

Microarray Experiments

Microarray GAL
Microarray GPR
Microarray Images

The current implementation of data management support in the MicroAqua website includes .gal, .gpr & image file upload and parsing of file associated data to populate the current MicroAQUA database for better visualization, handling and further analysis of Microarray data.

Following are the steps to operate the utility on MicroAqua internal website (<http://bioaqua1.microaqua.eu/signin>):

Prerequisite: before proceeding to create a *Microarray Experiment* record, it is required to save all oligos, utilized in the microarray experiment, in MicroAqua database. It can be done manually (from *Oligo Sequence* section) or by utilizing "*Batch file upload*" functionality (refer to the help guide).

All Microarray associated modules come under "*Microarray Experiment*" section, consisting of sections: Microarray GAL, Microarray GPR, Microarray Image, Microarray Analysis and Microarray Validations.

The Microarray Experiment section displays records of individual experiments performed on samples (from Filter Sample table) utilizing oligos (from Oligo Sequence table). One microarray experiment uses one .gal file, providing information about spots positioning on array chip, and produces image files and one result file, the .gpr file.

The microaqua internal website, backed by a database, supports the management of the data files (both .gal and .gpr) and images produced from the scanner.

This document will explain how to handle the data files using MicroAqua internal website.

1. Microarray Experiment section displays records showing unique experiment ID, unique GAL and GPR code, partner code, date of microarray experiment and scanner image associated with the particular experiment.

Microarray experiments

New microarray experiment

List of Microarray experiments: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

Microarray exp. code	Filter sample	GAL code	Partner	GPR code	Exp. date	Image	Edit

Unique microarray experiment code assigned to individual microarray experiment

Filter sample code displaying sample utilized in microarray experiment

Unique GAL code assigned to individual uploaded .gal file

Partner code

Unique GPR code assigned to individual uploaded .gpr file

Microarray experiment date

Image associated with individual microarray experiment

Edit Microarray experiment

2. To create a microarray experiment record, the related GAL file must first be uploaded. Everytime a new file is uploaded, the resulting page will ask user to upload the other related files. Once the files are uploaded and automatically parsed in the database, the entries are available and must be associated with each other in the "New Microarray Experiment" page.

The screenshot shows the 'Microarray experiments' page. At the top, there is a navigation bar with links: 'Internal site', 'External site', and 'Reports'. Below this is a sub-navigation bar with links: 'Sampling site', 'Sampling', 'Filter sample', 'Nucleic acid', 'Oligo sequence', and 'Microarray experiments'. A red banner message states: 'No microarraygal found! create first someone...'. Below the banner, there is a green checkmark icon and a message: 'New microarray experiment cannot be created without uploading .gal, .gpr & microarray images. User has to proceed from Microarray .GAL subtable'. A red arrow points to the 'New microarray experiment' link, with a red 'X' over it and a message: 'Dont click on "New microarray experiment" first to create a new microarray experment record.'.

Microarray experiments

New microarray experiment

List of Microarray experiments: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

Microarray exp. code	Filter sample	GAL code	Partner	GPR code	Exp. date	Image	Edit
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3. Click on the "New microarraygal" link.

The screenshot shows the 'Microarray Spots Information (.GAL)' page. At the top, there is a navigation bar with links: 'Internal site', 'External site', and 'Reports'. Below this is a sub-navigation bar with links: 'Sampling site', 'Sampling', 'Filter sample', 'Nucleic acid', 'Oligo sequence', and 'Microarray experiments'. Below the sub-navigation bar, there is a message: '**Tables with in Microarray .GAL module' with a red arrow pointing to a sub-navigation bar with links: 'GAL file header', 'GAL block information', and 'GAL oligo information'. Below this, there is a green box with the text 'New microarraygal' and a red arrow pointing to it with the text 'Upload new microarray .gal file'.

Microarray Spots Information (.GAL)

New microarraygal

List of .gal files: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

GAL code	Partner	GAL title	Barcode	Upload date	edit
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4. Provide a partner barcode (internal name, if any), browse and upload a file. Once the file is uploaded, data are automatically parsed and loaded in the MicroAqua database. The "New microarraygpr" page will pop up to aid in .gpr upload. Follow the same procedure for uploading .gpr file and then for microarray image files produced from GenePix software, modified from Tiff image obtained from the scanner.

(i)

The screenshot shows the 'New Microarray *.GAL File' form. At the top, there is a header with the MicroAqua logo, a user profile for 'partner1', and navigation links: 'Internal site', 'External site', and 'Reports'. Below this is a secondary navigation bar with links: 'Sampling site', 'Sampling', 'Filter sample', 'Nucleic acid', 'Oligo sequence', and 'Microarray experiments'. A third navigation bar contains links: 'Microarray .GAL', 'Microarray .GPR', 'Microarray Images', 'Microarray Analysis files', and 'Microarray Validations'. The main title is 'New Microarray *.GAL File'. Below the title is a 'Back' link and a 'Create' button (highlighted with a green box). To the right of the 'Create' button is the text 'Create a new gal record'. The form is divided into a 'General data' section. It contains fields for 'Partner' (dropdown menu with '1 - UniCam'), 'Code' (dropdown menu with 'UniCam'), 'Partner barcode' (text input with 'miqua_toxine'), 'Load the GAL file' (text input with '/home/kumar/Downloads/MicroAQUA_microar' and a 'Browse...' button), and 'Uploaded at' (date selector with '2013', 'February', and '18'). A red arrow points to the 'Browse...' button with the text 'Browse your local computer filesystem to select the .gal file'. At the bottom, there is a 'Note' section with a text input field.

(ii)

The screenshot shows the 'New microarray .GPR' form. At the top, there is a header with the MicroAqua logo, a user profile for 'partner1', and navigation links: 'Internal site', 'External site', and 'Reports'. Below this is a secondary navigation bar with links: 'Sampling site', 'Sampling', 'Filter sample', 'Nucleic acid', 'Oligo sequence', and 'Microarray experiments'. A third navigation bar contains links: 'Microarray .GAL', 'Microarray .GPR', 'Microarray Images', 'Microarray Analysis files', and 'Microarray Validations'. A yellow banner at the top of the form area says 'Microarray GAL file is successfully saved. Upload GPR file or Create new Microarray Experiment by associating your GAL file!!!'. The main title is 'New microarray .GPR' (highlighted with a green box). Below the title is a 'Back' link and a 'Create' button. To the right of the 'Create' button is the text 'Creating a gal record will take the user to the new microarray .gpr page where user can upload .gpr file. Files can be loaded individually from their respective sections.' The form is divided into a 'General data' section. It contains fields for 'Partner' (dropdown menu with '1 - UniCam'), 'Code' (dropdown menu with 'UniCam'), 'Load the gpr file' (text input with '/home/kumar/Downloads/MicroAQUA_microar' and a 'Browse...' button), and 'Uploaded at' (date selector with '2013', 'February', and '18'). A red arrow points to the 'Browse...' button with the text 'Browse your local computer file system to select the .gpr file'. At the bottom, there is a 'Note' section with a text input field.

5. On the "New Microarray image" page, user has to fill the relevant information about images and then click "Upload images". If clicked once, one file upload tag will appear. If clicked twice, two upload tags will appear and so on. Maximum three microarray images can be uploaded.

The basename of the image file will be utilized in the unique image code for individual image records.

6. Once the image file upload is finished, the page will be directed back to the "New Microarray Experiments" page where all the uploaded files can be associated together in one microarray experiment. Also, the sample utilized (from filter sample) can be associated with the performed microarray experiment.

7. Once the "Create" button is clicked, a new record is created for a microarray experiment, displaying all the associated files together in one row, on the index page of "Microarray Experiment" section.

The oligos utilized in this microarray experiment can be seen by clicking on the "+" sign, available at the beginning of each row.

The small displayed microarray image can be magnified by clicking on it. Generally, the displayed image is the first image of the "Microarray image" entry.

New experiment is successfully created (You can check the oligos, used in this experiment, by clicking on the "+" sign on individual experiments row!!!)

Microarray .GAL Microarray .GPR Microarray Images Microarray Analysis files Microarray Validations

Microarray experiments

New microarray experiment

List of Microarray experiments: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

	Microarray exp. code	Filter sample	GAL code	Partner	GPR code	Exp. date	Image	Edit
-	1	E01-130219-01	P03-110621-01-F01	GAL-1-UniCam-maqua_toxine-20130218165630	1 - UniCam	GPR-1-UniCam-20130218170646	2013-02-19	 Clickable image

Oligo Name edit

- McyB277M
- McyE445MA
- NdaH49232Nodspu
- gvpC7P
- McyA26MAP
- AoaB36638AphC
- McyA26MAP
- McyC1354M
- 16SrRNACy11267
- NdaG48367Nodspu
- McyB3253Ma
- McyB1032Ma
- McyE114Nod
- NdaE37248Nodspu

List of oligos utilized in that particular microarray experiment



8. The data parsed from the file are available in the sections under Microarray Experiment (Sub tables). Microarray GAL index page displays unique gal code, assigned to individual uploaded file, which differentiates between gal files.

partner1

Internal site External site Reports

Sampling site Sampling Filter sample Nucleic acid Oligo sequence Microarray experiments

Microarray .GAL Microarray .GPR Microarray Images Microarray Analysis files Microarray Validations

GAL file header GAL block information GAL oligo information

Microarray Spots Information (.GAL)

New microarraygal

List of .gal files: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

	GAL code	Partner	GAL title	Barcode	Upload date	edit
1	GAL-1-UniCam-maqua_toxine-20130218165630	1 - UniCam	20130218165630 µ-aqua_Toxine_17092012.gal	maqua_toxine	2013-02-18	edit
2	GAL-2-UniCam-maqua_toxine_2-20130218172847	1 - UniCam	20130218172847 µ-aqua_Toxine_mod.gal	maqua_toxine_2	2013-02-19	edit
3	GAL-3-UniCam-maqua_toxine_3-20130218173743	1 - UniCam	20130218173743 µ-aqua_Toxine_modII.gal	maqua_toxine_3	2013-02-19	edit

9. The header, block and spot coordinates data are available in sub tables of "Microarray GAL". These data can be edited by clicking on the last column of individual record.

Microarray GAL file Header information

GAL file header information: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

	GAL ID	ATF Version	Rows#	Columns#	Block#	Block Type	Supplier	Upload date	edit
1	1	1	25	40	4	0	Scienion	2013-02-18 23:56:30 UTC	
2	2	1	25	40	4	0	Scienion	2013-02-19 00:28:47 UTC	
3	3	1	25	40	4	0	Scienion	2013-02-19 00:37:43 UTC	

GAL file block information: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

	GAL ID	Block#	xOrigin	yOrigin	Feature Diameter	xFeature	xSpacing	yFeature	ySpacing	Upload date	edit
1	1	Block:1	7000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
2	1	Block:2	22500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
3	1	Block:3	38000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
4	1	Block:4	53500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
5	2	Block:1	7000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
6	2	Block:2	22500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
7	2	Block:3	38000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
8	2	Block:4	53500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
9	3	Block:1	7000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
10	3	Block:2	22500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
11	3	Block:3	38000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
12	1	Block:1	7000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
13	1	Block:2	22500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
14	1	Block:3	38000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
15	1	Block:4	53500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
16	2	Block:1	7000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
17	2	Block:2	22500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
18	2	Block:3	38000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
19	2	Block:4	53500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
20	3	Block:1	7000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
21	3	Block:2	22500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
22	3	Block:3	38000	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	
23	3	Block:4	53500	6650	200	25	300	40	300	2013-02-18 23:56:30 UTC	

List of oligos in GAL file: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

	GAL code	Array Information	Oligo Name	Upload date	edit
1	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:1-Column:1	SxtA4813AphAL	2013-02-18 23:56:30 UTC	
2	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:2-Column:1	McyA169P	2013-02-18 23:56:30 UTC	
3	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:3-Column:1	16S/rRNAChrOsc492	2013-02-18 23:56:30 UTC	
4	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:4-Column:1	McyB3253Ma	2013-02-18 23:56:30 UTC	
5	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:5-Column:1	McyE436Nod	2013-02-18 23:56:30 UTC	
6	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:6-Column:1	McyB449M	2013-02-18 23:56:31 UTC	
7	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:7-Column:1	McyC226M	2013-02-18 23:56:31 UTC	
8	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:8-Column:1	NdaI51028Nodspu	2013-02-18 23:56:31 UTC	
9	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:9-Column:1	AoaB36638AphC	2013-02-18 23:56:31 UTC	
10	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:10-Column:1	16SAph657	2013-02-18 23:56:31 UTC	
11	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:11-Column:1	McyE440M	2013-02-18 23:56:31 UTC	
12	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:12-Column:1	McyD712Ma	2013-02-18 23:56:31 UTC	
13	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:13-Column:1	McyB2134P	2013-02-18 23:56:31 UTC	
14	GAL-1-UniCam-maqua_toxine-20130218165630	Block:1-Row:14-Column:1	16SRNAOscI522	2013-02-18 23:56:31 UTC	

10. The .gpr file is a result of analysis performed on scanner image files and consist of spot intensity data. The raw .gpr file, like .gal file, can be divided in to two sections, the header and the data. These information is available in different sub tables of "Microarray GPR".

Microarray Experiment Data (.GPR)

New microarray GPR

List of .gpr files: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

	GPR code	Partner	GPR title	Barcode	Upload date	edit
1	GPR-1-UniCam-20130218170646	1 - UniCam	20130218170646 Toxin_2_rotated_1-3_cod.gpr		2013-02-19	
2	GPR-2-UniCam-20130218172905	1 - UniCam	20130218172905 Toxin_2_rotated_2-3_cce.gpr		2013-02-19	
3	GPR-3-UniCam-20130218173757	1 - UniCam	20130218173757 Toxin_2_rotated_3-3_Nod.gpr		2013-02-19	

11. The data available/displayed can also be edited and modified.

Microarray .GAL Microarray .GPR Microarray Images Microarray Analysis files Microarray Validations

GPR file header GPR results

Microarray .GPR File Header Data

GPR file header information: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

GPR ID	Version	Type	Date	Settings	Pix Size	Wavelength	Norm. method	Norm. factors	Std. dev.	Ratio formulation	Feature type	Barcode	Background sub.	Image Ori.	Jpeg Ori.	Creator	Sc
1	1	GenePix Results 3	2012/10/19 14:*	"	5	635 532	None	1 1	Type 1	W1/W2 (635/532)	Circular	"	LocalFeature	2080, 4440	200, 504	GenePix Pro 5. Ge	
2	1	GenePix Results 3	2012/10/19 14:*	"	5	635 532	None	1 1	Type 1	W1/W2 (635/532)	Circular	"	LocalFeature	2080, 4440	200, 504	GenePix Pro 5. Ge	
3	1	GenePix Results 3	2012/10/19 14:*	"	5	635 532	None	1 1	Type 1	W1/W2 (635/532)	Circular	"	LocalFeature	2080, 4440	200, 504	GenePix Pro 5. Ge	

Data in a GPR file: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

GPR code	Array Information	X	Y	Diameter	F635 me	F635 me	F635 SD	F635 CV	B635	B635 me	B635 me	B635 SD	B635 CV	% B635 +	% B635 +	F635 % s	F632
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:1-Oligo:SxtA4813AphAL	2990	5445	200	378	380	83	21	419	419	426	122	28	2	0	0	447
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:2-Oligo:gvpC415P	3290	5445	200	393	397	82	20	429	429	443	138	31	2	0	0	437
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:3-Oligo:16SRNAOscil522	3600	5455	165	36136	26324	13242	50	448	448	488	169	34	100	100	0	465
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:4-Oligo:AoaC26787AphC	3890	5445	200	379	360	230	63	439	439	456	121	26	2	0	0	450
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:5-Oligo:NdaB5804Hodspu	4190	5445	200	381	384	89	23	432	432	443	99	22	5	0	0	456
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:6-Oligo:16SApha657	4495	5450	155	41854	29055	16462	56	440	440	480	162	33	100	100	0	428
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:7-Oligo:16SrR589P	4790	5445	200	400	404	84	20	427	427	443	115	25	5	0	0	484
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:8-Oligo:16SApha647	5100	5445	100	835	840	131	15	432	432	436	79	18	99	98	0	368
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:9-Oligo:McyE617M	5390	5445	200	375	378	88	23	430	430	438	246	56	0	0	0	451
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:10-Oligo:McyA191P	5690	5445	200	390	394	82	20	425	425	430	105	24	4	0	0	480
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:11-Oligo:McyE783A	5990	5445	200	394	391	100	25	430	430	434	78	17	10	1	0	472
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:12-Oligo:McyC1022A	6290	5445	200	382	389	86	22	429	429	433	84	19	7	0	0	483
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:13-Oligo:16SrR718N	6590	5445	200	396	400	87	21	425	425	430	108	25	4	0	0	491
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:14-Oligo:McyB2097P	6890	5445	200	373	373	89	23	421	421	425	99	23	5	0	0	453
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:15-Oligo:McyE223M	7190	5445	200	312	318	70	22	423	423	434	101	23	0	0	0	367
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:16-Oligo:McyC3366A	7490	5445	200	383	381	86	22	417	417	420	72	17	10	1	0	455
GPR-1-UniCam-20130218170646	Block-1-Row:1-Column:17-Oligo:McvA1703Ma	7790	5445	200	367	369	85	23	415	415	418	72	17	7	1	0	448

NOTE: The uploaded files can be downloaded at anytime from the microaqua server by clicking on the first column of the grid/index which usually displays all the information related to that entry.

12. The index page of the "Microarray Image" section displays unique code generated for individual entry and also shows other related information. Each individual image entry can have maximum 3 images, available from the "Details" column (first column of the grid). The images can be replaced and entries can be modified from the "Edit" column.

Internal site External site Reports

Sampling site Sampling Filter sample Nucleic acid Oligo sequence Microarray experiments

Microarray .GAL Microarray .GPR Microarray Images Microarray Analysis files Microarray Validations

Microarray Images

Upload new image file

List of microarray image files: you can filter (using the lens icon in the bottom of the grid), sort (clicking on the header column), scroll the data in the grid (using the pagination system)

Details	Image Code	Name	Image ID	Channel	Status	Upload date	ed
1	MG-1-UniCam-2-A1-01a_R1	PTR1_image1	2	multiple	True	2013-02-19 00:23:56	
1	MG-2-UniCam-2-A1-01a_W1	PTR1_image2	3	multiple	True	2013-02-19 00:30:57	
1	MG-3-UniCam-2-A1-01a_W2	PTR1_image3	13	multiple	True	2013-02-19 00:39:24	

Displays information on individual records

Unique Image code

Replace image files or modify image data