



First report of '*Candidatus Phytoplasma asteris*' (16SrI group) affecting common bean in Cuba

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Common bean (*Phaseolus vulgaris*) is an important herbaceous plant in the Fabaceae, grown worldwide as a human food crop and fodder. Recently, symptoms of yellowing, short internodes, stunting, shoot proliferation and chlorosis of crown leaves have been observed in approximately 10% of plants in two common bean fields in the locality of San José de Havana province (Fig. 1), surveyed during 2009-2010. Similar symptoms were previously associated with a phytoplasma infection in *Vicia faba* in Havana province (Arocha *et al.*, 2007); therefore a possible phytoplasma infection was investigated.

Total extracted DNA was used as a template in a nested PCR assay with universal primers that target the phytoplasma 16S ribosomal RNA gene (16S rRNA): R16mF2/R1 (Gundersen & Lee, 1996) for the first PCR amplification followed by fU5/rU3 (Lorenz *et al.*, 1995) for the nested reaction. PCR amplicons (~880 bp) were obtained for 10 out of 22 symptom-bearing plants, but not from the symptomless plants. Restriction profiles after digestion of PCR amplicons with *Hpa*II, *Hae*III and *Sau*3AI endonucleases were all identical to each other and to those of phytoplasma references of '*Candidatus Phytoplasma asteris*' (16SrI group). Five representative amplicons were purified (Wizard SV Gel and PCR Clean-Up System, Promega, Madison, WI, USA), cloned (pGEMT-Easy Vector, Promega, USA), and sequenced bi-directionally.

The partial 16S rDNA sequences shared 100% identity with each other, and the consensus sequence was deposited in GenBank (Accession No. JN383914). The 16S rDNA consensus sequence exhibited the highest sequence identity of 99% with those of phytoplasmas of the '*Ca. Phytoplasma asteris*' (16SrI group) (Fig. 2). This group has been previously recorded in broad bean and sweet pepper (Arocha *et al.*, 2007) and other vegetable crops in western Cuba (Arocha *et al.*, 2009), and it has been also associated with 'amachamiento' disease of dry common bean in Costa Rica (Moreira *et al.*, 2010). Since 16SrI is the phytoplasma group with the widest host range and since a number of species of the Fabaceae

have been found infected by this group in Cuba, particularly in Havana province, our results significantly impact the development of further management strategies for the common bean crop in western Cuba.

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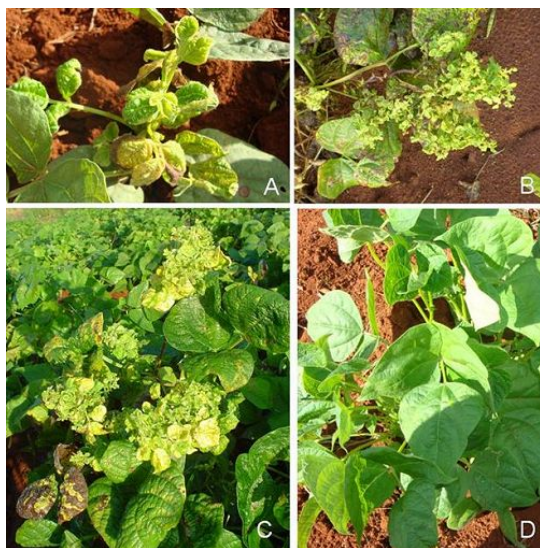


Figure 1

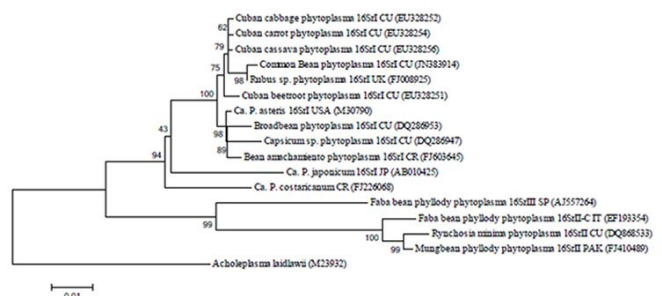


Figure 2

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