**Supplementary data**

**Supplemental Table S1**. Contigs of the new chuvirus in the blood sample of index patient by metagenomic analysis and their identities to the Suffolk virus isolate F13 (GenBank accession no. KM460042)

|  |  |  |  |
| --- | --- | --- | --- |
| **Contig** | **Location** | **Sequence (5′→3′)** | **Sequence identity (%)** |
| 1 | 6785-7450 | GCTTGGTGGGGTACGACTGCACAGGACGTGCTGCAAATGTGACAGCAGTCTCGCTGTCCTGGGTGCAGAAGTGTCCCATTGAACCCGGGACTCAAGAGACAATCCGGGACTATGTCCAGTTGGTTCAGGAGAGGAACGTCGAGACGATCAGCATCCGCGCATGTCTCGTGGAAAGGAGTTATCTCCTGAACCATTGTGGGATGCAKWSTTATCTCCTGAACCATTGTGGGATGCATTCCCACTCGTCGCTGACGTTCAACGGGCTAGTGACAAATGAAGTGCTGAAAGTGCCAAAGGAGGTGTGTGATATCTGCAGAGCTCCGGCCGGAGCTCTGCAGATATCCTGGGGGCAACGACTAACCGGGCTTCGAGTCAACAAAACGACTGTCGTTCCGGTCGTGGAAATGGGAATGGTTGACGCAGGAACGGCCAAGTGTCAAGGAGCATCGTTCAGCCTGAACGGAGTGTACTATCAAGATGTGGTGATGCAATCATCGTACAGTATCACACTTCGGGCGGAAAGTGCTCAACTGGACATCGGGTCCAACTCCATCCGGCTTTCATCAGGATACTCCCATCCCTTTCCGACACATTACGGATTTGACCCTGAGTACGGACAAACGTACTGGTCATCGGAGGGCGTGGGCGTAAAGTGCTCTCCAACCTCGTACATTGTAGTGTATGAGGGCGATGCTGCGAT | 65.53 |
| 2 | 7657-8015 | ATGGACCCAAAGGAGGYMRASKWGKTYSWCTTGTTTCTCTACACCAACTCTAAGTTGGTGTACGTCGAACAACATCTTGCCCGTGAGCTCACATCTGTGTACCTCCATTTCCAGCGTCAACTGTGTGACGTGAACCACCGGCTCTTGACACACCTCACAACACTCGCGATGGTGGCCCCCGAGGAGTTTGCTTGGACATATACACAGCAACCCGGTGTAACCGCAGTGTTGCGCGGGGAGGTTGTGTACATGGTCAAGTGCGCTCCAGTGTCTGTAACATACATGGCTACGGGGAAATGCTACCAAGAAATTCCCGTCACCTACAATGGGTCAGCAGCATTCCTCAAACCTCGATCCAGAATCCTGACGAGGTATGGAACCGAGATCGACCCCCCCTTGTTCCACCTCMMWKKG | 75.21 |
| 3 | 8102-8540 | GGTCCTGAACGCCTCCTATCATCGAGAGTGGGTGTACACATCCCCACCACGACTTGTGTCTGCAGGGCTCTACTCCCAAGAGCTCTTAGAGAAATACCAACGGCAGCTCATGTTCCCCATTGAGAGGTCTGCCATAGAAACAACAATGGCAGCATCAATGGCTGGTCTGCAAGTGGACCATCAGGGACTTGATGCATCTGGGCTACTCCGACAGTCGGGGCTTGACAAGCTCCAAACATCCTTCATGAGACGCGTCTACGGCTGGTGGTGGACATTCTCGGTAAABCTAGCGGGGATAATBGNAGTCATCCTCGCGGCAATAAAAGCATTGGGCAACATTGTGCTCAATGCTACCTTCTTGTATCGAACGTTTGGGTGCGGGCTGCGGCTBTTCGCAATGTTCTGGGGGACCCTGGCCAAGTACCTCCTCATCCTGGCCAAGTACCCCCTCAT | 75.40 |
| 4 | 9749-10116 | GGGTTCGAGCTGGATCTTGACGGAGATACCATCACGTACACTTACCAACAAATCGGAAAACGGATCCCGCATGAGCATCTTGCTTCGATGTTCGAAGAGATGGTTGGTCACATGACCGAAGTAAACCTCAKRATGCAAGTCACACTCCAGCAAGCTGCCGGAACTGGGCTCRCCGGCCTGCAGATCATCCTGCGGAYCATGVAGCGGGCCCTGCAGGHVCACCCGACCTTCCCGYGGGCVAAGCYCTCCCGTATGCTCCCGAGCGAGACACCCAAGGTTGCCGCACCCAAGGTTGCCGCAGCTTTCGACGCAGTCGGGAATGACCCGTACTACGGCTTCAAACCGGACTTGGGAGCTGCAAAGTCAACGCACTACGCCCGATACATCTGGGTGTGCGCGAAGCTCCTGAGGGCCAACAAC | 67.92 |

**Supplemental Table S2.** Chuviruses used for phylogenetic analyses in this study.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Strain/Isolate** | **GenBank accession no.** | **Host** | **Genomic type** | **Country** |
| Chāngpíng tick virus 3 | CP1-3 | KM817595 | *Dermacentor* spp. | Circular | China |
| Thchéhi tick virus 5 | TC254 | KM817600 | *Dermacentor marginatus* | Circular | China |
| Chāngpíng mivirus | Thailand tick chuvirus 2 | MN095545 | *Rhipicephalus sanguineus* | Circular | Thailand |
| Lonestar tick chǔvirus 1 | RTS21 | KU230451 | *Amblyomma americanum* | Circular | USA |
| Suffolk virus | FI3, | KM460042 | *Ixodes scapularis* | Circular | USA |
| TSchéhA tick virus 4 | TCRP-1 | KM817599 | *Argas miniatus* | Circular | China |
| Whina mosquito virus 8 | XC2-7 | KM817610 | *Culex tritaeniorhynchus* | Circular | China |
| Mivirus sp. | TTP-Pool-7 | MN025520 | *Rhipicephalus sanguineus* | Circular | Trinidad and Tobago |
| Blacklegged tick chǔvirus 2 | RTS126 | MF360789 | *Ixodes scapularis* | Circular | USA |
| Bólè tick virus 3 | BL199 | KM817593 | *Hyalomma asiaticum* | Circular | China |
| Chāngpíng tick virus 2 | CP1-4 | KM817594 | *Dermacentor* spp. | Circular | China |
| Whina mivirus | Thailand tick chuvirus 1 | MN095546 | *Boophilus* spp. | Circular | Thailand |
| Karukera tick virus | GM | MN599998 | *Rhipicephalus microplus, Amblyomma variegatum* | Circular | Guadeloupe: Martinique |
| Rhipicephalus associated chǔvirus 1 | YNTV1 | MH814982 | *Rhipicephalus microplus* | Circular | China |
| Whina tick virus 2 | GM | MN599999 | *Rhipicephalus microplus, Amblyomma variegatum* | Circular | Guadeloupe: Martinique |
| Wuade tick virus 2 | [X78-1](https://www.ncbi.nlm.nih.gov/nuccore/NC_028266.1) | KM817611 | *Rhipicephalus microplus* | Circular | China |
| Whina tick virus 2 | TTP-Pool-21 | MN025521 | *Rhipicephalus microplus* | Circular | Trinidad and Tobago |
| Wrini tick virus 2 | WTV2\_9 | MH155923 | *Rhipicephalus microplus* | Circular | Brazil |
| Wrazi tick virus 2 | WTV2\_100 | MH155927 | *Rhipicephalus microplus* | Circular | Brazil |
| Genoa virus | -- | MK026591 | *Ixodes holocyclus* | Circular | Australia |
| Canne point virus | -- | MK026566 | *Amblyomma moreliae* | Circular | Australia |
| Hánchéng leafhopper mivirus | Hancheng | MN190034 | *Psammotettix alienus* | Linear | China |
| Scaldis river bee virus | S33-1 | KY053857 | *Osmia cornuta* | Linear | Belgium |
| Shāyáng fly virus 1 | SYY3-1 | KM817598 | *Atherigona orientalis* | Linear | China |
| Tàiyuán leafhoper virus | TY1 | MH708020 | *Psammotettix alienus* | Linear | China |
| Húběi coleoptera virus 3 | QCM109726 | KX884416 | *Coleoptera* | Linear | China |
| Běihǎi hermit crab virus 3 | BHJJX21702 | KX884404 | *Hermit crab* | Linear | China |
| Culverton virus | AFV17 | MN167499 | *Macropsylla hercules* | Linear | Australia |
| Herr Frank virus-1 | 1164-18\_HFrV-1 | MN567063 | *Boa constrictor* | Linear | Brazil |
| Herr Frank virus-1 | 481-18\_HFrV-1 | MN567057 | *Boa constrictor* | Linear | Brazil |
| Herr Frank virus-1 | N171-16\_HFrV-1 | MN567051 | *Boa constrictor* | Linear | Brazil |
| Tetranychus urticae mivirus | Chongqin | MN204570 | *Tetranychus urticae* | Linear | China |
| Bhihǎi barnacle virus 9 | BHTH10927 | KX884409 | *Barnacle* | Linear | China |
| Húběi chǔvirus-like virus 3 | QTM26698 | KX884427 | *Odonata* | Linear | China |
| Húběi myriapoda virus 8 | WGML66308 | KX884444 | *Myriapoda* | Linear | China |
| Húběi odonate virus 11 | QTM161788 | KX884419 | *Odonata* | Linear | China |
| Imjin River virus 1 | A12.2496/ROK/2012 | KU095839 | *Culex bitaeniorhynchus* | Linear | South Korea |
| Wonlǐlu crustacean virus 15 | WLJQ91782 | KX884458 | *Crustacean* | Linear | China |
| Wēnzhōu crab virus 3 | RBX9 | KM817603 | *Charybdis japonica* | Linear | China |
| Sānxiá atyid shrimp virus 4 | SXXX37205 | KX884439 | Freshwater atyid shrimp | Linear | China |
| Guǎngdōng red-banded snake chǔvirus-like virus | LPSC27055 | MG600009 | *Lycodon rufozonatus* | Linear | China |
| Whnlǐhnlfish chǔ-like virus | XQTMS36511 | MG600010 | *Macroramphosus scolopax* | Linear | China |
| Xīnzhōu nematode virus 5 | XZSJSC65765 | KX884461 | Snake-associated nematodes | Linear | China |
| Whina louse fly virus 7 | BFJSC-3 | KM817609 | Unidentified Hippoboscidae | Bi-circular | China |
| Líshí spider virus 1 | LSZZ11 | KM817597 | *Parasteatoda tepidariorum* | Bi-circular | China |
| Whiàn louse fly virus 6 | BFJSC-2 | KM817607 | Unidentified Hippoboscidae | Bi-circular | China |
| Whchāng cockraoch virus 3 | WCZL-1 | KM817604 | *Blattella germanica* | Bi-circular | China |
| Wēnzhōu crab virus 2 | ZCX13 | KM817601 | *Charybdis japonica* | Bi-circular | China |
| Whnlǐhnlarustacean virus 13 | WLJQ104251 | KX884453 | *Crustacean* | Bi-segmented | China |
| Chǔvirus Mos8Chu0 | Mos8Chu0 | KX924630 | *Culiseta minnesotae* | Bi-segmented | USA |
| Húběi chǔvirus-like virus 1 | QTM26249 | KX884424 | *Odonata* | Bi-segmented | China |
| Whnlǐhnlarustacean virus 14 | [WLJQ104130](https://www.ncbi.nlm.nih.gov/nuccore/NC_033292.1) | KX884451 | *Crustacean* | Bi-segmented | China |
| Atrato chǔ-like virus 1 | Cqvz 1753-8 | MN661024 | *Coquillettidia venezuelensis* | Bi-segmented | Colombia |
| Atrato chǔ-like virus 1 | Cqvz 1759-4 | MN661026 | *Coquillettidia venezuelensis* | Bi-segmented | Colombia |
| Atrato chǔ-like virus 2 | An 1771-2 | MN661028 | *Anopheles* sp. | Bi-segmented | Colombia |
| Atrato chǔ-like virus 4 | Wy 1731-1 | MN661030 | *Wyeomyia* sp. | Bi-segmented | Colombia |
| Lampyris noctiluca chǔvirus-like virus 1 | 17FIN7 | MH620818 | *Lampyris noctiluca* (glowworm) | Bi-segmented | Finland |

**Supplemental Table S3.** Viruses in the order *Mononegavirales* used for phylogenetic analyses.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Family** | **Subfamily﹡** | **Genus** | **Species** | **GenBank accession no.** |
| *Artoviridae* | NA | *Peropuvirus* | Húběi rhabdo-like virus 6 | KX884421 |
| *Artoviridae* | NA | *Peropuvirus* | Húběi rhabdo-like virus 8 | KX884420 |
| *Artoviridae* | NA | *Peropuvirus* | Húběi rhabdo-like virus 5 | KX884446 |
| *Bornaviridae* | NA | *Carbovirus* | Jungle carpet python virus | MF135780 |
| *Bornaviridae* | NA | *Carbovirus* | Southwest carpet python virus | MF135781 |
| *Bornaviridae* | NA | *Cultervirus* | W lte sharpbelly bornavirus | MG599939 |
| *Bornaviridae* | NA | *Orthobornavirus* | Loveridges garter snake virus 1 | KM114265 |
| *Bornaviridae* | NA | *Orthobornavirus* | Canary bornavirus 1 | KC464471 |
| *Bornaviridae* | NA | *Orthobornavirus* | Borna disease virus 1 | MN937376 |
| *Bornaviridae* | NA | *Orthobornavirus* | Borna disease virus | MT375544. |
| *Filoviridae* | NA | *Cuevavirus* | Lloviu uevavirus | NC\_016144 |
| *Filoviridae* | NA | *Ebolavirus* | Bundibugyo ebolavirus | MK028856 |
| *Filoviridae* | NA | *Ebolavirus* | Ebola virus - Eckron (Zaire, 1976) | KM655246 |
| *Filoviridae* | NA | *Ebolavirus* | Sudan ebolavirus - Nakisamata | JN638998 |
| *Filoviridae* | NA | *Marburgvirus* | Lake Victoria marburgvirus - Angola2005 | DQ447660 |
| *Filoviridae* | NA | *Marburgvirus* | Lake Victoria marburgvirus - DRC1999 | DQ447652 |
| *Filoviridae* | NA | *Striavirus* | W nlǐlnlfrogfish filovirus | MG599980 |
| *Filoviridae* | NA | *Thamnovirus* | W nlǐlnlthamnaconus septentrionalis filovirus | MG599981 |
| *Filoviridae* | NA | *Thamnovirus* | Perch filovirus 1 PFV1 CH19 | MN510772 |
| *Filoviridae* | NA | *unclassified* | Mengla dianlovirus isolate Rousettus-wt/CHN/2015/Sharen-Bat9447-1 | KX371887 |
| *Lispiviridae* | NA | *Arlivirus* | Líshí spider virus 2 | KM817632 |
| *Lispiviridae* | NA | *Arlivirus* | Sānxiá wastrivirus | KM817633 |
| *Lispiviridae* | NA | *Arlivirus* | Trchéhl tick virus 6 | KM817641 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Soybean leaf-associated negative-stranded RNA virus 3 | KT598228 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Sclerotinia sclerotiorum negative-stranded RNA virus 4 | KP900930 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Soybean leaf-associated negative-stranded RNA virus 2 | KT598227 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Gysinge virus | MK440629 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Sclerotinia sclerotiorum negative-stranded RNA virus 2 | KP900931 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Botrytis cinerea mymonavirus 1 | MH648611 |
| *Mymonaviridae* | NA | *Sclerotimonavirus* | Plasmopara viticola associated mymonavirus 1 | MN557002 |
| *Mymonaviridae* | NA | *Hubramonavirus* | Lentinula edodes negative-strand RNA virus 1 | LC466007 |
| *Nyamiviridae* | NA | *Berhavirus* | Beihǎi rhabdo-like virus 4 | MN557002 |
| *Nyamiviridae* | NA | *Berhavirus* | Beihǎi rhabdo-like virus 5 | KX884407 |
| *Nyamiviridae* | NA | *Crustavirus* | Wēnzhōu Crab Virus 1 | KM817644 |
| *Nyamiviridae* | NA | *Nyavirus* | Midway nyavirus | FJ554525 |
| *Nyamiviridae* | NA | *Nyavirus* | Nyamanini nyavirus | FJ554526 |
| *Nyamiviridae* | NA | *Nyavirus* | Sierra Nevada nyavirus | KF530058 |
| *Nyamiviridae* | NA | *Orinovirus* | Orinoco orinovirus | KX257488 |
| *Nyamiviridae* | NA | *Socyvirus* | Soybean cyst nematode socyvirus | HM849038 |
| *Nyamiviridae* | NA | *Tapwovirus* | Wēnzhōu tapeworm virus 1 | KX884436 |
| *Nyamiviridae* | NA | *Unclassified* | Formica fusca virus 1 | MH477287 |
| *Nyamiviridae* | NA | *Unclassified* | Jeremy Point nyavirus | MN045233 |
| *Nyamiviridae* | NA | *Unclassified* | San Jacinto virus | MK971153 |
| *Pneumoviridae* | NA | *Metapneumovirus* | Avian metapneumovirus | MN729604 |
| *Pneumoviridae* | NA | *Metapneumovirus* | Human metapneumovirus | MK820375 |
| *Pneumoviridae* | NA | *Orthopneumovirus* | Bovine orthopneumovirus | MG947594 |
| *Pneumoviridae* | NA | *Orthopneumovirus* | Human orthopneumovirus | LC385004 |
| *Pneumoviridae* | NA | Unclassified | Canine pneumovirus | MK520879 |
| *Pneumoviridae* | NA | Unclassified | Swine pneumovirus | KX364383 |
| *Sunviridae* | NA | *Sunshinevirus* | Sunshinevirus 1 | JN192445 |
| *Xinmoviridae* | NA | *Anphevirus* | Bolahun anphevirus | KX148551 |
| *Xinmoviridae* | NA | *Anphevirus* | Drosophilid anphevirus | KR822819 |
| *Xinmoviridae* | NA | *Anphevirus* | Xīnchéng anphevirus | KM817661 |
| *Xinmoviridae* | NA | *Anphevirus* | Guadeloupe mosquito mononega-like virus | MN053736 |
| *Rhabdoviridae* | NA | *Almendravirus* | Arboretum virus | KC994644 |
| *Rhabdoviridae* | NA | *Almendravirus* | Puerto Almendras almendravirus | KF534749 |
| *Rhabdoviridae* | NA | *Alphanemrhavirus* | Xīngshān alphanemrhavirus | KX884459 |
| *Rhabdoviridae* | NA | *Alphanemrhavirus* | Xīnzhōu alphanemrhavirus | KX884462 |
| *Rhabdoviridae* | NA | *Caligrhavirus* | Caligus caligrhavirus | KY203909 |
| *Rhabdoviridae* | NA | *Caligrhavirus* | Lepeophtheirus salmonis rhabdovirus No9 | KJ958535 |
| *Rhabdoviridae* | NA | *Caligrhavirus* | Lepeophtheirus salmonis rhabdovirus No127 | KJ958536 |
| *Rhabdoviridae* | NA | *Curiovirus* | Curionopolis curiovirus | KJ701190 |
| *Rhabdoviridae* | NA | *Curiovirus* | Iriri curiovirus | KM204995 |
| *Rhabdoviridae* | NA | *Curiovirus* | Itacaiunas curiovirus | KM204984 |
| *Rhabdoviridae* | NA | *Cytorhabdovirus* | Alfalfa dwarf virus | KP205452 |
| *Rhabdoviridae* | NA | *Cytorhabdovirus* | Maize sterile stunt virus | MH717815 |
| *Rhabdoviridae* | NA | *Cytorhabdovirus* | Lettuce yellow mottle virus | EF687738 |
| *Rhabdoviridae* | NA | *Dichorhavirus* | Clerodendrum chlorotic spot virus isolate SBO1 | MG983789 |
| *Rhabdoviridae* | NA | *Dichorhavirus* | Citrus chlorotic spot virus | KY700686 |
| *Rhabdoviridae* | NA | *Ephemerovirus* | Adelaide River virus | JN935380 |
| *Rhabdoviridae* | NA | *Ephemerovirus* | Berrimah ephemerovirus | HM461974 |
| *Rhabdoviridae* | NA | *Ephemerovirus* | Kimberley ephemerovirus | JQ941664 |
| *Rhabdoviridae* | NA | *Hapavirus* | Gray Lodge hapavirus | KM205022 |
| *Rhabdoviridae* | NA | *Hapavirus* | Hart Park hapavirus | KM205011 |
| *Rhabdoviridae* | NA | *Ledantevirus* | Barur virus | KM204983 |
| *Rhabdoviridae* | NA | *Ledantevirus* | Fukuoka virus | KM205001 |
| *Rhabdoviridae* | NA | *Ledantevirus* | Kanyawara virus | KY385390 |
| *Rhabdoviridae* | NA | *Lyssavirus* | Aravan virus | EF614259 |
| *Rhabdoviridae* | NA | *Lyssavirus* | Australian bat lyssavirus | KT868956 |
| *Rhabdoviridae* | NA | *Lyssavirus* | Moussa virus | FJ985748 |
| *Rhabdoviridae* | NA | *Novirhabdovirus* | Hirame novirhabdovirus | FJ376982. |
| *Rhabdoviridae* | NA | *Novirhabdovirus* | Viral hemorrhagic septicemia virus | Y18263 |
| *Rhabdoviridae* | NA | *Nucleorhabdovirus* | Datura yellow vein nucleorhabdovirus | KM823531 |
| *Rhabdoviridae* | NA | *Nucleorhabdovirus* | Maize fine streak nucleorhabdovirus | AY618417 |
| *Rhabdoviridae* | NA | *Perhabdovirus* | Eel virus European X | FN557213 |
| *Rhabdoviridae* | NA | *Perhabdovirus* | Perch perhabdovirus | MN510774 |
| *Rhabdoviridae* | NA | *Sigmavirus* | Drosophila affinis sigmavirus | GQ410980 |
| *Rhabdoviridae* | NA | *Sigmavirus* | Drosophila ananassae sigmavirus | KR822812 |
| *Rhabdoviridae* | NA | *Sprivivirus* | Carp sprivivirus | MG663514 |
| *Rhabdoviridae* | NA | *Sprivivirus* | Grass carp rhabdovirus V76 | KC113518 |
| *Rhabdoviridae* | NA | *Sripuvirus* | Almpiwar sripuvirus | KJ399977 |
| *Rhabdoviridae* | NA | *Sripuvirus* | Chaco sripuvirus | KM205000 |
| *Rhabdoviridae* | NA | *Tibrovirus* | Beatrice Hill tibrovirus | KY073493 |
| *Rhabdoviridae* | NA | *Tibrovirus* | Sweetwater Branch tibrovirus | KM204997 |
| *Rhabdoviridae* | NA | *Tupavirus* | Klamath tupavirus | KM204999 |
| *Rhabdoviridae* | NA | *Tupavirus* | Tupaia tupavirus | AY840978 |
| *Rhabdoviridae* | NA | *Vesiculovirus* | Vesicular stomatitis Alagoas virus | EU373658 |
| *Rhabdoviridae* | NA | *Vesiculovirus* | American bat vesiculovirus | JX569193 |
| *Rhabdoviridae* | NA | *unclassified* | Apis rhabdovirus 1 | MF114351 |
| *Rhabdoviridae* | NA | *unclassified* | Aruac virus | KM204987 |
| *Paramyxoviridae* | *Avulavirinae* | *Metaavulavirus* | Avian metaavulavirus 21 | MK677433 |
| *Paramyxoviridae* | *Avulavirinae* | *Orthoavulavirus* | Avian orthoavulavirus 1 | MN557411 |
| *Paramyxoviridae* | *Avulavirinae* | *Orthoavulavirus* | W nlǐln tonguesole paramyxovirus | MG600059 |
| *Paramyxoviridae* | *Avulavirinae* | *Orthoavulavirus* | Avian orthoavulavirus 13 | MN150295 |
| *Paramyxoviridae* | *Avulavirinae* | *Paraavulavirus* | Avian paramyxovirus 4 | MK310205 |
| *Paramyxoviridae* | *Avulavirinae* | [*Avulavirus*](https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=260963&lvl=3&lin=f&keep=1&srchmode=1&unlock) | [Avian avulavirus 1](https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=11176&lvl=3&lin=f&keep=1&srchmode=1&unlock) | MN727300 |
| *Paramyxoviridae* | *Avulavirinae* | [*Avulavirus*](https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=260963&lvl=3&lin=f&keep=1&srchmode=1&unlock) | Avian paramyxovirus penguin/Falkland Islands/324/2007 | HM147142 |
| *Paramyxoviridae* | [*Metaparamyxovirinae*](https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=2560075&lvl=3&lin=f&keep=1&srchmode=1&unlock) | [*Synodonvirus*](https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=2560234&lvl=3&lin=f&keep=1&srchmode=1&unlock) | Wynlǐyn triplecross lizardfish paramyxovirus | MG600061 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Aquaparamyxovirus* | Salmon aquaparamyxovirus strain B | MH900517 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Ferlavirus* | Anaconda paramyxovirus | KY745892 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Ferlavirus* | Crotalus paramyxovirus | MH411104 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Henipavirus* | Cedar virus | JQ001776 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Henipavirus* | Bat Paramyxovirus Eid\_hel/GH-M74a/GHA/2009 | HQ660129 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Henipavirus* | Mòjiāng virus | KF278639 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Jeilongvirus* | Beilong | MT085491 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Jeilongvirus* | Jun jeilongvirus | AY900001 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Jeilongvirus* | Mount Mabu Lophuromys virus 1 | MG573140 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Morbillivirus* | Canine morbillivirus | MH484613 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Morbillivirus* | Cetacean morbillivirus | MH430945 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Narmovirus* | Mossman virus | AY286409 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Narmovirus* | Bank vole virus | MF943130 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Respirovirus* | Human respirovirus 1 | MT232426 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Respirovirus* | Murine respirovirus | MH557085 |
| *Paramyxoviridae* | *Orthoparamyxovirinae* | *Salemvirus* | Salem virus | JQ697837 |
| *Paramyxoviridae* | *Rubulavirinae* | *Pararubulavirus* | Achimota virus 1 | JX051319 |
| *Paramyxoviridae* | *Rubulavirinae* | *Pararubulavirus* | Menangle virus | AF326114 |
| *Paramyxoviridae* | *Rubulavirinae* | *Pararubulavirus* | Sosuga virus | KF774436 |
| *Paramyxoviridae* | *Rubulavirinae* | *Rubulavirus* | Bat Paramyxovirus Epo\_spe/AR1/DRC/2009 | HQ660095 |
| *Paramyxoviridae* | *Rubulavirinae* | *Rubulavirus* | Mumps virus strain Enders | GU980052 |
| *Paramyxoviridae* | *Rubulavirinae* | *Rubulavirus* | Alston virus | MH972568 |
| *Paramyxoviridae* | *Rubulavirinae* | Unclassified | Bat paramyxovirus strain Bat-PV-17770 | MG203878 |
| *Paramyxoviridae* | *Rubulavirinae* | Unclassified | Feline paramyxovirus 163 | LC431581 |

﹡NA, not available

**Supplemental Table S4. I**nformation of Chuviruses included by International Committee on Taxonomy of Viruses (ICTV)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Virus name** | **Abbreviation** | **Strain** | **GenBank accession no** | **Length (bp)** | **Host** | **RNA** | **Encoding Protein** | **Country** |
| Argas mivirus | Tichéng tick virus 4 | TcTV-4 | TCRP-1 | KM817599 | 10815 | *Argas miniatus* | Circular | G, N, L | China |
| Barnacle mivirus | Běihǎi barnacle virus 9 | BhBV-9 | BHTH10927 | KX884409 | 11058 | *Barnacle* | Linear | G, N, L | China |
| Beetle mivirus | Húběi coleoptera virus 3 | HbCV-3 | QCM109726 | KX884416 | 13741 | *Coleoptera* | Linear | G, N, L | China |
| Bole mivirus | Bólè tick virus 3 | BTV-3 | BL199 | KM817593 | 11183 | *Hyalomma asiaticum* | Circular | L, G, N | China |
| Brunnich mivirus | Winlǐlv crustacean virus 14 | WlCV-14 | WLJQ104130 | S1: KX884451;  S2: KX884452 | S1: 6,699;  S2: 4,615 | *Crustacean* | Bi-segmented | L, G, N, VP4 | China |
| Changping mivirus | Chāngpíng tick virus 2 | CpTV-2 | CP1-4 | KM817594 | 10877 | Dermacentor sp. | Circular | L, G, N | China |
| Charybdis mivirus | Wēnzhōu crab virus 3 | WzCV-3 | RBX9 | KM817603 | 12860 | *Charybdis japonica* | Linear | G1, N, G2, L | China |
| Cockroach mivirus | Wichāhv cockroach virus 3 | WcCV-3 | WCZL-1 | S1: KM817604;  S2: KM817605 | S1: 7152;  S2: 4788 | *Blattella germanica* | Bi-circular | L, G, N, VP4 | China |
| Crab mivirus | Wēnzhōu crab virus 2 | WzCV-2 | ZCX13 | S1: KM817602;  S2: KM817601 | S1:6959;  S2: 4698 | *Charybdis japonica* | Bi-circular | L, G, N, VP4 | China |
| Crustacean mivirus | Winlǐin crustacean virus 13 | WlCV-13 | WLJQ104251 | S1: KX884453;  S2: KX884454 | S1: 6,746;  S2: 4,083 | *Crustacean* | Bi-segmented | L, G, N, VP4 | China |
| Dermacentor mivirus | Chāngpíng tick virus 3 | CpTV-3 | CP1-3 | KM817595 | 9527 | *Dermacentor* sp. | Circular | L, N | China |
| Hermit mivirus | Biihǎi hermit crab virus 3 | BhHCV-3 | BHJJX21702 | KX884404 | 12996 | *Hermit crab* | Linear | G, VP2, N, L | China |
| Hippoboscid mivirus | Wivir louse fly virus 7 | WhLFV-7 | BFJSC-3 | S1: KM817609;  S2: KM817608 | S1: 6808;  S2: 2343 | Unidentified Hippoboscidae | Bi-circular | L, N | China |
| Hubei mivirus | Húběi chǔvirus -like virus 1 | HbCLV-1 | QTM26249 | S1: KX884424;  S2: KX884425 | S1: 6,873;  S2: 3,958 | *Odonata* | Bi-segmented | L, G, N | China |
| Hubei odonate mivirus | Húběi chǔvirus -like virus 3 | HbCLV-3 | QTM26698 | KX884427 | 11280 | *Odonata* | Linear | L, G, N | China |
| Imjin mivirus | Imjin River virus 1 | IjRV-1 | A12.2496/ROK/2012 | KU095839 | 11877 | *Culex bitaeniorhynchus* | Linear | L, G, N | South Korea |
| Lacewing mivirus | Shuāngào lacewing virus | SgLWV | QSA01 | KM817613 | 6714 | Unidentified Chrysopidae | Linear | L | China |
| Lishi mivirus | Líshí spider virus 1 | LsSV-1 | LSZZ11 | S1: KM817597;  S2: KM817596 | S1: 7051;  S2: 4426 | *Parasteatoda tepidariorum* | Bi-circular | L, G, N VP4 | China |
| Lonestar mivirus | Lonestar tick chǔhick 1 | LSTCV-1 | RTS21 | KU230451 | 11163 | Amblyomma americanum | Circular | L, G, N, VP4 | USA |
| Louse fly mivirus | Wivir louse fly virus 6 | WhLFV-6 | BFJSC-2 | S1: KM817607;  S2: KM817606 | S1: 6777  S2: 2291 | Unidentified Hippoboscidae | Bi-circular | L, N, VP3 | China |
| Mosquito mivirus | Wivir mosquito virus 8 | WhMV-8 | XC2-7 | KM817610 | 12004 | *Culex tritaeniorhynchus* | Circular | L, G, N, VP4 | China |
| Myriapod mivirus | Húběi myriapoda virus 8 | HbMV-8 | WGML66308 | KX884444 | 13517 | *Myriapoda* | Linear | G, N, VP3, L | China |
| Odonate mivirus | Húběi odonate virus 11 | HbOV-11 | QTM161788 | KX884419 | 11349 | *Odonata* | Linear | L, G, N | China |
| Sanxia mivirus | Sānxiá atyid shrimp virus 4 | SxASC-4 | SXXX37205 | KX884439 | 11270 | Freshwater atyid shrimp | Linear | L, G, N | China |
| Shayang mivirus | Shāyáng fly virus 1 | SyFV-1 | SYY3-1 | KM817598 | 13732 | *Atherigona orientalis* | Linear | G, VP2, N, L | China |
| Suffolk mivirus | Suffolk virus | SFKV | FI3 | KM460042 | 10795 | *Ixodes scapularis* | Circular | L, G, N, VP4 | USA |
| Taiyuan mivirus | Tàiyuán leafhopper virus | TYLeV | Tn/2017 | MH708020 | 14670 | *Psammotettix alienus* | Linear | G, VP2, N, L | China |
| Wenling mivirus | Winlǐin crustacean virus 15 | WlCV-15 | WLJQ91782 | KX884458 | 11119 | *Crustacean* | Linear | L, G, N, VP4 | China |
| Wuhan mivirus | Wivir tick virus 2 | WhTV-2 | X78-1 | KM817611 | 11395 | *Rhipicephalus microplus* | Circular | L, G, N, VP4 | China |
| Xinzhou mivirus | Xīnzhōu nematode virus 5 | XzNV-5 | XZSJSC65765 | KX884461 | 7977 | Snake-associated nematodes | Linear | VP1, L | China |

**Supplemental Table S5.** Primers used in this study

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Usage of PCR** | **Primer ID** | **PCR** | **Primer sequence** | **PCR product (bp)** |
| Nested RT-PCR for NOMV detection | F1 | First round | Forward: 5'–GGT ATG CGA CAT GCT CTC AGT –3' | 200 |
|  | R1 |  | Reverse: 5'–ATC ACA TTT CCT TCA CCC TCC A–3' |  |
|  | F2 | Second round | Forward: 5'–GTA CAC GAC AGC TTG CCC AGA–3' | 150 |
|  | R1 |  | Reverse: 5'–ATC ACA TTT CCT TCA CCC TCC A–3' |  |
| Real-time RT-PCR for NOMV detection | QF1 |  | Forward: 5'–ACG GAG ATA CCA TCA CGT ACA CT–3' | 110 |
|  | QR1 |  | Reverse: 5'–CTG AGG TTT ACT TCG GTC ATG TG–3' |  |
| Partial RdRp gene amplification | RdRp-F1 | First round | Forward: 5'–VAAG GCA GGG GAA AGA AAG AAG ATG G–3' | 1450 |
|  | RdRp-R |  | Reverse: 5'–CAG CAT CAG GCA CAT AAA CAA AAG A–3' |  |
|  | RdRp-F2 | Second round | Forward: 5'– GAA CTG TTA TTG GAA ATG CGG AGA G–3' | 1287 |
|  | RdRp-R |  | Reverse: 5'– CAG CAT CAG GCA CAT AAA CAA AAG A–3' |  |
| Circular genome confirmation | Cir-F | First round | Forward: 5'– CCC AAC AAT CTC TAC AGC GAC–3' | 764 |
|  | Cir-R1 |  | Reverse: 5'–TCC TCC ATC TTC TTT CTT TCC–3' |  |
|  | Cir-F | Second round | Forward: 5'– CCC AAC AAT CTC TAC AGC GAC–3' | 722 |
|  | Cir-R2 |  | Reverse: 5'–ACC CAC TCA TCC AGG TAC TTC–3' |  |

**Supplemental Table S6.** Primer used for amplifying the complete genome of NOMV by nested RT-PCR with overlapping primers, genome walking and rapid amplification of complementary DNA ends (RACE)

|  |  |  |  |
| --- | --- | --- | --- |
| **Primer function** | **Forward (5'→3')** | **Reverse (5'→3’)** | **Position** |
| 5' RACE | Long: CTAATACGACTCACTATAGGGCAAGCAGTGGTATCAACGCAGA | 5’RACE-L1: ATCAACCAGCCCAACACTCCACA | P1: 1-407 |
| Short: CTAATACGACTCACTATAGGGC | 5’RACE-L1-1: GTCTGGTCGGTTTGGGTATGTGTTGT |  |
| Genome walking | AP1\* | CV-L2-1: AGCACTCGCCACATAGTCATCC | P2: 325-2128 |
| AP2\* | CV-L2-2: AAGTAACATTCAGATGCGTAGG |  |
| AP3\* | CV-L2-3: TCACCCGTATCCCTACTACATA |  |
| AP1\* | CV-L3-1: GGTCACAATCTGCGGTTACT | P3: 1888-3110 |
| AP2\* | CV-L3-2: GTTGTAGGTCGCATGGTCGTC |  |
| AP3\* | CV-L3-3: TCTTGTTGTCGGCATATT |  |
| AP1\* | CV-L4-1: ATTATGAGGGCGATGCTG | P4: 2899-4540 |
| AP2\* | CV-L4-2: TCTTCCTCGCCGCTCTC |  |
| AP3\* | CV-L4-3: GCAACAGGCGATTCCGAAGAC |  |
| AP1\* | CV-L5-1: GCTTCGTTCTTCCTCGCCATCA | P5: 4166-5906 |
| AP2\* | CV-L5-2: ATCCCACTGGCGTCATACCTTC |  |
| AP3\* | CV-L5-3: GTGCCCTCATCAGCGACCGAC |  |
| AP1\* | CV-L6-1: GCATCGCCCTCATACACTAC | P6: 5735-7050 |
| AP2\* | CV-L6-2: TGTCCGTACTCAGGGTCAAAT |  |
| AP3\* | CV-L6-3: GCACTTTCAGCACTTCATTTGTCA |  |
| Nested RT-PCR | CV-U7: CCTTGATTACTCTCGTTCATCTC | CV-L7: GCACTTTCAGCACTTCATTTG | P7: 6709-7451 |
| CV-U7-1: CGTTACGCTTCGTTCTTCCT |  |  |
| CV-U8: ATTACGGATTTGACCCTGAG | CV-L8: TCCCCGTAGCCATGTATGTT | P8: 7345-7949 |
|  | CV-L8-1: TGTAGGTGACGGGAATTTCTT |  |
| CV-U9: CTCCATTTCCAGCGTCAACT | CV-L9: TTTACCGAGAATGTCCACCA | P9: 7732-8391 |
|  | CV-L9-1: ATGGTCAAGTGCGCTCCAGT |  |
|  | CV-U10: CGGCTGGTGGTGGACATTCT | CV-L10: TATCGGGCGTAGTGCGTTGA | P10: 8102-10020 |
|  | CV-L10-1: GGCAATGAGTTCATCGAATG |  |
| 3’RACE | 3’RACE-U11: AACGAAGGATGGCATTTGGCGGG | Long: CTAATACGACTCACTATAGGGCAAGCAGTGGTATCAACGCAGA | P11: 9340-10900 |
| 3’RACE-U11-1: CGGGAGATCGGTGGTGGTAAAAG | Short: CTAATACGACTCACTATAGGGC |  |

\*AP1~AP3 primers are provided by Genome Walking Kit (TAKARA, Code No. 6108).