

NEW DISEASE REPORT **OPEN ACCESS**

First Report of a '*Candidatus Phytoplasma cynodontis*' Strain Associated With Chilli Little Leaf Disease in India

Smriti Mall | Smriti Chaudhari | Apoorva Srivastava

Molecular Plant Pathology Laboratory, Department of Botany, Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur, Uttar Pradesh, India

Correspondence: Smriti Mall (smriti.bot@ddugu.ac.in)

Received: 30 December 2025 | **Revised:** 28 February 2026 | **Accepted:** 2 March 2026

Keywords: *Capsicum* sp | 16SrXIV


FIGURE 1 | Diseased chilli plant showing symptoms of little leaf disease (left) and a symptomless plant (right).

Chilli (*Capsicum annuum*) is an economically important solanaceous vegetable widely cultivated across tropical and subtropical regions of India, with 1,874,000 tonnes being produced annually. Though numerous diseases damage chillies, one of the main causes of significant yield loss is phytoplasma-induced chilli little leaf disease. During field surveys conducted in October 2025, chilli plants exhibiting severe little leaf symptoms with shortened internodes and overall stunting were observed in Gorakhpur, Uttar Pradesh, India (Figure 1). Disease incidence ranged from 8% to 10%.

Four diseased chilli plants along with three asymptomatic chilli samples were collected and genomic DNA was extracted from leaf midrib tissues using the CTAB method (Ahrens and Seemüller 1992). The DNA obtained was screened for phytoplasma infection

by nested PCR assays targeting the 16S rRNA gene using primer pairs P1/P7 followed by R16F2n/R16R2 (Deng and Hiruki 1991; Schneider et al. 1995; Gundersen and Lee 1996). Amplification of the expected c. 1.7 kb fragment, encompassing the 16S rRNA gene and the 16S–23S intergenic spacer region, was obtained from diseased samples whereas no amplification was detected in asymptomatic samples. The nested PCR amplicons were purified and sequenced. The sequences were assembled, aligned and deposited in GenBank under Accession No. PX691009. BLASTn analysis revealed 99.48% nucleotide identity with strains of '*Candidatus Phytoplasma cynodontis*' including the Bermuda grass white leaf phytoplasma (BGWL-C1, AJ550984), the reference strain of '*Ca. P. cynodontis*' belonging to the 16SrXIV-A subgroup. Phylogenetic study of the 16S rRNA gene sequence also showed that the chilli little leaf isolate, designated CLL01, obtained in this study clustered with established '*Ca. P. cynodontis*' strains, belonging to XIV-A subgroup (Figure 2). Subgroup assignment was performed based on 16S rRNA gene sequence analysis following established phytoplasma classification criteria.

Phytoplasmas belonging to the 16SrXIV group have previously been reported infecting monocot and dicot hosts, including grasses such as Bermuda grass and cultivated crops like linseed in India. However, chilli little leaf disease in India has predominantly been associated with phytoplasma groups 16SrI, 16SrII and 16SrVI (Kumari et al. 2019). To the best of our knowledge, this study represents the first report of chilli as a natural host of a strain of '*Candidatus Phytoplasma cynodontis*' (subgroup 16SrXIV-A). The occurrence of a 16SrXIV-A phytoplasma in chilli raises serious concerns regarding its potential spread through infected planting material and insect vectors to other economically important crops. Continuous surveillance and vector

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2026 The Author(s). *New Disease Reports* published by John Wiley & Sons Ltd on behalf of British Society for Plant Pathology.

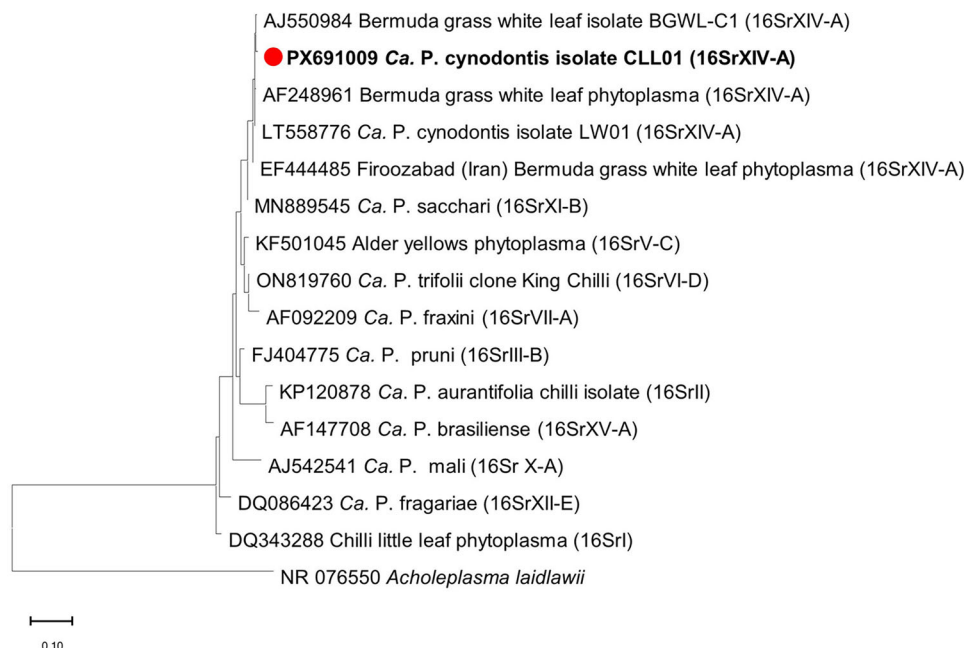


FIGURE 2 | Phylogenetic tree built using the maximum likelihood method from 16S rRNA gene sequences of the chilli little leaf-associated phytoplasma isolate CLL 01 and selected phytoplasma strains from GenBank. *Acholeplasma laidlawii* served as an outgroup for rooting the tree. The phytoplasma sequence from this study is marked with a red circle.

management strategies are therefore essential to prevent further dissemination of this emerging phytoplasma strain.

References

- Ahrens, U., and E. Seemüller. 1992. "Detection of DNA of Plant Pathogenic Mycoplasma-like Organisms by a Polymerase Chain Reaction That Amplifies a Sequence of the 16S rRNA Gene." *Phytopathology* 82: 828–832. <https://doi.org/10.1094/Phyto-82-828>.
- Deng, S., and C. Hiruki. 1991. "Amplification of 16S rRNA Genes From Culturable and Nonculturable Mollicutes." *Journal of Microbiological Methods* 14: 53–61. [https://doi.org/10.1016/0167-7012\(91\)90007-D](https://doi.org/10.1016/0167-7012(91)90007-D).
- Gundersen, D. E., and I. M. Lee. 1996. "Ultrasensitive Detection of Phytoplasmas by Nested-PCR Assays Using Two Universal Primer Sets." *Phytopathologia Mediterranea* 35: 144–151.
- Kumari, S., K. Nagendran, A. B. Rai, B. Singh, G. P. Rao, and A. Bertaccini. 2019. "Global Status of Phytoplasma Diseases in Vegetable Crops." *Frontiers in Microbiology* 10: 1349. <https://doi.org/10.3389/fmicb.2019.01349>.
- Schneider, B., E. Seemueller, C. D. Smart, and B. C. Kirkpatrick. 1995. "Phylogenetic Classification of Plant Pathogenic mycoplasma-Like Organisms or phytoplasmas." In *Molecular and Diagnostic Procedures in Mycoplasma*, edited by S. Razin and J.G. Tully, 369–380. Academic Press. <https://doi.org/10.1016/B978-012583805-4/50040-6>.