Table S1. Primers used in this research. All the miRNA sequences and the designed primer sequences for miRNA qRT-PCR, as well as the primer sequences for the amplification of 3' UTRs or precursor miRNAs are listed.

For miRNA Realtime				
Name	**har-miRNA**	**sli-miRNA**	**bmo-miRNA**	**Primer Sequence**
miR-2a	UAUCACAGCCAGCUUUGAUGA	UCACAGCCAGCUUUGAUGAGC	UAUCACAGCCAGCUUUGAUGAGC	TATCACAGCCAGCTTTGATGAGC
miR-34	UGGCAGUGUGGUUAGCUG	UGGCAGUGUGGUUAGCUGGUUGU	UGGCAGUGUGGUUAGCUGGUUG	TGGCAGTGTGGTTAGCTGGT
miR-2796-3p	GUAGGCCGGCGGAAACUACU		GUAGGCCGGCGGAAACUACUUGC	GTAGGCCGGCGGAAACTA
miR-11		CAUCACAGUCAGAGUUCUAGCU	CAUCACAGUCAGAGUUCUAGCU	CATCACAGTCAGAGTTCTAGCT
U6 isoform E				AGGATGACACGCAAAATCGT
For 3'UTR Amplification				
PrimerName	**Sequence**	**Restriction Site**	**Species**	**NucleotideID**
BmoHSP90-F	GCtctagaCTCTACTTTAACTGTAGGAACCATGTC	XbaI	*Bombyx mori*	NM_001043411
BmoHSP90-R	GGAATTCcatatgGATACATTCAGAGTTCACCTTTAGC	NdeI	*Bombyx mori*	NM_001043411
SliHSP90-F	GCtctagaTCTCAGCTTTTAGCCATGTTGT	XbaI	*Spodoptera litura*	HM046609
SliHSP90-R	GGAATTCcatatgACCATTATTTGATATGAATTTGAAC	NdeI	*Spodoptera litura*	HM046609
HarHSP90-F	GCtctagaTCTCAGCTTAGCCATGTTGT	XbaI	*Helicoverpa armigera*	FJ986209
HarHSP90-R	GGAATTCcatatgTGTTAATGTTACCATTTATTTTGA	NdeI	*Helicoverpa armigera*	FJ986209
For Precursor miRNA amplification				
PrimerName	**Sequence**	**Restriction Site**	**Species**	
mir14-Xho-F	CCGctcgagGGCGTTTTGAATTTTCGATAT	XhoI	*Bombyx mori*	
mir14-EcoI-R	CGgaattcCGACCGATTGCGACAAAGAT	EcoRI	*Bombyx mori*	

mir2766-XhoI-F	CCGctcgagACGTTGCGACGAGCGCAGTT	XhoI	*Bombyx mori*
mir2766-EcoI-R	CGgaattcACACGAAGCGCCGAAACCCA	EcoRI	*Bombyx mori*
mir9a-XhoI-F	CCGctcgagCATCGCGTGCGCTACTTCCCA	XhoI	*Bombyx mori*
mir9a-EcoI-R	CGgaattcTACTAGCGACCCGCCCTCGC	EcoRI	*Bombyx mori*

Table S2. Distribution of small RNAs among different categories.

	H. armigera				*S. litura*			
Categories	**Unique**	**Unique (%)**	**Total**	**Total (%)**	**Unique**	**Unique (%)**	**Total**	**Total (%)**
exon_antisense	183	0.02	529	0.01	209	0.02	588	0.01
exon_sense	739	0.07	1025	0.02	518	0.06	734	0.01
intron_antisense	411	0.04	22892	0.43	299	0.03	36817	0.32
intron_sense	861	0.08	3474	0.07	556	0.06	4869	0.04
miRNA	923	0.08	1005884	19.10	818	0.09	2777193	24.27
rRNA	45705	4.06	652803	12.40	50508	5.60	1183609	10.34
repeat	532	0.05	2288	0.04	214	0.02	816	0.01
snRNA	746	0.07	2037	0.04	1074	0.12	20728	0.18
snoRNA	127	0.01	253	0.00	125	0.01	214	0.00
tRNA	8633	0.77	94809	1.80	12447	1.38	189423	1.66
unann	1066907	94.77	3480546	66.09	834601	92.59	7228502	63.17

Table S3. Sequences of predicted miRNAs. Predicted miRNAs of both *H. armigera* (*har-*) and *S. litura* (*sli-*) are presented with their sequences. Only the sequence with the highest number of reads was selected for each miRNA. The column "Reads" shows the total number of reads for each miRNA.

miRNA	Reads	Sequences
har-bantam	12766	UGAGAUCAUUGUGAAAGCU
har-let-7	90492	UGAGGUAGUAGGUUGUAUAG
har-miR-1	2	UGGGAAGUAAGGAAGCACG
har-miR-10	5824	UACCCUGUAGAUCCGAAUUUGU
*har-miR-10**	8710	AAAUUCGGUUCUAGAGAGGUUU
har-miR-100	3232	AACCCGUAGAUCCGAACUUGUG
har-miR-1000	2	AUAUUGUCCUGUCACAGCA
har-miR-11	687	CAUCACAGUCAGAGUUCUAGCU
har-miR-1175-3p	27	GAGAUUCAACUCCUCCAACUUAA
har-miR-1175-5p	34	AAGUGGAGGUGUGAUCUCUUC
har-miR-12	325	UGAGUAUUACUUCAGGUACU
har-miR-124	66	UAAGGCACGCGGUGAAUG
har-miR-133	39	UUGGUCCCCUUCAACCAGCU
har-miR-137	2	UAUUGCUUGAGAAUACAC
har-miR-13a	5	UAUCACAGCCACUUUGAUGUG
har-miR-13b	8	UAUCACAGCCAUUUUUGACGAG
har-miR-14	1080	UCAGUCUUUUUCUCUCUCCUAU
har-miR-184	40631	UGGACGGAGAACUGAUAAGGGC
har-miR-190	544	AGAUAUGUUUGAUAUUCUUGGUUG
har-miR-1a	629624	UGGAAUGUAAAGAAGUAUGG
*har-miR-1a**	14	CCGUGCUUCCUUACUUCCCAUA
har-miR-210	6	UUGUGCGUGUGACAGCGGCU
har-miR-252	378	CUAAGUACUAGUGCCGCAG
har-miR-263a	26616	AAUGGCACUGGAAGAAUUCACGG
har-miR-263b	71	CUUGGCACUGGGAGAAUUC
har-miR-274	2	UUUGUGACCGUCACUAACG
har-miR-2745	1	UAAAUUCGGUCUUUCGGGCAU
har-miR-275	14593	UCAGGUACCUGAAGUAGCGC
har-miR-2755	40122	CACCCUGUCAGACCAUACUUGUU
har-miR-276	1784	AGCGAGGUAUAGAGUUCCUACG
*har-miR-276**	8015	UAGGAACUUCAUACCGUGC
har-miR-2765	20	UGGUAACUCCACCACCGUUGGC
har-miR-2766	15524	UCAGUCUUGUCGAAUGGU
*har-miR-2766**	1	CCGCCCUUCGUCUUGACU
har-miR-2767	76	CAAGUAAAUCUCGUGCGG
har-miR-2768	9	AUUGGUUAAGAUAUUGCAUC
har-miR-277	1812	UAAAUGCACUAUCUGGUACGACA
*har-miR-277**	54	UCGUGCCAGGAGUGCGUUUGCA
har-miR-2779	85	AUCCGGCUCGAAGGACCA
har-miR-278	2692	UCGGUGGGAUCUUCGUCCGUUU
*har-miR-278**	491	CCGGACGAACUUCCCAGCUCGGCC

har-miR-2796-3p	2478	GUAGGCCGGCGGAAACUACU
har-miR-2796-5p	5	AGGGGUUUCUUUCGGCCUUCA
har-miR-279a	1259	UGACUAGAUCCACACUCAUCCA
har-miR-279b	6816	UGACUAGAUCUACACUCAUUG
har-miR-279c	7347	UGACUAGAUCCAUACUCGUCU
har-miR-281	15	UGUCAUGGAGUUGCUCUCUUUA
*har-miR-281**	27726	AAGAGAGCUAUCCGUCGACAGU
har-miR-282	175	UAGCCUCUCCUUGGCUUUGUCU
*har-miR-282**	1	ACAUAGCCUGAUAGAGGUU
har-miR-283	3981	AAAUAUCAGCUGGUAAUU
har-miR-285	5005	UAGCACCAUUCGAAUUCAGU
har-miR-2a	422	UAUCACAGCCAGCUUUGAUGA
har-miR-2b	57	UAUCACAGCCAGCUUUGUUGA
har-miR-305	486	AUUGUACUUCAUCAGGUG
*har-miR-305**	1107	AGGCGCUUGUUGGAGUACACU
har-miR-306a	317	UCAGGUACUAGGUGACUCUGAG
har-miR-307	679	UCACAACCUCCUUGAGUGAGCGA
*har-miR-307**	6	ACUCACUCAACCUGGGUGUGAUG
har-miR-308	140	AAUCACAGGAUAAUACUGCGAG
har-miR-31	1257	AGGCAAGAAGUCGGCAUA
*har-miR-316**	23	UGUCUUUUUCCGCUUUGCUGC
har-miR-317	1617	UGAACACAGCUGGUGGUAUCUCA
*har-miR-317**	2	GGGUGCCACGCUGUGCUCUCU
har-miR-33	193	GUGCAUUGUAGUUGCAUU
har-miR-3338	16	AUGUACUUACUUUGUUUGUUCU
har-miR-34	2473	UGGCAGUGUGGUUAGCUG
*har-miR-34**	3	AGCCACUAACGACACUGC
*har-miR-375**	6	UUUGUUCGCCCCGGCUCG
har-miR-7	351	UGGAAGACUAGUGAUUUU
*har-miR-71**	46	UCUCACUACCUUGUCUUUCAU
har-miR-745	16	CAGCUGCCUAGCGAAGGGCAA
har-miR-750	5843	CCAGAUCUAUCUUUCCAGCU
*har-miR-750**	1	AGUUGGACAGGGGAUCUUGA
har-miR-79	46	AUAAAGCUAGAUUACCAAAG
har-miR-8	5434	UAAUACUGUCAGGUAAAGAUGU
*har-miR-8**	12789	CAUCUUACCGGGCAGCAUUAG
har-miR-87	28	GUGAGCAAACUUUCAGGUGU
har-miR-927	51	UUUAGAAUUCCUACGCUUUACC
*har-miR-927**	71	CAAAGCGUUUGGAUUCUAA
har-miR-92a	232	UAUUGCACCAGUCCCGGCCUAU
har-miR-92b	191	AAUUGCACCAAUCCCGGCCU
har-miR-932	20	UCAAUUCCGUAGUGCAUU
*har-miR-965**	28	UAAGCGUAUAGCUUUUCCC
har-miR-970	805	UCAUAAGACACACGCGGCU
har-miR-989	3785	GUGUGAUGUGACGUAGUGG
har-miR-993a	172	GAAGCUCGUCUCUACAGGUAUC
*har-miR-993a**	675	UACCCUGUAGAUCCGGGCUUUU

*har-miR-993b**	59	UACCCUGUAGAUCCGGGCUUU
har-miR-998	811	UAGCACCAUGGGAUUCAGCU
har-miR-9a	981	UCUUUGGUUAUCUAGCUGUAUG
*har-miR-9a**	150	UAAAGCUAGGUUACCGGAGUUA
har-miR-9c	120	UAAAGUUAUGGUACCGAAGUUA
*har-miR-9c**	127	UCUUUGGUAUCCUAGCUG
har-miR-iab-4-3p	42	CGGUAUACCUUCAGUAUACGUA
har-miR-iab-4-5p	2896	ACGUAUACUGAAUGUAUCC
har-miR-iab-8	36	UUACGUAUACUGAAGGUAU
sli-bantam	290	UGAGAUCAUUGUGAAAGCU
*sli-bantam**	21	UGGUUUUCAUAAUGAUUUGACAGA
sli-let-7	105685	UGAGGUAGUAGGUUGUAUAG
sli-miR-1	15	UGGGAAGUAAGGAAGCACGGAA
sli-miR-10	16271	UACCCUGUAGAUCCGAAUUUGU
*sli-miR-10**	11501	CAAAUUCGGUUCUAGAGAGG
sli-miR-100	8879	AACCCGUAGAUCCGAACUUGU
sli-miR-1000	1	AUAUUGUCCUGUCACAGCAGUA
sli-miR-11	1960	CAUCACAGUCAGAGUUCUAGCU
sli-miR-1175-3p	261	UGAGAUUCAACUCCUCCAACUU
sli-miR-1175-5p	28	AAGUGGAGGUGUGAUCUCUUCA
sli-miR-12	995	UGAGUAUUACUUCAGGUACUGG
sli-miR-124	6	UAAGGCACGCGGUGAAUGC
sli-miR-133	8	UUGGUCCCCUUCAACCAGCUGU
sli-miR-137	29	UAUUGCUUGAGAAUACACGUAG
sli-miR-13a	5	UAUCACAGCCACUUUGAUGUG
sli-miR-13b	10	UAUCACAGCCAUUUUUGACGAGUU
sli-miR-14	1153	UCAGUCUUUUUCUCUCUCCUAU
sli-miR-184	564278	UGGACGGAGAACUGAUAAGGGC
sli-miR-190	67	AGAUAUGUUUGAUAUUCUUGG
sli-miR-1a	1E+06	UGGAAUGUAAAGAAGUAUGGAG
*sli-miR-1a**	3	CCGUGCUUCCUUACUUCCCAUA
sli-miR-210	10	CUUGUGCGUGUGACAGCGGCU
sli-miR-252	4789	CUAAGUACUAGUGCCGCAGGAG
sli-miR-263a	482707	AAUGGCACUGGAAGAAUUCACGGG
sli-miR-263b	9902	CUUGGCACUGGGAGAAUUCAC
sli-miR-274	822	UUUGUGACCGUCACUAACGGGC
sli-miR-275	25566	UCAGGUACCUGAAGUAGCGCGCG
sli-miR-2755	511	CACCCUGUCAGACCAUACUUGUU
sli-miR-276	10	AGCGAGGUAUAGAGUUCCUACG
*sli-miR-276**	22975	UAGGAACUUCAUACCGUGCUCU
sli-miR-2765	190	UGGUAACUCCACCACCGUUGGC
sli-miR-2766	63546	UCAGUCUUGUCGAAUGGUGGGU
sli-miR-2767	4	CAAGUAAAUCUCGUGCGG
sli-miR-2768	11	AUUGGUUAAGAUAUUGCAUCGU
sli-miR-277	1028	UAAAUGCACUAUCUGGUACGACA
*sli-miR-277**	7	GUGCCAGGAGUGCGUUUGC
sli-miR-278	1391	UCGGUGGGAUCUUCGUCCGUUU

*sli-miR-278**	613	CCGGACGAACUUCCCAGCUCGGCC
sli-miR-2796-3p	65	GUAGGCCGGCGGAAACUACUUGC
sli-miR-279a	1297	UGACUAGAUCCACACUCAUCCA
sli-miR-279b	12546	UGACUAGAUCUACACUCAUUGA
sli-miR-279c	1172	UGACUAGAUCCAUACUCGUCUG
sli-miR-281	218	CUGUCAUGGAGUUGCUCUCUUUA
*sli-miR-281**	30851	AAGAGAGCUAUCCGUCGACAGUA
sli-miR-282	276	UAGCCUCUCCUUGGCUUUGUCUG
*sli-miR-282**	14	ACAUAGCCUGAUAGAGGUUACG
sli-miR-283	2191	AAAUAUCAGCUGGUAAUUCUGGG
sli-miR-285	44	UAGCACCAUUCGAAUUCAGUGC
sli-miR-2a	229	UCACAGCCAGCUUUGAUGAGC
sli-miR-2b	40	UAUCACAGCCAGCUUUGUUGA
sli-miR-305	519	AUUGUACUUCAUCAGGUGCUCUGG
*sli-miR-305**	32	AGGCGCUUGUUGGAGUACACUUA
sli-miR-306a	993	UCAGGUACUAGGUGACUCUGA
sli-miR-307	111	UCACAACCUCCUUGAGUGAGC
*sli-miR-307**	1	UCACUCAACCUGGGUGUGAU
sli-miR-308	41	AAUCACAGGAUAAUACUGCGA
sli-miR-31	10440	AGGCAAGAAGUCGGCAUAGCUGU
sli-miR-317	4820	UGAACACAGCUGGUGGUAUCU
sli-miR-33	2	GUGCAUUGUAGUUGCAUUGC
sli-miR-3338	10	AUGUACUUACUUUGUUUGUUCU
sli-miR-34	63	UGGCAGUGUGGUUAGCUGGUUGU
sli-miR-7	2332	UGGAAGACUAGUGAUUUUGU
*sli-miR-71**	193	UCUCACUACCUUGUCUUUCAUG
sli-miR-745	31	CAGCUGCCUAGCGAAGGGCAAC
sli-miR-750	547	CCAGAUCUAUCUUUCCAGCUCA
*sli-miR-750**	148	AGUUGGACAGGGGAUCUUGACA
sli-miR-79	97	AUAAAGCUAGAUUACCAAAGCA
*sli-miR-79**	1	CUUUGGCGAUUUAGCUCCGUGA
sli-miR-8	84861	UAAUACUGUCAGGUAAAGAUGUC
*sli-miR-8**	29365	CAUCUUACCGGGCAGCAUUAGA
sli-miR-87	419	GUGAGCAAACUUUCAGGUGUGU
sli-miR-927	98	UUUAGAAUUCCUACGCUUUACC
*sli-miR-927**	196	CAAAGCGUUUGGAUUCUAAAAC
sli-miR-929	1	AAAUUGACUCUAGUAGGGAGUC
sli-miR-92a	30	UAUUGCACCAGUCCCGGCCUAU
sli-miR-92b	249	AAUUGCACCAAUCCCGGCCUGC
sli-miR-932	9	UCAAUUCCGUAGUGCAUUGCAG
*sli-miR-965**	4	UAAGCGUAUAGCUUUUCCCCUU
sli-miR-970	806	UCAUAAGACACACGCGGCUCU
sli-miR-989	48340	GUGUGAUGUGACGUAGUGGAAG
sli-miR-993a	4	GAAGCUCGUCUCUACAGGUAUC
*sli-miR-993a**	233	UACCCUGUAGAUCCGGGCUUUUG
*sli-miR-993b**	2	UACCCUGUAGAUCCGGGCUUU
sli-miR-998	392	UAGCACCAUGGGAUUCAGCUCA

sli-miR-9a	9634	UCUUUGGUUAUCUAGCUGUAUGA
*sli-miR-9a**	2	AUAAAGCUAGGUUACCGGAG
sli-miR-9c	10	UAAAGUUAUGGUACCGAAGUUA
*sli-miR-9c**	177390	UCUUUGGUAUCCUAGCUGUAGG
sli-miR-iab-4-5p	38	ACGUAUACUGAAUGUAUCCUGA
sli-miR-iab-8	12	UUACGUAUACUGAAGGUAUACCGGA

Table S4. Homology analysis of *H. armigera* miRNA homologs. Metazoan species were divided into four catalogs: insects, other arthropods (arthropods other than insects), other invertebrates (invertebrates other than arthropods), and vertebrates. According to the BLAST results, the miRNAs were classified into four kinds: highly conserved (with homologs in vertebrates), invertebrate-specific (with homologs only in invertebrates), arthropod-specific (with homologs only in arthropods), and insect-specific (with homologs only in insects). "√" indicates the existence of miRNA homologs in the corresponding category. The column "Note" lists our definition of the miRNA (highly conserved, invertebrate-specific, arthropod-specific, or insect-specific). The column "LepiSpecific" indicates whether the miRNA is only identified in lepidopteran species. The last 6 columns indicates whether the miRNA has homologs in the corresponding species. The abbreviations represent species as follows: bmo, *Bombyx mori*; sli, *Spodoptera litura*; mse, *Manduca sexta*; dpl, *Danaus plexippus*; hmeM, *Heliconius melpomene melpomene*; hmeR, *Heliconius melpomene rosina*.

har-miR	Lepidopteran	Insects	OtherArthropods	OtherInvertbrates	Vertebrates	Note	LepiSpecific	bmo	sli	mse	dpl	hmeM	hmeR
har-let-7	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
har-miR-10	√	√	√	√	√	highly_conserved	non-specific	√	√	—	√	√	√
har-miR-100	√	√	√	√	√	highly_conserved	non-specific	√	√	√	—	√	√
har-miR-124	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	—	—
har-miR-133	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	—	—
har-miR-137	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	—
har-miR-184	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
har-miR-190	√	√	—	√	√	highly_conserved	non-specific	√	√	√	√	√	—
har-miR-1a	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
har-miR-210	√	√	—	√	√	highly_conserved	non-specific	√	√	√	√	√	√
har-miR-281	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	—	—
har-miR-33	√	√	√	√	√	highly_conserved	non-specific	√	√	√	—	—	—
har-miR-7	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
har-miR-993a*	√	√	—	√	√	highly_conserved	non-specific	√	√	√	—	√	√
har-miR-993b*	√	√	—	√	√	highly_conserved	non-specific	√	√	√	—	√	√
har-miR-9a	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
har-bantam	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-1175-3p	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	—	—
har-miR-252	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	—	—
har-miR-263a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-279a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√

har-miR-279c	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-283	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	—	—
har-miR-2a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-2b	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-307	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	—
har-miR-317	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-34	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-8	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
har-miR-993a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	—	—	—	—
har-miR-275	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
har-miR-276*	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
har-miR-278	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	—
har-miR-305	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
har-miR-iab-4-3p	√	√	√	—	—	arthropod_specific	non-specific	√	—	—	—	—	—
har-miR-iab-4-5p	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	—	—	—
har-miR-10*	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	√	√
har-miR-1000	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
har-miR-11	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-13a	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-13b	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-14	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-1a*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	—	—
har-miR-263b	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-276	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
har-miR-2765	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-277	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	√	√
har-miR-2796-3p	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
har-miR-2796-5p	√	√	—	—	—	insect_specific	non-specific	√	—	—	—	—	—
har-miR-279b	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-281*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
har-miR-282	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—

har-miR-285	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
har-miR-307*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	—
har-miR-316*	√	√	—	—	—	insect_specific	non-specific	√	—	√	√	—	—
har-miR-71*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
har-miR-79	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-8*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
har-miR-927	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	—	—
har-miR-927*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	—	√
har-miR-92a	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-932	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
har-miR-965*	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	—
har-miR-970	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-989	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-998	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-9a*	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
har-miR-iab-8	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	—	—
har-miR-1	√	√	—	—	—	insect_specific	specific	√	—	—	—	—	—
har-miR-1175-5p	√	√	—	—	—	insect_specific	specific	√	√	√	—	—	—
har-miR-12	√	√	—	—	—	insect_specific	specific	√	√	√	—	√	√
har-miR-274	√	√	—	—	—	insect_specific	specific	√	√	√	√	—	—
har-miR-2745	√	√	—	—	—	insect_specific	specific	√	—	—	—	—	—
har-miR-2755	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-2766	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-2766*	√	√	—	—	—	insect_specific	specific	√	—	—	—	—	—
har-miR-2767	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-2768	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-277*	√	√	—	—	—	insect_specific	specific	√	√	—	—	—	√
har-miR-2779	√	√	—	—	—	insect_specific	specific	√	—	√	—	√	√
har-miR-278*	√	√	—	—	—	insect_specific	specific	√	√	—	—	√	√
har-miR-282*	√	√	—	—	—	insect_specific	specific	√	√	—	—	√	—
har-miR-305*	√	√	—	—	—	insect_specific	specific	√	√	√	—	√	√

har-miR-306a	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-308	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-31	√	√	—	—	—	insect_specific	specific	√	√	√	—	√	√
har-miR-317*	√	√	—	—	—	insect_specific	specific	√	—	—	—	—	—
har-miR-3338	√	√	—	—	—	insect_specific	specific	√	√	√	√	—	—
har-miR-34*	√	√	—	—	—	insect_specific	specific	√	—	—	—	—	—
har-miR-375*	√	√	—	—	—	insect_specific	specific	√	—	—	√	—	—
har-miR-745	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-750	√	√	—	—	—	insect_specific	specific	√	√	√	√	—	—
har-miR-750*	√	√	—	—	—	insect_specific	specific	√	√	√	—	√	—
har-miR-87	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	—
har-miR-92b	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-9c	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
har-miR-9c*	√	√	—	—	—	insect_specific	specific	√	√	—	√	√	√

Table S5. Homology analysis of *S. litura* miRNA homologs. Metazoan species were divided into four catalogs: insects, other arthropods (arthropods other than insects), other invertebrates (invertebrates other than arthropods), and vertebrates. According to the BLAST results, the miRNAs were classified into four kinds: highly conserved (with homologs in vertebrates), invertebrate-specific (with homologs only in invertebrates), arthropod-specific (with homologs only in arthropods), and insect-specific (with homologs only in insects). "√" indicates the existence of miRNA homologs in the corresponding category. The column "Note" lists our definition of the miRNA (highly conserved, invertebrate-specific, arthropod-specific, or insect-specific). The column "LepiSpecific" indicates whether the miRNA is only identified in lepidopteran species. The last 6 columns indicates whether the miRNA has homologs in the corresponding species. The abbreviations represent species as follows: bmo, *Bombyx mori*; har, *Helicoverpa armigera*; mse, *Manduca sexta*; dpl, *Danaus plexippus*; hmeM, *Heliconius melpomene melpomene*; hmeR, *Heliconius melpomene rosina*.

sli-miR	Lepidopteran	Insects	OtherArthropods	OtherInvertbrates	Vertebrates	Note	LepiSpecific	bmo	har	mse	dpl	hmeM	hmeR
sli-let-7	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
sli-miR-10	√	√	√	√	√	highly_conserved	non-specific	√	√	—	√	√	√
sli-miR-100	√	√	√	√	√	highly_conserved	non-specific	√	√	√	—	√	√
sli-miR-124	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	—	—
sli-miR-133	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	—	—
sli-miR-137	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	—
sli-miR-184	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
sli-miR-190	√	√	—	√	√	highly_conserved	non-specific	√	√	√	√	√	—
sli-miR-1a	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
sli-miR-210	√	√	—	√	√	highly_conserved	non-specific	√	√	√	√	√	√
sli-miR-281	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	—	—
sli-miR-33	√	√	√	√	√	highly_conserved	non-specific	√	√	√	—	—	—
sli-miR-7	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
sli-miR-993a*	√	√	—	√	√	highly_conserved	non-specific	√	√	√	—	√	√
sli-miR-993b*	√	√	—	√	√	highly_conserved	non-specific	√	√	√	—	√	√
sli-miR-9a	√	√	√	√	√	highly_conserved	non-specific	√	√	√	√	√	√
sli-bantam	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-1175-3p	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	—	—
sli-miR-252	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	—	—
sli-miR-263a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√

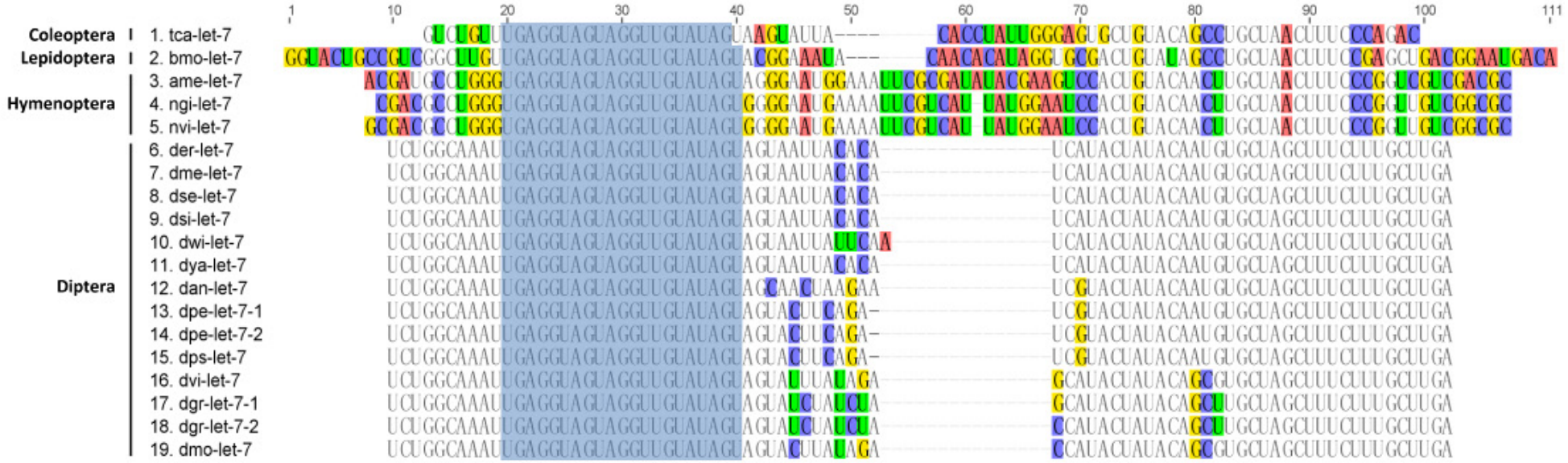
sli-miR-263b	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-279a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-279c	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-283	√	√	—	√	—	invertebrate_specific	non-specific	√	√	√	√	—	—
sli-miR-2a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-2b	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-307	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	—
sli-miR-317	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-34	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-8	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-87	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	—
sli-miR-993a	√	√	√	√	—	invertebrate_specific	non-specific	√	√	—	—	—	—
sli-miR-9a*	√	√	√	√	—	invertebrate_specific	non-specific	√	√	√	√	√	√
sli-miR-12	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	—	√	√
sli-miR-275	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
sli-miR-276*	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
sli-miR-278	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	—
sli-miR-305	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
sli-miR-31	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	√
sli-miR-965*	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	√	√	—
sli-miR-iab-4-5p	√	√	√	—	—	arthropod_specific	non-specific	√	√	√	—	—	—
sli-miR-10*	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	√	√
sli-miR-1000	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
sli-miR-11	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-13a	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-13b	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-14	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-1a*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	—	—
sli-miR-276	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
sli-miR-2765	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-277	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	√	√

sli-miR-2796-3p	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
sli-miR-279b	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-281*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
sli-miR-282	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
sli-miR-282*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	—
sli-miR-285	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
sli-miR-305*	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	√	√
sli-miR-307*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	—
sli-miR-71*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
sli-miR-79	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-8*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	√	√
sli-miR-927	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	—	—
sli-miR-927*	√	√	—	—	—	insect_specific	non-specific	√	√	—	—	—	√
sli-miR-929	√	√	—	—	—	insect_specific	non-specific	√	—	—	√	—	—
sli-miR-92a	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-932	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	—	—
sli-miR-970	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-989	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-998	√	√	—	—	—	insect_specific	non-specific	√	√	√	√	√	√
sli-miR-iab-8	√	√	—	—	—	insect_specific	non-specific	√	√	√	—	—	—
sli-bantam*	√	√	—	—	—	insect_specific	specific	√	—	—	—	√	√
sli-miR-1	√	√	—	—	—	insect_specific	specific	√	√	—	—	√	√
sli-miR-1175-5p	√	√	—	—	—	insect_specific	specific	√	√	√	—	—	—
sli-miR-274	√	√	—	—	—	insect_specific	specific	√	√	√	√	—	—
sli-miR-2755	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-2766	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-2767	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-2768	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-277*	√	√	—	—	—	insect_specific	specific	√	√	—	—	—	—
sli-miR-278*	√	√	—	—	—	insect_specific	specific	√	√	—	—	√	√
sli-miR-306a	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√

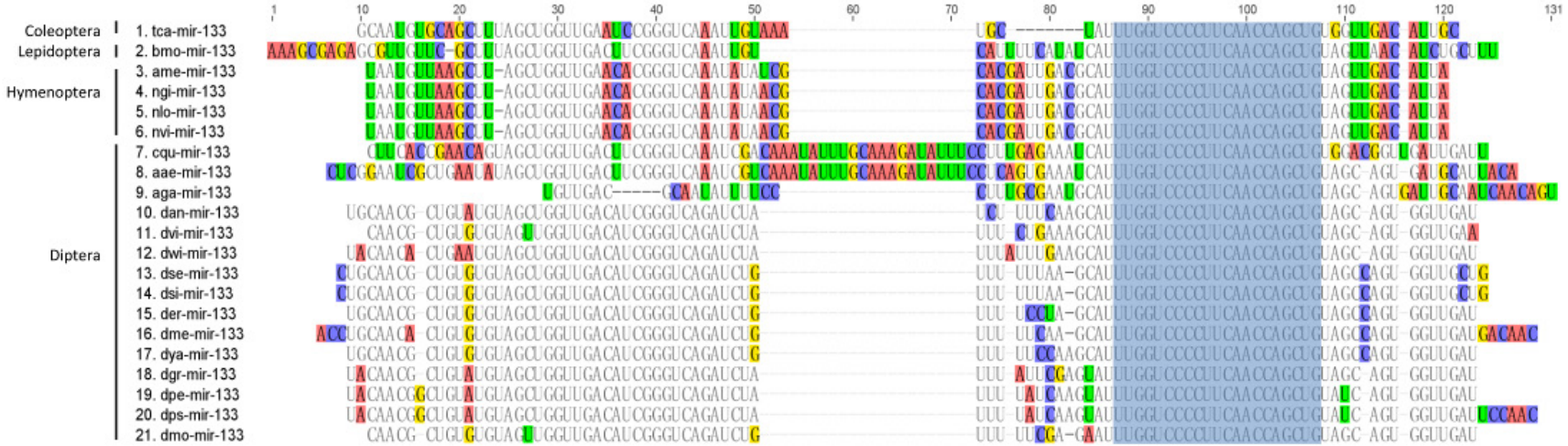
sli-miR-308	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-3338	√	√	—	—	—	insect_specific	specific	√	√	√	√	—	—
sli-miR-745	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-750	√	√	—	—	—	insect_specific	specific	√	√	√	√	—	—
sli-miR-750*	√	√	—	—	—	insect_specific	specific	√	√	√	—	√	—
sli-miR-79*	√	√	—	—	—	insect_specific	specific	√	—	—	—	—	—
sli-miR-92b	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-9c	√	√	—	—	—	insect_specific	specific	√	√	√	√	√	√
sli-miR-9c*	√	√	—	—	—	insect_specific	specific	√	√	—	√	√	√

Figure S1. Homology analysis of homologous miRNA precursor sequences among different species. Alignment was carried out for homologs of *har-let-7* (A), *har-mir-133* (B), *har-mir-1000* (C), and *har-mir-14* (D). Dissimilar nucleotides are marked in different colors. Blue highlighting indicates mature miRNA sequences. The names of the pre-miRNA sequences are listed on the left, labeled with their taxonomic order. The abbreviations represent species as follows: api, *Acyrthosiphon pisum*; tca, *Tribolium castaneum*; bmo, *Bombyx mori*; ame, *Apis mellifera*; ngi, *Nasonia giraulti*; nlo, *Nasonia longicornis*; nvi, *Nasonia vitripennis*; aae, *Aedes aegypti*; aga, *Anopheles gambiae*; cqu, *Culex quinquefasciatus*; dan, *Drosophila ananassae*; der, *Drosophila erecta*; dgr, *Drosophila grimshawi*; dme, *Drosophila melanogaster*; dmo, *Drosophila mojavensis*; dpe, *Drosophila persimilis*; dps, *Drosophila pseudoobscura*; dse, *Drosophila sechellia*; dsi, *Drosophila simulans*; dvi, *Drosophila virilis*; dwi, *Drosophila willistoni*; and dya, *Drosophila yakuba*.

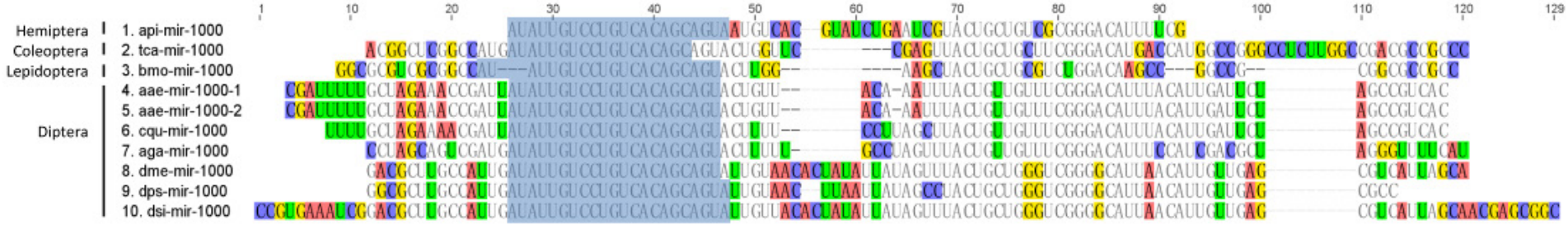
(A)



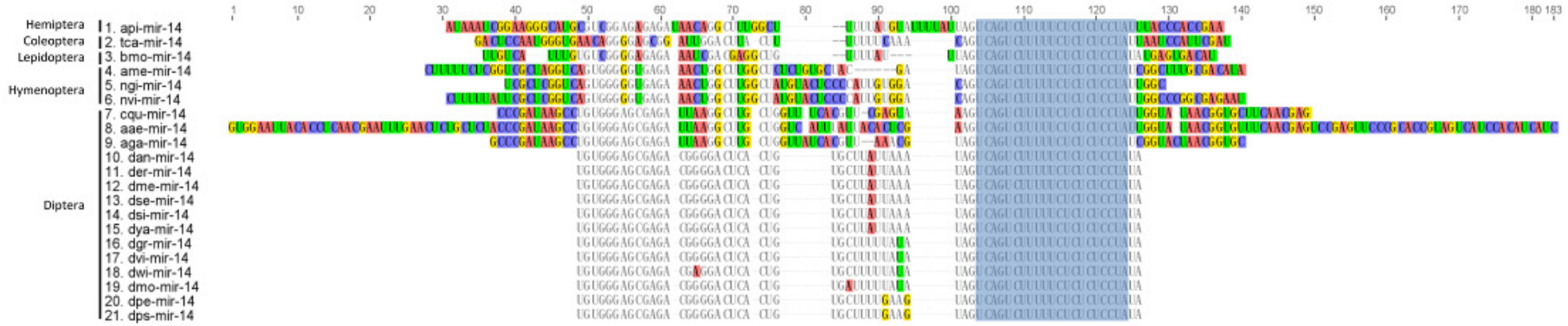
(B)


Coleoptera
Lepidoptera
Hymenoptera
Diptera
1. tca-mir-133
2. bmo-mir-133
3. ame-mir-133
4. ngi-mir-133
5. nlo-mir-133
6. nvi-mir-133
7. cqu-mir-133
8. aae-mir-133
9. aga-mir-133
10. dan-mir-133
11. dvi-mir-133
12. dwi-mir-133
13. dse-mir-133
14. dsi-mir-133
15. der-mir-133
16. dme-mir-133
17. dya-mir-133
18. dgr-mir-133
19. dpe-mir-133
20. dps-mir-133
21. dmo-mir-133

(C)


Hemiptera
Coleoptera
Lepidoptera
Diptera
1. api-mir-1000
2. tca-mir-1000
3. bmo-mir-1000
4. aae-mir-1000-1
5. aae-mir-1000-2
6. cqu-mir-1000
7. aga-mir-1000
8. dme-mir-1000
9. dps-mir-1000
10. dsi-mir-1000

(D)


Hemiptera
Coleoptera
Lepidoptera
Hymenoptera
Diptera
1. api-mir-14
2. tca-mir-14
3. bmo-mir-14
4. ame-mir-14
5. ngi-mir-14
6. nvi-mir-14
7. cqu-mir-14
8. aae-mir-14
9. aga-mir-14
10. dan-mir-14
11. der-mir-14
12. dme-mir-14
13. dse-mir-14
14. dsi-mir-14
15. dya-mir-14
16. dgr-mir-14
17. dvi-mir-14
18. dwi-mir-14
19. dmo-mir-14
20. dpe-mir-14
21. dps-mir-14