(Abstract) Chiu-Ping Cheng

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Antibodies that were prepared against bacterially-expressed *Commelina* yellow mottle badnavirus (CoYMV) proteins and purified virions were used to determine the localization of the viral proteins. By using these antisera, it was also possible to confirm that the CoYMV coat protein is encoded in ORF III. In addition to the two major forms of the coat protein (37 kDa and 39 kDa), several high molecular weight virus-specific proteins were detected. These proteins are possible ORF III polyprotein processing intermediates and might be associated with "immature" virions. As predicted by the genomic sequence, a 20 kDa virus-specific protein was detected by an antiserum raised against the C-terminus of the putative ORF I protein and this protein was shown to be associated with "immature" virions and with plant component(s). An antiserum raised against the putative ORF II gene product detected a 15 kDa virus-specific protein which was associated with both "mature" and "immature" virions and was found to be sensitive to some protease(s) that co-purified with the virions. Virion-containing tubules were found in cell-free extracts prepared from CoYMV-infected *Commelina diffusa.* Similar virion-containing tubules were observed within or passing through both cell wall thickenings and cell wall protrusions, suggesting that the tubules play a role in cell-to-cell movement of virions. An ORF I mutant which contained a 13 amino acid deletion exhibited phenotypes of reduced mealybug transmissibility which could be improved by serial mealybug transmissions, delayed symptom appearance which was unaltered during the serial mealybug transmissions, a reduced

amount of detectable ORF I protein and slower systemic movement in plants compared to the wild-type virus. These results suggested a possible role of the ORF I protein in mealybug transmission of CoYMV and in symptom development. A new transposon-mediated mutagenesis method was developed and applied to the CoYMV genome to generate random, non-polar mutations for elucidating the functions of the viral gene products. The possible functions of these viral proteins are discussed.