

Supplementary Materials: Identification and Functional Analysis of microRNAs Involved in the Anther Development in Cotton Genic Male Sterile Line Yu98-8A

Xiaojie Yang, Yuanming Zhao, Deyi Xie, Yao Sun, Xunlu Zhu, Nardana Esmaili, Zuoren Yang, Ye Wang, Guo Yin, Shuping Lv, Lihong Nie, Zhongjie Tang, Fu'an Zhao, Wu Li, Neelam Mishra, Li Sun, Wei Zhu and Weiping Fang

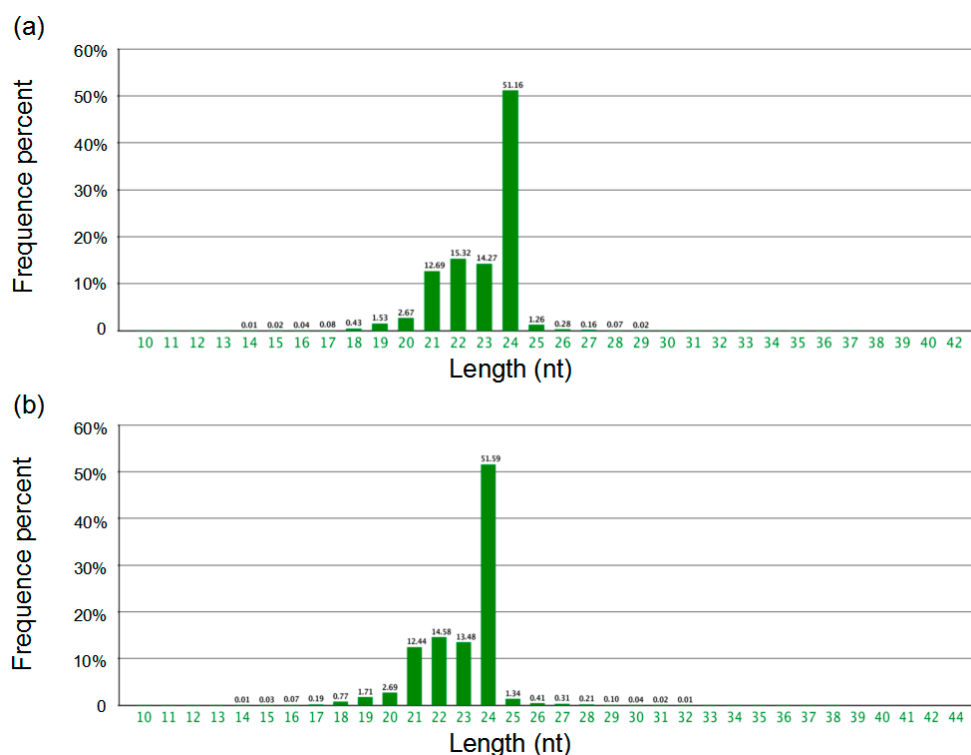


Figure S1. Length distribution of small RNAs.

Table S1. Summary of sequencing data from two individual libraries.

Type	Library of MS Buds		Library of MF Buds	
	Count	Percent (%)	Count	Percent (%)
Total reads	11,095,604	—	10,741,527	—
High_quality	11,044,443	100.00	10,688,607	100.00
3' adapter_null	2073	0.02	2869	0.03
Insert_null	312	0.00	341	0.00
5' adapter_null	6529	0.06	5927	0.06
Shorter_than_18nt	32,275	0.29	14,930	0.14
PolyA	972	0.01	881	0.01
Clean_reads	11,002,282	99.62	10,663,659	99.77

Table S2. Statistics of conserved miRNAs from two individual libraries.

Type	No. of miRNA	No. of miRNA-5p	No. of miRNA-3p	No. of Hairpin
No. of miRBase 19	4412	766	762	5127
No. of identified	MS	1588	206	165
	MF	1536	205	167
				1897
				1842

Table S6. Targets of differentially expressed known and novel miRNAs predicted by informatics.

miRNA	Targets	
	Number	Gene ID
miR160a	8	Cotton_D_gene_10032280, Cotton_D_gene_10025306, Cotton_D_gene_10019554, Cotton_D_gene_10010678, Cotton_D_gene_10008456, Cotton_D_gene_10005922, Cotton_D_gene_10006397, Cotton_D_gene_10002224
miR2111a	1	Cotton_D_gene_10019350
miR2118a-3p	8	Cotton_D_gene_10011549, Cotton_D_gene_10015239, Cotton_D_gene_10003169, Cotton_D_gene_10012641, Cotton_D_gene_10012642, Cotton_D_gene_10012644, Cotton_D_gene_10001596, Cotton_D_gene_10002457
miR2911	1	Cotton_D_gene_10037642
miR319	1	Cotton_D_gene_10015208
miR394a	2	Cotton_D_gene_10024254, Cotton_D_gene_10011419
miR397a	20	Cotton_D_gene_10032147, Cotton_D_gene_10024560, Cotton_D_gene_10024579, Cotton_D_gene_10025270, Cotton_D_gene_10034883, Cotton_D_gene_10033270, Cotton_D_gene_10029334, Cotton_D_gene_10029336, Cotton_D_gene_10036799, Cotton_D_gene_10034274, Cotton_D_gene_10034277, Cotton_D_gene_10034278, Cotton_D_gene_10034326, Cotton_D_gene_10010424, Cotton_D_gene_10024113, Cotton_D_gene_10021697, Cotton_D_gene_10004240, Cotton_D_gene_100042422, Cotton_D_gene_10004255, Cotton_D_gene_10009260
miR473	2	Cotton_D_gene_10021396, Cotton_D_gene_10021796
miR5224a	1	Cotton_D_gene_10013047
miR5338	2	Cotton_D_gene_10025591, Cotton_D_gene_10025592
miR5658	53	Cotton_D_gene_10030644, Cotton_D_gene_10030730, Cotton_D_gene_10032182, Cotton_D_gene_10032194, Cotton_D_gene_10024719, Cotton_D_gene_10025777, Cotton_D_gene_10033147, Cotton_D_gene_10040494, Cotton_D_gene_10025206, Cotton_D_gene_10028544, Cotton_D_gene_10027756, Cotton_D_gene_10037721, Cotton_D_gene_10015441, Cotton_D_gene_10028340, Cotton_D_gene_10029792, Cotton_D_gene_10029828, Cotton_D_gene_10031210, Cotton_D_gene_10028210, Cotton_D_gene_10013894, Cotton_D_gene_10013990, Cotton_D_gene_10012955, Cotton_D_gene_10030124, Cotton_D_gene_10012266, Cotton_D_gene_10012379, Cotton_D_gene_10027686, Cotton_D_gene_10018858, Cotton_D_gene_10016981, Cotton_D_gene_10034540, Cotton_D_gene_10025541, Cotton_D_gene_10010232, Cotton_D_gene_10012128, Cotton_D_gene_10037240, Cotton_D_gene_10037435, Cotton_D_gene_10009431, Cotton_D_gene_10017165, Cotton_D_gene_10015913, Cotton_D_gene_10015920, Cotton_D_gene_10009137, Cotton_D_gene_10006267, Cotton_D_gene_10013688, Cotton_D_gene_10004867, Cotton_D_gene_10008830, Cotton_D_gene_10008830, Cotton_D_gene_10009653, Cotton_D_gene_10011608, Cotton_D_gene_10017453, Cotton_D_gene_10004743, Cotton_D_gene_10008407, Cotton_D_gene_10003171, Cotton_D_gene_10012070, Cotton_D_gene_10002589, Cotton_D_gene_10000877, Cotton_D_gene_10000377
miR5825	1	Cotton_D_gene_10024045
miR6247	1	Cotton_D_gene_10034386
novel_mir_104	3	Cotton_D_gene_10006847, Cotton_D_gene_10003369, Cotton_D_gene_10020936
novel_mir_137	2	Cotton_D_gene_10036714, Cotton_D_gene_10016627
novel_mir_165	2	Cotton_D_gene_10035777, Cotton_D_gene_10001001
novel_mir_168	1	Cotton_D_gene_10024580
novel_mir_20	1	Cotton_D_gene_10035647
novel_mir_204	1	Cotton_D_gene_10034932
novel_mir_206	1	Cotton_D_gene_10014577

Table S6. Cont.

miRNA	Targets	
	Number	Gene ID
novel_mir_22	13	Cotton_D_gene_10040158, Cotton_D_gene_10034716, Cotton_D_gene_10018762, Cotton_D_gene_10028326, Cotton_D_gene_10028249, Cotton_D_gene_10036613, Cotton_D_gene_10020700, Cotton_D_gene_10019674, Cotton_D_gene_10019674, Cotton_D_gene_10021118, Cotton_D_gene_10006199, Cotton_D_gene_10013041, Cotton_D_gene_10010354
novel_mir_229	1	Cotton_D_gene_10011581
novel_mir_23	109	Cotton_D_gene_10040129, Cotton_D_gene_10032171, Cotton_D_gene_10029877, Cotton_D_gene_10034713, Cotton_D_gene_10040827, Cotton_D_gene_10033566, Cotton_D_gene_10024628, Cotton_D_gene_10035245, Cotton_D_gene_10035277, Cotton_D_gene_10035417, Cotton_D_gene_10036178, Cotton_D_gene_10022905, Cotton_D_gene_10022967, Cotton_D_gene_10023060, Cotton_D_gene_10039648, Cotton_D_gene_10026515, Cotton_D_gene_10038967, Cotton_D_gene_10028050, Cotton_D_gene_10038536, Cotton_D_gene_10019695, Cotton_D_gene_10036227, Cotton_D_gene_10036307, Cotton_D_gene_10035007, Cotton_D_gene_10035041, Cotton_D_gene_10027927, Cotton_D_gene_10039707, Cotton_D_gene_10039717, Cotton_D_gene_10039839, Cotton_D_gene_10039851, Cotton_D_gene_10015463, Cotton_D_gene_10038426, Cotton_D_gene_10023706, Cotton_D_gene_10029656, Cotton_D_gene_10026941, Cotton_D_gene_10022078, Cotton_D_gene_10022107, Cotton_D_gene_10027131, Cotton_D_gene_10027231, Cotton_D_gene_10014337, Cotton_D_gene_10014622, Cotton_D_gene_10014664, Cotton_D_gene_10034832, Cotton_D_gene_10028276, Cotton_D_gene_10015648, Cotton_D_gene_10014081, Cotton_D_gene_10025649, Cotton_D_gene_10025697, Cotton_D_gene_10023925, Cotton_D_gene_10016539, Cotton_D_gene_10016543, Cotton_D_gene_10033257, Cotton_D_gene_10036714, Cotton_D_gene_10018882, Cotton_D_gene_10020810, Cotton_D_gene_10023437, Cotton_D_gene_10034402, Cotton_D_gene_10034442, Cotton_D_gene_10034491, Cotton_D_gene_10036442, Cotton_D_gene_10037481, Cotton_D_gene_10024015, Cotton_D_gene_10028955, Cotton_D_gene_10014876, Cotton_D_gene_10027249, Cotton_D_gene_10021781, Cotton_D_gene_10015934, Cotton_D_gene_10010765, Cotton_D_gene_10026366, Cotton_D_gene_10026059, Cotton_D_gene_10019553, Cotton_D_gene_10019572, Cotton_D_gene_10008774, Cotton_D_gene_10008282, Cotton_D_gene_10010670, Cotton_D_gene_10006258, Cotton_D_gene_10007195, Cotton_D_gene_10013740, Cotton_D_gene_10011451, Cotton_D_gene_10005104, Cotton_D_gene_10024309, Cotton_D_gene_10024483, Cotton_D_gene_10024485, Cotton_D_gene_10008894, Cotton_D_gene_10027070, Cotton_D_gene_10006537, Cotton_D_gene_10004797, Cotton_D_gene_10011063, Cotton_D_gene_10005095, Cotton_D_gene_10010752, Cotton_D_gene_10015702, Cotton_D_gene_10013027, Cotton_D_gene_10006381, Cotton_D_gene_10004377, Cotton_D_gene_10006431, Cotton_D_gene_10014130, Cotton_D_gene_10010301, Cotton_D_gene_10010323, Cotton_D_gene_10004130, Cotton_D_gene_10003881, Cotton_D_gene_10002338, Cotton_D_gene_10006202, Cotton_D_gene_10004652, Cotton_D_gene_10002911, Cotton_D_gene_10003495, Cotton_D_gene_10001342, Cotton_D_gene_10001247, Cotton_D_gene_10002984, Cotton_D_gene_10001974, Cotton_D_gene_10000516

Table S6. Cont.

miRNA	Targets	
	Number	Gene ID
novel_mir_265	112	Cotton_D_gene_10040068, Cotton_D_gene_10040103, Cotton_D_gene_10038593, Cotton_D_gene_10038598, Cotton_D_gene_10032522, Cotton_D_gene_10034237, Cotton_D_gene_10031989, Cotton_D_gene_10030975, Cotton_D_gene_10029885, Cotton_D_gene_10040808, Cotton_D_gene_10025019, Cotton_D_gene_10039279, Cotton_D_gene_10039375, Cotton_D_gene_10035228, Cotton_D_gene_10023322, Cotton_D_gene_10036135, Cotton_D_gene_10036150, Cotton_D_gene_10025954, Cotton_D_gene_10022902, Cotton_D_gene_10022916, Cotton_D_gene_10039579, Cotton_D_gene_10039034, Cotton_D_gene_10039228, Cotton_D_gene_10028059, Cotton_D_gene_10038949, Cotton_D_gene_10028723, Cotton_D_gene_10028745, Cotton_D_gene_10018238, Cotton_D_gene_10027799, Cotton_D_gene_10036234, Cotton_D_gene_10036906, Cotton_D_gene_10039994, Cotton_D_gene_10028374, Cotton_D_gene_10029057, Cotton_D_gene_10018516, Cotton_D_gene_10027174, Cotton_D_gene_10032484, Cotton_D_gene_10014631, Cotton_D_gene_10026671, Cotton_D_gene_10024224, Cotton_D_gene_10028223, Cotton_D_gene_10031618, Cotton_D_gene_10018624, Cotton_D_gene_10022651, Cotton_D_gene_10025667, Cotton_D_gene_10025671, Cotton_D_gene_10030045, Cotton_D_gene_10030151, Cotton_D_gene_10030155, Cotton_D_gene_10030168, Cotton_D_gene_10016547, Cotton_D_gene_10027631, Cotton_D_gene_10029463, Cotton_D_gene_10029500, Cotton_D_gene_10022547, Cotton_D_gene_10014388, Cotton_D_gene_10014984, Cotton_D_gene_10036433, Cotton_D_gene_10012163, Cotton_D_gene_10023836, Cotton_D_gene_10014246, Cotton_D_gene_10026232, Cotton_D_gene_10020591, Cotton_D_gene_10027255, Cotton_D_gene_10017644, Cotton_D_gene_10015894, Cotton_D_gene_10015967, Cotton_D_gene_10017709, Cotton_D_gene_10013332, Cotton_D_gene_10010791, Cotton_D_gene_10026326, Cotton_D_gene_10019565, Cotton_D_gene_10019671, Cotton_D_gene_10014452, Cotton_D_gene_10009731, Cotton_D_gene_10010653, Cotton_D_gene_10022158, Cotton_D_gene_10008693, Cotton_D_gene_10007237, Cotton_D_gene_10014793, Cotton_D_gene_10009911, Cotton_D_gene_10024256, Cotton_D_gene_10024260, Cotton_D_gene_10024334, Cotton_D_gene_10006467, Cotton_D_gene_10005490, Cotton_D_gene_10027017, Cotton_D_gene_10011070, Cotton_D_gene_10007253, Cotton_D_gene_10004512, Cotton_D_gene_10007516, Cotton_D_gene_10017424, Cotton_D_gene_10015710, Cotton_D_gene_10003386, Cotton_D_gene_10014150, Cotton_D_gene_10020994, Cotton_D_gene_10003585, Cotton_D_gene_10012054, Cotton_D_gene_10003460, Cotton_D_gene_10008234, Cotton_D_gene_10003065, Cotton_D_gene_10010271, Cotton_D_gene_10002056, Cotton_D_gene_10001890, Cotton_D_gene_10001787, Cotton_D_gene_10001634, Cotton_D_gene_10001041, Cotton_D_gene_10001000, Cotton_D_gene_10002545, Cotton_D_gene_10000403, Cotton_D_gene_10000672, Cotton_D_gene_10000154
		Cotton_D_gene_10036714, Cotton_D_gene_10016627
		Cotton_D_gene_10011395, Cotton_D_gene_10012990, Cotton_D_gene_10000913
		Cotton_D_gene_10032704, Cotton_D_gene_10016308, Cotton_D_gene_10039873
		Cotton_D_gene_10036216
		Cotton_D_gene_10034825, Cotton_D_gene_10032791, Cotton_D_gene_10019765, Cotton_D_gene_10035011, Cotton_D_gene_10026261
		Cotton_D_gene_10032704, Cotton_D_gene_10039873, Cotton_D_gene_10013879
		Cotton_D_gene_10032903
		Cotton_D_gene_10033088
		Cotton_D_gene_10022875, Cotton_D_gene_10013994
		Cotton_D_gene_10022694, Cotton_D_gene_10022695
		Cotton_D_gene_10033485
		Cotton_D_gene_10028854, Cotton_D_gene_10022050, Cotton_D_gene_10012403, Cotton_D_gene_10026100, Cotton_D_gene_10024142
		Cotton_D_gene_10026137, Cotton_D_gene_10036714, Cotton_D_gene_10013795, Cotton_D_gene_10009122, Cotton_D_gene_10009122, Cotton_D_gene_10011063, Cotton_D_gene_10016627
		Cotton_D_gene_10036186, Cotton_D_gene_10013933, Cotton_D_gene_10015879
		Cotton_D_gene_10024886
		Cotton_D_gene_10032704, Cotton_D_gene_10013879

Table S6. *Cont.*

miRNA	Targets	
	Number	Gene ID
novel_mir_372	2	Cotton_D_gene_10039772, Cotton_D_gene_10007827
novel_mir_374	1	Cotton_D_gene_10029444
novel_mir_94	1	Cotton_D_gene_10036376

Note: Only genes with known or putative functions were presented.

Table S8. List of selected miRNAs and the corresponding primers used for real time RT-PCR analysis.

No.	miRNA (sequence)	miR9-RT (5' → 3')	miR-S (5' → 3')
1	miR5658 (UGUGAUG	CTCAACTGGTGTCTGGAGTC	GGGTGTGATGA
	AUGAAGAUGGAA)	GGCAATTCAGTTGAGTTCCATCT	TGAAGATGGAA
2	miR159 (TTTGGATT	CTCAACTGGTGTCTGGAGTC	GTTTGGATTGA
	GAAGGGAGCTCTA)	GGCAATTCAGTTGAGTAGAGCTC	AGGGAGCTCTA
3	miR172 (AGAATCTT	CTCAACTGGTGTCTGGAGTCG	TGAGAATCTTG
	GATGATGCTGCAT)	GCAATTCAGTTGAGATGCAGCA	ATGATGCTGCAT
4	Cotton 5S	CCGACACTAATGCACCGGAT	CGAGGACTTCC CAGGAGGTC