

Appendix 1. A list of species used for the study.

Suborder	Infraorder	Family	Species	GenBank accession number	Position of the Control Region	Source
Heteroptera	Cimicomorpha	Miridae	<i>Lygus lineolaris</i>	EU401991.2	14710..17027	Roehrdanz R.L. 2008. Insect Genetics & Biochemistry, USDA ARS, Red River Valley Agricultural Research Center, 1605 Albrecht Blvd, Fargo, ND 58105, USA; unpublished.
			<i>Nesidiocoris tenuis</i>	JQ806057	14390..17544	Dai X., Xun H., Chang J., Zhang J., Hu B., Li H., Yuan X., Cai W. 2012. The complete mitochondrial genome of the plant bug <i>Nesidiocoris tenuis</i> (Reuter) (Hemiptera: Miridae: Bryocorinae: Dicyphini). Zootaxa, 3554: 30-44.
		Nabidae	<i>Alloeorhynchus bakeri</i>	HM235722.1	14540..15851	Li H., Liu H., Cao L., Shi A., Yang H., Cai W. 2012. The complete mitochondrial genome of the damsel bug <i>Alloeorhynchus bakeri</i> (Hemiptera: Nabidae). Int. J. Biol. Sci., 8(1): 93-107.
			<i>Gorpis annulatus</i>	NC_019595.1	15472..16660	Li H., Liu H., Song F., Shi A., Zhou X., Cai W. 2012. Comparative mitogenomic analysis of damsel bugs representing three tribes in the family Nabidae (Insecta: Hemiptera). PLoS ONE, 7(9): e45925.
			<i>Gorpis humeralis</i>	NC_019593.1	16799..18165	Li H., Liu H., Song F., Shi A., Zhou X., Cai W. 2012. Comparative mitogenomic analysis of damsel bugs representing three tribes in the family Nabidae (Insecta: Hemiptera). PLoS ONE, 7(9): e45925.
			<i>Himacerus apterus</i>	JF927831.1	14442..15995	Li H., Liu H., Song F., Shi A., Zhou X., Cai W. 2012. Comparative mitogenomic analysis of damsel bugs representing three tribes in the family Nabidae (Insecta: Hemiptera). PLoS ONE, 7(9): e45925.
			<i>Himacerus nodipes</i>	JF927832.1	15211..16457	Li H., Liu H., Song F., Shi A., Zhou X., Cai W. 2012. Comparative mitogenomic analysis of damsel bugs representing three tribes in the family Nabidae (Insecta: Hemiptera). PLoS ONE, 7(9): e45925.
			<i>Nabis apicalis</i>	NC_019594.1	14519..15588	Li H., Liu H., Song F., Shi A., Zhou X., Cai W. 2012. Comparative mitogenomic analysis of damsel bugs representing three tribes in the family Nabidae (Insecta: Hemiptera). PLoS ONE, 7(9): e45925.

Suborder	Infraorder	Family	Species	GenBank accession number	Position of the Control Region	Source
Heteroptera	Cimicomorpha	Reduviidae	<i>Agriosphodrus dohrni</i>	NC_015842.1	14828..16470	Li H., Gao J., Liu H., Liu H., Liang A., Zhou X., Cai W. 2011. The architecture and complete sequence of mitochondrial genome of an assassin bug <i>Agriosphodrus dohrni</i> (Hemiptera: Reduviidae). <i>Int. J. Biol. Sci.</i> , 7(6): 792-804.
			<i>Sirthenea flavipes</i>	NC_020143.1	14622..15961	Gao J., Li H., Truong X.L., Dai X., Chang J., Cai W. 2013. Complete nucleotide sequence and organization of the mitochondrial genome of <i>Sirthenea flavipes</i> (Hemiptera: Reduviidae: Peiratinae) and comparison with other assassin bugs. <i>Zootaxa</i> , 3669: 001-016.
			<i>Triatoma dimidiata</i>	AF301594.1	14855..17019	Dotson E.M., Beard C.B. 2001. Sequence and organization of the mitochondrial genome of the Chagas disease vector, <i>Triatoma dimidiata</i> . <i>Insect Molecular Biology</i> , 10(3): 205-215.
			<i>Valentia hoffmanni</i>	NC_012823.1	14902..15625	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2009. Phylogenetic analysis of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha): evidence from mitochondrial genomes. <i>BMC Evolutionary Biology</i> , 9: 134.
	Enicocephalomorpha	Enicocephalidae	<i>Stenopirates sp.</i>	NC_016017.1	10779..11543	Li H., Liu H., Shi A., Štys P., Zhou X., Cai W. 2012. The complete mitochondrial genome and novel gene arrangement of the unique-headed bug <i>Stenopirates sp.</i> (Hemiptera: Enicocephalidae). <i>PLoS ONE</i> , 7(1): e29419.
	Gerromorpha	Gerridae	<i>Aquarius paludum</i>	FJ456944.1	14600..15380	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2009. Phylogenetic analysis of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha): evidence from mitochondrial genomes. <i>BMC Evolutionary Biology</i> , 9: 134.
	Leptopodomorpha	Saldidae	<i>Saldula arsenjevi</i>	EU427345.1	14628..15324	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). <i>BMC Genomics</i> , 9: 610.
	Nepomorpha	Naucoridae	<i>Ilyocoris cimicoides</i>	NC_012845.1	14601..15209	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2009. Phylogenetic analysis of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha): evidence from mitochondrial genomes. <i>BMC Evolutionary Biology</i> , 9: 134.
Nepidae		<i>Laccotrephes robustus</i>	NC_012817.1	14571..15321	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2009. Phylogenetic analysis of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha): evidence from mitochondrial genomes. <i>BMC Evolutionary Biology</i> , 9: 134.	

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Heteroptera	Nepomorpha	Notonectidae	<i>Enithares tibialis</i>	NC_012819.1	14617..15262	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2009. Phylogenetic analysis of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha): evidence from mitochondrial genomes. <i>BMC Evolutionary Biology</i> , 9: 134.
		Pleidae	<i>Paraplea frontalis</i>	NC_012822.1	14523..15130	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2009. Phylogenetic analysis of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha): evidence from mitochondrial genomes. <i>BMC Evolutionary Biology</i> , 9: 134.
	Pentatomomorpha	Alydidae	<i>Riptortus pedestris</i>	EU427344.1	14792..17191	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). <i>BMC Genomics</i> , 9: 610.
		Aradidae	<i>Aradacanthia heissi</i>	HQ441233.1	14293..15324	Shi A., Li H., Bai X., Dai X., Chang J., Guilbert E., Cai W. 2012. The complete mitochondrial genome of the flat bug <i>Aradacanthia heissi</i> (Hemiptera: Aradidae). <i>Zootaxa</i> , 3238: 23-38.
			<i>Neuroctenus parus</i>	EU427340.1	14593..15241	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). <i>BMC Genomics</i> , 9: 610.
		Berytidae	<i>Yemmalysus parallelus</i>	EU427346.1	14567..15747	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). <i>BMC Genomics</i> , 9: 610.
		Coreidae	<i>Hydaropsis longirostris</i>	EU427337.1	14531..16521	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). <i>BMC Genomics</i> , 9: 610.
		Largidae	<i>Physopelta gutta</i>	EU427343.1	14712..14935	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). <i>BMC Genomics</i> , 9: 610.
		Malcidae	<i>Chauliops fallax</i>	JX839706.1	14592..15739	Li T., Gao C., Cui Y., Xie Q., Bu W. 2013. The complete mitochondrial genome of the stalk-eyed bug <i>Chauliops fallax</i> Scott, and the monophyly of Malcidae (Hemiptera: Heteroptera). <i>PLoS ONE</i> , 8(2): e55381.

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Heteroptera	Pentatomomorpha	Pentatomidae	<i>Dolycoris baccarum</i>	KC460537.1	14670..16549	Zhang W., Yuan M., Shen Y. 2013. The complete mitochondrial genome of <i>Dolycoris baccarum</i> (Insecta: Hemiptera: Pentatomidae). Mitochondrial DNA, 24(5): 469-471.
			<i>Halyomorpha halys</i>	FJ685650.1	14704..16518	Lee W., Kang J., Jung C., Hoelmer K., Lee S.H., Lee S. 2009. Complete mitochondrial genome of brown marmorated stink bug <i>Halyomorpha halys</i> (Hemiptera: Pentatomidae), and phylogenetic relationships of Hemipteran suborders. Mol. Cells, 28: 155-165.
			<i>Nezara viridula</i>	NC_011755.1	14700..16889	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). BMC Genomics, 9: 610.
		Plataspidae	<i>Coptosoma bifaria</i>	EU427334.1	14595..16179	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). BMC Genomics, 9: 610.
			<i>Megacopta cribraria</i>	NC_015342.1	14664..15647	Eaton T.D., Jenkins T.M. 2011. National Center for Biotechnology Information, NIH, Bethesda, MD 20894, USA; unpublished.
		Pyrrhocoridae	<i>Dysdercus cingulatus</i>	EU427335.1	14633..16249	Hua J., Li M., Dong P., Cui Y., Xie Q., Bu W. 2008. Comparative and phylogenomic studies on the mitochondrial genomes of Pentatomomorpha (Insecta: Hemiptera: Heteroptera). BMC Genomics, 9: 610.
		Rhopalidae	<i>Stictopleurus subviridis</i>	NC_012888.1	14635..15319	Hua J., Dong P., Li M., Cui Y., Zhu W., Xie W., Bu W. 2009. The analysis of mitochondrial genome of <i>Stictopleurus subviridis</i> Hsiao (Insecta, Hemiptera - Heteroptera, Rhopalidae). Acta Zootaxonomica Sinica, 34(1): 1-9.
		Tessaratomidae	<i>Eusthenes cupreus</i>	JQ910983.1	14710..16229	Song W., Li H., Song F., Liu L., Wang P., Xun H., Dai X., Chang J., Cai W. 2013. The complete mitochondrial genome of a tessaratomid bug, <i>Eusthenes cupreus</i> (Hemiptera: Heteroptera: Pentatomomorpha: Tessaratomidae). Zootaxa, 3620(2): 260-272.
		Urostylididae	<i>Urochela quadrinotata</i>	NC_020144.1	14286..16587	Dai Y., Li H., Pei J., Song F., Ye Z., Yuan X., Dai X., Chang J., Cai W. 2012. Sequence and organization of the mitochondrial genome of an urostylidid bug, <i>Urochela quadrinotata</i> Reuter (Hemiptera: Urostylididae). Entomotaxonomia, 34(4): 613-623.

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Cicado-morpha	Aphrophoridae	<i>Philaenus spumarius</i>	AY630340.1	14490..16324	Stewart J.B., Beckenbach A.T. 2005. Insect mitochondrial genomics: the complete mitochondrial genome sequence of the meadow spittlebug <i>Philaenus spumarius</i> (Hemiptera: Auchenorrhyncha: Cercopoidae). <i>Genome</i> , 48: 46-54.
	Cercopidae	<i>Abidama producta</i>	NC_015799.1	14605..15277	Liu J. 2011. National Center for Biotechnology Information, NIH, Bethesda, MD 20894, USA; unpublished.
		<i>Callitettix versicolor</i>	NC_020031.1	14601..15374	Bu C.P., Liang A.P. 2013. National Center for Biotechnology Information, NIH, Bethesda, MD 20894, USA; unpublished.
		<i>Paphnutius ruficeps</i>	NC_021100.1	14532..14841	Liu J., Liang A. 2013. The complete mitochondrial genome of spittlebug <i>Paphnutius ruficeps</i> (Insecta: Hemiptera: Cercopidae) with a fairly short putative control region. <i>Acta Biochim. Biophys. Sin. (Shanghai)</i> , 45(4): 309-319.
Coleorhyncha	Peloriidiidae	<i>Hackeriella veitchi</i>	NC_020309.1	14498..15793	Cui Y., Xie G., Hua J., Dang K., Zhou J., Liu X., Wang G., Yu X., Bu W. 2013. Phylogenomics of Hemiptera (Insecta: Paraneoptera) based on mitochondrial genomes. <i>Syst. Entomol.</i> , 38(1): 233-245.
Fulgoro-morpha	Delphacidae	<i>Laodelphax striatella</i>	JX880068.1	14390..16431	Zhang K., Zhu W., Rong X., Zhang Y., Ding X., Liu J., Chen D., Du Y., Hong X. 2013. The complete mitochondrial genomes of two rice planthoppers, <i>Nilaparvata lugens</i> and <i>Laodelphax striatellus</i> : conserved genome rearrangement in Delphacidae and discovery of new characteristics of atp8 and tRNA genes. <i>BMC Genomics</i> , 14: 417.
		<i>Nilaparvata lugens</i>	JX880069.1	15191..17619	Zhang K., Zhu W., Rong X., Zhang Y., Ding X., Liu J., Chen D., Du Y., Hong X. 2013. The complete mitochondrial genomes of two rice planthoppers, <i>Nilaparvata lugens</i> and <i>Laodelphax striatellus</i> : conserved genome rearrangement in Delphacidae and discovery of new characteristics of atp8 and tRNA genes. <i>BMC Genomics</i> , 14: 417.
		<i>Sogatella furcifera</i>	NC_021417.1	14390..16612	Zhang K., Zhu W., Hong X. 2013. Department of Entomology, Nanjing Agricultural University, Weigang 1, Nanjing, Jiangsu 210095, China; unpublished.

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Fulgoro- morpha	Flatidae		<i>Geisha distinctissima</i>	NC_012617.1	14270..15971	Song N., Liang A. 2009. The complete mitochondrial genome sequence of <i>Geisha distinctissima</i> (Hemiptera: Flatidae) and comparison with other hemipteran insects. Acta Biochim Biophys Sin, 41(3): 206-216.
	Fulgoridae		<i>Laternaria candelaria</i>	NC_019576.1	14430..16021	Song N., Liang A.P., Bu C.P. 2012. A molecular phylogeny of Hemiptera inferred from mitochondrial genome sequences. PLoS ONE 7(11): e48778.
			<i>Lycorma delicatula</i>	EU909203.1	14305..15946	Song N., Liang A.P., Bu C.P. 2012. A molecular phylogeny of Hemiptera inferred from mitochondrial genome sequences. PLoS ONE 7(11): e48778.
	Issidae		<i>Sivaloka damnosus</i>	NC_014286.1	14294..15287	Song N., Liang A., Ma C. 2010. The complete mitochondrial genome sequence of the planthopper, <i>Sivaloka damnosus</i> . Journal of Insect Science, 10(76): 1-20.
	Ricaniidae		<i>Ricania marginalis</i>	NC_019597.1	14375..15698	Song N., Liang A.P., Bu C.P. 2012. A molecular phylogeny of Hemiptera inferred from mitochondrial genome sequences. PLoS ONE 7(11): e48778.

Outgroup:

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Psocoptera	Psocidae	<i>Psococerastis albimaculata</i>	NC_021400.1	14679..15589	Li H., Shao R., Song F., Zhou X., Yang Q., Li Z., Cai W. 2013. Mitochondrial genomes of two barklice, <i>Psococerastis albimaculata</i> and <i>Longivalvus hyalospilus</i> (Psocoptera: Psocomorpha): contrasting rates in mitochondrial gene rearrangement between major lineages of Psocodea. PLoS ONE, 8(4): e61685.