

Identification of biotic agents associated with chickpea yellowing syndrome (CYS) in Argentina

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Introduction

- In Argentina, during 2023, 22,000 tons. of chickpea were produced in 74,000 ha.
- In recent years, plants showing chlorosis, overgrowth and stunting symptoms have been observed in chickpea crops.
- This set of symptoms was named **chickpea yellowing syndrome (CYS)**.
- The aim of this study was to determine the biotic agents associated with **CYS** in Argentina.



Fig. 1. Chickpea plant with **CYS** symptoms.

Material and methods

- A total of 22 fields, from Salta, Santiago del Estero, and Córdoba provinces were sampled during 2020, 2021, and 2022.
- In each field, 5 symptomatic and 5 asymptomatic plants were collected.
- **Fungal and viral diagnostics** were performed for all samples.
- The presence of viruses was determined using ELISA tests with specific antibodies for all viruses reported in chickpeas so far.
- The diagnosis of fungi was made by *in vitro* culture of vascular tissue from the plants.

Results

- Two viruses were detected: **Bean leaf roll virus (BLRV)** and **alfalfa mosaic virus (AMV)**.

BLRV - Relative incidence

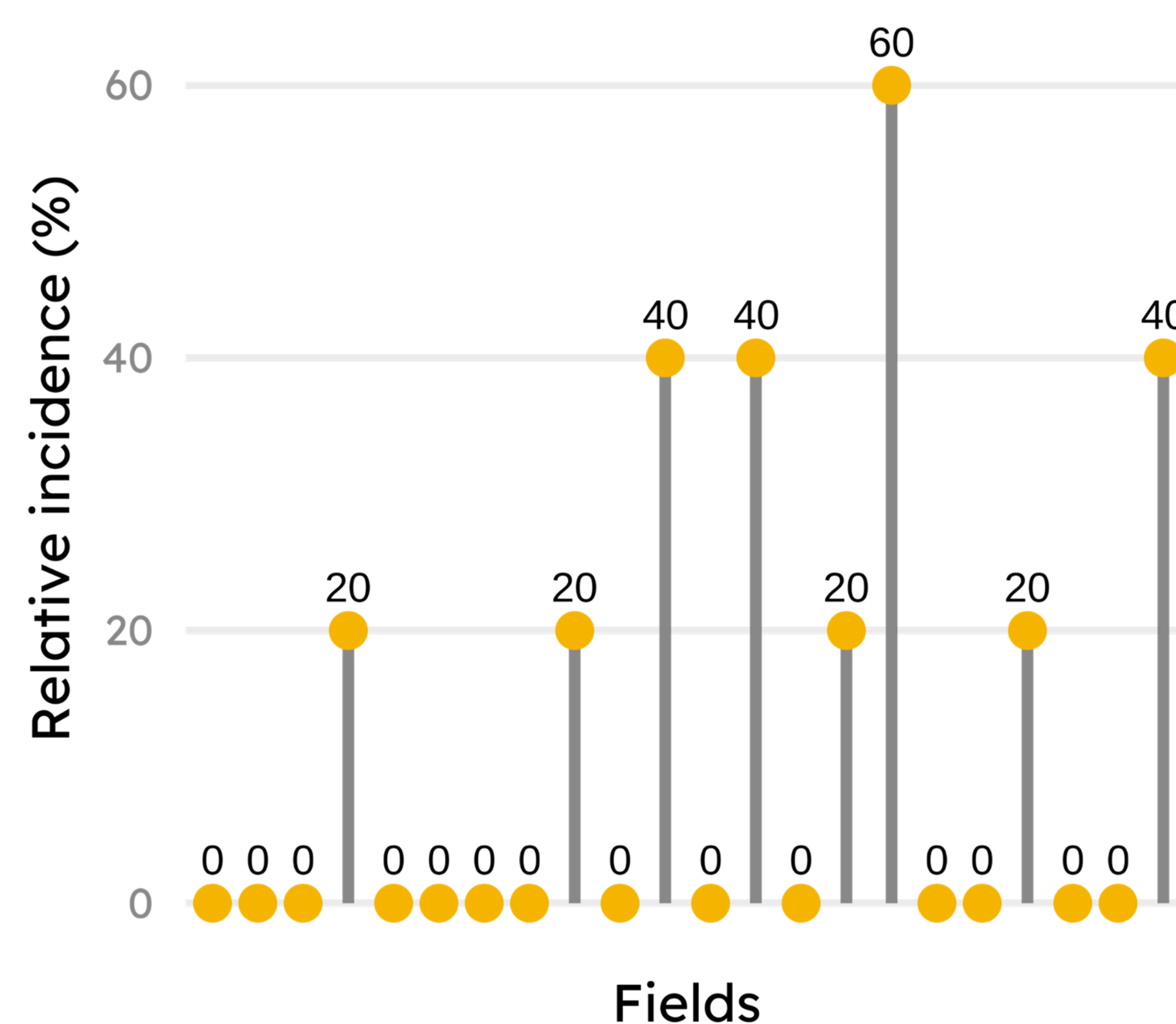


Fig. 2. Relative incidence of BLRV in each sampled field.

AMV - Relative incidence

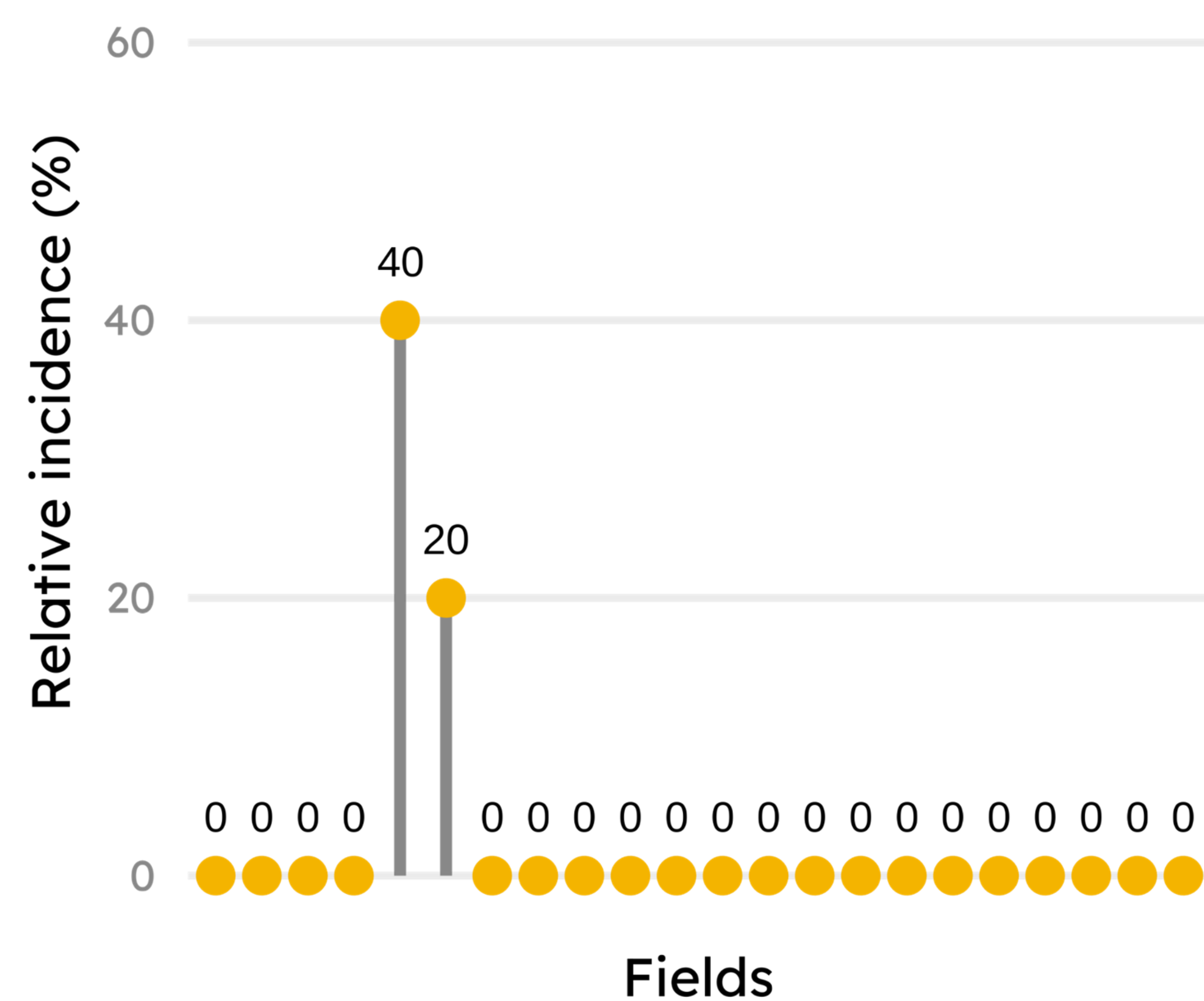


Fig. 3. Relative incidence of AMV in each sampled field..

- For the fungal diagnostics, **Fusarium spp.** was the most frequently detected pathogen.
- **Fusarium spp.** was detected in both symptomatic and asymptomatic plants.
- **Macrophomina spp.** and **Rhizoctonia spp.** were also detected, but at low frequencies.

Fungal genera detected

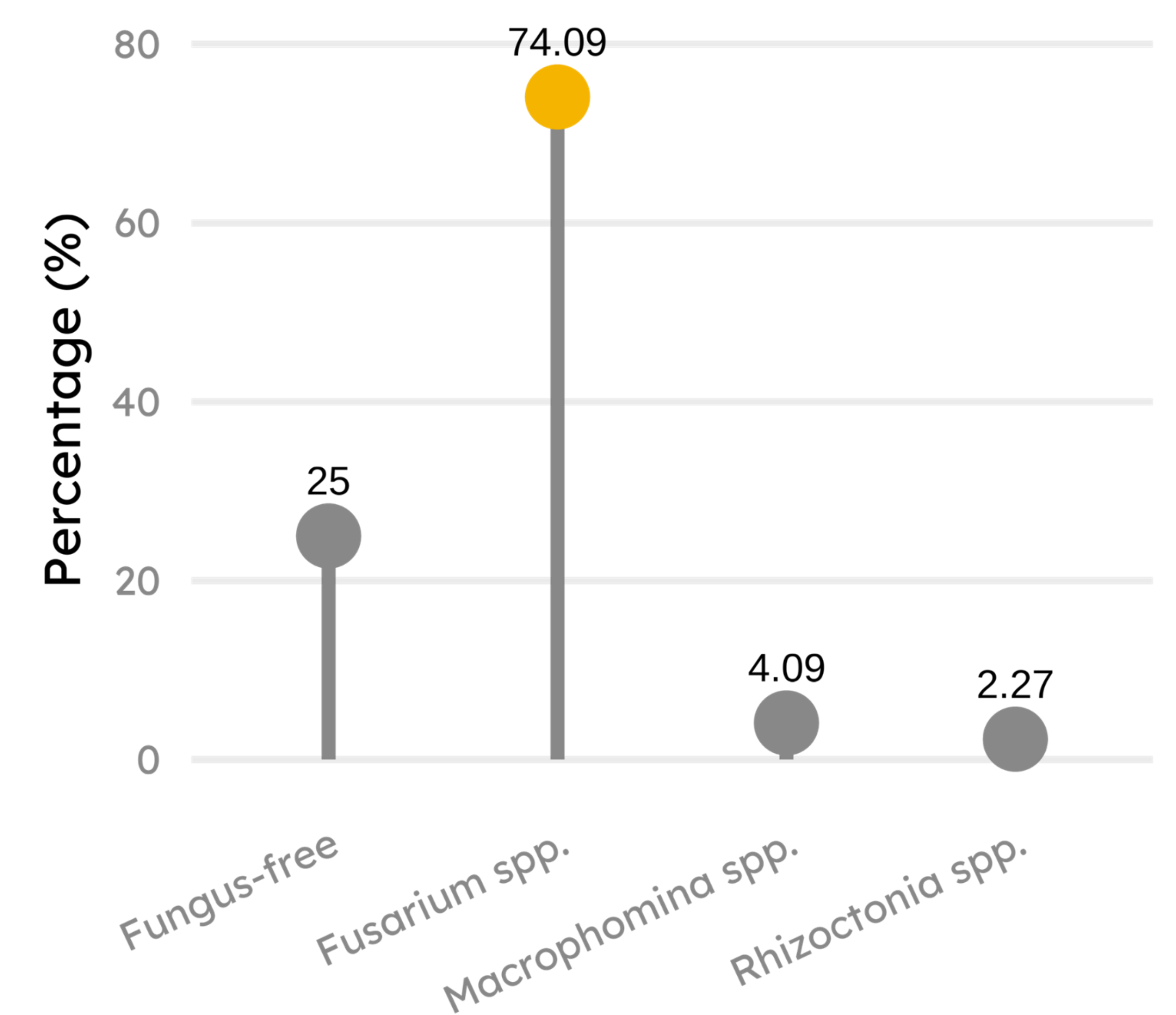


Fig. 4. Detection percentage of each fungal genus found in the 220 processed samples.

Conclusions

- **CYS** is associated with a **complex of biotic agents**, including soil fungi and viruses, which can occur in single or mixed infections.
- **Fusarium spp.** is the most frequently identified fungal genus associated with **CYS**.
- Of the two viruses detected, **BLRV** has the widest distribution.
- These results provide a foundation for understanding the etiology of the disease and serve as a starting point for future research aimed at mitigating its impact on chickpea production in Argentina.