



Agdia Releases ELISA and ImmunoStrip® Products for Detection of Emerging Soybean Pathogen, *Cowpea Mild Mottle Virus*.

Agdia, Inc., a market leader in plant diagnostic products and services, is happy to announce the commercialization of products for the detection of *Cowpea mild mottle virus* on [ELISA](#) and [ImmunoStrip®](#) platforms.

Cowpea mild mottle virus (CPMMV) is an emerging pathogen in the genus *Carlavirus*. This virus is capable of causing severe disease and significant crop losses in several species in the family Fabaceae, including *Arachis hypogaea* (groundnut), *Glycine max* (soybean), *Phaseolus vulgaris* (common bean) and *Vigna unguiculata* (cowpea). Additionally, CPMMV is considered pathogenic on several economically important members of Solanaceae, ornamentals and weedy species. *Cowpea mild mottle virus* was first identified infecting cowpea in Ghana in 1973 and is now considered endemic on the African continent. Subsequently, CPMMV spread to India, Southeast Asia, South America, Oceania, Puerto Rico, Mexico and much of the Caribbean.



Figure 1. Soybean field

Cowpea mild mottle virus is not widespread in the continental U.S., but isolated detections have occurred in Florida and Oklahoma, causing anxiety within agronomic markets and inspection services. Due to its multi-faceted epidemiology, potential for virulence and burgeoning list of hosts, CPMMV poses a serious threat to soybean production in the U.S., a market spread across nearly 90 million acres and worth 53 billion dollars in 2023 (Figure 1.). Moreover, many public and private U.S. soybean breeding programs use Puerto Rico as a winter nursery location for seed expansion operations. The widespread incidence of CPMMV has constrained winter production and compromises present and future soybean cultivation altogether on the island.

Symptoms of CPMMV infection vary by host species, variety, and viral isolate, and most are not diagnostically adequate to permit definitive identification. Typical symptoms on legumes include mild chlorosis and mottling, leaf deformation and stunting, whereas some hosts are asymptomatic. Nevertheless, severe stem and pod necrosis of soybean have been associated with CPMMV outbreaks in Brazil, resulting in significant crop losses.



Cowpea mild mottle virus is transmitted by the silverleaf whitefly biotype B, *Bemisia tabaci* (syn. *Bemisia argentifolii*, Hemiptera), in a non-persistent manner (**Figure 2.**) This is



Figure 2. Silverleaf whitefly adults and eggs on underside of leaf

exceptional for two reasons: carlaviruses are typically transmitted by several species of aphids non-persistently, and most whitefly-transmitted viruses are done so in a semi-persistent manner. The dynamics of this deviation from typical transmission pathways is unclear. Since the late 20th century, the expansion of whitefly populations in sub-tropical and temperate climates has facilitated the synchronous expansion of their vectored viruses and plant host ranges. Moreover, whiteflies can exhibit prohibitive levels of resistance to many traditional insecticides.

In addition to its insect vector, CPMMV is known to be seed-transmitted in many of its leguminous hosts, including soybean. Moreover, infected ornamental and vegetable transplants and common weedy species can act as reservoirs of inoculum and vehicles of transmission in the absence of agricultural hosts. The range and diversity of host-virus-vector interactions combined with pesticide resistance and seed transmission can potentially precipitate epidemics previously not witnessed in areas of whitefly expansion. These include many of the world's most fertile soybean-producing regions for grain, meal, oil and seed. Exclusion is the most effective procedure for managing viruses. Consequently, early and accurate identification of propagative materials, transplants and seed infected with CPMMV is paramount to successful plant breeding and regulatory programs.

Agdia states their new [ELISA](#) and [ImmunoStrip® products](#) for detection of *Cowpea mild mottle virus* were screened against a diverse group of isolates, including those present in Puerto Rico, and detected all true positives. Moreover, no cross reactivity was observed with a broad panel of potential cross reactors, including *Alfalfa mosaic virus*, *Arabis mosaic virus*, *Bean common mosaic virus*, *Bean pod mottle virus*, *Bean Yellow Mosaic Virus*, *Cowpea mosaic virus*, *Groundnut ringspot virus*, *Peanut stunt virus*, *Southern bean mosaic virus*, *Soybean mosaic virus*, *Soybean vein necrosis virus*, *Tobacco mosaic virus*, *Tobacco streak virus* and *Tomato spotted wilt virus*. The ImmunoStrip® can be used with leaf tissue, and the ELISA can be used with leaf and seed.



Figure 3. ELISA platform



Both [ELISA](#) and [ImmunoStrip® platforms](#) utilize immunochemistry, and results are visualized via an antibody-antigen reaction in infected samples, contributing assay sensitivity and specificity. The ELISA platform has been used for more than 50 years and is widespread throughout the plant diagnostic community. This trusted, lab-based technology offers unparalleled cost efficiency in high-throughput applications (**Figure 3.**). Agdia's ImmunoStrip® platform provides end-users with unparalleled utility; samples can be tested in the field or lab by those having no previous diagnostic experience, and results are visualized within 30 minutes (**Figure 4.**).



Figure 4. New ImmunoStrip® for CPMMV

Agdia provides a one-year warranty on and comprehensive technical support for all purchased products. For more information on ELISA and ImmunoStrip® products, please see Agdia's full catalog at the company's website www.agdia.com, e-mail info@agdia.com, phone 1-574-264-2615 (toll-free 800-622-4342) or fax 1-574-264-2153.

ImmunoStrip® is a registered trademark of Agdia, Inc.