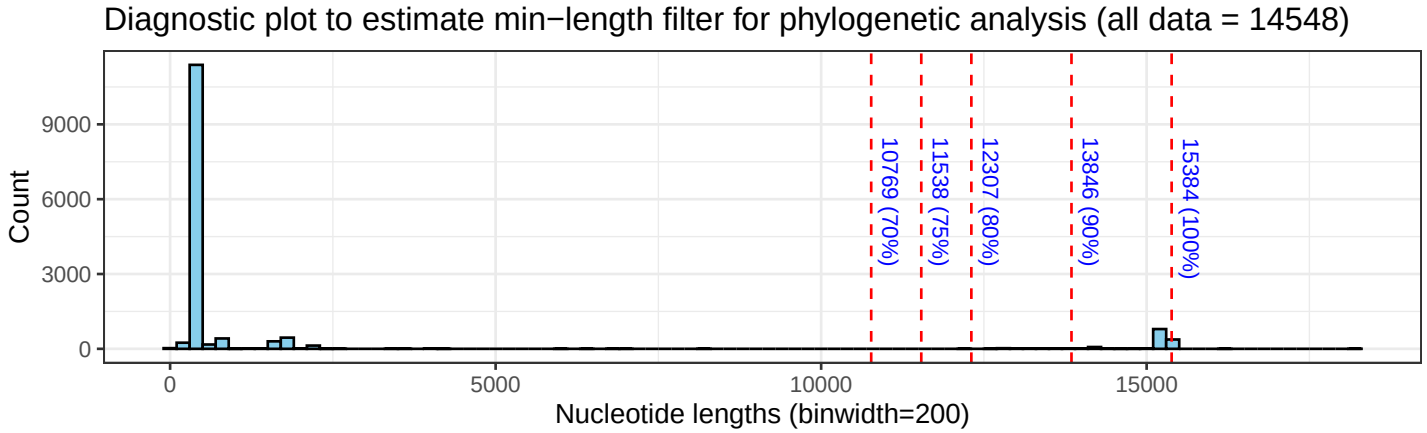
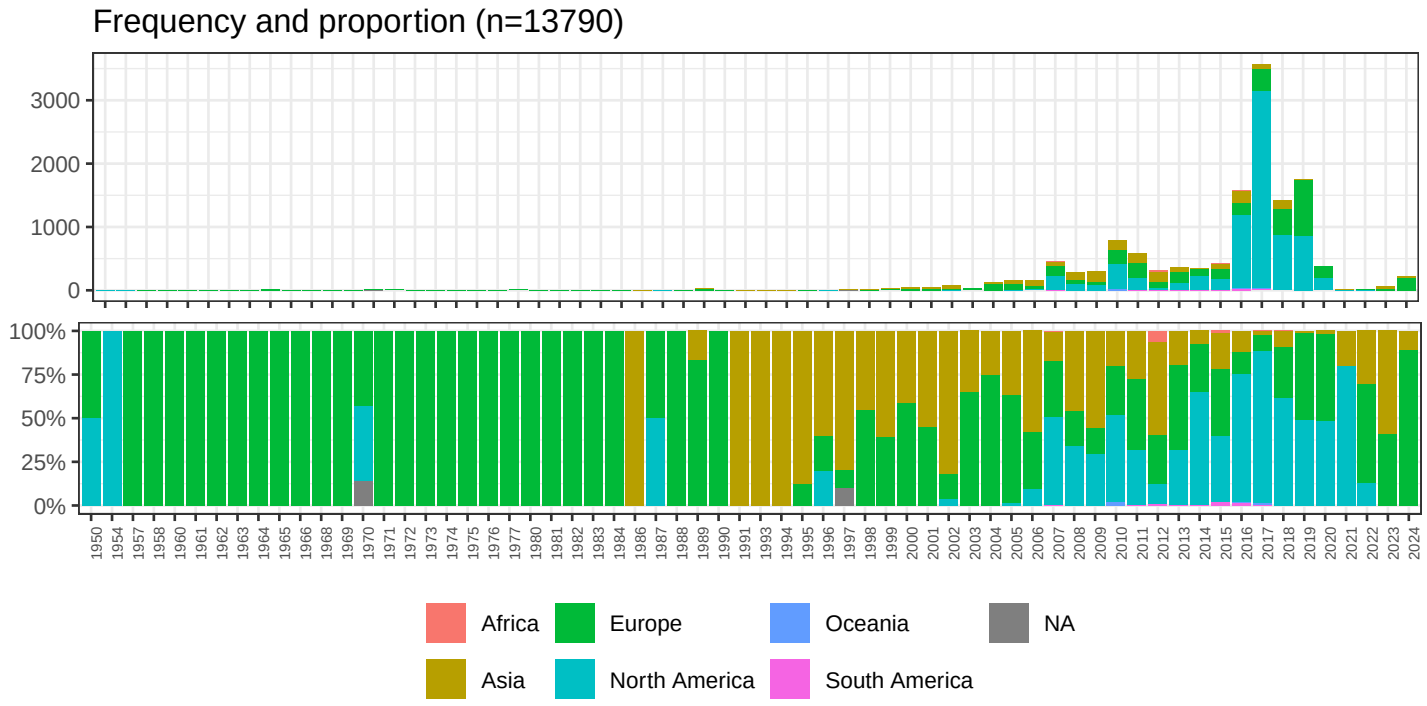
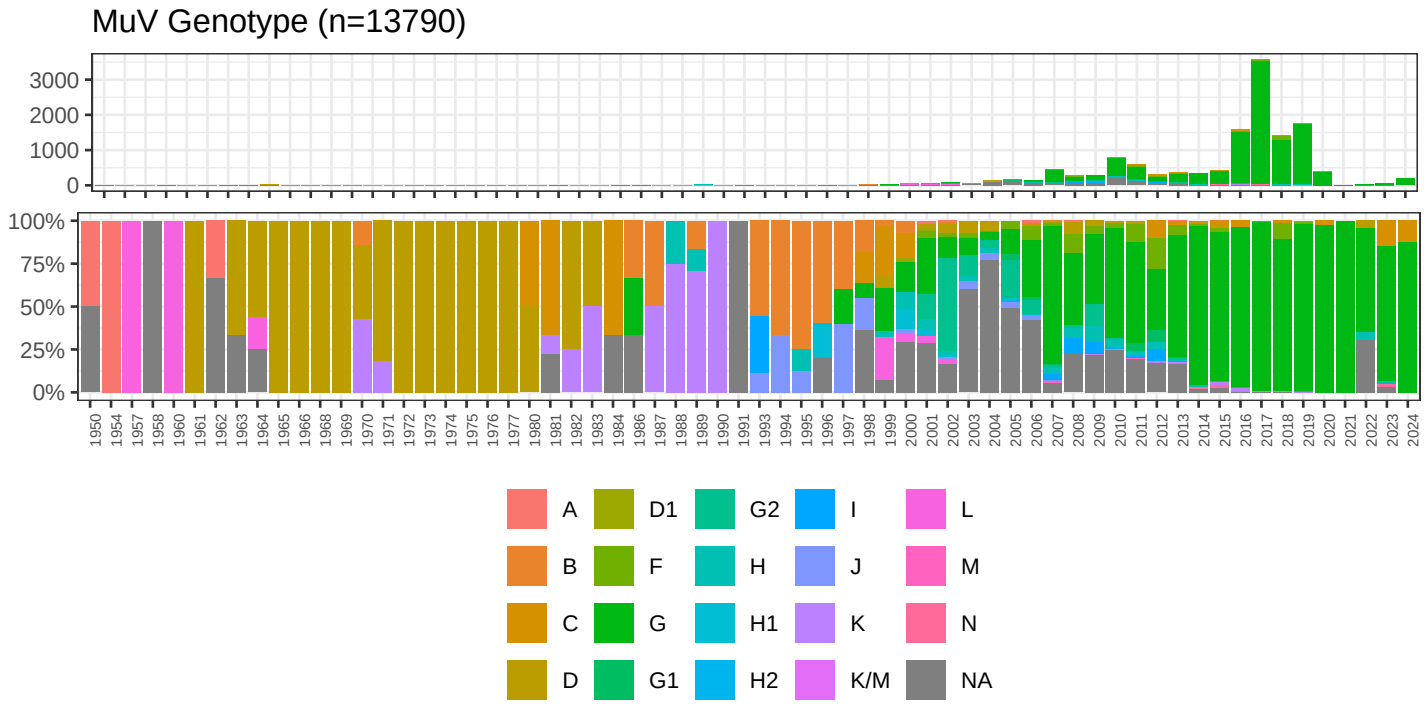
# Background

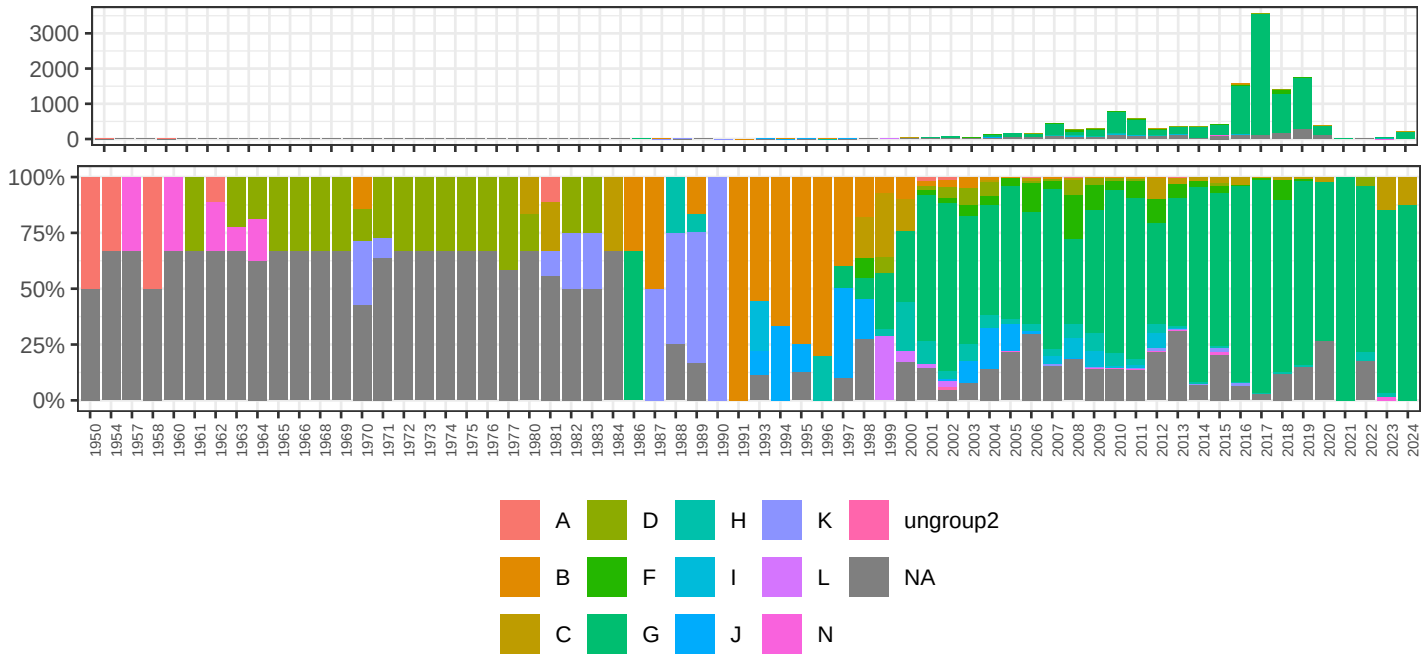
# Exploratory Graphics

# NCBI GenBank records




MuV Genotype (n=13790)
3000
2000
1000
0
100%
75%
50%
25%
0%
1950 1954 1957 1958 1960 1961 1962 1963 1964 1965 1966 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1980 1981 1982 1983 1984 1986 1987 1988 1989 1990 1991 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024
A
B
C
D
D1
F
G
G1
G2
H
H1
H2
I
J
K
K/M
L
M
N
NA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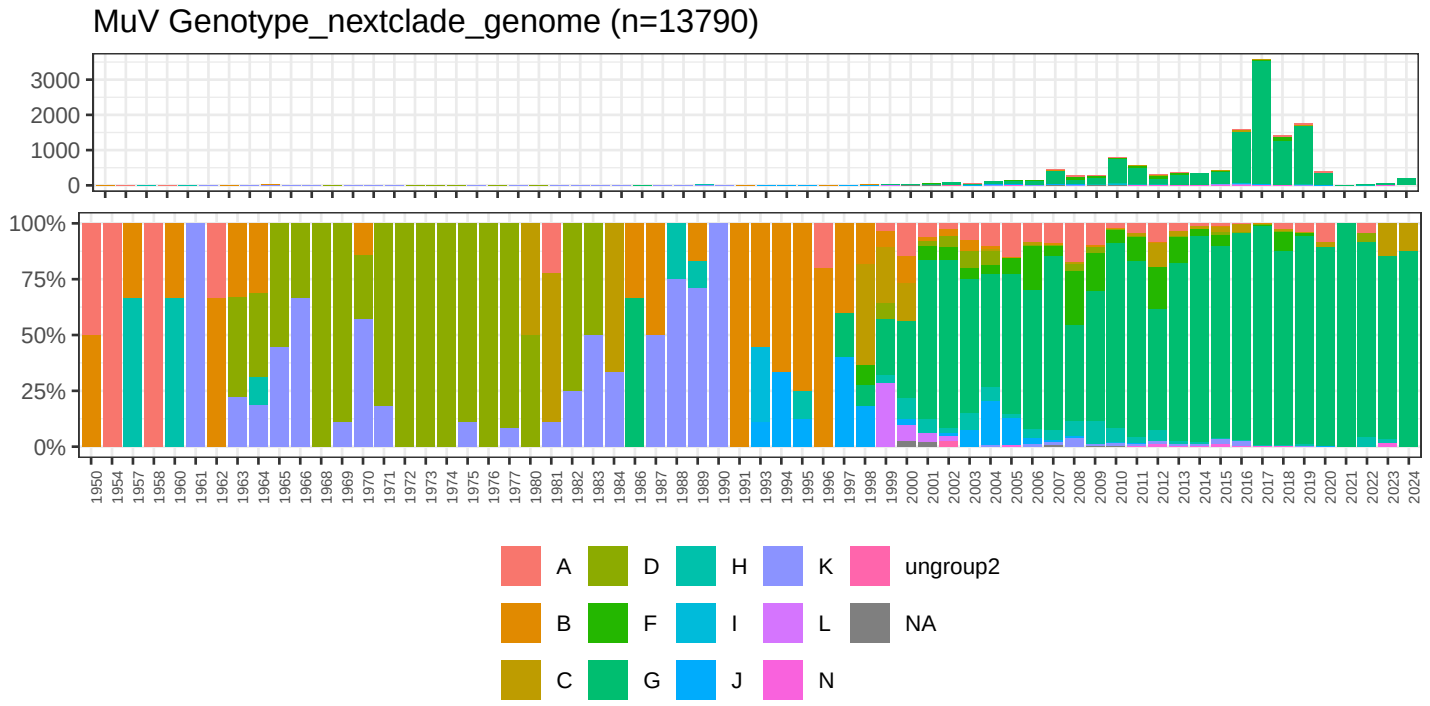
3000
2000
1000
0
100%
75%
50%
25%
0%
1950 1954 1957 1958 1960 1961 1962 1963 1964 1965 1966 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1980 1981 1982 1983 1984 1986 1987 1988 1989 1990 1991 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024
A
B
C
D
F
G
H
I
J
K
L
N
ungroup2
NA


MuV Genotype_nextclade_genome (n=13790)
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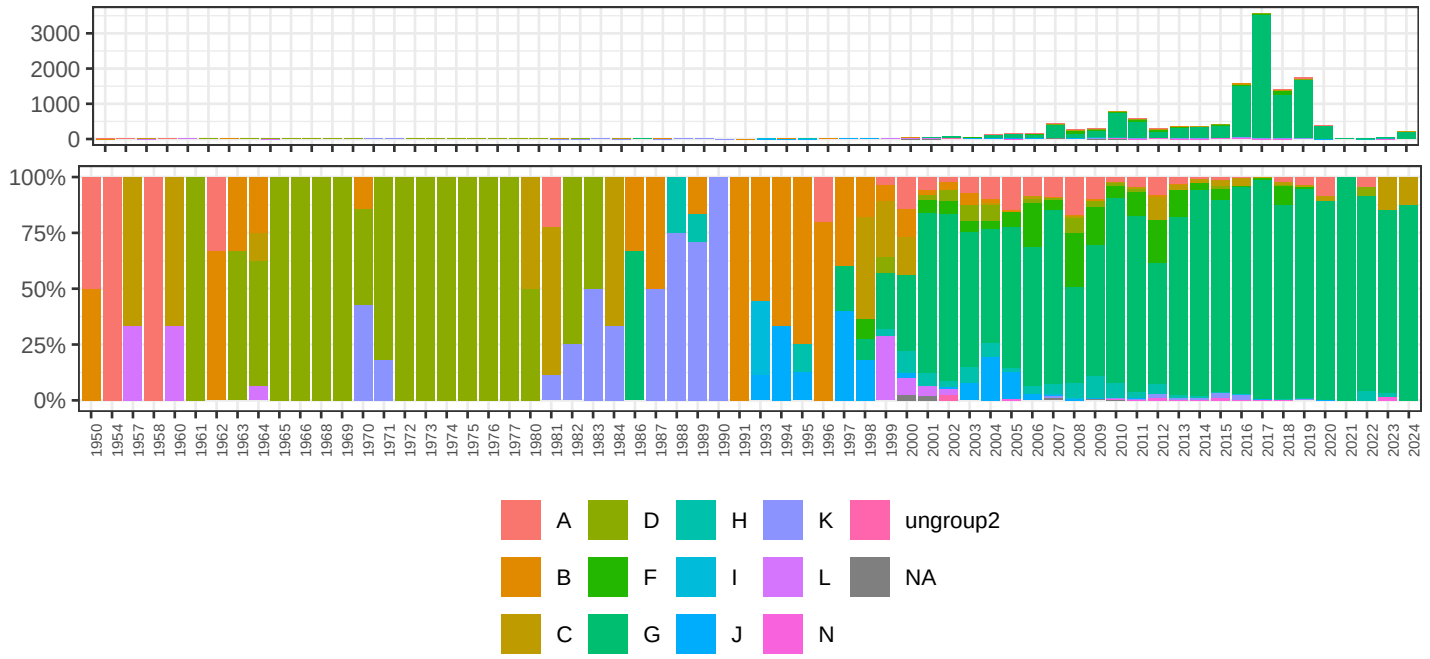
2000
1000
0
100%
75%
50%
25%
0%
1950 1954 1957 1958 1960 1961 1962 1963 1964 1965 1966 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1980 1981 1982 1983 1984 1986 1987 1988 1989 1990 1991 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024
A
B
C
D
F
G
H
I
J
K
L
N
ungroup2
NA


MuV Genotype_nextclade_genomesample (n=13790)
3000
2000
1000
0
100%
75%
50%
25%
0%
1950 1954 1957 1958 1960 1961 1962 1963 1964 1965 1966 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1980 1981 1982 1983 1984 1986 1987 1988 1989 1990 1991 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024
A
B
C
D
F
G
H
I
J
K
L
N
ungroup2
NA

# Nextclade dataset

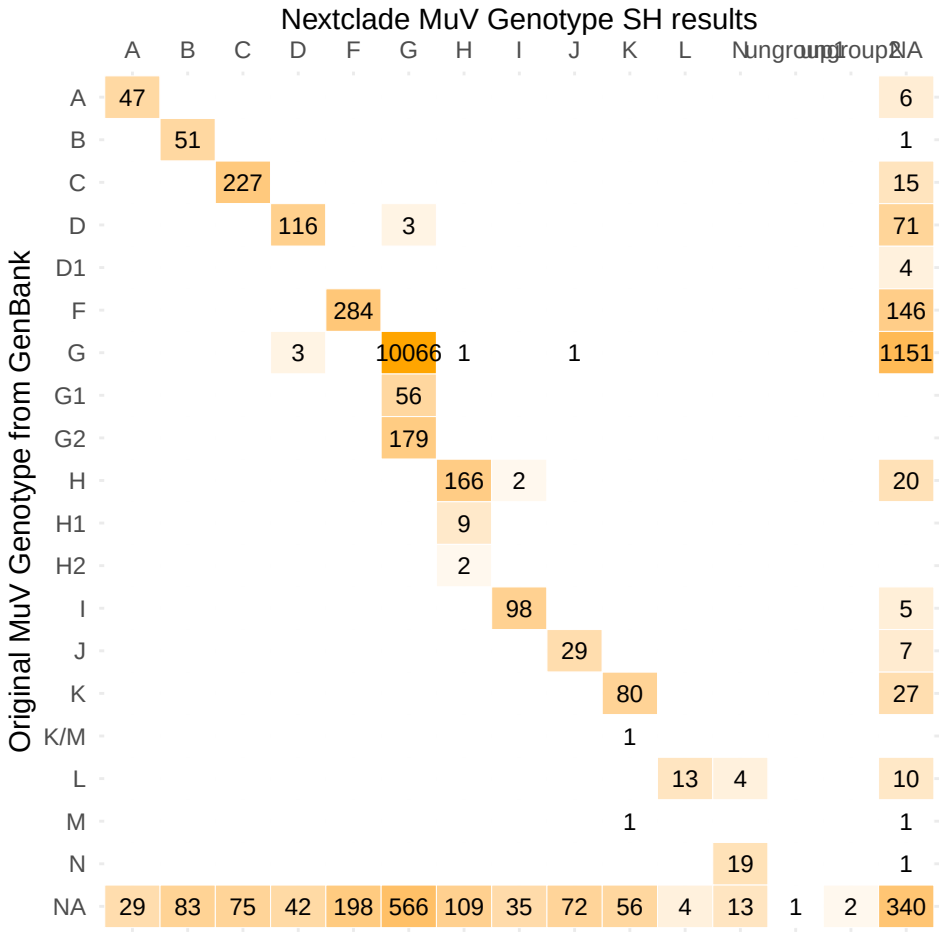



Table 1: Mismatched Genotype between GenBank and Nextclade datasets

| accession | strain | length | genotype | MuV_genotype | SH |
|---|---|---|---|---|---|
| MN436859 | MuVs/Segovia.ESP/15.09/[D] | 316 | Mumps virus genotype D | D | G |
| MN436862 | MuVs/Madrid.ESP/21.09/[D] | 316 | Mumps virus genotype D | D | G |
| MN436869 | MuVs/Madrid.ESP/36.09/[D] | 316 | Mumps virus genotype D | D | G |
| MZ913526 | MuVs/Washington.USA/15.20[G] | 316 | Mumps virus genotype G | G | J |
| MN436857 | MuVs/Ceuta.ESP/14.09/[G] | 316 | Mumps virus genotype G | G | D |
| MN436860 | MuVs/Ceuta.ESP/16.09/[G] | 316 | Mumps virus genotype G | G | D |
| MN436868 | MuVs/Ceuta.ESP/30.09/[G] | 316 | Mumps virus genotype G | G | D |
| MN511294 | MuVs/Stockholm.SWE/19.19[G] | 316 | Mumps virus genotype G | G | H |
| AB600942 | ODATE-3 | 15384 | Mumps orthorubulavirus | H | I |
| KP213049 | MuVi/Incheon.KOR/50.11/12[H] | 316 | Mumps virus genotype H | H | I |
| KX136901 | MuVi/NLD/0.57[L] | 316 | Mumps virus genotype L | L | N |
| KX136902 | MuVi/NLD/0.60/1[L] | 316 | Mumps virus genotype L | L | N |
| KX136903 | MuVi/NLD/0.60/2[L] | 316 | Mumps virus genotype L | L | N |
| KX136908 | MuVi/NLD/0.64/1[L] | 316 | Mumps virus genotype L | L | N |

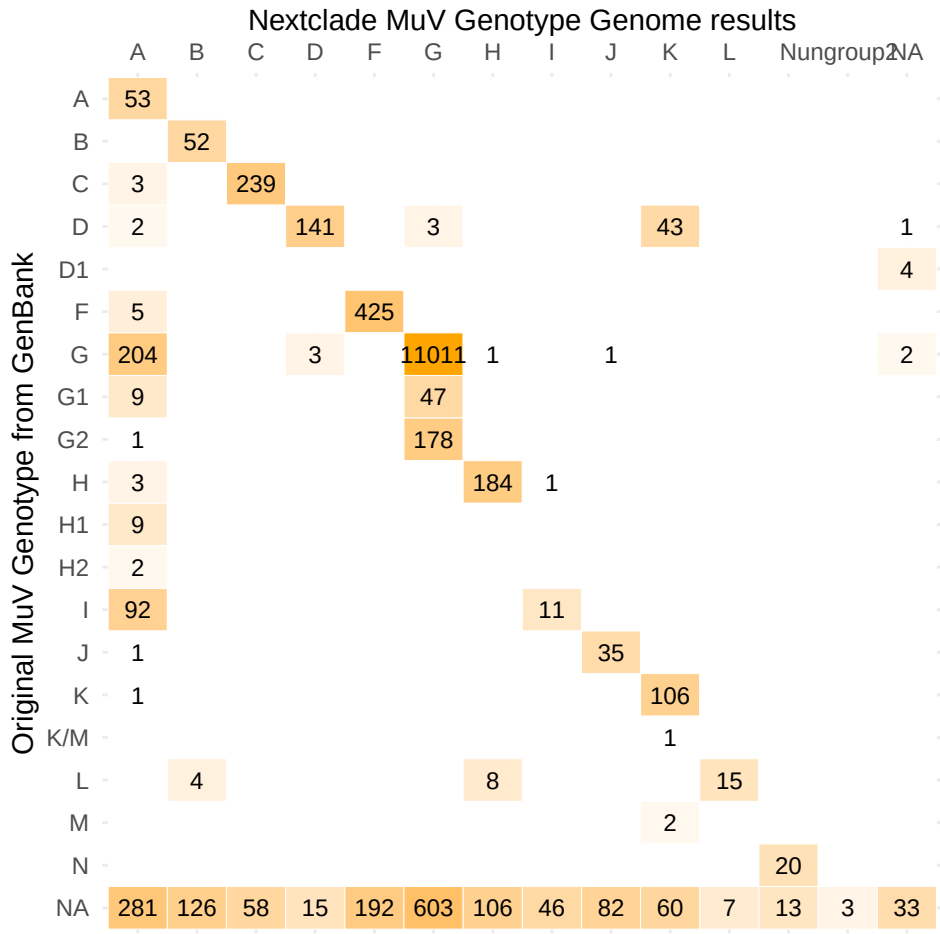



Table 2: Mismatched Genotype between GenBank and Nextclade datasets

| accession | strain | length | MuV_genotype | SH | Genome |
|---|---|---|---|---|---|
| MH509394 | MuV/ITA/52.00/INMI-2[C] | 425 | C | C | A |
| FJ919369 | 1610NE | 156 | C | C | A |
| KC429766 | MuVi/Chennai.IND/45.12.4[C] | 483 | C | C | A |
| MN920214 | MuVs/Quebec.CAN/26.19[D] | 316 | D | D | A |
| MW819866 | MuVi/Sint Philipsland.NLD/02.08[D] | 15375 | D | D | K |
| MF522126 | RIE26 | 606 | D | D | K |
| MN436859 | MuVs/Segovia.ESP/15.09/[D] | 316 | D | G | G |
| MN436862 | MuVs/Madrid.ESP/21.09/[D] | 316 | D | G | G |
| MN436869 | MuVs/Madrid.ESP/36.09/[D] | 316 | D | G | G |
| JQ034464 | MuVi/Nottingham.GBR/19.04[D] | 1749 | D | NA | K |

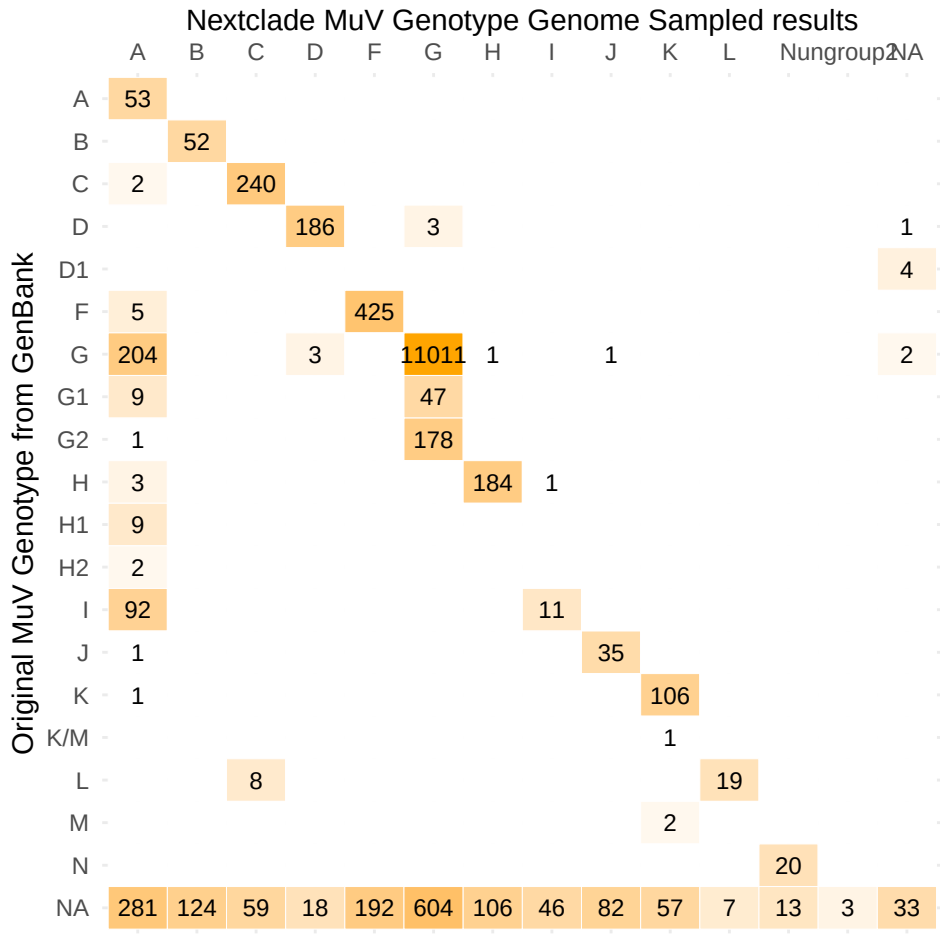



Table 3: Mismatched Genotype between GenBank and Nextclade datasets

| accession | strain | length | MuV_genotype | SH | Genome | GenomeSample |
|---|---|---|---|---|---|---|
| MH509394 | MuV/ITA/52.00/INMI-2[C] | 425 | C | C | A | A |
| FJ919369 | 1610NE | 156 | C | C | A | A |
| MN436859 | MuVs/Segovia.ESP/15.09/[D] | 316 | D | G | G | G |
| MN436862 | MuVs/Madrid.ESP/21.09/[D] | 316 | D | G | G | G |
| MN436869 | MuVs/Madrid.ESP/36.09/[D] | 316 | D | G | G | G |
| MH521278 | IQ-1 | 221 | F | F | A | A |
| MH521279 | IQ-2 | 221 | F | F | A | A |
| MH521280 | IQ-3 | 221 | F | F | A | A |
| MH521281 | IQ-4 | 221 | F | F | A | A |
| MH521282 | IQ-5 | 221 | F | F | A | A |

# Debugging Nextclade Assignments

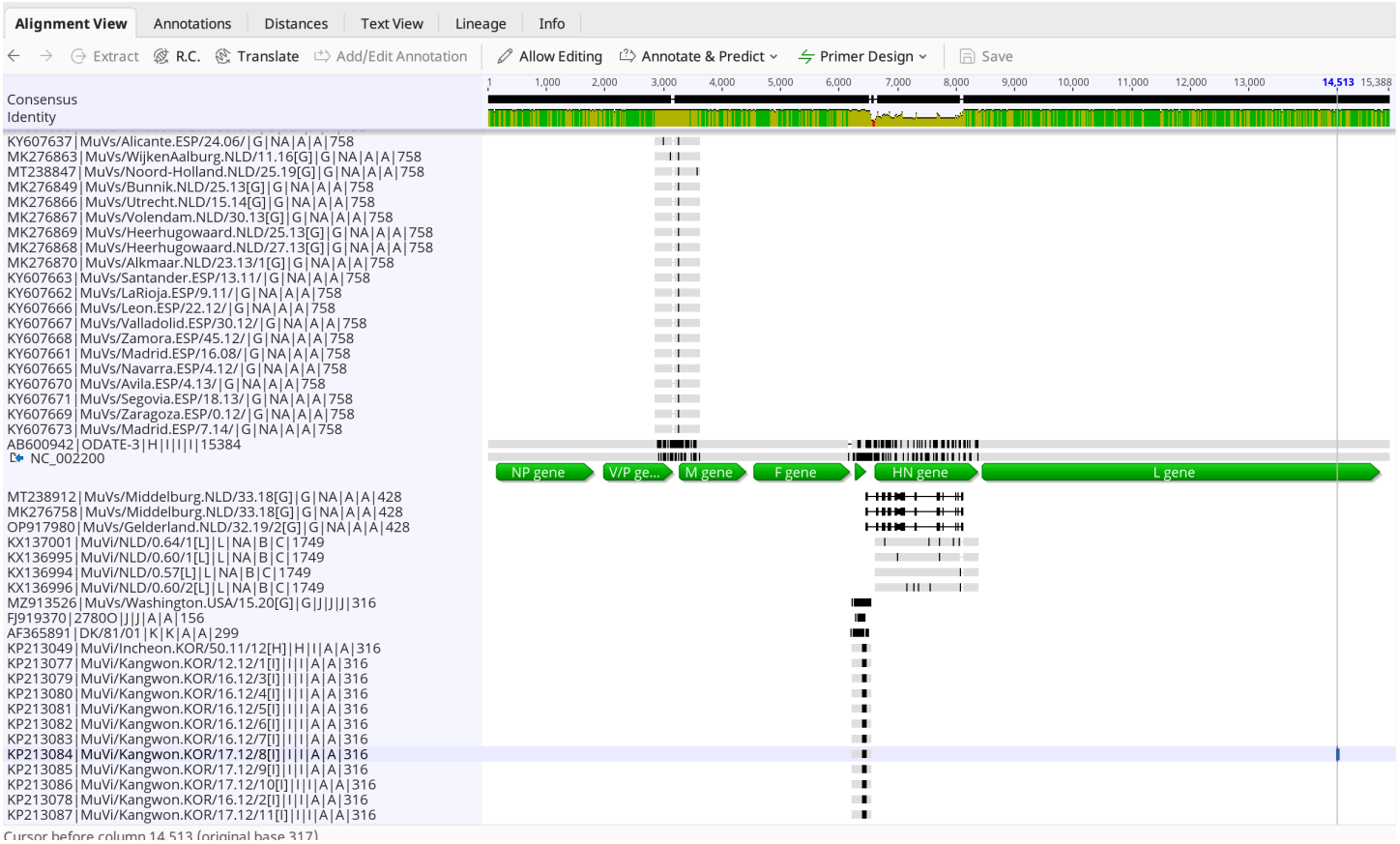
```
nextstrain shell .

#export BUILD=sh
#export METADATA_COLUMNS="strain,MuV_genotype,SH,length"
#export BUILD=genome
#export METADATA_COLUMNS="strain,MuV_genotype,SH,Genome,length"
export BUILD=genomesample
export METADATA_COLUMNS="strain,MuV_genotype,SH,Genome,GenomeSample,length"

augur filter \
  --metadata mumps/mismatch_${BUILD}.tsv \
  --metadata-id-columns accession \
  --sequences ~/Desktop/MUMPS/mumps/ingest/results/sequences.fasta \
  --output-sequences mumps/mismatch_${BUILD}_raw.fasta

python ~/github/j23414/basic-phylogenetic-pipeline/bin/annotate_header.py \
  --metadata mumps/mismatch_${BUILD}.tsv \
  --metadata-columns ${METADATA_COLUMNS} \
  --sequences mumps/mismatch_${BUILD}_raw.fasta \
  > mumps/mismatch_${BUILD}.fasta

nextclade3 run \
  mumps/mismatch_${BUILD}.fasta \
  --input-dataset ~/github/nextstrain/mumps-branches/add-nextclade-workflow-wgs/nextclade_data/${BUILD} \
  --output-tsv mumps/nextclade_${BUILD}.tsv \
  --output-fasta mumps/nextclade_${BUILD}.fasta \
  --silent
```




- Mis-assignments seem to be in the gap between V/P and M gene (weird indel), SH region for Genotype I, and HN gene.
- Dragged mis-assignments onto Nextclade tree, see figures below

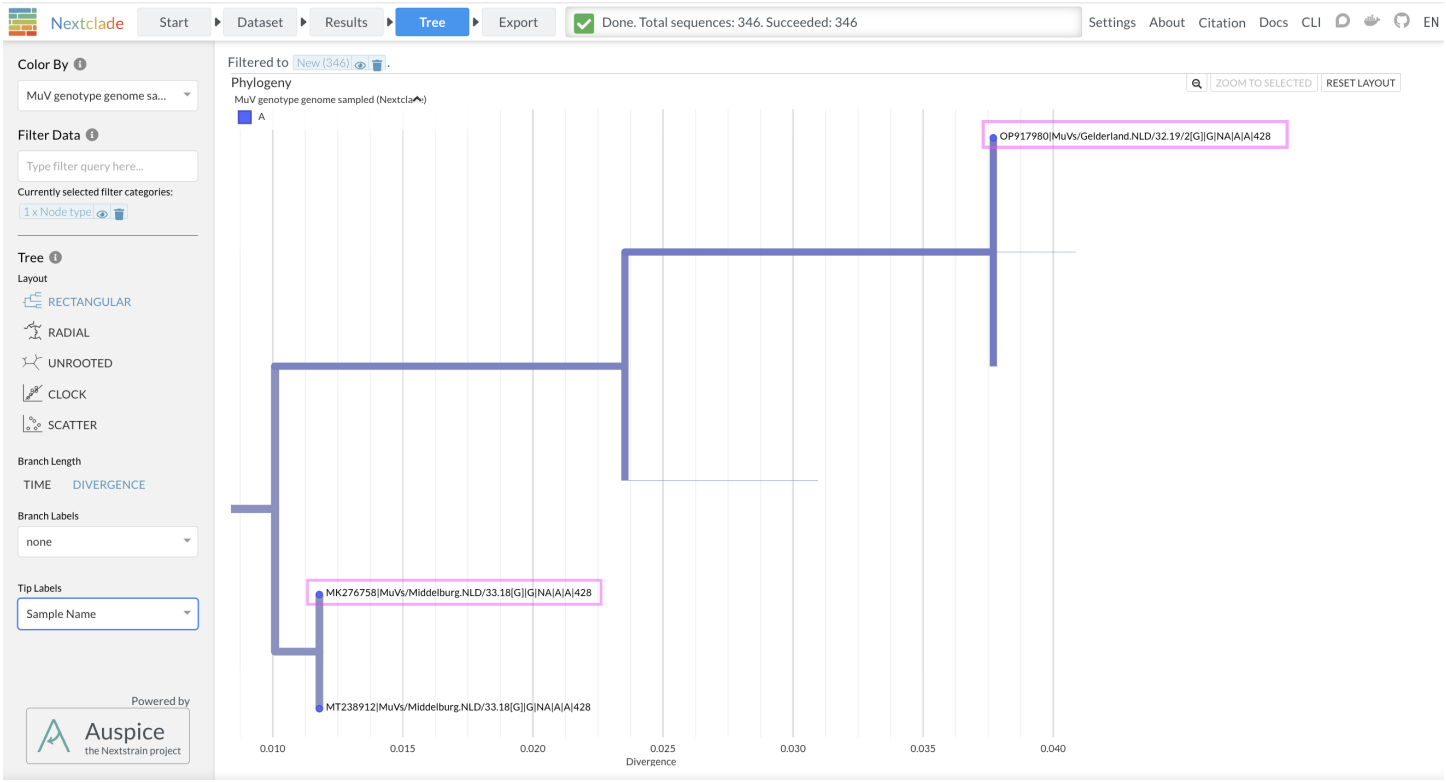



Table 4: For same strain, different segment genotype calls

| accession | strain | length | MuV_genotype | SH | Genome | GenomeSample |
|---|---|---|---|---|---|---|
| MK276692 | MuVs/Middelburg.NLD/33.18[G] | 315 | G | G | G | G |
| MT238912 | MuVs/Middelburg.NLD/33.18[G] | 428 | G | NA | A | A |
| MK276758 | MuVs/Middelburg.NLD/33.18[G] | 428 | G | NA | A | A |
| MT238839 | MuVs/Middelburg.NLD/33.18[G] | 758 | G | NA | A | A |
| MK276840 | MuVs/Middelburg.NLD/33.18[G] | 758 | G | NA | A | A |
| MT238766 | MuVs/Middelburg.NLD/33.18[G] | 768 | G | NA | G | G |
| MK276799 | MuVs/Middelburg.NLD/33.18[G] | 768 | G | NA | G | G |
| MK276734 | MuVs/Middelburg.NLD/33.18[G] | 1617 | G | NA | G | G |
| MK276713 | MuVs/Middelburg.NLD/33.18[G] | 1749 | G | NA | G | G |

| | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | accessio | strain | isolat | date | regic | country | division | l | lengt | host | | date_rele | date_upd | authors | full_autho | institutio | url | genotype | M | taxon_id | M | MuV_genc | MuV_genc |
| 2 | MK276692.1 | MuVs/Middelburg.NLD/33.18[G] | 18248 | 2018-XX-XX | Europe | Netherlands | Middelburg | | 315 | Homo sapiens | | 2/20/19 | 2/20/19 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | G | G | G |
| 3 | MT238912.1 | MuVs/Middelburg.NLD/33.18[G] | | 2018-XX-XX | Europe | Netherlands | Middelburg | | 428 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | A | A |
| 4 | MK276758.1 | MuVs/Middelburg.NLD/33.18[G] | 18248 | 2018-XX-XX | Europe | Netherlands | Middelburg | | 428 | Homo sapiens | | 2/20/19 | 2/20/19 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | A | A |
| 5 | MT238839.1 | MuVs/Middelburg.NLD/33.18[G] | | 2018-XX-XX | Europe | Netherlands | Middelburg | | 758 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | A | A |
| 6 | MK276840.1 | MuVs/Middelburg.NLD/33.18[G] | 18248 | 2018-XX-XX | Europe | Netherlands | Middelburg | | 758 | Homo sapiens | | 2/20/19 | 2/20/19 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | A | A |
| 7 | MT238766.1 | MuVs/Middelburg.NLD/33.18[G] | | 2018-XX-XX | Europe | Netherlands | Middelburg | | 768 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | G | G |
| 8 | MK276799.1 | MuVs/Middelburg.NLD/33.18[G] | 18248 | 2018-XX-XX | Europe | Netherlands | Middelburg | | 768 | Homo sapiens | | 2/20/19 | 2/20/19 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | G | G |
| 9 | MK276734.1 | MuVs/Middelburg.NLD/33.18[G] | 18248 | 2018-XX-XX | Europe | Netherlands | Middelburg | | 1617 | Homo sapiens | | 2/20/19 | 2/20/19 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | G | G |
| 10 | MK276713.1 | MuVs/Middelburg.NLD/33.18[G] | 18248 | 2018-XX-XX | Europe | Netherlands | Middelburg | | 1749 | Homo sapiens | | 2/20/19 | 2/20/19 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | G | G |
| 11 | | | | | | | | | | | | | | | | | | | | | | | |

| | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | accession_ve | strain | isola | date | region | country | division | loc | length | host | is_ | date_relea | date_upda | authors | full_authors | institution | url | genotype | MuV_ | taxon_id | MuV_ | MuV_genotyp | MuV_genc |
| | MT238698.1 | MuVs/Gelderland.NLD/32.19[G] | | 2019-XX-XX | Europe | Netherlands | Gelderland | | 316 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | G | G | G |
| | MT238759.1 | MuVs/Gelderland.NLD/32.19[G] | | 2019-XX-XX | Europe | Netherlands | Gelderland | | 768 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | G | G |
| | MT238832.1 | MuVs/Gelderland.NLD/32.19[G] | | 2019-XX-XX | Europe | Netherlands | Gelderland | | 758 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | A | A |
| | MT238905.1 | MuVs/Gelderland.NLD/32.19[G] | | 2019-XX-XX | Europe | Netherlands | Gelderland | | 428 | Homo sapiens | | 4/29/20 | 4/29/20 | Bodewes et a | Bodewes,R.,\ | National Inst | https://www. | Mumps virus | G | 1384672 | | G | G |
| | OP917964.1 | MuVs/Gelderland.NLD/32.19/2[G] | | 2019-08-XX | Europe | Netherlands | Gelderland | | 316 | Homo sapiens | | 5/24/23 | 5/24/23 | Cremer et al. | Cremer,J.,va | National Inst | https://www. | Mumps virus | G | 1384672 | G | G | G |
| | OP917980.1 | MuVs/Gelderland.NLD/32.19/2[G] | | 2019-08-XX | Europe | Netherlands | Gelderland | | 428 | Homo sapiens | | 5/24/23 | 5/24/23 | van de Nes-R | van de Nes-R | National Inst | https://www. | Mumps virus | G | 1384672 | | A | A |

Table 5: For same strain, different segment genotype calls

| accession | strain | length | MuV_genotype | SH | Genome | GenomeSample |
|---|---|---|---|---|---|---|
| MT238698 | MuVs/Gelderland.NLD/32.19[G] | 316 | G | G | G | G |
| OP917964 | MuVs/Gelderland.NLD/32.19/2[G] | 316 | G | G | G | G |
| MT238905 | MuVs/Gelderland.NLD/32.19[G] | 428 | G | NA | G | G |
| OP917980 | MuVs/Gelderland.NLD/32.19/2[G] | 428 | G | NA | A | A |
| MT238832 | MuVs/Gelderland.NLD/32.19[G] | 758 | G | NA | A | A |
| MT238759 | MuVs/Gelderland.NLD/32.19[G] | 768 | G | NA | G | G |

# Add an outgroup

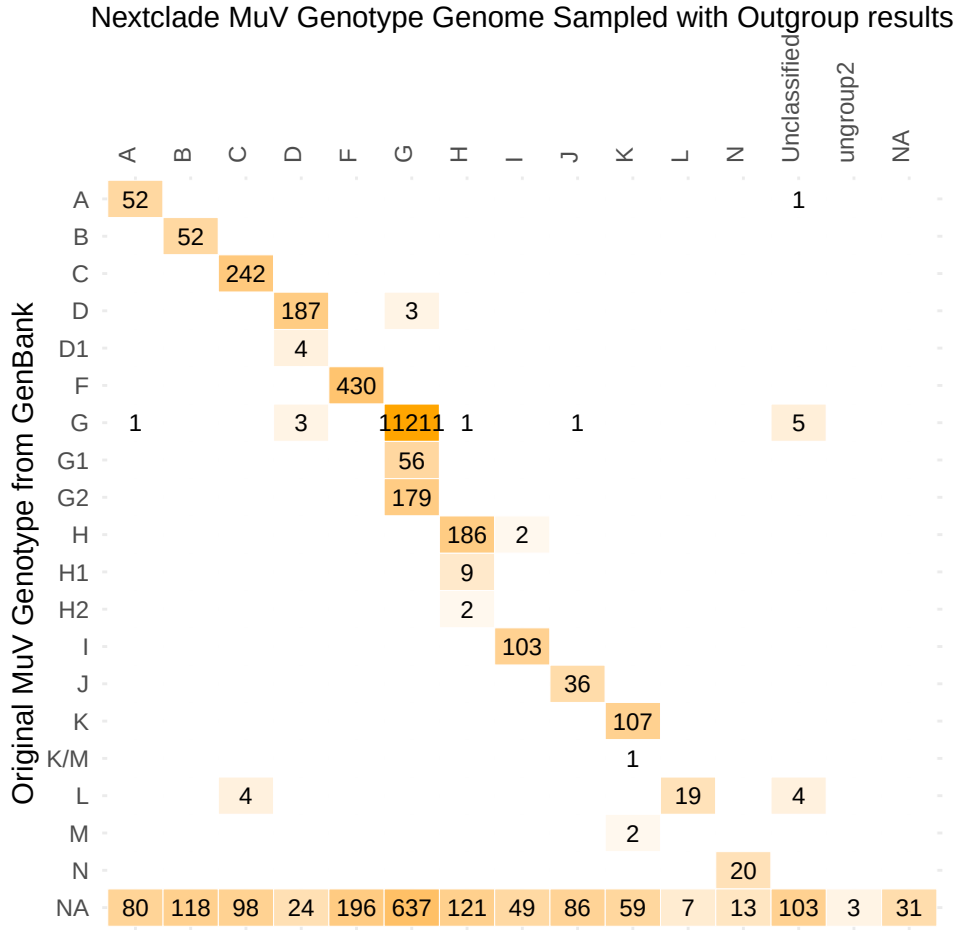


Table 6: Mismatched Genotype between GenBank and Nextclade datasets

| accession | strain | length | MuV_genotype | SH | Genome | GenomeSample | GenomeSampleO |
|---|---|---|---|---|---|---|---|
| KR633038 | MuVi/Mexico_City.MEX/00.08[A] | 316 | A | A | A | A | Unclassified |
| MN436859 | MuVs/Segovia.ESP/15.09/[D] | 316 | D | G | G | G | G |
| MN436862 | MuVs/Madrid.ESP/21.09/[D] | 316 | D | G | G | G | G |
| MN436869 | MuVs/Madrid.ESP/36.09/[D] | 316 | D | G | G | G | G |
| FJ919364 | 985O | 156 | D1 | NA | NA | NA | D |
| FJ919365 | 9820 | 156 | D1 | NA | NA | NA | D |
| FJ919366 | 1818O | 156 | D1 | NA | NA | NA | D |
| FJ919367 | 1913O | 156 | D1 | NA | NA | NA | D |
| MT238912 | MuVs/Middelburg.NLD/33.18[G] | 428 | G | NA | A | A | Unclassified |
| MZ913526 | MuVs/Washington.USA/15.20[G] | 316 | G | J | J | J | J |
| OP917980 | MuVs/Gelderland.NLD/32.19/2[G] | 428 | G | NA | A | A | A |
| OQ408150 | MuVs/Palencia.ESP/46.17/2[G] | 381 | G | G | A | A | Unclassified |
| MK276758 | MuVs/Middelburg.NLD/33.18[G] | 428 | G | NA | A | A | Unclassified |
| MN436857 | MuVs/Ceuta.ESP/14.09/[G] | 316 | G | D | D | D | D |
| MN436860 | MuVs/Ceuta.ESP/16.09/[G] | 316 | G | D | D | D | D |
| MN436868 | MuVs/Ceuta.ESP/30.09/[G] | 316 | G | D | D | D | D |
| MN511294 | MuVs/Stockholm.SWE/19.19[G] | 316 | G | H | H | H | H |
| AY380075 | UK01-22 | 598 | G | G | G | G | Unclassified |
| KX609922 | MuVs/Barcelona.ES/31.2010[G] | 665 | G | G | A | A | Unclassified |
| AB600942 | ODATE-3 | 15384 | H | I | I | I | I |
| KP213049 | MuVi/Incheon.KOR/50.11/12[H] | 316 | H | I | A | A | I |
| KX136901 | MuVi/NLD/0.57[L] | 316 | L | N | H | C | C |
| KX136902 | MuVi/NLD/0.60/1[L] | 316 | L | N | H | C | C |
| KX136903 | MuVi/NLD/0.60/2[L] | 316 | L | N | H | C | C |
| KX136908 | MuVi/NLD/0.64/1[L] | 316 | L | N | H | C | C |
| KX136994 | MuVi/NLD/0.57[L] | 1749 | L | NA | B | C | Unclassified |
| KX136995 | MuVi/NLD/0.60/1[L] | 1749 | L | NA | B | C | Unclassified |
| KX136996 | MuVi/NLD/0.60/2[L] | 1749 | L | NA | B | C | Unclassified |
| KX137001 | MuVi/NLD/0.64/1[L] | 1749 | L | NA | B | C | Unclassified |

Table 7: Top 25 most frequent sequence submitters with their region and countries

| authors | n | regions | countries |
|---|---|---|---|
| hiebert et al. | 3174 | North America | Canada |
| mcnall et al. | 1502 | North America | USA |
| castellanos et al. | 1061 | Europe | Spain |
| wharton et al. | 945 | North America, Oceania | USA, Micronesia, Marshall Islands |
| cui et al. | 514 | Europe, Asia, North America | United Kingdom, China, Dominican Republic |
| bodewes et al. | 488 | Europe | Netherlands |
| gouma et al. | 485 | Europe, North America | Netherlands, USA |
| rota et al. | 425 | North America, NA | USA, NA |
| kidokoro et al. | 392 | Asia, NA | Japan, Mongolia, NA |
| frost et al. | 319 | Europe, North America | United Kingdom, Canada |
| bryant et al. | 315 | North America | USA |
| kim et al. | 285 | North America, Asia, NA | USA, South Korea, NA, Korea |
| hickman et al. | 254 | North America | USA |
| peran-ramos et al. | 253 | Europe | Spain |
| aoki et al. | 249 | Asia | Japan |
| gavilan et al. | 227 | Europe | Spain |
| rubalskaia et al. | 218 | Europe | Russia |
| ma et al. | 178 | Asia | China |
| catellanos et al. | 172 | Europe | Spain |
| byrne et al. | 169 | North America | USA |
| moncla et al. | 166 | North America | USA |
| anton et al. | 155 | Europe | Spain |
| shah et al. | 154 | Europe, North America | Netherlands, Canada |
| rivailler et al. | 144 | Oceania, North America | Guam, USA |
| jin et al. | 142 | NA, Europe, Asia, North America | NA, Sweden, Japan, United Kingdom, USA, Germany, Malaysia, |

Table 8: Top 20 earliest records

| date_adjusted | accession | strain | country | authors |
|---|---|---|---|---|
| 1950-01-01 | JQ946042 | MuVi/Taylor.GBR/0.50s | United Kingdom | Jin et al. |
| 1950-01-01 | KF876715 | MuVi/Kilham.USA/0.50[A] | USA | Jin et al. |
| 1954-01-01 | KX136900 | MuVi/Albany.USA/0.54[A] | USA | Gouma et al. |
| 1954-01-01 | KX136946 | MuVi/Albany.USA/0.54[A] | USA | Gouma et al. |
| 1954-01-01 | KX136993 | MuVi/Albany.USA/0.54[A] | USA | Gouma et al. |
| 1957-01-01 | KX136901 | MuVi/NLD/0.57[L] | Netherlands | Gouma et al. |
| 1957-01-01 | KX136947 | MuVi/NLD/0.57[L] | Netherlands | Gouma et al. |
| 1957-01-01 | KX136994 | MuVi/NLD/0.57[L] | Netherlands | Gouma et al. |
| 1958-01-01 | JQ034458 | Enders-58-2 | United Kingdom | Cui et al. |
| 1958-01-01 | JQ034507 | ENDERS-58-2 | United Kingdom | Cui et al. |
| 1960-01-01 | KX136902 | MuVi/NLD/0.60/1[L] | Netherlands | Gouma et al. |
| 1960-01-01 | KX136903 | MuVi/NLD/0.60/2[L] | Netherlands | Gouma et al. |
| 1960-01-01 | KX136948 | MuVi/NLD/0.60/1[L] | Netherlands | Gouma et al. |
| 1960-01-01 | KX136949 | MuVi/NLD/0.60/2[L] | Netherlands | Gouma et al. |
| 1960-01-01 | KX136995 | MuVi/NLD/0.60/1[L] | Netherlands | Gouma et al. |
| 1960-01-01 | KX136996 | MuVi/NLD/0.60/2[L] | Netherlands | Gouma et al. |
| 1961-01-01 | KX136904 | MuVi/NLD/0.61[D] | Netherlands | Gouma et al. |
| 1961-01-01 | KX136950 | MuVi/NLD/0.61[D] | Netherlands | Gouma et al. |
| 1961-01-01 | KX136997 | MuVi/NLD/0.61[D] | Netherlands | Gouma et al. |
| 1962-01-01 | KX136905 | MuVi/NLD/0.62/1 | Netherlands | Gouma et al. |

Table 9: Top 20 latest records

| date_adjusted | accession | strain | country | authors |
|---|---|---|---|---|
| 2024-03-22 | PQ311690 | MuVs/KIPMR/Chennai.IND/4.24/3[C] | India | Kaveri et al. |
| 2024-03-23 | PQ311691 | MuVs/KIPMR/Chennai.IND/4.24/4[C] | India | Kaveri et al. |
| 2024-03-23 | PQ311692 | MuVs/KIPMR/Chennai.IND/4.24/5[C] | India | Kaveri et al. |
| 2024-03-25 | PQ311693 | MuVs/KIPMR/Chennai.IND/5.24[C] | India | Kaveri et al. |
| 2024-05-14 | PQ311694 | MuVs/KIPMR/Chennai.IND/3.24[C] | India | Kaveri et al. |
| 2024-05-14 | PQ311695 | MuVs/KIPMR/Chennai.IND/3.24/2[C] | India | Kaveri et al. |
| 2024-05-14 | PQ311696 | MuVs/KIPMR/Chennai.IND/3.24/3[C] | India | Kaveri et al. |
| 2024-05-14 | PQ311697 | MuVs/KIPMR/Chennai.IND/3.24/4[C] | India | Kaveri et al. |
| 2024-05-17 | PQ451425 | MuVs/Odisha.INDIA/20.24[C] | India | Mamidi et al. |
| 2024-05-17 | PQ451426 | MuVs/Odisha.INDIA/20.24/1[C] | India | Mamidi et al. |
| 2024-05-17 | PQ451427 | MuVs/Odisha.INDIA/20.24/2[C] | India | Mamidi et al. |
| 2024-05-17 | PV072739 | MuVs/Odisha.INDIA/20.24/8[C] | India | Mishra et al. |
| 2024-05-27 | PV072740 | MuVs/Odisha.INDIA/20.24/9[C] | India | Mishra et al. |
| 2024-06-07 | PQ001008 | MuVs/Makhchkala.RUS/23.24[C] | Russia | Zamotaeva et al. |
| 2024-06-07 | PQ001009 | MuVs/Makhchkala.RUS/23.24[G] | Russia | Zamotaeva et al. |
| 2024-06-19 | PV072734 | MuVs/Odisha.INDIA/20.24/3[C] | India | Mishra et al. |
| 2024-07-05 | PV072735 | MuVs/Odisha.INDIA/20.24/4[C] | India | Mishra et al. |
| 2024-07-31 | PV072738 | MuVs/Odisha.INDIA/20.24/7[C] | India | Mishra et al. |
| 2024-08-09 | PV072737 | MuVs/Odisha.INDIA/20.24/6[C] | India | Mishra et al. |
| 2024-08-29 | PV072736 | MuVs/Odisha.INDIA/20.24/5[C] | India | Mishra et al. |