

Evaluation of *in situ* and *ex situ* forage germplasm collections reveals the first detection of Alfalfa Mosaic Virus (AMV) and Southern Bean Mosaic Virus (SBMV) in *Urochloa* spp.

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Abstract

AMV and SBMV are economically important seedborne pathogens that mainly attack Fabaceae. The present study revealed the first evidence of the occurrence and seed-transmission of these viruses infecting *Urochloa* species.

Introduction

Urochloa (Syn. *Brachiaria*) are multipurpose grasses which are receiving considerable recognition as an option to improve the existing feed quality in tropical areas. Currently, the ILRI forage Genebank maintains 671 *Urochloa* grass accessions, belonging to 28 species. AMV and SBMV are the most important seedborne plant pathogens that attack legumes. These two viruses have not previously been detected in forage grasses. Evaluation of *in situ* and *ex situ* forage germplasm collections reveals the occurrence of these two viruses in *Urochloa* grasses for the first time.

Methods

Plant materials: seed and leaf samples from 136 *Urochloa* accessions were tested.

Dot blot and reverse transcriptase PCR (RT-PCR) were used for virus detection using virus-specific antisera and primer, respectively. For further confirmation, randomly selected PCR products of each virus were sequenced.

Transmission test: the test was carried out to confirm the seed transmission of the viruses as well as transmission of the viruses from legumes to grasses.



Fig. 1: *Urochloa* accessions conserved at Zwei field genebank, Ethiopia.

Results

Dot blot and RT-PCR test: The RT-PCR test results revealed that 95 (70%) and 108 (79%) of the accessions tested positive for AMV and SBMV, respectively. One hundred twenty-five (92%) of the accessions were positive for AMV and/or SBMV viruses. Similarly, the dot blot assay revealed that 83 (61%) and 82 (60%) of the accessions exhibited a positive reaction (Fig. 2). These two viruses were detected on all the tested species: *U. brizantha*, *U. decumben*, *U. humidicola*, and *U. jubata*. The BLAST analysis of the sequences also confirmed the association of the viruses with the *Urochloa* grass.

Conclusion

The study indicates that AMV and SBMV could be spread to new areas through the exchange of infected seed of *Urochloa* grass. The detection of these two viruses in *Urochloa* spp. presents a new challenge to germplasm conservation, distribution, and its sustainable production of the grasses and demands an immediate attention to mitigate the risk of disease spread.

Transmission of AMV and SBMV: The test result confirmed seed transmission (seedborne) of the two viruses with the transmission rate of 18% (AMV) and 22% (SBMV). Similarly, the developed symptom (Fig. 3) in the artificially inoculated healthy *U. brizantha* plants using AMV and SBMV inocula from legumes indicates that both legumes and *Urochloa* grasses could be infected by the same strains of AMV and SBMV.

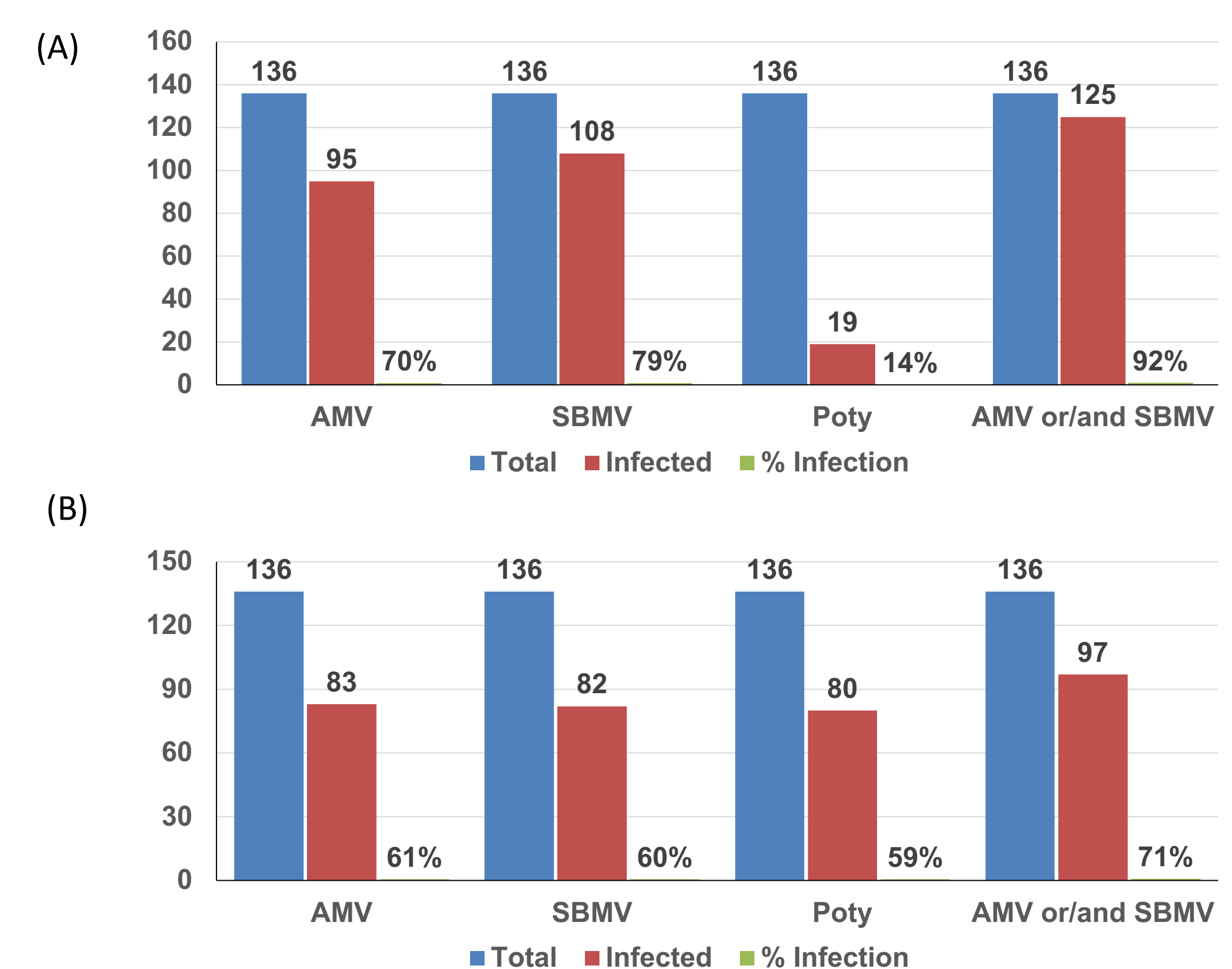


Fig. 2: RT-PCR (A) and dot blot (B) detection of viruses in leaves of *Urochloa* accession.



Fig. 3: Mosaic and chlorotic lesions symptom observed on inoculated *Urochloa brizantha* leaves for AMV (A) and SBMV (B).

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