

## Supplementary Figure Legend

**Suppl. Fig S1.** An alignment of the deduced amino acid sequences of the 97 Australian BEFV isolates used for evolutionary analysis. The isolates are colored according to the four identified antigenic sub-types: Type I = red; Type II = blue; Type III = green; Type IV = purple. Variable amino acids are highlighted in the sequence and highly variable sites are indicated with arrows. Known or proposed antigenic sites are shaded in grey with variant amino acids previously identified in escape mutants by Kongsuwan *et al.* (13) highlighted in black.













**Suppl. Table S1.** Australian and exotic BEFV sequences in this study.

<b>Isolate</b>	<b>Source</b>	<b>Location</b>	<b>Map coordinates</b>	<b>Date of isolation</b>	<b>Passage History*</b>	<b>Sequence ambiguities</b>	<b>Genbank accession</b>
<b>QUEENSLAND ISOLATES</b>							
<b>BB7721</b>	Bovine	Charters Towers	20° 04' S 146° 15' E	Jan 1968	1SMB		
<b>CS1818</b>	Bovine	Upper Barron	17° 21' S 145° 35' E	Jun 1970	xSMB/1C6/2BHK2		AF058325
<b>CS1867</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	3SMB/2C6		
<b>CS1869</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	2SMB		
<b>CS1870</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	2C6		
<b>CS1873</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	2SMB/2C6		
<b>CS1901</b>	Bovine	Peachester	26° 51' S 152° 53' E	Feb 1988		Not sequenced	
<b>CS1902</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	1C6		
<b>CS1903</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	1C6		
<b>CS1904</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	1C6		
<b>CS1941</b>	Bovine	Rockhampton	23° 22' S 150° 31' E	6 Nov 1970	5SMB/1C6		
<b>CS1938</b>	Bovine	Munna Creek	25° 53' S 152° 27' E	16 Nov 1970	1C6		
<b>CS1940</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	17 Nov 1970	1C6		
<b>CS660</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	Nov 1970	10SMB/5BHK/2C6		
<b>CS1939</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	15 Dec 1970	1C6		
<b>CS1942</b>	Bovine	Camp Mountain	27° 23' S	2 Jan 1971	1C6		



			152° 53' E			
<b>CS1930</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	26 May 1973	1C6	
<b>CS1931</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	3 Jun 1973	1C6	G/a pos 752; G/t pos 1340
<b>CS1932</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	3 Jun 1973	1C6	
<b>CS1933</b>	Bovine	Etna Creek	23° 13' S 150° 28' E	5 Jun 1973	1C6	
<b>CS1935</b>	Bovine	Belmont	23° 14' S 150° 32' E	3 Jun 1973	1C6	C/A pos 653
<b>CS1819</b>	Bovine	Wacol	27° 35' S 152° 55' E	Nov 1973	xSMB/3C6/3BHK	
<b>CS1925</b>	Bovine	Tolga	17° 13' S 145° 29' E	13 Mar 1975	1C6	
<b>CS1926</b>	Bovine	Kairi	17° 13' S 145° 32' E	10 Apr 1975	1C6	
<b>CS1821</b>	Bovine	Amberley	27° 38' S 152° 42' E	Nov 1975	xSMB/3C6/3BHK	
<b>CS1820</b>	Bovine	Peachester	26° 51' S 152° 53' E	Jan 1976	xSMB/3C6/3BHK	
<b>CS968</b>	Bovine	Jimboomba	27° 50' S 153° 02' E	Dec 1979	2C6	
<b>CS355</b>	Bovine	Peachester	26° 51' S 152° 53' E	Feb 1980	6BHK	
<b>CS366</b>	Bovine	Peachester	26° 51' S 152° 53' E	Feb 1980	6BHK	
<b>CS967</b>	Bovine	Kairi	17° 13' S 145° 32' E	Feb 1981	3SMB/4BHK	
<b>CS1362</b>	Bovine	Samford	27° 22' S 152° 53' E	Nov 1981	3SMB/3C6/3BHK	
<b>CS1179</b>	Bovine	Peachester	26° 51' S 152° 53' E	Jan 1982	4BHK	
<b>CS1180</b>	Bovine	Peachester	26° 51' S 152° 53' E	Jan 1982	3C6/BHK3	AF058321
<b>CS1188</b>	Bovine	Long Pocket	27° 31' S 152° 59' E	Jan 1982	3C6/4BHK	
<b>CS1204</b>	Bovine	Jimboomba	27° 50' S	Jan 1982	3C6/8BHK	

			153° 02' E			
<b>CS1618</b>	Bovine	Peachester	26° 51' S 152° 53' E	Jan 1984	3C6/5BHK	
<b>CS1619</b>	Bovine	Peachester	26° 51' S 152° 53' E	Jan 1984	3C6/BHK5	AF058323
<b>CS1622</b>	<i>An. bancroftii</i>	Peachester	26° 51' S 152° 53' E	Feb 1984	1C6/1BHK	
<b>CS1647</b>	<i>C. brevitarsis</i>	Peachester	26° 51' S 152° 53' E	Feb 1984	1C6/4BHK	AF058322
<b>CS1900</b>	Bovine	Peachester	26° 51' S 152° 53' E	Feb 1988	?SMB/1C6	
<b>CS1899</b>	Bovine	Boonah	28° 00' S 152° 41' E	Nov 1988	1C6	
<b>CS1905</b>	Bovine	Amberley	27° 38' S 152° 42' E	Jan 1989	1C6	C/T pos 1403
<b>CS1906</b>	Bovine	Samford	27° 22' S 152° 53' E	Jan 1989	1C6	C/T pos 125
<b>CS1907</b>	Bovine	Samford	27° 22' S 152° 53' E	Jan 1989	1C6	
<b>CS1908</b>	Bovine	Samford	27° 22' S 152° 53' E	Jan 1989	1C6	
<b>CS1909</b>	Bovine	Greenmount	27° 47' S 151° 54' E	Jan 1989	1C6	G/A pos 607; G/a pos 784; A/g pos 1043
<b>CS1910</b>	Bovine	Samford	27° 22' S 152° 53' E	Jan 1989	1C6	G/A pos 1377; T/g pos 1393
<b>CS1911</b>	Bovine	Closeburn	27° 19' S 152° 52' E	Jan 1989	1C6	
<b>CS1912</b>	Bovine	Drapers Crossing	27° 21' S 152° 55' E	Feb 1989	1C6	
<b>CS1913</b>	Bovine	Oakey	27° 26' S 151° 43' E	Feb 1989	(1C6)?	
<b>CS1914</b>	Bovine	Toowoomba	27° 34' S 151° 57' E	28 Feb 1989	(1C6)?	G/a pos 607
<b>CS1917</b>	Bovine	Oakey	27° 26' S 151° 43' E	7 Apr 1989	(1C6)?	
<b>CS1918</b>	Bovine	Oakey	27° 26' S 151° 43' E	7 Apr 1989	(1C6)?	
<b>CS1915</b>	Bovine	Amberley	27° 38' S	12 Apr 1989	(1C6)?	

			152° 42' E			
<b>CS1920</b>	Bovine	Injune	25° 51' S 148° 34' E	10 May 1989	(1C6)?	G/T pos 142
<b>CS1921</b>	Bovine	Injune	25° 51' S 148° 34' E	May 1989	(1C6)?	
<b>CS1923</b>	Bovine	Cunnamulla	28° 04' S 145° 41' E	16 May 1989	(1C6)?	
<b>CS1924</b>	Bovine	Roma	26° 34' S 148° 47' E	1 Jun 1989	?	
<b>CS1927</b>	Bovine	Kairi	17° 13' S 145° 32' E	10 Apr 1975	1C6	Not sequenced
<b>CS1947</b>	Bovine	Calliope	24° 00' S 151° 12' E	17 Nov 1989	?	C/A pos 140
<b>CS1951</b>	Bovine	Willowbank	27° 39' S 152° 42' E	19 Feb 1992	?	
<b>CS1952</b>	Bovine	Amberley	27° 38' S 152° 42' E	Feb 1992	?	
<b>NORTHERN TERRITORY ISOLATES</b>						
<b>CS42</b>	<i>An. bancroftii</i>	Beatrice Hill	12° 39' S 131° 19' E	Apr 1975	12 SMB/6C6/4BHK	AF058324
<b>DPP54</b>	Bovine	Tortilla Flats	13° 05' S 131° 14' E	Mar 1981	?	
<b>DPP57</b>	Bovine	Tortilla Flats	13° 05' S 131° 14' E	Mar 1981	?	
<b>V963</b>	Bovine	Beatrice Hill	12° 39' S 131° 19' E	5 Mar 1986	5BHK/1BSR	
<b>V8363</b>	Bovine	Beatrice Hill	12° 39' S 131° 19' E	23 Sep 2010	1C6/3BSR	
<b>V7203</b>	Bovine	Berrimah	12° 26' S 130° 55' E	12 Mar 2008	1C6/3BSR	
<b>V933</b>	Bovine	Beatrice Hill	12° 39' S 131° 19' E	20 Mar 1986	4BHK/xBSR	
<b>V6330</b>	Bovine	Beatrice Hill	12° 39' S 131° 19' E	28 Oct 2004	1C6/3BSR	
<b>BVLB6</b>	Bovine	Berrimah	12° 26' S 130° 55' E	19 Jan 2012	EDTA Blood	
<b>BVLB14</b>	Bovine	Berrimah	12° 26' S 130° 55' E	19 Jan 2012	EDTA Blood	

NEW SOUTH WALES ISOLATES					
<b>V1956</b>	Bovine	near Sydney	33° 52' S 151° 12' E	1956	7 BHK (post arrival at AAHL)
<b>CS1937</b>	Bovine	Wollongbar	28° 50' 0 S 153° 25' E	15 Feb 1971	1C6
<b>V393</b>	Bovine	Scone	32° 03' S 150° 52' E	1973	?
<b>V496</b>	Bovine	Aberdeen	32° 10' S 150° 53' E	1974	?
<b>V511</b>	Bovine	NSW		1974	?
<b>V633</b>	Bovine	Kiama	34° 40' S 150° 51' E	1974	?
<b>V629</b>	Bovine	NSW		1976	EDTA Blood
<b>X837</b>	Bovine	NSW		1991	EDTA Blood
<b>X760</b>	Bovine	Camden	34° 03' S 150° 42' E	1991	EDTA Blood
<b>D819</b>	Bovine	Homeleigh	28° 35' S 153° 03' E	20 Jan 2010	EDTA Blood
<b>D821</b>	Bovine	Maitland	32° 44' S 151° 33' E	2 Feb 2010	EDTA Blood
<b>D826</b>	Bovine	Lightning Ridge	29° 26' S 147° 59' E	2 Feb 2010	EDTA Blood
<b>D831</b>	Bovine	Gravesend	29° 35' S 150° 20' E	3 Feb 2010	EDTA Blood
<b>D837</b>	Bovine	Forbes	33° 23' S 148° 00' E	4 Feb 2010	EDTA Blood
<b>D853</b>	Bovine	Henty	35° 31' S 147° 02' E	24 Feb 2010	EDTA Blood
<b>D905</b>	Bovine	Merriwagga	33° 49' S 145° 37' E	1 Mar 2010	EDTA Blood
<b>D901</b>	Bovine	Kangaloon	34° 33' S 150° 32' E	2 Mar 2010	EDTA Blood
<b>D909</b>	Bovine	Cobargo	36° 23' S 149° 53' E	2 Mar 2010	EDTA Blood
<b>D991</b>	Bovine	Deniliquin	35° 31' 0 S 144° 59' E	5 Mar 2010	EDTA Blood
<b>D997</b>	Bovine	O'Connell	33° 32' S 149° 44' E	7 Mar 2010	EDTA Blood

<b>E005</b>	Bovine	Harden	34° 33' S 148° 22' E	11 Mar 2010	EDTA Blood
<b>E008</b>	Bovine	Balranald	34° 38' S 143° 34' E	18 Mar 2010	EDTA Blood
<b>E012</b>	Bovine	Gundagai	35° 04' S 148° 06' E	16 Mar 2010	EDTA Blood
<b>E015</b>	Bovine	Kemps Creek	33° 53' S 150° 47' E	23 Mar 2010	EDTA Blood
<b>E496</b>	Bovine	Tenterfield	29° 03' S 152° 01' E	30 Jan 2011	EDTA Blood
<b>EMAI66</b>	Bovine	Gloucester	32° 00' S 151° 58' E	30 Mar 2011	EDTA Blood
<b>E714</b>	Bovine	Paterson	32° 36' S 151° 37' E	27 Apr 2011	EDTA Blood

#### JAPAN ISOLATES

<b>Amakusa-1</b>	Bovine	Kumamoto		1988	5HL	AB462031
<b>Amakusa-2</b>	Bovine	Kumamoto		1988	5HL	AB462032
<b>Azuma</b>	Bovine	Kagoshima		1988	7HL	AB462033
<b>Hirado-6</b>	Bovine	Nagasaki		1988	3HL	AB462029
<b>Hirado-9</b>	Bovine	Nagasaki		1988	4HL	AB462030
<b>ON01-1</b>	Bovine	Tamara Island		2001	4HL	AB462041
<b>ON01-3</b>	Bovine	Ishigaki Island		2001	4HL	AB462043
<b>ON01-2</b>	Bovine	Ishigaki Island		2001	4HL	AB462042
<b>ON04-1</b>	Bovine	Ishigaki Island		2004	4HL	AB462044
<b>ON88-1</b>	Bovine	Okinawa Island		1988	4HL	AB462034
<b>ON88-3</b>	Bovine	Okinawa Island		1988	4HL	AB462035
<b>ON88-4</b>	Bovine	Okinawa Island		1988	5HL	AB462036
<b>ON89-1</b>	Bovine	Ishigaki Island		1989	7HL	AB462037
<b>ON89-2</b>	Bovine	Ishigaki Island		1989	5HL	AB462038
<b>ON89-3</b>	Bovine	Ishigaki Island		1989	8HL	AB462039
<b>Onna-3</b>	Bovine	Okinawa Island		1989	3HL	AB462040
<b>YHL</b>	Bovine	Yamaguchi		1966	22HL	AB462028

#### TAIWAN ISOLATES

<b>TN1-84</b>	Bovine			1984		AY935239
<b>TN1-96</b>	Bovine			1996		AY935240
<b>TN88128</b>	Bovine	Kaoshiung		Sep 1999		AF208840
<b>TN1-01</b>	Bovine			2001		AY935241

<b>TN2-01</b>	Bovine		2001	AY954451
<b>TN3-01</b>	Bovine		2001	AY954452
<b>TN4-01</b>	Bovine		2001	AY954453
<b>TN5-01</b>	Bovine		2001	AY954454
<b>TN6-01</b>	Bovine		2001	AY954455
<b>TN7-01</b>	Bovine		2001	AY954456
<b>TN8-01</b>	Bovine		2001	AY954457
<b>TN9-01</b>	Bovine		2001	AY954458
<b>TN10-01</b>	Bovine		2001	AY954459
<b>TN11-01</b>	Bovine		2001	AY954460
<b>UL1</b>	Bovine		2001	AY062166
<b>HL</b>	Bovine		2002	AY768942
<b>TN124</b>	Bovine		2004	AY818194
<b>CHINA ISOLATES</b>				
<b>JB76H</b>	Bovine	Beijing	1976	JX564640
<b>LYC11</b>	Bovine	Louyang, Henan	Aug 2011	JX564638
<b>JT02L</b>	Bovine	Zhejiang	2002	JX564639
<b>LS11</b>	Bovine	Louyang, Henan	Aug 2011	JX564637
<b>JN1</b>	Bovine	Shandong	2011	JX174661
<b>ISRAEL ISOLATES</b>				
<b>ISR10-1</b>	Bovine		2010	JN833633
<b>ISR10-2</b>	Bovine		2010	JN833634
<b>ISR10-3</b>	Bovine		2010	JN833635
<b>ISR04</b>	Bovine		2004	JN833632
<b>IL01</b>	Bovine		2001	JN833631
<b>IL08</b>	Bovine		2008	JN646090
<b>ISR00</b>	Bovine		2000	JN833639
<b>IL00</b>	Bovine		2000	JQ008943
<b>TURKEY ISOLATES</b>				
<b>CP62</b>	Bovine		Jul 2008	GQ229451
<b>CP77</b>	Bovine		Jul 2008	GQ229452
<b>ADYMN</b>	Bovine		2012	KC788421
<b>CP3</b>	Bovine		10 Aug 2012	KC470310
<b>CP13</b>	Bovine		10 Aug 2012	KC470311
<b>CU15</b>	Bovine		10 Aug 2012	KC470312
<b>CU16</b>	Bovine		10 Aug 2012	KC470313

\* SMB = suckling mouse brain; BHK = baby hamster kidney (BHK-21); BSR = baby hamster kidney (BSR); C6 = *Aedes albopictus* (C6/36); HL = hamster lung (HmLu-1)