



An annotated list of viruses infecting or associated with passion fruit (*Passiflora* spp.)

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Abstract: Plants belonging to the genus *Passiflora* (family Passifloraceae) are found in tropical regions and are cultivated worldwide. Among them, the yellow passion fruit (*P. edulis* f. *flavicarpa* Deg.) is the most economically important species. This fruit is widely consumed fresh and is used in the juice industry. Additionally, it is employed as a natural ingredient in cosmetic and medicinal products. The yellow passion fruit is also grown as an ornamental plant in gardens and landscaping. One of the primary challenges in passion fruit cultivation is the occurrence of viral diseases, which can decrease both fruit production and quality, posing an ongoing threat to growers. Efficient strategies for managing and controlling viruses in these crops, particularly those that focus on developing resistant genotypes, rely on an extensive understanding of the viral diversity affecting the crop. In recent years, advances in technology and the development of new tools for virus detection and identification have led to a significant increase in the number of viruses reported to infect or be associated with *Passiflora* species and passion fruit hybrids. This review catalogs the known diversity of DNA and RNA viruses affecting the passion fruit crop. To date, this diversity includes 74 species (accepted and proposed) across 17 families and 25 genera of viruses.

Keywords: Viral disease; Geographical distribution; *Passiflora* species.

Lista comentada de vírus infectando ou associado ao maracujazeiro (*Passiflora* spp.)

Resumo: Plantas pertencentes ao gênero *Passiflora* (família Passifloraceae) são encontradas em regiões tropicais e cultivadas em todo o mundo. Entre elas, o maracujá-amarelo (*P. edulis* f. *flavicarpa* Deg.) é a espécie de maior importância econômica. Este fruto é amplamente consumido fresco e utilizado na indústria de sucos. Além disso, é empregado como ingrediente natural em produtos cosméticos e medicinais. O maracujá-amarelo também é cultivado como planta ornamental em jardins e paisagismo. Um dos principais desafios no cultivo do maracujá é a ocorrência de doenças virais, que podem diminuir tanto a produção quanto a qualidade dos frutos, representando uma ameaça constante aos produtores. Estratégias eficientes para o manejo e controle de vírus nessas culturas, particularmente aquelas que se concentram no desenvolvimento de genótipos resistentes, dependem de um amplo conhecimento da diversidade viral que afeta a cultura. Nos últimos anos, os avanços tecnológicos e o desenvolvimento de novas ferramentas para detecção e identificação de vírus levaram a um aumento significativo no número de vírus relatados como infectantes ou associados a espécies de *Passiflora* e híbridos de maracujá. Esta revisão cataloga a diversidade conhecida de vírus de DNA e RNA que afetam a cultura do maracujá. Até o momento, essa diversidade inclui 74 espécies (aceitas e propostas) distribuídas em 17 famílias e 25 gêneros de vírus.

Palavras-chave: Doença viral; Distribuição geográfica; Espécies de *passifloras*.

Introduction

Passion fruit is a tropical plant belonging to the genus *Passiflora* (family Passifloraceae) cultivated in tropical and subtropical regions (Wijeratnam 2016). Most *Passiflora* species originated in South America, including Brazil, Colombia Peru, Ecuador, Bolivia, and Paraguay. The name of passion fruit in Portuguese is “maracuja” and has its origins in the Tupi-Guarani indigenous language and means

“food in the form of a gourd” (Faleiro et al. 2016). The passion fruit, also referred to as passionflower, reflects the symbolism associated with its flower structures and the “Passion of Christ”: the three pistils represent the Holy Trinity, the three stylets symbolize the nails used in the crucifixion, the five anthers represent the wounds of Christ, and the filaments of the corona represent the crown of thorns (Souza & Meletti 1997, Faleiro et al. 2016). Passion fruit has various applications and

is widely used in food production, particularly for juices, as well as in cosmetics, herbal medicines, and ornamental purposes (Castillo et al. 2020, Cerqueira-Silva et al. 2014a).

Global passion fruit production is estimated at approximately 1.5 million tons, with Brazil accounting for around 90% of the total output (Asande et al. 2023). In this scenario, yellow passion fruit (*P. edulis* Sims. f. *flavicarpa* Deg.) is by far the most economically significant type. Other types and species, such as *P. edulis* f. *edulis*. Sims, *P. alata* Curtis, *P. setacea* DC., and *P. cincinnata* Mast. are cultivated commercially on a smaller scale (Junghans & Junghans, 2022).

Many pathogens affect passion fruit, causing significant losses in yield worldwide. Viruses are particularly concerning among these pathogens, as they affect plant development, production, and fruit quality (Ocampo et al. 2021). This review highlights the considerable diversity of viruses that infect the passion fruit crop, presenting a major challenge for the control and prevention of *Passiflora* virus diseases.

Material and Methods

In this article, database searches were carried out to identify publications that address viruses affecting passion fruit plants (*Passiflora* spp.). The search was performed in several databases including Google Scholar (<https://scholar.google.com/>), Scientific Electronic Library Online- SciELO (<https://www.scielo.br/>), PubMed (<https://pubmed.ncbi.nlm.nih.gov/>), ScienceDirect (<https://www.sciencedirect.com/>) and Portal de Periódicos da CAPES (<https://www-periodicos-capes-gov-br>). We used the keywords “Passion fruit and virus” and “*Passiflora* and virus”.

The identified viruses were organized by genome type and taxonomy following the latest binomial nomenclature of species, according to the International Committee on Taxonomy of Viruses- ICTV (Zerbini et al. 2025). The taxonomic status of the listed viruses is based on the most recent ICTV Master species list (ICTV_Master_Species_List_2024_MSL40.v1 and ICTV_Master_Species_List_2024_MSL40.v2), which is available on the ICTV website (<https://ictv.global/msl>).

All viruses known to infect passion fruit are listed below, accompanied by a discussion that includes information about the *Passiflora* host, geographical location, and, when possible, symptoms, insect vectors, and other modes of transmission. Additionally, in the supplementary files, two lists are provided: one detailing virus described as infecting *Passiflora* spp. in nature along with their countries of occurrence (Table S1), and another listing *Passiflora* species that have been found to be infected naturally by viruses, also including their respective countries (Table S2).

Results and Discussion

1. Viruses in *Passiflora*

An updated account for Passifloraceae-infecting viruses lists 74 accepted or proposed virus species distributed in 25 genera belonging to 17 families (Figure 1). The cucumber mosaic virus (CMV) was the first virus registered in *Passiflora* species (Magee 1948), followed by the passion fruit woodiness virus (PWV) (McKnight 1953), both identified in Australia. Since then, a diverse array of viruses has been reported in passion fruit around the world (Table S1,

Supplementary Material; Figure 1), mainly in Brazil and China, which lead with 22 virus occurrences each (Figure 2). All passion fruit viruses have been detected in various *Passiflora* species (Table S2, Supplementary Material), with a notable rise in reported cases in recent years, largely attributed to improvements in molecular diagnostic methods.

These viruses possess either DNA or RNA genomes, diverse genome organizations, and particle morphologies. Most of these viruses are transmitted by arthropod vectors, although some can also be seed-borne.

Of the viruses identified in *Passiflora* plants, 57 have RNA genomes and primarily belong to the *Potyvirus* genus within the *Potyviridae* family (Figure 1). The DNA viruses ($n = 17$) are mainly classified under the *Begomovirus* genus in the family *Geminiviridae* (Figure 1). The purple granadilla mosaic has not had its genomic sequence characterized and remains unassigned to a specific genus or family.

Although diverse viruses have been documented infecting passion fruit plants globally, only a few are considered as major economic concerns for the crop. Notably, the viruses associated with passion fruit woodiness disease (PWD), which are members of the genus *Potyvirus*, are particularly detrimental to the crop. PWD can result from infections by several viruses, including cowpea aphid-borne mosaic virus (CABMV) (McKern et al. 1994), East Asian *Passiflora* virus (Iwai et al. 1996), Ugandan *Passiflora* virus (Ochwo-Ssemakula et al. 2012), passion fruit woodiness virus (McKnight 1953), *Telosma* mosaic virus (Chiemsoibat et al. 2014), and *Passiflora* mottle virus (Do et al. 2021, Xie et al. 2019). The disease is a major limiting factor for passion fruit production, as potyvirus-infected plants exhibit reduced size, deformed leaves and fruits, and fruit woodiness. PWD eventually can lead to the death of the plant due to attacks of opportunistic pathogens on affected plants (Cerqueira-Silva et al. 2014b, Nascimento et al. 2006, Rezende 2006). While geminiviruses infections have been reported worldwide, their impact has been mostly of local importance. The following lines provide information on the viruses reported in *Passiflora* up until December 2025.

2. List of DNA viruses infecting passion fruit plants

Realm Monodnaviria/ Kingdom Sholukuvirae/ Phylum Cressdnviricota/ Class Repensiviricetes/ Order Geplafuvirales/ Family Geminiviridae

Genus *Begomovirus*

Cotton leaf curl Multan virus (CLCuMuV, *Begomovirus gossymultanense*): In China, CLCuMuV was detected in *P. edulis* Sims plants which showed symptoms of leaf curling and dark green, swollen veins (Tang et al. 2020).

Euphorbia leaf curl virus (EuLCV, *Begomovirus euphorbiae*): EuLCV was first reported in passion fruit in Taiwan (Cheng et al. 2014) in the cv. Tainung No. 1 (*P. edulis* × *P. edulis* f. *flavicarpa*). The virus was also identified in *P. edulis* in South Korea (Kil et al. 2016, Kim et al. 2018) and China (Huang et al. 2021, Ye et al. 2022). Infected passion fruit plants exhibit symptoms of systemic mottle, mosaic, yellowing or yellow spotting, stunting, chlorotic, curling, and malformation of leaves.

Euphorbia mosaic virus (EuMV, *Begomovirus euphorbiamusivi*): Passion fruit plants (*P. edulis*) showing symptoms of leaf distortion and necrotic spots sampled in Florida, USA identified as infected with EuMV. When the passion fruit cv. Lilikoi was inoculated with EuMV,

Passion fruit-infecting viruses

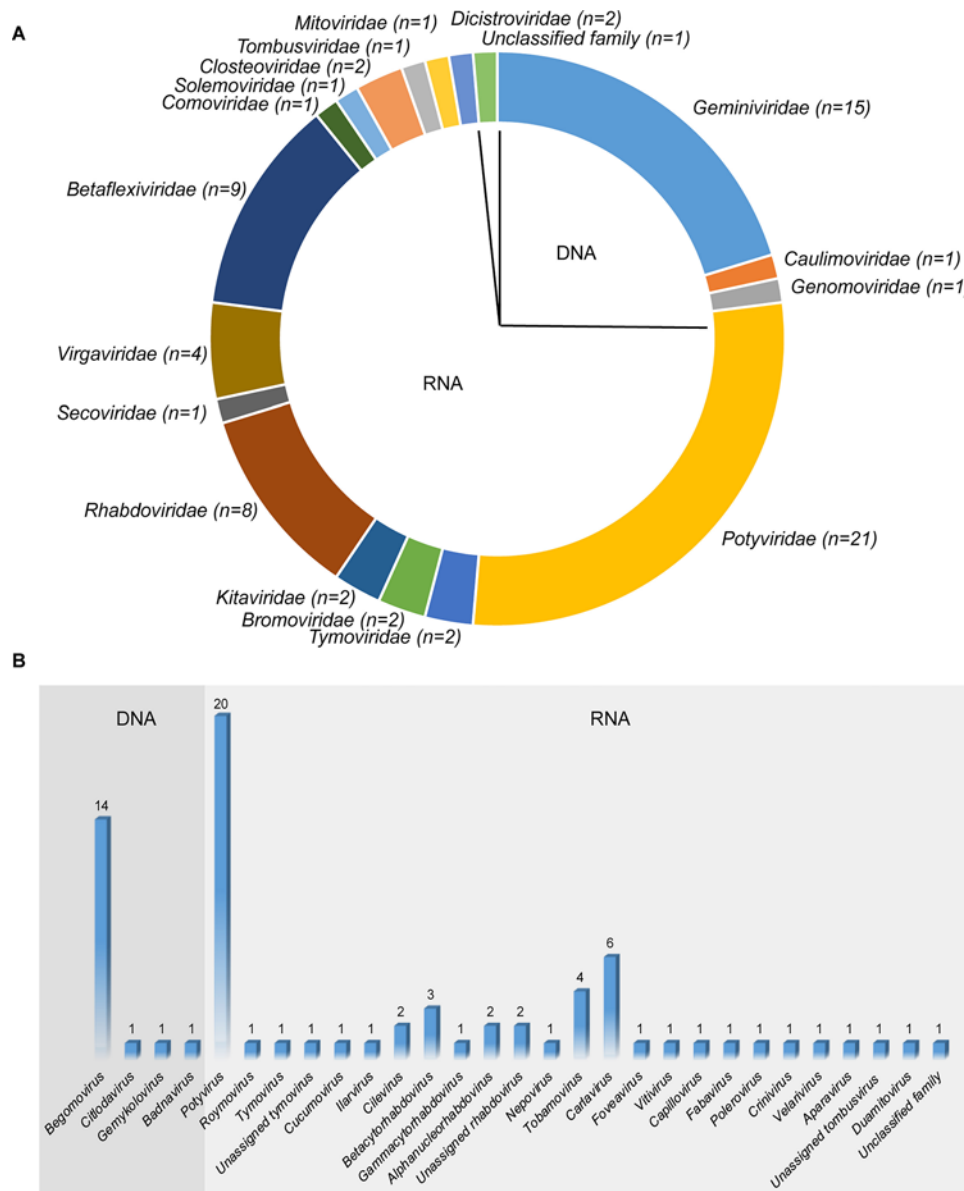


Figure 1. Family (A) and genus (B) of viruses reported in *Passiflora*.

the infected plants developed symptoms of mild mottling followed by necrotic spots, leaf deformation, and flower abortion (Polston et al. 2017).

Melochia yellow mosaic virus (MeLYMV, *Begomovirus melochiaflavi*): The natural occurrence of MeLYMV was reported in *P. edulis* (cv. Sol do Cerrado) in an orchard in Mato Grosso do Sul state, Brazil (Spadotti et al. 2019). Infected plants display mosaic symptoms, yellow spots, curling, and malformation of leaves (Spadotti et al. 2019). This begomovirus could be transmitted to passion fruit plants by biolistics but not by *Bemisia tabaci* MEAM1 or MED (Spadotti et al. 2019).

Papaya leaf curl China virus (PaLCuCNV, *Begomovirus caricachinaense*): In China, purple (*P. edulis* Sims) and yellow (*P. edulis* f. *flavicarpa* Deg.) passion fruit plants exhibiting leaf curl and malformations were found to be infected with PaLCuCNV (Huang et al. 2020).

Papaya leaf curl Guangdong virus (PalCuGDV, *Begomovirus caricaguandongense*): PalCuGDV was identified in mixed infection with EuLCV in the cv. Tainung No. 1 (*P. edulis* × *P. edulis* f. *flavicarpa*) from Taiwan (Cheng et al. 2014). It has also been detected in *P. edulis* in South Korea (Kim et al. 2018) and China (Huang et al. 2021). Symptoms observed in infected plants with the begomovirus PalCuGDV include mosaic, deformation, chlorotic ringspot or yellowing, leaf curling, and vein swelling (Cheng et al. 2014, Huang et al. 2021, Wu et al. 2024).

Passion fruit leaf curl virus (PFLCuV, *Begomovirus passiflorae*): PFLCuV is a begomovirus associated with the leaf curl disease of passion fruit (*P. edulis*) in India. Metagenomic studies revealed the presence of two satellite viruses, an alphasatellite (with 95.7% similarity to cotton leaf curl Multan alphasatellite) and a betasatellite (with 98.3% similarity to tomato leaf curl Bangladesh betasatellite) (Venkataravanappa et al. 2022).

in mixed infection with CABMV (Fontenele et al. 2018). PCMoV infectious clone was capable of infecting *Nicotiana benthamiana*, *P. edulis*, *P. alata*, and *Arabidopsis thaliana* through biobalistics. Infected *N. benthamiana* plants displayed symptoms of chlorotic spots, mottle, and growth impairment. Mild symptoms were observed in *P. edulis* six months after inoculation while the other plants remained symptomless (Fontenele et al. 2018).

Realm Monodnaviria/ Kingdom Sholukuvirae/ Phylum Cressdnaviricota/ Class Repensiviricetes/ Order Geplafuvirales/ Family Genomoviridae

Genus Gemykolovirus

Plant-associated genomovirus 7 (PaGmV7, Gemykolovirus herisI): PaGmV7 was found associated with *P. edulis* in Bahia state, Brazil (Fontenele et al. 2020). Many genomoviruses have been identified in association with plants. However, most of the hosts of genomoviruses have yet to be confirmed (Fontenele et al. 2020, Nery et al. 2023).

Realm Riboviria/ Kingdom Paramavirae/ Phylum Arterviricota/ Class Revtraviricetes/ Order Ortevirales/ Family Caulimoviridae

Genus Badnavirus

Gulupa bacilliform virus A (GBVA, Badnavirus passiflorae): GBVA was identified in asymptomatic purple passion fruit (*P. edulis* f. *edulis* Sims) in Colombia (Cardona et al. 2022a, Sepúlveda et al. 2022) and in symptomatic *P. edulis* plants exhibiting vein clearing, mottling, leaf distortion, and yellowing growing in China (Khan et al. 2025). High incidence of GBVA has been observed in mixed infections with other RNA viruses in adult plants, plantlets, and newly germinated seed buds (Cardona et al. 2022b, Cardona et al. 2022c, Sepúlveda et al. 2022).

3. List of RNA viruses infecting passion fruit plants

Realm Riboviria/ Kingdom Orthornavirae/ Phylum Kitrinoviricota/ Class Alsuviricetes/ Order Martellivirales/ Family Bromoviridae

Genus Cucumovirus

Cucumber mosaic virus (CMV, Cucumovirus CMV): CMV was originally reported associated with PWD in yellow passion fruit (*P. edulis* f. *flavicarpa*) plants in Australia (Magee, 1948, Taylor & Kimble 1964). Subsequent reports of CMV in various *Passiflora* species were recorded from the USA (Teakle et al. 1963), Japan (Yonaha et al. 1981), Brazil (Colariccio et al. 1987, Gioria et al. 2002), Italy (1511a & Sorrentino 2009), Ecuador (Yeturu et al. 2018), Colombia (Cardona et al. 2022b), Nigeria (Arogundade et al. 2023), some regions of South Africa (Brand & Wechmar 1993), China (Higuaita et al. 2025), and South Korea (Kim et al. 2024).

Genus Iilarvirus

Mercurialis latent virus (MeLaV, not assigned to a species): MeLaV is an ilarvirus initially identified in symptomatic *Mercurialis annua* plants grown in glasshouses in Lausanne (Switzerland). Later, a phytosanitary survey revealed the presence of this ilarvirus in other crops, as well as in *Passiflora tripartita* Juss. var. *mollissima*

collected in 1991 from an unknown location in the Netherlands and conserved in a historical herbarium collection (Mahillon et al. 2024).

Realm Riboviria/ Kingdom Orthornavirae/ Phylum Kitrinoviricota/ Class Alsuviricetes/ Order Martellivirales/ Family Closteroviridae

Genus Crinivirus

Lettuce chlorosis virus (LCV, Crinivirus lactucachlorosi): The crinivirus LCV was reported in *Passiflora* spp. plants for the first time in Brazil. The virus was found in *P. auriculata* Kunth and *P. alata* plants collected from the Germplasm Bank “Flor da Paixão” in Distrito Federal and in *P. edulis* sampled in a commercial field in Bahia state (Vidal et al. 2021). The LCV-infected plants were also found to be co-infected with cucurbit aphid-borne yellows virus (CABYV). Recently mixed infections of LCV with the rhabdovirus bean-associated cytorhabdovirus (BaCV), CABMV, and *Passiflora* cytorhabdovirus (PFCV) have been reported in passion fruit plants from a commercial field in the Distrito Federal (Vidal et al. 2023a, Vidal et al. 2025).

Genus Velarivirus

Passiflora oerstedii-associated virus (PAaCV, not assigned to a species): PAaCV was characterized as a new virus classified within the *Velarivirus* genus and discovered through analysis of transcriptome data of *P. oerstedii* Mast. from The United States (Higuaita et al. 2025).

Realm Riboviria/ Kingdom Orthornavirae/ Phylum Kitrinoviricota/ Class Alsuviricetes/ Order Martellivirales/ Family Kitaviridae

Genus Cilevirus

Citrus leprosis virus 2-Hibiscus strain (CiLV-C2H, Cilevirus colombiaense): CiLV-C2H Hibiscus strain was found infecting *P. edulis* grown in residential properties and community gardens in Honolulu, Hawaii (Olmedo-Velarde et al. 2022). The passion fruit plants infected with CiLV-C2H exhibited symptoms of chlorotic spots on young leaves and green spots in senescing leaves. Additionally, these plants were found to be colonized by the mites *Brevipalpus yothersi*, which have been identified as the vector for CiLV-C2H (Olmedo-Velarde et al. 2022).

Passion fruit green spot virus (PFGSV, Cilevirus passiflorae): PFGSV was initially reported in high incidence, causing passion fruit green spot disease in orchards in several Brazilian states (Kitajima et al. 1997, Kitajima et al. 2003, Moraes et al. 2006, Antonioli-Luizon et al. 2009, Antonioli-Luizon, 2010, Chabi-Jesus et al. 2017, Tassi 2018, Ramos-González et al. 2020, Pires 2022). More recently, PFGSV has been detected in *P. edulis* growing in Colombia (Roy et al. 2023). Infected *P. edulis* plants exhibit symptoms such as leaf mottling, rugose mosaic, leaf distortion, necrotic lesions on leaves, stems, and fruits, green spots in mature fruits, senescent leaves, and, in severe cases, plant death (Kitajima et al. 1997, Ramos-González et al. 2020, Roy et al. 2023). The virus is transmitted by mites initially identified as *Brevipalpus phoenicis* (Kitajima et al. 1997), which have since been reclassified as *Brevipalpus yothersi* (Tassi 2018, Pires 2022).

Realm Riboviria/ Kingdom Orthornavirae/ Phylum Kitrinoviricota/ Class Alsuviricetes/ Order Martellivirales/ Family Virgaviridae

Genus *Tobamovirus*

Hibiscus latent Fort Pierce virus (HLFPV, *Tobamovirus fortpiercense*): HLFPV is a tobamovirus found in *P. edulis* without apparent viral disease symptoms growing in a passion fruit orchard in China (Xie et al. 2022).

Maracuja mosaic virus (MarMV, *Tobamovirus maracujae*): The tobamovirus MarMVA was characterized in *P. edulis* f. *flavicarpa* in Peru (Fribourg et al. 1987, Koenig and Fribourg, 1986, Song et al. 2006). The systemic infection caused by this virus resulted in mosaic and incomplete necrotic rings in *P. edulis* and *Nicotiana benthamiana*, respectively, as well as necrotic local lesions or leaf rugosity in plants of different families (Fribourg et al. 1987).

Passion fruit mosaic virus (PFMV, *Tobamovirus passiflorae*) (Syn: maracuja mosaic virus Florida strain-MarMV-FL): PFMV was discovered in *P. incarnata* L. plants in a germplasm collection in Florida, USA (St Hill et al. 1992, Song & Ryu 2011). Designated as MarMV-FL, it has been described as a distinct strain of MarMV, which originates from Peru (Fribourg et al. 1987). Subsequent sequencing of the complete genome revealed that MarMV-FL belongs to a different tobamovirus species, the passion fruit mosaic virus. PFMV induces systemic mosaic symptoms and local lesions in *Passiflora* plants and other alternative hosts when mechanically inoculated (St Hill et al. 1992, Song & Ryu 2011).

Tobacco mosaic virus (TMV, *Tobamovirus tabaci*): *Passiflora caerulea* L. plants exhibiting mosaic symptoms were found in India. The causal agent was determined to be an isolate of TMV based on transmission assays, physical properties *in vitro*, and serology (Mali & Vyanjane 1980). No sequence of this TMV isolate is available. Recently, TMV was also detected in the transcriptome data of *P. edulis* from China (Higuaita et al. 2025).

Realm *Riboviria*/ Kingdom *Orthornavirae*/ Phylum *Kitrinoviricota*/ Class *Alsuviricetes*/ Order *Tymovirales*/ Family *Betaflexiviridae*/ Subfamily *Quinvirinae*

Genus *Carlavirus*

Cowpea mild mottle virus (CPMMV, *Carlavirus vignae*): CPMMV has been found infecting several *Passiflora* species, including *P. maliformis* L., *P. eichleriana* x *P. gibertii*, *P. galbana* Mast., *P. incarnata* L., *P. galbana* Mast., *P. malacophylla* Mast., *P. suberosa* L., *P. riparia* Mast., *P. hatschbachii* Cervi., *P. gardneri* Mast., *P. rufa* Feuillet & J. M. MacDougal, *Passiflora* spp., *P. cincinnata* Mast. from the Germplasm Bank “Flor da Paixão” in Distrito Federal, Brazil (Vidal et al. 2023a). It has been detected in mixed infections alongside BaCV, CABMV, CABYV, and PFCV in passion fruit plants from commercial fields in Distrito Federal, Rio de Janeiro, Paraíba e Pernambuco (Vidal et al. 2025) as well as from the Germplasm Bank “Flor da Paixão” (Vidal et al. 2023a). While CPMMV and BaCV are known to be vectored by the whitefly *Bemisia tabaci* in other crops (Pinheiro-Lima et al. 2020), there is currently no data on their transmission to passion fruit.

Passiflora latent virus (PLV, *Carlavirus latenspassiflorae*) (Syn: passiflora latent carlavirus): PLV is a virus associated with the passion fruit tip necrosis disease (Pares et al. 1997), which has been reported in different *Passiflora* species in Germany (Brandes & Wetter 1963), The United States (St Hill et al. 1992), Australia (Pares et al.

1997), Israel (Spiegel et al. 2007), New Zealand (Tang et al. 2008), South Korea (Choi & Ju 2023), and China (Bao et al. 2023). This virus was also detected in *P. caerulea*, *P. suberosa* L., *P. incense* (*Passiflora incarnata* x *P. cinninata*), *P. edulis* f. *edulis* Sims (purple passion fruit), *P. edulis* f. *flavicarpa* (yellow passion fruit), *P. subpeltata* Ortega, and *P. tarminiana* Coppens & V.E. Barney (banana passion fruit) (Brandes & Wetter 1963, St Hill et al. 1992, Pares et al. 1997, Spiegel et al. 2007, Tang et al. 2008). *P. tarminiana* from New Zealand exhibited chlorotic lesions on leaves, while purple passion fruit cv. Passion Dream displayed foliar and fruit mosaic symptoms (Spiegel et al. 2007, Tang et al. 2008). PLV was transmitted mechanically to *Chenopodium* spp. inducing local chlorotic lesions, systemic leaf chlorosis and necrosis, and mottling on upper leaves (Brandes & Wetter 1963, St Hill et al. 1992, Pares et al. 1997, Spiegel et al. 2007, Tang et al. 2008). In *P. edulis* f. *edulis*, *P. edulis* f. *flavicarpa*, and *P. incarnata*, the virus induced discreet systemic foliar mosaic symptoms (St Hill et al. 1992, Spiegel et al. 2007).

Chrysanthemum virus B (CBV, *Carlavirus betachrysanthemi*): CBV has been identified in the transcriptome data of *P. auriculata* from Suriname and *P. caerulea* L. from an unreported location (Higuaita et al. 2025).

Potato virus S (PotVS, *Carlavirus sigmasolani*): The carlavirus PotVS was detected in the transcriptome data of *P. caerulea* from The United States (Higuaita et al. 2025).

Stevia carlavirus 1 (StcV1, *Carlavirus unisteviae*): StcV1 has been identified in the transcriptome data of *P. caerulea* from China (Higuaita et al. 2025).

Passiflora auriculata-associated carlavirus (PAaCV, not assigned to a species): PAaCV has been classified as a new carlavirus and was discovered in the transcriptome data of *P. auriculata* from Suriname (Higuaita et al. 2025).

Genus *Foveavirus*

Passiflora tenuiloba-associated foveavirus (PTaFV, not assigned to a species): PTaFV was characterized as a new foveavirus and identified in the transcriptome data of *P. tenuiloba* Engelm. from The United States (Higuaita et al. 2025).

Realm *Riboviria*/ Kingdom *Orthornavirae*/ Phylum *Kitrinoviricota*/ Class *Alsuviricetes*/ Order *Tymovirales*/ Family *Betaflexiviridae*/ Subfamily *Trivirinae*

Genus *Vitivirus*

Grapevine virus A (GVA, *Vitivirus alphavitis*): Vitivirus GVA was identified in Brazil and induced ultrastructural changes in the mesophyll cells of asymptomatic *P. alata* (Galletti et al. 2006, Lombardi & Galletti 2007).

Genus *Capillovirus*

Passiflora edulis associated-capillovirus (PEaCV, not assigned to a species): PEaCV was described as a new capillovirus and identified in the transcriptome data of *P. edulis* from Colombia (Higuaita et al. 2025).

Realm *Riboviria*/ Kingdom *Orthornavirae*/ Phylum *Kitrinoviricota*/ Class *Alsuviricetes*/ Order *Tymovirales*/ Family *Tymoviridae*

Genus *Tymovirus*

Passion fruit yellow mosaic virus (PFYMV, *Tymovirus passiflorae*) (Syn: passionfruit enation virus): PFYMV was first identified in golden passion fruit (*P. edulis* f. *flavicarpa*) plants collected in several regions of Rio de Janeiro state, Brazil. These plants displayed symptoms such as yellow netting, yellow mosaic, and leaf crinkles. Cytopathological and serological tests indicated that PFYMV is a tymovirus (Crestani et al. 1986). Later, a similar virus was discovered in Colombia, infecting *P. edulis* Sims plants, which presented yellow mosaic leaf symptoms and mosaic patterns, mottling along the veins, enations, and severe leaflet deformations in purple passion fruit (*P. edulis* f. *edulis*) (Morales et al. 2002, Jaramillo-Mesa et al. 2019, Sepúlveda et al. 2022). The virus was transmitted both mechanically and through grafting to various *Passiflora* species, which then developed systemic symptoms (Crestani et al. 1986, Morales et al. 2002). Molecular assays and genome sequencing confirmed that PFYMV is indeed a tymovirus (Morales et al. 2002, Jaramillo-Mesa et al. 2019).

Unassigned genus

Purple passionfruit leaf deformation virus (PpLDV, not assigned to a species): PpLDV was characterized in purple passion fruit (*P. edulis*) in Colombia and classified as a distinct species in the family *Tymoviridae*. Phylogenetically, PpLDV is more closely related to viruses in the genus *Tymovirus* as well as to the poinsettia mosaic virus, which is also an unassigned species within the family *Tymoviridae*. PpLDV may represent a member of a new genus within this family (Cardona et al. 2022c).

Realm *Riboviria*/ Kingdom *Orthornavirae*/ Phylum *Kitrinoviricota*/ Class *Tolucaviricetes*/ Order *Tolivirales*/ Family *Tombusviridae*

Unassigned genus

Tobacco necrosis virus (TNV, unassigned strain): Icosahedral particles identified as tobacco necrosis virus (TNV) were observed in passion fruit plants (*P. edulis* and *P. caerulea*) from South Africa (Brand 1992; Brand & Wechmar 1993; Von Wechmar et al. 1991). This virus was not further molecularly characterized. TNV was identified in tobacco (Smith & Bald 1935). Isolates previously assigned to this virus are now classified as tobacco necrosis virus A (TNV-A, genus *Alphanecrovirus*, *Alphanecrovirus nicotianae*) and tobacco necrosis virus D (TNV-D, genus *Betanecrovirus*, *Betanecrovirus nicotianae*) (Varanda et al. 2014, Verdin et al. 2018, Lopez-Jimenez et al. 2025).

Realm *Riboviria*/ Kingdom *Orthornavirae*/ Phylum *Lenarviricota*/ Class *Amabiliviricetes*/ Order *Wolframvirales*/ Family *Mitoviridae*

Genus *Duamitovirus*

Passion fruit mitovirus-like 1 (Pfmv1, proposed species name “*Duamitovirus passiflorae*”): Pfmv1 is a putative duamitovirus phylogenetically related to other plant-associated duamitoviruses and was identified as infecting *P. edulis* in Bahia state, Brazil (Santos et al. 2024).

Realm *Riboviria*/ Kingdom *Orthornavirae*/ Phylum *Negarnaviricota*/ Subphylum *Haploviricota*/ Class *Monjiviricetes*/ Order *Mononegavirales*/ Family *Rhabdoviridae*/ Subfamily *Betarhabdovirinae*

Genus *Betacytorhabdovirus*

Bean-associated cytorhabdovirus (BaCV, *Betacytorhabdovirus caricae*) (Syn: citrus-associated rhabdovirus – CiARV, passion fruit-associated rhabdovirus – PaRV, papaya virus – PvVE): CiARV was first identified infecting yellow passion fruit (*P. edulis*) (Zhang et al. 2021) in China and later found in purple passion fruit (*P. edulis* × *P. edulis* f. *flavicarpa*) (Huang et al. 2023). Subsequently, another isolate related to CiARV was discovered in *Passiflora edulis* in China and was designated as passion fruit-associated rhabdovirus (PaRV (Wang et al. 2025)). In Brazil, BaCV infects various species and hybrids of *Passiflora*, including *P. eichleriana* × *P. gibertii*, *P. cacao* Bernacci & M. M. Souza, *P. edulis*, and *P. Gardneri* Mast. sourced from the Germplasm Bank “Flor da Paixão,” as well as *P. edulis* from commercial fields in Distrito Federal (Vidal et al. 2023a). Reports from Brazil indicate cases of mixed infections involving BaCV, CPMMV, LCV, and CABMV in various *Passiflora* species and their hybrids (Vidal et al. 2023a). Symptomatic passion fruit plants in China displayed yellow spots, chlorosis, and leaf curling. In contrast, plants from Brazil with mixed virus infections exhibited symptoms such as mosaic patterns, yellow spots, blisters, vein banding, and leaf deformation (Zhang et al. 2021, Vidal et al. 2023a, Wang et al. 2025). BaCV is transmitted to bean, soybean, and cowpea plants by the whitefly *Bemisia tabaci* (Pinheiro-Lima et al. 2020). However, the transmission of BaCV to passion fruit plants has not yet been studied. PaRV was mechanically transmitted to *Nicotiana benthamiana*, which displayed symptoms of leaf curling and chlorosis (Wang et al. 2025).

Barley yellow striate mosaic virus (BYSMV, *Betacytorhabdovirus hordei*): BYSMV was recently identified in three transcriptome data of *P. edulis* from China (Higuita et al. 2025).

Passiflora betacytorhabdovirus 1 (PaBCR1, *Betacytorhabdovirus passiflorae*): PaBCR1 was detected in transcriptome data of blue passionflower (*P. caerulea*). The specific plant origin was not provided, and the virus has been classified as belonging to the genus *Betacytorhabdovirus* (Bejerman et al. 2023, Higuita et al. 2025).

Genus *Gammacytorhabdovirus*

Passiflora cytorhabdovirus (PFCV, proposed species name “*Gammacytorhabdovirus passionis*”): PFCV was identified in several *Passiflora* accessions (*P. eichleriana*, *P. caerulea*, *P. ferruginea*, *P. galbana*, *P. hatschbachii*, *P. incarnata*, *P. maliformis*, *P. mucronata*, *P. quadrangularis*, *P. riparia*, *P. rufa*, *P. cacao*, *P. malacophylla*, *P. serratodigitata*, *P. maliformis* and *Passiflora* spp.) from the Germplasm Bank “Flor da Paixão”, Distrito Federal, Brazil, as well as in *P. edulis* and *P. alata* from commercial fields in the Distrito Federal, Rio de Janeiro, Paraíba and Pernambuco (Vidal et al. 2025). Symptoms observed in these plants include leaf deformation, blistering, and mosaic. However, these symptoms cannot be solely attributed to PFCV infection, as the plants were found to be infected with multiple viruses, including *Passiflora nucleorhabdovirus 2*, CABMV, LCV, CPMMV, BaCV, and CABYV (Vidal et al. 2025).

Genus *Alphanucleorhabdovirus*

Passiflora nucleorhabdovirus 1 (PaNV1, proposed species name “*Alphanucleorhabdovirus passionis*”): PaNV1 was identified in a *P. edulis* plant from Bahia, Brazil. This virus was found in a mixed infection along with CABYV and CABMV (Vidal et al. 2025).

The symptoms observed in these plants included leaf deformation, blistering, and mosaic. However, due to the presence of mixed infections, the observed symptoms cannot be attributed to PaNV1 (Vidal et al. 2025). Although the insect vector was not identified, it is speculated that a leafhopper may be a potential candidate (Vidal et al. 2025).

Passiflora nucleorhabdovirus 2 (PaNV2, proposed species name “*Alphanucleorhabdovirus passiflorae*”): PaNV2 was identified in *Passiflora* accessions from the “Flor da Paixão” germplasm collection, in Distrito Federal, Brazil. The virus was identified in *P. galbana*, *P. quadrangularis*, *P. riparia*, and *P. gardneri*. Some symptoms observed were leaf deformation, blistering, and mosaic. Still, due to mixed infections with CABMV, CPMMV, and BaCV in these plants, the symptoms cannot be attributed solely to PaNV2 (Vidal et al. 2025). While the insect vector has not been confirmed, it is speculated that leafhoppers may be potential candidates (Vidal et al. 2025).

Unassigned genus

Passifruit rhabdovirus (PRV, not assigned to a species): PRV was identified as a putative nucleorhabdovirus infecting passionfruit (*P. edulis*) in Australia. The passion fruit plants with PRV were also infected with PWV, and the symptoms were similar to those of PWV infection (Pares et al. 1983). Electron microscopy of thin sections from infected samples detected possible nucleorhabdovirus particles (Pares et al. 1983).

Passion fruit vein clearing virus (PVCV, not assigned to a species): PVCV is an unclassified nucleorhabdovirus as judged by cytopathology, identified in passion fruit (*P. edulis* f. *flavicarpa*) in Brazil (Kitajima & Crestani 1985, Chagas et al. 1987). Symptomatic plants showed short internodes, brittle leaves with a typical vein clearing, stunting, fruit deformation, and low yield production (Kitajima & Crestani 1985).

Realm Riboviria/Kingdom Orthornavirae/Phylum Pisuviricota/Class Pisoniviricetes/Order Picornavirales/Family Secoviridae/Subfamily Comovirinae

Genus Fabavirus

Broad bean wilt virus 2 (BBWV2, *Fabavirus betaviciae*): BBWV2 is a fabavirus that has been detected in passionfruit (*P. edulis*) in Japan (Yonaha et al. 1993, Kobayashi 2004).

Genus Nepovirus

Tomato ringspot virus (ToRSV, *Nepovirus nicotianae*): ToRSV was found in passion fruit plants (*P. edulis*) that showed mosaic and ring spot symptoms in Peru (Koenig & Fribourg 1986). The virus was mechanically inoculated and was able to infect plants belonging to several plant families, including Passifloraceae, inducing mainly chlorotic or necrotic spots or ring symptoms (Koenig & Fribourg 1986).

Realm Riboviria/Kingdom Orthornavirae/Phylum Pisuviricota/Class Pisoniviricetes/Order Sobelivirales/Family Solemoviridae

Genus Pterovirus

Cucurbit aphid-borne yellows virus (CABYV, *Pterovirus CABYV*): The first occurrence of CABYV in *P. edulis*, *P. cincinnata* Mast., and *P. alata* was reported in Northeastern Brazil (Vidal et al. 2018, Vidal et al. 2023b). Later, the virus was found in *P. edulis* f. *flavicarpa* in China (Zhang et al. 2020) and in other regions of Brazil, including

commercial fields in the Distrito Federal, Rio de Janeiro, Paraíba, and Pernambuco (Vidal et al. 2025). Plants infected with CABYV exhibited severe symptoms, such as mosaic patterns, blisters, and leaf deformation (Vidal et al., 2018). In China, passion fruit plants infected by CABYV also showed mottling and mosaic (Zhang et al., 2020). Furthermore, mixed infections involving BaCV, CPMMV, LCV, CABMV, and PFCV have been confirmed in these plants, complicating the association of symptoms with a specific virus (Vidal et al., 2018; Vidal et al., 2023b; Vidal et al., 2025).

Realm Riboviria/Kingdom Orthornavirae/Phylum Pisuviricota/Class Stelpaviricetes/Order Patatavirales/Family Potyviridae

Genus Potyvirus

Bean yellow mosaic virus (BYMV, *Potyvirus phaseoluteum*): BYMV was identified for the first time in the ornamental blue passionflower *P. caerulea* in Croatia (Pleše & Wrisher 1984). Later, BYMV was reported in Southern Italy, infecting a blue passionflower plant growing in a private garden (Parrella & Castellano 2002, Parrella & Lanave 2009). The blue passionflower infected by BYMV from Croatia showed spotting, vein clearing, and deformation of leaflets (Pleše & Wrisher 1984), while *Passiflora* from Italy showed chlorotic spots and light mottling (Parrella & Castellano 2002).

Cowpea aphid-borne mosaic virus (CABMV, *Potyvirus vignae*) (Syn: South African Passiflora virus – SAPV): Cowpea aphid-borne mosaic virus (CABMV, *Potyvirus vignae*) is a potyvirus frequently associated with passion fruit crops and is linked to the fruit woodiness disease (PWD) in South Africa, Kenya, and Brazil (McKern et al. 1994; Munguti et al. 2019; Munguti et al. 2024; Nascimento et al. 2006). CABMV has been reported in passion fruit (*P. edulis* f. *flavicarpa*) orchards across several states in Brazil (Cerqueira-Silva et al. 2014b). Initially identified as the passion fruit woodiness virus (PWV), it was later reclassified through molecular analysis as a CABMV isolate (Nascimento et al. 2004; Nascimento et al. 2006). Another strain, known as South African Passiflora virus (SAPV), was first identified in South Africa and later was classified as CABMV (Brand et al. 1993; McKern et al. 1994). CABMV was also reported in *P. edulis* plants in Kenya, where it was associated with other viruses causing PWD (Munguti et al. 2019; Munguti et al. 2024). CABMV is transmitted by aphids, including *Aphis gossypii*, *A. fabae*, and *A. craccivora*, or through mechanical means during pruning (Santos-Jiménez et al. 2022). Infected plants exhibit a variety of symptoms, including reduced growth, smaller leaf size, varying degrees of leaf wrinkling, mosaic, bubbles, blisters, and fruit deformation. The host range of CABMV within the Passifloraceae family is broad and includes various species, genotypes, and hybrids (Nascimento et al. 2006; Rezende 2006; Santos et al. 2015; Rodrigues et al. 2015; Sacomam et al. 2018; Mendes et al. 2022; Gonçalves et al. 2021; Vidal et al. 2023a; Vidal et al. 2025).

East Asian Passiflora distortion virus (EAPDV, *Potyvirus passifloradistorti*): EAPDV is a potyvirus causing deformation of passion fruits (*P. edulis*) in Japan (Riska et al. 2019, Riska et al. 2020) and Kenya (Munguti et al. 2024). EAPDV was able to infect *P. foetida* L. (wild maracuja, bush passionfruit, or marya–marya) by mechanical transmission, causing leaf curl and mosaic symptoms on the upper trifoliate leaves. It was also transmitted to purple passionfruit (*P. edulis*) and French beans by grafting from an infected *P. foetida* stem. French bean cultivars systemically infected developed mosaic symptoms

(Riska et al. 2019). Overall, in natural conditions and greenhouse experiments, mosaic, leaf curl, and fruit malformation were associated with the infection by EAPDV in purple passion fruit (Riska et al. 2019). Later, the coinfection of EAPDV and the potyvirus East Asian Passiflora virus was found in passion fruit plants in Japan (Riska et al. 2020). The effects of coinfection in *P. foetida* revealed more severe symptoms in the leaves and differential viral titers (Riska et al. 2020).

East Asian Passiflora virus (EAPV, *Potyvirus orionspassiflorae*):

The potyvirus EAPV induces PWD and was initially described as passionfruit woodiness virus; it was later classified as East Asian Passiflora virus, a new potyvirus species (Iwai et al. 1996, Iwai et al. 2006a, Iwai et al. 2006b). EAPV was first identified in Japan, infecting a purple passion fruit hybrid (*P. edulis* × *P. edulis* f. *flavicarpa*, cv. Summer queen) that showed deformed and woody fruits (Iwai et al. 1996). Since then, it has spread to Taiwan, Vietnam, and Japan, infecting purple passion fruit (*P. edulis* × *P. edulis* f. *flavicarpa*, cv. Tainung No. 1 [TN-1]) and *P. foetida* in Japan (Chong et al. 2018, Do et al. 2021, Fukumoto et al. 2012, Riska et al. 2020). Recently, EAPV was identified in the *P. edulis* transcriptome data from China (Higuita et al. 2025). The virus can be transmitted mechanically to the wild species *P. foetida*, purple passion fruit (*P. edulis*) TN-1 cultivar, and alternative host plants. Symptoms induced by EAPV include local lesions, mosaic, leaf curl, chlorotic mottling, yellowing, latent infection, and systemic necrosis, leaf and fruit deformation (Chong et al. 2018, Do et al. 2021, Iwai et al. 2006a, Riska et al. 2019, Riska et al. 2020).

Passiflora chlorosis virus (PaCV, *Potyvirus passiflorae*): A PaCV isolate was initially identified in *P. incense* (*P. cincinnata* × *P. incarnata*) plants with chlorotic symptoms in Florida, USA (Baker & Jones 2007, Baker et al. 2014). Later, additional isolates were identified in *P. edulis* plants in Germany (Ochwo-Ssemakula et al. 2012) and Israel (Fresnillo et al. 2022).

Passion fruit mottle virus (PaMV, not assigned to a species):

PaMV was identified in purple passion fruit plants (*P. edulis* Sim s × *P. edulis* f. *flavicarpa*, cv. Tainung No. 1 [TN-1]) showing mild mottling in Taiwan (Chang 1992).

Passionfruit Vietnam virus (PVV, *Potyvirus passifloramaculae*)

(Syn: **Passiflora mottle virus – PaMoV, passionfruit Vietnam potyvirus – PVNV, passion fruit severe mottle-associated virus – PFSMoAV**): PVV was identified in *P. edulis* in Vietnam (Do et al. 2021). In China, another strain related to PVV or PVNV was tentatively named passion fruit severe mottle-associated virus – PFSMoAV and identified infecting *P. edulis* plants (Xie et al. 2019, Luo et al. 2025). Later, in Vietnam, two other strains related to PVV and PFSMoAV were identified as isolates belonging to a new potyvirus named Passiflora mottle virus – PaMoV (Do et al. 2021). The plants infected with this virus exhibited stunted growth, severe mosaic, leaf mottling, and small, hardened, and distorted fruit (Xie et al. 2019, Do et al. 2021). In addition, PVV was identified as one of the viruses responsible for PWD in Vietnam (Do et al. 2021).

Passion fruit crinkle virus (PCV, not assigned to a species):

PCV was reported in China, infecting purple passion fruit (*P. edulis* × *P. edulis* f. *flavicarpa*, cv. Tainung No. 1) that showed crinkled leaves. PCV was able to infect golden passion fruit via the aphid *Myzus persicae* and was mechanically transferred to different species of Passifloraceae and experimental hosts, which displayed systemic foliar mottling and crinkling (Chang et al. 1996).

Passiflora mosaic virus (PmMoV, not assigned to a species):

PmMoV isolates were originally described as passion fruit woodiness virus (PWV) infecting *P. subpeltata*, *P. edulis*, and one passion fruit genotype in New South Wales, Australia (Sokhandan et al. 1997, Webster et al. 2007). Later, the coat protein sequences of these isolates were compared, indicating that they belong to a distinct virus group named Passiflora mosaic virus (Webster et al. 2007).

Passiflora ringspot virus (PFRSV, not assigned to a species):

PFRSV is a virus identified as causing ringspots in *P. edulis* in the Ivory Coast (Wijs 1974). The virus was able to infect Passifloraceae and Leguminosae species and is transmitted mechanically or by insect vectors like aphids, but seed transmission was not detected (Wijs 1974).

Passiflora virus Y (PaVY, *Potyvirus passiflorae*) (Syn: **Passiflora foetida virus Y):**

PaVY was first identified in Australia and Indonesia, infecting *P. foetida*, and in commercial *P. edulis* hybrids (Parry et al. 2004). Another PaVY strain was found infecting *Macroptilium atropurpureum* (siratiro plants) in Taiwan and named Passiflora virus Y (PaVY) (Chiang et al. 2012). Later, the virus also was identified in passion fruit plants in the USA (Baker et al. 2014) and in *P. edulis* in Japan (Nakasato et al. 2020). Infected plants exhibited yellow or green mosaic symptoms, sometimes ringspots and chlorotic spots. PaVY is vectored by *Aphis gossypii* (Parry et al. 2004). In Brazil, PaVY was identified as naturally infecting soybeans and successfully transmitted by *Myzus persicae* to *P. edulis*, inducing chlorotic local lesions on yellow passion fruit (Ribeiro-Junior et al. 2022).

Passion fruit woodiness virus (PWV, *Potyvirus passiflorae*):

PWV occurs exclusively in Australia and is associated with PWD disease in the country (McKnight 1953, Fukumoto et al. 2013). It infects various *Passiflora* species, causing symptoms that range from mild to severe (Sokhandan et al. 1997, Wylie & Jones 2011). PWV symptoms include chlorotic local lesions, necrotic local lesions, chlorotic spotting, chlorotic, stunting, wilting, systemic mottle, vein banding, vein clearing, die-back, leaf distortion, mosaic, bunching, and wooden and distorted fruits (Parry et al. 2004, Sokhandan et al. 1997, Wylie & Jones 2011). The virus can be transmitted mechanically, by graft, and by aphids (McKnight 1953, Omatsu et al. 2004).

Sri Lankan passion fruit mottle virus (SLPFMV, not assigned to a species):

SLPFMV is a sap-transmissible virus isolated from golden passion fruits (*P. edulis* f. *flavicarpa*) in Sri Lanka (Dassanayake & Hicks 1992). The virus was able to infect mechanically 23 species in five plant families, inducing systemic infection. SLPFMV was transmitted by the aphids *Myzus persicae*, *Aphis spiraeicola*, *A. gossypii*, and *A. craccivora* and mechanically to passion fruit plants that displayed symptoms of mosaic, chlorotic mottle, chlorotic lesions, chlorotic flecking, vein yellow, and leaf distortion (Dassanayake & Hicks 1992).

Soybean mosaic virus (SMV, *Potyvirus glycitesellati*):

SMV was found infecting *P. edulis* f. *flavicarpa* (yellow passion fruit), *P. ligularis* Juss. (granadilla), and *P. quadrangularis* L. (badea) that displayed severe mosaic, epinasty, defoliation, and premature death in Colombia (Benschler et al. 1996). Later, SMV was also found to infect *P. edulis* in Ecuador (Sivaprasad et al. 2017), and purple *P. edulis* f. *edulis* (gulupa) in Colombia (Camelo-Garcia 2010, Gordillo-Alarcón 2011, Jaramillo-Mesa et al. 2018). Recently, SMV was identified in the *P. edulis* transcriptome data from China and Colombia (Higuita et al. 2025). Symptoms associated with these plants include green spots on unripe fruits and ring spots on ripe fruits, deformation on fruits, and

mottling, vein banding, mosaics, chlorosis, deformation on leaves, and deformation at the terminal tips of the branches (Camelo-Garcia 2010, Jaramillo-Mesa et al. 2018). Transmission by the aphids *Aphis gossypii* and *Toxoptera citricida* (Benschler et al. 1996) and seed transmission (Jaramillo-Mesa et al. 2018) were confirmed.

Telosma mosaic virus (TeMV, *Potyvirus telosmae*): TeMV is an important potyvirus reported with high incidence in passion fruit in recent years and one of the most important causes of PWD in the crop (Fu et al. 2021, Yu et al. 2021). TeMV was reported on passion fruit in Thailand (Chiemsombat et al. 2014), in different provinces of Mainland China (Chen et al. 2018, Xie et al. 2017, Xie et al. 2020, Yang et al. 2018, Yang et al. 2021, Yu et al. 2021), in Vietnam (Do et al. 2021, Ha et al. 2008), and in Taiwan (Chen et al. 2025). In Thailand, the virus was reported to infect purple passion fruit plants naturally. It was transmitted mechanically to *P. edulis* cv. Purple No.2, which showed severe mosaic, yellow spot mottling, distortion on the leaf, mosaic skin on green fruit, and decreased fruit size (Chiemsombat et al. 2014). TeMV is pervasive in purple and yellow passionfruit plants in China and has been identified in symptomatic and symptomless plants (Yu et al. 2021). In Vietnam, *P. edulis* plants displayed mosaic, shrinkage, leaf distortion, woodiness, and deformation on fruits (Do et al. 2021). TeMV from Vietnam was mechanically transmitted to yellow passion fruit (*P. edulis* f. *flavicarpa*), inducing foliar symptoms of severe leaf mosaic, distortion, and slight yellowing on systemic leaves one month after inoculation. By six months post-inoculation, the plants exhibited reduced size, malformation, and woodiness of the fruits (Do et al. 2021). In Taiwan, TeMV was detected in wild plants of *P. foetida*, exhibiting mottle and mosaic symptoms. Additionally, TeMV from Taiwan was mechanically transmitted to *Chenopodium quinoa*, resulting in noticeable local lesions symptoms, as well as to *P. foetida* and *P. edulis*, causing apparent mosaic symptoms (Chen et al. 2025). Besides adversely affecting the development of fruits, TeMV infection also alters the phytochemical components of *P. edulis* fruits (Chen et al. 2018).

Thailand Passiflora potyvirus (ThPV, not assigned to a species): A virus called Thailand Passiflora potyvirus was mentioned by Fisher and Kyle (Fisher & Kyle 1994, Fisher & Kyle 1996), but no additional registry was found about this virus.

Turnip mosaic virus (TuMV, *Potyvirus rapae*): In China, TuMV was found in yellow passion fruit (*P. edulis*). Passion fruit plants infected with TuMV sampled from Guangdong Province displayed symptoms of stunting, green-yellow mosaic, or necrotic spots (Chen et al. 2021), while plants from Fujian Province showed mosaic, crinkle, and yellow spots (Li et al. 2023).

Urania mosaic virus (UMV, not assigned to a species): UMV was found to infect newly bred passion fruit cultivars in Japan. In these plants, UMV causes mild ringspot symptoms on the fruits and a mild mosaic on the leaves. It was demonstrated that UMV was transmitted mechanically to different experimental hosts, causing latent infection in inoculated plants (Nakasato et al. 2020).

Ugandan Passiflora virus (UPV, *Potyvirus passiflorae*): UPV is a potyvirus reported to cause PWD in passion fruit (*P. edulis* Sims) in Uganda, Rwanda, and Kenya (Mbeyagala et al. 2019, Munguti et al. 2024, Ochwo-Ssemakula et al. 2012, Bancy et al. 2019). PWD-like symptoms associated with the UPV infection include chlorotic spots,

malformation, crinkling, mottling, mosaic, distortion of the leaf, and woodiness of fruits (Ochwo-Ssemakula et al. 2012, Bancy et al. 2019). UPV isolates were able to mechanically infect experimental species of the families Solanaceae and Chenopodiaceae (Ochwo-Ssemakula et al. 2012).

Watermelon mosaic virus (WMV, *Potyvirus citrulli*): In Hawaii, *P. edulis* showing leaves with mosaic and rugosity were found near an orchid *Dendrobium anasimum* plant infected with WMV. The *P. edulis* plant was also identified with WMV (Watanabe et al. 2016).

Genus *Roymovirus*

Passiflora edulis symptomless virus (PeSV, *Roymovirus passifloralatis*): PeSV was identified in asymptomatic passion fruit plants (*P. edulis*, cv. Passion Dream) grown in Israel (Jover-Gil et al. 2018).

Realm Riboviria/Kingdom Orthornavirae/Phylum Pisuviricota/Class Pisoniviricetes/Order Picornavirales/Family Dicistroviridae

Genus *Aparavirus*

Passiflora edulis associated dicistro-like virus (PEaDV, not assigned to a species): PEaDV is a new aparavirus identified in transcriptome data of *P. edulis* from China (Higuita et al. 2025).

4. Unassigned family/Unassigned genus

Purple granadilla mosaic virus (PGMV, not assigned to a species) (Syn: purple passion fruit mosaic virus): PGMV or purple passion fruit mosaic virus is an unclassified virus identified in purple granadilla (*P. edulis*) in São Paulo, Brazil (Chagas et al. 1984). Infected plants exhibit mild or line pattern mosaic on the leaves, vein clearing, irregular chlorotic bands on the veins, and fruits from infected plants are smaller, deformed, and woody (Chagas et al. 1984, Fischer & Rezende 2008). PGMV was transmitted to several *Passiflora* species, and was experimentally transmitted by beetle *Diabrotica speciosa* (Fischer & Rezende 2008, Kitajima 2020). The virus was purified, and a specific antiserum was produced, and assayed serologically against 33 distinct viruses, but no relationship could be demonstrated (Oliveira et al. 1994). There is currently a lack of molecular studies addressing this virus.

Supplementary Material

The following online material is available for this article:

Table S1 – Viruses that infect *Passiflora* species in nature and their country of occurrence.

Table S2 – *Passiflora* species that are naturally infected by viruses and the country of occurrence.

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Authors' Contribution

Andreza Henrique Vidal: Conceptualization; Methodology; Writing – original draft; Writing – review and editing.

Elliot Watanabe Kitajima: Conceptualization; Methodology; Writing – original draft; Writing – review and editing.

Simone Graça Ribeiro: Conceptualization; Resources; Methodology; Writing – original draft; Writing – review and editing.

Conflicts of Interest

The author(s) declare(s) that they have no conflict of interest related to the publication of this manuscript.

Ethics

This study did not involve human beings or clinical trials that should be approved by one Institutional Committee.

Data Availability

The datasets generated during and/or analyzed during the current study are available at: <https://doi.org/10.48331/SCIELODATA.RJZUHK>.

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