak jintan hitam, dan 5 ml madu. Bahan-bahan tersebut dicampurkan sehingga dihasilkan masker dengan struktur pasta yang siap digunakan. Masker digunakan setiap tiga hari sekali hingga 12 kali pemakaian masker. Masker diberikan kepada sepuluh probandus wanita yang memenuhi kriteria inklusi yang ditentukan. Karakteristik kulit wajah yang diamati meliputi adanya kerutan dan nilai kelembaban kulit. Data kerutan diambil secara visual dengan difoto menggunakan camera DSLR 1000D pada tiga sisi wajah (depan, kanan, kiri) dan kelembaban kulit wajah diukur dengan skin analyzer HL-611 (Beautistyle International Corporation) yang ditempelkan langsung pada kulit wajah selama 4-5 detik. Area kulit wajah yang diukur kelembabannya adalah dahi, hidung, dagu, dan pipi. Data yang diperoleh dianalisis menggunakan uji ANOVA selang kepercayaan 95% dan uji signifikansi menggunakan SPSS 15 for windows serta uji persepsi. Berdasarkan hasil penelitian diketahui bahwa peningkatan kelembaban kulit wajah mulai terlihat pada minggu ke-2. Penggunaan masker pada minggu ke-6 memberikan pengaruh yang paling tinggi terhadap kelembaban kulit wajah dengan nilai rerata 36.85 %. Nilai kelembaban kulit pada setiap area wajah relatif sama dan tidak terdapat perbedaan yang signifikan. Hasil persepsi data kerutan wajah menunjukkan adanya perubahan kerutan sebanyak 100%.

Kata kunci: bengkoang, cokelat, jintan hitam, madu, masker

Appendix 8b. Sample of Postgraduate Thesis Abstract in Indonesian

RINGKASAN

Variasi Morfologi pada Ikan Lempuk (*Gobiopterus brachypterus*) di Danau Ranugrati Pasuruan

Muhammad Imam, Sri Widyarti, Rodiyati Azrianingsih
Program Magister Biologi, Jurusan Biologi,
Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Brawijaya
2012

Penelitian ini bertujuan untuk mendeskripsikan karakteristik morfologi ikan Lempuk di Ranugrati, membuktikan ada tidaknya variasi morfologi pada populasi ikan lempuk Ranugrati, membuktikan ada tidaknya variasi genetic pada populasi ikan lempuk Ranugrati, dan membuktikan ada tidaknya perbedaan karakteristik morfologi ikan lempuk Ranugrati dengan karakteristik morfologi *Gobiopterus brachypterus*. Karakteristik umum ikan lempuk yang terdapat di danau Ranugrati ditandai dengan warna tubuh yang transparan sehingga organ internal seperti jantung, ginjal, gelembung renang, pembuluh darah dan tulang belakang dapat terlihat dari luar tubuhnya. Berdasarkan pengamatan terdapat dua variasi tipe ikan lempuk yang dalam penelitian ini dikelompokkan sebagai Tipe B dan Tipe C. Ikan lempuk Tipe B memiliki duri sirip dorsal pertama sebanyak 4 s/d 5, duri dan jari sirip dorsal kedua sebanyak I,7 s/d I,8, duri dan jari sirip anal sebanyak I,10 s/d I,13, tinggi badan (BD) 4,5 s/d 5 kali lebih pendek dari panjang standar (SL), terdapat pigment pada pipi dan batas pre-perkulum berwarna hitam berbentuk memanjang vertical, sirip ekor berbentuk membulat, sirip dorsal kedua berbentuk jajaran genjang, sirip anal berbentuk jajaran genjang, memiliki mandibula yang pendek dan tebal serta memiliki pre-maxila yang melengkung. Perbandingan morfologi antara ikan lempuk di Ranugrati dan *Gobiopterus brachypterus* yang dideskripsikan oleh Kottelat, *et al*. (1993) menunjukkan adanya beberapa perbedaan. Perbedaan tersebut terletak pada sirip dorsal kedua, sirip anal dan rasio antara tinggi badan dengan panjang standar. Sementara itu dendogram fenetik hasil RAPD menunjukkan bahwa tidak terdapat bukti bahwa ikan Tipe B dan Tipe C merupakan dua spesies yang berbeda. Hasil ini memperkuat hipotesis bahwa dikotom morfologis yang ditemukan antara Tipe B dan Tipe C diduga merupakan dimorfisme seksual.

Appendix 8c. Sample of Dissertation Abstract in Indonesian

RINGKASAN

Induksi Mutasi Dengan Mutagen Ethyl Methane Sulfonate (EMS) untuk Menghasilkan Percabangan pada Kenaf (*Hibiscus cannabinus* L.).

Estri Laras Arumingtyas, Nur Basuki, Sudjindro, Sutiman Bambang Sumitro
Program Doktor Biologi, Jurusan Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Brawijaya
2005

Dalam penelitian ini dilakukan induksi mutasi dengan *Ethyl Methane Sulfoneta* (EMS) untuk menghasilkan percabangan pada kenaf (*Hibiscus cannabinus* L.), sebagai upaya untuk meningkatkan potensi menghasilkan biji dan biomassa. Deteksi secara morfologi, pewarisan sifat bercabang dan identifikasi molekuler terhadap gen percabangan serta deteksi hubungan antara munculnya percabangan dengan keberadaan gen repair photolyase dilakukan terhadap mutan hasil induksi dengan EMS. Induksi mutasi dilakukan dengan metode perendaman pada larutan EMS dengan konsentrasi 0.04 %; 0.05 %; 0.06 %; 0.08 %; 0.1 %; 0.3 %; 0.5 % dan 1.0 %. Identifikasi molekuler dengan metode *Restriction Fragment Length Polymorphism* (RFLP) menggunakan enzim restriksi *EcoRl*, *Pstl*, *Hind*lll, *BamHl* serta *Avall*. *Random Amplified Polymorphic DNA* (RAPD) menggunakan 1 set primer OPO dan 2 primer OPA (Operon Technologies). *Polymerase Chain Reaction* (PCR) menggunakan degenerate primer F: 5'GA(AG)AC(N)(TC)T(N)GC(N)(GA)T(N)AA(TC)TG (TC)GC-3' dan R: 5'-TA(N)CC(TC)TC(N)GA(N)GG(AG)TA(AG)TG-3'(Invitrogen) serta spesifik primer F: ATGAGAGGAATGTTATTGGTCGG dan R: CGCTCATTTAA TGGCAAAGATG (Alpha DNA). Sekuensing dilakukan dengan prosedur Big Dye Terminator mix pada mesin ABI 337 sequencer. Identifikasi gen *photolyse* diawali dengan PCR menggunakan primer AC1-AC3R dan AC4R, dilanjutkan dengan ekstraksi DNA target, ligasi fragmen tersebut pada vector plasmid pCR2. 1, transformasi pada *Eschericia coli* strain XL-1 Blue, cloning dan sekuensing fragmen yang diinginkan.

Perlakuan EMS menurunkan persentase tanaman hidup yang disebabkan karena biji tidak mampu berkecambah, secara umum peningkatan konsentrasi EMS sampai 0.08 % mampu menghasilkan mutan bercabang, tetapi peningkatan lebih dari itu menurunkan jumlah mutan bercabang dan menyebabkan biji tidak mampu berkecambah. Identifikasi morfologi menunjukkan bahwa semua tanaman hasil perlakuan EMS mempunyai morfologi yang sama kecuali pada parameter percabangan yang meliputi jumlah cabang dan rata-rata panjang cabang. Konsentrasi EMS yang mampu menghasilkan jumlah dan panjang rata-rata cabang tertinggi adalah antara 0.06 % dan 0.08 %. Berdasarkan letak cabang pada nodus, mutan dapat dikelompokkan menjadi mutan bercabang basal, dan mutan bercabang *aerial*. Berdasarkan fenotip M2 yang dihasilkan , maka M1 dapat dikelompokkan menjadi 4 kelompok. 1. M1 bercabang yang menghasilkan lebih banyak keturunan bercabang dan sebagian kecil keturunan tidak bercabang, menunjukkan pewarisan alel dominan. 2. M1 tidak bercabang yang menghasilkan sedikit keturunan bercabang dan banyak keturunan tidak bercabang

menunjukkan adanya alel resesif yang mengontrol sifat bercabang. 3. M1 bercabang yang

menghasilkan keturunan tidak bercabang, menunjukkan adanya sifat bercabang yang epigenetic. 4. M1 tidak bercabang yang menghasilkan keturunan tidak bercabang, menunjukkan tidak terjadi mutasi.

Hasil identifikasi molekuler menunjukkan adanya perbedaan sekuen DNA antara tanaman control dengan tanaman bercabang, serta antara tanaman bercabang satu dengan yang lainnya. Pola RFLP maupun RAPD tanaman-tanaman bercabang tersebut tidak seragam yang mengindikasikan adanya banyak gen (famili gen) yang mengontrol percabangan kenaf melalui pengaruhnya terhadap dominansi apikal. Berdasarkan konsistensi keberadaanya, pita- pita RFLP BamHl 900 bp, 1000 bp, 1100 bp, 1400 bp, 2000 bp, 3000 bp, dan 4000 bp, Hindlll 1100 bp, dan EcoRL 3000 bp, serta 4000 bp dan RAPD PO07 1000 bp dapat digunakan sebagai penanda percabangan. Sekuensing menggunakan degenerate dan spefisik primer menunjukkan adanya mutasi gen kloroplas dan mutasi pada sekuen yang homolog dengan transpodon *orge* yang tampaknya berperanan dalam penyediaan energy dan pembawa signal penghambatan auksin dalam proses pembentukan cabang. *Hot spot* mutasi oleh EMS diidentifikasi berada pada basa-basa purin yang menghasilkan mutasi *missense*, dan mutasi *frameshift*. Identifikasi gen photollyase menunjukkan keberadaan sekuen yang homolog dengan gen tersebut tetapi tidak menunjukkan adanya kemampuan repair pada semua tanaman yang diidentifikasi. Tampaknya telah terjadi mutasi pada gen *photolyase* menjadi *cryptochrome* yang mempunyai sekuen asam amino serupa dengan *photolyase* sehingga mekanisme repair tidak terjadi. Sebagai alternatifnya terjadi mekanisme aklimatisasi yang memicu munculnya percabangan.

Appendix 9a. Sample of Undergraduate Thesis Abstract in English

Natural Mask Based on *Pachyrhizus erosus* and Black Seed to Increase Skin's Moisture and Reduce Face Wrinkles

Swaidatul M. A., Widodo, Sri Widyarti
Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Brawijaya
2012

ABSTRACT

This research aims to obtain the exact formulation of mask paste from the mixture of *Pachyrhizus erosus* powder, black seed oil, cocoa powder, and honey, in order to know the effect of natural mask on skin's moisture and determine the effect of the use of natural mask to reduce wrinkles on face. The ingredients used to make the formulation of this natural mask were 2 grams of Pachyrhizus erosus powder, 1 gram of cocoa powder, 0.6 ml of black seed oil, and 5 ml of honey. The ingredients were mixed to produce ready-to-use mask paste. Mask was used once every three days up to 12 times. Mask was given to ten female simulated patient who met the pre-determined inclusion criteria. The skin characteristics observed included wrinkles and skin's moisture level. Data on wrinkles was taken visually by photographing the three sides of the face (front, right, left) using DSLR 1000D camera. The skin's moisture was measured using skin analyzer HL-611(Beautistyle International Corporation) which was applied on the skin for 4-5 seconds. The parts of the face measured for moisture were forehead, nose, chin, and cheek. The data were analyzed using ANOVA test with 95% convidence interval and significance test using SPSS 15 for windows as well as perception test. Based on the result, the skin's moisture had begun to increase on the second week. The use of the mask on the sixth week had seen the highest boost on skin's moisture, with an average of 36.85%. The level of skin's moisture in every part of the face was relatively the same and did not have significant differences. The data on wrinkles from the perception test showed a 100% change.

Keywords: *Pachyrhizus erosus*, cocoa, black seed, honey, mask

Appendix 9b. Sample of Dissertation Abstract in English

SUMMARY

Morphological Variation of Lempuk Fish (*Gobiopterus brachypterus*) in Lake Ranugrati Pasuruan

Muhammad Imam, Sri Widyarti, Rodiyati A.
Biology Master Program, Department of Biology, Faculty of Mathematics and Natural Sciences,
Universitas Brawijaya
2012

The aims of the research are to describe morphological characteristics of lempuk fish in Ranugrati, to investigate morphological variation and genetic variation of lempuk fish population in Ranugrati and to verify the distinctive characteristics of morphology between lempuk fish and *Gobiopterus brachypterus*. A common characteristic of lempuk fish is their transparent body, so the internal organ such as the heart, kidney, swim bladder, arteries, and backbone can be seen from the outside. There are two morphological groupings of lempuk fish in Ranugrati which are divided as Type B and Type C. The characteristics of the Type B fish are: the first dorsal fin consists of 4-5 spines, the number of spines and rays in the second dorsal fin are I,7 to I,8, the number of spines and rays in the anal fin are I,10 to I,13, the standard length is 4.5 to 5 times of the body depth, there is a pigment on the cheek and black, vertical margin of preopercle, the shape of the caudal fin is truncate, the shapes of second dorsal fin and anal fin are triangle, the mandible is long and thin, and the pre-maxilla is straight. The characteristics of the Type C fish are: the first dorsal fin consists of 4-5 spines, the number of spines and rays in the second dorsal fin are I,7 to I,9, the number of spines and rays in the anal fin are I,11 to I,15, the standard length is 4 to 4.5 times of the body depth, there is pigment on the cheek and black, vertical margin of preopercle, the shape of the caudal fin is rounded, the shapes of second dorsal fin and anal fin are parallelogram, the mandible is short and thick, and the pre-maxilla is curved. Comparison of morphological characteristics between lempuk fish in Ranugrati and the *Gobiopterus brachypterus* which was described by Kotelat, *et al*. (1993) shows several differences. The differences are found in the second dorsal fin, anal fin, and the ratio between body depth and standard length. At the same time, the phenogram based on the result of RAPD concluded that Type B and Type C are possibly the same species. This result supports the hypothesis that morphological dichotomy found between Type B and Type C is likely sexual dimorphism.

Appendix 9c. Sample of Dissertation Abstract in English

SUMMARY

Induction of Mutation Using Mutagen *Ethyl Methane Sulfonate* (EMS) to Produce Branching on Kenaf (*Hibiscus Cannabinus* L.).

Estri Laras Arumingtyas. Nur Basuki, Sujindro, Sutiman Bambang Sumitro.
Biology Doctoral Program, Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Brawijaya
2005

Mutation was induced using *Ethyl Methane Sulfonate* (EMS) to produce branching on kenaf (*Hibiscus cannabinus* L.) in order to increase the potential to produce seed and biomass. Morphological detection of mutant, branching heritability and molecular identification to the branching gene and the relation of branching phenotype to the existence of repair gene photolyase were conducted. Induction of mutation was performed by immersing kenaf seed in EMS solution with the concentration of 0.04 %; 0.05 %; 0.06 %; 0.08; 0.1 %; 0.3 %; 0.5 % and 1.0 %. The molecular identification employed *Restriction Fragment Length Polymorphism* (RFLP) method using restriction enzymes *Eco*Rl, *Pst*l, *Hind*lll, *BamH*I and *Ava*ll. *Random Amplified Polymorphic* DNA (RAPD) was performed using 1 set of primer OPO and 2 primers OPA (Operon Technologies). *Polymerase Chain Reaction* (PCR) was conducted using degenerate primer F : 5'-GA (AG)AC(N)(TC)T(N)GC(N)(GA)T(N)AA(TC)TG(TC) GC-3' and R :5'- T(N)CC(TC)(N)GA(N)GG(AG) TA(AG)TG-3' (Invitrogen) and specific primer F: ATGAGAGGAATGTTATTGGTCGG and R: CGCTCATTTAATGGCAAAGATG (Alpha DNA). Sequencing was done using Big Dyne Terminator mix procedure on the ABl 377 A sequencer machine. The identification of photolyase was initiated with PCR amplification using primers AC1-AC3R and AC4R, and the next step was extracting the target DNA fragment, performing ligation of the fragment into plasmid vector pCR2.1, conducting transformation on the plasmid construct to Eschericia coli strain XL-1 Blue, cloning the construct and sequencing the fragment.

EMS treatment decreased the percentage of viable plant caused by the failure of seed to germinate. Generally the increase of EMS concentration up to 0.08% was capable to produce branching mutant, but increasing the concentration more than 0.08% caused the seed fail to germinate. Morphological identification of the M1 plants showed that all the morphological characters identified were identical between the control and the mutants except for the branching appearance (the number and average length of branches). Plants treated by EMS concentration of 0.06% to 0.08 % showed the highest number and average length of branches. According to their branches position on the nodus, the mutants were grouped into basal branching and aerial branching mutants. Based on the phenotype of M2 progeny, the M1 generation could be grouped into 4 groups. First, M1 branching plants that produced mostly branching progeny and a little number of non-branching progeny showed dominant inheritance. Second, M1 non-branching plants that produced mostly non-branching progeny and a small number branching progeny showed recessive inheritance. Third, M1 branching plants that produced non-branching progeny only showed epigenetic phenomenon. Fourth, M1 non-

branching plants that produced non-branching progeny showed no mutation occurred.

Molecular identification showed differences between the DNA sequence of control plants and mutants and among the mutants. RFLP and RAPD patterns of the mutant that were not identical indicated that there were many genes (gene family) that controlled branching phenotype through the role in apical dominance. Based on its preservation RFLP bands of *BamH*l 900 bp, 1000 bp, 1100 bp, 1400 bp, 2000 bp, 3000 bp, 4000 bp, *Hind*III 1100 bp, *EcoR*I 3000 bp, and 4000 bp and RAPD band of PO07 1000 bp can be used as markers of branching gene. Sequencing using degenerate and specific primers showed mutation on chloroplast gene and sequence that was homologous to the ogre transposon of pea that might be involved in the supply of energy for the production of branches and the messenger for inhibition signal of auxin. Hot spot mutation of EMS was identified at the purin base that produced missense and frameshift mutations. Photolyase identification showed the existence of this gene but no sign of its role in repair mechanism. The photolyase gene was likely mutated to cryptochrome that caused the loss of its repair ability and the plants went into acclimatization causing the production of branches.

Appendix 10 Sample of Acknowledgments

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2 space

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This undergraduate thesis is the proof of my best effort for the development of science. Recommendations and constructive criticism are appreciated so that this research can be even more insightful.

Malang, July 2012

The Author

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Appendix 15. Sample of List of Symbols and Abbreviations

LIST OF SYMBOLS AND ABBREVIATIONS

Symbol/Abbreviation	Description
A(*A*260)	absorbance (absorbance at 260 nm)
A	ampere
BSA	bovine serum albumin
Con A	concanavalin A
cp	chloroplast
Da	Dalton
g	gram
g	gravitational acceleration (5000 ×*g*)
DAPI	4-6-diamidino-2-phenylindole
ELISA	enzyme linked immunosorbent assay
EtBr	ethidium bromide
FITC	fluorescein isothiocyanate
IgG	immunoglobulin G
MES	2-[*N*-morpholino] ethanesulphonic acid
nos	nophaline synthase
TEMED	*n′n′n′n′* tetramethyl ethylene diamine
Tris	tris (hydroxymethyl) aminomethane

Symbol/Abbreviation	Unit name
α	alpha
β	beta
Ω	gamma
∞	lamda
µm	micrometer
nm	nanometer

Appendix 16. Sample of References

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