nucleotide sequence of two isolate (Puan and Yeonggwang) showed only 3 nt difference, where as the SSCP analysis gave different pattern. However, the nucleotide sequence was more (32 nt) between the two isolate (Gochang and gwangju), the SSCP patterns did not show the difference. SSCP analysis may provide a procedure to identify and differentiate BaMMV isolates based on comparisons of several genes. It is rapid and cheap and may drastically reduce the amount of sequencing necessary for accurate comparisons.

**C-24 Characterization of the virus isolated from elderberry shrub, in Corea.** S.G. Ye[1], H.M. Lee[2], S.K. Lee[1], H.J. Kim[1], S.B. Kwon[3], S.Y. Lee[1] [1]Dept. Forest Resources protection, Kangwon National University, Chunchon, 200-701, Corea; [2]Dept. Biological Environment, Kangwon National University, Chunchon, 200-701,Corea; [3]Gangwondo Agricultural Research and Extension Services, Gangwon, Chunchon 200-939, Corea.

Elderberry (*Sambucus nigra*, Family: Caprifoliaceae) is a shrub, which reproduce vegetatively by producing stolons is known to have medicinal properties, which is why it is grown all over the world. Elderberry carlavirus, elderberry latent carmovirus, cherry leaf roll nepovirus, the European strain of elderberry carlavirus and North American strain of elderberry carlavirus have been reported to infect elderberry plant. Elderberry (*Sambucus nigra*) showing line-pattern viral symptom was discovered in Hoengseong-gun Kangwon-do. When the virus was sap inoculated onto *C. amaranticolor*, it showed systemic infection after 7 days. Electron microscopic examination of the negatively stained preparation of virus revealed mixed infection. It showed flexuous rod-shaped particle of 680nm and isometric particles of 30 nm in diameter. The virus could infect systemically in *C.amaranticolor* and *C.quinoa*. It showed Systemic vein-clearing in *N. glutinosa* on the upper leaves. In case of *N. xanthi-nc*, it showed symptomless systemic infection, which was later confirmed by back inoculation onto *C. quinoa*. RT-PCR assay was not able to detect the virus by using specific primer for elderberry latent virus; however, further characterization of the virus is being done.

**C-25 Cytopathological Characteristics of Zimbabwe Isolate of Cowpea Aphid-Borne Mosaic Virus in *Nicotiana benthamiana*.** Jeom Deog Cho[1], Jan W.M. van Lent[2], Rob W. Goldbach[2]. [1]Laboratory of Plant Virology, Horticultural environment division, National Horticultural Research Institute, R.D.A. Tap

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The Netherlands. Zimbabwe isolate of *Cowpea aphid-borne mosaic virus* (CABMV-Z) in *Potyviridae* was analyzed in ultrastructural aspect. CABMV-Z induced pinwheels, scrolls, laminated aggregates and short curved laminated aggregates in cells of *Nicotiana benthamiana*. In cells of the upper leaves mainly pinwheels and scrolls that belongs to cylindrical inclusion body (CI) subdivision-I were maintained, and cells of the inoculated or the lower leaves having virions for a long time after infection contained short curved laminated aggregates (CI subdivision-IV) and a few laminated aggregates (CI subdivision-III) as well as pinwheels and scrolls. The cytopathological properties of CABMV-Z indicate that sampling time and stage is important to classify CI subdivision of *Potyvirus*.

**C-26 HC-pro of *Cowpea Aphid-Borne Mosaic Virus* Aggravates Synergism in Mixed Infection with *Cowpea Mosaic Virus*.** Jeom Deog Cho[1], Jan W.M. van Lent[2], Rob W. Goldbach[2]. [1]Laboratory of Plant Virology, Horticultural environment division, National Horticultural Research Institute, R.D.A. Tap Dong Campus, Tap Dong 540-41, Gweon-seon Gu, Suwon Gyeonggi-do, 441-440, Republic of Korea; [2] Laboratory of Virology, Department of Plant Sciences, Wageningen University, Building 504, Binnenhaven 11, 6709 PD Wageningen, The Netherlands.

Synergistic symptoms were produced on non-transgenic *Nicotiana benthamiana* infected with both *Cowpea mosaic virus* (CPMV) and *Cowpea aphid-borne mosaic virus* (CABMV), and transgenic plants of *N. benthamiana* inducted HC-pro of CABMV (*N. benthamiana*-HCpro) infected with CPMV. Single infection of CPMV revealed continuously typical symptoms on the upper leaves of non-transgenic *N. benthamiana*. However, in the *N. benthamiana*-HCpro the typical symptoms were decreased on the upper leaves at 14days post-inoculation. CPMV expressed green fluorescence protein (CPMV-GFP) could move in *N. benthamiana* and *N. benthamiana*-HCpro. In *N. benthamiana*-HCpro the fluorescence produced and moved faster along veins. The veinal movement of fluorescence on non-transgenic *N. benthamiana* infected doubly with CPMV-GFP and CABMV was occurred on the whole plants, and in the non-transgenic *N. benthamiana* infected singly with CPMV-GFP virions moved slower to