## AN APHID VIRUS WITH A PLANT VIRUS-DERIVED COAT PROTEIN

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The soybean aphid, *Aphis glycines* Matsumura, is the most important insect pest of soybean in North America. Management of the soybean aphid has cost an estimated $1.6 billion over the last 10 years. Our goal is to identify viruses of the soybean aphid which have potential for use in soybean aphid management. The soybean aphid transcriptome was sequenced using Illumina/Solexa short read sequencing and the data screened for viral sequences. A new insect virus, *Aphis glycines* virus (AGV), was discovered. AGV is estimated to have a 5 kb single stranded RNA (ssRNA) genome and to form a 30 nm particle. The RNA-dependent RNA polymerase (RdRp) of this virus is closely related to that of *Euprosterna elaeasa* virus (EeV: Tetraviridae) and *Drosophila* A virus (DAV: unclassified). However, based on structural predictions, the AGV coat protein (CP) is more similar to the CP of plant viruses (*Necroviruses* and *Sobemoviruses*). Notably, a potential CP-readthrough protein (CP-RTP) is predicted from the AGV genome sequence. The AGV RTP has a polyproline track in the N-terminus of the RTP which is structurally similar to that of the *Luteoviruses.* Analysis of the RTP suggests that RTP may be involved in penetration of the host cell. AGV appears to have a 100% vertical transmission rate and has also been detected by RT-PCR in laboratory colonies of two other aphid species, the bird cherry-oat aphid, *Rhopalosiphum padi* (Linnaeus) and the green peach aphid, *Myzus persicae* (Sulzer). AGV represents a new group of insect viruses which appears to infect multiple aphid species.