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DISEASE NOTE

First molecular identification and characterization of *Spiroplasma citri*, the causal agent of citrus stubborn disease in Algerian citrus groves

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Citrus is one of the most popular fruit crops cultivated in Algeria. The major citrus production regions is situated in the Mitidja area in the Northern part of the country. In order to assess the presence of *Spiroplasma citri,* the causal agent of citrus stubborn disease, a field survey was carried out during the summer on two citrus varietal collections located in the Mitidja, the main citrus growing area. Among the 112 collected samples, two infected trees were identified by molecular techniques in both varietal collections using specific primers SC1-fw (5'ATTTTCAATTTGATGTTTATCAAGAC AAC3') and SC1-rev (5'CAAAATCACTTGC TCCTGCAT TTGG3') (Saillard C., not published). The partial Spiralin gene nucleotide sequence retrieved from the Algerian isolate (GenBank accession No. LN713947.1), revealed a high percentage of nucleotide homology (99%) with the Iranian Fasa I strain isolated from a leafhopper vector (FJ755921.1) (Khanchezar et al. 2014). Interestingly, the Algerian isolate also reacted positively with the primer pairs targeting the TraG gene (Breton et al. 2010) which is essential for insect transmission and predicts a natural diffusion of the pathogen in case of the presence of insect vectors *Circulifer haematoceps* in the infected area. The obtained sequence (LN908966) revealed 97% nucleotide homology with *Spiroplasma citri* plasmid pSci6 from the Moroccan strain GII3. *S. citri* was previously reported in Algeria by Vignault et al. (1980) by isolation from plant material showing symptoms of the disease but no other investigations were carried out afterwards. To our knowledge, this is the first molecular identification and characterization of *S. citri* in the country.

References

Breton M, Duret S, Danet JL, Dubrana MP, Renaudin J (2010) Sequences essential for transmission of *Spiroplasma citri* by its leafhopper vector, Circulifer haematoceps, revealed by plasmid curing and replacement based on incompatibility. Appl Environ Microbiol 76(10): 3198–3205

Khanchezar A, Béven L, Izadpanah K, Salehi M, Saillard C (2014) Spiralin diversity within Iranian strains of *Spiroplasma citri*. Curr Microbiol 68(1):96–104

Vignault JC, Bové JM, Saillard C, Vogel R (1980) Mise en culture de spiroplasmes à partir de matériel végétal et d'insectes provenant de pays circum-méditerranéens et du Proche-Orient. Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Série D. Sciences Naturelles 290:775–778

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