

PAPER • OPEN ACCESS

## Online library database from national center for information on biotechnology (NCBI) regarding *Ganoderma boninense*

To cite this article: R Hayati *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **260** 012148

View the [article online](#) for updates and enhancements.

## Online library database from national center for information on biotechnology (NCBI) regarding *Ganoderma boninense*

R Hayati<sup>1</sup>, M Basyuni<sup>2\*</sup>, D Chalil<sup>3</sup> and Y Bimantara<sup>2</sup>

<sup>1</sup>Graduate School of Agroteknologi, Faculty of Agriculture, Universitas Sumatera Utara, Jl. Dr A Sofyan No. 3 Medan, North Sumatera 20155, Indonesia

<sup>2</sup>Department of Forestry, Faculty of Forestry, Universitas Sumatera Utara, Jl. Tri Dharma Ujung No. 1 Medan, North Sumatera 20155, Indonesia

<sup>3</sup>Department of Agribusiness, Faculty of Agriculture, Universitas Sumatera Utara, Medan, North Sumatera 20155, Indonesia

E-mail: \*m.basyuni@usu.ac.id

**Abstract.** *Ganoderma boninense* now becomes a trending topic to researchers, and it spreads through the roots and usually the oil palm tree will basal stem rot cause harm the plantation. The National Center for Biotechnology Information (NCBI) online available overall suite of online resources can be accessed for biological information the data, including the PubMed database and additional NCBI resources, focus on literature, health, genomes, genes, proteins, and chemicals regarding *G. Boninense* and can prevent intention of Ganoderma pathogenic diseases for the health of sustainable oil palm plants. *G. boninense* pathogens have 28 books and reports, 10 online books, collection of journals and others in the NLM, 62 scientific and medical abstracts or citation and 65 articles. This information can be used in biotechnology research which contains explanations about pathological diseases, including prevention and early detection for *G.boninense* worldwide. Moreover, 162 nucleotide DNA and RNA sequences have reported.

### 1. Introduction

*Ganoderma boninense* is a fungal pathogen which on average attacks palm oil plantations and causes of Basal Stem Rot (BSR) which causes economic losses [1]. The BSR development was indicated fungi around the roots of asymptomatic plant stages, furthermore yellowing leaves indicated exhaustion of lowes the biotrophic interaction of the pathogen will gradually cause necrosis of the parent plant so that the whole plant becomes infected, and the leaves and stems will become frail and then the tree will cause death [2]. Still with no known remedy at present to *G.boninense* now and becomes a trending topic to researcher [3]. Bioinformatics plays an essential role in plant pathology with regards to the development of new pathogen diagnostic tools and disease management in plant [4]. The National Center for Biotechnology Information (NCBI) online available overall suite of online resources can be accessed for biological information the data, including the PubMed database and additional NCBI resources, focus on literature, health, genomes, genes, proteins, and chemicals regarding *G. Boninense* and can prevent intention of Ganoderma pathogenic diseases for the health of sustainable oil palm plants. The biological information data, including the PubMed database [5].



This study aims to present information online about the biological of *G. boninense* pathogen to open mind insight in biotechnology researchers for information diseases known from several plants attacked by Ganoderma pathogens. Early identification of the pathogen Ganoderma is the one step even though there is currently no specific method that can stop the spread disease. NCBI online provides biological information including infection mode and infection of *G. boninense* and proposed various types of methods for detection that have been carried out by previous researchers. PubMed Central through the journal illustrates several possible ways to control BSR disease [6]. The output can contribute significantly to maintaining the health of oil palm plants.

## 2. Materials and method

The literature, health, genomes, genes, protein and chemical properties of *Ganoderma boninense* was performed using NCBI databases (GQuery) ([www.ncbi.nlm.nih.gov/](http://www.ncbi.nlm.nih.gov/)). The calculated factors define the Bookshelf, NLM Catalog, PubMed, PubMed Central, OMIM, PubMed health, Assembly, BioProject, BioSample, Genome, Nucleotide, SRA, Taxonomy, PopSet, Identical Protein Groups, Protein, PubChem BioAssay, PubChem Compound, PubChem Substance.

## 3. Results and Discussion

The NCBI literature online is providing national online libraries and free access information of bookshelf, NLM catalog reported, Pubmed and PubMed Central documentation in the pathogens. *Ganoderma boninense* pathogens have 28 books and reports, 10 Books includes the journals collections and over in the NLM, 62 scientific and abstracts or citations, 65 full-text journal articles can be read (Table 1). The PubMed database contains citations from experiment biomolecular *Ganoderma boninense*, many links to detection and control *G. Boninense* full-text articles open access.

**Table 1.** Literature source NCBI database for *Ganoderma boninense*

Literature	Number	Description
Bookshelf	28	Books and reports
NLM Catalog	10	Books, journals and more in the NLM Collections
PubMed	65	Scientific and medical abstracts/citations
PubMed Central	79	Full-text journal articles

Information on pathology, including how to prevent and detect *G. Boninense* for the pathway of spread and handling (Table 2). Online Mendelian Inheritance in Man (OMIM) offers assistance to researchers in the compound relationship between genes and Ganoderma, thoroughly reported and knowing of the main full characteristics of collected Ganoderma [7].

The NCBI resource for *G. boninense* organizes information on genomes including 2 assemblies, 6 biological projects providing data, 5 descriptions of biological source materials and 1 genome sequencing project. *G. Boninense* has 162 nucleotides, DNA and RNA sequences have been reported (Table 3). On the other hand, also available taxonomic classification and nomenclature of fungi.

FASTA base sequences for genomes can be downloaded on the GFF menu, currently available in 2 genomes in GenBank BLAST from NCBI for *G. boninense*. Pop sequence genes sets have six from phylogenetic and population studies (Table 3). Furthermore, BLAST program optimized to search specialized datasets search to *G. boninenses* strain NJ3 in the database of NCBI have been reported [8].

**Table 2.** Health source NCBI database for *Ganoderma boninense*

Health	Number	Description
OMIM	3	online mendelian inheritance in man
PubMed Health	5	clinical effectiveness, disease, and drug reports

**Table 3.** Genomes source NCBI database for *Ganoderma boninense*

Genomes	Number	Description
Assembly	2	genome assembly information
BioProject	6	biological projects providing data to NCBI
BioSample	5	descriptions of biological source materials
Genome	1	genome sequencing projects by the organism
Nucleotide	162	DNA and RNA sequences
SRA	3	high-throughput DNA and RNA sequence read archive
Taxonomy	1	taxonomic classification and nomenclature catalog

**Table 4.** Genes source NCBI database for *Ganoderma boninense*

Genes	Number	Description
PopSet	7	sequence sets from phylogenetic and population studies

Cyclophilins (CYP) are *peptidyl prolyl cis-trans isomerases* (PPIase) protein implicated in various cellular processes and the virulence factors in some pathogenic fungi include *G. boninense*, cDNA encoding CYP to enhance tolerance of oil palm against BSR have reported [9].

**Table 5.** Proteins source NCBI database for *Ganoderma boninense*

Proteins	Number	Description
Identical Protein Groups	5	protein sequences grouped by identity
Protein	23	protein sequences

**Table 6.** Chemicals source NCBI database for *Ganoderma boninense*

Chemicals	Number	Description
PubChem BioAssay	5	bioactivity screening studies
PubChem Compound	3	chemical information with structures, knowledge, and links
PubChem Substance	53	deposited substance and chemical information

Antifungal chemical compounds that are capable of murder pathogens *G. boninense* are *Toxononins*, *Ophiopogonin C* and *Cyclopasiflosides*, *Elemicin*, *Neocnidilide*, *Gingerglycolipid* and *Apiole* have been reported [10]. Providing some of these compounds in plants can protect trees from attack by pathogens

#### 4. Conclusions

The NCBI online describes various biological information including infection modes, prevention methods, *Ganoderma boninense* functional genes and explains various types of techniques for their detection. PubMed Central through journals experiment previously explained several possible molecular ways to control the pathogens. The output can contribute significantly to maintaining the health of plants loose of *G. boninense* disease.

## References

- [1] Xing J H, Sun Y F, Han Y L, Cui B K, Dai Y C 2018 Morphological and molecular identification of two new *Ganoderma* species on *Casuarina equisetifolia* from China *J MycoKeys* **34** pp 93–108
- [2] Govender N T, Mahmood M, Seman I A, and Wong N Y 2017 The Phenylpropanoid Pathway and Lignin in Defense against *Ganoderma boninense* Colonized Root Tissues in Oil Palm (*Elaeis guineensis* Jacq.) *J Front Plant Sci.* **8** 1395
- [3] Alexander A, Dayou J and Chong K P 2016 Morphological changes of *Ganoderma boninense* mycelia after challenged by *Trichoderma* and *Bacillus* *Conf. Proc. Of the 23rd Scientific Conference of Microscopy Society Malaysia 2014* (Malaysia/AIP Conf. Proc.)
- [4] Alemu K 2015 The Role and Application of Bioinformatics in Plant Disease Management *J Advances in Life Science and Technology* **28** pp 2225-062
- [5] NCBI Resource Coordinators 2015 Database resources of the National Center for Biotechnology Information *Nucleic Acids Research* **44** 1290
- [6] Hushiarian R, Yusof N A, and Dutse S W 2013 Detection and control of *Ganoderma boninense*: strategies and perspectives *J Springerplus* **2** 555
- [7] Hamosh A, Scott A F, Amberger J, Bocchini C, Valle D and McKusick V A 2002 Online Mendelian Inheritance in Man (OMIM), a knowledgebase of human genes and genetic disorders *J Nucleic Acids Research* **30** 1 pp 52–5
- [8] Basyuni M, Purba A, Putri L A P, Hayati R, Chalil D and Syahputra I 2018 Bioinformatics analysis of predicted *Ganoderma boninense* from oil palm (*Elaeis guineensis*) *J Phys Conf Ser* accepted
- [9] Lim F H, Fakhrana I N, Rasid O A, Idris A S and Parveez G K A 2016 *Family of gene encoding potential pathogenicity associated protein (cyclophilin) from Ganoderma boninense* (Malaysia: Malaysian Palm Oil Board Information Series No. 592) p 721
- [10] Abdullah S, Gobilik J and Chong K P 2014 American-Eurasian Journal of Sustainable Agriculture *J Sustainable Agriculture* **8** 7 pp 22-7

## Acknowledgment

A Master Education towards Doctoral Research supported a part of this study (No.04/UN5.2.3.1./PPM/KP-DPRM-PMDSU II/2018). Directorate for Research and Community Service, Ministry of Research, Technology and Higher Education, Republic of Indonesia.