

生物数据库-以关键词为主的生物信息数据库检索

日期：2022-10-26

实验者：生信 2001 张子栋

[MarkdownNotes/软件第1次作业.md at main · Bluuur/MarkdownNotes \(github.com\)](#)

[生物信息学原理/软件第1次作业.md · blur/MarkdownNotes - 码云 - 开源中国 \(gitee.com\)](#)

实验目的与内容

- 熟悉 NCBI 数据库 Entrez 检索系统
- 会使用关键词检索 NCBI、UnitProtKB、PubMed 等数据库，能理解检索结果页面各条目含义
- 了解文献管理工具

实验流程和结果

1. 查找与水稻抗病金银 *Xa21* 有关的资料 (GenBank, UnitProt 等)

1. 有多少条序列具有全长 CDS，分别由多少碱基构成？编码多少个氨基酸？
2. 选择修改时间最早的一条序列，指出该基因 exon 和 intron 的位置。该基因编码的蛋白质有多少个氨基酸残基？该蛋白质可能位于细胞中的哪个位置？是否有三维结构信息？

1.1:

NIH National Library of Medicine
National Center for Biotechnology Information

Nucleotide Home Help

Nucleotide Advanced Search Builder

Search query: ((rice[Organism]) AND xa21[Title]) AND complete cds

Edit Clear

Builder

Organism	rice	Show index list
AND Title	xa21	Show index list
AND All Fields	complete cds	Show index list
AND All Fields		Show index list

Search or Add to history

Nucleotide ((rice[Organism]) AND xa21[Title]) AND complete cds [Create alert](#) [Advanced](#) [Help](#)

Species Sort by Default order [Filters: Manage Filters](#)

Plants (3)
Customize ...

Molecule types
genomic DNA/RNA (3)
Customize ...

Source databases
INSDC (GenBank) (3)
Customize ...

Sequence Type
Nucleotide (3)

Sequence length
Custom range...

Release date
Custom range...

Revision date
Custom range...

[Clear all](#)
[Show additional filters](#)

Items: 3

- ☐ [Oryza sativa receptor kinase-like protein \(Xa21\) gene, complete cds](#)
3,921 bp linear DNA
Accession: U37133.1 GI: 1122442
[Protein](#) [PubMed](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#)
- ☐ [Oryza sativa Indica Group Xa21 gene for receptor kinase-like protein, complete cds, cultivar:II you 8220](#)
4,623 bp linear DNA
Accession: AB212799.1 GI: 94481122
[Protein](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#)
- ☐ [Oryza sativa Indica Group Xa21 gene for receptor kinase-like protein, complete cds, cultivar:zheda8220](#)
4,623 bp linear DNA
Accession: AB212798.1 GI: 94481120
[Protein](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#)

Analyze these sequences
Run BLAST

Find related data
Database:
 [See more...](#)

Search details
("Oryza sativa"[Organism] AND xa21[Title]) AND (complete[All Fields] AND cds[All Fields])
 [See more...](#)

Recent activity
[Turn Off](#) [Clear](#)

有 3 条序列具有全长 CDS

第 1 条序列:

- 有 3921 个碱基
- 编码 1025 个氨基酸

GenBank

Oryza sativa receptor kinase-like protein (Xa21) gene, complete cds

GenBank: U37133.1
[FASTA](#) [Graphics](#)

[Go to:](#)

LOCUS OSU37133 3921 bp DNA linear PLN 14-DEC-1995
DEFINITION Oryza sativa receptor kinase-like protein (Xa21) gene, complete cds.
ACCESSION U37133
VERSION U37133.1
KEYWORDS .
SOURCE Oryza sativa Indica Group (long-grained rice)
ORGANISM [Oryza sativa Indica Group](#)
Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta; Spermatophyta; Magnoliopsida; Liliopsida; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza; Oryza sativa.
REFERENCE 1 (bases 1 to 3921)
AUTHORS Song, W.-Y., Wang, G.-L., Chen, L.-L., Kim, H.-S., Pi, L.-Y., Holston, T., Wang, G. B., Zhai, W.-X., Zhu, L.-H., Fauquet, C. and Ronald, P.
TITLE A receptor kinase-like protein encoded by the rice disease resistance gene, Xa21
JOURNAL Science 270 (5243), 1804-1806 (1995)
PUBMED [8525370](#)
REFERENCE 2 (bases 1 to 3921)
AUTHORS Ronald, P., Song, W.-Y., Wang, G.-L., Kim, H.-S. and Pi, L.-Y.
TITLE Direct Submission
JOURNAL Submitted (26-SEP-1995) Pamela Ronald, Plant Pathology, UC Davis, Hatcher Hall, Davis, CA 95616 USA

Analyze this sequence
Run BLAST
[Pick Primers](#)
[Highlight Sequence Features](#)
[Find in this Sequence](#)

Related information
 编码蛋白质信息
[PubMed](#)
[Taxonomy](#)
[Full text in PMC](#)

Recent activity
[Turn Off](#) [Clear](#)
Oryza sativa receptor kinase-like protein (Xa21) gene, complete cds Nucleotide
((rice[Organism]) AND xa21[Title]) AND

receptor kinase-like protein [Oryza sativa Indica Group]

GenBank: AAC49123.1

[Identical Proteins](#) [FASTA](#) [Graphics](#)[Go to:](#) ☒**编码 1025 个氨基酸**

LOCUS AAC49123 **1025 aa** linear PLN 14-DEC-1995
DEFINITION receptor kinase-like protein [Oryza sativa Indica Group].
ACCESSION AAC49123
VERSION AAC49123.1
DBSOURCE locus OSU37133 accession [U37133.1](#)
KEYWORDS .
SOURCE Oryza sativa Indica Group (long-grained rice)
ORGANISM [Oryza sativa Indica Group](#)
Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
Spermatophyta; Magnoliopsida; Liliopsida; Poales; Poaceae; BOP
clade; Oryzoideae; Oryzeae; Oryzinae; Oryza; Oryza sativa.
REFERENCE 1 (residues 1 to 1025)
AUTHORS Song, W.-Y., Wang, G.-L., Chen, L.-L., Kim, H.-S., Pi, L.-Y.,
Holsten, T., Wang, G. B., Zhai, W.-X., Zhu, L.-H., Fauquet, C. and
Ronald, P.
TITLE A receptor kinase-like protein encoded by the rice disease
resistance gene, Xa21
JOURNAL Science 270 (5243), 1804-1806 (1995)
PUBMED [8525370](#)
REFERENCE 2 (residues 1 to 1025)
AUTHORS Ronald, P., Song, W.-Y., Wang, G.-L., Kim, H.-S. and Pi, L.-Y.
TITLE Direct Submission

第 2 条序列:

- 有 4623 个碱基
- 编码 1025 个氨基酸

Oryza sativa Indica Group Xa21 gene for receptor kinase-like protein, complete cds, cultivar:II you 8220

GenBank: AB212799.1

[FASTA](#) [Graphics](#)[Go to:](#) ☒

LOCUS AB212799 **4623 bp DNA** linear PLN 14-FEB-2008
DEFINITION Oryza sativa Indica Group Xa21 gene for receptor kinase-like
protein, complete cds, cultivar:II you 8220.
ACCESSION AB212799
VERSION AB212799.1
KEYWORDS .
SOURCE Oryza sativa Indica Group (long-grained rice)
ORGANISM [Oryza sativa Indica Group](#)
Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
Spermatophyta; Magnoliopsida; Liliopsida; Poales; Poaceae; BOP
clade; Oryzoideae; Oryzeae; Oryzinae; Oryza; Oryza sativa.
REFERENCE 1
AUTHORS Xue, Q. and Xu, J.

receptor kinase-like protein [Oryza sativa Indica Group]

GenBank: BAE93934.1

[Identical Proteins](#) [FASTA](#) [Graphics](#)[Go to:](#) ☒

LOCUS BAE93934 1025 aa linear PLN 14-FEB-2008
DEFINITION receptor kinase-like protein [Oryza sativa Indica Group].
ACCESSION BAE93934
VERSION BAE93934.1
DBSOURCE accession [AB212799.1](#)
KEYWORDS .
SOURCE Oryza sativa Indica Group (long-grained rice)
ORGANISM [Oryza sativa Indica Group](#)
Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
Spermatophyta; Magnoliopsida; Liliopsida; Poales; Poaceae; BOP
clade; Oryzoideae; Oryzeae; Oryzinae; Oryza; Oryza sativa.

第 3 条序列:

- 有 4623 个碱基
- 编码 1025 个氨基酸

Oryza sativa Indica Group Xa21 gene for receptor kinase-like protein, complete cds, cultivar:zheda8220

GenBank: AB212798.1

[FASTA](#) [Graphics](#)[Go to:](#) ☒

LOCUS AB212798 4623 bp DNA linear PLN 14-FEB-2008
DEFINITION Oryza sativa Indica Group Xa21 gene for receptor kinase-like
protein, complete cds, cultivar:zheda8220.
ACCESSION AB212798
VERSION AB212798.1
KEYWORDS .
SOURCE Oryza sativa Indica Group (long-grained rice)
ORGANISM [Oryza sativa Indica Group](#)
Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
Spermatophyta; Magnoliopsida; Liliopsida; Poales; Poaceae; BOP
clade; Oryzoideae; Oryzeae; Oryzinae; Oryza; Oryza sativa.
REFERENCE 1
AUTHORS Xue, Q. and Xu, J.
TITLE Xa21 gene with bacterial blight resistance from wild rice (Oryza
longistaminata) to hybrid rice(Oryza. sativa)
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 4623)
AUTHORS Qingzhong, X. and Jianhong, X.
TITLE Direct Submission
JOURNAL Submitted (02-MAY-2005) Contact:Xue Qingzhong zhejiang university,
agronomy; kaixuan road 268, hangzhou, zhejiang 310029, China

receptor kinase-like protein [Oryza sativa Indica Group]

GenBank: BAE93933.1



[Identical Proteins](#) [FASTA](#) [Graphics](#)

Go to: 



LOCUS BAE93933 **1025 aa** linear PLN 14-FEB-2008
DEFINITION receptor kinase-like protein [Oryza sativa Indica Group].
ACCESSION BAE93933
VERSION BAE93933.1
DBSOURCE accession [AB212798.1](#)
KEYWORDS .
SOURCE Oryza sativa Indica Group (long-grained rice)
ORGANISM [Oryza sativa Indica Group](#)
Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
Spermatophyta; Magnoliopsida; Liliopsida; Poales; Poaceae; BOP
clade; Oryzoideae; Oryzeae; Oryzinae; Oryza; Oryza sativa.
REFERENCE 1
AUTHORS Xue, Q. and Xu, J.
TITLE Xa21 gene with bacterial blight resistance from wild rice (Oryza.
longistaminata) to hybrid rice(Oryza.sativa)
JOURNAL Unpublished
REFERENCE 2 (residues 1 to 1025)

1.2:

找到修改时间最早的一条序列

Nucleotide  ((rice[Organism]) AND xa21[Title]) AND complete cds  [Search](#)

[Create alert](#) [Advanced](#)

Summary  **Sort by Date Modified** 

Sort by

- ☐ Default order
- ☐ Accession
- ☒ **Date Modified**
- ☐ Date Released
- ☐ Organism Name
- ☐ Taxonomy ID
- ☐ Sequence Length

Items:

☐ [Oryza sativa Indica Group Xa21 gene for receptor kinase-like protein, complete cds.](#)

1. [cultivar:II you](#)

4,623 bp linear DNA

Accession: AB212798.1 GI: 94481122

[Protein](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#)

☐ [Oryza sativa Indica Group Xa21 gene for receptor kinase-like protein, complete cds, cultivar:II you](#)

2. [8220](#)

4,623 bp linear DNA

Accession: AB212798.1 GI: 94481122

[Protein](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#)


☐ [Oryza sativa receptor kinase-like protein \(Xa21\) gene, complete cds](#)

3. [3,921 bp linear DNA](#)

Accession: U37133.1 GI: 1122442

[Protein](#) [PubMed](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#)

Send to:  **Filters:** [Manage Filters](#)

Analyze these sequence

[Run BLAST](#)

Find related data

Database: [Select](#)

[Find items](#)

Search details

("Oryza sativa"[Organism] AND (complete[All Fields Fields]))

[Search](#)

Recent activity

外显子为 1-2677, 3521-3921; 内含子为 2678-3520

gene

CDS

/map="11q, RG103"

1..3921

/gene="Xa21"

join(1..2677, 3521..3921)

/gene= xa21

/note="Xa21 disease resistance gene"

/codon_start=1

/product="receptor kinase-like protein"

/protein_id="AAC49123.1"

/translation="MISLPLLLFVLLFSALLCPSSSDDDGDA
YQGGQSLASWNTSGHGQHCTWVGVCGRRRRRHPHRVVKLLLR
SFLRELDLGDNYLSGEIPPELSRLSRLQLELSDNSIQGSIPA

氨基酸残基数 1025

UniProt BLAST Align Peptide search ID mapping SPARQL UniProtKB Advanced List Search

Q1MX30 · XA21_ORYSI

Protein ¹	Receptor kinase-like protein Xa21	Amino acids	1025
Status ¹	UniProtKB reviewed (Swiss-Prot)	Protein existence	Evidence at protein level
Organism ¹	Oryza sativa subsp. indica (Rice)	Annotation score ¹	5/5
Gene ¹	XA21		

Entry Feature viewer Publications External links History

BLAST Align Download Add Add a publication Entry feedback

Function¹

Receptor kinase-like protein Xa21
Receptor kinase that detects *X.oryzae* pv. *oryzae* protein Ax21 to promote innate immunity (PubMed:20118235). Following *X.oryzae* pv. *oryzae* protein Ax21 detection, undergoes cleavage, releasing the processed protein kinase Xa21 chain (By similarity). [1 Automatic Annotation](#) [1 Publication](#)

Receptor kinase-like protein Xa21, processed
The processed protein kinase Xa21 chain released by protein cleavage after *X.oryzae* pv. *oryzae* protein Ax21 detection translocates into the nucleus where it can bind and regulate WRKY62, a transcription factor (By similarity). Confers resistance to the bacterial pathogen *X.oryzae* pv. *oryzae* (Xoo) (PubMed:8525370, PubMed:19825552, PubMed:20118235). [1 Automatic Annotation](#) [3 Publications](#)

Catalytic Activity

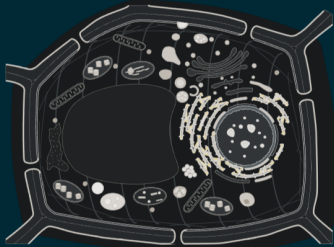
ATP + L-seryl-[protein] = ADP + H⁺ + O-phospho-L-seryl-[protein] [1 Publication](#)

亚细胞定位：细胞膜，内质网膜

UniProt BLAST Align Peptide search ID mapping SPARQL UniProtKB Advanced List Search

Subcellular Location¹

UniProt Annotation GO Annotation



Receptor kinase-like protein Xa21

- Cell membrane [1 Automatic Annotation](#); Single-pass membrane protein
- Endoplasmic reticulum membrane [1 Automatic Annotation](#); Single-pass membrane protein

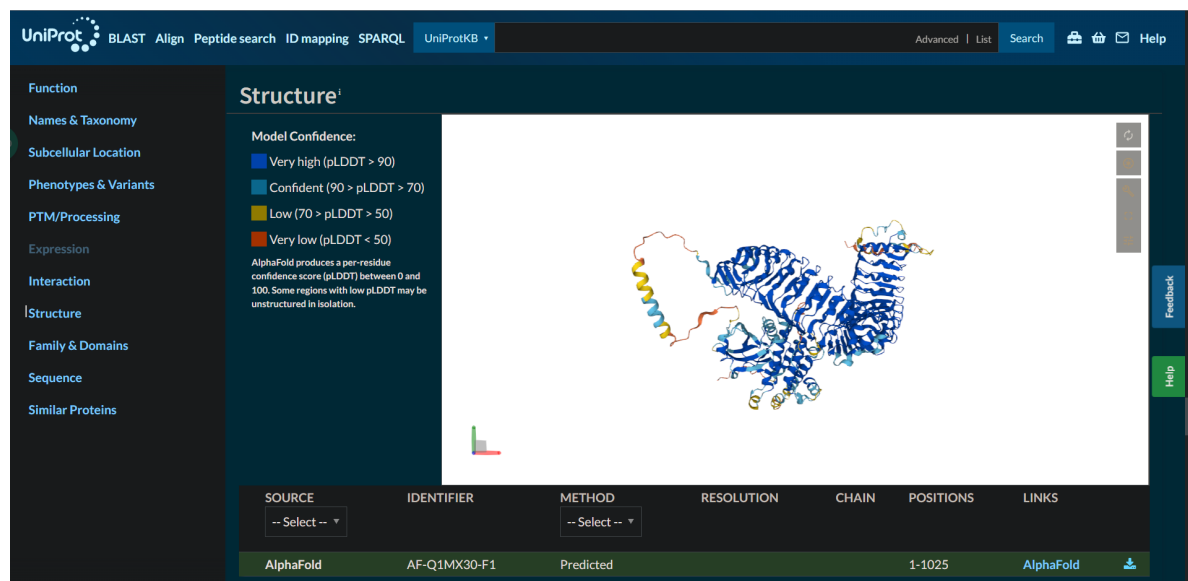
Present in cortical and perinuclear endoplasmic reticulum. Cleaved upon *X.oryzae* pv. *oryzae* protein Ax21 recognition; the kinase containing fragment is translocated into the nucleus. [1 Automatic Annotation](#)

Receptor kinase-like protein Xa21, processed

- Nucleus [1 Automatic Annotation](#)

Features

三维结构信息



The image shows the UniProt Structure page for protein AF-Q1MX30-F1. The page features a 3D ribbon diagram of the protein structure, which is primarily blue with some yellow and red segments. To the left of the diagram, there is a 'Model Confidence' section with a legend: 'Very high (pLDDT > 90)' in blue, 'Confident (90 > pLDDT > 70)' in light blue, 'Low (70 > pLDDT > 50)' in yellow, and 'Very low (pLDDT < 50)' in red. Below the legend, a note states: 'AlphaFold produces a per-residue confidence score (pLDDT) between 0 and 100. Some regions with low pLDDT may be unstructured in isolation.' At the bottom of the page, there is a table with columns: SOURCE, IDENTIFIER, METHOD, RESOLUTION, CHAIN, POSITIONS, and LINKS. The table contains one row: AlphaFold, AF-Q1MX30-F1, Predicted, 1-1025, AlphaFold, and a download icon.

2. 检索注册号在 AF123456-AF123478 之间并且序列长度在 1500 到 1800 *bp* 之间的核苷酸数据，共有多少条？如何批量下载它们 FASTA 的序列？

共 17 条

Nucleotide Advanced Search Builder

(AF123456:AF123478[Accession]) AND 1500:1800[Sequence Length]

[Edit](#)

Builder

	Accession	▼	AF123456:AF123478
AND ▼	Sequence Length	▼	1500:1800
AND ▼	All Fields	▼	

[Search](#) or [Add to history](#)

Nucleotide (AF123456:AF123478[Accession]) AND 1500:1800[Sequence Length]
Create alert Advanced

Summary 20 per page Sort by Date Modified

Items: 17

- 5) ☐ [Magnolia albosericca maturase K \(matK\).gene, complete cds; chloroplast](#)
1. 1,524 bp linear DNA
Accession: AF123464.1 GI: 7239725
[Protein](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)
- 7) ☐ [Magnolia denudata maturase K \(matK\).gene, complete cds; chloroplast](#)
2. 1,524 bp linear DNA
Accession: AF123465.1 GI: 7239727
[Protein](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)
- ☐ [Magnolia alba maturase K \(matK\).gene, complete cds; chloroplast](#)
3. 1,524 bp linear DNA
Accession: AF123466.1 GI: 7239729

勾选后点击 **Send to**，格式选择 FASTA

Summary 20 per page Sort by Date Modified

Items: 17
Selected: 17

☒ [Magnolia albosericca maturase K \(matK\).gene, complete cds; chloroplast](#)
1. 1,524 bp linear DNA
Accession: AF123464.1 GI: 7239725
[Protein](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)

☒ [Magnolia denudata maturase K \(matK\).gene, complete cds; chloroplast](#)
2. 1,524 bp linear DNA
Accession: AF123465.1 GI: 7239727
[Protein](#) [Taxonomy](#)
[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)

☒ [Magnolia alba maturase K \(matK\).gene, complete cds; chloroplast](#)
3. 1,524 bp linear DNA
Accession: AF123466.1 GI: 7239729
[Protein](#) [Taxonomy](#)

Send to: Filters: [Manage](#)

- ☒ Complete Record
- ☐ Coding Sequences
- ☐ Gene Features

Choose Destination

- ☒ File
- ☐ Clipboard
- ☐ Collections
- ☐ Analysis Tool

Download 17 items.

Format
FASTA

Sort by
Date Modified

Show GI ☐

Create File

Find items

3. 通过关键词，在 PubMed 等数据库搜索跟你「项目育人」项目相关的文献

PubMed:

National Library of Medicine
National Center for Biotechnology Information

Log in

rhizosphere microbiome

Advanced

Create alert

Create RSS

User Guide

Save

Email

Send to

Sorted by: Best match

Display options

MY NCBI FILTERS

2,318 results

<<

<

Page 1

>

>>

RESULTS BY YEAR

1989

2023

TEXT AVAILABILITY

☐ Abstract
 ☐ Free full text
 ☐ Full text

ARTICLE ATTRIBUTE

☐ 1

Cite

Share

The rhizosphere microbiome: significance of plant beneficial, plant pathogenic, and human pathogenic microorganisms.
Mendes R, Garbeva P, Raaijmakers JM.
FEMS Microbiol Rev. 2013 Sep;37(5):634-63. doi: 10.1111/1574-6976.12028. Epub 2013 Jul 22.
PMID: 23790204 [Free article](#) [Review](#).
Although the importance of the **rhizosphere microbiome** for plant growth has been widely recognized, for the vast majority of **rhizosphere** microorganisms no knowledge exists. To enhance plant growth and health, it is essential to know which microorganism is pres ...

☐ 2

Cite

Share

Rhizosphere Microbiome Assembly and Its Impact on Plant Growth.
Qu Q, Zhang Z, Peijnenburg WJGM, Liu W, Lu T, Hu B, Chen J, Chen J, Lin Z, Qian H.
J Agric Food Chem. 2020 May 6;68(18):5024-5038. doi: 10.1021/acs.jafc.0c00073. Epub 2020 Apr 17.
PMID: 32255613 [Review](#).
Also, not much is known about the various beneficial functions of the **rhizosphere microbiome**. In this review, we summarize the current knowledge of biotic and abiotic factors that shape the **rhizosphere microbiome** as well as the **rhizosphere** m...

Google Scholar

Google Scholar

rhizosphere microbiome

About 63,200 results (0.13 sec)

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My library

Articles

Any time

Since 2022

Since 2021

Since 2018

Custom range...

Sort by relevance

Sort by date

Any type

Review articles

☐ include patents
 ☒ include citations

Create alert

The rhizosphere microbiome and plant health

RL Berendsen, CMJ Pieterse, PAHM Bakker - Trends in plant science, 2012 - Elsevier

... that plants are able to shape their **rhizosphere microbiome**, as evidenced by the fact that ... activity to suppress pathogens in the **rhizosphere**. A comprehensive understanding of the ...

☆ Save Cite Cited by 3555 Related articles All 28 versions

(HTML) Rhizosphere microbiome assemblage is affected by plant development

JM Chaparro, DV Badri, JM Vivanco - The ISME journal, 2014 - nature.com

... a core **rhizosphere microbiome**. (2) this core **microbiome** is ... times that the core **microbiome** not currently expressing; (4) ... for specific functions that the core **microbiome** can't express (ie...

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Rhizosphere microbiome assembly and its impact on plant growth

Q Qu, Z Zheng, W Peijnenburg, W Liu... - Journal of agricultural ..., 2020 - ACS Publications

... In fact, the **rhizosphere microbiome** is not only influenced by plant species, genotypes, and ... breaks our traditional opinion that the **rhizosphere microbiome** is relative stable in the short ...

☆ Save Cite Cited by 107 Related articles All 6 versions

Deciphering the rhizosphere microbiome for disease-suppressive bacteria

R Mendes, M Krujt, L De Bruijn, E Dekkers... - Science, 2011 - science.org

... between plants and **rhizosphere** microorganisms have ... soil microorganisms in their **rhizospheres** to counteract pathogen ... is to decipher the **rhizosphere microbiome** to identify such ...

☆ Save Cite Cited by 2100 Related articles All 28 versions

Related searches

root rhizosphere microbiome

soil rhizosphere microbiome

impact of plant rhizosphere microbiome

soybean rhizosphere microbiome

rhizosphere microbiome fungal invasion

Bing Scholar

Microsoft Bing

rhizosphere microbiome

Zidong

网页

图片

视频

学术

词典

地图

按相关性

时间

年

年

确认

rhizosphere microbiome: significance of plant beneficial, plant pathogenic, and human pathogenic microorganisms | FEMS ...

https://academic.oup.com/femsre/article/37/5/634/540803

Abstract. Microbial communities play a pivotal role in the functioning of plants by influencing their physiology and development. While many members of the **rhizosphere microbiome** are beneficia...

The rhizosphere microbiome and plant health - ScienceDirect

https://www.sciencedirect.com/science/article/pii/S1360138512000799

Figure 2. Interactions in the **rhizosphere**. Plants are able to influence the composition and activation of their **rhizosphere microbiome** through exudation of compounds that stimulate (gree...

Rhizosphere microbiome structure alters to enable wilt resistance in tomato | Nature Biotechnology

https://www.nature.com/articles/nbt.4232

Tomato **rhizosphere microbiome** alterations that contribute to bacterial wilt resistance are detected using metagenomics. Tomato variety Hawaii 7996 is resistant to the soil-borne pathogen Ralston...

Rhizosphere microbiome assemblage is affected by plant development | The ISME Journal - Nature

https://www.nature.com/articles/ismej2013196

Accordingly, metatranscriptomics analysis of the **rhizosphere microbiome** revealed that 81 unique transcripts were significantly ($P < 0.05$) expressed at different stages of plant development.

The rhizosphere microbiome: A key component of sustainable crop...

讨论

在本次上机实验中，熟悉了几种生信数据库的查询操作以及文献检索。