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# Part 1: TITLE, AUTHORS, etc

Code assigned:	2017.013D	(to be completed by ICTV officers)
Short title: creation of new or Modules attached (Modules 1, 4 and either 2 or 3 ar		of reverse-transcribing viruses $2 \boxtimes 3 \square 4 \boxtimes$

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#### List the ICTV study group(s) that have seen this proposal:

A list of study groups and contacts is provided at <u>http://www.ictvonline.org/subcommittees.asp</u>. If in doubt, contact the appropriate subcommittee chair (there are six virus subcommittees: animal DNA and retroviruses, animal ssRNA-, animal ssRNA+, fungal and protist, plant, bacterial and archaeal)

ICTV Retroviridae and Caulimoviridae Study Groups as well as Chairs of the Plant Viruses Subcommittee, Animal DNA Viruses and Retroviruses Subcommittee, as well as Fungal and Protist Viruses Subcommittee

### ICTV Study Group comments (if any) and response of the proposer:

Date first submitted to ICTV:	June 8, 2017
Date of this revision (if different to above):	June 22, 2017

### **ICTV-EC** comments and response of the proposer:

## Part 2: PROPOSED TAXONOMY

Present the proposed new taxonomy on accompanying spreadsheet

### Name of accompanying spreadsheet: 2017.013D.N.v1.Ortervirales

Please display the taxonomic changes you are proposing on the accompanying spreadsheet module 2017\_TP\_Template\_Excel\_module. Submit both this and the spreadsheet to the appropriate ICTV Subcommittee Chair.

## Part 4: <u>APPENDIX</u>: supporting material

Reverse-transcribing viruses are currently classified into five families: *Caulimoviridae, Hepadnaviridae, Metaviridae, Pseudoviridae,* and *Retroviridae* (https://talk.ictvonline.org/taxonomy/). In addition, a taxonomic relocation of the genus *Semotivirus* from the family *Metaviridae* to a new family "Belpaoviridae" has been proposed in 2017 (submitted TaxoProp 2017.001D.N.v1.Belpaoviridae). The only protein shared by viruses from all these families is the reverse-transcriptase (RT) including an RNase H (RH) domain (Table 1). Phylogenetic analyses support the monophyly of these viral RTs (Xiong and Eickbush, 1990; Gladyshev and Arkhipova, 2011), to the exclusion of those encoded by non-viral retroelements from both eukaryotes and prokaryotes (Figure 1). However, besides RTs, members of the families "Belpaoviridae", *Caulimoviridae, Metaviridae, Pseudoviridae*, and *Retroviridae* share several conserved features that hepadnaviruses lack (Table 1).

		Retroviruses	Metaviruses	Pseudoviruses	Belpaoviruses	Caulimoviruses	Hepadnaviruses
	RT-RH	+	+	+	+	+	+
Pol	Protease	+	+	+	+	+	-
	Integrase	+	+	+	+	-	-
C	CA/CP	+	+	+	+	+	-
Gag	NC	$^{+*}$	+	+	+	+	-
LTR		+	+	+	+	-	-
Primir	ıg	tRNA	tRNA	tRNA	tRNA	tRNA	TP

**Table 1.** Features shared by reverse-transcribing viruses.

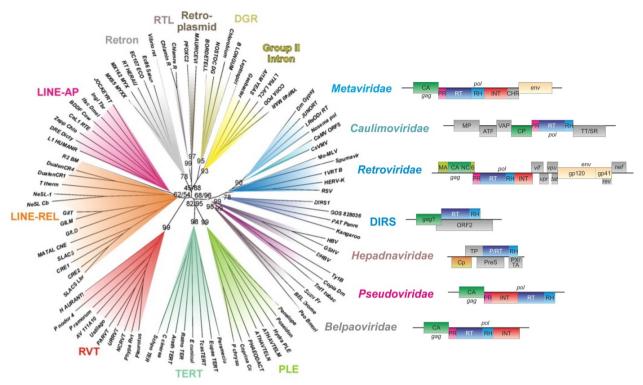
\* – members of the subfamily *Spumaretrovirinae* do not contain the canonical NC domain within their Gag polyproteins. Abbreviations: RT, reverse transcriptase; RH, RNase H; CA/CP, capsid protein; NC, nucleocapsid protein; LTR, long terminal repeats; Gag, group-specific antigen; Pol, polymerase polyprotein; TP, terminal protein.

In particular, the Pol polyproteins of belpaoviruses, caulimoviruses, metaviruses, pseudoviruses, and retroviruses possess similar domain architectures. These Pol polyproteins encode an aspartate protease, which is responsible for the processing of viral polyproteins. Furthermore, belpaoviruses, metaviruses, pseudoviruses, and retroviruses integrate into host-cell chromosomes as part of their life cycles, share long terminal repeats (LTR), and encode homologous integrases of the DDE recombinase superfamily, which are expressed as part of the corresponding Pol polyproteins. Although members of the *Caulimoviridae* lack an integrase, in RT-based phylogenies, they consistently form a sister clade to metaviruses, suggesting that the integrase has been lost in the caulimovirus branch (Figures 1 and 2). In agreement with this hypothesis, petunia vein clearing virus (genus *Petuvirus*, family *Caulimoviridae*), which in RT-based phylogenies occupies a basal position within the *Caulimoviridae* clade, contains sequence motifs resembling those of retroviral integrases (Richert-Pöggeler and Shepherd, 1997), although no evidence for integrase activity of the corresponding protein domain has been presented. We note that the basal branches of the RT tree are not resolved and are presented as a multifurcation in Figure 2. This topology is at least compatible with the *Hepadnaviridae* clade being outside of the viral group including belpaoviruses, caulimoviruses, metaviruses, pseudoviruses, and retroviruses.

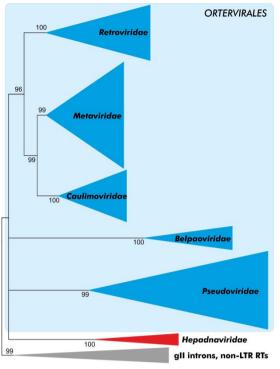
Belpaoviruses, caulimoviruses, metaviruses, pseudoviruses, and retroviruses share not only homologous proteins involved in genome replication and polyprotein processing, but also the two principal protein components of the viral particles, namely the capsid and nucleocapsid proteins/domains (Figure 3, Table 1) (Vo et al., 2016; Krupovic and Koonin, 2017). By contrast, hepadnaviruses encode an unrelated capsid protein (Steven et al., 2005). These findings indicate that belpaoviruses, caulimoviruses, metaviruses, pseudoviruses, and retroviruses have evolved from a common viral ancestor, rather than from distinct capsid-less retrotransposons (Krupovic and Koonin, 2017).

Finally, similarities between belpaoviruses, caulimoviruses, metaviruses, pseudoviruses, and retroviruses extend to the mechanism of replication priming. All these viruses utilize host tRNA molecules as primers for genome replication by reverse transcription (Menéndez-Arias et al., 2017), whereas hepadnaviruses use a specific protein priming mechanism mediated by the terminal protein (TP) domain of the viral RT (Nassal, 2008).

The common complement of proteins required for genome replication, polyprotein processing, and virion formation, the topology of the phylogenetic tree of the RTs, as well as mechanistic similarities in genome replication, strongly suggest that belpaoviruses, caulimoviruses, metaviruses, pseudoviruses, and retroviruses share a common evolutionary origin. By contrast, hepadnaviruses that typically branch out at the base of the viral RT clade (Figures 1 and 2) appear to be more distantly related. Thus, we propose to include the families *Caulimoviridae*, *Metaviridae*, *Pseudoviridae*, *Retroviridae* and the putative family "Belpaoviridae", into an order to be named *Ortervirales (orter*: an inversion of *retro*, which stands for reverse transcription; *virales*: suffix for an order).



**Figure 1.** Genomic organizations of selected representatives of reverse-transcribing viruses overlay the phylogenetic tree of reverse transcriptases (RTs). A phylogram indicating both minimum evolution (ME) and maximum-likelihood (ML) support values for the most basal branches and ME support for each colored clade in cases where it exceeds 70%. The tree is reproduced from (Gladyshev and Arkhipova, 2011). Abbreviations: DGR, diversity-generating retroelements; LINE, long interspersed nucleotide elements; *gag*, group-specific antigen gene; *env*, envelope gene; *pol*, polymerase gene; PR, aspartate protease; RT, reverse transcriptase; RH, RNase H; INT, integrase; CHR, chromodomain. The sites of Pol processing by PR are shown as vertical dashed lines. MA, matrix protein; CA/Cp, capsid protein; NC, nucleocapsid; 6, 6-kDa protein; *vif, vpr, vpu, tat, rev*, and *nef*, genes that express regulatory proteins via spliced mRNAs; gp120 and gp41, 120- (surface) and 41-kDa (transmembrane) glycoproteins; ATF, aphid transmission factor; VAP, virion-associated protein; TT/SR, translation trans-activator/suppressor of RNA interference; TP, terminal protein; P, polymerase; PreS, pre-surface protein (envelope); PX/TA, protein X/transcription activator; RVT, RT-related cellular genes; TERT, telomerase reverse transcriptase; PLE, Penelope-like retroelements.



0.50

**Figure 2.** Maximum likelihood phylogeny of viral RTs. The tree includes sequences of 290 taxa representing all ICTV-recognized genera of RT viruses. The phylogeny was inferred using PhyML (Guindon et al., 2010) with the LG+G+F substitution model and is rooted with sequences from non-viral retroelements (bacterial group II introns and eukaryotic LINE retroelements).

		α1	a2		CA-NTD	a3	α4			α5
HIV-1:4d1k	145	QAISPRTLNAWVKVVEEKAR	SPEVIPMES	ALSEGAT	PODLN	TMLNTVGGHOAA	OMLKETINE	CAAEWDRVHP	HAGPIAPGO-	MREPRGSD
RSV:5a9e	1	TPLEPKLITRLADTVRTKG-	-LRSPITMAEVEA	LMSSPLL	LPHDVT	NLMRVILG-PAP	ALWMDAWGV	LQTVIAAAT	RDPRHPANGQG	RGERTNLDRL
BLV:4ph0 ISRV	9	RAWALRELQDIKKEIENKAI -SLPFKQLKELKIACSQYG-	GSOVWIOTLRLA	ILQADPT	PADLE	OLCOYIAS-PVD	TAHMTSLTA	AIAAAEAANTI	LQGF	Teve
LPDV	1	TPLDPKMVKQLKEAIGEEG-	TTGPLASVLLDQ	VHQIALT	PPSDLR	OLARIVIS-PVM	AALWKSEWTE	RLOARVTTATI	HDRRDPLH	GVTVAV
MMTV	1	-PLPLKTLKELQSAVRTMG-	-PSAPYTLOVVDM	VASOWLT	rpSDWH	OTARATLS-PGD	VINRTEYEE	SKEMVQKAA	GKRKGK	VSLD
PyERV	1	IDYKQIKEIKSAVRDYG-	LOSRYVMGLLTS	LSTAAVE	MLLADWQ	SLFGMILT-PAQ	VIWNSEYGK	DAAVAINAGL	PQNV	TAD
IAV:2eia Beetle1	1	IKLDVPEFDGNLNPDA								
Blastopia	11	VIIAAEKFEKVVSDCDGK	-SIPIKKWF	EIFEKNAEAYELSE	KQK¥	VOARSKMI-GSA	ELFLESECVS			
Cer4	1	TKYQFSLE-EPDS	FRRWWDRHH	LIFSEDAAELSE	RERT	RLLLSCLE-EGTI	FRREVDTORN	CDIYEV		
DRM	1	LIGSIGEFAPKAES	WSAYIERLE	QFFVANEISQ	EKQV	ATLLSVMG-ATT	GLLRNFVRL	LWLFW		
lydra2-1 Vicropia	1	HFGNLSEFNSN-ED	PDAACVEAAKWCS	TTDIILT	PPLKGSEHPLKGSKL	TALSNCME-GTA	SOWLTOISYO	M		
Osvaldo	2	PSSSEOE PRVAKHVREWNE	FREDGTSKPLEF-	LEOVEWS	SADTYGLDLDLIP	RAMPELLK-GMAI	LKWYVANNRH	R		
fy3-1	1	-IQPSLTFRGRNDSHE YAIWKFRIR-ALLAEQDV	LKNFISEIM	LNMSMISWPND	ASRI	VYCRRHLL-NPA	AQWANDFVQE	GILEI		
Copia Dryco1-2	9 10									
ourf	4	WLTAMSCFHAAEGK	PANLPPEDE	AKEKAED	NLFR	GAVISALD-TKF	OKSYIILP			
Bel	4	IKLPTFSGNYED IKIPKFKGESWE	WKHFSDMFI	GSIASNSSLTD	CQRF	HYLKSYLA-GDAI	LALVKHIPVT	1D		
Cer7	4	IKIPKFKGESWE	FQNFWVLFEI	ELVH-KTDMPD	MVKF	IRLLGALE-GEP	TLATKYQIT.	SE		
(obel Max	4	CDTEVEDGDYLR	WPTERDLET	ATYVNNPRLTP	VEKL	FHLLTKTS-GEA	ATVAKSPLT	ID		
Moose	4	IQLPEFGGDFND	WLPFHDTFV	SLIDKSDELSG	VQKL	HYLKAALK-GEA	ARLMSQFSLQ	4		
Pao	4	LEITKFGGDCLS- CDTEVFDGDYLR- IQLPEFGGDFND- LPFFNGNHQD-	WLSFRAAYHI	ETMNSFTK	TENI	NFLRRNLK-GRAI	(EAVDGLLIT	JA		
BSGFV BSOLV	66 68	LPSANARQGSIFVMPYDFD- LPPAQSRQGAMFVMPMDFD-	VKVFERWESSV	LVHLADKNFDTP====	EDKV	IYIENLLG-ESE	KAPMTWEME	LPEFEALKA	AAL	
CaMV	1	-MLNIDCQTNRRTLIDE								
CERV	1	-ILNLDCVNSPSDRKNKID	WAAELGLVFLTN	PEAYTT	FAPNAARARL	AYMEHKSL-GIV	NRFIKSTOWT	MNGD		
DBALV	66	LPSAQQTTGAMFYMPLELD								
MiMV faBV	64	-TINIDCIGDLDLRRKIIDP LPPAYNQOGAILVLPDDIGI								
									CTD	
		α6	α7		3/10-helix	¢ (	α8	_	α9	
HIV-1:4d1k	235	DIAGTTSTLQEQIGWMTNN-								
RSV:5a9e BLV:4ph0	96 88	KGLADGMVGNPQGQAAL NPQNGTLTQQSAQP								
SRV	82	EMLIGEGPYQATDTQLN								
PDV	88	VLKGSDPAMATPQLQAAF	RMRGREIQASCQA	SVSICGGRTVGKRT	DPWTKV	TQGLGE	FLSFAERLL	JAYEKSQLPE-	AAKNAVFR	DCVKQQGNMLT
MMTV	83	DMLLGTGQFLSPSSQIK DDVLGTGTISTIAQQQN								
PyERV EIAV:2eia	81 88	ARFIRGLGVPRERQMEP								
Beetle1	71			KFLPSTYT						
Blastopia	76									
Cer4 DRM	66 65			ALGSHRSL HFEPKPLL						
lydra2-1	65			HKSPTPNP						
Nicropia	69		TWQEFQELFLQ	RFETEE	TPAATFLNL	LNSRPTA-AE	YAVYASRLV	<b>COLTTKWRNM</b>	EIEEIAVT	TVLAHMANIDS
Osvaldo	75			FFFAEDYL						
y3-1 Copia	67 69			HFYKPPD						
Dryco1-2	59			AWEAIKTRRIGVQHV-						
ourf	57		TGKELWDALVG	KFGVTDAGSE	LYLMEQLYDY	KMV-ENR	VVEQAHEFQ.	ALAKELELFP	CPLPDKFVA	GGIIAKLPPSW
Bel	63			RY-NKQSLI						
Cer7 Cobel	62 63			KYTNSESTI RYGDPEVI						
Aax	63			REQNKRLL						
Noose	62		RITKCMANVGR	PLWHKHLL	KKRHIQAILRL	PKIINS-NLD	LIRRTVDDFQ	RHTLVLEQLG	EPIKHLSS <mark>FL</mark> V	ELLSEKLDSAS
ao	58			RFGRPETI						
BSGFV BSOLV	146 148	GNN		IFFLENPRVGTTDE						
aMV	66		I LEOVIDAMYT	MFLGLNYSDNKVAE	-KIDEQEKAKIRMTKL	QLCDIC	LEEFTCDYE	NMYKTELA-	DFPGYI	NOYLSKIPII-
CERV	73		ILLNVVSGLYT	MFLGEDYTGNQEKT	-LEQERAKASLRLINL	QLCDIC:	SLQSFFCDYE	SNLYKLPQN-	EY <mark>PSL</mark> V	KQYLAKIPIV-
VIARC	148			IFSLEDPFRGSTKI						
				MEVGVDIATDQANQ		0700101				
VMiN	71			TELLODPYOGSTAE				JLAAKSGRLF.		
VMiN	146		-ETQNLLSQVRR	IFLLQDPYQGSTAE			DLIPYLIQFR	1926		
MiMV TaBV	146	α10	E <mark>T</mark> QNLLSQVRR		QDQAYNDLERI	SCDNIK	DLIPYLIGER N	c	KKCEWKECKE	• • )
MiM∨ FaBV HIV-1:4d1k		α10 CKTILKALGP	ETONLLSOVRR α11 AATLEEMMTAC		QDQAYNDLERI	CGKE	DLIPYLIOFR N-GHTAR	C NC(4)1	OCT OVTOGODO	HOMKDETER
AiMV aBV IIV-1:4d1k ISV:5a9e ILV:4ph0	146 330 190 178	α10 CKTILKALGP IQQLIRAAPST	ETONLLSOVRR a11 AATLEEMMTAC -LTTPGEIIKYV AAPVGOKLOAC	QGVGGPGHKARV LDRQKTAPLTDQGI AHWAPKVKOPAT	QDQAYNDLERI /(25)KIVKCFN [(24)	CGKE	OLIPYLIOFR N-GHTAR	C NC (4)1	RGLCYTCGSPG	HOMKDCTER HYQAQCPKK
AiMV aBV IIV-1:4d1k SV:5a9e ILV:4ph0 SRV	146 330 190 178 176	α10 CKTILKALGP IQOLIRAAPST- CQCILOGRGLV CQALRPYRK	ETONLLSOVR a11 AATLEEMMTAC LTTPGEIIKYV AAPVGOKLOAC KGDLSDFIRIC	QGVGGPGHKARV LDRQKTAPLTDQGI AHWAPKVKQPAI ADJGPSVMQGIA	QDQAYNDLERI 	CGRE	GHRAA	C NC (4) (2) (7) /C (7)	RGLC <mark>Y</mark> TCGSPG PGPCYRCLKEG PNLCPRCKKGK	HOMKDCTER HYOAOCPKK HWARDCPTK HWARDC
AiMV aBV IIV-1:4d1k ISV:5a9e ILV:4ph0 SRV PDV	146 330 190 178 176 182	α10 CKTILKALGP IQOLIRAAPST- CQCILOGRGLV CQALRPYRK	ETONLLSOVR a11 AATLEEMMTAC LTTPGEIIKYV AAPVGOKLOAC KGDLSDFIRIC	QGVGGPGHKARV LDRQKTAPLTDQGI AHWAPKVKQPAI ADJGPSVMQGIA	QDQAYNDLERI 	CGRE	GHRAA	C NC (4) (2) (7) /C (7)	RGLC <mark>Y</mark> TCGSPG PGPCYRCLKEG PNLCPRCKKGK	HOMKDCTER HYQAQCPKK HWARDCPTK HWARDC
AIIMV aBV IIV-1:4d1k ISV:5a9e ILV:4ph0 SRV PDV AMTV yERV	146 330 190 178 176 182 177 176	α10 CKTILKALGP IQ	-ETONLLSOVRR α11 -AATLEEMMTAC -LTTRGEIIKYV -AAPVGQKLQAC -KGDLSOFIRIC -ENTAELVK -TGTODYIPAC		QDQAYNDLERI 	SCDNIK CGKE CGOP CGKT	GHTAA GHTAA GHIRK	C *C(4) (2) (7) /C(7) (10) (10) (4)	RGLCYTCGSPG PGPCYRCLKEG PNLCPRCKKGK JANCFKCGAVG PGLCPRCKKGY	HOMKDCTER HYQAQCPKK HWARDCPTK HWARDCPTK HWRRDCPSL HWKSEC
AIIMV aBV IIV-1:4d1k ISV:5a9e ILV:4ph0 SRV PDV AMTV yERV IAV:2eia	146 330 190 178 176 182 177 176 182	α10 CKΤΙΙΚΑΙGP	-ETONLLSOVR all -AATLEEMMTAC -LTTFGEIIKYV -AAPVGQKLQAC -KGOLSDFIRIC -GITIADFIQAC -GITIADFIQAC -GITIADFIQAC		QDQAYNDLERI 	CGKE CGCF	GHTAR GHTAR GHRAA GHIRK	C *(2)	RGLCYTCGSPG PGPCYRCLKEG PNLCPRCKKGK 3ANCFKCGAVG PGLCPRCKKGY AGNCFNCGKPG PKVCFKCKOPG	HOMKDCTER BYQAQCPKK HWARDCPTK HWARDCPSL HWRSEC HFKSQCRAP HFSKOC
AIIMV aBV IIV-1:4d1k SV:5a9e IV:4ph0 SRV PDV AMTV yERV JERV JERV JERV LAV:2eia eetle1	146 330 190 178 176 182 177 176 182 141	α10 CK	-ETONLLSOVR a11 AATLEEMMTAC LTPPGEIIKYV AAPVGOKLOAC KGUJSDFIRIC GITIADFLOAC EDTLEEKMYAC YSTIDELFRLA	CGVGGPGHKARV LDRQKTABLTDQGI AHWABKVKQPAI ADIGBSYMQGIA LDASBSYMQGIA LDASBSYMQGIA RIVGTTSHKNAA RDIGTTSHKNAA LKVGTTSHKNAA		CGKE CGQP CGKT CGKP	GHTAR GHTAR GHIRK GHLSS GKKVA	C (2) (2) (2) (2) (2) (2) (10) (10) (10) (10) (10) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)	RGLOYTCGSPG PGPCYRCLKEG PNLCPRCKKGK SANCFKCGAVG PGLCPRCKKGY AGNCFNCGKPG PKVCFKCKGYG DIKCFKCHGYG	HOMKDCTER HYQAQCPKK WARDCPTK WARDC HMRRDCPSL HWKSEC HFKSQCRAP HFSKQC HYQAQC
AiMV aBV IIV-1:4d1k SV:5a9e LV:4ph0 SRV PDV MMTV yERV JAV:2eia eetle1 lastopia	146 330 190 178 176 182 177 176 182	α10     CK	a11 	CGVG GPGHKARV LDRQKT APLTDQGI ABIG BYNVQGIA ADIG BYNVQGIA LDAS PSYNQGIA LDAS PAVVOGVA RIVG TTSHKNAA RDIG TTSHKNAA RUG TTSHKNAA LKVE SLNIVOKP LKVE SLNIVOKP UTS OTXSOTU		CGRE	GHTAR GHTAR GHIRK GHLSS GKKVA EHKRK DAKRK	C (2) (2) (2) (7) (7) (10)	RGLOYT CGSPG PGEOYRCLKEG PNLOPRCKKGK GANCFKCGAVC PGLOPRCKKGY AGNCFNCGKPG PKVCFKCKOPG DIKCFKCHGYG PTKCFSCNQG	HOMKDCTER HYQAOCPKK WARDCPTK HWARDCPTK HWRRDCPSL HWKSEC HFSKOC HFSKOC HYQAOC HISSKC
AiMV aBV IIV-1:4d1k iSV:5a9e iLV:4ph0 SRV PDV AMTV yERV IAV:2eia ieetle1 ilastopia cer4 SRM	146 330 190 178 176 182 177 176 182 141 145 141 137	c10           CKTILKALGB           IQCILCGRGLV           CQALRPYRK           TQCYMLGABST           CQALVQBIANKP           CQ           CQ	-ETONLLSOVR a11 	CGVGGPGHKARV LDRQKTAFLTDQGI AHWAPKVKQPAI ADIGPSYMQGIA LDASPAVVQGVA LDASPAVVQGVA RIVGTTSHKMAA RLVGTTSHKMAA RLYE-SINIVDRF EIYE-SINIVDRF UFVLQTKSQTHI LSWFTJEKDTOC		SCDNIKI CGKE CGQP CGKP CGKP CGSR CGSR CGSR	GHTAR GHTAR GHIRK GHLSS GKKVA EHKRK DAKSD	C * NC(2) /C(7) /C(7) (10)	RGLOYTCGSPG PGCYRCLKEG PNLOPRCKKGK SANCFKCGAVC PGLOPRCKKGY AGNCFNCGKPG PKVCFKCKQPG DIKCFKCHGYG PTKCFSCNQEG VITCYRCGASC	HOMKDCTER HYQAQCPKK HWARDCPTK HWARDCPTK HWARDCSL HKSEC HFKSOCRAP HFSKCC HISSKC HISSKC HYQAC HYQAC HYQAC
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**Figure 3.** Multiple-sequence alignment of CAs/CPs of reverse-transcribing viruses belonging to the families "Belpaoviridae", *Caulimoviridae*, *Metaviridae*, *Pseudoviridae*, and *Retroviridae*. The figure is modified from Krupovic and Koonin (2017). Secondary-structure elements above the alignment are indicated for Rous sarcoma virus CA (PDB accession number 5A9E). Red and blue asterisks indicate the conserved residues in the single or tandem Zn-knuckle motifs of the nucleocapsid (NC) domain. CP

sequences are conserved throughout the *Caulimoviridae* family; however, for convenient representation, only CP sequences from viruses classified into genera *Caulimovirus* and *Badnavirus* are shown in Figure 3. Abbreviations: HIV-1, human immunodeficiency virus 1; BLV, bovine leukemia virus; JSRV, Jaagsiekte sheep retrovirus; LPDV, lymphoproliferative disease virus; MMTV, mouse mammary tumor virus; MPMV, Mason-Pfizer monkey virus; PyERV, Python molurus endogenous retrovirus; EIAV, equine infectious anemia virus; DRM, Danio rerio Mag element; BSGFV, banana streak Goldfinger virus; BSOLV, banana streak OL (badna)virus; CaMV, cauliflower mosaic virus; CERV, carnation etched ring virus; CSSV, cacao swollen shoot virus; DBALV, Dioscorea bacilliform AL virus; MiMV, Mirabilis mosaic virus; TaBV, taro bacilliform virus.

#### References

- Gladyshev EA, Arkhipova IR. A widespread class of reverse transcriptase-related cellular genes. Proc Natl Acad Sci U S A. 2011; 108(51):20311-6.
- Guindon S, Dufayard JF, Lefort V, Anisimova M, Hordijk W, Gascuel O. New algorithms and methods to estimate maximum-likelihood phylogenies: assessing the performance of PhyML 3.0. Syst Biol. 2010; 59(3):307-21.
- Krupovic M, Koonin EV. Homologous capsid proteins testify to the common ancestry of retroviruses, caulimoviruses, pseudoviruses, and metaviruses. J Virol. 2017; 91(12):e00210-17.
- Menéndez-Arias L, Sebastián-Martín A, Álvarez M. Viral reverse transcriptases. Virus Res. 2017; 234:153-76.
- Nassal M. Hepatitis B viruses: reverse transcription a different way. Virus Res. 2008; 134(1-2):235-49.
- Richert-Pöggeler KR, Shepherd RJ. Petunia vein-clearing virus: a plant pararetrovirus with the core sequences for an integrase function. Virology. 1997; 236(1):137-46.
- Steven AC, Conway JF, Cheng N, Watts NR, Belnap DM, Harris A, Stahl SJ, Wingfield PT. Structure, assembly, and antigenicity of hepatitis B virus capsid proteins. Adv Virus Res. 2005; 64:125-64.
- Vo JN, Campbell PR, Mahfuz NN, Ramli R, Pagendam D, Barnard R, Geering AD. Characterization of the banana streak virus capsid protein and mapping of the immunodominant continuous B-cell epitopes to the surface-exposed N terminus. J Gen Virol. 2016; 97(12):3446-3457.
- Xiong Y, Eickbush TH. Origin and evolution of retroelements based upon their reverse transcriptase sequences. EMBO J. 1990; 9(10):3353-62.

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er	Family	Subtamily	Genus	Species	Type Sp?	Natives	Order	Family	Subfamily	Genus	Species	Тури Хріт	Exemplar Accession Number	Exemplar virus name	Exemplar isolate i.d.	complete genome? (CG, CCG or DG)	Abbrev <sup>*</sup> if any	Proposed charge (e.g. new species; species renamed and reassigned)
issigned	Selpaovitidae Selpaovitidae	unassigned unassigned	Semotivirus Semotivirus	Ancaheles aombiae Moose v Ascaris iumbricoides Tas viru	1	AF060859 229712	Ortervinales Ortervinales	Belpaoviridae Belpaoviridae	unassigned	Semotivirus Semotivirus	Anopheles combiae Moose visu Ascaris iumbricoides Tos visus	a 0 1	AF060859 729712	Anopheles gambiae Moos Ascaris lumbricoides Tas y	e visus irus	CG CG	AgaMooV AluTasV	species, genus and new family (proposed in 20) species, genus and new family (proposed in 20)
usigned usigned	Selpovitidae Selpovitidae	unassigned unassigned unassigned	Semotivirus Semotivirus	Caencrhabditis eleaans Cerz Droscohila melonoposter Bel	0	281510	Orten/indies Orten/indies	Aripaoviridae Aripaoviridae	unassigned unassigned	Semeticina Semeticina	Caenorhobditis eleaans Cer23 v Orosophila melonoposter Bei vi	0	109635 281530 U23420	Caerorhabditis elegans Ca Droscohila melanoraster	er 13 virus Rel virus	CG CG	BmoPaol/ CelCer12V DmeBelV	species genus and new family lorocosed in 20 species, genus and new family lorocosed in 20 species, genus and new family (proposed in 20 species, genus and new family lorocosed in 20
usigned usigned		unassigned unassigned unassigned	Semotivirus Semotivirus Semotivirus	Drosophila melanoposter Ros Drosophila simulans Ninia vin Takifuau rubriaes Supu vinus	0	AV180917 083207 AF537216	Ortervirales Ortervirales Ortervirales	Arlpsoviridae Arlpsoviridae Arlpsoviridae	unassigned unassigned unassigned	Semotikirus Semotikirus Semotikirus	Drosophila mekonogoster Roo u Drosophila simulans Ninja virus Takifuau rubrioes Suzu virus		AF537216	Drosophila melanogaster Drosophila simulans Ninja Fugu rubriogs Sugu virus	vina	CG CG	DmeRooV DuNnV FruSutV	species, genus and new family (proposed in 20) species, genus and new family (proposed in 20)
ssigned ssigned	Selpovitidae Selpovitidae	unassigned unassigned	Semotivirus Semotivirus	Drosophila semotivirus Max Aethenana semotivirus Tamv	0	A/487856 AF530470	Ortervirales Ortervirales	Arlpsoviridar Arlpsoviridar Arlpsoviridar	unassigned unassigned	Semetkirus Semetkirus	Drosophila semotivirus Max Anthenana semotivirus Tamy	0	A3487856 AF530470	Fueu rubrioes Supu virus Drosophila melanogaster Antheraea mylitta Tarny v	Max virus	CG CG	DmeMaxV TamyV	species, eenus and new family loroposed in 201 species, genus and new family (proposed in 201 species, genus and new family (proposed in 201
ssigned	Belooviridae Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	Semotivina Badnovina Bodnovina	Schistosoma semotivinu: Sinb Aglaonema baciliform virus Bonana streak GF virus	0	ANSO6538 0 AX492509	Orten/indies Orten/indies	Bribaoviridae Coulimouiridae Coulimouiridae	unamigned unamigned	Semeticina Rodnevina Rodnevina	Schistosoma semotivirus Sinbos Aglaonema baciliform virus Bonana streak GF virus	0	ANS06538 0 AN492509	Schistosoma mansoni Sini 0 Goldforear	ad vina	cg		species, genus and new family incomposition 200 species, genus and family assigned to new order species, genus and family assigned to new order
signed signed	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned unassigned	Astrovirus Astrovirus Astrovirus	Bonana streak GF situs Bonana streak (M situs Bonana streak MY situs	0	A120503112 A12050236	Orteninales Orteninales	Coulimouiridae Coulimouiridae Coulimouiridae	unassigned unassigned	Rodnovinus Rodnovinus Rodnovinus	Ronana streak GF vinus Ronana streak (M vinus Ronana streak MY vinus	0	AX4932509 H0599112 AX905074	Xenua Australia				species many and family assigned to new order
siened	Caulimoviridae Caulimoviridae	unamiened unamiened	Astrovirus Ratinovirus	Bonana streak OL virus Bonana streak UA virus Bonana streak UV virus	0	A002234 H0599307	Ortervindes Ortervindes	Coulimounidae Coulimounidae	unamiened unamiened	Podnovinat Podnovinat	Penena streak OL virus Penena streak UA virus	0	AJ0022234 HI0593107	Neeria Ketua				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
signed signed	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned	Aadhovirus Aadhovirus Aadhovirus	Ronana strvak UV virus Ronana strvak UV virus Ronana strvak UM virus	0	HQ593108 HQ593109 HQ593109	Ortervirales Ortervirales Ortervirales	Coulimovinidae Coulimovinidae Coulimovinidae	unassigned unassigned unassigned	Rodnovinus Rodnovinus Rodnovinus	Banana streak UV virus Banana streak UV virus Banana streak UM virus	0	HQ593108 HQ593109 HQ593110	Uganda Uganda Uganda				species, genus and family assigned to new orde species, eenus and family assigned to new orde species, genus and family assigned to new orde
signed signed	Caulimoviridae Caulimoviridae	unassigned unassigned	Badnovirus Badnovirus	Ronana streak VN virus Rougainvilleg chlorotic yein b	0	AV750155 EU034539	Ortervirales Ortervirales	Coulimovinidae Coulimovinidae	unassigned unassigned	Rodnovinus Rodnovinus	Ronana streak VN virus Rougainvilleo chiarotic vein bar	0	AY750155 EU034539	Acuminata Vietnam Taiwan				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
signed signed	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	äadhovirus äadhovirus äadhovirus	Cacao swellen sheet CD virus Cacao swellen sheet Toao A Cacao swellen sheet virus	0	1N606110 A/782002	Ortervirales Ortervirales	Coulimovinidae Coulimovinidae Coulimovinidae	unassigned unassigned unassigned	Rodnovirus Rodnovirus	Cacao swollen shoot CD virus Cacao swollen shoot Taao A vir Cacao swollen shoot virus	0	JN606110 AJ781003	CSSV-C1152 CSSV-Wobe12				species, genus and family assigned to new orde species, genus and family assigned to new orde species, eenus and family assigned to new orde
signed signed	Caulimouiridae Caulimouiridae	unassigned	Asthovirus Asthovirus Asthovirus	Canno yellow mottle virus Canno yellow mottle virus Citrus vellow mosoic virus	0	0 AF247695	Ortervirales Ortervirales	Coulimounidae Coulimounidae	unamigned	Podnovinus Podnovinus	Canno yellow motife virus Canno yellow motife virus Citrus vellow motoic virus	0	0 AF247695	Alapen 0 Huane				species, genus and family assigned to new orde
signed	Caulimoviridae Caulimoviridae	unassigned unassigned	Badhovirus Badhovirus	Commelleg vellow mottle vir Dioscoreg baciliform AL virus	0	x52938 0	Ortenvindies Ortenvindies	Coulimovinidae Coulimovinidae	unamigned unamigned	Rodnovinus Rodnovinus	Commellog sellow mottle virus Diascorea baciliform AL virus	1	x52938 0	Otornaski O				species, perce and family assigned to new order species, perce and family assigned to new order species, genus and family assigned to new order
signed signed	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned unassigned	Badhovirus Badhovirus Badhovirus	Disacorea baciliform SV viry Fia badnovirys I Gooseberry vein bandina oss	0	00822073 16411989 10216114	Ortenvirales Ortenvirales	Coulimouiridae Coulimouiridae Coulimouiridae	unamimed unamimed unamimed	Podnovinus Podnovinus Podnovinus	Diascerva baciliform SV virus Fia badnovirus 1 Gooseberry vein bandina assoc	0	00822073 15411989 10316114	Benin Arkansas 1 RCHC				species, enus and family assigned to new orde species, enus and family assigned to new orde species, enus and family assigned to new orde
siened	Caulimoviridae Caulimoviridae	unamiened unamiened	Badhovirus Badhovirus	Groorvine Roditis leaf discole Groorvine with clearing virus	0	HG940503	Orten/indies Orten/indies	Coulimouinidae Coulimouinidae	unassigned unassigned	Podnovina Podnovina	Greatwise Roditis leaf discolors Greatwise with clearing vitus	2 O	HG940503 IF303669	GRLDsV-w-8				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Caulimouiridae Caulimouiridae	unassigned unassigned	Asthovirus Asthovirus	Kalancholi tap-spatting virus Mulberry badravirus J	0	D LAGS1258	Ortervirales Ortervirales	Coulimouinidae Coulimouinidae	unassigned	Rodnovinus Rodnovinus	Kalanchol top-spotting virus Multerny badrovirus J	0	0 LN651258	0 Multerry badravirus 1. Le	banon M			species, eenus and family assigned to new order
igned igned	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned	Badhovinus Badhovinus Badhovinus	Pagada yellow moxaic associ Rineaaale baciliform CD viru Rineaaale baciliform ER viru	0	QU121676	Ortenvirales	Coulimovinidae Coulimovinidae Coulimovinidae	unassigned unassigned	Rodnovinus Rodnovinus Rodnovinus	Pagada yellow mosoic associat Pineapple baciliform CD virus Pineapple baciliform IR virus	0	KI013302 GU121676	pyrrau-01 China 0				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Caulimoviridae Caulimoviridae	unassigned	Badhovinus Badhovinus	Piper yellow mottle virus Rubus unilow net virus	0	HC808712 KM0278034	Orten/indies Orten/indies	Coulimovinidae Coulimovinidae	unassigned	Rodnovinus	Riper yellow mottle virus Rubus vellow net virus	0	KC808712 KM078034	194-1 Reumforth's Seedling A				species, genus and family assigned to new orde species, genus and family assigned to new orde
igned	Caulimoviridae Caulimoviridae		Badhovinus Badhovinus	Scheffling ringspot visus Spinang vellow legispot visus	0	0	Ortervirales Ortervirales	Coulimouiridae Coulimouiridae	unassigned	Podnovinus Rodnovinus	Scheffliero rinasaat visus Spinaro yellow leafspot visus	0	0	0				species, genus and family assigned to new orde species, genus and family assigned to new orde
erned erned	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	Badhovinus Badhovinus Badhovinus	Suparcare baciliform Guade Suparcare baciliform Guade Suparcare baciliform IM vicu	0	F#24813 F#29817 A277291	Ortervinder Ortervinder	Coulimouinidae Coulimouinidae Coulimouinidae	unamimed unamimed unamimed	Podnovina Podnovina Podnovina	Supprome baciliform Guadelos Supprome baciliform Guadelos Supprome baciliform IM virus	0 0 0	FJ824813 FJ429817 AJ277091	SCRV-RS70 SCRV-Rs7 Irenar Malenar				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
erred	Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	Astroving Astroving	Suppropre beciliform MO vin Seven pototo pokakyy vina	0	A277091 M89923 F/560943	Ortenjoder Ortenjoder	Coulimounidae Coulimounidae	benimenu benimenu	Rodnevinus Rodnevinus	Supprese beciliform MO visus Seent pototo pokakuv visus	0	M89923 F/560943	Morocco Huscharo1				
red	Caulimouiridae Caulimouiridae	unassigned	Androvina Androvina	Tara baoliifarm CH virus Tara baoliifarm virus	0	AF257836	Ortervirales Ortervirales	Coulimouiridae Coulimouiridae	unassigned	Rodnevirus Rodnevirus	Tana baoliliform CH virus Tana baoliliform virus	0	KP710178 AF357836	Taro baciliform CH vinus, Papus New Guinea		-1		species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Caulimouiridae Caulimouiridae Caulimouiridae	unassigned unassigned	Badnovirus Coulimovirus Coulimovirus	Nacon necrotic mottle virus Atractivlades mild mottle virus Connection etched sins virus	0	KM229702 KR080327	Ortervinales Ortervinales	Coulimovinidae Coulimovinidae Coulimovinidae	unassigned unassigned unassigned	Rodnovirus Coulimovirus Coulimovirus	Nacon necrotic mottle virus Atractylades mild mottle virus Connection atrabad sinn virus	0	KM229702 KR080327 WMC58	Yacon necrotic mottle vin AMMV-ES Jand	a, isolate YV1			species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	Coulimovina Coulimovina	Canaction etched ring virus Cauliflower mospic virus Dohlig mospic virus	1	V00341 19272320	Ortervindes Ortervindes	Coulimouiridae Coulimouiridae	unassigned unassigned	Coulimovinus Coulimovinus	Caulflower mospic virus Dahlia mospic virus	1	x04658 V00141 IX272320	Franck Portland				species, eenus and family assigned to new order
iened igned	Caulimoviridae Caulimoviridae	unassigned	Coulimovina Coulimovina	Fizeart mosoic virus Horseradish latent virus	0	N06166 IN129923	Ortervirales Ortervirales	Coulimouinidae Coulimouinidae	unamigned	Coulimovinus Coulimovinus	Fizeart motolic virus Honercadish latent virus	0	¥06166	clone pFMV Sc3 ID1				species, eenus and family assigned to new orde species, genus and family assigned to new orde
iered	Caulimouiridae Caulimouiridae	unamiened unamiened	Coulimovina Coulimovina Coulimovina	Lomium leaf distortion virus Mirabilis masaic virus	0	EUS54423 AF454635	Orten/odles Orten/odles	Coulimounidae Coulimounidae	unamiened unamiened	Coulimovinus Coulimovinus	Lonium leaf distortion view Mirabilis masaic view	0	EU554423 AF454635	USA Dev				species, sense and family assigned to new orde species, sense and family assigned to new orde species, genus and family assigned to new orde
igned igned	Caulimouiridae Caulimouiridae Caulimouiridae	unassigned unassigned unassigned	Coulimovinus Coulimovinus Coulimovinus	Soybean Putnam virus Straveberry vein bandina viru Thistie mottle virus	0	1Q926983 997304 0	Ortervindes Ortervindes	Coulimouinidae Coulimouinidae Coulimouinidae	unassigned unassigned unassigned	Coulimovirus Coulimovirus Coulimovirus	Scybean Putnom virus Strouberry wein banding virus Thistle mottle virus	0	x97204 0	cione oSVEV-E2				species, eenus and family assigned to new orde species, eenus and family assigned to new orde
igned igned	Caulimoviridae Caulimoviridae	unassigned	Countrolina Countrolina Countrolina	Cassava vein mosaic virus Search poteto colhaine virus	0	US9751 H0694978	Ortenvindies	Coulimovinidae Coulimovinidae	unassigned	Covernovirus Covernovirus	Cassava vein mosoic virus Sweet actoto collusive virus	1	U59751 H0694978	de Kochko Mad1				species, genus and family assigned to new orde
igned igned	Caulimoviridae Caulimoviridae	unassigned unassigned	Petusinus Rosodnovinus	Antania vein clearing virus Rose yellow vein virus	1	U95208 19028536	Ortervirales Ortervirales	Coulimovinidae Coulimovinidae	unassigned unassigned	Petavinus Rosodnevitus	Petania vein clearing virus Rose yellow vein virus	1	U95208 14028536	Richert-Poggeler RYVV-MN1				species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Caulimoviridae Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	Solendovinus Solendovinus Soymovinus	Search actato unin cinarina vi Tabacco unin cinaring virus Blueberry red ringspot virus	1	AF190123 AF404509	Ortenviralies Ortenviralies Ortenviralies	Coulimovinidae Coulimovinidae Coulimovinidae	unassigned unassigned unassigned	Salendovinus Salendovinus Saymavinus	Sweet actato wile clearing vitu Tabacco wile clearing vitus Blueberry red ringspot vitus	0	H0698979 AF190123 AF404509	Dom1 Lockhart Glasheen				species, eenus and family assigned to new orde species, genus and family assigned to new orde species, eenus and family assigned to new orde
igned igned	Caulimoviridae Caulimoviridae	unassigned unassigned unassigned	Scottevitur Scottevitur	Blueberry red ringspot virus Cestrum vellow leaf curlino v Peanut ahlarotic streak virus	0	AF354175 U12288	Ortervirales Ortervirales	Coulimounidae Coulimounidae	unamigned unamigned	Soymovine Soymovine	Blueberry red ringspot visus Gestrum vellow leaf curlino visu Peanut chlorotic streak virus	0	AF404509 AF364175 U13988	Stavolone K1				species many and family assigned to new order
iened	Caulimoviridae Caulimoviridae	unassigned	Scorrevitur Tunorovitur	Soubean chlorotic mottle viru Rice tunoro bacilliform virus		x15828 x52824	Ortervindes Ortervindes	Coulimouiridae Coulimouiridae	unamiened unamiened	Sournavirus Tungnavirus	Soubean chibrotic mottle virus Rice tunoro booiliform virus		x15828 x57924	Hbi Philippines				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Metoviridae Metoviridae Metoviridae	unassigned unassigned unassigned	Erranthérus Erranthérus Erranthérus	Ceratitis capitato Yoyo virus Drosophila ananossae Tom v Drosophila melanoposter 17.	0	0	Ortervinales Ortervinales	Metoviridae Metoviridae Metoviridae	unassigned unassigned unassigned	Errentivinus Errentivinus Errentivinus	Ceratitis capitato Yoyo xirus Droscobila ananossar Tom viru Droscobila melonoposter 17.6	0	0	0 0				species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Metouiridae Metouiridae Metouiridae	unassigned	Errattivirus Errattivirus	Drosophia melanapaster 17 Drosophia melanapaster 29 Drosophia melanapaster Ge		0	Ortenviralies Ortenviralies Ortenviralies	Metovisidae Metovisidae Metovisidae	unamigned unamigned	Errentivinus Errentivinus Errentivinus	Drosophila melanopaster 17.6 Drosophila melanopaster 297 v Drosophila melanopaster Gura	4 0 4 0						species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
igned igned	Metouiridae Metouiridae	unassigned unassigned	Erranthérus Erranthérus	Drosophila melanogoster ide Drosophila melanogoster Tir	0	0	Ortervirales Ortervirales	Metoviridae Metoviridae	unassigned unassigned	Errantivirus Errantivirus	Drosophila melonogoster idefo Drosophila melonogoster Tiran	c 0	0	0				species, genus and family assigned to new order
iered igned	Metouiridae Metouiridae	unassigned	Erronthérus Erronthérus	Drosophila meionoposter Zan Drosophila vitilla 7x2 virus	00	0	Ortervirales Ortervirales	Metoviridae Metoviridae	unassigned	Errontivinus Errontivinus	Drosophila melonopaster Zam Drosophila vitilis Ted vitus	000	0 0	0				species, genus and family assigned to new order
igned	Metouiridoe Metouiridoe	unassigned unassigned unassigned	Errattivirus Metovirus	Trichoplusia ni TED virus Arabidoasis thaliana Athila vi Arabidoasis thaliana Taté vir	0	0	Ortervinales Ortervinales	Metoviridae Metoviridae	unamigned unamigned unamigned	Errentleines Metavinus	Trichoplusia ni TED virus Arabidoosis thaliona Athila viru Arabidoosis thaliona Taté virus	0	0	0				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
irred irred	Metouiridae Metouiridae	unassigned	Metovinus Metovinus	Rombus mori Moo virus Connorhobditis eleaans Cerd	0	0	Ortervinales	Metovinidae	unamimed	Metavirus Metavirus	Rombus mari Maa virus Gaenarhabditis elegans Ceril vi	0	0	0				species, genus and tarrily assigned to new order species, genus and family assigned to new order species, genus and family assigned to new order
igned igned	Metouiridae Metouiridae	unassigned	Metovirus Metovirus	Cledosponium failvum 7-1 viru Dictrostellum discoldeum Ski	000	211966	Ortervirales Ortervirales	Metoviridae Metoviridae	unassigned unassigned	Metavirus Metavirus	Cledosporium fulvum 7-1 virus Dictuostellum discoldeum Skiep	0 0	211866 0	McHale 0				species, genus and family assigned to new orde
ugned	Metouiridae Metouiridae	unassigned unassigned	Metovinus Metovinus	Drosophila buzzeti Osvoldo v Drosophila melonoposter 41.	0	0	Ortervinales Ortervinales	Metoviridae Metoviridae	unassigned	Metavirus Metavirus	Drosophila buzzeti Osvoldo vin Drosophila melonoposter 412 v	0		0				species, eenus and family assigned to new orde species, genus and family assigned to new orde
iened igned	Metouiridae Metouiridae Metouiridae	unassigned unassigned	Metovirus Metovirus Metovirus	Drosophila melanopaster Bia Drosophila melanopaster Ma Drosophila melanopaster Ma		0	Ortenvirales	Metovicidae Metovicidae Metovicidae	unamigned	Metavirus Metavirus	Drosophila melonoposter Mdal Drosophila melonoposter Mdal			0				species, evenus and family assigned to new orde species, evenus and family assigned to new orde species, genus and family assigned to new orde
iered igned	Metouiridae Metouiridae	unassigned	Metovirus Metovirus	Drosophila meionoposter Mis Drosophila vitilis Ulysses viru	0	0	Ortervirales Ortervirales	Metoviridae Metoviridae	unassigned	Metavirus Metavirus	Drosophila melanoposter Micro Drosophila virilis Lilysses virus	0	0	0 0				species, genus and family assigned to new orde species, genus and family assigned to new orde
signed	Metouiridae Metouiridae	unassigned	Metovirus Metovirus	Ausarium oxysaorum Skieev v Lilium hennyi Deli virus	0	0	Ortervindies Ortervindies	Metovikidae Metovikidae	unassigned unassigned	Metavirus Metavirus	Ausarium ozysaonum Skipov vin Lilium hennyi Dell vinus	0	0 x13886	0 Smith				species, genus and family assigned to new orde species, genus and family assigned to new orde
signed signed	Metouiridae Metouiridae Metouiridae	unassigned unassigned unassigned	Metovirus Metovirus Metovirus	Soccharamyces cerevisioe Ty Schiessocchoromyces pombe Schiessocchoromyces pombe	0	M34549 M38526 L10324	Ortenvirales Ortenvirales	Metoviridae Metoviridae Metoviridae	unassigned unassigned unassigned	Metavirus Metavirus Metavirus	Soccharamyces cerevisiae Ty3 a Schlassoccharamyces annbe Th Schlassoccharamyces annbe Th	r 0	M34549 M38526 L10224	A2950 Lavin Weaver				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
signed	Metowiridae Metowiridae	unassigned unassigned	Metovirus Metovirus	Schlassarchoromyors pomber Takifugu rubripes Sushi virus Tribolium castoneum Woot v	0	0	Ortervirales Ortervirales	Metoviridae Metoviridae	unassigned	Metavirus Metavirus	Takifugu rubripes Sushi virus Tribolium contoneum ikiast viru	0	0	0				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
ugned		unawiened unawigned	Metovinat Nemivina	Tripneustic protiile SURL viru Aedes pequeti Masacopie vir	0	0	Ortervirales Ortervirales	Metovinidae Pseudovinidae	unassigned	Metavirus Hemivirus	Tripneustis protiilo SUAL virus Aedes pegypti Mospopio virus	0		0 0				species, genus and family assigned to new orde species, genus and family assigned to new orde
iered iered	Paradoviridor Paradoviridor Paradoviridor	unamiened unamiened unamiened	Hemivina Hemivina Hemivina	Candido albicom Tca2 vinus Candido albicom Tca5 vinus Droscobilo melonoposter 17:	0	AF050215 AF065434	Ortenviralies Ortenviralies Ortenviralies	Preudovinidae Preudovinidae Preudovinidae	unamimed unamimed unamimed	Hemisian Hemisian Hemisian	Candida albicans Tca2 virus Candida albicans Tca5 virus Drosophila melonoposter 1721	0	AF050215 AF065434 0	N06759 505314 0				species, genus and family assigned to new orde species, genus and family assigned to new orde species, genus and family assigned to new orde
gned igned	Paradoviridor Paradoviridor	unassigned unassigned	Hemivina Hemivina	Drosophila melonoposter con Soccharamyces cerevision Ty		0	Ortervirales Ortervirales	Purudovinidae Purudovinidae	unassigned unassigned	Hemivitus Hemivitus	Droscehila melonapaster coala Soccharamyors cerevisiae TyS r	1	0	0 Zou				species, genus and family assigned to new orde species, genus and family assigned to new orde
gned	Paradoviridor Paradoviridor	unassigned unassigned	Nemivirus	Voletse carteri Lueckenburus Voletse carteri Osser virus	0	1/90320 x59552	Ortervinales Ortervinales	Pseudovinidae Pseudovinidae	unassigned	Hemisins Hemising	Volvox contexi Lueckenbuesser Volvox contexi Osser virus	0	U90320 x69552	UTEX 1885 (HK30) Lindeuer				species, genus and family assigned to new orde species, genus and family assigned to new orde
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