



First report of '*Candidatus Phytoplasma asteris*' associated with green ear disease of bajra (pearl millet) in India

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Pennisetum glaucum, commonly known as pearl millet or bajra, is one of the major cereal crops of arid and semi-arid regions of the world. Its seeds are nutritious and easily-digested source of calories and proteins for humans (Ejecta *et al.*, 1987). They are mainly consumed in the form of bread, flour and cooked gruels. Fields of bajra showing distinctly affected plants with bushy tops were spotted during September 2009 in the district of Badaun, Uttar Pradesh, India. Plants exhibited a broom-like appearance of panicles bearing leafy structures in place of florets, and panicles looked much greener in comparison to the healthy inflorescences. Both symptom-bearing and healthy bajra panicles were collected in triplicate for further evaluation. Genomic DNA was isolated using the DNeasy Plant Mini Kit (QIAGEN) and subjected to nested-PCR assay using phytoplasma 16S rDNA universal primers P1/P7 (Deng & Hiruki, 1991) followed by primer pair R16F2/R16R2 (Gundersen & Lee, 1996). An amplicon of expected size of 1.24kb was obtained for all the three samples from symptom-bearing plants, while no amplicons were observed for healthy and negative controls. RFLP profiles of the amplicon using restriction enzymes *Hha*I, *Kpn*I, *Sau*3AI, *Alu*I, *Hin*fI and *Mse*I indicated that the phytoplasma detected was a member of group 16SrI '*Candidatus Phytoplasma asteris*', subgroup 16SrI-B. The PCR product was purified, sequenced and submitted to GenBank (Accession No. HM134245). Analysis of the partial 16S rDNA sequence using BLAST comparisons showed a 99% of sequence identity with those of 16SrI phytoplasmas, confirming the results.

To our knowledge, this is the first record of group 16SrI, '*Ca. Phytoplasma asteris*' associated with the green ear disease of *P. glaucum*, and the first world record of pearl millet as a new host for phytoplasma. In regions of Asia and Africa pearl millet is the most important millet species both in

terms of cropped area and contributions to food security (FAO/ICRISAT, 1996). Green ear disease means serious phytosanitary threats for the cropping system if spread to phytoplasma free territories, especially bearing in mind that 16SrI is the phytoplasma group with the highest host range. Therefore monitoring should be implemented as a mandatory management measure to prevent disease spread and outbreaks.

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Figure 1

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