

# funRiceGenes

**Comprehensive understanding and application of  
rice functional genes**

# Part I

**Display of information in this database as  
static web pages**

# Welcome to funRiceGenes!

HOME

GENE

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## A comprehensive database of functionally characterized rice genes

- 2800+ cloned rice genes [Download↓]
- 400+ gene families [Download↓]
- 400+ keywords [Download↓]
- 5000+ literatures [Download↓]
- 200+ interaction networks [Download↓]
- Contact: ywhzau at gmail.com
- Help manual [Download↓]

At the [homepage](#) of our database, we provide the download of the whole dataset in tidy format.

[On-site search](#) using Google or Bing

To search this site, please use **Google** or **Bing** with the following search pattern!

```
yourSearchKeyword site:https://funricegenes.github.io/
```

For example, to search this site with the keyword "domestication", open **Google** or **Bing** and type the following words:

```
domestication site:https://funricegenes.github.io/
```

<https://funricegenes.github.io/>

## Gene

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- \* ZOS8-11
- \* ZN
- \* ZIP4,SPO22
- \* ZFP252,RZF71
- \* ZFP245
- \* ZFP185
- \* ZFP182,ZOS3-21
- \* **ZFP179**
- \* ZFP177
- \* ZFP15

## ZFP179

2015-01-20 | Categories [genes](#) | Tags [salt stress](#) [ABA](#) [seedling](#) [salt tolerance](#) [salt](#) [oxidative](#)

### • Information

- Symbol: ZFP179
- MSU: [LOC\\_Os01g62190](#)
- RAPdb: [Os01g0839100](#)

[Link to MSU](#)

[Link to RAPdb](#)

### • Publication

- Functional analysis of a novel Cys2/His2-type zinc finger protein involved in salt tolerance in rice, 2010, J Exp Bot.
- Salt-responsive ERF1 regulates reactive oxygen species-dependent signaling during the initial response to salt stress in rice, 2013, Plant Cell.

[Link to PubMed](#)

### • Genbank accession number

- [AK108227](#)

[Link to GenBank](#)

### • Key message

- The ZFP179 transgenic rice exhibited significantly increased tolerance to oxidative stress, the reactive oxygen species (ROS)-scavenging ability, and expression levels of a number of stress-related genes, including OsDREB2A, OsP5CS OsProT, and OsLea3 under salt stress
- Our studies suggest that ZFP179 plays a crucial role in the plant response to salt stress, and is useful in developing transgenic crops with enhanced tolerance to salt stress
- The real-time RT-PCR analysis showed that ZFP179 was highly expressed in immature spikes, and markedly induced in the seedlings by NaCl, PEG 6000, and ABA treatments
- Through microarray analysis, a salt-responsive zinc finger protein gene ZFP179 was identified and subsequently cloned from rice seedlings
- Overexpression of ZFP179 in rice increased salt tolerance and the transgenic seedlings showed hypersensitivity to exogenous ABA

[Link to PubMed](#)

### • Connection

- [OsProT~ProT, ZFP179, Functional analysis of a novel Cys2/His2-type zinc finger protein involved in salt tolerance in rice](#), The ZFP179 transgenic rice exhibited significantly increased tolerance to oxidative stress, the

The **GENE** menu lists 2800+ cloned rice genes.

The detailed information of a gene is shown as a single page.

<https://funricegenes.github.io/>

# Gene Family

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- \* ZTL
- \* ZRT\_and\_IRT\_like\_proteins
- \* ZIFL
- \* YUCCA
- \* YSL
- \* XYLP
- \* XTH
- \* XHS
- \* XBOS
- \* WRKY

The FAMS menu lists 400+ rice gene families.

The detailed information of a gene family is shown as a single page.

<https://funricegenes.github.io/>

## XYLP

2015-01-20 | Categories [gene family](#)

[Link to MSU](#)

[Link to RAPdb](#)

### Information

- OsLTPL1, LOC\_Os03g26820, Os03g0385400.
- OsXYLP2, LOC\_Os03g26800, Os03g0385100.
- OsXYLP3, LOC\_Os07g30590, Os07g0489000.
- OsXYLP4, LOC\_Os07g43290, Os07g0625800.
- OsXYLP5, LOC\_Os03g09230, Os03g0192600.
- OsXYLP6, LOC\_Os03g20760, Os03g0323900.
- OsXYLP7, LOC\_Os05g41030, Os05g0489200.
- OsXYLP8, LOC\_Os01g59870, Os01g0814100.
- OsXYLP9, LOC\_Os07g07790, Os07g0174400.
- OsXYLP10, LOC\_Os07g07860, Os07g0174900.
- OsXYLP11, LOC\_Os03g57990, Os03g0794000.
- OsXYLP12, LOC\_Os07g07870, Os07g0175000.
- OsXYLP13, LOC\_Os03g57970, Os03g0793800.
- OsXYLP14, LOC\_Os07g07930, Os07g0175600.
- OsXYLP15, LOC\_Os04g38840, Os04g0462200.
- OsXYLP16, LOC\_Os07g09970, Os07g0198300.
- OsXYLP17, LOC\_Os03g58940, Os03g0804200.
- OsXYLP18, LOC\_Os03g07100, Os03g0167000.
- OsXYLP19, LOC\_Os06g47200, Os06g0686400.
- OsXYLP20, LOC\_Os03g46150, Os03g0664400.
- OsXYLP21, LOC\_Os08g42040, Os08g0532800.

### Publication

- Identification, characterization, and transcription analysis of xylogen-like arabinogalactan proteins in rice *Oryza sativa* L., 2014, BMC Plant Biol.

[Link to PubMed](#)

# Keywords

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nitrogen leaf leaf senescence transcription factor early leaf senescence  
xylem vascular bundle seedlings acetylcholinesterase shoot gravitropism  
gravitropic response stem root leaf development shoot resistance flower  
pollen panicle spikelet grain tiller anther sterility seedling chloroplast  
seedling death domestication development awn grains per panicle grain  
number grain length mitochondria sheath submergence starch temperature  
ATPase alkaline tolerance defense oxidative stress  
alkaline stress seed drought salinity salt seed germ  
tolerance potassium cold tolerance oxidative growth  
stress ABA ethylene yield insect jasmonate grain yield  
defense response vegetative drought tolerance crown root elongation  
root development auxin cytokinin crown root elongation

grain length

\* TGW6

\* RDD1

\* PGL2,OsBUL1

\* PGL1

\* OsSGL

\* OsPPKL3

\* OsPPKL2

\* GW7,GL7,SLG7

\* GS3

\* GL3.1,qGL3-1,qGL3,OsPPKL1

\* DEP1,DN1,qPE9-1,OsDEP1

\* APG,OsPIL16

\* AL8,RAE2,GAD1

The **KEYS** menu lists all keywords regarding phenotype description or biological process.

Each keyword links to a list of genes related to this keyword.

<https://funricegenes.github.io/>

## News

---

HOME

- 2017/Mar/1 fix info

GENE

- 2017/Mar/1 add new accessions for OsGPCR
- 2017/Mar/1 add new pub.

FAMS

- 2017/Mar/1 fix info

KEYS

- 2017/Feb/27 fix info

NEWS

- 2017/Feb/27 fix info
- 2017/Feb/27 fix info

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- 2017/Feb/27 fix info

CITE

- 2017/Feb/27 fix info
- 2017/Feb/27 fix info
- 2017/Feb/27 fix info
- 2017/Feb/27 fix info
- 2017/Feb/27 fix info
- 2017/Feb/27 add new info for gene: OsLBD3-7
- 2017/Feb/27 add new pub.
- 2017/Feb/27 PLA3 == OsLBD3-7

The **NEWS** menu shows the updating history of this database.



# Literatures

---

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1. Cloning of a cDNA encoding an importin-alpha and down-regulation of the gene by light in rice leaves, 1998, Gene.
2. Molecular cloning of a novel importin alpha homologue from rice, by which constitutive photomorphogenic 1 COP1 nuclear localization signal NLS-protein is preferentially nuclear imported, 2001, J Biol Chem.
3. Mutations of genes in synthesis of the carotenoid precursors of ABA lead to pre-harvest sprouting and photo-oxidation in rice, 2008, Plant J.
4. A pair of orthologs of a leucine-rich repeat receptor kinase-like disease resistance gene family regulates rice response to raised temperature, 2011, BMC Plant Biol.
5. The ATP-binding cassette transporter OsABCG15 is required for anther development and pollen fertility in rice, 2013, J Integr Plant Biol.
6. ABCG15 encodes an ABC transporter protein, and is essential for post-meiotic anther and pollen exine development in rice, 2013, Plant Cell Physiol.

The **DOCS** menu lists all the literatures archived in this database.



[Link to PubMed](#)



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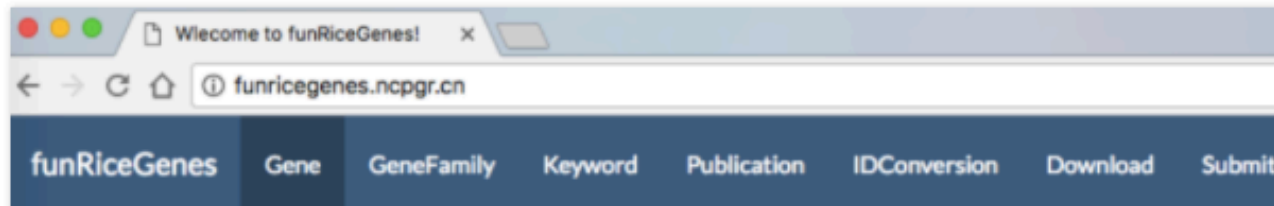
NEWS

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At the [homepage](#) of our database, we provide a link to a website allowing interactive query of this database.

To interactively query this database, go to the following site!



If you find any error information in our database or any functionally characterized rice genes missing from our database, please leave us a message.

Your Email :

Message :

<https://funricegenes.github.io/>

# Part II

Interactive query of this database

\* Query with a gene symbol or a genomic locus ?

☒ MSU Locus ☐ RAPdb Locus ☐ Gene Symbol

LOC\_Os05g06480

Detail information of a gene  
are shown in different tables

Information

Reference

Accession

Expression

Keyword

Connection

RiceNet

Show 1 entries

Symbol



RAPdb



MSU



Chalk5

[Os05g0156900](#)

[LOC\\_Os05g06480](#)

Showing 1 to 1 of 1 entries

Previous

1

Next

Link to RAPdb

Link to MSU

The **Gene** menu allows query of 2900+ genes using a MSU/RAPdb genomic locus or a gene symbol.

funRiceGenes   Gene   **GeneFamily**   Keyword   Publication   IDConversion   Download   Submit

\* Query with a gene symbol or a genomic locus ?

☒ MSU Locus   ☐ RAPdb Locus   ☐ Gene Symbol

LOC\_Os10g41510

**Information**   Reference

Show 1 entries

Symbol	RAPdb	MSU
CBL1	<a href="#">Os10g0564800</a>	<a href="#">LOC_Os10g41510</a>

Showing 1 to 1 of 1 entries

Previous   1   Next

Detail information of a gene are shown in different tables

Link to RAPdb

Link to MSU

The **GeneFamily** menu allows query of 5000+ gene family members using a MSU/RAPdb genomic locus or a gene symbol.

\* Query with keywords characterizing agronomic trait of rice listed on [this page](#)

[Information](#)

Show  entries

Symbol	RAPdb	MSU	Title
brd2 DIM DWF1 LHDD10	<a href="#">Os10g0397400</a>	<a href="#">LOC_Os10g25780</a>	<a href="#">Brassinosteroid (BR) biosynthetic gene lhdd10 controls late heading and plant height in rice (Oryza sativa L.).</a>
CKI EL1 Hd16	<a href="#">Os03g0793500</a>	<a href="#">LOC_Os03g57940</a>	<a href="#">Genetic interactions involved in the inhibition of heading by heading date QTL, Hd2 in rice under long-day conditions</a>

Link to RAPdb

Link to MSU

Link to PubMed

The [Keyword](#) menu allows query of the database with keywords regarding phenotype description or biological process.

\* Query with any word concerning rice functional genomic studies

Result

Show 1 entries

Title	Year	Journal	Affiliation	Abstract	Gene
Association of functional nucleotide polymorphisms at DTH2 with the northward expansion of rice cultivation in Asia	2013	Proc Natl Acad Sci U S A	National Key Laboratory for Crop Genetics and Germplasm Enhancement, Jiangsu Plant Gene Engineering Research	Flowering time (i.e., heading date in crops) is an important ecological trait that determines growing seasons and regional adaptability of plants to specific natural environments. Rice ( <i>Oryza sativa</i> L.) is a short-day plant that originated in the tropics. Increasing evidence suggests that the northward expansion of cultivated rice was accompanied by human selection of the heading date under noninductive long-day (LD) conditions. We report here the molecular cloning and characterization of DTH2 (for Days to heading on chromosome 2), a minor-effect quantitative trait locus that promotes heading under LD conditions. We show that DTH2 encodes a CONSTANS-like protein that promotes heading by inducing the florigen genes Heading date 3a and	DTH2,Hd3a,RFT1

The **Publication** menu allows query of the titles and abstracts of all publications archived in this database with any word.

funRiceGenes

Gene

GeneFamily

Keyword

Publication

IDConversion

Download

Submit

\* Convert between MSU genomic locus and RAPdb genomic locus

RAPdb to MSU

MSU to RAPdb

Os02g0677300

Result

Show

4

entries

RAPdb	MSU
Os02g0677300	LOC_Os02g45450

Showing 1 to 1 of 1 entries

Previous

1

Next

The [IDConversion](#) menu provides a tool to convert between a MSU genomic locus and a RAPdb genomic locus.

[Batch query](#) is supported.

<http://funricegenes.ncpgr.cn/>



funRiceGenes   Gene   GeneFamily   Keyword   Publication   **IDConversion**   Download   Submit

\* Convert between *indica* and *japonica* gene IDs ?

☒ MSU Nipponbare   ☐ RAPdb Nipponbare   ☐ Minghui 63   ☐ Zhenshan 97

LOC\_Os03g57940

Result

Show 4 entries

Nipponbare.MSU	Nipponbare.RAPdb	Minghui 63	Zhenshan 97
<a href="#">LOC_Os03g57940</a>	<a href="#">Os03g0793500</a>	<a href="#">MH03g0701100</a>	<a href="#">ZS03g0736800</a>

Showing 1 to 1 of 1 entries

Previous 1 Next

Link to MSU      Link to RAPdb      Link to <http://rice.hzau.edu.cn/rice/>


The **IDConversion** menu also provides a tool to convert between *indica* and *japonica* gene IDs.


**Batch query** is supported.


<http://funricegenes.ncpgr.cn/>


\* Extract data using MSU genomic locus

One locus in one row

 Download locus information


 Download Keywords data


 Download literatures


 Download RiceNet data

\* Extract data using RAP genomic locus

One locus in one row

 Download locus information

 Download Keywords data

 Download literatures

The **Download** menu provides extracting of gene information using MSU genomic locus or RAPdb genomic locus.

\* Submit a new Genbank accession

Our database provides tools allowing **submission** of new information.

Gene symbol

Accession

Password

Submit

Clear

Currently, only our team members have permissions to submit new information.

\* Submit a new connection between genes

Gene symbol 1

Gene symbol 2

Title

Evidence

Password

Submit

Clear

\* Submit new phenotype and expression figures

Gene symbol

Password

Phenotype Figure

Browse...

No file selected

Expression Figure

Browse...

No file selected

Submit

Clear

<http://funricegenes.ncpgr.cn/>



Link to <https://funricegenes.github.io/>

# Part III

**Add new records to this database**

## What's new for 'rice alert' in PubMed ☆

发件人: My NCBI <efback@ncbi.nlm.nih.gov> 

时 间: 2017年9月12日(星期二) 上午8:00 (UTC-04:00 阿根廷、巴西时间)

收件人: ywhzau <ywhzau@gmail.com>

This message contains My NCBI what's new results from the National Center for Biotechnology Information. Do not reply directly to this message.

### Sender's message:

Daily email alert from PubMed

Sent on Tuesday, 2017 September 12

Search: (((rice[Title]) OR rice[Title/Abstract]) OR oryza[Title]) OR oryza[Title/Abstract]

[View](#) complete results in PubMed (results may change over time).

[Edit](#) saved search settings, or [unsubscribe](#) from these e-mail updates.

PubMed Results

Items 1 - 6 of 6

1. Plants (Basel). 2017 Sep 9;6(3). pii: E37. doi: 10.3390/plants6030037.

Impact of Silicon in Plant Biomass Production: Focus on Bast Fibres, Hypotheses, and Perspectives.

<https://www.ncbi.nlm.nih.gov/pubmed/24723033>

J Plant Res. 2014 May;127(3):423-32. doi: [10.1007/s10265-014-0631-5](https://doi.org/10.1007/s10265-014-0631-5). Epub 2014 Apr 11.

## Functional conservation of the glycosyltransferase gene GT47A in the monocot rice.

Zhang B<sup>1</sup>, Zhao T, Yu W, Kuang B, Yao Y, Liu T, Chen X, Zhang W, Wu AM.

### ⊕ Author information

#### Abstract

Glucuronoarabinoxylan is the major hemicellulose in grass cell walls, yet the mechanism of xylan synthesis in monocot plants is still unclear. Unraveling the genes involved in the biosynthesis of xylan in rice will be very important for the utilization of rice straw as a source of bioenergy in the future. In this report, we investigated the functional role of a rice gene homologous to Arabidopsis IRREGULAR XYLEM10 (IRX10), belonging to the glycosyl transferase (GT) gene family 47 (GT47), in the biosynthesis of xylan. The protein sequence of OsGT47A from rice exhibits a 93.49% similarity to IRX10, which is involved in the biosynthesis of glucuronoxylen in Arabidopsis. Phylogenetic analysis of the GT47 glycosyl transferase family in the rice genome revealed that OsGT47A is a closely related homolog of IRX10 and IRX10L. Expression pattern analysis showed that the OsGT47A gene is highly expressed in the rice stem. Overexpression of OsGT47A in the *irx10* *irx10L* double mutant rescued the plant growth phenotype and restored secondary wall thickness. Analysis of monosaccharides indicated that the rescued plants had levels of xylose identical to those of the wild type plants, and the fluorescence signals were restored in the complementation plants by xylan immunolocalization. The OsGT47A complementation under the native promoter of Arabidopsis IRX10L (ProIRX10L) partially rescued the double mutant, indicating that OsGT47A is functionally equivalent to IRX10L. Together, these results suggest that the IRX10 homolog OsGT47A exhibits functional conservation and is most likely involved in xylan synthesis in rice.

PMID: [24723033](https://pubmed.ncbi.nlm.nih.gov/24723033/) DOI: [10.1007/s10265-014-0631-5](https://doi.org/10.1007/s10265-014-0631-5)

We identified from the email alert a PubMed record ([24723033](https://pubmed.ncbi.nlm.nih.gov/24723033/)) which described the cloning of a rice gene (*OsGT47A*).

We further identified the genomic locus [LOC\\_Os01g70190](#) and [Os01g0926600](#) assigned by the MSU and the RAPdb database by manually searching of the full text of this paper at <https://link.springer.com/article/10.1007%2Fs10265-014-0631-5>.



funRiceGenes   Gene   GeneFamily   Keyword   Publication   IDConversion   Download   Submit

\* Query with a gene symbol or a genomic locus ?

☒ MSU Locus   ☐ RAPdb Locus   ☐ Gene Symbol

LOC\_Os05g06480

Information   Reference   Accession   Expression   Keyword   Connection   RiceNet

Show 1 entries

Symbol	RAPdb
Chalk5	<a href="#">Os05g0156900</a>

Showing 1 to 1 of 1 entries

\* Submit a new Gene or add new information for an existing gene

Gene symbol	MSU genomic locus	RAPdb genomic locus	Pubmed ID
OsGT47A	LOC_Os01g70190	Os01g0926600	24723033

Submit   Clear

Then go to <http://funricegenes.ncpgr.cn/>.

In the **Gene** menu, fill in the four cells "**Gene Symbol**", "**MSU genomic locus**", "**RAPdb genomic locus**" and "**Pubmed ID**" and click the "**Submit**" button.

Then the Shiny application will extract information on this gene from the publication and add all the information to this database.

Add new info successfully!

确定

Once succeeded, the Shiny application will give a popup message.

\* Query with a gene symbol or a genomic locus ?

☐ MSU Locus ☐ RAPdb Locus ☒ Gene Symbol

OsGT47A

Information Reference Accession Expression Keyword Connection RiceNet

Show 1 entries

Symbol	RAPdb
OsGT47A	<a href="#">Os01g0926600</a>

\* Query with a gene symbol or a genomic locus ?

☐ MSU Locus ☐ RAPdb Locus ☒ Gene Symbol

OsGT47A

Information Reference Accession Expression Keyword Connection

Show 1 entries

Title	Year	Journal	Abstract
<a href="#">Functional conservation of the glycosyltransferase gene GT47A in the monocot rice.</a>	2014	J Plant Res	Glucuronoarabinoxylan is the major hemicellulose genes involved in the biosynthesis of xylan in rice v investigated the functional role of a rice gene hom family 47 (GT47), in the biosynthesis of xylan. The biosynthesis of glucuronoxylan in Arabidopsis. Phy closely related homolog of IRX10 and IRX10L. Exp

Now, gene *OsGT47A* is included in this database!

If the [paper](#) on the cloning of a new gene was [not archived in PubMed](#), we can use other functionality of the [Shiny](#) application to submit this gene to the [funRiceGenes](#) database.

Submit basic information of the gene.

**\* Submit a new Gene or add new information for an existing gene**

Gene symbol	MSU genomic locus	RAPdb genomic locus	Pubmed ID	Pa
OsPPR676	LOC_Os03g11670	Os03g0215900		
Submit		Clear		

Submit publication on the gene.

**\* Submit a new publication**

Gene symbol	Title	Year	Journal	Affiliation	Abstract	Pa
OsPPR676	A Plasti	2017	Sci Rep	Institute of Crop Science	Several mitochondrial-ta	a
Submit		Clear				

## Part IV

Deploy the Shiny application on local computer

The content of the Shiny application (<http://funricegenes.ncpgr.cn/>) was deposited in Github (<https://github.com/venyao/RICENCODE>). You can deploy the Shiny application on local computer.

## Step 1: Install R and Rstudio

Before running the app you will need to have R and RStudio installed (tested with R 3.3.3 and RStudio 1.0.143).

Please check CRAN (<https://cran.r-project.org/>) for the installation of R. Please check <https://www.rstudio.com/> for the installation of RStudio.

## Step 2: Install the R Shiny package and other packages required by the Shiny application

Start an R session using RStudio and run these lines:

`# try http:// if https:// URLs are not supported`

`install.packages("shiny")`

`install.packages("shinythemes")`

`install.packages("shinyBS")`

`install.packages("RCurl")`

`install.packages("XML")`

`install.packages("stringr")`

`install.packages("plyr")`

### Step 3: Download the content of the Shiny application

Go to <https://github.com/venyao/RICENCODE>

Download the content of the Shiny application as a **ZIP** file.

venyao / RICENCODE

Unwatch 2 Unstar 4 Fork 9

Code Issues 0 Pull requests 0 Projects 0 Wiki Settings Insights

The knowledge of cloned rice genes lost in the information of rice functional genomics studies  
<https://funricegenes.github.io/>

rice-genes rice gene database shiny Manage topics

4,564 commits 2 branches 1 release 4 contributors

Branch: master New pull request

Create new file Upload files Find file Clone or download

venyao add new info for gene: OsGT47A

data	add new info for gene: OsGT47A
script	update write_md.R
toadd	delete files done
www	using new shiny version and theme

Clone with HTTPS Use SSH

Use Git or checkout with SVN using the web URL.

<https://github.com/venyao/RICENCODE.git>

Open in Desktop Download ZIP



## Step 4: Launch the Shiny application

Unzip the [ZIP](#) file downloaded in Step 3 into a directory (for example, /RICENCODE/).

Start an R session using RStudio and run these lines:

```
library(shiny)  
runApp("/RICENCODE/", launch.browser = TRUE)
```

The first parameter of [runApp](#) is the directory where the content of this Shiny application are stored. In this directory, you can find two R scripts [server.R](#) and [ui.R](#).

Then your browser will open the Shiny application.

