New Disease Reports

WILEY

NEW DISEASE REPORT OPEN ACCESS

First Report of Groundnut Ringspot Virus Infecting Mungbean in Argentina

G. M. Varela[1,2] | P. M. Lopez-Lambertini[1,2] | P. Rodriguez-Pardina[1,2]

[1]Instituto Nacional de Tecnología Agropecuaria, Instituto de Patología Vegetal (IPAVE), Córdoba, Argentina | [2]Consejo Nacional de Investigaciones Científicas y Técnicas, Unidad de Fitopatología y Modelización Agrícola (UFyMA), Córdoba, Argentina

Correspondence: G. M. Varela (varela.gonzalo@inta.gob.ar)

Received: 11 July 2025 | **Accepted:** 16 September 2025

Keywords: *Orthotospovirus arachianuli* | tospovirus | *Vigna radiata*

Mungbean (*Vigna radiata*) is a plant species native to India and widely cultivated worldwide. In recent decades, its production and consumption outside Asia have increased significantly, mainly due to its high protein content. In Argentina, it has been incorporated into production systems to diversify summer crops in the northwest of the country (Vizgarra et al. 2014). Orthotospoviruses cause severe damage to economically important crops in many parts of the world, causing significant losses in yield and product quality (Pappu et al. 2009). In Argentina, groundnut ringspot virus (GRSV, a member of the species *Orthotospovirus arachianuli*) has been identified as a pathogen affecting several crops. However, there have been no reports of GRSV infecting mungbean, either in Argentina or globally.

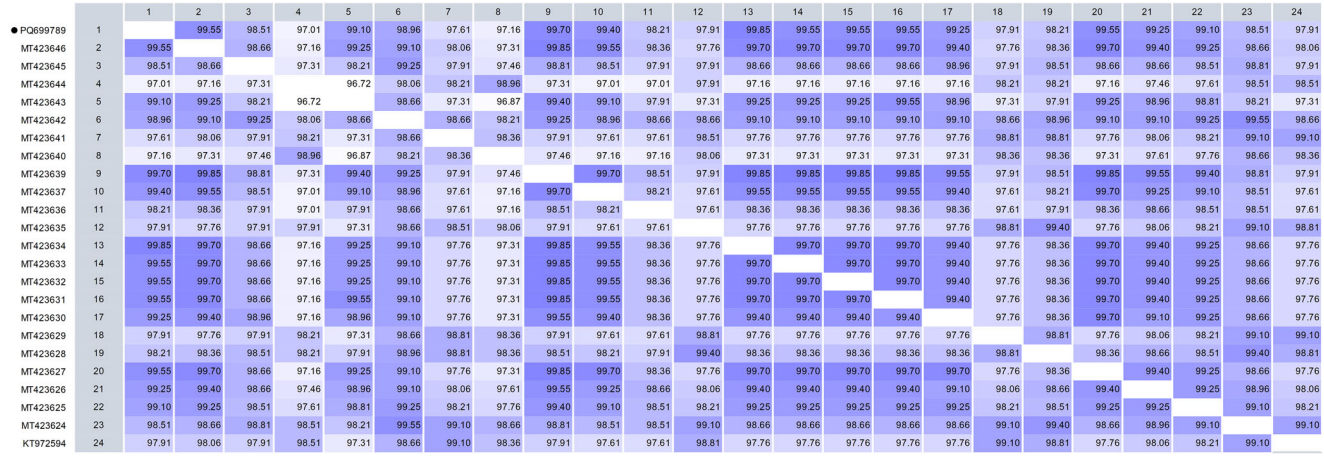
Mungbean plants with virus-like symptoms including distorted leaves, mosaic and chlorotic ringspots (Figure 1) were collected during the 2023/24 growing season in Córdoba and Santiago del Estero provinces. A total of 121 samples were analysed by PTA-



FIGURE 1 | Mungbean leaves with symptoms of virus infection collected in the provinces of Córdoba and Santiago del Estero, Argentina.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2025 The Author(s). *New Disease Reports* published by John Wiley & Sons Ltd on behalf of British Society for Plant Pathology.



		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
● PQ699789	1		99.55	98.51	97.01	99.10	98.96	97.61	97.16	99.70	99.40	98.21	97.91	99.85	99.55	99.55	99.55	99.25	97.91	98.21	99.55	99.25	99.10	98.51	97.91
MT423646	2	99.55		98.66	97.16	99.25	99.10	98.06	97.31	99.85	99.55	98.36	97.76	99.70	99.70	99.70	99.70	99.40	97.76	98.36	99.70	99.40	99.25	98.66	98.06
MT423645	3	98.51	98.66		97.31	98.21	99.25	97.91	97.46	98.81	98.51	97.91	97.91	98.66	98.66	98.66	98.66	98.96	97.91	98.51	98.66	98.66	98.51	98.81	97.91
MT423644	4	97.01	97.16	97.31		96.72	98.06	98.21	98.96	97.31	97.01	97.01	97.91	97.16	97.16	97.16	97.16	97.16	98.21	98.21	97.16	97.46	97.61	98.51	98.51
MT423643	5	99.10	99.25	98.21	96.72		98.66	97.31	96.87	99.40	99.10	97.91	97.31	99.25	99.25	99.25	99.55	98.96	97.31	97.91	99.25	98.96	98.81	98.21	97.31
MT423642	6	98.96	99.10	99.25	98.06	98.66		98.66	98.21	99.25	98.96	98.66	98.66	99.10	99.10	99.10	99.10	99.10	98.66	98.96	99.10	99.10	99.25	99.55	98.66
MT423641	7	97.61	98.06	97.91	98.21	97.31	98.66		98.36	97.91	97.61	97.61	98.51	97.76	97.76	97.76	97.76	97.76	98.81	98.81	97.76	98.06	98.21	99.10	99.10
MT423640	8	97.16	97.31	97.46	98.96	96.87	98.21	98.36		97.46	97.16	97.16	98.06	97.31	97.31	97.31	97.31	97.31	98.36	98.36	97.31	97.61	97.76	98.66	98.36
MT423639	9	99.70	99.85	98.81	97.31	99.40	99.25	97.91	97.46		99.70	98.51	97.91	99.85	99.85	99.85	99.85	99.55	97.91	98.51	99.85	99.55	99.40	98.81	97.91
MT423637	10	99.40	99.55	98.51	97.01	99.10	98.96	97.61	97.16	99.70		98.21	97.61	99.55	99.55	99.55	99.55	99.40	97.61	98.21	99.70	99.25	99.10	98.51	97.61
MT423636	11	98.21	98.36	97.91	97.01	97.91	98.66	97.61	97.16	98.51	98.21		97.61	98.36	98.36	98.36	98.36	98.36	97.61	97.91	98.36	98.66	98.51	98.51	97.61
MT423635	12	97.91	97.76	97.91	97.91	97.31	98.66	98.51	98.06	97.91	97.61	97.61		97.76	97.76	97.76	97.76	97.76	98.81	99.40	97.76	98.06	98.21	99.10	98.81
MT423634	13	99.85	99.70	98.66	97.16	99.25	99.10	97.76	97.31	99.85	99.55	98.36	97.76		99.70	99.70	99.70	99.40	97.76	98.36	99.70	99.40	99.25	98.66	97.76
MT423633	14	99.55	99.70	98.66	97.16	99.25	99.10	97.76	97.31	99.85	99.55	98.36	97.76	99.70		99.70	99.70	99.40	97.76	98.36	99.70	99.40	99.25	98.66	97.76
MT423632	15	99.55	99.70	98.66	97.16	99.25	99.10	97.76	97.31	99.85	99.55	98.36	97.76	99.70	99.70		99.70	99.40	97.76	98.36	99.70	99.40	99.25	98.66	97.76
MT423631	16	99.55	99.70	98.66	97.16	99.55	99.10	97.76	97.31	99.85	99.55	98.36	97.76	99.70	99.70	99.70		99.40	97.76	98.36	99.70	99.40	99.25	98.66	97.76
MT423630	17	99.25	99.40	98.96	97.16	98.96	99.10	97.76	97.31	99.55	99.40	98.36	97.76	99.40	99.40	99.40	99.40		97.76	98.36	99.70	99.10	99.25	98.66	97.76
MT423629	18	97.91	97.76	97.91	98.21	97.31	98.66	98.81	98.36	97.91	97.61	97.61	98.81	97.76	97.76	97.76	97.76	97.76		98.81	97.76	98.06	98.21	99.10	99.10
MT423628	19	98.21	98.36	98.51	98.21	97.91	98.96	98.81	98.36	98.51	98.21	97.91	99.40	98.36	98.36	98.36	98.36	98.36	98.81		98.36	98.66	98.51	99.40	98.81
MT423627	20	99.55	99.70	98.66	97.16	99.25	99.10	97.76	97.31	99.85	99.70	98.36	97.76	99.70	99.70	99.70	99.70	99.70	97.76	98.36		99.40	99.25	98.66	97.76
MT423626	21	99.25	99.40	98.66	97.46	98.96	99.10	98.06	97.61	99.55	99.25	98.66	98.06	99.40	99.40	99.40	99.40	99.10	98.06	98.66	99.40		99.25	98.96	98.06
MT423625	22	99.10	99.25	98.51	97.61	98.81	99.25	98.21	97.76	99.40	99.10	98.51	98.21	99.25	99.25	99.25	99.25	99.25	98.21	98.51	99.25	99.25		99.10	98.21
MT423624	23	98.51	98.66	98.81	98.51	98.21	99.55	99.10	98.66	98.81	98.51	98.51	99.10	98.66	98.66	98.66	98.66	98.66	99.10	99.40	98.66	98.96	99.10		99.10
KT972594	24	97.91	98.06	97.91	98.51	97.31	98.66	99.10	98.36	97.91	97.61	97.61	98.81	97.76	97.76	97.76	97.76	97.76	99.10	98.81	97.76	98.06	98.21	99.10	

FIGURE 2 | Nucleotide sequence identity and heat map for the partial N gene of groundnut ringspot virus isolated from mungbean (marked with black circle) and other isolates from Argentina. Darker blue colour indicates a higher sequence identity.

ELISA using antisera raised against alfalfa mosaic virus (IPAVE, Córdoba, Argentina), and potyviruses (Agdia, USA) and by DAS-ELISA with cucumber mosaic virus antiserum (BIOREBA, Switzerland). Furthermore, a polyclonal antiserum raised against the GRSV nucleocapsid (N) protein, which was heterologously expressed in *Escherichia coli*, was employed to differentiate infections caused by GRSV and tomato spotted wilt virus (TSWV) by DAS-ELISA (Williams et al. 2001). Among the samples tested, five yielded positive results for GRSV, exhibiting an average OD_{405} value of 0.95. In comparison, negative controls showed an average OD_{405} value of 0.030 and the positive controls for GRSV and TSWV had OD_{405} values of 1.25 and 0.006, respectively. No positive results were obtained for the other viruses tested.

Total RNA was extracted from three of the GRSV-positive samples using the CTAB method. Reverse transcription reactions were performed using the M-MLV reverse transcriptase enzyme (Epicentre, USA) and the reverse primer NGRSVR (Boari et al. 2002), according to manufacturer's instructions. PCR reactions were performed using Pegasus Taq polymerase (Bio-Logical Products, Argentina) and the specific primers NGRSVR and NGRSVF (Boari et al. 2002). The reaction consisted of 30 cycles with the following steps: 95°C for 1 min, 57°C for 2 min and 72°C for 1 min, with a final extension at 72°C for 7 min. A DNA fragment of approximately 800 base pairs, corresponding to the N gene was amplified. The amplicon was purified and Sanger sequenced (Genomics Unit of the Institute of Biotechnology of INTA Castelar). The obtained sequence (670 bp; GenBank Accession No. PQ699789) had >97% nucleotide identity (Figure 2) with sequences of other Argentinian GRSV isolates, all obtained from peanut.

This is the first report of GRSV infecting mungbean in Argentina and globally. Understanding the host range of the virus is an important step in developing effective management strategies.

Acknowledgements

This work was funded by the Instituto Nacional de Tecnología Agropecuaria (INTA), Grant/Award Number: PD084.

References

Boari, A. J., E. Maciel-Zambolim, D. D. Lau, et al. 2002. "Detection and Partial Characterization of an Isolate of Groundnut Ringspot Virus in *Solanum Sessiliflorum*." *Fitopatologia Brasileira* 27: 249–253. https://doi.org/10.1590/S0100-41582002000300002.

Pappu, H. R., R. A. C. Jones, and R. K. Jain. 2009. "Global Status of Tospovirus Epidemics in Diverse Cropping Systems: Successes Achieved and Challenges Ahead." *Virus Research* 141: 219–236. https://doi.org/10.1016/j.virusres.2009.01.009.

Vizgarra, O. N., S. Y. Mamani Gonzales, C. M. Espeche, D. E. Mendez, and L. D. Ploper. 2014. "Evaluaciones Preliminares de Variedades de Poroto Mungo (*Vigna radiata)* en Tucumán, Argentina." *Estación Experimental Agroindustrial Obispo Colombres; Avance Agroindustrial* 35: 30–34.

Williams, L. V., P. M. López Lambertini, K. Shohara, and E. B. Biderbost. 2001. "Occurrence and Geographical Distribution of Tospovirus Species Infecting Tomato Crops in Argentina." *Plant Disease* 85: 1227–1229. https://doi.org/10.1094/PDIS.2001.85.12.1227.