

Table 1 Suppl. Differentially expressed circRNAs which sponge miRNAs.

Parent gene id	Circ id	Target gene	Function	Number of DE circRNAs which sponge miRNA at each step of cluster development					
				first step up reg	down reg	second step up reg	down reg	third step up reg	down reg
VIT_00s0733g00010	Un:34796646-34797004	vvi-miR156a	<i>SPL9</i>	4	3	1	2	8	6
VIT_06s0004g03550	6:4445200-4445532		squamosa promoter binding protein-like 9						
VIT_19s0014g01710	19:1836124-1882860								
VIT_05s0062g00980	5:19573623-19602661								
VIT_17s0000g05090	17:5578522-5598882								
VIT_13s0064g00320	13:21847309-21873298								
VIT_08s0007g08480	8:21836316-21884054								
VIT_13s0064g00240	13:21717064-21758519								
VIT_11s0118g00480	11:6233768-6261513								
VIT_13s0156g00470	13:24143941-24162514								
VIT_14s0066g01820	14:28140710-28149351								
VIT_18s0089g00280	18:28012444-28099586								
VIT_05s0020g00410	5:2219437-2230645								
VIT_06s0004g05340	6:6214879-6295602								
VIT_08s0040g00570	8:11532972-11534676								
VIT_17s0119g00350	17:14000742-14067042								
VIT_08s0007g01030	8:15145225-15153638								
VIT_12s0059g00220	12:5106923-5115365								
VIT_18s0089g00520	18:28307821-28414784								
VIT_05s0062g00980	5:19573623-19602661	vvi-miR156f	<i>SPL9</i>	3	1	0	1	3	6
VIT_18s0001g08850	18:7344300-7356957		squamosa promoter binding protein-like 9						
VIT_14s0060g02620	14:2158440-2409389								
VIT_14s0006g03000	14:21336690-21337640								
VIT_03s0088g01050	3:9286712-9310814								
VIT_18s0089g00280	18:28012444-28099586								
VIT_04s0044g00150	4:20847041-20864760								
VIT_04s0008g01510	4:1220306-1223918								
VIT_05s0062g00980	5:19573623-19602661								
VIT_12s0035g00420	12:19754366-19799148								
VIT_12s0059g00220	12:5106923-5115365								
VIT_01s0011g02000	1:1712485-1730148								
VIT_08s0040g01360	8:12454027-12463433								
VIT_17s0000g02240	17:1868098-1882723								
VIT_08s0007g04400	8:18354835-18384094	vvi-miR156h	<i>SPL9</i>	6	10	4	1	9	8
VIT_05s0062g00980	5:19573623-19602661		squamosa promoter binding protein-like 9						
VIT_00s1739g00010	Un:40347206-40347518								
VIT_03s0132g00070	3:11399534-11439319								
VIT_02s0033g00080	2:13479179-13595327								
VIT_14s0060g02620	14:2158440-2409389								

[illegible]

VIT_10s0003g04500	10:7866466-7866778										
VIT_12s0028g01130	12:1696085-1696396										
VIT_16s0050g01840	16:18760560-18774354										
VIT_13s0064g00320	13:21847309-21873298										
VIT_14s0066g01820	14:28140710-28149351										
VIT_19s0014g00750	19:748966-821424										
VIT_13s0064g00240	13:21717064-21758519										
VIT_18s0089g00280	18:28012444-28099586										
VIT_10s0003g04470	10:7769390-7780823										
VIT_05s0029g00730	5:15862958-15897787										
VIT_12s0035g00490	12:19801821-19886740										
VIT_11s0065g01110	11:15196701-15271955										
VIT_15s0046g00760	15:17688963-17711949										
VIT_01s0010g01440	1:17507830-17513194	vvi-miR164b	NAC1	NAC domain containing protein 1	2	1	1	0	4	7	
VIT_04s0023g02800	4:19375080-19503273										
VIT_01s0010g01440	1:17507830-17513194										
VIT_19s0014g00750	19:748966-821424										
VIT_13s0064g00240	13:21717064-21758519										
VIT_05s0020g05050	5:7006374-7021436										
VIT_16s0039g02290	16:2447607-2530358										
VIT_09s0002g02170	9:1983285-1995323		RAP2.7	related to AP2.7							
VIT_06s0004g05340	6:6214879-6295602										
VIT_16s0013g00490	16:5626821-5638492										
VIT_08s0040g01360	8:12454027-12463433										
VIT_18s0001g11550	18:9821510-9833058										
VIT_15s0046g00760	15:17688963-17711949										
VIT_04s0023g02800	4:19375080-19503273	vvi-miR164c	NAC100	NAC domain containing protein 100	2	1	1	2	3	5	
VIT_18s0001g08850	18:7344300-7356957										
VIT_03s0017g01400	3:17429353-17461698										
VIT_19s0014g00750	19:748966-821424										
VIT_13s0064g00240	13:21717064-21758519										
VIT_16s0039g02290	16:2447607-2530358										
VIT_05s0029g00730	5:15862958-15897787										
VIT_09s0002g02170	9:1983285-1995323										
VIT_06s0004g05340	6:6214879-6295602										
VIT_11s0016g00280	11:291329-292710										
VIT_11s0065g01110	11:15196701-15271955										
VIT_16s0013g00490	16:5626821-5638492										
VIT_18s0001g11550	18:9821510-9833058										
VIT_15s0046g00760	15:17688963-17711949										
VIT_05s0062g00980	5:19573623-19602661	vvi-miR172c	AP2	integrase-type DNA-binding superfamily protein	2	3	1	0	5	1	
VIT_18s0001g08850	18:7344300-7356957										
VIT_10s0003g02830	10:4922643-4933365										
VIT_13s0064g01110	13:22988766-22994065										
VIT_00s0505g00030	Un:30798171-30798607										
VIT_08s0007g08480	8:21836316-21884054										

VIT_18s0001g06940	18:5164109-5170518		<i>RAP2.7</i> related to AP2.7							
VIT_03s0088g01050	3:9286712-9310814									
VIT_15s0048g02480	15:16658644-16665012									
VIT_13s0084g00430	13:19258143-19273396									
VIT_05s0020g00410	5:2219437-2230645									
VIT_01s0010g01440	1:17507830-17513194	vvi-miR172d	<i>RAP2.7</i> related to AP2.7	5	1	1	1	3	2	
VIT_10s0092g00770	10:12615367-12616031									
VIT_17s0000g01230	17:878501-879808									
VIT_18s0001g08850	18:7344300-7356957									
VIT_14s0060g02620	14:2158440-2409389									
VIT_10s0003g02830	10:4922643-4933365									
VIT_00s0505g00030	Un:30798171-30798607									
VIT_08s0007g08480	8:21836316-21884054									
VIT_11s0118g00480	11:6233768-6261513									
VIT_09s0002g02840	9:2596343-2647241									
VIT_16s0050g00160	16:16994704-17014379									
VIT_12s0035g00420	12:19754366-19799148									
VIT_04s0023g02800	4:19375080-19503273	vvi-miR3629a-3p	ribosomal protein L7Ae/L30e/S12e/Gadd45 family protein	5	0	2	0	1	3	
VIT_03s0132g00070	3:11399534-11439319									
VIT_18s0001g08850	18:7344300-7356957		<i>SOS3</i> calcium-binding EF-hand family protein							
VIT_18s0001g14020	18:12042204-12055135									
VIT_14s0060g02620	14:2158440-2409389									
VIT_17s0000g05090	17:5578522-5598882									
VIT_01s0010g03370	1:20705662-20710439									
VIT_16s0039g02290	16:2447607-2530358		<i>RPI</i> ribosomal protein 1							
VIT_06s0004g05340	6:6214879-6295602									
VIT_16s0013g00490	16:5626821-5638492									
VIT_04s0023g02800	4:19375080-19503273	vvi-miR3629b	ribosomal protein L7Ae/L30e/S12e/Gadd45 family protein	5	0	2	0	1	3	
VIT_03s0132g00070	3:11399534-11439319									
VIT_18s0001g08850	18:7344300-7356957									
VIT_18s0001g14020	18:12042204-12055135									
VIT_14s0060g02620	14:2158440-2409389									
VIT_17s0000g05090	17:5578522-5598882									
VIT_01s0010g03370	1:20705662-20710439									
VIT_16s0039g02290	16:2447607-2530358		<i>SOS3</i> calcium-binding EF-hand family protein							
VIT_06s0004g05340	6:6214879-6295602									
VIT_04s0023g02800	4:19375080-19503273									
VIT_16s0013g00490	16:5626821-5638492									
VIT_16s0039g02410	16:2601292-2603945	vvi-miR3637-5p	<i>CYCP4</i> ; cyclin p4;l	6	10	9	7	9	16	
VIT_02s0012g02160	2:8959176-8963460		<i>I</i>							
VIT_05s0062g00980	5:19573623-19602661									
VIT_19s0014g01710	19:1836124-1882860									
VIT_02s0033g00080	2:13479179-13595327									
VIT_14s0060g02620	14:2158440-2409389									
VIT_03s0038g04680	3:3431026-3451765									
VIT_12s0059g01750	12:6622509-6644024									

VIT_14s0128g00480	14:3107026-3108059
VIT_03s0017g01400	3:17429353-17461698
VIT_17s0000g05090	17:5578522-5598882
VIT_01s0010g03370	1:20705662-20710439
VIT_10s0003g00420	10:1698560-1702877
VIT_18s0001g09530	18:7963120-7963495
VIT_16s0050g01840	16:18760560-18774354
VIT_13s0064g00320	13:21847309-21873298
VIT_06s0004g04650	6:5622414-5629756
VIT_19s0014g00750	19:748966-821424
VIT_13s0064g00240	13:21717064-21758519
VIT_16s0039g02290	16:2447607-2530358
VIT_18s0089g00280	18:28012444-28099586
VIT_12s0055g00100	12:12665056-12668954
VIT_15s0048g02480	15:16658644-16665012
VIT_09s0002g02840	9:2596343-2647241
VIT_08s0007g02420	8:16505935-16541810
VIT_13s0084g00430	13:19258143-19273396
VIT_02s0012g00140	2:5766069-5773458
VIT_10s0003g04470	10:7769390-7780823
VIT_14s0060g02470	14:2120159-2159148
VIT_09s0002g00100	9:70705-82170
VIT_09s0002g02170	9:1983285-1995323
VIT_05s0020g00410	5:2219437-2230645
VIT_15s0045g00710	15:5757497-5847225
VIT_12s0035g00490	12:19801821-19886740
VIT_17s0119g00350	17:14000742-14067042
VIT_06s0009g02170	6:14492273-14497085
VIT_16s0050g00160	16:16994704-17014379
VIT_16s0013g00860	16:6370172-6372592
VIT_08s0007g01030	8:15145225-15153638
VIT_01s0011g02000	1:1712485-1730148
VIT_08s0007g05170	8:19091506-19095438
VIT_17s0000g02240	17:1868098-1882723
VIT_17s0053g01010	17:16978672-16980739
VIT_18s0001g11550	18:9821510-9833058
VIT_15s0046g00760	15:17688963-17711949
VIT_18s0089g00520	18:28307821-28414784

Table 2 Suppl. Number of circRNAs which sponge index miRNAs. Only circRNAs which identified with 4 or more detection tools are listed.

Circ-id	miRNA	Target gene	Function
11:6233768-6261513 5:19573623-19602661 17:5578522-5598882 13:24143941-24162514 8:11532972-11534676 17:14000742-14067042	vvi-miR156a	<i>SPL9</i> <i>SPL13B</i> <i>SPL2</i> <i>SPL4</i>	squamosa promoter binding protein-like 9 squamosa promoter-binding protein-like (SBP domain) transcription factor family protein squamosa promoter binding protein-like 2 squamosa promoter binding protein-like 4
5:19573623-19602661 18:7344300-7356957 12:19754366-19799148 8:12454027-12463433	vvi-miR156f	<i>SPL9</i>	squamosa promoter binding protein-like 9
8:18354835-18384094 5:19573623-19602661 9:2596343-2647241 3:11399534-11439319 18:19977410-19977822 9:70705-82170 10:7769390-7780823 19:23711393-23711700	vvi-miR156h	<i>SPL9</i> <i>SPL13B</i> <i>SPL2</i> <i>SPL4</i>	squamosa promoter binding protein-like 9 squamosa promoter-binding protein-like (SBP domain) transcription factor family protein squamosa promoter binding protein-like 2 squamosa promoter binding protein-like 4
5:19573623-19602661 18:7344300-7356957	vvi-miR156i	<i>SPL9</i>	squamosa promoter binding protein-like 9

12:19754366-19799148			
8:12454027-12463433			
7:5035566-5039778	vvi-miR159c	<i>SPEAR2</i>	DNA-binding transcription factor
3:11399534-11439319			
9:1983285-1995323	vvi-miR164b	<i>NAC1</i>	NAC domain containing protein 1
1:17507830-17513194		<i>RAP2.7</i>	related to AP2.7
16:5626821-5638492			
8:12454027-12463433			
18:7344300-7356957	vvi-miR164c	<i>NAC100</i>	NAC domain-containing protein 100
19:748966-821424			
5:15862958-15897787			
9:1983285-1995323			
11:291329-292710			
16:5626821-5638492			
5:19573623-19602661	vvi-miR172c	<i>AP2</i>	integrase-type DNA-binding superfamily protein
18:7344300-7356957		<i>RAP2.7</i>	related to AP2.7
17:878501-879808	vvi-miR172d	<i>RAP2.7</i>	related to AP2.7
1:17507830-17513194			
11:6233768-6261513			
18:7344300-7356957			
12:19754366-19799148			
9:2596343-2647241			

3:11399534-11439319	vvi-miR3629a-3p	<i>RLK902</i>	Ribosomal protein L7Ae/l30e/s12e/Gadd45 family protein
18:7344300-7356957		<i>SOS3</i>	Calcium-binding EF-hand family protein
18:12042204-12055135		<i>RPI</i>	Ribosomal protein 1
16:5626821-5638492			
17:5578522-5598882			
3:11399534-11439319	vvi-miR3629b	<i>RLK902</i>	Ribosomal protein L7Ae/l30e/s12e/Gadd45 family protein
16:2601292-2603945		<i>SOS3</i>	Calcium-binding EF-hand family protein
2:8959176-8963460	vvi-miR3637-5p	<i>CYCP4;1</i>	Cyclin p4;1
5:19573623-19602661			
14:3107026-3108059			
17:5578522-5598882			