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Article

Development of Angiospermal Encyclopedia in the Java Tradition in Kaliwining Village as a Supporting Book for Junior High School StudentsLailatul Ulfa Magfiroh^{1*}, Dinar Maftukh Fajar²^{1,2}Universitas Islam Negeri Kiai Haji Ahmad Siddiq Jember, Indonesia**Corresponding Address: lailatululfa98@gmail.com***Article Info**

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Keywords:Supporting book;
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Kaliwining villages**ABSTRACT**

This research aimed to describe the validity of the Angiosperm plant's encyclopedia in the Javanese tradition of Kaliwining Village and to describe the students' responses to the development of an encyclopedia of Angiosperm plants in the Javanese tradition of Kaliwining Villages. This research uses Research and Development (R&D) method with a 4D research model developed by Thiagarajan. In this research only 3 stages were carried out, there are Define, Design, and Develop. The subject consisted of validators, there are 2 expert lecturers, 1 science teacher, 6 students in the small-scale test, and 32 students in the large-scale test at SMPN 2 Rambipuji. The result of this research obtained an average percentage of validity tests, there are material experts of 90.91%, media experts of 97.65%, and science teachers of 90.91% with every valid category. Small-scale tests obtained an average percentage of 90.95%, which means that it can be used without revision, continued to large-scale tests the result of the average percentage is 85.98%, which means it is very suitable to be used as a supporting book.

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INTRODUCTION

Natural Sciences is one of the subjects at the SMP/MTs level which has a very complex material component. In science, the components of this complex material include many aspects that can be explored both from books and from the surrounding environment. Through science learning, students can gain hands-on experience to explore and apply concepts that have been thoroughly studied in everyday life (Nailiyah, Subiki, & Wahyuni, 2016). Science is a science that refers to everyday life. So that this subject can make students think scientifically about the situation around them.

Science can be learned through the culture that develops in the local environment. Utilization of the environment as a learning resource will be a reference material and added value for students in learning (Nizar, Ulung, & Susanti, 2017). Science learning can take advantage of the surrounding environment as a source of learning, one of which is through local wisdom found in the area (Irawati, 2015). Utilization of learning resources through local potential in certain areas is by the socio-cultural developed by Vygotsky who explains that

learning by discovery is easier to obtain in a socio-cultural context (Utami, 2016). This is to the contents of the 2013 Curriculum, namely integrated science learning can be taught by utilizing the culture that surrounds students. Learning resources based on local wisdom can help students learn by linking the material being studied with the surrounding environment. One of the science subjects that can be learned from the natural environment is about the world of plants, the subdivision of Angiospermae from the division of Spermatophyta.

Science material can be learned from traditions that exist around the school, such as the culture located in Kaliwining Village, Rambipuji District, Jember Regency, East Java Province. Kaliwining village is located in the south of the Rambipuji sub-district far from Jember city center. The majority of the residents of Kaliwining Village are remote people who still maintain some Javanese traditions that are fading every year. Most of the Javanese traditions in Kaliwining Village use plants as part of rituals such as the use of sow flowers for the *nyekar* tradition. When viewed from a natural science perspective, the plants used are plants belonging to the Angiospermae Subdivision of the Spermatophyta Division of Kingdom Plantae as one of the subjects in the Classification of Living Things at the Junior High School level.

In this regard, an interview was conducted with one of the science teachers at SMPN 2 Rambipuji. It was found that there were several obstacles in learning science, one of which was the inadequate science supporting books, causing students to lack understanding of the material, especially on the classification of living things, the subject of Kingdom Plantae, Angiospermae subdivision. Interview, 2019). Students cannot learn contextually because the supporting books used in schools still do not invite students to learn contextually in their surroundings, one example is that most students only know the local names of plants but do not know the scientific names of plants. There are even students who only know the national names of plants but do not know the local names and scientific names of plants. The lack of contextual learning also has an impact on the knowledge of students who currently know more about foreign culture than local culture, one of which is the Javanese tradition in Kaliwining Village.

From the explanation above, it is necessary to have a supporting book, one of which is an encyclopedia. An encyclopedia is a collection of writings containing extensive, complete, and easy-to-understand explanations of various kinds of information about science or specifically for certain branches of science which are arranged alphabetically or by category and printed in book form (Setiadi & Setiawati, 2016). Encyclopedias are one type of supporting book, namely books that function to enrich knowledge, especially knowledge that is not contained in the main book (Prihartanta, 2015).

The encyclopedia that will be developed is the Angiospermae encyclopedia in Javanese Tradition which can support the main book in learning and can also increase knowledge about Javanese traditions in Kaliwining Village which are not presented in the main book. In addition, this encyclopedia can be used by students both inside and outside the learning process so that it will greatly assist students in adding insight and knowledge about Angiosperm plants contained in the Javanese tradition in Kaliwining Village.

This study aims to describe the validity of the Angiosperm plant encyclopedia in the Javanese tradition in Kaliwining Village and describe the students' responses to the development of the Angiosperm plant encyclopedia in the Javanese tradition in Kaliwining Village.

METHODS

The research model is a 4D model developed by Thiagarajan. According to Thiagarajan, the steps of this research consist of define, design, development, and disseminate, which can be abbreviated as 4-D (Sugiyono, 2019). However, this research only reached the

development stage, due to time and cost limitations, and only limited to testing the feasibility of the encyclopedia through student response tests.

The targets in this study consisted of two expert validators (material experts and media experts) from two lecturers of the Tarbiyah Faculty of UIN Khas Jember, a science teacher at SMPN 2 Rambipuji, and class VIII E students at SMPN 2 Rambipuji as small-scale test subjects (6 students) and large (32 students). The study was conducted for 7 days in July 2020.

In collecting data, using validated questionnaires and student response questionnaires. The questionnaire used in this study was in the form of a checklist with scoring on each aspect using a Likert scale of 1-5 (Sahlan, 2015).

Table 1. Likert Scale Criteria

No	Criteria	Score
1	Very Good (VG)	5
2	Good (G)	4
3	Enough (E)	3
4	Poor (P)	2
5	Very Poor (VP)	1

(Source: Sahlan, 2015)

The data analysis technique consisted of expert validation data analysis and student responses. The data analysis techniques used are percentage calculation techniques and qualitative descriptive techniques (Akbar, 2016). The formula used in the expert validation data analysis is as follows:

$$V_{ah} = \frac{T_{se}}{T_{sh}} \times 100\% \quad (1)$$

Information:

V_{ah} = expert validation

T_{se} = total empirical score obtained from expert judgment

T_{sh} = total expected score

There are criteria for testing the validity of the encyclopedia, which can be seen in Table 2 below:

Table 2. Validity Criteria

Validity Criteria	Validity Level
85,01% - 100,00%	Very valid or can be used without revision
70,01% - 85,00%	Valid or usable but need minor revision
50,01% - 70%	Not valid, it is recommended not to use it because it needs a major revision
20,01% - 50%	Invalid or cannot be used
0% - 20%	Very invalid or should not be used

(Source: Akar, 2016)

Meanwhile, in analyzing student response data, the following formula was used:

$$V_{au} = \frac{T_{se}}{T_{sh}} \times 100\% \quad (2)$$

Information :

V_{au} = percentage value (audience validation)

T_{se} = total empirical score obtained from student responses

T_{sh} = total expected score

There are criteria for student responses to the encyclopedia which can be seen in the T 3 below:

Table 3. Student Response Results Criteria

Percentage (%)	Criteria
81% - 100%	Very valid or can be used without revision
61% - 80%	Valid or usable but need minor revision
41% - 60%	Not valid, it is recommended not to use it because it needs a major revision

Percentage (%)	Criteria
21% - 40%	Invalid or cannot be used
0% - 20%	Very invalid or should not be used

(Source: Abar, 2016)

RESULTS AND DISCUSSION

The result of this research is the product of the Encyclopedia of Angiospermae in Javanese Tradition in Kaliwining Village which contains acculturation content between natural science material (especially on Classification of Living Things subject matter of Kingdom Plantae Subdivision of Angiospermae) with local culture. This encyclopedia is used as a supporting book for SMP/MTs students, especially in class VII. The study took both small-scale and large-scale subjects using class VIII students because these students had already taken the Classification of Living Things subject matter of Kingdom Plantae Subdivision of Angiosperms in class VII.

Derived from observations and interviews during the Internship II IAIN Jember program in August 2019, researchers found a problem in learning at SMPN 2 Rambipuji. These problems consist of students' learning difficulties in the Classification of Living Things, especially on the subject of Kingdom Plantae, and also the lack of reference books that can be used as student support books. From these problems, the researcher wants to develop a supporting book, one of which is an encyclopedia.

Researchers want to make the developed encyclopedia has a differentiating point from other encyclopedias so that researchers develop an encyclopedia that has contents in the form of acculturation between local traditions and plants. The reason for developing the acculturated encyclopedia, the researcher wants to introduce and provide additional information that will never be found in the main book that science can also be studied through local traditions. This causes the researcher to raise the title of the book to be developed, namely the Encyclopedia of Angiospermae in Javanese Tradition in Kaliwining Village. Following the concept of science that can be learned through the surrounding environment, including utilizing the local potential that exists in the region (Suhandono, 2000). The development of this encyclopedia is also following the socio-cultural theory developed by Vygotsky that learning by discovery will be easier if you take advantage of the surrounding environment and develop traditions (Utami, 2016).

The Encyclopedia of Angiosperms in Javanese Tradition in Kaliwining Village is an encyclopedia developed based on direct research in Kaliwining Village. This encyclopedia contains Angiosperm plants used by the community in a series of Javanese traditions in Kaliwining Village. Angiosperms are known by name by identification using a parallel key found in Steenis' Flora book. The results of the identification of Angiosperms used in the Javanese tradition in Kaliwining Village obtained 23 types of plants whose names are by the parallel key used. This parallel key can be used when identifying a variety of living things that are impossible to bring directly into the classroom, so when identification is used, sources that can provide complete information about plants can be found (Purnamasari, Rahayuningsih, & Chasnah, 2012).

The encyclopedia, besides presenting 23 types of plants, is also equipped with a brief lesson about Angiosperms plants and their classification procedures and information on Javanese traditions that are still carried out by the community. With the taxonomy of Angiospermae plants, it is hoped that students as the main readers of this encyclopedia can study the taxon order in more detail. To support the material presented, the encyclopedia is also equipped with pictures of each species, classification, description, plant conservation, and local use. This encyclopedia is in the plant catalog section, sorted alphabetically A-Z by national name which aims to make it easier for readers to find plants. The following is an encyclopedia product developed by the researcher.

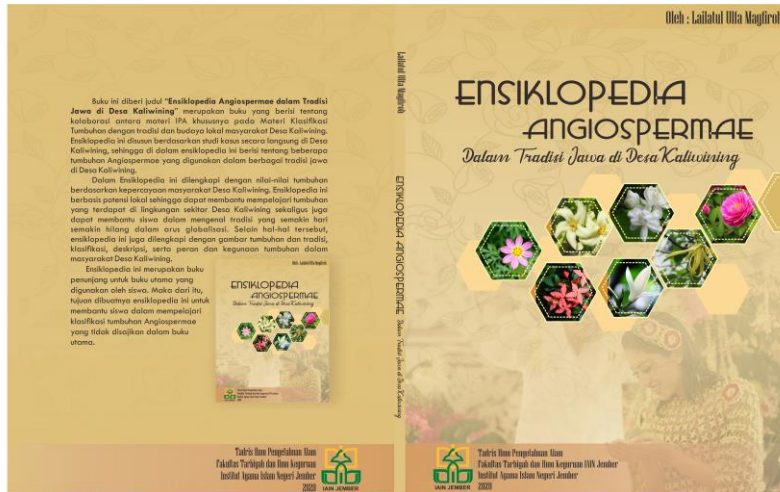


Figure 1. Product of an angiosperm encyclopedia in the Javanese tradition in the village of Kaliwining
 The encyclopedia that was developed was then validated by material experts, media experts, and science teachers to determine the feasibility of the Angiosperms encyclopedia. The results of the expert assessment in the graph are as follows:

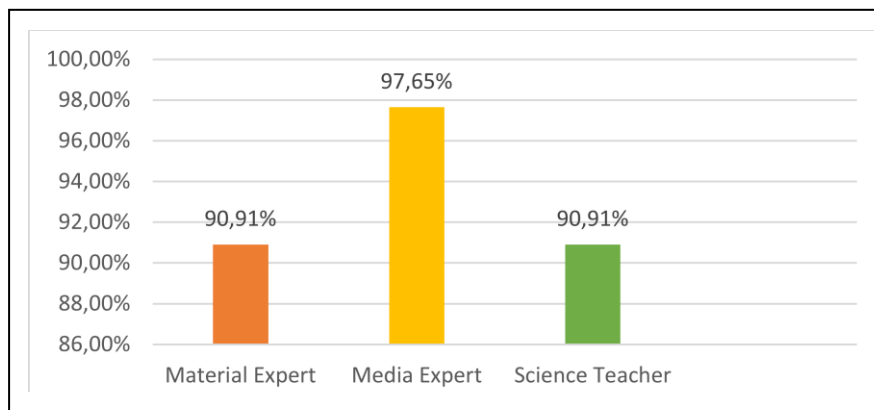


Figure 2. Graph of Assessment of Science Experts and Teachers

Based on the graph, it shows that the validation results from material experts, media experts, and science teachers on the Angiosperms encyclopedia are very valid (appropriate) to be used with a few notes of input from experts and science teachers as a revision of the Angiosperms encyclopedia. The assessment of the Angiospermae encyclopedia by material experts with a percentage of 90.91% with suggestions and input, namely in the description of the picture on page 1 about the use of roses by local people should be more specified.

The percentage of eligibility for angiosperms encyclopedia by media experts is 97.65%. There are suggestions and input as a revision of the encyclopedia, namely the writing of the word "Java" must begin with a capital letter, the first mention of Kaliwining Village must be completed with the sub-district, district, and province, and one of the sentences on the back cover has not been SPOK which must be corrected.

In addition to material experts and media experts, this encyclopedia was also tested on science teachers. The percentage of eligibility by the science teacher was 90.91%. There are suggestions and input given by the science teacher, namely about small mistakes such as typing errors caused by the lack of thoroughness of the researcher.

The validation results from material experts, media experts, and science teachers show that the developed Angiospermae encyclopedia can be used for further trials, namely small-scale trials and large-scale trials. Following the Guidelines for Writing Non-Text Books published by the Book Center of the Ministry of National Education, this encyclopedia can be used as a learning support book or reference if the book that has been validated has several

aspects consisting of arranged alphabetically, explanations accompanied by interesting pictures, discussed comprehensively, consistent material, equipped with an index, glossary, and bibliography (Depdiknas, 2008). This encyclopedia can be said to be very valid because the aspects contained in the encyclopedia have been fulfilled and are following the writing guidelines.

The Angiospermae Encyclopedia which has been validated by experts and science teachers and revised is then tested on students. The first test is a small-scale trial conducted by 6 students of class VIII E SMPN 2 Rambipuji. While the second test is a large-scale trial conducted by 32 students of class VIII E SMPN 2 Rambipuji.

The results of small-scale trials in the form of a percentage of eligibility based on student assessments of 90.95% with very valid criteria. The Angiospermae Encyclopedia is already feasible to use based on student assessments on a small scale and can then be used in large-scale trials. The results of small-scale trials can be seen in the following Table 4.

Table 4. Small-Scale Trial Results

Aspect	Question Number	Total Score	Percentage	Category
Material Coverage	1	26	86,67%	Very Valid
	2	28	93,33%	Very Valid
	3	26	86,67%	Very Valid
	4	28	93,33%	Very Valid
	5	28	93,33%	Very Valid
Presentation	6	28	93,33%	Very Valid
	7	27	90,00%	Very Valid
	8	28	93,33%	Very Valid
	9	28	93,33%	Very Valid
Language	10	28	93,33%	Very Valid
	11	26	86,67%	Very Valid
Compatibility of Encyclopedias with Learning	12	28	93,33%	Very Valid
	13	26	86,67%	Very Valid
	14	27	90,00%	Very Valid
Amount Average			1273,33% 90,95% (Very Valid)	

The second test was a large-scale trial conducted by 32 students who assessed the Angiosperms encyclopedia according to the student response questionnaire to the Angiosperms encyclopedia as in the small-scale trial. The results of large-scale trials are 85.98% with very valid criteria. The results of large-scale trials can be seen in the following Table 5.

Table 5. Large-Scale Trial Results

Aspect	Question Number	Total Score	Percentage	Category
Material Coverage	1	134	83,75%	Very Valid
	2	140	87,50%	Very Valid
	3	134	83,75%	Very Valid
	4	142	88,75%	Very Valid
	5	142	88,75%	Very Valid
Presentation	6	140	87,50%	Very Valid
	7	144	90,00%	Very Valid
	8	135	84,38%	Very Valid
	9	142	88,75%	Very Valid
Language	10	136	85,00%	Very Valid
	11	134	83,75%	Very Valid
Compatibility of Encyclopedias with Learning	12	134	83,75%	Very Valid
	13	132	82,50%	Very Valid
	14	137	85,63%	Very Valid
Amount Average			1203,75% 85,98% (Very Valid)	

The results of small-scale and large-scale trials can be said to be valid even though the percentage in large-scale trials decreased to 85.98% due to differences in cognitive levels and student learning styles which were dominated by audio-visual and kinesthetic learning styles. The percentage is based on the percentage criteria developed by Sa'dun Akbar. This encyclopedia is very valid and can be used by students as a learning support book because the material in this encyclopedia is adapted to the cognitive development of SMP/MTs students so that this book can be understood by students (Depdiknas, 2008).

The results of the revision of the supporting book product in the form of the Encyclopedia of Angiospermae in Javanese Tradition in Kaliwining Village are as follows:



Figure 3. Cover of the Encyclopedia of Angiosperms

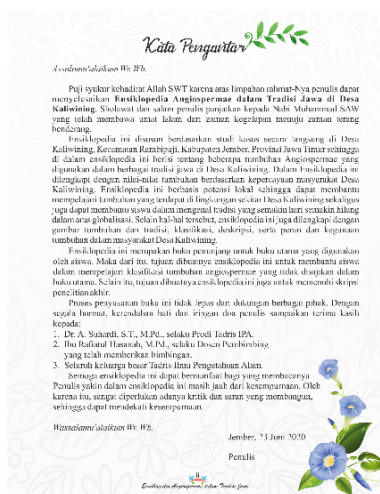


Figure 4. Foreword

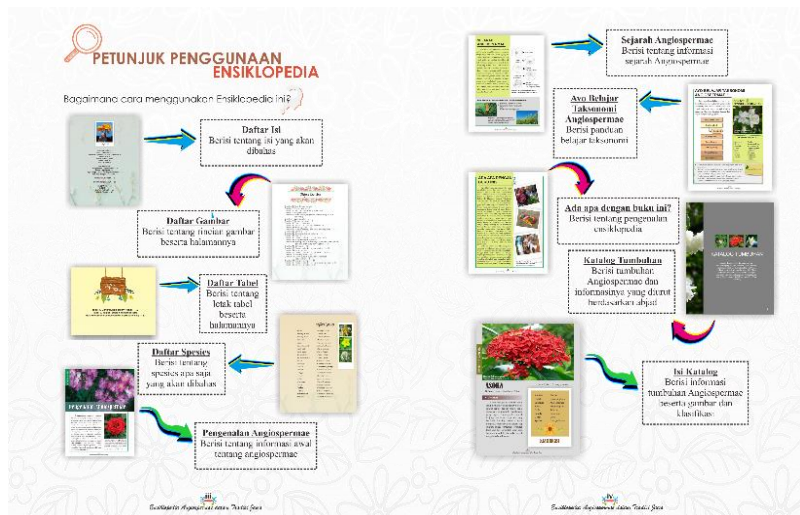


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Anaka	<i>Brevo rubra</i>
Bawang ancah	<i>Allium cepa</i>
Bawang putih	<i>Allium sativum</i>
Beluntas	<i>Phloxes tubica</i>
Cabi	<i>Capisi-pu annua</i>
Cempaka putih	<i>Melaleuca cajuputi</i>
Jarak haji	<i>Citrus maxima</i>
Jarak paku	<i>Citrus hystrix</i>
Kacang bijan	<i>Vigna radiata</i>
Kacang pelepas	<i>Vigna sinensis</i>
Kelapa	<i>Cocos nucifera</i>
Kesambi	<i>Cassia alata</i>
Kuncar	<i>Koeleria galanga</i>
Kudis	<i>Cosmos caudata</i>
Mangga	<i>Mangifera indica</i>
Mawar	<i>Rosa hybrida</i>
Melati	<i>Jasminum sambac</i>
Mentimun	<i>Cucumis sativus</i>
Nanas	<i>Ananas comosus</i>
Padah	<i>Pandanus tectorius</i>
Pepaya	<i>Carica papaya</i>
Serap malam	<i>Pithecolobium tobira</i>
Singkong	<i>Melastoma malabanicum</i>

Figure 9. Species list



PENDAHULUAN

Pengenalan Angiospermae

Tumbuhan berbunga atau *Anthophyta* ("tumbuhan bunga") merupakan kelompok terbesar tumbuhan yang ada di daratan. Nama tersebut diambil dari Yunani kuno yang berarti kuncup yang berbunga dan berbuah. Bunga sebenarnya yaitu terdistribusi dan dan sangat untuk mendukung sistem perbanyakan seksual yang menjadi salah satu ciri khas yang ada pada tumbuhan ini. Karena itu, kelompok tersebut dengan nama Angiospermae ("berbunga berbuah tertutup"). Ciri ini yang membedakan dan kelompok tumbuhan berbiiji (Spermatophyta) yang lain yaitu tumbuhan berbiiji terbuka (Gymnospermae). Terdapat sekitar 300.000 spesies tumbuhan berbunga yang ada di dunia ini.

Gambar 1. Rose (Rosa sp.) merupakan salah satu jenis tumbuhan berbunga yang indah dan banyak dibudidayakan. Sumber: Dokumentasi Pribadi

SEJARAH ANGIOSPERMAE

Angiospermae merupakan tanaman berbiyi yang memiliki sistem reproduksi berupa bunga dan buah. Nama angiospermae diambil dari bahasa Yunani yaitu *angios* yang berarti wadah, dan *sperma* yang berarti biji. Pada tahun 1800-an, para ilmuwan menemukan bahwa tumbuhan berbiyi yang paling beragam dan banyak terdistribusi di daratan adalah angiospermae, yaitu lebih dari 250.000 spesies (lebih dari 90% dari semua jenis tumbuhan). Angiospermae merupakan tumbuhan berbiyi tingkat yang paling tinggi setelah diawali oleh suatu buahan yang berasal dari daun buah yang di modifikasi menjadi buah.



Gambar 2. Partikel benih terdapat dalam... Sumber: Lintingsih et al (2018:4, 19 Maret, 172)

LETAK PERBEDAAN GYMNASPERMAE DAN ANGIOSPERMAE

Gambar 3. *Cycas* sp. adalah salah satu jenis tumbuhan berbiyi yang ada di dunia ini. Sumber: Biologi Campbell, 646.

Gambar 4. *Triticum aestivum* adalah salah satu jenis tumbuhan berbiyi yang ada di dunia ini. Sumber: Biologi Campbell, 646.

Figure 10. Introduction

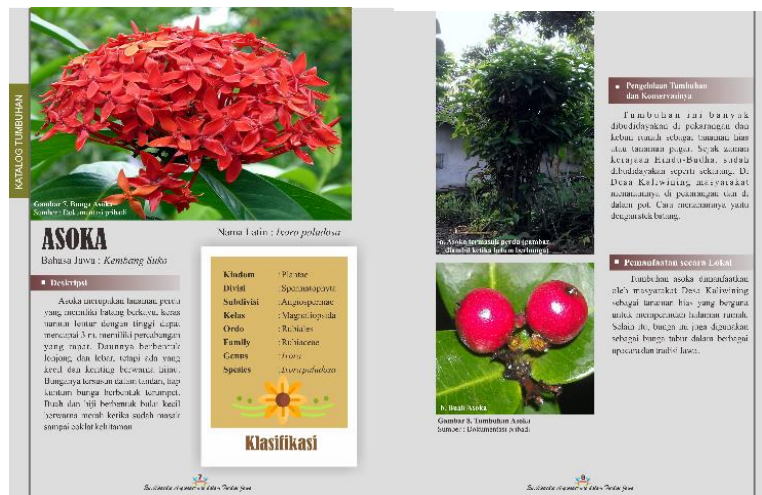


Figure 11. Plants catalog



Figure 12. Javanese traditions

GLOSARIUM

- Akar serabut** Akar-akar rimpang yang keluar dari bagian pangkal batang yang umumnya tua tua menggecombol.
- Akar tungga** Akar utama yang tumbuh tegak ke bawah dan bercabang-bungak.
- Angiospermae** Tumbuhan subdvisi dari divisi Spermatophyta yang memiliki sistem reproduksi berupa bunga dan buah.
- Antioksidan** Zat-zat yang mampu memperlambat atau mencegah proses oksidasi.
- Ari-Ari** Jaringan yang bertugas menyalurkan oksigen dan makanan pada jaringan lain pada tumbuhan.
- Berkelamin ganda (pada bunga)** Terdapat dua alat reproduksi dalam satu bunga (bunga sari atau putik terdapat dalam satu bunga).
- Berkelamin tunggal (pada bunga)** Hanya terdapat satu alat reproduksi dalam satu bunga (bunga sari saja atau putik saja).
- Bunga majemuk** Sekelompok kuntum bunga yang terangkai pada satu induk tunggal bunga.
- Bunga setaman** Sekelompok bunga dalam tradisi Jawa yang terdiri dari: bunga empaka putih (cantil, cecati, kembang, mawar merah dan mawar putih). Sekelompok bunga yang terdiri dari: bunga mawar putih, dan empaka putih (cantil).
- Bunga telon** Daun yang dalam satu tangkainya terdapat lebih dari dua anak daun.
- Danus majemuk** Batang sejati.

Figure 13. Glossary

INDEKS

A	Cucurbitaceae 11
Ailanthus 9, 11	Cucurbitales 41
Ailanthus indica 9	
Ailanthus sonchifolia 11	E
Amaranthaceae 48	Euphorbiaceae 51
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Celastrus indica 33	Melastomales 31
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Celastrus indica 41	Melastomales 31

Figure 14. Index

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Figure 15. Bibliography

TENTANG PENULIS



Penulis, Lailatul Ufa Magfirah lahir di Jember, 25 Oktober 1998, anak pertama dari tiga saudara-saudara, berasal dari Bapak Muslim dan Ibu Suciwati (guru). Saat ini penulis merupakan mahasiswa di Program Studi Tadris IPA di kelas terbelah di UIN Sunan Kalijaga Jember. Penulis juga aktif sebagai Dosen di SDN Kalitengah 02 pada tahun 2021, dan melanjutkan pendidikan formal di UIN Sunan Kalijaga Jember. Penulis juga aktif sebagai dosen di UIN Sunan Kalijaga Jember.

Tertarik untuk belajar lebih mengenai Ilmu Pengajaran Alam dan berkeinginan menjadi guru profesional, penulis melanjutkan kuliah di Program Studi Tadris IPA UIN Jember. Di dalam proses ini penulis mempelajari Ilmu Pengajaran Alam yang sebelumnya penulis sudah mempelajari Biologi. Hal tersebut menyebabkan penulis tertarik untuk membuat karya ilmiah sederhana sebagai dukungan pengajaran biologi di lingkungan sekitar. Untuk mengembangkan sebuah buku saku ini, penulis sangat bersyukur kepada Allah dan teman yang membantu untuk menyempurnakan buku ini.

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Figure 16. About the Author

CONCLUSION

The development of an encyclopedia of Angiospermae plants in the Javanese tradition in Kaliwining Village is appropriate to be used as a supporting book for SMP/MTs students based on the results of validity tests and trials students. Results of the percentage of validity by material experts are 90.91%, media experts are 97.63%, and science teachers are 90.91%

with very valid categories. Small-scale trials obtained an average percentage result of 90.95% which means it can be used without revision, continued to large-scale trials, the average percentage results are 85.98% which means it is very suitable to be used as a supporting book. To better know the effectiveness of this encyclopedia, a direct trial is needed in the science learning process so that the advantages and disadvantages can be maximally known.

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