

## Rodrigo A. Valverde Abstract 10/29/2020

Based on the type of relationship with the host, plant viruses can be grouped as acute or persistent. Acute viruses cause symptoms and plant diseases. In contrast, persistent viruses do not appear to affect the phenotype of the host. The viral family *Endornaviridae* includes persistent viruses that infect plants without causing visible symptoms. Infections by endornaviruses have been reported in many economically important crops, such as avocado, barley, common bean, melon, pepper, and rice. However, little is known about the effect they have on their plant hosts. It is possible that these viruses are in a mutualistic relationship with the host and may provide tolerance to unknown biotic or abiotic factors. We have conducted comparative studies between endornavirus-infected and endornavirus-free common bean (*Phaseolus vulgaris*) and bell pepper (*Capsicum annuum*) plants. We evaluated physiological characteristics of eight lines of common bean, four of which were endornavirus-infected and four of which were endornavirus-free. Plants of all eight lines were morphologically similar and did not show statistically significant differences in plant height, wet weight, number of seeds per pod, and anthocyanin content. However, the endornavirus-infected lines had higher values of seed germination, radicle length, and weight of 100 seeds. We developed two near-isogenic lines of the bell pepper cultivar Marengo, one infected with bell pepper endornavirus (BPEV) and the other endornavirus-free. The BPEV-negative line consistently yielded higher percentage of fruit weight and total dry matter than the BPEV-positive line; however, only the fruit weight value was statistically significant. Preliminary studies on differential gene expression between endornavirus-infected and endornavirus-free common bean lines were conducted. RNAseq data revealed that a total of 132 genes were differentially expressed. In the endornavirus-infected line 84 genes were down-regulated while 48 genes up-regulated. Gene ontology distribution showed that redox processes were the main processes associated with endornavirus infection. It is worth mentioning that among the list of differentially expressed genes, one gene, *Myzus persicae-induced lipase 1* (MPL1), was up-regulated 8-fold in the endornavirus-infected line. In *Arabidopsis*, this gene has been shown to play an important role in defense against the green peach aphid (*Myzus persicae*). The results of these investigations suggest that the type of symbiotic relationship between endornaviruses and the host depends on the character being evaluated and can range from mutualistic to parasitic.