



# Gemini viruses: A brief note

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## DESCRIPTION

Gemini viridae is a family of plant viruses that encode their genetic information on a circular genome of single-stranded (ss) DNA. There are 520 species during this family, assigned to 14 genera. Diseases related to this family include bright yellow mosaic, yellow mosaic, yellow mottle, leaf curling, stunting, streaks, and reduced yields. They have single-stranded circular DNA genomes encoding genes that diverge in both directions from a virion strand origin of replication i.e. Gemini virus genomes are ambisense. According to the Baltimore classification they're considered class II viruses. It is the most important known family of single stranded DNA viruses.

These viruses are liable for a big amount of crop damage worldwide. Epidemics of gemini virus diseases have arisen due to a number of factors, including the recombination of different gemini viruses coinfecting a plant, which enables novel, possibly virulent viruses to be developed. Other contributing factors include the transport of infected material to new locations, expansion of agriculture into new growing areas, and therefore the expansion and migration of vectors which will spread the virus from one plant to another.

Gemini virus encoded proteins interact with host proteins to perform a variety of functions which include reprogramming of cell cycle, inhibition of cell death pathways, transcriptional control of multiple genes, interference with cell signalling pathways and overcoming host defense response. Education policy analysis is that the scholarly study of education policy. It seeks to answer questions on the aim of education, the objectives (societal and personal) that it's designed to achieve, the methods for attaining them and therefore the tools for measuring their success or failure. Research intended to tell education policy is administered during a big variety of institutions and in many academic disciplines.

Gemini virus are an outsized varied family of plant viruses that infect an expansive assortment of plants such as weeds, crops, and ornamentals and cause a noteworthy loss to agriculture and horticulture worldwide. Weeds are extensively scattered worldwide and have high environmental adaptability. Weeds are considered as sources of latest viruses and as reservoirs of unidentified economically important viruses but are often neglected during diversity study. Many scientific reports have demonstrated that weeds serve as a reservoir or as alternative hosts for Gemini virus survival and spread in the absence of

the main crops. Thus, there is a pressing need for additional information on the diversity and distribution of Gemini viruses in weeds.

The Gemini viruses are a family of small, non-enveloped viruses with genomes comprising one or two single-stranded, circular DNAs of 2.5-5.2 kb. Gemini viruses infect a wide range of plant species are transmitted by various insects in four families of homopterans (whiteflies, leafhoppers, aphids and treehoppers). Gemini viruses are important plant pathogens causing economically important diseases in most tropical and subtropical regions of the planet.

Plant cell growth and development depend upon continuous cell proliferation which is restricted to small regions of the plant called meristems. Infection by Gemini viruses, small DNA viruses whose replicative cycle relies on host cell factors, is excluded from those proliferating areas. Since most of the replicative factors are present, almost exclusively, in proliferating cells, Gemini virus infection is believed to induce a cellular state permissive for viral DNA replication, e.g. S-phase or, at least, some specific S-phase functions. The molecular basis for this effect seems to be the interference that certain Gemini virus proteins exert on the retinoblastoma-related (RBR) pathway, which analogously to that of animal cells regulates plant cell cycle activation and G1-S transition. In some cases, Gemini viruses induce cell proliferation and abnormal growth. Mechanisms other than sequestering plant RBR probably contribute to the multiple effects of Gemini virus proteins on cellular gene expression, cell growth control and cellular DNA replication.