

Figure S1. Amino acid of the RNA-dependent RNA polymerase between MKWV, KURV and MJPV.

	1	10	20	30	40	50	60	70
MKWV-Japan-Ixodes_persulcatus	MEPILSRIGNFQGFQKPKQVQHYEADLFNTALPSFQVSNTKAGLSLDVNLEDLDRASTVGSITTKDQVTPMDQILN							
MKWV-China-Heamaphysalis_concinna	MEPILSRIGNFQGFQKPKQVQHYEADLFNTALPSFQVSNTKAGLSLDVNLEDLDRASTVGSITTKDQVTPMDQILN							
MKWV-China-Ixodes_persulcatus	MEPILSRIGNFQGFQKPKQVQHYEADLFNTALPSFQVSNTKAGLSLDVNLEDLDRASTVGSITTKDQVTPMDQILN							
KURV-Japan-Ixodes_persulcatus	MEPILSRIGNFQGFQKPKQVQHYEADLFNTALPSFQVSNTKAGLSLDVNLEDLDRASTVGSITTKDQVTPMDQILN							
MJTV-China-Ixodes_persulcatus	MEPILSRIGNFQGFQKPKQVQHYEADLFNTALPSFQVSNTKAGLSLDVNLEDLDRASTVGSITTKDQVTPMDQILN							
Our_MJTV-Ixodes_persulcatus	MEPILSRIGNFQGFQKPKQVQHYEADLFNTALPSFQVSNTKAGLSLDVNLEDLDRASTVGSITTKDQVTPMDQILN							
	80	90	100	110	120	130	140	150
MKWV-Japan-Ixodes_persulcatus	FVHDFTVAHILTKSTDSTRFSEAFPLIGDGFDCGHTP	DDIIITPGQRFVVEYTTNRGNERQARQ	AAATKFAKYELAC					
MKWV-China-Heamaphysalis_concinna	FVHDFTVAHILTKSTDSTRFSEAFPLIGDGFDCGHTP	DDIIITPGQRFVVEYTTNRGNERQARQ	AAATKFAKYELAC					
MKWV-China-Ixodes_persulcatus	FVHDFTVAHILTKSTDSTRFSEAFPLIGDGFDCGHTP	DDIIITPGQRFVVEYTTNRGNERQARQ	AAATKFAKYELAC					
KURV-Japan-Ixodes_persulcatus	FVHDFTVAHILTKSTDSTRFSEAFPLIGDGFDCGHTP	DDIIITPGQRFVVEYTTNRGNERQARQ	AAATKFAKYELAC					
MJTV-China-Ixodes_persulcatus	FVHDFTVAHILTKSTDSTRFSEAFPLIGDGFDCGHTP	DDIIITPGQRFVVEYTTNRGNERQARQ	AAATKFAKYELAC					
Our_MJTV-Ixodes_persulcatus	FVHDFTVAHILTKSTDSTRFSEAFPLIGDGFDCGHTP	DDIIITPGQRFVVEYTTNRGNERQARQ	AAATKFAKYELAC					
	160	170	180	190	200	210	220	
MKWV-Japan-Ixodes_persulcatus	QNRSSIMPTIMLCVTSVHRDGVNSNIPITQAEVDELVFRFLAVATFGETIREMSPDAIKDDPELSKTEREVLGIIS							
MKWV-China-Heamaphysalis_concinna	QNRSSIMPTIMLCVTSVHRDGVNSNIPITQAEVDELVFRFLAVATFGETIREMSPDAIKDDPELSKTEREVLGIIS							
MKWV-China-Ixodes_persulcatus	QNRSSIMPTIMLCVTSVHRDGVNSNIPITQAEVDELVFRFLAVATFGETIREMSPDAIKDDPELSKTEREVLGIIS							
KURV-Japan-Ixodes_persulcatus	QNRSSIMPTIMLCVTSVHRDGVNSNIPITQAEVDELVFRFLAVATFGETIREMSPDAIKDDPELSKTEREVLGIIS							
MJTV-China-Ixodes_persulcatus	QNRSSIMPTIMLCVTSVHRDGVNSNIPITQAEVDELVFRFLAVATFGETIREMSPDAIKDDPELSKTEREVLGIIS							
Our_MJTV-Ixodes_persulcatus	QNRSSIMPTIMLCVTSVHRDGVNSNIPITQAEVDELVFRFLAVATFGETIREMSPDAIKDDPELSKTEREVLGIIS							
	230	240	250	260	270	280	290	300
MKWV-Japan-Ixodes_persulcatus	QIPLDNEKTSKAPFAFQESTITMGFIKSPEDDEYVNSVIAQC	DKAAQDLIRESHMD	SEDLGRRLNRRITTEMA					
MKWV-China-Heamaphysalis_concinna	QIPLDNEKTSKAPFAFQESTITMGFIKSPEDDEYVNSVIAQC	DKAAQDLIRESHMD	SEDLGRRLNRRITTEMA					
MKWV-China-Ixodes_persulcatus	QIPLDNEKTSKAPFAFQESTITMGFIKSPEDDEYVNSVIAQC	DKAAQDLIRESHMD	SEDLGRRLNRRITTEMA					
KURV-Japan-Ixodes_persulcatus	QIPLDNEKTSKAPFAFQESTITMGFIKSPEDDEYVNSVIAQC	DKAAQDLIRESHMD	SEDLGRRLNRRITTEMA					
MJTV-China-Ixodes_persulcatus	QIPLDNEKTSKAPFAFQESTITMGFIKSPEDDEYVNSVIAQC	DKAAQDLIRESHMD	SEDLGRRLNRRITTEMA					
Our_MJTV-Ixodes_persulcatus	QIPLDNEKTSKAPFAFQESTITMGFIKSPEDDEYVNSVIAQC	DKAAQDLIRESHMD	SEDLGRRLNRRITTEMA					
	310	320	330	340	350	360	370	
MKWV-Japan-Ixodes_persulcatus	IDARMVEYTDGRSMRHEKDRKSTVQFPFVMT	EGPEGKDLSP	MDVDVR	ESPMARVWSSVVRNSCTEETQRMDD				
MKWV-China-Heamaphysalis_concinna	IDARMVEYTDGRSMRHEKDRKSTVQFPFVMT	EGPEGKDLSP	MDVDVR	ESPMARVWSSVVRNSCTEETQRMDD				
MKWV-China-Ixodes_persulcatus	IDARMVEYTDGRSMRHEKDRKSTVQFPFVMT	EGPEGKDLSP	MDVDVR	ESPMARVWSSVVRNSCTEETQRMDD				
KURV-Japan-Ixodes_persulcatus	IDARMVEYTDGRSMRHEKDRKSTVQFPFVMT	EGPEGKDLSP	MDVDVR	ESPMARVWSSVVRNSCTEETQRMDD				
MJTV-China-Ixodes_persulcatus	IDARMVEYTDGRSMRHEKDRKSTVQFPFVMT	EGPEGKDLSP	MDVDVR	ESPMARVWSSVVRNSCTEETQRMDD				
Our_MJTV-Ixodes_persulcatus	IDARMVEYTDGRSMRHEKDRKSTVQFPFVMT	EGPEGKDLSP	MDVDVR	ESPMARVWSSVVRNSCTEETQRMDD				
	380	390	400	410	420	430	440	450
MKWV-Japan-Ixodes_persulcatus	DPEEELRLALENSMSSSDQRRQYHRTTILEESERVYAATLGVEAKYKDMPLV	QDARAS	SKLPFS	ED	HTNDIS			
MKWV-China-Heamaphysalis_concinna	DPEEELRLALENSMSSSDQRRQYHRTTILEESERVYAATLGVEAKYKDMPLV	QDARAS	SKLPFS	ED	HTNDIS			
MKWV-China-Ixodes_persulcatus	DPEEELRLALENSMSSSDQRRQYHRTTILEESERVYAATLGVEAKYKDMPLV	QDARAS	SKLPFS	ED	HTNDIS			
KURV-Japan-Ixodes_persulcatus	DPEEELRLALENSMSSSDQRRQYHRTTILEESERVYAATLGVEAKYKDMPLV	QDARAS	SKLPFS	ED	HTNDIS			
MJTV-China-Ixodes_persulcatus	DPEEELRLALENSMSSSDQRRQYHRTTILEESERVYAATLGVEAKYKDMPLV	QDARAS	SKLPFS	ED	HTNDIS			
Our_MJTV-Ixodes_persulcatus	DPEEELRLALENSMSSSDQRRQYHRTTILEESERVYAATLGVEAKYKDMPLV	QDARAS	SKLPFS	ED	HTNDIS			
	460	470	480	490	500	510	520	
MKWV-Japan-Ixodes_persulcatus	RYHPAGQDFRNDYLYSCPMADSELKKAAKIHQPTLLQ	EGGNEW	ITNHDN	FLQSP	MGSLWLOVSV	SGSELAA		
MKWV-China-Heamaphysalis_concinna	RYHPAGQDFRNDYLYSCPMADSELKKAAKIHQPTLLQ	EGGNEW	ITNHDN	FLQSP	MGSLWLOVSV	SGSELAA		
MKWV-China-Ixodes_persulcatus	RYHPAGQDFRNDYLYSCPMADSELKKAAKIHQPTLLQ	EGGNEW	ITNHDN	FLQSP	MGSLWLOVSV	SGSELAA		
KURV-Japan-Ixodes_persulcatus	RYHPAGQDFRNDYLYSCPMADSELKKAAKIHQPTLLQ	EGGNEW	ITNHDN	FLQSP	MGSLWLOVSV	SGSELAA		
MJTV-China-Ixodes_persulcatus	RYHPAGQDFRNDYLYSCPMADSELKKAAKIHQPTLLQ	EGGNEW	ITNHDN	FLQSP	MGSLWLOVSV	SGSELAA		
Our_MJTV-Ixodes_persulcatus	RYHPAGQDFRNDYLYSCPMADSELKKAAKIHQPTLLQ	EGGNEW	ITNHDN	FLQSP	MGSLWLOVSV	SGSELAA		
	530	540	550	560	570	580	590	600
MKWV-Japan-Ixodes_persulcatus	SVKQCHCKPGQFIVKRLNLSGVLLIKPTNSDSHFVSMALDRKNYWRD	LGADCFK	AYEDV	GLV	TFVSFKVS			
MKWV-China-Heamaphysalis_concinna	SVKQCHCKPGQFIVKRLNLSGVLLIKPTNSDSHFVSMALDRKNYWRD	LGADCFK	AYEDV	GLV	TFVSFKVS			
MKWV-China-Ixodes_persulcatus	SVKQCHCKPGQFIVKRLNLSGVLLIKPTNSDSHFVSMALDRKNYWRD	LGADCFK	AYEDV	GLV	TFVSFKVS			
KURV-Japan-Ixodes_persulcatus	SVKQCHCKPGQFIVKRLNLSGVLLIKPTNSDSHFVSMALDRKNYWRD	LGADCFK	AYEDV	GLV	TFVSFKVS			
MJTV-China-Ixodes_persulcatus	SVKQCHCKPGQFIVKRLNLSGVLLIKPTNSDSHFVSMALDRKNYWRD	LGADCFK	AYEDV	GLV	TFVSFKVS			
Our_MJTV-Ixodes_persulcatus	SVKQCHCKPGQFIVKRLNLSGVLLIKPTNSDSHFVSMALDRKNYWRD	LGADCFK	AYEDV	GLV	TFVSFKVS			
	610	620	630	640	650	660	670	
MKWV-Japan-Ixodes_persulcatus	KLTLNLCKSDSVLSAAACFWAEQYGIKFWL	TS	ED	GL	SD	SP	NR	EARSM
MKWV-China-Heamaphysalis_concinna	KLTLNLCKSDSVLSAAACFWAEQYGIKFWL	TS	ED	GL	SD	SP	NR	EARSM
MKWV-China-Ixodes_persulcatus	KLTLNLCKSDSVLSAAACFWAEQYGIKFWL	TS	ED	GL	SD	SP	NR	EARSM
KURV-Japan-Ixodes_persulcatus	KLTLNLCKSDSVLSAAACFWAEQYGIKFWL	TS	ED	GL	SD	SP	NR	EARSM
MJTV-China-Ixodes_persulcatus	KLTLNLCKSDSVLSAAACFWAEQYGIKFWL	TS	ED	GL	SD	SP	NR	EARSM
Our_MJTV-Ixodes_persulcatus	KLTLNLCKSDSVLSAAACFWAEQYGIKFWL	TS	ED	GL	SD	SP	NR	EARSM

	1360	1370	1380	1390	1400	1410	1420																																																													
MKWV-Japan-Ixodes_persulcatus	VIRWGNRK	KYERLL	QSMDLPT	WEDD	INKNPF	ILYRAPQSGEEALIRICEKH	HSFGIASSLSKGNVIRVMASVV																																																													
MKWV-China-Haemaphysalis_concinna	VIRWGNRK	KYERLL	QSMDLPT	WEDD	INKNPF	ILYRAPQSGEEALIRICEKH	HSFGIASSLSKGNVIRVMASVV																																																													
MKWV-China-Ixodes_persulcatus	MIRWGNRK	KYERLL	QSMDLPT	WEDD	INKNPF	ILYRAPQSGEEALIRICEKH	HSFGIASSLSKGNVIRVMASVV																																																													
KURV-Japan-Ixodes_persulcatus	VIRWGNRK	KYERLL	QSMDLPT	WEDD	INKNPF	ILYRAPQSGEEALIRICEKH	HSFGIASSLSKGNVIRVMASVV																																																													
MJPV-China-Ixodes_persulcatus	VVRWGNRK	KYERLL	QSMDLPT	WEDD	INKNPF	ILYRAPQSGEEALIRICEKH	HSFGIASSLSKGNVIRVMASVV																																																													
Our_MJPV-Ixodes_persulcatus	VVRWGNRK	KYERLL	QSMDLPT	WEDD	INKNPF	ILYRAPQSGEEALIRICEKH	HSFGIASSLSKGNVIRVMASVV																																																													
	1430	1440	1450	1460	1470	1480	1490	1500																																																												
MKWV-Japan-Ixodes_persulcatus	YALSAAIYQD	IRRM	PF	SPLG	GGKYSLLSRVIAFETSGII	RL	EP	DI	I	FLFPNIEELEK	DEIAFD	RG	A	IQ	I	RP																																																				
MKWV-China-Haemaphysalis_concinna	YALSAAIYQD	IRRM	PF	SPLG	GGKYSLLSRVIAFETSGII	RL	EP	DI	I	FLFPNIEELEK	DEIAFD	RG	A	IQ	I	RP																																																				
MKWV-China-Ixodes_persulcatus	YALSAAIYQD	IRRM	PF	SPLG	GGKYSLLSRVIAFETSGII	RL	EP	DI	I	FLFPNIEELEK	DEIAFD	RG	A	IQ	I	RP																																																				
KURV-Japan-Ixodes_persulcatus	YALSAAIYQD	IRRM	PF	SPLG	GGKYSLLSRVIAFETSGII	RL	EP	DI	I	FLFPNIEELEK	DEIAFD	RG	A	IQ	I	RP																																																				
MJPV-China-Ixodes_persulcatus	YALSAAIYQD	IRRM	PF	SPLG	GGKYSLLSRVIAFETSGII	RL	EP	DI	I	FLFPNIEELEK	DEIAFD	RG	A	IQ	I	RP																																																				
Our_MJPV-Ixodes_persulcatus	YALSAAIYQD	IRRM	PF	SPLG	GGKYSLLSRVIAFETSGII	RL	EP	DI	I	FLFPNIEELEK	DEIAFD	RG	A	IQ	I	RP																																																				
	1510	1520	1530	1540	1550	1560	1570																																																													
MKWV-Japan-Ixodes_persulcatus	SSMRESTQ	IRVQV	LGDSNOYRVSPDKLVSDKKWFQ	TS	SKVSR	TL	ED	DL	W	RL	A	RL	S	W	L	R	D	T	E	E	T	L	E	A	S	P	L	A	S	H																																						
MKWV-China-Haemaphysalis_concinna	SSMRESTQ	IRVQV	LGDSNOYRVSPDKLVSDKKWFQ	TS	SKVSR	TL	ED	DL	W	RL	A	RL	S	W	L	R	D	T	E	E	T	L	E	A	S	P	L	A	S	H																																						
MKWV-China-Ixodes_persulcatus	SSMRESTQ	IRVQV	LGDSNOYRVSPDKLVSDKKWFQ	TS	SKVSR	TL	ED	DL	W	RL	A	RL	S	W	L	R	D	T	E	E	T	L	E	A	S	P	L	A	S	H																																						
KURV-Japan-Ixodes_persulcatus	SSMRESTQ	IRVQV	LGDSNOYRVSPDKLVSDKKWFQ	TS	SKVSR	TL	ED	DL	W	RL	A	RL	S	W	L	R	D	T	E	E	T	L	E	A	S	P	L	A	S	H																																						
MJPV-China-Ixodes_persulcatus	SSMRESTQ	IRVQV	LGDSNOYRVSPDKLVSDKKWFQ	TS	SKVSR	TL	ED	DL	W	RL	A	RL	S	W	L	R	D	T	E	E	T	L	E	A	S	P	L	A	S	H																																						
Our_MJPV-Ixodes_persulcatus	SSMRESTQ	IRVQV	LGDSNOYRVSPDKLVSDKKWFQ	TS	SKVSR	TL	ED	DL	W	RL	A	RL	S	W	L	R	D	T	E	E	T	L	E	A	S	P	L	A	S	H																																						
	1580	1590	1600	1610	1620	1630	1640	1650																																																												
MKWV-Japan-Ixodes_persulcatus	VOI	RN	FLARM	SKPR	FL	SITGAPVKK	RSGL	SKMLS	SVLRDNFARDAI	D	IED	H	V	G	L	S	K	H	T	A	T	E	L	V	K	H	S	L	F	C	A	L	O	G																																		
MKWV-China-Haemaphysalis_concinna	VOI	RN	FLARM	SKPR	FL	SITGAPVKK	RSGL	SKMLS	SVLRDNFARDAI	D	IED	H	V	G	L	S	K	H	T	A	T	E	L	V	K	H	S	L	F	C	A	L	O	G																																		
MKWV-China-Ixodes_persulcatus	VOI	RN	FLARM	SKPR	FL	SITGAPVKK	RSGL	SKMLS	SVLRDNFARDAI	D	IED	H	V	G	L	S	K	H	T	A	T	E	L	V	K	H	S	L	F	C	A	L	O	G																																		
KURV-Japan-Ixodes_persulcatus	VOI	RN	FLARM	SKPR	FL	SITGAPVKK	RSGL	SKMLS	SVLRDNFARDAI	D	IED	H	V	G	L	S	K	H	T	A	T	E	L	V	K	H	S	L	F	C	A	L	O	G																																		
MJPV-China-Ixodes_persulcatus	VOI	RN	FLARM	SKPR	FL	SITGAPVKK	RSGL	SKMLS	SVLRDNFARDAI	D	IED	H	V	G	L	S	K	H	T	A	T	E	L	V	K	H	S	L	F	C	A	L	O	G																																		
Our_MJPV-Ixodes_persulcatus	VOI	RN	FLARM	SKPR	FL	SITGAPVKK	RSGL	SKMLS	SVLRDNFARDAI	D	IED	H	V	G	L	S	K	H	T	A	T	E	L	V	K	H	S	L	F	C	A	L	O	G																																		
	1660	1670	1680	1690	1700	1710	1720																																																													
MKWV-Japan-Ixodes_persulcatus	PYT	D	STKEQL	QYFL	GL	ALPEIPL	KD	QDGK	TRSNVLA	L	Q	R	F	V	S	S	E	S	V	I	D	I	R	V	G	A	I	V	G	G	T	R	P	Q	R	A	A	R	R	D	G																											
MKWV-China-Haemaphysalis_concinna	PYT	D	STKEQL	QYFL	GL	ALPEIPL	KD	QDGK	TRSNVLA	L	Q	R	F	V	S	S	E	S	V	I	D	I	R	V	G	A	I	V	G	G	T	R	P	Q	R	A	A	R	R	D	G																											
MKWV-China-Ixodes_persulcatus	PYT	D	STKEQL	QYFL	GL	ALPEIPL	KD	QDGK	TRSNVLA	L	Q	R	F	V	S	S	E	S	V	I	D	I	R	V	G	A	I	V	G	G	T	R	P	Q	R	A	A	R	R	D	G																											
KURV-Japan-Ixodes_persulcatus	PYT	D	STKEQL	QYFL	GL	ALPEIPL	KD	QDGK	TRSNVLA	L	Q	R	F	V	S	S	E	S	V	I	D	I	R	V	G	A	I	V	G	G	T	R	P	Q	R	A	A	R	R	D	G																											
MJPV-China-Ixodes_persulcatus	PYT	D	STKEQL	QYFL	GL	ALPEIPL	KD	QDGK	TRSNVLA	L	Q	R	F	V	S	S	E	S	V	I	D	I	R	V	G	A	I	V	G	G	T	R	P	Q	R	A	A	R	R	D	G																											
Our_MJPV-Ixodes_persulcatus	PYT	D	STKEQL	QYFL	GL	ALPEIPL	KD	QDGK	TRSNVLA	L	Q	R	F	V	S	S	E	S	V	I	D	I	R	V	G	A	I	V	G	G	T	R	P	Q	R	A	A	R	R	D	G																											
	1730	1740	1750	1760	1770	1780	1790	1800																																																												
MKWV-Japan-Ixodes_persulcatus	FHY	H	GGPTWRGV	MDG	V	Q	VOID	IDNRE	QEP	PPQ	VA	T	V	S	G	T	Q	T	P	W	A	I	P	S	L	Q	S	W	C	D	V	R	S	K	S	R	P	G	A	K	F																											
MKWV-China-Haemaphysalis_concinna	FHY	H	GGPTWRGV	MDG	V	Q	VOID	IDNRE	QEP	PPQ	VA	T	V	S	G	T	Q	T	P	W	A	I	P	S	L	Q	S	W	C	D	V	R	S	K	S	R	P	G	A	K	F																											
MKWV-China-Ixodes_persulcatus	FHY	H	GGPTWRGV	MDG	V	Q	VOID	IDNRE	QEP	PPQ	VA	T	V	S	G	T	Q	T	P	W	A	I	P	S	L	Q	S	W	C	D	V	R	S	K	S	R	P	G	A	K	F																											
KURV-Japan-Ixodes_persulcatus	FHY	H	GGPTWRGV	MDG	V	Q	VOID	IDNRE	QEP	PPQ	VA	T	V	S	G	T	Q	T	P	W	A	I	P	S	L	Q	S	W	C	D	V	R	S	K	S	R	P	G	A	K	F																											
MJPV-China-Ixodes_persulcatus	FHY	H	GGPTWRGV	MDG	V	Q	VOID	IDNRE	QEP	PPQ	VA	T	V	S	G	T	Q	T	P	W	A	I	P	S	L	Q	S	W	C	D	V	R	S	K	S	R	P	G	A	K	F																											
Our_MJPV-Ixodes_persulcatus	FHY	H	GGPTWRGV	MDG	V	Q	VOID	IDNRE	QEP	PPQ	VA	T	V	S	G	T	Q	T	P	W	A	I	P	S	L	Q	S	W	C	D	V	R	S	K	S	R	P	G	A	K	F																											
	1810	1820	1830	1840	1850	1860	1870																																																													
MKWV-Japan-Ixodes_persulcatus	WIY	G	F	R	M	S	G	P	S	S	P	G	V	P	V	I	V	Y	R	I	S	D	E	L	S	K	S	D	I	P	I	S	M	K	V	R	N	S	T	I	N	L	Y	T	R	S	R	F	T	A	D	L	H	L	S	Y	T	A	S	D	O	D	I	S	S	A	S	I
MKWV-China-Haemaphysalis_concinna	WIY	G	F	R	M	S	G	P	S	S	P	G	V	P	V	I	V	Y	R	I	S	D	E	L	S	K	S	D	I	P	I	S	M	K	V	R	N	S	T	I	N	L	Y	T	R	S	R	F	T	A	D	L	H	L	S	Y	T	A	S	D	O	D	I	S	S	A	S	I
MKWV-China-Ixodes_persulcatus	WIY	G	F	R	M	S	G	P	S	S	P	G	V	P	V	I	V	Y	R	I	S	D	E	L	S	K	S	D	I	P	I	S	M	K	V	R	N	S	T	I	N	L	Y	T	R	S	R	F	T	A	D	L	H	L	S	Y	T	A	S	D	O	D	I	S	S	A	S	I
KURV-Japan-Ixodes_persulcatus	WIY	G	F	R	M	S	G	P	S	S	P	G	V	P	V	I	V	Y	R	I	S	D	E	L	S	K	S	D	I	P	I	S	M	K	V	R	N	S	T	I	N	L	Y	T	R	S	R	F	T	A	D	L	H	L	S	Y	T	A	S	D	O	D	I	S	S	A	S	I
MJPV-China-Ixodes_persulcatus	WIY	G	F	R	M	S	G	P	S	S	P	G	V	P	V	I	V	Y	R	I	S	D	E	L	S	K	S	D	I	P	I	S	M	K	V	R	N	S	T	I	N	L	Y	T	R	S	R	F	T	A	D	L	H	L	S	Y	T	A	S	D	O	D	I	S	S	A	S	I
Our_MJPV-Ixodes_persulcatus	WIY	G	F	R	M	S	G	P	S	S	P	G	V	P	V	I	V	Y	R	I	S	D	E	L	S	K	S	D	I	P	I	S	M	K	V	R	N	S	T	I	N	L	Y	T	R	S	R	F	T	A	D	L	H	L	S	Y	T	A	S	D	O	D	I	S	S	A	S	I
	1880	1890	1900	1910	1920	1930	1940	1950																																																												
MKWV-Japan-Ixodes_persulcatus	AAL	R	K	C	E	D	Q	L	E	D	L	K	R	E	P	T	C	S	W	F	N	C	P	L	D	I	C	M	V	E	A	L	A	Q	V	L	D	G	R	S	L	P	R	H	L	D	K	E	R	L	S	S	I	F	K	M	S	C	E	S	S	R	A	R	I	G	G	L
MKWV-China-Haemaphysalis_concinna	AAL	R	K	C	E	D	Q	L	E	D	L	K	R	E	P	T	C	S	W	F	N	C	P	L	D	I	C	M	V	E	A	L	A	Q	V	L	D	G	R	S	L	P	R	H	L	D	K	E	R	L	S	S	I	F	K	M	S	C	E	S	S	R	A	R	I	G	G	L
MKWV-China-Ixodes_persulcatus	AAL	R	K	C	E	D	Q	L	E	D	L	K	R	E	P	T	C	S	W	F	N	C	P	L	D	I	C	M	V	E	A	L	A	Q	V	L	D	G	R	S	L	P	R	H	L	D	K	E	R	L	S	S	I	F	K	M	S	C	E	S	S	R	A	R	I	G	G	L
KURV-Japan-Ixodes_persulcatus	AAL	R	K	C	E	D	Q	L	E	D	L	K	R	E	P	T	C	S	W	F	N	C	P	L	D	I	C	M	V	E	A	L	A	Q	V	L	D	G	R	S	L	P	R	H	L	D	K	E	R	L	S	S	I	F	K	M	S	C	E	S	S	R	A	R	I	G	G	L
MJPV-China-Ixodes_persulcatus	AAL	R	K	C	E	D	Q	L	E	D	L	K	R	E	P	T	C	S	W	F	N	C	P	L	D	I	C	M	V	E	A	L	A	Q	V	L	D	G	R	S	L	P	R	H	L	D	K	E	R	L	S	S	I	F	K	M	S	C	E	S	S	R	A	R	I	G	G	L
Our_MJPV-Ixodes_persulcatus	AAL	R	K	C	E	D	Q	L	E	D	L	K	R	E	P	T	C	S	W	F	N	C	P	L	D	I	C	M	V	E	A	L	A	Q	V	L	D	G	R	S	L	P	R	H	L	D	K	E	R	L	S	S	I	F	K	M	S	C	E	S	S	R	A	R	I	G	G	L
	1960	1970	1980	1990	2000	2010	2020																																																													
MKWV-Japan-Ixodes_persulcatus	P	L	A	E	V	K	I	E	D	N	S	N	F	L	Q	D	M	I	G	E	V	M	L	S	L	K	S	D	E	L	F	E	Q	A	V	E	G	M	E	L	P	N	I	S	D	L	D	F	E	G	E	D	S	G	I	E	A	F	G									

Figure S2. Amino acid of the glycoprotein precursor between MKWV, KURV and MJPV.

	1	10	20	30	40	50	60	70
MKWV-Japan-Ixodes_persulcatus	MMKILMQ	LLTSGALT	LCPPHL	KNRRIMGHNSI	STLHL	ESCTATDYDK	CAEFETWSDP	PTRYPLFYSKHHM
MKWV-China-Beaemophysalis_concinna	MMKILIQ	LLTSGALT	LCPPHL	KNRRIMGHNSI	STLHL	ESCTATDYDK	CAEFETWSDP	PTRYPLFYSKHHM
MKWV-China-Ixodes_persulcatus	MMKILQ	LLTSGALT	LCPPHL	KNRRIMGHNSI	STLHL	ESCTATDYDK	CAEFETWSDP	PTRYPLFYSKHHM
KURV-Japan-Ixodes_persulcatus	MMKILMQ	LLTSGALT	LCPPHL	KNRRIMGHNSI	STLHL	ESCTATDYDK	CAEFETWSDP	PTRYPLFYSKHHM
MJPV-China-Ixodes_persulcatus	MMKILQ	LLTSGALT	LCPPHL	KNRRIMGHNSI	STLHL	ESCTATDYDK	CAEFETWSDP	PTRYPLFYSKHHM
Our_MJPV-Ixodes_persulcatus	MMKILQ	LLTSGALT	LCPPHL	KNRRIMGHNSI	STLHL	ESCTATDYDK	CAEFETWSDP	PTRYPLFYSKHHM

	80	90	100	110	120	130	140	
MKWV-Japan-Ixodes_persulcatus	LNAEAMN	KLRLKSN	CGSNTGCK	VSKKEMFL	REHVNC	ASNPTSLILGMG	KDGGFHLWECE	PKTVFSQDLMQGE
MKWV-China-Beaemophysalis_concinna	LNAEAMN	KLRLKSN	CGSNTGCK	VSKKEMFL	REHVNC	ASNPTSLILGMG	KDGGFHLWECE	PKTVFSQDLMQGE
MKWV-China-Ixodes_persulcatus	LNAEAMN	KLRLKSN	CGSNTGCK	VSKKEMFL	REHVNC	ASNPTSLILGMG	KDGGFHLWECE	PKTVFSQDLMQGE
KURV-Japan-Ixodes_persulcatus	LNAEAMN	KLRLKSN	CGSNTGCK	VSKKEMFL	REHVNC	ASNPTSLILGMG	KDGGFHLWECE	PKTVFSQDLMQGE
MJPV-China-Ixodes_persulcatus	LNAEAMN	KLRLKSN	CGSNTGCK	VSKKEMFL	REHVNC	ASNPTSLILGMG	KDGGFHLWECE	PKTVFSQDLMQGE
Our_MJPV-Ixodes_persulcatus	LNAEAMN	KLRLKSN	CGSNTGCK	VSKKEMFL	REHVNC	ASNPTSLILGMG	KDGGFHLWECE	PKTVFSQDLMQGE

	150	160	170	180	190	200	210	220
MKWV-Japan-Ixodes_persulcatus	DRKEN	TQNLIF	DDAVCC	KVDPQNAI	FPFPPV	PRDVCAI	CKILYRC	CEVPV
MKWV-China-Beaemophysalis_concinna	DRKEN	TQNLIF	DDAVCC	KVDPQNAI	FPFPPV	PRDVCAI	CKILYRC	CEVPV
MKWV-China-Ixodes_persulcatus	DRKEN	TQNLIF	DDAVCC	KVDPQNAI	FPFPPV	PRDVCAI	CKILYRC	CEVPV
KURV-Japan-Ixodes_persulcatus	DRKEN	TQNLIF	DDAVCC	KVDPQNAI	FPFPPV	PRDVCAI	CKILYRC	CEVPV
MJPV-China-Ixodes_persulcatus	DRKEN	TQNLIF	DDAVCC	KVDPQNAI	FPFPPV	PRDVCAI	CKILYRC	CEVPV
Our_MJPV-Ixodes_persulcatus	DRKEN	TQNLIF	DDAVCC	KVDPQNAI	FPFPPV	PRDVCAI	CKILYRC	CEVPV

	230	240	250	260	270	280	290
MKWV-Japan-Ixodes_persulcatus	NAHVTE	DGDPHE	FTD	AGKSCSI	KCGSSST	...E	CSGDTTF
MKWV-China-Beaemophysalis_concinna	NAHVTE	DGDPHE	FTD	AGKSCSI	KCGSSST	...E	CSGDTTF
MKWV-China-Ixodes_persulcatus	NAHVTE	DGDPHE	FTD	AGKSCSI	KCGSSST	...E	CSGDTTF
KURV-Japan-Ixodes_persulcatus	NAHVTE	DGDPHE	FTD	AGKSCSI	KCGSSST	...E	CSGDTTF
MJPV-China-Ixodes_persulcatus	NAHVTE	DGDPHE	FTD	AGKSCSI	KCGSSST	...E	CSGDTTF
Our_MJPV-Ixodes_persulcatus	NAHVTE	DGDPHE	FTD	AGKSCSI	KCGSSST	...E	CSGDTTF

	300	310	320	330	340	350	360	370
MKWV-Japan-Ixodes_persulcatus	GRWYTF	ICFGSK	RRARV	RNRN	VPD	ESAKK	RCT	CVTE
MKWV-China-Beaemophysalis_concinna	GRWYTF	ICFGSK	RRARV	RNRN	VPD	ESAKK	RCT	CVTE
MKWV-China-Ixodes_persulcatus	GRWYTF	ICFGSK	RRARV	RNRN	VPD	ESAKK	RCT	CVTE
KURV-Japan-Ixodes_persulcatus	GRWYTF	ICFGSK	RRARV	RNRN	VPD	ESAKK	RCT	CVTE
MJPV-China-Ixodes_persulcatus	GRWYTF	ICFGSK	RRARV	RNRN	VPD	ESAKK	RCT	CVTE
Our_MJPV-Ixodes_persulcatus	GRWYTF	ICFGSK	RRARV	RNRN	VPD	ESAKK	RCT	CVTE

	380	390	400	410	420	430	440
MKWV-Japan-Ixodes_persulcatus	FTRPD	ACKNGG	PPFIV	MDGSKG	SSA	IKVKCT	CEVPK
MKWV-China-Beaemophysalis_concinna	FTRPD	ACKNGG	PPFIV	MDGSKG	SSA	IKVKCT	CEVPK
MKWV-China-Ixodes_persulcatus	FTRPD	ACKNGG	PPFIV	MDGSKG	SSA	IKVKCT	CEVPK
KURV-Japan-Ixodes_persulcatus	FTRPD	ACKNGG	PPFIV	MDGSKG	SSA	IKVKCT	CEVPK
MJPV-China-Ixodes_persulcatus	FTRPD	ACKNGG	PPFIV	MDGSKG	SSA	IKVKCT	CEVPK
Our_MJPV-Ixodes_persulcatus	FTRPD	ACKNGG	PPFIV	MDGSKG	SSA	IKVKCT	CEVPK

	450	460	470	480	490	500	510
MKWV-Japan-Ixodes_persulcatus	LAGSI	IGYLRG	TMILK	AAWG	PPRW	TLIKWVA	GLTGR
MKWV-China-Beaemophysalis_concinna	LAGSI	IGYLRG	TMILK	AAWG	PPRW	TLIKWVA	GLTGR
MKWV-China-Ixodes_persulcatus	LAGSI	IGYLRG	TMILK	AAWG	PPRW	TLIKWVA	GLTGR
KURV-Japan-Ixodes_persulcatus	LAGSI	IGYLRG	TMILK	AAWG	PPRW	TLIKWVA	GLTGR
MJPV-China-Ixodes_persulcatus	LAGSI	IGYLRG	TMILK	AAWG	PPRW	TLIKWVA	GLTGR
Our_MJPV-Ixodes_persulcatus	LAGSI	IGYLRG	TMILK	AAWG	PPRW	TLIKWVA	GLTGR

	520	530	540	550	560	570	580	590
MKWV-Japan-Ixodes_persulcatus	YPRK	KGVP	IYMY	VVAG	LVV	GSCT	ACSENH	LLS
MKWV-China-Beaemophysalis_concinna	YPRK	KGVP	IYMY	VVAG	LVV	GSCT	ACSENH	LLS
MKWV-China-Ixodes_persulcatus	YPRK	KGVP	IYMY	VVAG	LVV	GSCT	ACSENH	LLS
KURV-Japan-Ixodes_persulcatus	YPRK	KGVP	IYMY	VVAG	LVV	GSCT	ACSENH	LLS
MJPV-China-Ixodes_persulcatus	YPRK	KGVP	IYMY	VVAG	LVV	GSCT	ACSENH	LLS
Our_MJPV-Ixodes_persulcatus	YPRK	KGVP	IYMY	VVAG	LVV	GSCT	ACSENH	LLS

	600	610	620	630	640	650	660
MKWV-Japan-Ixodes_persulcatus	QRSV	IKTL	GSSL	KCR	RGG	SYWT	AS
MKWV-China-Beaemophysalis_concinna	QRSV	IKTL	GSSL	KCR	RGG	SYWT	AS
MKWV-China-Ixodes_persulcatus	QRSV	IKTL	GSSL	KCR	RGG	SYWT	AS
KURV-Japan-Ixodes_persulcatus	QRSV	IKTL	GSSL	KCR	RGG	SYWT	AS
MJPV-China-Ixodes_persulcatus	QRSV	IKTL	GSSL	KCR	RGG	SYWT	AS
Our_MJPV-Ixodes_persulcatus	QRSV	IKTL	GSSL	KCR	RGG	SYWT	AS


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670      680      690      700      710      720      730      740
MKWV-Japan-Ixodes_persulcatus EQCGGAGCGCFNIHASCLEFYRNEFHRAAGSYEVVFQCAEWVHEIQSVSGTSHQPVLELTMDDGETKQLDNGTISII
MKWV-China-Baemaphysalis_concinna EQCGGAGCGCFNIHASCLEFYRNEFHRAAGSYEVVFQCAEWVHEIQSVSGTSHQPVLELTMDDGETKQLDNGTISII
KURV-Japan-Ixodes_persulcatus EQCGGAGCGCFNIHASCLEFYRNEFHRAAGSYEVVFQCAEWVHEIQSVSGTSHQPVLELTMDDGETKQLDNGTISII
MJPV-China-Ixodes_persulcatus EQCGGAGCGCFNIHASCLEFYRNEFHRAAGSYEVVFQCAEWVHEIQSVSGTSHQPVLELTMDDGETKQLDNGTISII
Our_MJPV-Ixodes_persulcatus EQCGGAGCGCFNIHASCLEFYRNEFHRAAGSYEVVFQCAEWVHEIQSVSGTSHQPVLELTMDDGETKQLDNGTISII

750      760      770      780      790      800      810
MKWV-Japan-Ixodes_persulcatus AIDGETVTSNAPHFIRKSGSKFAIVDEEFSDFPRKGFGLGEIRCPSSQASAEIVSSACLNAAEGLTRYVGQLDSIRCE
MKWV-China-Baemaphysalis_concinna AIDGETVTSNAPHFIRKSGSKFAIVDEEFSDFPRKGFGLGEIRCPSSQASAEIVSSACLNAAEGLTRYVGQLDSIRCE
KURV-Japan-Ixodes_persulcatus AIDGETVTSNAPHFIRKSGSKFAIVDEEFSDFPRKGFGLGEIRCPSSQASAEIVSSACLNAAEGLTRYVGQLDSIRCE
MJPV-China-Ixodes_persulcatus AIDGETVTSNAPHFIRKSGSKFAIVDEEFSDFPRKGFGLGEIRCPSSQASAEIVSSACLNAAEGLTRYVGQLDSIRCE
Our_MJPV-Ixodes_persulcatus AIDGETVTSNAPHFIRKSGSKFAIVDEEFSDFPRKGFGLGEIRCPSSQASAEIVSSACLNAAEGLTRYVGQLDSIRCE

820      830      840      850      860      870      880      890
MKWV-Japan-Ixodes_persulcatus SRMVDPLIFRRGKLPQSRAGTCFTTKPGSSVVEALTSKPIRVILKASMDGTGTOFDVDFPKCSASKNMTGCYS
MKWV-China-Baemaphysalis_concinna SRMVDPLIFRRGKLPQSRAGTCFTTKPGSSVVEALTSKPIRVILKASMDGTGTOFDVDFPKCSASKNMTGCYS
KURV-Japan-Ixodes_persulcatus SRMVDPLIFRRGKLPQSRAGTCFTTKPGSSVVEALTSKPIRVILKASMDGTGTOFDVDFPKCSASKNMTGCYS
MJPV-China-Ixodes_persulcatus SRMVDPLIFRRGKLPQSRAGTCFTTKPGSSVVEALTSKPIRVILKASMDGTGTOFDVDFPKCSASKNMTGCYS
Our_MJPV-Ixodes_persulcatus SRMVDPLIFRRGKLPQSRAGTCFTTKPGSSVVEALTSKPIRVILKASMDGTGTOFDVDFPKCSASKNMTGCYS

900      910      920      930      940      950      960
MKWV-Japan-Ixodes_persulcatus CNHSGTCLCVKAGMDTGATGTMVLKCPSSGIESAFGVSNVKAHCFVAHTDRVINEDECSYSCGRDEKKLHVYGTLL
MKWV-China-Baemaphysalis_concinna CNHSGTCLCVKAGMDTGATGTMVLKCPSSGIESAFGVSNVKAHCFVAHTDRVINEDECSYSCGRDEKKLHVYGTLL
KURV-Japan-Ixodes_persulcatus CNHSGTCLCVKAGMDTGATGTMVLKCPSSGIESAFGVSNVKAHCFVAHTDRVINEDECSYSCGRDEKKLHVYGTLL
MJPV-China-Ixodes_persulcatus CNHSGTCLCVKAGMDTGATGTMVLKCPSSGIESAFGVSNVKAHCFVAHTDRVINEDECSYSCGRDEKKLHVYGTLL
Our_MJPV-Ixodes_persulcatus CNHSGTCLCVKAGMDTGATGTMVLKCPSSGIESAFGVSNVKAHCFVAHTDRVINEDECSYSCGRDEKKLHVYGTLL

970      980      990      1000      1010      1020      1030      1040
MKWV-Japan-Ixodes_persulcatus QYVEPHDDRANESVAPIINPKSDSFSWGNWFLGLDGLGGGWFKTVIFSLLEASGLIIVVILGLRVTRISLFSILM
MKWV-China-Baemaphysalis_concinna QYVEPHDDRANESVAPIINPKSDSFSWGNWFLGLDGLGGGWFKTVIFSLLEASGLIIVVILGLRVTRISLFSILM
KURV-Japan-Ixodes_persulcatus QYVEPHDDRANESVAPIINPKSDSFSWGNWFLGLDGLGGGWFKTVIFSLLEASGLIIVVILGLRVTRISLFSILM
MJPV-China-Ixodes_persulcatus QYVEPHDDRANESVAPIINPKSDSFSWGNWFLGLDGLGGGWFKTVIFSLLEASGLIIVVILGLRVTRISLFSILM
Our_MJPV-Ixodes_persulcatus QYVEPHDDRANESVAPIINPKSDSFSWGNWFLGLDGLGGGWFKTVIFSLLEASGLIIVVILGLRVTRISLFSILM

1050
MKWV-Japan-Ixodes_persulcatus SARWRKIID
MKWV-China-Baemaphysalis_concinna SARWRKIID
KURV-Japan-Ixodes_persulcatus SARWRKIID
Kuriyama virus STRWRKIID
MJPV-China-Ixodes_persulcatus SARWRKIID
Our_MJPV-Ixodes_persulcatus SARWRKIID

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Amino acid alignment was performed using ESPrpt 3.0 (<http://esprpt.ibcp.fr/ESPrpt/cgi-bin/ESPrpt.cgi>). MKWV, Mukawa virus; KURV, Kuriyama virus; MJPV, Mudanjiang phlebovirus.

Figure S3. Amino acid of the nucleocapsid protein between MKWV, KURV and MJPV.

	1	10	20	30	40	50	60	70
MEKV-Japan-Ixodes_persulcatus	MSG	KNYAKIALEFGGE	VIDCDFTIS	IAEE	CAYOGFDPIKIME	ITQTRG	QD	WKEDC
MEKV-China-Haemaphysalis_concinna	MSG	KNYAKIALEFGGE	VIDCDFTIS	IAEE	CAYOGFDPIKIME	ITQTRG	QD	WKEDC
MEKV-China-Ixodes_persulcatus	MSG	KNYAKIALEFGGE	VIDCDFTIS	IAEE	CAYOGFDPIKIME	ITQTRG	QD	WKEDC
KURV-Japan-Ixodes_persulcatus	MSG	KNYAKIALEFGGE	VIDCDFTIS	IAEE	CAYOGFDPIKIME	ITQTRG	QD	WKEDC
MJPV-China-Ixodes_persulcatus	MSG	KNYAKIALEFGGE	VIDCDFTIS	IAEE	CAYOGFDPIKIME	ITQTRG	QD	WKEDC
Our_MJPV-Ixodes_persulcatus	MSG	KNYAKIALEFGGE	VIDCDFTIS	IAEE	CAYOGFDPIKIME	ITQTRG	QD	WKEDC

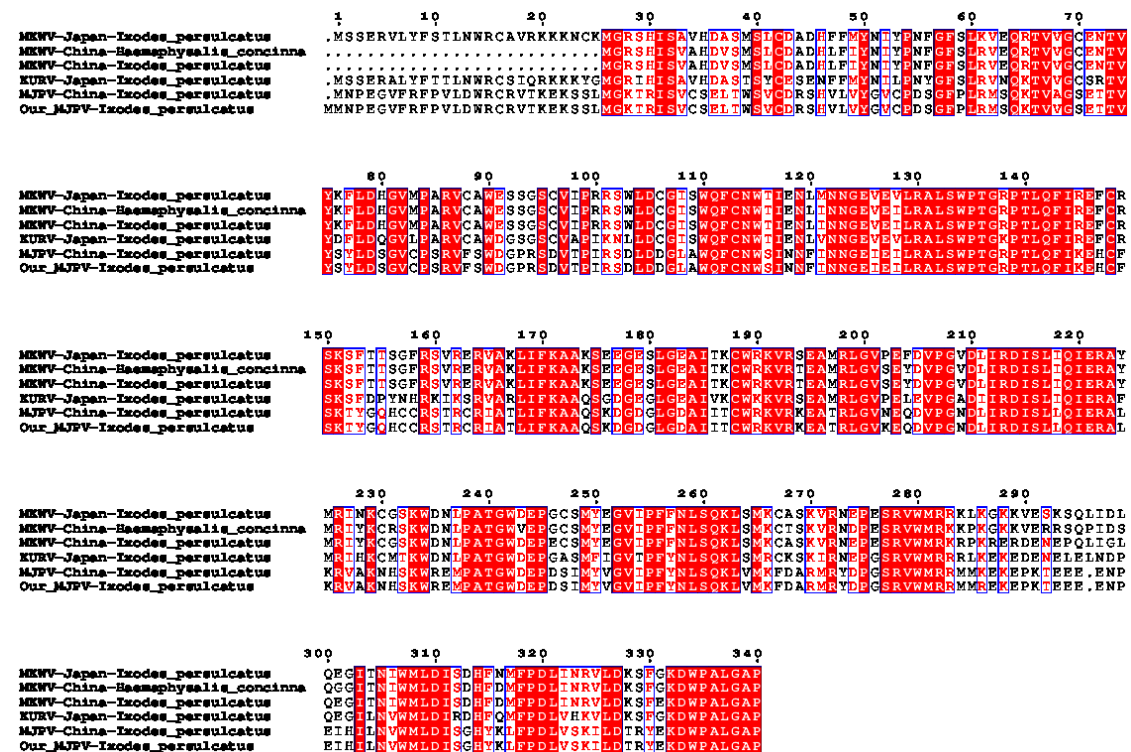
	80	90	100	110	120	130	140	150
MEKV-Japan-Ixodes_persulcatus	RMA	ESGKAK	LNVLIR	KYKLKSGKPGKDD	LTARV	SAVLAPWTC	KVIAHLENM	LPVVG
MEKV-China-Haemaphysalis_concinna	RMA	ESGKAK	LNVLIR	KYKLKSGKPGKDD	LTARV	SAVLAPWTC	KVIAHLENM	LPVVG
MEKV-China-Ixodes_persulcatus	RMA	ESGKAK	LNVLIR	KYKLKSGKPGKDD	LTARV	SAVLAPWTC	KVIAHLENM	LPVVG
KURV-Japan-Ixodes_persulcatus	RMA	ESGKAK	LNVLIR	KYKLKSGKPGKDD	LTARV	SAVLAPWTC	KVIAHLENM	LPVVG
MJPV-China-Ixodes_persulcatus	RMS	ESGKAR	LNVLIR	KYKLKSGKPGKDD	LTARV	SAVLAPWTC	KVIAHLENM	LPVVG
Our_MJPV-Ixodes_persulcatus	RMS	ESGKAR	LNVLIR	KYKLKSGKPGKDD	LTARV	SAVLAPWTC	KVIAHLENM	LPVVG

	160	170	180	190	200	210	220
MEKV-Japan-Ixodes_persulcatus	FGGLID	ASLSRDD	LTAIV	DAHKLW	LVHFAQVIN	RDLRGK	TKADI
MEKV-China-Haemaphysalis_concinna	FGGLID	ASLSRDD	LTAIV	DAHKLW	LVHFAQVIN	RDLRGK	TKADI
MEKV-China-Ixodes_persulcatus	FGGLID	ASLSRDD	LTAIV	DAHKLW	LVHFAQVIN	RDLRGK	TKADI
KURV-Japan-Ixodes_persulcatus	FGGLID	ASLSRDD	LTAIV	DAHKLW	LVHFAQVIN	RDLRGK	TKADI
MJPV-China-Ixodes_persulcatus	FGGLID	ASLSRDD	LTAIV	DAHKLW	LVHFAQVIN	RDLRGK	TKADI
Our_MJPV-Ixodes_persulcatus	FGGLID	ASLSRDD	LTAIV	DAHKLW	LVHFAQVIN	RDLRGK	TKADI

	230	240			
MEKV-Japan-Ixodes_persulcatus	VD	LNGKVN	SEVRRAA	EKYROL	V
MEKV-China-Haemaphysalis_concinna	VD	LNGKVN	SEVRRAA	EKYROL	V
MEKV-China-Ixodes_persulcatus	VD	LNGKVN	SEVRRAA	EKYROL	V
KURV-Japan-Ixodes_persulcatus	VD	LNGKVN	SEVRRAA	EKYROL	V
MJPV-China-Ixodes_persulcatus	VD	LNGKVN	SEVRRAA	EKYROL	V
Our_MJPV-Ixodes_persulcatus	VD	LNGKVN	SEVRRAA	EKYROL	V

Amino acid alignment was performed using ESPrnt 3.0 (<http://esprnt.ibcp.fr/ESPrnt/cgi-bin/ESPrnt.cgi>). MKWV, Mukawa virus; KURV, Kuriyama virus; MJPV, Mudanjiang phlebovirus.

Figure S4. Amino acid of the nonstructural protein between MKWV, KURV and MJPV.



Amino acid alignment was performed using ESPrpt 3.0 (<http://esprpt.ibcp.fr/ESPrpt/cgi-bin/ESPrpt.cgi>). MKWV, Mukawa virus; KURV, Kuriyama virus; MJPV, Mudanjiang phlebovirus.

Table S1. Nucleotide similarity between MJPV, MKWV and KURV*.

Nucleotide	Virus	MKWV (From <i>H. concinna</i>)	Japanese MKWV	Japanese KURV	MJPV (From <i>I. persulcatus</i>)	Our MJPV (From <i>I. persulcatus</i>)	Our MJPV (From <i>Meriones meridianus</i>)
L							
	Chinese MKWV (From <i>I. persulcatus</i>)	92.72	92.89	82.55	76.23	76.32	76.97
	Chinese MKWV (From <i>H. concinna</i>)	***	92.75	82.65	75.93	75.95	76.59
	Japanese MKWV (From <i>I. persulcatus</i>)	***	***	82.85	76.39	76.44	77.56
	Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	77.60	77.55	78.79
	Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	99.11	99.29
	Our MJPV (From <i>I. persulcatus</i>)	***	***	***	***	***	99.40
M							
	Chinese MKWV (From <i>I. persulcatus</i>)	92.28	92.22	83.98	69.98	70.36	***
	Chinese MKWV (From <i>H. concinna</i>)	***	99.94	83.38	69.92	70.13	***
	Japanese MKWV (From <i>I. persulcatus</i>)	***	***	83.44	69.89	70.10	***
	Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	70.93	70.66	***
	Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	98.23	***
S							
	Chinese MKWV (From <i>I. persulcatus</i>)	96.28	94.18	79.83	71.93	72.05	***
	Chinese MKWV (From <i>H. concinna</i>)	***	93.97	79.51	71.74	72.22	***
	Japanese MKWV (From <i>I. persulcatus</i>)	***	***	80.50	72.46	72.81	***
	Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	72.48	72.45	***
	Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	98.73	***

*MKWV, Mukawa virus; KURV, Kuriyama virus; MJPV, Mudanjiang phlebovirus; *I. persulcatus*, *Ixodes persulcatus*; *H. concinna*, *Haemaphysalis concinna*.

&Partial length of the L segment (2844 bp; strain IM-54).

Table S2. Amino acid similarity between MJPV, MKWV and KURV*.

Protein	Virus	MKWV (From <i>H. concinna</i>)	Japanese MKWV	Japanese KURV	MJPV (From <i>I. persulcatus</i>)	Our MJPV (From <i>I. persulcatus</i>)	Our MJPV (From <i>Meriones meridianus</i>)
RdRp							
	Chinese MKWV (From <i>I. persulcatus</i>)	98.70	99.24	94.91	88.09	88.20	89.54
	Chinese MKWV (From <i>H. concinna</i>)	***	99.15	95.17	88.59	88.64	90.21
	Japanese MKWV (From <i>I. persulcatus</i>)	***	***	95.33	88.70	88.75	90.10
	Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	88.18	88.18	89.65
	Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	99.67	100.00
	Our MJPV (From <i>I. persulcatus</i>)	***	***	***	***	***	100.00
Glycoprotein							
	Chinese MKWV (From <i>I. persulcatus</i>)	98.19	98.10	93.72	70.93	71.02	***
	Chinese MKWV (From <i>H. concinna</i>)	***	99.91	93.72	70.93	71.12	***
	Japanese MKWV (From <i>I. persulcatus</i>)	***	***	93.82	70.83	71.02	***
	Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	70.55	70.46	***
	Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	99.43	***
N							
	Chinese MKWV (From <i>I. persulcatus</i>)	100.00	99.60	93.12	84.96	84.96	***
	Chinese MKWV (From <i>H. concinna</i>)	***	99.60	93.12	84.96	84.96	***
	Japanese MKWV (From <i>I. persulcatus</i>)	***	***	92.71	84.55	84.55	***
	Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	81.38	81.38	***
	Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	100.00	***
NSs							
	Chinese MKWV (From <i>I. persulcatus</i>)	94.29	91.75	73.02	58.41	59.05	***

Chinese MKWV (From <i>H. concinna</i>)	***	92.38	71.75	57.78	58.10	***
Japanese MKWV (From <i>I. persulcatus</i>)	***	***	75.00	56.18	56.18	***
Japanese KURV (From <i>I. persulcatus</i>)	***	***	***	56.18	56.18	***
Chinese MJPV (From <i>I. persulcatus</i>)	***	***	***	***	99.12	***

* RdRp, RNA-dependent RNA polymerase; N, nucleocapsid protein; NSs, nonstructural protein; MKWV, Mukawa virus; KURV, Kuriyama virus; MJPV, Mudanjiang phlebovirus; *I. persulcatus*, *Ixodes persulcatus*; *H. concinna*, *Haemaphysalis concinna*.

&Partial RdRp of strain IM-54.