

Summary of codon statistics for complete genomes of plant viruses (Adams & Antoniw)

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Alfalfa mosaic virus	Alfamovirus	2441	43.6	49.9	39.7	41.1	55.9
Garlic virus A	Allexivirus	2721	49.5	54.9	42.4	51.1	56.5
Garlic virus C	Allexivirus	2657	47.9	53.7	41.4	48.7	58.6
Garlic virus E	Allexivirus	2653	50.4	55.0	42.4	53.6	58.4
Garlic virus X	Allexivirus	2547	47.2	51.2	41.9	48.4	57.3
Shallot virus X	Allexivirus	2838	49.3	53.4	42.2	52.4	56.6
Pothos latent virus	Aureusvirus	1487	47.6	52.5	44.1	46.3	57.9
Oat chlorotic stunt virus	Avenavirus	1283	50.6	50.8	44.9	56.0	57.6
Banana bunchy top virus	Babuvirus	1030	40.9	44.8	37.3	40.6	52.6
Banana streak virus	Badnavirus	2146	41.1	47.9	34.4	40.9	51.0
Cacao swollen shoot virus	Badnavirus	2112	44.6	51.1	37.9	44.7	55.0
Citrus yellow mosaic virus	Badnavirus	2697	44.3	50.8	38.4	43.6	55.8
Commelina yellow mottle virus	Badnavirus	2224	40.1	47.9	35.1	37.1	47.6
Sugarcane bacilliform virus	Badnavirus	2223	42.9	49.8	36.2	42.8	50.6
Abutilon mosaic virus	Begomovirus	1298	47.8	48.2	41.3	54.0	59.6
African cassava mosaic virus	Begomovirus	1700	44.1	47.0	40.1	45.4	56.2
Ageratum enation virus	Begomovirus	1091	44.1	48.5	40.2	43.5	57.9
Ageratum yellow vein China virus	Begomovirus	1114	42.6	47.2	39.8	40.8	56.2
Ageratum yellow vein Sri Lanka virus	Begomovirus	1103	44.0	47.7	39.8	44.6	58.2
Ageratum yellow vein Taiwan virus	Begomovirus	1093	43.2	47.6	40.2	41.7	56.4
Ageratum yellow vein virus	Begomovirus	1106	43.3	47.5	40.1	42.5	57.2
Bean calico mosaic virus	Begomovirus	1570	42.0	44.7	39.5	41.8	55.7
Bean dwarf mosaic virus	Begomovirus	1514	46.4	47.8	41.2	50.1	59.4
Bean golden mosaic virus	Begomovirus	1511	41.6	45.2	40.9	38.7	55.5
Bean golden yellow mosaic virus	Begomovirus	1664	41.9	45.5	39.4	40.6	54.2
Bhendi yellow vein mosaic virus	Begomovirus	1124	44.8	48.8	40.1	45.6	59.1
Cabbage leaf curl virus	Begomovirus	1540	44.1	46.6	41.8	44.1	57.7
Chayote yellow mosaic virus	Begomovirus	979	48.5	50.7	42.6	52.3	60.5
Chilli leaf curl virus	Begomovirus	1094	45.3	48.6	40.6	46.8	58.1
Chino del tomate virus	Begomovirus	1516	47.0	47.7	41.9	51.5	58.8
Cotton leaf curl Alabad virus	Begomovirus	1115	44.5	48.3	39.6	45.7	58.4
Cotton leaf curl Gezira virus	Begomovirus	1112	45.8	48.8	40.8	47.7	59.4
Cotton leaf curl Kokhran virus	Begomovirus	1108	45.3	48.0	41.8	46.1	57.8

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Cotton leaf curl Multan virus	Begomovirus	1130	45.3	49.1	41.0	45.8	59.2
Cotton leaf curl Rajasthan virus	Begomovirus	1126	45.2	48.1	41.7	45.7	58.6
Cowpea golden mosaic virus	Begomovirus	1089	45.7	47.5	41.2	48.5	59.7
Croton yellow vein mosaic virus	Begomovirus	1094	44.3	48.2	40.7	44.0	57.3
Cucurbit leaf curl virus	Begomovirus	1540	44.7	45.9	41.4	46.6	58.2
Dicliptera yellow mottle virus	Begomovirus	1548	41.5	45.0	39.5	40.1	54.6
East African cassava mosaic Cameroon virus	Begomovirus	1636	45.7	48.6	41.4	47.0	59.9
East African cassava mosaic virus	Begomovirus	1633	46.1	48.4	41.3	48.6	59.2
East African cassava mosaic Zanzibar virus	Begomovirus	1661	46.2	48.3	41.6	48.8	59.1
Eupatorium yellow vein virus	Begomovirus	1110	44.1	47.7	40.4	44.4	57.1
Hollyhock leaf crumple virus	Begomovirus	1112	44.7	47.6	41.7	44.8	58.5
Honeysuckle yellow vein mosaic virus	Begomovirus	1108	45.5	48.2	42.0	46.4	58.4
Indian cassava mosaic virus	Begomovirus	1645	45.6	48.2	41.3	47.4	58.5
Ipomoea yellow vein virus	Begomovirus	683	46.0	46.6	43.2	48.2	58.6
Macroptilium mosaic Puerto Rico virus	Begomovirus	1517	40.8	44.5	39.7	38.2	54.4
Macroptilium yellow mosaic Florida virus	Begomovirus	1500	43.4	45.7	40.2	44.3	56.9
Macroptilium yellow mosaic virus	Begomovirus	951	45.7	48.3	41.0	48.0	57.9
Malvastrum yellow vein virus	Begomovirus	1122	45.3	48.3	40.5	47.2	60.0
Melon chlorotic leaf curl virus	Begomovirus	1005	43.3	46.3	39.6	44.1	59.6
Mungbean yellow mosaic India virus	Begomovirus	1609	43.4	45.6	39.8	44.9	57.5
Mungbean yellow mosaic virus	Begomovirus	1398	42.9	44.9	39.4	44.5	58.5
Okra yellow vein mosaic virus	Begomovirus	1130	45.3	48.9	40.7	46.2	59.4
Papaya leaf curl virus	Begomovirus	1094	42.8	47.4	39.7	41.3	55.8
Pepper golden mosaic virus	Begomovirus	1475	45.3	48.5	41.2	46.1	58.9
Pepper huasteco yellow vein virus	Begomovirus	1486	43.5	46.2	40.9	43.2	58.5
Pepper leaf curl Bangladesh virus	Begomovirus	1094	46.1	49.3	41.2	47.7	60.5
Pepper leaf curl virus	Begomovirus	1090	44.8	48.9	40.3	45.2	58.7
Potato yellow mosaic Panama virus	Begomovirus	1516	45.0	48.0	41.0	45.9	58.7
Potato yellow mosaic Trinidad virus	Begomovirus	1502	45.9	48.0	41.0	48.8	59.2
Potato yellow mosaic virus	Begomovirus	1514	45.5	48.0	40.6	47.8	58.8
Rhynchosia golden mosaic virus	Begomovirus	1012	45.4	46.5	41.4	48.3	58.1
Sida golden mosaic Costa Rica virus	Begomovirus	1514	47.2	47.8	41.7	52.1	59.3
Sida golden mosaic Florida virus	Begomovirus	1017	47.8	49.4	42.1	51.8	57.3
Sida golden mosaic Honduras virus	Begomovirus	1514	47.4	47.6	41.6	53.0	58.8
Sida golden mosaic virus	Begomovirus	1516	47.9	48.4	41.6	53.7	58.2

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Sida golden yellow vein virus	Begomovirus	962	46.6	48.5	41.2	50.2	58.3
Sida mottle virus	Begomovirus	920	46.7	48.4	40.0	51.7	58.6
Sida yellow mosaic virus	Begomovirus	962	46.8	47.8	41.0	51.6	58.9
Sida yellow vein virus	Begomovirus	965	47.6	48.2	41.8	52.9	58.3
South African cassava mosaic virus	Begomovirus	1668	46.6	48.4	41.5	49.8	58.9
Soybean crinkle leaf virus	Begomovirus	1105	44.9	47.2	40.5	47.1	59.4
Squash leaf curl China virus	Begomovirus	924	44.8	50.3	39.3	44.7	59.2
Squash leaf curl virus	Begomovirus	1573	44.5	46.5	41.1	45.9	57.7
Squash leaf curl Yunnan virus	Begomovirus	1098	43.4	47.6	39.4	43.3	59.2
Squash mild leaf curl virus	Begomovirus	1536	44.7	47.7	41.1	45.3	58.7
Squash yellow mottle virus	Begomovirus	1556	44.3	46.7	41.6	44.7	57.8
Sri Lankan cassava mosaic virus	Begomovirus	1694	46.6	48.2	42.9	48.6	58.6
Stachytarpheta leaf curl virus	Begomovirus	1104	44.2	48.0	41.0	43.6	58.5
Sweet potato leaf curl Georgia virus	Begomovirus	1117	45.2	47.6	42.4	45.5	56.2
Sweet potato leaf curl virus	Begomovirus	1115	47.2	48.2	44.2	49.3	58.6
Tobacco curly shoot virus	Begomovirus	1105	43.1	47.7	39.5	42.1	57.3
Tobacco leaf curl Japan virus	Begomovirus	1106	44.8	48.2	41.8	44.5	58.4
Tobacco leaf curl Kochi virus	Begomovirus	1104	44.4	47.4	41.1	44.6	57.4
Tobacco leaf curl Yunnan virus	Begomovirus	1106	44.6	47.3	41.2	45.3	58.0
Tobacco leaf curl Zimbabwe virus	Begomovirus	1086	44.6	48.3	41.3	44.2	59.1
Tomato chlorotic mottle virus	Begomovirus	1516	43.3	46.1	40.2	43.7	57.4
Tomato curly stunt virus	Begomovirus	1090	45.9	49.4	40.0	48.4	59.6
Tomato golden mosaic virus	Begomovirus	1394	43.0	45.8	40.0	43.2	57.7
Tomato golden mottle virus	Begomovirus	962	44.2	47.9	38.7	46.0	58.8
Tomato leaf curl Bangalore virus	Begomovirus	1102	44.3	48.6	40.2	44.0	59.1
Tomato leaf curl Bangladesh virus	Begomovirus	1106	44.7	48.9	40.5	44.6	58.3
Tomato leaf curl Gujurat virus	Begomovirus	1103	45.5	48.8	41.6	46.2	59.7
Tomato leaf curl Karnataka virus	Begomovirus	1106	44.4	47.8	40.3	45.0	57.8
Tomato leaf curl Laos virus	Begomovirus	1104	44.5	46.7	40.8	46.1	58.0
Tomato leaf curl Malaysia virus	Begomovirus	1109	44.6	46.8	40.8	46.4	58.3
Tomato leaf curl New Delhi virus	Begomovirus	1628	44.0	47.5	40.3	44.2	57.8
Tomato leaf curl Taiwan virus	Begomovirus	1104	43.4	48.1	39.4	42.7	56.7
Tomato leaf curl Vietnam virus	Begomovirus	1107	44.1	48.2	39.9	44.0	58.8
Tomato leaf curl virus	Begomovirus	1110	45.5	48.0	40.5	47.9	58.8
Tomato mosaic Havana virus	Begomovirus	1515	46.2	48.3	41.0	49.2	57.6

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Tomato mottle Taino virus	Begomovirus	1518	45.9	47.6	41.2	48.8	59.0
Tomato mottle virus	Begomovirus	1517	45.2	47.6	40.5	47.4	58.1
Tomato rugose mosaic virus	Begomovirus	1507	44.0	46.7	41.1	44.3	58.4
Tomato severe leaf curl virus	Begomovirus	981	46.7	47.0	40.8	52.3	57.6
Tomato severe rugose virus	Begomovirus	955	44.9	47.1	41.2	46.4	57.6
Tomato yellow leaf curl China virus	Begomovirus	1103	43.7	47.9	40.6	42.5	58.9
Tomato yellow leaf curl Gezira virus	Begomovirus	1107	42.9	47.0	39.2	42.4	58.2
Tomato yellow leaf curl Sardinia virus	Begomovirus	1105	42.4	47.1	38.4	41.6	59.1
Tomato yellow leaf curl Thailand virus	Begomovirus	1563	43.5	46.8	40.3	43.5	58.2
Tomato yellow leaf curl virus	Begomovirus	1108	43.3	46.9	39.0	44.0	58.5
Watermelon chlorotic stunt virus	Begomovirus	1618	48.8	50.4	41.7	54.2	59.6
Beet necrotic yellow vein virus	Benyvirus	4300	41.3	49.9	39.7	34.1	45.8
Beet soil-borne mosaic virus	Benyvirus	3930	41.7	49.9	39.7	35.7	44.1
Pelargonium zonate spot virus	Bromoviridae	2170	45.1	50.1	39.9	45.3	53.5
Broad bean mottle virus	Bromovirus	2265	43.8	49.4	39.3	42.6	56.1
Brome mosaic virus	Bromovirus	2279	46.7	53.0	40.8	46.4	56.1
Cowpea chlorotic mottle virus	Bromovirus	2262	43.8	48.7	39.8	42.9	53.9
Barley mild mosaic virus	Bymovirus	3154	49.5	53.6	40.8	54.0	54.7
Barley yellow mosaic virus	Bymovirus	3302	46.7	52.8	41.6	45.6	55.9
Oat mosaic virus	Bymovirus	2656	46.7	51.3	39.5	49.2	55.1
Wheat yellow mosaic virus	Bymovirus	3310	48.7	52.5	41.9	51.6	54.5
Apple stem grooving virus	Capillovirus	2427	41.9	44.7	37.9	43.2	52.1
Cherry virus A	Capillovirus	2807	39.9	42.4	36.4	40.9	49.6
Aconitum latent virus	Carlavirus	2801	47.5	52.4	40.8	49.2	56.8
Blueberry scorch virus	Carlavirus	2830	48.3	52.3	40.9	51.9	56.9
Garlic latent virus	Carlavirus	2735	44.2	48.2	39.1	45.5	56.1
Hop latent virus	Carlavirus	2796	48.1	52.8	40.3	51.2	53.9
Potato virus M	Carlavirus	2787	49.0	53.1	40.7	53.3	55.6
Cardamine chlorotic fleck virus	Carmovirus	1293	50.8	54.1	44.2	54.1	60.0
Carnation mottle virus	Carmovirus	1260	48.7	50.6	42.1	53.4	57.6
Cowpea mottle virus	Carmovirus	1270	50.9	52.7	44.3	55.7	59.3
Galinsoga mosaic virus	Carmovirus	1200	47.9	51.3	44.2	48.4	60.5
Hibiscus chlorotic ringspot virus	Carmovirus	1232	48.7	53.9	43.4	48.9	57.2
Japanese iris necrotic ring virus	Carmovirus	1304	51.3	52.8	45.6	55.7	57.5
Melon necrotic spot virus	Carmovirus	1311	45.8	50.1	43.6	43.6	55.5

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Saguaro cactus virus	Carmovirus	1241	51.0	55.8	44.3	53.0	58.0
Turnip crinkle virus	Carmovirus	1286	51.4	53.0	43.6	57.5	57.8
Tobacco vein-clearing virus	Caulimoviridae	2054	27.2	35.8	27.6	18.1	33.9
Blueberry red ringspot virus	Caulimovirus	2466	30.8	39.7	30.0	22.6	37.7
Carnation etched ring virus	Caulimovirus	2270	36.2	43.2	33.4	32.1	48.3
Cauliflower mosaic virus	Caulimovirus	2406	39.9	45.1	33.6	40.9	50.7
Figwort mosaic virus	Caulimovirus	2342	35.5	43.6	32.5	30.3	47.3
Mirabilis mosaic virus	Caulimovirus	2391	38.1	44.6	33.3	36.5	49.8
Strawberry vein banding virus	Caulimovirus	2308	38.7	46.5	34.5	35.2	48.7
Cassava vein mosaic virus	Cavemovirus	2546	24.4	36.4	23.7	13.2	31.0
Little cherry virus-1	Closteroviridae	5484	35.5	40.7	32.7	33.1	48.8
Beet yellows virus	Closterovirus	5125	46.2	49.4	40.4	49.0	56.0
Citrus tristeza virus	Closterovirus	6258	45.5	48.5	41.6	46.4	54.5
Apple latent spherical virus	Comoviridae	3042	40.9	48.9	39.4	34.4	48.1
Bean pod mottle virus	Comovirus	2870	38.9	46.1	38.2	32.4	45.2
Cowpea mosaic virus	Comovirus	2914	42.7	49.0	39.8	39.3	50.4
Cowpea severe mosaic virus	Comovirus	2862	42.7	49.0	38.6	40.4	53.8
Red clover mottle virus	Comovirus	2862	42.3	48.3	39.7	38.9	50.5
Squash mosaic virus	Comovirus	2869	43.0	48.3	38.9	41.8	51.6
Lettuce infectious yellows virus	Crinivirus	4666	35.9	38.6	33.0	36.0	50.5
Cucumber mosaic virus	Cucumovirus	2462	46.3	51.1	42.5	45.2	56.0
Peanut stunt virus	Cucumovirus	2455	47.2	51.6	42.9	47.0	57.0
Tomato aspermy virus	Cucumovirus	2419	44.0	49.9	40.6	41.4	55.7
Beet curly top virus	Curtovirus	1229	41.0	43.9	37.7	41.6	54.3
Beet mild curly top virus	Curtovirus	1201	41.4	44.2	38.6	41.5	54.7
Beet severe curly top virus	Curtovirus	1333	40.4	44.3	36.2	40.6	54.4
Horseradish curly top virus	Curtovirus	1073	42.4	43.6	39.7	44.0	56.0
Northern cereal mosaic virus	Cytorhabdovirus	3974	42.6	45.2	38.7	44.1	53.3
Carnation ringspot virus	Dianthovirus	1419	47.9	49.8	42.4	51.4	58.7
Red clover necrotic mosaic virus	Dianthovirus	1425	46.4	49.3	42.3	47.7	58.5
Sweet clover necrotic mosaic virus	Dianthovirus	1166	48.7	50.1	42.7	53.3	59.1
Pea enation mosaic virus-1	Enamovirus	2159	51.0	53.3	47.5	52.3	57.8
Broad bean wilt virus 2	Fabavirus	2935	43.6	48.0	39.6	43.1	52.4
Nilaparvata lugens reovirus	Fijivirus	8927	34.8	42.1	35.2	27.2	46.5
Rice black streaked dwarf virus	Fijivirus	9122	33.9	40.9	32.3	28.5	44.9

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Apple stem pitting virus	Foveavirus	3015	43.9	49.2	39.9	42.8	52.0
Banana mild mosaic virus	Foveavirus	2420	37.7	44.1	32.6	36.3	49.1
Cherry green ring mottle virus	Foveavirus	2698	42.6	47.7	37.3	42.8	51.9
Cherry necrotic rusty mottle virus	Foveavirus	2714	41.0	46.2	37.6	39.3	50.0
Rupestris stem pitting-associated virus	Foveavirus	2842	43.2	47.6	39.1	42.9	52.7
Chinese wheat mosaic virus	Furovirus	3123	44.0	49.1	38.0	45.0	52.3
Oat golden stripe virus	Furovirus	3037	44.7	49.6	37.0	47.5	51.6
Soil-borne cereal mosaic virus	Furovirus	3065	43.8	48.7	37.6	44.9	51.6
Soil-borne wheat mosaic virus	Furovirus	3187	44.1	49.6	38.4	44.3	50.7
Sorghum chlorotic spot virus	Furovirus	2997	45.0	49.6	37.6	47.8	52.8
Barley stripe mosaic virus	Hordeivirus	3082	43.2	49.4	39.3	40.8	54.3
Raspberry bushy dwarf virus	Idaeovirus	2329	43.6	47.4	39.1	44.3	54.2
American plum line pattern virus	Ilarvirus	2312	44.6	49.7	39.7	44.5	55.0
Apple mosaic virus	Ilarvirus	2433	44.4	47.6	38.1	47.6	54.7
Citrus leaf rugose virus	Ilarvirus	2388	43.8	48.5	40.8	42.1	53.2
Elm mottle virus	Ilarvirus	2344	44.5	49.9	39.3	44.3	53.3
Prune dwarf virus	Ilarvirus	2358	40.9	47.3	37.2	38.1	49.7
Prunus necrotic ringspot virus	Ilarvirus	2355	44.4	48.9	39.1	45.3	53.0
Spinach latent virus	Ilarvirus	2553	43.0	48.7	39.5	40.8	52.5
Tobacco streak virus	Ilarvirus	2630	43.5	49.5	39.0	41.9	55.4
Tulare apple mosaic virus	Ilarvirus	2576	44.6	50.1	41.2	42.6	54.2
Sweet potato mild mottle virus	Ipomovirus	3457	43.0	50.5	36.9	41.6	54.4
Arabidopsis mosaic virus large satellite RNA	Large satellite RNAs	361	54.2	57.1	54.0	51.5	61.0
Bamboo mosaic virus satellite RNA	Large satellite RNAs	184	53.6	53.3	51.6	56.0	61.0
Blackcurrant reversion virus satellite RNA	Large satellite RNAs	403	56.8	58.1	56.6	55.8	61.0
Chicory yellow mottle virus large satellite RNA	Large satellite RNAs	363	52.7	54.8	49.9	53.4	61.0
Grapevine fanleaf virus satellite RNA	Large satellite RNAs	342	55.7	57.6	52.9	56.4	56.3
Strawberry latent ringspot virus satellite RNA	Large satellite RNAs	332	52.2	52.1	51.5	53.0	59.9
Tomato black ring virus satellite RNA	Large satellite RNAs	420	46.8	53.1	42.1	45.2	60.4
Bean leafroll virus	Luteoviridae	1768	45.8	50.2	41.6	45.6	58.4
Soybean dwarf virus	Luteoviridae	1811	45.3	50.1	41.1	44.7	58.3
Sugarcane yellow leaf virus	Luteoviridae	2300	50.3	53.4	45.3	52.2	58.6
Barley yellow dwarf virus-MAV	Luteovirus	1730	48.0	50.8	41.3	51.9	57.8
Barley yellow dwarf virus-PAS	Luteovirus	1719	48.1	51.1	41.7	51.6	56.8
Barley yellow dwarf virus-PAV	Luteovirus	1799	48.3	50.9	42.2	51.9	58.4

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Maize chlorotic mottle virus	Machlomovirus	1773	50.3	55.2	46.1	49.5	57.7
Grapevine fleck virus	Maculavirus	2649	67.1	63.6	55.9	81.8	30.8
Maize rayado fino virus	Marafivirus	2028	62.4	64.8	50.4	71.9	41.0
Oat blue dwarf virus	Marafivirus	2067	63.1	63.2	50.9	75.2	35.5
Poinsettia mosaic virus	Marafivirus	1988	56.2	55.3	45.9	67.5	48.7
Bean yellow dwarf virus	Mastrevirus	770	45.5	46.2	44.8	45.6	55.2
Chloris striate mosaic virus	Mastrevirus	625	55.1	53.6	51.8	59.8	56.4
Digitaria streak virus	Mastrevirus	771	49.6	51.0	45.7	52.1	59.4
Maize streak virus	Mastrevirus	769	48.9	49.8	44.0	53.1	58.0
Miscanthus streak virus	Mastrevirus	696	51.6	53.2	44.0	57.6	54.5
Panicum streak virus	Mastrevirus	818	53.5	51.8	47.1	61.6	53.9
Sugarcane streak Egypt virus	Mastrevirus	767	52.6	52.3	46.8	58.7	57.3
Sugarcane streak Reunion virus	Mastrevirus	816	52.3	52.7	48.7	55.4	58.4
Sugarcane streak virus	Mastrevirus	822	51.3	50.1	49.6	54.1	56.7
Tobacco yellow dwarf virus	Mastrevirus	792	44.7	48.4	43.4	42.4	55.8
Wheat dwarf virus	Mastrevirus	759	48.5	49.9	43.1	52.6	58.5
Faba bean necrotic yellows virus	Nanovirus	2029	38.5	45.2	36.3	34.1	46.7
Milk vetch dwarf virus	Nanovirus	2308	39.4	46.1	35.7	36.4	49.6
Subterranean clover stunt virus	Nanovirus	1603	39.4	46.2	36.1	35.8	45.9
Leek white stripe virus	Necrovirus	1138	44.9	49.0	41.1	44.6	54.7
Olive latent virus 1	Necrovirus	1127	47.6	50.8	41.0	50.9	59.7
Tobacco necrosis virus A	Necrovirus	1192	49.0	52.2	42.0	52.9	59.0
Tobacco necrosis virus D	Necrovirus	1192	47.1	50.8	42.4	48.2	56.5
Beet ringspot virus	Nepovirus	3625	45.6	53.9	40.5	42.5	53.9
Blackcurrant reversion virus	Nepovirus	3722	46.7	54.5	44.4	41.3	54.2
Cycas necrotic stunt virus	Nepovirus	3585	45.3	53.1	40.5	42.2	53.1
Grapevine chrome mosaic virus	Nepovirus	3578	46.2	53.4	41.6	43.5	54.3
Grapevine fanleaf virus	Nepovirus	3395	46.6	52.6	43.0	44.0	54.2
Satsuma dwarf virus	Nepovirus	3657	48.2	53.8	44.8	46.0	56.1
Tomato black ring virus	Nepovirus	3611	45.3	53.5	40.5	41.8	52.9
Tomato ringspot virus	Nepovirus	4081	48.3	55.1	44.2	45.5	51.8
Rice yellow stunt virus	Nucleorhabdovirus	4135	44.0	46.1	39.0	46.8	52.4
Sonchus yellow net virus	Nucleorhabdovirus	4184	41.8	43.5	38.0	43.8	51.8
Olive latent virus 2	Oleavirus	2218	48.9	54.6	41.8	50.2	56.5
Mirafiori lettuce virus	Ophiovirus	3908	34.9	39.9	31.9	32.8	46.5

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Rice ragged stunt virus	Oryzavirus	9029	44.4	49.3	41.1	42.9	56.1
Panicum mosaic virus	Panicovirus	1503	50.4	53.6	43.3	54.4	57.6
Indian peanut clump virus	Pecluvirus	3027	43.2	48.2	37.3	44.0	50.7
Peanut clump virus	Pecluvirus	3098	42.7	48.9	37.0	42.2	52.2
Petunia vein clearing virus	Petuvirus	2180	38.6	45.1	37.1	33.5	45.8
Rice dwarf virus	Phytoreovirus	7760	43.6	47.9	39.1	43.9	57.4
Beet chlorosis virus	Polerovirus	2174	47.3	50.2	43.5	48.3	59.2
Beet mild yellowing virus	Polerovirus	2370	48.9	51.1	46.0	49.5	59.5
Beet western yellows virus	Polerovirus	2348	51.2	53.5	46.5	53.7	59.2
Cereal yellow dwarf virus-RPS	Polerovirus	2089	52.2	54.5	47.3	54.7	57.6
Cereal yellow dwarf virus-RPV	Polerovirus	2304	51.3	53.4	48.4	52.2	58.3
Cucurbit aphid-borne yellows virus	Polerovirus	2341	50.8	53.4	46.6	52.4	59.0
Potato leafroll virus	Polerovirus	2380	50.3	52.9	46.4	51.7	58.7
Turnip yellows virus	Polerovirus	2292	49.5	52.0	45.4	51.1	58.5
Beet soil-borne virus	Pomovirus	3447	41.2	48.0	37.1	38.5	51.7
Beet virus Q	Pomovirus	3341	42.3	49.2	39.0	38.6	53.0
Broad bean necrosis virus	Pomovirus	3732	38.6	44.4	35.6	35.8	45.8
Potato mop-top virus	Pomovirus	3483	43.0	48.3	38.7	41.9	51.0
Bamboo mosaic virus	Potexvirus	2036	51.0	53.7	42.4	57.0	53.0
Cactus virus X	Potexvirus	2175	51.4	53.3	41.2	59.6	53.0
Cassava common mosaic virus	Potexvirus	2123	47.3	52.2	41.2	48.4	54.1
Clover yellow mosaic virus	Potexvirus	2298	49.7	52.6	39.8	56.7	49.0
Cymbidium mosaic virus	Potexvirus	2077	49.0	54.4	41.4	51.3	55.3
Foxtail mosaic virus	Potexvirus	1948	52.7	55.6	41.4	61.2	53.9
Narcissus mosaic virus	Potexvirus	2351	47.9	51.0	41.4	51.4	57.4
Papaya mosaic virus	Potexvirus	2179	48.2	51.8	39.4	53.5	53.2
Pepino mosaic virus	Potexvirus	2122	41.5	48.3	38.6	37.6	50.8
Plantago asiatica mosaic virus	Potexvirus	2058	59.3	58.6	45.7	73.6	39.5
Potato aucuba mosaic virus	Potexvirus	2316	43.8	50.1	37.7	43.6	55.0
Potato virus X	Potexvirus	2109	47.0	50.7	40.7	49.5	55.2
Scallion virus X	Potexvirus	2315	53.3	56.0	42.9	61.1	51.7
Strawberry mild yellow edge virus	Potexvirus	1996	51.3	55.2	42.6	56.0	56.3
Tulip virus X	Potexvirus	2004	57.6	57.8	45.0	70.0	43.5
White clover mosaic virus	Potexvirus	1907	44.1	49.4	38.3	44.6	50.8
Bean common mosaic necrosis virus	Potyvirus	3067	42.2	49.0	35.3	42.4	52.9

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Bean common mosaic virus	Potyvirus	3203	42.4	48.0	36.8	42.4	49.9
Bean yellow mosaic virus	Potyvirus	3057	41.6	46.6	35.8	42.3	51.8
Chilli veinal mottle virus	Potyvirus	3089	42.2	50.2	37.3	39.1	52.3
Clover yellow vein virus	Potyvirus	3073	41.4	46.2	36.1	41.8	48.8
Cocksfoot streak virus	Potyvirus	3090	45.2	52.2	38.0	45.3	57.0
Cowpea aphid-borne mosaic virus	Potyvirus	3054	42.0	49.0	35.5	41.3	51.1
Dasheen mosaic virus	Potyvirus	3192	43.1	49.5	37.6	42.2	55.1
Japanese yam mosaic virus	Potyvirus	3133	41.3	49.5	36.4	38.1	51.2
Johnsongrass mosaic virus	Potyvirus	3053	41.9	49.1	35.5	41.1	50.7
Leek yellow stripe virus	Potyvirus	3153	42.6	48.9	36.7	42.2	54.6
Lettuce mosaic virus	Potyvirus	3256	45.1	50.1	38.2	47.0	55.3
Maize dwarf mosaic virus	Potyvirus	3042	40.5	49.1	36.2	36.4	51.1
Papaya ringspot virus	Potyvirus	3345	41.8	49.0	35.9	40.6	54.1
Pea seed-borne mosaic virus	Potyvirus	3207	42.2	47.8	37.8	41.0	50.7
Peanut mottle virus	Potyvirus	3099	42.2	49.7	36.6	40.3	51.7
Pepper mottle virus	Potyvirus	3069	41.7	46.9	38.3	39.9	53.1
Plum pox virus	Potyvirus	3126	43.7	50.4	37.4	43.4	53.7
Potato virus A	Potyvirus	3060	43.0	48.6	37.1	43.3	51.9
Potato virus V	Potyvirus	3067	43.3	49.0	38.0	43.0	53.5
Potato virus Y	Potyvirus	3062	42.6	48.2	37.0	42.6	53.9
Scallion mosaic virus	Potyvirus	3002	42.5	49.6	36.8	41.2	53.8
Sorghum mosaic virus	Potyvirus	3072	39.1	47.6	35.9	33.9	49.1
Soybean mosaic virus	Potyvirus	3067	42.2	48.5	36.1	42.0	51.5
Sugarcane mosaic virus	Potyvirus	3064	41.6	48.6	37.2	39.2	51.6
Sweet potato feathery mottle virus	Potyvirus	3494	42.3	50.1	38.5	38.4	52.8
Tobacco etch virus	Potyvirus	3055	43.6	48.7	36.8	45.2	53.5
Tobacco vein mottling virus	Potyvirus	3024	42.5	48.9	37.2	41.3	52.9
Turnip mosaic virus	Potyvirus	3165	46.0	50.4	38.0	49.6	54.3
Wild potato mosaic virus	Potyvirus	3066	42.6	48.0	37.5	42.3	53.4
Yam mosaic virus	Potyvirus	3104	41.0	47.9	37.2	37.9	50.7
Zucchini yellow mosaic virus	Potyvirus	3081	43.4	49.4	36.5	44.2	55.9
Ryegrass mosaic virus	Rymovirus	3087	46.2	51.5	41.0	46.0	56.0
Ageratum yellow vein virus satellite DNA beta	Satellite DNAs	119	34.3	40.3	24.4	37.8	42.1
Ageratum yellow vein virus satellite DNA rep	Satellite DNAs	296	41.9	52.4	36.5	36.8	50.0
Cotton leaf curl virus satellite DNA beta	Satellite DNAs	119	40.9	43.7	23.5	55.5	50.1

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Cotton leaf curl virus satellite DNA rep	Satellite DNAs	316	45.2	53.5	39.6	42.4	53.9
Okra leaf curl virus satellite DNA beta	Satellite DNAs	118	40.4	42.4	25.4	53.4	46.9
Parsnip yellow fleck virus	Sequivirus	3028	43.7	47.3	40.9	43.0	51.3
Cocksfoot mottle virus	Sobemovirus	1437	54.4	53.9	51.1	58.1	58.5
Lucerne transient streak virus	Sobemovirus	1553	50.2	52.2	46.7	51.6	58.9
Rice yellow mottle virus	Sobemovirus	1524	55.6	57.0	49.0	60.8	57.0
Ryegrass mottle virus	Sobemovirus	1496	53.8	55.4	49.7	56.4	59.6
Sesbania mosaic virus	Sobemovirus	1538	51.0	52.1	48.1	52.7	56.4
Southern bean mosaic virus	Sobemovirus	1512	50.6	52.3	46.9	52.8	58.8
Southern cowpea mosaic virus	Sobemovirus	1586	52.1	53.6	47.5	55.3	58.7
Subterranean clover mottle virus	Sobemovirus	1401	48.3	52.3	44.1	48.4	57.3
Peanut chlorotic streak virus	Soymovirus	2565	34.2	42.9	31.6	28.2	42.2
Soybean chlorotic mottle virus	Soymovirus	2647	33.5	42.3	30.4	27.8	44.5
Rice grassy stunt virus	Tenuivirus	6302	37.1	42.3	33.4	35.5	46.3
Rice stripe virus	Tenuivirus	4956	39.9	44.3	34.6	40.8	48.9
Maize white line mosaic satellite virus	TNsatV-like satellite viruses	219	52.2	54.8	42.9	58.9	54.3
Panicum mosaic satellite virus	TNsatV-like satellite viruses	158	57.8	53.8	53.8	65.8	52.9
Tobacco mosaic satellite virus	TNsatV-like satellite viruses	160	45.6	45.0	49.4	42.5	60.8
Tobacco necrosis satellite virus	TNsatV-like satellite viruses	197	45.4	47.2	41.6	47.2	56.0
Crucifer tobamovirus	Tobamovirus	2024	43.7	48.1	36.6	46.5	54.2
Cucumber fruit mottle mosaic virus	Tobamovirus	2089	43.6	48.7	39.2	42.8	48.9
Cucumber green mottle mosaic virus	Tobamovirus	2076	43.1	47.3	38.2	44.0	51.7
Kyuri green mottle mosaic virus	Tobamovirus	2096	45.4	47.5	39.5	49.3	54.0
Obuda pepper virus	Tobamovirus	2054	41.5	46.0	36.1	42.6	53.0
Odontoglossum ringspot virus	Tobamovirus	2060	39.5	47.0	35.9	35.7	51.6
Paprika mild mottle virus	Tobamovirus	2049	41.2	45.7	36.9	40.9	53.2
Pepper mild mottle virus	Tobamovirus	2029	42.4	47.1	36.2	43.8	54.6
Ribgrass mosaic virus	Tobamovirus	2021	44.7	48.7	36.7	48.6	54.0
Tobacco mild green mosaic virus	Tobamovirus	2027	41.1	46.7	35.4	41.1	52.1
Tobacco mosaic virus	Tobamovirus	2046	43.3	47.3	37.0	45.7	55.4
Tomato mosaic virus	Tobamovirus	2042	41.7	47.8	36.1	41.3	54.0
Turnip vein-clearing virus	Tobamovirus	2028	44.3	48.3	36.0	48.6	53.7
Zucchini green mottle mosaic virus	Tobamovirus	2095	44.0	48.1	39.5	44.5	51.4
Pea early-browning virus	Tobravirus	2816	41.3	46.0	36.1	41.9	50.4
Pepper ringspot virus	Tobravirus	2289	42.8	47.3	36.7	44.4	51.7

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Tobacco rattle virus	Tobravirus	2956	42.9	48.4	37.1	43.0	51.6
Artichoke mottled crinkle virus	Tombusvirus	1571	48.3	52.7	43.7	48.6	57.3
Carnation Italian ringspot virus	Tombusvirus	1602	47.8	52.3	44.0	47.3	57.9
Cucumber necrosis virus	Tombusvirus	1565	48.8	52.8	43.5	50.0	58.6
Cymbidium ringspot virus	Tombusvirus	1563	49.8	53.2	44.5	51.8	58.5
Pear redleaf-associated virus	Tombusvirus	1573	48.5	53.7	43.9	47.9	58.4
Tomato bushy stunt virus	Tombusvirus	1571	47.9	53.1	43.5	47.0	58.0
Tomato pseudo-curly top virus	Topocuvirus	1071	42.9	45.4	41.9	41.5	58.5
Groundnut bud necrosis virus	Tospovirus	5025	35.0	38.8	32.4	33.9	46.1
Impatiens necrotic spot virus	Tospovirus	4958	34.3	38.2	33.6	31.1	43.8
Tomato spotted wilt virus	Tospovirus	5039	35.3	39.3	33.3	33.2	46.3
Watermelon silver mottle virus	Tospovirus	5030	35.3	38.6	32.4	34.9	46.6
Apple chlorotic leaf spot virus	Trichovirus	2540	42.2	45.6	36.7	44.3	50.9
Cherry mottle leaf virus	Trichovirus	2641	41.4	44.2	37.8	42.3	51.4
Brome streak mosaic virus	Tritimovirus	3094	46.6	53.2	38.1	48.5	55.7
Wheat streak mosaic virus	Tritimovirus	3036	44.6	50.7	37.9	45.4	53.6
Rice tungro bacilliform virus	Tungrovirus	2377	32.9	42.5	31.6	24.6	40.6
Chayote mosaic virus	Tymovirus	2709	57.3	59.4	50.5	62.1	44.4
Eggplant mosaic virus	Tymovirus	2679	54.4	56.9	49.2	57.1	47.5
Erysimum latent virus	Tymovirus	2393	51.1	55.1	47.2	50.9	49.8
Kennedya yellow mosaic virus	Tymovirus	2818	55.1	58.1	48.8	58.3	45.7
Ononis yellow mosaic virus	Tymovirus	2568	50.9	54.2	47.2	51.3	47.5
Physalis mottle virus	Tymovirus	2789	53.9	55.9	48.5	57.2	44.7
Turnip yellow mosaic virus	Tymovirus	2652	57.0	59.2	49.7	62.1	46.1
Carrot mottle mimic virus	Umbravirus	1438	53.2	58.1	48.0	53.4	58.8
Groundnut rosette virus	Umbravirus	1364	55.6	59.4	47.9	59.5	56.6
Pea enation mosaic virus-2	Umbravirus	1373	55.8	58.5	47.6	61.4	56.7
Beet western yellows ST9 associated virus	Unassigned virus	759	49.5	51.8	45.5	51.1	59.1
Carrot red leaf associated virus	Unassigned virus	798	49.8	50.0	44.6	54.9	56.8
Citrus leaf blotch virus	Unassigned virus	2690	40.0	46.0	34.9	39.2	50.9
Indian citrus ringspot virus	Unassigned virus	2605	52.3	55.2	43.9	57.7	52.1
Strawberry mottle virus	Unassigned virus	3369	45.6	50.6	39.9	46.3	55.0
Sugarcane striate mosaic associated virus	Unassigned virus	2545	39.6	44.9	36.0	37.9	50.9
Grapevine virus A	Vitivirus	2453	49.2	51.7	37.6	58.3	53.0
Grapevine virus B	Vitivirus	2533	46.8	49.8	38.1	52.6	54.6

Virus	Genus	Codons	%GC	%GC1	%GC2	%GC3	ENC
Maize chlorotic dwarf virus	Waikavirus	3444	41.8	47.6	38.1	39.8	52.3
Rice tungro spherical virus	Waikavirus	3474	45.9	50.7	40.3	46.8	54.4