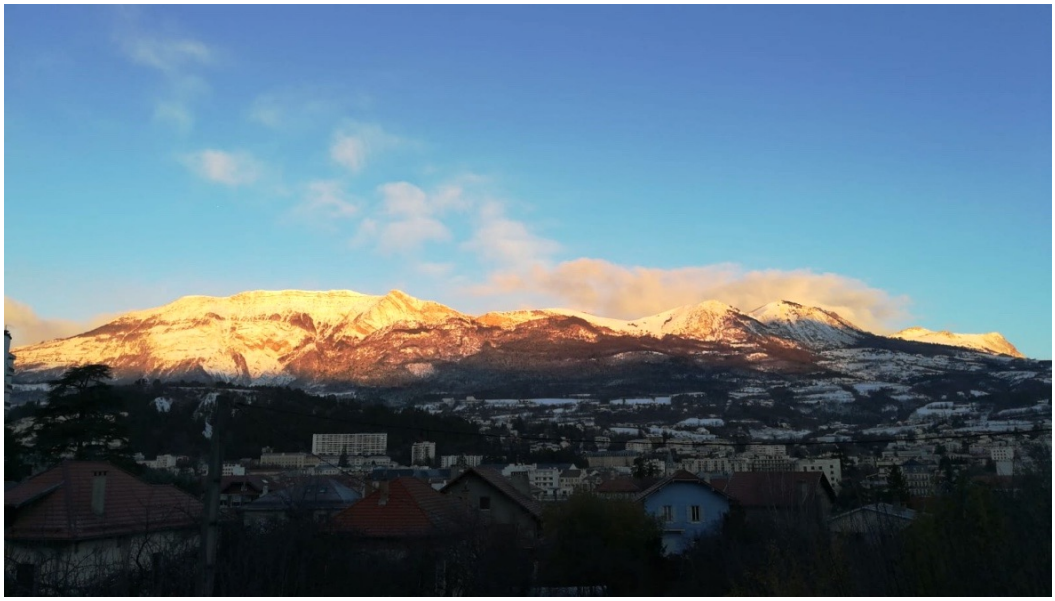
18e Rencontres

de Virologie Végétale



Aussois

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O-01

A newly emerging alphasatellite of banana bunchy top virus affects viral replication, transcription, siRNA production and transmission by aphids

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Banana bunchy top virus (BBTV) is a six-component ssDNA nanovirus transmitted by aphids, causing severe disease of monocot *Musa* plants, which originates from South-East Asia. Asian BBTV isolates are often associated with self-replicating alphasatellites. By Illumina sequencing analysis of banana aphids and leafs collected in Congo, we discovered an alphasatellite of previously unknown genus, phylogenetically related to alphasatellites of dicot nanoviruses. It was encapsidated by BBTV coat protein and accumulated at high levels in plants and aphids, thereby reducing helper virus loads and altering relative abundance of its genomic components (formula). Consequently, the alphasatellite reduced virus transmission efficiency and delayed symptom appearance without impacting disease severity. BBTV and alphasatellite clones caused systemic infection in *Nicotiana bentamiana*, followed by recovery, and BBTV replication protein Rep (but not alphasatellite Rep) induced leaf chlorosis. Illumina sequencing revealed 21, 22 and 24 nucleotide small interfering (si)RNAs covering both strands entire viral of the genome, allowed to map monodirectional Pol II transcription units for each viral mRNA and uncovered pervasive transcription of each component and alphasatellite in both polarities, likely generating double-stranded precursors of viral siRNAs. Consistent with latter hypothesis, viral DNA formulas resembled viral siRNA (but not mRNA) formulas. In summary, following African invasion, BBTV got associated with an alphasatellite, likely originating from a banana neighbour plant and having a negative impact on BBTV replication and transmission. Molecular analysis of BBTV- and alphasatellite-infected plants revealed novel mechanistic aspects of viral DNA transcription by Pol II and siRNA production by the antiviral silencing machinery.