Supplemental Table S1: Accession numbers used for phylogenetic analysis

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| **Virus name** | **Abbreviation** | **Genbank Accession numbers** |
| fig mosaic virus | FMV | RdRP: QBH72679; GPP: CAR95645; NC: AEI98678; MP: CAX32469 |
| rose rosette virus | RRV | RdRP: ADZ54688; GPP: ADZ54689; NC: ADZ54690; MP: ADZ54691 |
| pigeonpea sterility mosaic virus 1  | PPSMV-1 | RdRP: CUR49050; GPP: CUR49051; NC: CUR49052; MP: CUR49053 |
| pigeonpea sterility mosaic virus 2 | PPSMV-2 | RdRP: CCV01186; GPP: CCV01187; NC: CDX09883; MP: CCV01189 |
| blackberry leaf mottle associated virus | BLMaV | RdRP: AQX45473; GPP: AQX45474; NC: AQX45475; MP: AQX45476 |
| Pistacia virus B | PiVB | RdRP: QAR18002; GPP: QAR18003; NC: QAR18004; MP: QAR18005 |
| Actinidia chlorotic virus 2 | AcV-2 | RdRP: QEE82886; GPP: QEE82887; NC: QEE82888; MP: QEE82889 |
| aspen mosaic-associated virus | AsMaV | RdRP: CAA0079389; GPP: CAA0079597; NC: CAA0079646; MP: CAA0079685 |
| maple mottle-associated virus | MaMaV | RdRP: QOI17315; GPP: QOI17316; NC: QOI17317; MP: QOI17318 |
| Vitis emaravirus | VEV | RdRP: BCS90314; GPP: BCS90315; NC: BCS90316; MP: BCS90323 |
| grapevine emaravirus | GEVA | RdRP: QVW29591; GPP: QVW29592; NC: QVW29593; MP: QVW29594 |
| ash shoestring-associated virus | ASaV | RdRP: OU466880; GPP: OU466881; NC: OU466882; MP: OU466883 |
| pea associated emaravirus | PaEV | NC: QJX15717 |
| Pueraria lobata-associated emaravirus | PloAEV | RdRP: UQV97405; GPP: UQV97406; NC: UQV97407; MP: UQV97408 |
| European mountain ash ringspot-associated virus | EMARaV | RdRP: AAS73287; GPP: AAS73288; NC: ACJ68824; P5 MP: VFU05382 |
| Actinidia chlorotic ringspot-associated virus | AcCRaV | RdRP: ALX00127; GPP: ALX00128; NC: ALX00129; MP: ALX00130 |
| redbud yellow ringspot-associated virus | RYRaV | RdRP: AEO95760; GPP: AEO95761; NC: AEO95762; MP: AEO95763 |
| lilac chlorotic ringspot-associated virus | LiCRaV | RdRP: QIN85945; GPP: QIN85946; NC: QIN85947; MP: QIN85948 |
| High Plains wheat mosaic virus | HPWMoV | RdRP: AIK23031; GPP: AIK23032; NC P3a: AIK23033; NC P3b: AIK23034; MP: AIK23035 |
| raspberry leaf blotch virus | RLBV | RdRP: CBZ42024; GPP: CBZ42025; NC: CBZ42026; MP: CBZ42027 |
| palo verde broom virus | PVBV | RdRP: AWH90163; GPP: AWH90168; NC: AWH90173; MP: AWH90182 |
| jujube yellow mottle-associated virus | JYMaV | RdRP: QDM38999; GPP: QDM39000; NC: QDM39001; MP: QDM39002 |
| ti ringspot-associated virus | TiRSaV | RdRP: QAB47307; GPP: QAB47308; NC: QAB47309; MP: QAB47310 |
| common oak ringspot-associated virus | CORaV | RdRP: CAD0281685; GPP: CAD0281686; NC: CAD0281687; MP: CAD0281688 |
| alfalfa ringspot-associated virus | ARaV | NC: QGX86471 |
| Arceuthobium sichuanense virus 1 | ArSaV1 | RdRP: DAZ87272; GPP: DAZ87273; NC: DAZ87274; MP: DAZ87275 |
| Camellia japonica-associated virus 1 | CjaV-1 | RdRP: QGX73503; GPP: QGX73504; NC: QGX73505; MP: QGX73506  |
| Camellia japonica-associated virus 2 | CjaV-2 | RdRP: QGX73507; GPP: QGX73508; NC: QGX73509; MP: QGX73510 |
| Camellia chlorotic ringspot virus 1 | CaCRSV-1 | RdRP: QID58973; GPP: QID58975; NC: QID58977; MP: QID58979 |
| Camellia chlorotic ringspot virus 2 | CaCRSV-2 | RdRP: QID58974; GPP: QID58976; NC: QID58978; MP: QID58980 |
| pear chlorotic leaf spot-associated virus | PCLSaV | RdRP: QEE82892; GPP: QEE82893; NC: QEE82894; MP: QEE82895 |
| Chrysanthemum mosaic-associated virus | ChMaV | RdRP: BCK60941; GPP: BCK60942; NC P3a: BCK60943; NC P3b: BCK60944; MP: BCK60945 |
| Perilla mosaic virus | PerMV | RdRP: BBM96177; GPP: BBM96178; NC P3a: BBM96179; NC P3b: BBM96180; MP: BBM96181 |
| Karaka Okahu purepure virus | KOPV | RdRP: QZN83753; GPP: QZN83754; NC: QZN83755; MP: QZN83756 |
| Japanese star anise ringspot-associated virus | JSARaV | RdRP: BCO17108; GPP: BCO17109; NC: BCO17110; MP: BCO17111 |
| Artemisia fimovirus 1 | ArtV1 | RdRP: USL90372; GPP: USL90373; NC: USL90374; MP: USL90375 |
| rice grassy stunt virus | RGSV | RdRP: BAA89602; GPP: AIK24705; NC: AAK85272; MP: AIK24724 |
| tomato spotted wilt virus | TSWV | RdRP: NP\_049362 |
| impatiens necrotic spot virus | INSV | RdRP: AWK77935 |
| tomato chlorotic spot virus | TCSV | RdRP: ASJ77182 |
| zucchini lethal chlorosis virus | ZLCV | RdRP: AOZ65576 |

Table S2: Accession numbers of emaraviral proteins containing the CTR region

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| **Virus name and protein name** | **Abbreviation** | **Genbank Accession number** |
| fig mosaic virus P5 | FMV | CCH27326.2 |
| rose rosette virus P7 | RRV | AJW66847.1 |
| Pistacia virus B P5A | PiVB | QAR18006.1 |
| Pistacia virus B P5B  | PiVB | QAR18007.1 |
| Pistacia virus B P7 | PiVB | QAR18009.1 |
| rose rosette virus P5 | RRV | AJW66844.1 |
| maple mottle-associated virus P5 | MaMaV | QOI17319.1 |
| pigeonpea sterility mosaic virus 2 P5 | PPSMV-2 | CCW28369.2 |
| Actinidia virus 2 P5 | AcV-2 | QEE82890.1 |
| Chrysanthemum mosaic-associated virus P6 | ChMaV | BCK60947.1 |
| High Plains wheat mosaic virus P6 | HPWMoV | YP\_009237260.1 |
| High Plains wheat mosaic virus Cophil P6 | HPWMoV | QQO58781.1 |
| raspberry leaf blotch virus P5 | RLBV | CBZ42028.1 |
| High Plains wheat mosaic virus P5 | HPWMoV | YP\_009237259.1 |
| High Plains wheat mosaic virus Cophil P5 | HPWMoV | QQO58783.1 |

Table S3: Accession numbers of viral proteins containing the Glu2-Pro domain

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| **Family,** **genus** | **Virus name** | **Protein name** | **Abbreviation** | **Genbank Accession number** |
| *Fimoviridae*,emaravirus | High Plains wheat mosaic virus | P7 | HPWMoV | YP\_009237261.1 |
| High Plains wheat mosaic virus CoPhil  | P7 | HPWMoV | QQO58779.1 |
| Perilla mosaic virus | P5 | PerMV | BBM96182.1 |
| pear chlorotic leaf spot virus  | P5 | PCLSaV | QEE82896.1 |
| Camellia japonica-associated virus 1  | P8 | CjaV-1 | QHG11080.1 |
| Camellia japonica-associated virus 1  | P7 | CjaV-1 | QHG11079.1 |
| Chrysanthemum mosaic-associated virus  | P5 | ChMaV | BCK60946.1 |
| *Phenuiviridae*,tenuivirus | rice grassy stunt virus | P1 | RGSV | AIK24670.1 |
| *Secoviridae*, sadwavirus | strawberry mottle virus  | Polyprotein 2 | SMoV | AWK49425.1 |
| *Closteroviridae*,crinivirus | potato yellow vein virus | Minor coat protein CPm | PYVV | AMR69011.1 |
| *Closteroviridae*,crinivirus | cucurbit yellow stunting disorder virus | p22 | CYSDV | ABQ41110.1 |
| *Closteroviridae*,crinivirus | beet pseudoyellows virus | Minor coat protein CPm | BPYV | NP\_940793.1 |
| *Closteroviridae*,crinivirus | sweet potato chlorotic stunt virus | Minor coat protein CPm | SPCSV | NP\_689405.1 |
| *Closteroviridae*,ampelovirus | little cherry virus 2 | p55 | LChV-2 | ATB18129.1 |
| *Closteroviridae*,ampelovirus | grapevine leafroll-associated virus 1 | Coat protein duplicate 2 | GLRaV-1 | AXL94962.1 |
| *Closteroviridae*,velarivirus | Cordyline virus 1 | Minor coat protein CPm | CV1 | YP\_009506350.1 |
| *Closteroviridae*,velarivirus | Malus domestica virus A | Minor coat protein CPm | MdoV1 | QGA73181.1 |

Table S4: Accession numbers of orphan sequences

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| **Name** | **Genbank Accession numbers** |
| Yunnan emara-like virus | MW896848- MW896854 |
| Illicium anisatum ringspot-associated virus | LC578480 |