# First Report of Tomato yellow spot virus Infecting Leonurus sibiricus in Brazil

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# First Report of *Tomato yellow spot virus* Infecting *Leonurus sibiricus* in Brazil

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## Abstract

In Brazil, serious epidemics of begomovirus diseases have been successively reported since the mid-90s, among them those caused by *Tomato yellow spot virus* (ToYSV) (1). In July 2009 and October 2010, high incidences (40 to 60%) of plants of the weed *Leonurus sibiricus* (Lamiaceae) exhibiting symptoms of yellow leaf mosaic were found near soybean (*Glycine max*) crops within the municipalities of Marechal Cândido Rondon and Tapejara, in the states of Paraná and Rio Grande do Sul. Leaves from 21 symptomatic and seven asymptomatic *L. sibiricus* plants were collected from both localities and tested for the presence of begomovirus. Total DNA was extracted from each sample using Dneasy Plant Mini Kit (Qiagen) and submitted to PCR using begomovirus universal oligonucleotides PAL1v1978/PAR1c496 (3). One fragment of approximately 1,300 bp comprising the 5′-region of the replication-associated protein (Rep) gene, the entire intergenic region (IR), and the 5′-region of the coat protein (CP) gene was amplified from

all symptomatic, but not from asymptomatic samples. Amplified fragments corresponding to all isolates were directly sequenced and nucleotide sequence comparisons indicated 98 to 99% nucleotide identity among themselves, and 93 to 94% identity with the corresponding nucleotide sequences for the DNA-A of the begomovirus ToYSV (GenBank Accession No. DQ336350). To confirm these results, the full genome of ToYSV Mc-7 isolated from Marechal Cândido Rondon was cloned and completely sequenced by primer walking (Macrogen Seoul, Korea). The DNA-A of ToYSV Mc-7 (JX513952) was 2,592 nt long and shared 92 and 91% identity with isolates of ToYSV from Argentina (FJ538207) and Brazil (DQ336350), respectively. The DNA-B of ToYSV Mc-7 (JX513952) was 2,568 nt long and shared 91% identity with DNA-B of a Brazilian isolate of ToYSV (DQ336351). The ToYSV Mc-7 isolate is a new strain named *Tomato yellow spot virus* (Brazil:Marechal Candido Rondon 7:Leonurus:2009) [ToYSV-(BR:MCR7:Le:09)]. To demonstrate pathogenicity, virus-free adults of *Bemisia tabaci* biotype B were confined on symptomatic *L. sibiricus* plants for a 48-h acquisition period. The whiteflies were then transferred to healthy *L. sibiricus,* bean (*Phaseolus vulgaris*), soybean, and tomato (*Solanum lycopersicum*) plants. *L. sibiricus* plants showed the original symptoms on the leaves (five symptomatic plants, seven inoculated plants), whereas bean (3/7), soybean (4/10), and tomato plants (5/10) exhibited mild yellow leaf mosaic. The infection in these symptomatic plants was confirmed by PCR with oligonucleotides PAL1v1978/PAR1c496 (3) and subsequent direct nucleotide sequencing of the 5’-region of the CP gene, which confirmed the identity of the transmitted virus as ToYSV. ToYSV was first reported infecting tomato plants in Minas Gerais state, Brazil (1). Recently, ToYSV was found infecting bean and soybean plants in northwestern Argentina (2). Because *L. sibiricus* is a weed widely distributed throughout Brazil, and the ToYSV vector *B. tabaci* is also common, this weed may become a potential source of inoculun of ToYSV to bean, soybean, and tomato crops. To our knowledge, this is the first report of *L. sibiricus* as a natural host of ToYSV.

*References*: (1) R. F. Calegario et al. Pesq. Agropec. Bras. 42:1335, 2007. (2) P. E. Rodríguez-Pardina et al. Ann. Appl. Biol. 158:69, 2011. (3) M. R. Rojas et al. Plant Dis. 77:340, 1993.

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