



Stress Combination and their Interactions in Plants (SCIP) Database

Website link- <http://www.nipgr.ac.in/SCIPdb.php>

Home

Provides various menus and submenus to navigate through SCIPDb

- [Slider](#) Representative images illustrating effect combined stress in plants
- [Phenomics](#) Option to mine the phenomics data.
- [Transcriptomics](#) Option to mine the transcriptomics data.
- [Statistics](#) Quantitative info about various data points hosted in SCIPdb.
- [Welcome to SCIP database](#) Brief introduction about database, and definition of important terms, pertaining to combined stress in plants

About

Provide various submenus listed below

- [FAQ](#) Hosts impotent FAQs related to SCIPDb.
- [Methodology- Phenome](#) Details steps for data collection, curation, and integration of phenomics data in SCIPDb.
- [Methodology- Transcriptome](#) Details steps for data collection, curation, and integration of transcriptomics data in SCIPDb.
- [Applications](#) List important applications of SCIPDb.
- [References & Links](#) Hosts important references and links pertaining to combined stress in plants.
- [Downloads](#) Hosts raw data files and references covered in this database. Also hosts teaching materials, like slides, posters, thesis.

Search

User based to search to mine data from SCIPdb

[Search phenomics dataset](#)

Search based on plant, stress combination, pathogen, parameter, author, year or keyword.

[Search transcriptomics dataset](#)

Search based on multiple gene ids, gene name, stress combination, pathway, plant.

SCIPDb

Submit

Submit data to SCIPDb

- [Submit phenomics dataset](#) Users can submit their data by making desired entries in google form hosted in this section.
- [Submit other omics dataset](#) They can also use the raw data file template provided to prepare their data, and mail to us.

Connect

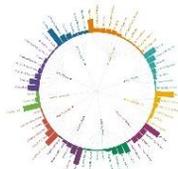
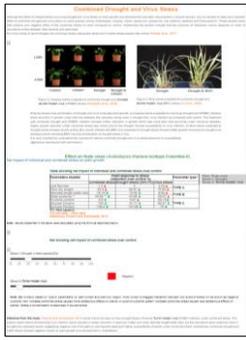
Details about contact information and other aspects

- [Reach Us](#) Provides contact information and information about recent news and events related to combined stress in plants.
- [Team members](#) Information about the team members.
- [Funding and Acknowledgement](#) Information about financial support and funding.
- [SCIP social](#) Link to various social networking sites that will host recent updates related to SCIP. It also hosts several videos and podcasts related to combined stress.

Help

Help pages for user's

- [Sitemap](#) Explanation about various sections of database.
- [User Guide](#) Help pages for various sections of database.
- [Video resouces](#) Videos on various aspects of combined stress in plants.



The net impact of stress combinations on plant performance

Impact of combined stress on agriculturally important traits and crops

Global distribution of stress combinations and their impact

Stress matrix depicting impact (+ve/-ve) of stress combinations

Data pages

Visualizations

Phenomics
Morphophysiological data

Home

Transcriptomics
RNA-seq & microarray data

DEGs table

Visualizations

Drought and nonhost pathogen stress in Thale cress
Genes common to all stresses (D, NH and DNH)
Search results matching your query

Show 10 entries

Search:

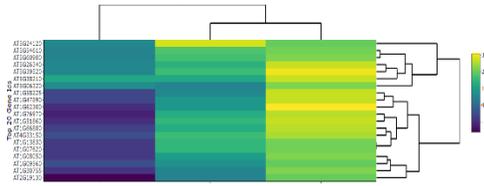
Sl.no.	Gene ID	Gene name	Transcript Fold change (FC)	Nature of change in expression	Pathway & metadata
1	AT1G62300	WRKY family transcription factor	NH:8.7; D:1.8 ; DNH: -2.1	Tailored response	KEGG Genes Link
2	AT5G39520	Protein of unknown function (DUF1997)	DNH: 3.1; NH: 1.50; D: 8.11	Similar expression/response under all stress	KEGG Genes Link
3	AT5G38210	Protein kinase family protein	DNH: 2.40; NH: 2.30; D: 6.68	Similar expression/response under all stress	KEGG Genes Link
4	AT1G51860	Leucine-rich repeat protein kinase family protein	DNH: 6.70; NH: 2.90; D: -1.90	Tailored response	KEGG Genes Link
5	AT1G47890	Receptor like protein 7	DNH: 6.60; NH: 1.80; D: -1.50	Tailored response	KEGG Genes Link
6	AT1G58225	NA	DNH: 6.50; NH: 1.50; D: -1.50	Tailored response	KEGG Genes Link
7	AT5G26340	Major facilitator superfamily protein	DNH: 2.70; NH: 1.50; D: 6.40	Similar expression/response under all stress	KEGG Genes Link
8	AT1G76970	Target of Myb protein 1	DNH: 6.10; NH: 2.40; D: -2.30	Tailored response	KEGG Genes Link
9	AT1G66880	Protein kinase superfamily protein	DNH: 6.00; NH: 2.50; D: -1.60	Tailored response	KEGG Genes Link
10	AT4G33150	Lysine-ketoglutarate reductase/saccharopine dehydrogenase bifunctional enzyme	DNH: 5.60; NH: 3.00; D: -1.40	Tailored response	ath00310-Lysine degradation; ath01100-Metabolic pathways; ath01110-Biosynthesis of secondary metabolites

Showing 1 to 10 of 20 entries

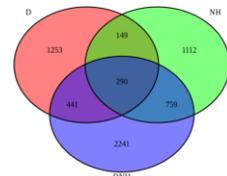
Previous 1 2 Next

Platform	Plant	Stress	GEO/SRA IDs	Publication
Gene Chip Gene 1.0ST, Cat#901915, Affymetrix, California, USA	Arabidopsis thaliana ecotype Col-0 (accession number#CS70000)	Drought1 - 40% FC & pathogen- Pseudomonas syringae pv. tabaci (Pta)- 3x10000000 CFU/mL, 5x10000000 CFU/mL and 2x100000000 CFU/mL	GSE79681	Choudhary et al., 2017

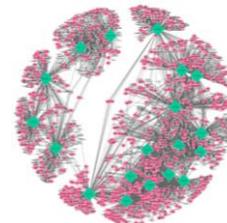
[View Heat Map](#) [View Venn diagram](#) [Download complete results](#)



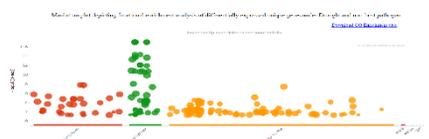
Heatmap



Venn diagram



Co-expression network



Manhattan plot

About

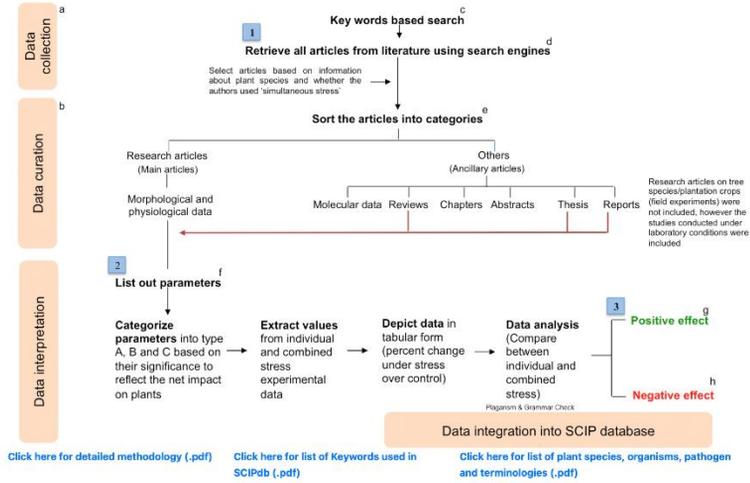
FAQ

Methodology-phenome

SCIP database - FAQ

- 1. What is SCIPdb (Stress Combination and their interaction in Plants)?
- 2. What are the different datasets hosted in SCIPdb?
- 3. Is the data in the SCIPdb public?
- 4. What information does SCIPdb provide related to combined stresses?
- 5. What can be downloaded from the database?
- 6. How to download the data in SCIPdb?
- 7. How is the literature mining, sorting, and data analysis done?
- 8. Can I submit my data to SCIPdb?
- 9. What is the copyright information about data hosted in SCIPdb?
- 10. How to contact the authors?

Outline of methodology

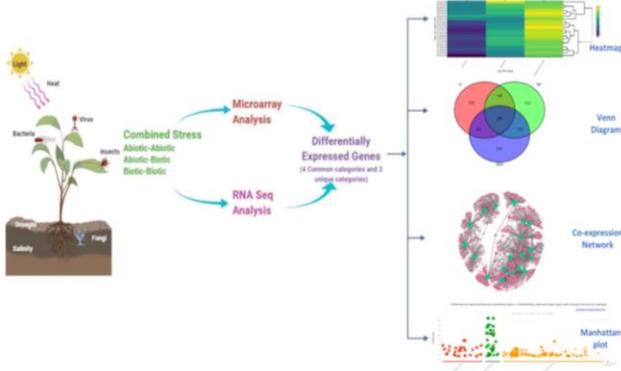


Methodology-transcriptome

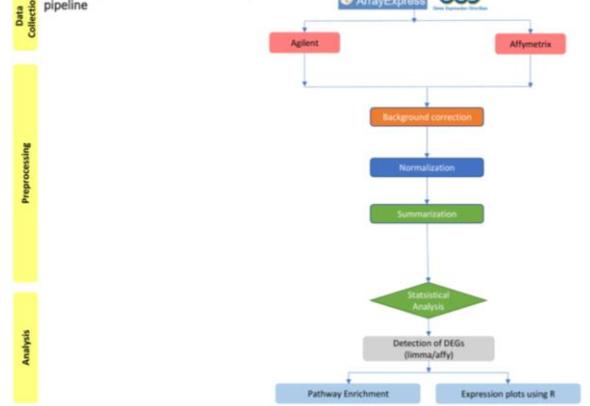
SCIP database - Transcriptome data analysis

This section depicts steps followed to compile, curate and analyse the transcriptome combined stress data. It also illustrates the downstream analysis done and different visualizations developed for each of the transcriptome studies.

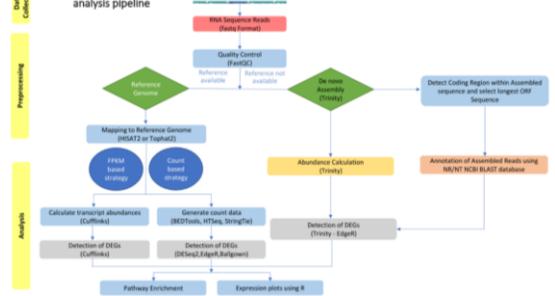
Transcriptome profiling of combined stress data



Microarray combined stress data analysis pipeline



RNA Seq combined stress data analysis pipeline



Applications

SCIP database - applications

Phenome

- Plant performance**
- 1. What is the effect of stress combinations on plant performance? Which is the most and least deleterious stress combination which showed a reduction in plant performance?
 - 2. What are plant species which showed the least reduction in plant performance under combined stresses?
- Pathogen**
- 3. What are the most and least deleterious stress combinations which cause diseases in plants?
 - 4. What are the plant species which showed higher and lower disease incidence?
 - 5. What is the effect of abiotic stress on pathogen incidence?
 - 6. Which combination inhibits pathogen-induced disease incidence to greatest extent, and which one favors disease incidence?
- Physiology**
- 7. What is the effect of different stress combinations on photosynthesis?
 - 8. What are the stress combinations and plant species which show a significant reduction in photosynthesis?
 - 9. What is the effect of different stress combinations on stomatal conductance?
 - 10. What is the effect of different stress combinations on chlorophyll content?

References & links

SCIP database- reference and links

IMPORTANT PUBLICATIONS

- [Combined stress reviews](#)
- [Choudhary et al., 2022](#)
- [Zandalinas et al., 2021](#)
- [Zandalinas et al., 2020](#)
- [Gupta et al., 2017](#)
- [Zhang and Sonnewald, 2017](#)
- [Shaar-Moshe et al., 2017](#)
- [Gupta et al., 2017](#)
- [Barah et al., 2016](#)
- [Coolen et al., 2016](#)

STEP I : CATEGORY:

Choose a Category:

STEP II: SUBCATEGORY:

Choose a Subcategory:

IMPORTANT LINKS

- **Web resources and Databases**
 - [Bioristor tool for early drought stress detection](#)
 - [Combined water & nutrient stress in tomato](#)
 - [Plant Stress](#)
 - [Stress Combination](#)
 - [STIF-DB V2](#)
- **Journals special issues**
 - [Frontiers in plant science special issue- "Biological Mechanisms of Plant Interactions With a Combination of Biotic and Abiotic Stresses"](#)
 - [Journal of experimental botany](#)

This section comprises list of research articles used in developing phenome data pages along with other related articles such as reviews, thesis and reports. The section provides comprehensive information on each stress combinations and can help identifying most prominent stress combination affecting crop growth. It can also helps the researchers in ranking the stress combination based on their prominence and intensity of occurrence. Desired articles can be accessed either by selecting particular stress combination category and respective name directly from the drop down based selection or by using key word based search given on the "Search" page. Articles which are freely accessible a 'Pub-Med' link is provided to download. Important web links of labs and scientists working in the area of combined stress, important books and articles pertaining to combined stress are provided separately. This will be updated periodically.

A customised keyword-based option for search within references is can be done from [here](#). Users can use this option to pull-out the desired article by entering specific keywords like author name, year of publishing, stress name and others.

Downloads

SCIP database- downloads

This section catalogs entire list of raw data files and references covered in this database. It acts as a comprehensive resource for scientific community working in the area of combined stress. From plant breeders point of view, studies related to genotypes characterization under stress are provided under each stress sections. A compiled study material is also provided separately which can be used for teaching purpose.

Research materials (Included as omics dataset in SCIP)

- Combined stress (Simultaneous)
 - [Raw data files](#)
 - [References](#)
 - [Genotype study](#)
- Combined stress (Sequential)
 - [Raw data files](#)
 - [References](#)
 - [Genotype study](#)
- Transcriptome: Mutant studies
 - [Transcriptome analysis of Arabidopsis mutants suggests a crosstalk between ABA, ethylene and GSH against combined cold and osmotic stress](#)
[Download raw data files](#)
 - [Transcriptomic Profiling of Arabidopsis thaliana Mutant pad2.1 in Response to Combined Cold and Osmotic Stress](#)
[Download raw data files](#)
 - [Dual impact of elevated temperature on plant defence and bacterial virulence in Arabidopsis](#)
[Download raw data files](#)

Academic teaching materials (Referred in SCIP)

- Thesis
 - [Evaluation of combined effects of heat and drought stress during seed filling in lentil lens culinaris medik genotypes](#)
 - [Physiology of mungbean \[Vignaradiata\(L.\)Wilczek\] under salt and high temperature stress condition](#)
 - [Impact of climate related multiple stresses on Soybean](#)
 - [Physiological Responses Of Indian Mustard \(Brassica Juncea L\) To Interactive Effects Of Water Deficit And Salt Stress](#)
 - [Effect of waterlogging, salinity and their interaction on growth, oxidative and carbohydrate metabolism in pigeonpea \(Cajanus cajan L. Millsp.\) genotypes](#)
 - [Physiological Studies On The Interactive Effects Of Waterlogging And Alkalinity On Growth And Development Of Wheat \(Triticum Aestivum L.\)](#)
- Other materials
 - [Posters](#)
 - [Protocols](#)
 - [Slides](#)
 - [Author's repository](#)

Search

SCIP database- search

This section provides extensive search options for users to mine the phenomics and transcriptomics data hosted in SCIP database.

Search Phenomics dataset

Select category

Enter data :

Submit

Search Transcriptomics dataset

Select category

Enter data :

Submit

II. Search by Sequence (input sequence in Fasta Format):

Provides an option for search by sequence of interest using blastx or blastp server.

STEP I : PASTE YOUR SEQUENCE (Maximum 10 sequences): [See an Example](#)

Autofill this form

Select BLAST program :

Help

SCIP database- Help pages

Site map

This section provides user's with a detailed tutorial on browsing and mining combined stress data from Stress Combination and their Interaction in Plants (SCIP) database.

Tutorial

1. How to search and mine phenomics data?

2. How to navigate and understand the visualizations of phenomics data?

2. How to search and mine transcriptomics data?

4. How to navigate and understand the visualizations of transcriptomics data?

5. How to navigate through various menus of SCIPDb?

User guide

SCIP database - Sitemap

Home

Provides various menus and submenus to navigate through SCIPDb.

- Slider
- Phenomics
- Transcriptomics
- Statistics
- Welcome to SCIP database

Representative images illustrating effect combined stress in plants.
Option to mine the phenomics data.
Option to mine the transcriptomics data.
Quantitative info about various data points hosted in SCIPDb.
Brief introduction about database, and definition of important terms, pertaining to combined stress in plants.

About

Provide various submenus listed below

- FAQ
- Methodology- Phenome
- Methodology- Transcriptome
- Applications
- References & Links
- Downloads

Hosts important FAQs related to SCIPDb.
Details steps for data collection, curation, and integration of phenomics data in SCIPDb.
Details steps for data collection, curation, and integration of transcriptomics data in SCIPDb.
List important applications of SCIPDb.
Hosts important references and links pertaining to combined stress in plants.
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Search based on multiple gene ids, gene name, stress combination, pathway, plant.

Submit

Submit data to SCIPDb.

- Submit phenomics dataset
- Submit other omics dataset

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They can also use the raw data file template provided to prepare their data, and mail to us.

Connect

Details about contact information and other aspects

- Reach Us
- Team members
- Author repository
- SCIP social

Provides contact information and information about recent news and events related to combined stress in plants.
Information about the team members.
Information about the scientists and researchers working in the area of combined stress.
Link to various social networking sites that will host recent updates related to SCIP. It also hosts several videos and podcasts related to combined stress.

Help

Help pages for user's

- Sitemap
- User Guide
- Video resources

Explanation about various sections of database.
Help pages for various sections of database.
Videos on various aspects of combined stress in plants.

[Click here for SCIP database tutorial \(.pdf\)](#)

Video resources

SCIP database- Video Resources

Video 1: Role of Bioinformatics in understanding combined stress tolerance in plants

Contributed by: Piyush Priya and Muthappa Senthil-Kumar*



Piyush Priya | Muthappa Senthil-Kumar

National Institute of Plant Genome Research,
Arava Araf All Maru, Hite Durg,
Gannavaram - 500045, Telangana
http://www.nipgr.ac.in | www.nipgr.org

Video 1: Role of Bioinformatics in understanding combined stress tolerance in plants

Video 2: The need for shifting focus from single stress studies to studying stresses in combination

Contributed by:



Video 2: The need for shifting focus from single stress studies to studying stresses in combination

Connect

Reach us

Contact Us

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Website : [Lab Page](#)
Link : <http://www.nipgr.ac.in/scipdb.php>



NEWS and EVENTS

- Research grants**
 - "Stress combination: Bridging the gap between Arabidopsis stress research and agriculture".
 - "Impact of heat and drought stress on sorghum and wheat grain composition and chemistry".

[Find us on Facebook](#)
[Find us on Scoop.it](#)
[Follow us on Youtube](#)
[Follow us on Twitter](#)
[Follow us on Researchgate](#)

SCIP social

SCIP database- social networking sites

This section provides the users to listen to our podcasts and connect with us through below mentioned social networking sites and get the latest updates, highlights and news related to SCIP database.

Connect with us on



Listen to our podcasts



Team members

Team Members

This database is developed and maintained by [Muthappa Senthil-Kumar](#) research group at National Institute of Plant Genome Research (NIPGR), New Delhi, India.

Muthappa Senthil-Kumar



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 National Institute of Plant Genome Research (NIPGR)
 New Delhi, India

View Publications

Piyush Priya



CSIR-Senior Research Associate (Scientist-Pool)
 NIPGR

Maresh Patil



CSIR-Senior Research Associate (Scientist-Pool)
 NIPGR

Prachi Pandey



Research associate III
 NIPGR

Anupriya Singh



Senior Research Fellow
 NIPGR

Vishnu S Babu



Project Associate I
 NIPGR

Jyoti Singh



Senior Research Fellow
 NIPGR

For further details [Visit Lab Website](#)

Funding and Acknowledgement

Funding & acknowledgement

Financial support



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We sincerely acknowledge the inputs made by the following lab members (in the order of surname alphabet)

Uppendra Bhatle Junior Research Fellow, NIPGR	Siva Shanmugam NR Post Graduate Trainee, NIPGR	Ravi Arunraj Visiting Scientist, NIPGR	Priya Chandra Post Graduate Trainee, NIPGR
Christina Nilofar Project Assistant I, NIPGR	Rahul Kumar Tiwari Visiting Scientist, NIPGR	Arya Das Post Graduate Trainee, NIPGR	Anjagam Paramangantham Junior Research Fellow, NIPGR
Zahoor Ahmad Visiting Scientist, NIPGR	Gayatri Krishna Under Graduate Trainee, NIPGR	Reema Prajapati Junior Research Fellow, NIPGR	

We sincerely acknowledge the following scientists for their critical comments during SCIPDb development (in the order of surname alphabet)

Gopajee Iha Scientist, NIPGR, India	Saurabh Raghuvamshi Professor, UOES, Delhi, India	Jyothilakshmi Vadaceery Scientist, NIPGR, India	Guna Nachimuthu Senior Research Scientist, NSW, Australia
Aashish Ranjan Scientist, NIPGR, India	Ramegowda Venkategowda Ramanujan Fellow, UOES, India	Sam Periyannan Research Scientist, CSIRO, Australia	Sanjati Srinharoy Scientist, NIPGR, India

We sincerely acknowledge the following tools and resources used in SCIPDb development

Copyright SCIPDb 2022

Submit

SCIP database- submit combined stress data

This section provides users with an option to submit combined stress data pertaining to Phenome and Transcriptome to Stress Combination and their Interaction in Plants (SCIP) database. Submitter's will be duly acknowledged.

Options to submit data to SCIP

1. Prepare and submit your data using following google form

Please submit your dataset using this [data submission form](#).

2. Prepare your data using following template (optional)

You can prepare your dataset [this template](#).

1) Download the [blank template file](#) (xlsx format).

2) Prepare tables according to the template. If you have any question related to dataset preparation, please contact us (scipdatabase@nipgr.ac.in).

3) Please send your dataset to (scipdatabase@nipgr.ac.in).



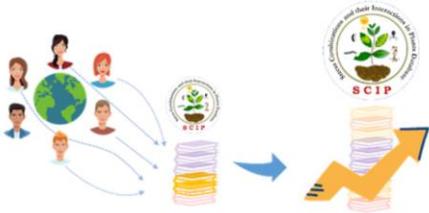
Submission of new data pertaining to combined stress

This form is designed to encourage and enable enthusiastic researchers in the field of combined stress to present their interesting observations and research papers related to combined stresses on SCIPdb platform. Users can choose to upload their research paper and related data or images to enrich the database. Their contribution to the database will help in the growth of database and enrich the knowledge of combined stress for the scientific fraternity. The purpose of this activity is to help enhance sharing of scientific knowledge for the benefit of the scientific community.

The name and photo associated with your Google account will be recorded when you upload files and submit this form

*** Required**

SCIPdb_ share and grow



Email of the submitter *

Your answer _____

Title of Publication *

Your answer _____

Name of the plant species studied *

Please provide the details of the cultivars, if available.

Your answer _____