

Template for Taxonomic Proposal to the ICTV Executive Committee Creating Species in an existing genus

Code[†] To designate the following as species in the genus:

belonging to the family[°] :

[†] Assigned by ICTV officers

[°] leave blank if inappropriate or in the case of an unassigned genus

Author(s) with email address(es) of the Taxonomic Proposal

Judy brown, Chair of the SG

jbrown@ag.arizona.edu

SG members

moriones@eelm.csic.es, rrivera@ira.cinvestav.mx, j.dale@qut.edu.au, stanleyj@fsmail.net,
zzhou@zju.edu.cn, robbriddon@nibge.org, iltab@danforthcenter.org, zerbini@ufv.br

Old Taxonomic Order

Order

Family

Geminiviridae

Genus

Begomovirus

Type Species

Species in the Genus

Tentative Species in the Genus

Unassigned Species in the family

New Taxonomic Order

Order

Family

Geminiviridae

Genus

Begomovirus

Type Species

Species in the Genus

Tentative Species in the Genus

Unassigned Species in the family

ICTV-EC comments and response of the SG

Species demarcation criteria in the genus

The following criteria should be used as a guideline to establish taxonomic status:

- Number of genomic components. Presence or absence of a DNA B component
- Organization of the genome. Presence or absence of ORF AV2.
- Nucleotide sequence identity. Because of the growing number of recognized species, derivation of the complete nucleotide sequence will be necessary to distinguish species. Nucleotide sequence identity <89% is generally indicative of a distinct species. However, decisions based on nucleotide sequence comparisons, particularly when approaching this value, must take into account the biological properties of the virus. The taxonomic status of a recombinant will depend on relatedness to the parental viruses, the frequency and extent of recombination events, and its biological properties compared with the parental viruses. Information concerning the diversity of related recombinants may be helpful to determine status.
- *Trans*-replication of genomic components. The inability of Rep protein to *trans*-replicate a genomic component suggests a distinct species. However, when considering this criterion, it should be kept in mind that small changes in the Rep binding site of otherwise identical viruses might prevent functional interaction, and recombination involving a small part of the genome may confer replication competence on a distinct species.
- Production of viable pseudorecombinants. Account should be taken of the fitness of the pseudorecombinant in the natural host(s) of the parental viruses. It should be ensured that pseudorecombinant viability is not the result of inter-component recombination.
- Coat protein characteristics. Amino acid sequence identity <90% and substantial serological differences may be indicative of a distinct species in the first instance, but derivation of the complete sequence will be necessary to confirm taxonomic status.
- Natural host range and symptom phenotype. These characteristics may relate to a particular species but their commonest use will be to distinguish strains.

Argument to justify the designation of new species in the genus

The proposed species show less than 89% nt sequence identity with existing species, in accordance with the demarcation criteria:

New species	Accession	Most closely related sp	% identity
<i>Ageratum yellow vein Hualian virus</i> Ageratum yellow vein Hualian virus – Hsinchu [Taiwan:Hsinchu:Tom:2005]	DQ866124	AYVCNV - [Hn2;19]	AJ564744 86%
<i>Bitter gourd yellow vein virus</i> Bitter gourd yellow vein virus - [Pakistan:Lahore:2004]	AM491590	Tomato leaf curl New Delhi virus - In	86%
<i>Boerhavia yellow spot virus</i> Boerhavia yellow spot virus - [Mexico:Yucatan:2005]	EF121755	ToGMoV	AF132852 70%
<i>Clerodendron golden mosaic virus</i> Clerodendron golden mosaic virus - [Vietnam:Sonla:2005]	DQ641692	ToLCCNV - [CN;Gx18;02].	AJ558119 66%
<i>Corchorus golden mosaic virus</i> Corchorus golden mosaic virus - [Vietnam:Hanoi:2005]	DQ641688	CYVV - [VN;Hoa;00]	AY727903 68%
<i>Corchorus yellow spot virus</i> Corchorus yellow spot virus - [Mexico:Yucatan:2005]	DQ875868	CdTV - [H8]	AF226664 82%
<i>Desmodium leaf distortion virus</i> Desmodium leaf distortion virus - [Mexico:Yucatan:2005]	DQ875870	ToSLCV	AF130415 74%
<i>Dicliptera yellow mottle Cuba virus</i> Dicliptera yellow mottle Cuba virus - [Cuba]	AJ549960	DiYMoV	AF139168 86%
<i>Erectites yellow mosaic virus</i> Erectites yellow mosaic virus - [Vietnam:Hoabinh:2005]	DQ641698	PepLCV - [MY;Kla;97]	AF414287 88%
<i>Euphorbia leaf curl Guangxi virus</i> Euphorbia leaf curl Guangxi virus - [China:Guangxi 35-1:2002]	AM411424	TbCSV - [CN;Yn35;01].	AJ420318 77%
<i>Euphorbia mosaic virus</i> Euphorbia mosaic virus - A [Mexico:Yucatan:2004]	DQ318937	ToMYLCAV - [VN;10].	AY927277 82%
<i>Kudzu mosaic virus</i> Kudzu mosaic virus - [Vietnam:Hoabinh:2005]	DQ641690	HgYMV - [IN;Coi].	AJ627904 65%
<i>Ludwigia yellow vein Vietnam virus</i> Ludwigia yellow vein Vietnam virus - [Vietnam:Hochiminh:2005]	DQ641699	LuYVV - [VN;Hoc;05]	DQ641708 88%
<i>Malvastrum yellow leaf curl virus</i> Malvastrum yellow leaf curl virus - [China:Yunnan 193:2003]	AJ971524	ToYLCCNV – [Yn231]	AM260701 80%
<i>Mesta yellow vein mosaic virus</i> Mesta yellow vein mosaic virus - [India:Barackpore:2006]	EF373060	CLCuBV - [IN;Ban;04]	AY705380 82%
<i>Mimosa yellow leaf curl virus</i> Mimosa yellow leaf curl virus - [Vietnam:Binhduong:2005]	DQ641695	TYLCVNV - [VN;Han;05]	DQ641697 82%
<i>Okra yellow crinkle virus</i> Okra yellow crinkle virus - [Mali:01:2005]	DQ902715	TbLCZVV - [ZW]	AF350330 73%
<i>Pedilanthus leaf curl virus</i> Pedilanthus leaf curl virus - [Pakistan:Multan:2006]	AM712436	Tomato leaf curl Pakistan virus	DQ116884 90%
<i>Pepper leaf curl Lahore virus</i> Pepper leaf curl Lahore virus - [Pakistan:Lahore:2004]	AM404179	PepLCBDV - BD[BD;Bog;99]	AF314531 87%
<i>Pepper leaf curl Pakistan virus</i> Pepper leaf curl Pakistan virus - [Pakistan:Khanewal 1:2004]	DQ116878	PepLCBDV - BD[BD;Bog;99]	AF314531 87%
<i>Pepper yellow leaf curl Indonesia virus</i> Pepper yellow leaf curl Indonesia virus - [Indonesia:Ageratum:2005]	AB267838	TYLCKaV - [TH;Kan2;Egg;01].	AF511530 70%
<i>Pumpkin yellow mosaic virus</i> Pumpkin yellow mosaic virus - [Malaysia:Negeri Sembilan:2001]	EF197941	Squash leaf curl Philippines virus	AB085793 87%
<i>Radish leaf curl virus</i> Radish leaf curl virus - [India:Varanasi:2005]	EF175733	ToLCKV - A[IN;Jan;05]	AY754812 81%
<i>Sida yellow mosaic Yucatan virus</i> Sida yellow mosaic Yucatan virus - [Mexico:Yucatan:2005]	DQ875872	OYMMV - [MX;Maz3;04]	DQ022611 86%
<i>Sida yellow vein Madurai virus</i> Sida yellow vein Madurai virus - [India:Madurai:2005]	AM259382	SiLCuV - [CN;Hn57;05]	AM050730 87%
<i>Sida yellow vein Vietnam virus</i> Sida yellow vein Vietnam virus - [Vietnam:Hanoi:2005]	DQ641696	SiYMCNV - [CN;Hn8;03]	AJ810096 85%
<i>Soybean blistering mosaic virus</i> Soybean blistering mosaic virus - [Argentina:NOA:2005]	EF016486	TGMV - [BR;Com;84]	M73794 76%
<i>Spilanthes yellow vein virus</i> Spilanthes yellow vein virus - [Vietnam:Dalat:2005]	DQ641694	ToLCYTV - B[YT;Kah;03]	AJ865340 66%
<i>Sweet potato leaf curl Canary virus</i> Sweet potato leaf curl Canary virus - [Spain:Canary Islands:BG4:2002]	EF456742	Ipomea yellow vein virus - [Spain:1998]	AJ132548 84%
<i>Sweet potato leaf curl China virus</i> Sweet potato leaf curl China virus - [China:2005]	DQ512731	SPLCV - [US;Lou;94]	AF104036 76%
<i>Sweet potato leaf curl Lanzarote virus</i> Sweet potato leaf curl Lanzarote virus - [Spain:Canary Islands:BG27:2002]	EF456746	Ipomea yellow vein virus - [Spain:1998]	AJ132548 85%
<i>Sweet potato leaf curl Spain virus</i> Sweet potato leaf curl Spain virus - [Spain:Canary Islands:BG1:2002]	EF456741	Ipomea yellow vein virus - [Spain:1998]	AJ132548 83%
<i>Tomato leaf curl Arusha virus</i>			

Tomato leaf curl Arusha virus- [Tanzania:Tengelu:2005]	DQ519575	ToLCYTV-A[YT;Dem;03]	AJ865341	78%
Tomato leaf curl Comoros virus				
Tomato leaf curl Comoros virus - [Mayotte:Dembeni:2003]	AJ865341	TYLCAxV-[ES;Alg;00]	AY227862	86%
Tomato leaf curl Hsinchu virus				
Tomato leaf curl Hsinchu virus - [Taiwan:Hsinchu:2005]	DQ866131	ALCuV-[CN;G52;03]	AJ851005	76%
Tomato leaf curl Kerala virus				
Tomato leaf curl Kerala virus-[India:Kerala II:2005]	DQ852623	ToLCBV-A[IN;Ban1]	Z48182	85%
Tomato leaf curl Pakistan virus				
Tomato leaf curl Pakistan virus - [Pakistan:Rahim Yar Khan 1:2004]	AB116884	EuLCV-[CN;Gx35;02]	AJ558121	84%
Tomato leaf curl Pune virus				
Tomato leaf curl Pune virus - [India:Pune:2005]	AY754814	AYVSLV-[LK;99]	AF314144	85%
Tomato leaf curl Seychelles virus				
Tomato leaf curl Seychelles virus- [Seychelles:Mahe:2006]	AM491778	ToLCKMV-[YT;Dem;03].	AJ865341	83%
Tomato leaf curl Sinaloa virus				
Tomato leaf curl Sinaloa virus - [Nicaragua:Santa Lucia]	AJ608286	Chino del tomate virus-[H8]	AF226664	85%
Tomato yellow leaf curl Indonesia virus				
Tomato yellow leaf curl Indonesia virus – [Indonesia:Lembang:2005]	AF189018	ToLCLV-[LA]	AF195782	87%
Tomato yellow leaf curl Vietnam virus				
Tomato yellow leaf curl Vietnam virus - [Vietnam:Hanoi:2005]	DQ641697	PaLCuCNV -XX[CN;Gx22;Tom;02]	AJ704604	85%
Tomato yellow vein streak virus				
Tomato yellow vein streak virus- [Brazil:Potato:1983]	EF417915	Potato yellow mosaic Panama virus	Y15034	79%

List of created species in the genus

<i>Ageratum yellow vein Hualian virus</i>			
Ageratum yellow vein Hualian virus - Hsinchu [Taiwan:Hsinchu:Tom:2005]	DQ866124		(AYVHuV-Hsi[TW:Hsi:Tom:05])
Ageratum yellow vein Hualian virus - Hualian [Taiwan:Hualian2:2005]	DQ866133		(AYVHuV-Hua[TW:Hua2:05])
Ageratum yellow vein Hualian virus - Hualian [Taiwan:Hualian4:2005]	DQ866132		(AYVHuV-Hua[TW:Hua4:05])
<i>Boerhavia yellow spot virus</i>			
Boerhavia yellow spot virus - [Mexico:Yucatan:2005]	EF121755		(BoYSV-[MX:Yuc:05])
<i>Clerodendron golden mosaic virus</i>			
Clerodendron golden mosaic virus - [Vietnam:Sonla:2005]	DQ641692	DQ641693	(CIGMV-[VN:Son:05])
<i>Corchorus golden mosaic virus</i>			
Corchorus golden mosaic virus - [Vietnam:Hanoi:2005]	DQ641688	DQ641689	(CoGMV-[VN:Han:05])
<i>Corchorus yellow spot virus</i>			
Corchorus yellow spot virus - [Mexico:Yucatan:2005]	DQ875868	DQ875869	(CoYSV-[MX:Yuc:05])
<i>Desmodium leaf distortion virus</i>			
Desmodium leaf distortion virus - [Mexico:Yucatan:2005]	DQ875870	DQ875871	(DesLDV-[MX:Yuc:05])
<i>Dicliptera yellow mottle Cuba virus</i>			
Dicliptera yellow mottle Cuba virus - [Cuba]	AJ549960		(DiYMoCUV-[CU])
<i>Erectites yellow mosaic virus</i>			
Erectites yellow mosaic virus - [Vietnam:Hoabinh:2005]	DQ641698		(ErYMV-[VN:Hoabinh:05])
<i>Euphorbia leaf curl Guangxi virus</i>			
Euphorbia leaf curl Guangxi virus - [China:Guangxi 35-1:2002]	AM411424		(EuLCGxV-[CN:Gx35-1:02])
<i>Euphorbia mosaic virus</i>			
Euphorbia mosaic virus - A [Mexico:Yucatan:2004]	DQ318937	DQ318938	(EuMV-A-[MX:Yuc:04])
Euphorbia mosaic virus - A [Puerto Rico:Jurabo:1991]	AF068642		(EuMV-A-[PR:Jur:91])
Euphorbia mosaic virus - B [Mexico:Jalisco:2005]	DQ520942		(EuMV-B-[MX:Jal:05])
<i>Kudzu mosaic virus</i>			
Kudzu mosaic virus - [Vietnam:Hoabinh:2005]	DQ641690	DQ641691	(KuMV-[VN:Hoabinh:05])
<i>Ludwigia yellow vein Vietnam virus</i>			
Ludwigia yellow vein Vietnam virus - [Vietnam:Hochiminh:2005]	DQ641699		(LuYVVNV-[VN:Hoc:05])
<i>Malvastrum yellow leaf curl virus</i>			
Malvastrum yellow leaf curl virus - [China:Yunnan 193:2003]	AJ971524		(MaYLCV-[CN:Yn193:03])
Malvastrum yellow leaf curl virus - [China:Yunnan 194:2003]	AJ971265		(MaYLCV-[CN:Yn194:03])
<i>Mesta yellow vein mosaic virus</i>			
Mesta yellow vein mosaic virus - [India:Barackpore:2006]	AE373060		MYVMV-[IN:Bar:06]
<i>Mimosa yellow leaf curl virus</i>			
Mimosa yellow leaf curl virus - [Vietnam:Binhduong:2005]	DQ641695		(MiYLCV-[VN:Bin:05])
<i>Okra yellow crinkle virus</i>			
Okra yellow crinkle virus - [Mali:01:2005]	DQ902715		(OYCrV-[ML:01:05])
Okra yellow crinkle virus - [Mali:02:2005]	DQ875879		(OYCrV-[ML:02:05])
<i>Pepper leaf curl Lahore virus</i>			
Pepper leaf curl Lahore virus - [Pakistan:Lahore:2004]	AM404179		(PepLCLV-[PK:Lah:04])
<i>Pepper leaf curl Pakistan virus</i>			
Pepper leaf curl Pakistan virus - [Pakistan:Khane wal 1:2004]	DQ116878		(PepLCPKV-[PK:Kha1:04])
Pepper leaf curl Pakistan virus - [Pakistan:Khanewal 2:2004]	DQ116879		(PepLCPKV-[PK:Kha2:04])
<i>Pepper yellow leaf curl Indonesia virus</i>			
Pepper yellow leaf curl Indonesia virus - [Indonesia:2005]	AB267834	AB267835	(PepLCIV-[ID:05])
Pepper yellow leaf curl Indonesia virus - [Indonesia:Ageratum:2005]	AB267838	AB267839	(PepLCIV-[ID:Age:05])
Pepper yellow leaf curl Indonesia virus - [Indonesia:Tomato:2005]	AB267836	AB267837	(PepLCIV-[ID:Tom:05])
Pepper yellow leaf curl Indonesia virus - [Indonesia:Tomato2:2005]		AB213599	(PepLCIV-[ID:Tom2:05])
<i>Radish leaf curl virus</i>			
Radish leaf curl virus - [India:Varanasi:2005]	EF175733		(RaLCV-[IN:Var:03])
<i>Sida yellow mosaic Yucatan virus</i>			
Sida yellow mosaic Yucatan virus - [Mexico:Yucatan:2005]	DQ875872	DQ875873	(SiYMYuV-[MX:Yuc:05])
<i>Sida yellow vein Madurai virus</i>			
Sida yellow vein Madurai virus - [India:Madurai:2005]	AM259382		(SiYVMAV-[IN:Mad:05])
<i>Sida yellow vein Vietnam virus</i>			
Sida yellow vein Vietnam virus - [Vietnam:Hanoi:2005]	DQ641696		(SiYVVNV-[VN:Han:05])

Continued

Soybean blistering mosaic virus			
Soybean blistering mosaic virus - [Argentina:NOA:2005]	EF016486		(SbBMV-[AR:NOA:05])
Spilanthus yellow vein virus			
Spilanthus yellow vein virus - [Vietnam:Dalat:2005]	DQ641694		(SpYVV-[VN:Dal:05])
Tomato leaf curl Arusha virus			
Tomato leaf curl Arusha virus - [Tanzania:Tengelu:2005]	DQ519575		(ToLCArV-[TZ:Ten:05])
Tomato leaf curl Comoros virus			
Tomato leaf curl Comoros virus - [Mayotte:Dembeni:2003]	AJ865341		(ToLCKMV-[YT:Dem:03])
Tomato leaf curl Hsinchu virus			
Tomato leaf curl Hsinchu virus - [China:Fujian:2005]	EF125190		(ToLCHsV-[CN:Fuj:05])
Tomato leaf curl Hsin chu virus - [Taiwan:Hsinchu:2005]	DQ866131		(ToLCHsV-[TW:Hsi:05])
Tomato leaf curl Kerala virus			
Tomato leaf curl Kerala virus - [India:Kerala II:2005]	DQ852623		(ToLCKeV-[IN:KerII:05])
Tomato leaf curl Mayotte virus			
Tomato leaf curl Mayotte virus - [Mayotte:Kahani:2003]	AJ865340		(ToLCYTV-[YT:Kah:03])
Tomato leaf curl Pakistan virus			
Tomato leaf curl Pakistan virus - [Pakistan:Rahim Yar Khan 1:2004]	DQ116884		(ToLCPKV-[PK:RYK1:04])
Tomato leaf curl Pune virus			
Tomato leaf curl Pune virus - [India:Pune:2005]	AY754814		(ToLCPuV-[IN:Pun:05])
Tomato leaf curl Seychelles virus			
Tomato leaf curl Seychelles virus - [Seychelles:Mahe:2006]	AM491778		ToLCSCV-[SC:Mah:06]
Tomato yellow leaf curl Indonesia virus			
Tomato yellow leaf curl Indonesia virus - [Indonesia:Lembang:2005]	AF189018		(TYLCIDV-[ID:Lem:05])
Tomato yellow leaf curl Vietnam virus			
Tomato yellow leaf curl Vietnam virus - [Vietnam:Hanoi:2005]	DQ641697		(TYLCVNV-[VN:Han:05])
Bitter gourd yellow vein virus			
Bitter gourd yellow vein virus - [Pakistan:Lahore:2004]	AM491590	AM709505	BGYVV-[PK:Lah:04]
Pedilanthus leaf curl virus			
Pedilanthus leaf curl virus - [Pakistan:Multan:2006]	AM712436		PedLCuV-[PK:Mul:06]
Pumpkin yellow mosaic virus			
Pumpkin yellow mosaic virus - [Malaysia:Negeri Sambilan:2001]	EF197941		PuYMV-[ML:Neg:01]
Sweet potato leaf curl Canary virus			
Sweet potato leaf curl Canary virus - [Spain:Canary Islands:BG4:2002]	EF456742		SPLCCanV-[ES:CI:BG4:02]
Sweet potato leaf curl Canary virus - [Spain:Canary Islands:BG7:2002]	EF456745		SPLCCanV-[ES:CI:BG7:02]
Sweet potato leaf curl China virus			
Sweet potato leaf curl China virus - [China:2005]	DQ512731		SPLCCNV-[CN::05]
Sweet potato leaf curl Lanzarote virus			
Sweet potato leaf curl Lanzarote virus - [Spain:Canary Islands:BG27:2002]	EF456746		SPLCLanV-[ES:CI:BG27:02]
Sweet potato leaf curl Spain virus			
Sweet potato leaf curl Spain virus - [Spain:Canary Islands:BG1:2002]	EF456741		SPLCESV-[ES:CI:BG1:02]
Sweet potato leaf curl Spain virus - [Spain:Canary Islands:BG5:2002]	EF456743		SPLCESV-[ES:CI:BG5:02]
Tomato leaf curl Sinaloa virus			
Tomato leaf curl Sinaloa virus - [Nicaragua:Condega]		AJ508782	ToLCSinV-[NI:Con]
Tomato leaf curl Sinaloa virus - [Nicaragua:Santa Lucia]	AJ608286	AJ508783	ToLCSinV-[NI:SL]

The species names are indicated in green and the isolate names in black

Annexe.

Phylogenetic tree of representative isolates of all begomogeminivirus species. The arrow is indicating (most) the new species representatives.

