

Fungal flora in cowpea crops in the province of Corrientes, Argentina

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INTRODUCTION & AIM

Argentina is among the top 20 legume producers in terms of tonnage. Cowpea (*Vigna unguiculata* [L.] Walp., cv. Cuarentón) contains a high concentration of protein, minerals, vitamins, and carbohydrates and a low lipid content, making it of great importance in human nutrition. The seeds of various legumes have been reported to be an important source of primary inoculum for various pathogenic fungi, including species of the genera *Fusarium*, *Curvularia*, *Bipolaris*, *Alternaria*, and *Macrophomina*. Therefore, the objective of this study was to quantify the presence of fungi in cowpea seeds from two agricultural seasons and to identify the fungi present in different parts of the seedling (root, leaf, and petiole).

METHOD

Obtaining cowpea seedling isolates: This was done by culturing roots, petioles, and leaves on 1.5% Potato Glucose Agar (PGA) culture medium, after disinfection in 1.5% sodium hypochlorite. The plates were incubated under laboratory conditions (25°C ± 2°C; 12 h light/12 h dark) for 10 days. The seedlings were obtained this year (2025) from cultures grown at the Regional School of Agriculture, Livestock, and Related Industries (ERAGIA). Obtaining cowpea seed isolates: This was done by in vitro culturing 400 seeds (200 seeds per 2023/24 and 2024/25 growing seasons of the INTA-El Sombrero "Cuarentón" variety) on 1.5% Potato Glucose Agar (PGA) culture medium, after disinfection in 1.5% sodium hypochlorite. The boxes were incubated under laboratory conditions (25°C +/- 2°C; 12 h light/12 h darkness) for 10 days.



Figure 1. *Fusarium* in the seeds



Figure 2. *Trichoderma* in the seeds

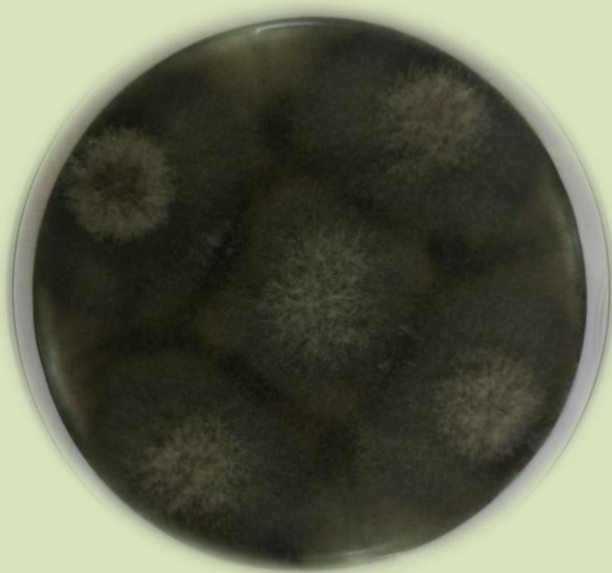


Figure 3. *Bipolaris* sp.

FUTURE WORK / REFERENCES

- Al-Jaradi et al. (2018). PeerJ 6:e6064.
- Cabrera et al. (2010) Phyopatologica 36 (2) 172-174 p.
- Ofi et al. (2024). Breed. Genet. 56(3): 1169-1176.
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RESULTS & DISCUSSION

As we can see among the different genera of fungi found in cowpea seeds and seedlings (Table 1), some stand out as pathogens in legume crops, especially the genera *Fusarium* (Fig. 1), *Alternaria*, *Bipolaris*, and *Exsheroillum*. As mentioned by Al-Jaradi et al. (2018), the species *Fusarium equiseti* is capable of causing seedling death in this crop. In a similar study, Reis & Trezzi (2012) mention that several species of the genus *Fusarium* cause root death (Table 2) in legume crops. These same authors also mention that the fungi *Alternaria alternata* and *A. tenuissima* are foliar pathogens in soybean crops. Regarding the genus *Bipolaris*, Cabrera et al. (2010) demonstrated that *Bipolaris sorokiniana* is capable of causing leaf spots in soybean crops. In a more recent study, Ofi et al. (2024) demonstrated that *Exsheroillum rostratum* is a foliar pathogen of *Vicia faba*. It is noteworthy that the fungus with the highest incidence in the seeds was *Trichoderma* (Fig. 2). This microorganism stands out as the most widely used fungal antagonist in the biological control of plant diseases. It is a fungus with several mechanisms of action, such as mycoparasitism, antibiosis, lysis, and induction of plant defenses, which significantly reduces the pathogen's resistance, unlike chemical control using fungicides.

Table 1: Fungi detected in cowpea seeds from two agricultural seasons

		Present fungi(%)							
Camp.	Tri.	Fus.	Sor.	Alt.	Pen.	Asp.	Bip.	Cur.	Nig.
22/23	11.5	9	4	4	3.5	1.5	0.5	-	0.5
23/24	22	7	-	-	-	1.5	-	3	0.5

Trichoderma (Tri), *Fusarium* (Fus), *Sordaria* (Sor), *Alternaria* (Alt), *Penicilium* (Pen), *Aspergillus* (Asp), *Bipolaris* (Bip), *Curvularia* (Cur), *Nigrospora* (Nig), *Exsheroillum* (Exs), *Cladosporium* (Cla), and *Campaing* (Camp.)

Table 2: Fungi identified in root, leaf and petiole of cowpea plants, present (+) absent (-).

Parts	Fungi genus				
	Alt.	Fus.	Exs.	Cla.	Bip.
Root	-	+	+	-	-
Petiole	+	-	-	-	+
Leaf	+	+	-	+	-

Alternaria (Alt), *Fusarium* (Fus), *Exsheroillum* (Exs), *Cladosporium* (Cla), *Bipolaris* (Bip).

CONCLUSION

The presence of *Trichoderma* spp. in the seed is very encouraging for this type of research, as it indicates the presence of biological control by native strains adapted to local conditions. This result is very promising for future studies, which will evaluate the antagonistic capacity in vitro using dual cultures between *Trichoderma* and the pathogenic fungi isolated from seeds and seedlings.