The Occurrence of *Bean common mosaic virus* and *Cucumber mosaic virus* in Yardlong Beans in Indonesia

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Yardlong bean (*Vigna unguiculata* subsp. *sesquipedalis*) is extensively cultivated in Indonesia for consumption as a green vegetable. During the 2008 season, a severe outbreak of a virus-like disease occurred in yardlong beans grown in farmers' fields in Bogor, Bekasi, Subang, Indramayu, and Cirebon of West Java, Tanggerang of Banten, and Pekalongan and Muntilan of Central Java. Leaves of infected plants showed severe mosaic to bright yellow mosaic and vein-clearing symptoms, and pods were deformed and also showed mosaic symptoms on the surface. In cv. 777, vein-clearing was observed, resulting in a netting pattern on symptomatic leaves followed by death of the plants as the season advanced. Disease incidence in the Bogor region was approximately 80%, resulting in 100% yield loss. Symptomatic leaf samples from five representative plants tested positive in antigen-coated plate-ELISA with potyvirus group-specific antibodies (AS-573/1; DSMZ, German Resource Center for Biological Material, Braunschweig, Germany) and antibodies to *Cucumber mosaic virus* (CMV; AS-0929). To confirm these results, viral nucleic acids eluted from FTA classic cards (FTA Classic Card, Whatman International Ltd., Maidstone, UK) were subjected to reverse transcription (RT)-PCR using potyvirus degenerate primers (CIFor: 5′-GGIVVIGTIGGIWSIGGIAARTCIAC-3′ and CIRev: 5′-ACICCRTTYTCDATDATRTTIGTIGC-3′) (3) and degenerate primers (CMV-1F: 5′-ACCGCGGGTCTTATTATGGT-3′ and CMV-1R: 5′ ACGGATTCAAACTGGGAGCA-3′) specific for CMV subgroup I (1). A single DNA product of approximately 683 base pairs (bp) with the potyvirus-specific primers and a 382-bp fragment with the CMV-specific primers were amplified from ELISA-positive samples. These results indicated the presence of a potyvirus and CMV as mixed infections in all five samples. The amplified fragments specific to potyvirus (four samples) and CMV (three samples) were cloned separately into pCR2.1 (Invitrogen Corp., Carlsbad, CA). Two independent clones per amplicon were sequenced from both orientations. Pairwise comparison of these sequences showed 93 to 100% identity among the cloned amplicons produced using the potyvirus-specific primers (GenBank Accessions Nos. FJ653916, FJ653917, FJ653918, FJ653919, FJ653920, FJ653921, FJ653922, FJ653923, FJ653924, FJ653925, and FJ653926) and 92 to 97% with a corresponding nucleotide sequence of *Bean common mosaic virus* (BCMV) from Taiwan (No. AY575773) and 88 to 90% with BCMV sequences from China (No. AJ312438) and the United States (No. AY863025). The sequence analysis indicated that BCMV isolates from yardlong bean are more closely related to an isolate from Taiwan than with isolates from China and the United States. The CMV isolates (GenBank

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No. FJ687054) each were 100% identical and 96% identical with corresponding sequences of CMV subgroup I isolates from Thailand (No. AJ810264) and Malaysia (No. DQ195082). Both BCMV and CMV have been documented in soybean, mungbean, and peanut in East Java of Indonesia (2). Previously, BCMV, but not CMV, was documented on yardlong beans in Guam (4). To our knowledge, this study represents the first confirmed report of CMV in yardlong bean in Indonesia and is further evidence that BCMV is becoming established in Indonesia.

References: (1) J. Aramburu et al. J. Phytopathol. 155:513, 2007. (2) S. K. Green et al. Plant Dis. 72:994, 1988. (3) C. Ha et al. Arch. Virol. 153:25, 2008. (4) G. C. Wall et al. Micronesica 29:101, 1996.

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