

Status of wilt and root rot diseases of Kabuli chickpea in some regions of Morocco

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Abstract

Kabuli chickpea is the most important temperate food legume in wheat based cropping system of Morocco. The area covered by the crop is over 88,000 ha in 2015-16 with a production of 44,000 tons which is not enough to meet the demands of the population, a fact that pushed the country to import chickpea to fill the gaps. The low productivity of chickpea is partly due to diseases and insect pests. Major chickpea diseases are Ascochyta blight and wilt root rot (WRR) affecting spring and winter planted crops causing high yield losses. Although WRR diseases are known to impact chickpea production in Morocco, knowledge on disease incidence, distribution and pathogen associated with WRR complex are not well established. For this purpose, a survey was conducted in two regions of Morocco (Gharb and Saiss) covering 19 fields, to determine the distribution and importance of WRR. The results showed that WRR incidence ranged from 1-30% where the majority of the field had 5 to 15 % disease incidence. Laboratory isolation revealed that the major pathogens associated with disease plants were *Fusarium oxysporum* f.sp. *ciceris* (59.8%), *Rhizoctonia bataticola* (32.7%) and *R. solani* (7.3%) and very low incidence of *Pythium* spp. These results showed the need to develop cultivars resistant to *Fusarium* wilt and dry root rot which are dominant in farmers' fields.

Introduction

Chickpea (*Cicer arietinum* L.) is one of the most important legume crop cultivated in wheat-based cropping system in Morocco. The crop covers an area of 88,000 ha with an annual production of 44,000t. Chickpea production is very low due to diseases, insect pests, poor agronomic practices and drought. The major chickpea diseases are Ascochyta blight (*Ascochyta rabiei*) and wilt root rot (WRR) complex caused by *Fusarium* spp, *Rhizoctonia solani*, *R. bataticola*, and *Sclerotium rolfsii*. Limited information is available on disease distribution and pathogens associated with WRR complex in Morocco. The objectives of the study were to:

- ❖ Determine the distribution and importance of WRR in major chickpea growing regions of Morocco and
- ❖ Identify pathogens associated with WRR complex and their relative importance

Materials and methods

1. Disease survey

Field surveys were undertaken in some major chickpea growing regions of Morocco (Rabat-Sale-Kenitra and Fes-Meknes) covering 19 fields at different growth stages (vegetative and flowering). In each field, percent WRR were recorded and diseased plant samples were collected for pathogen isolations and identifications (Fig.2).

2. Pathogens isolation and identification

Infected chickpea roots (200 samples) were cut into small parts (1 cm), then washed with tap water, sterilized with 20% Clorox (NaOCl) for 2 minutes, after they are rinsed three times in changes of sterilized distilled water and finally dried with sterilized filter papers. The dried pieces were, plated onto PDA and incubated at 25° C for seven days. The fungi were identified by using the key of Barnett and Hunter (1972).

Results

1. Disease survey

The WRR incidence ranged from 1 % to 30 % where 16 fields showed less than 20% WRR incidence (Table 1). Most of the fields in Rabat-Sale-Kenitra showed high WRR incidence (Fig.1).



Figure 1 : Chickpea field severely affected by WRR

2. Pathogens isolation and identification

Results showed that the major pathogens isolated and identified (Fig.3A-F) were *Fusarium* spp (60%), *R. bataticola* (33%) and 7% of *R. solani*. Cultures of the *Fusarium* spp were kept for diversity analysis using host differentials and molecular markers

Table : WRR incidence in chickpea cultivars on farmers field

Village	Province	Region	WRR incidence (%)
Boufakran	Meknes	Meknes-fes	1
Hajeb	Hejeb	Meknes-fes	1
Hajeb	Hejeb	Meknes-fes	1
Meknes	Azrou	Meknes-fes	1
Mraza	Fes	Meknes-fes	10
MO zairhou	Fes	Meknes-fes	20
haj kadour	Meknes	Meknes-fes	15
Arbaous	Sidi kacem	Rabat-Sale-Kenitra	10
Nouirat	Sidi kacem	Rabat-Sale-Kenitra	5
Belkazi	Sidi kacem	Rabat-Sale-Kenitra	30
Had kourt	Sidi kacem	Rabat-Sale-Kenitra	20
Had kourt	Sidi kacem	Rabat-Sale-Kenitra	15
Had kourt	Sidi kacem	Rabat-Sale-Kenitra	5
Am d'fali	Sidi kacem	Rabat-Sale-Kenitra	1
Jorf elmeiha	Sidi kacem	Rabat-Sale-Kenitra	5
Khichat	Sidi kacem	Rabat-Sale-Kenitra	10
Oulad Kadour	Sidi kacem	Rabat-Sale-Kenitra	2
Had kourt	Sidi kacem	Rabat-Sale-Kenitra	5
Had kourt	Sidi kacem	Rabat-Sale-Kenitra	5



Figure 2 : A : Healthy plant, B: affected plant by affected by WRR

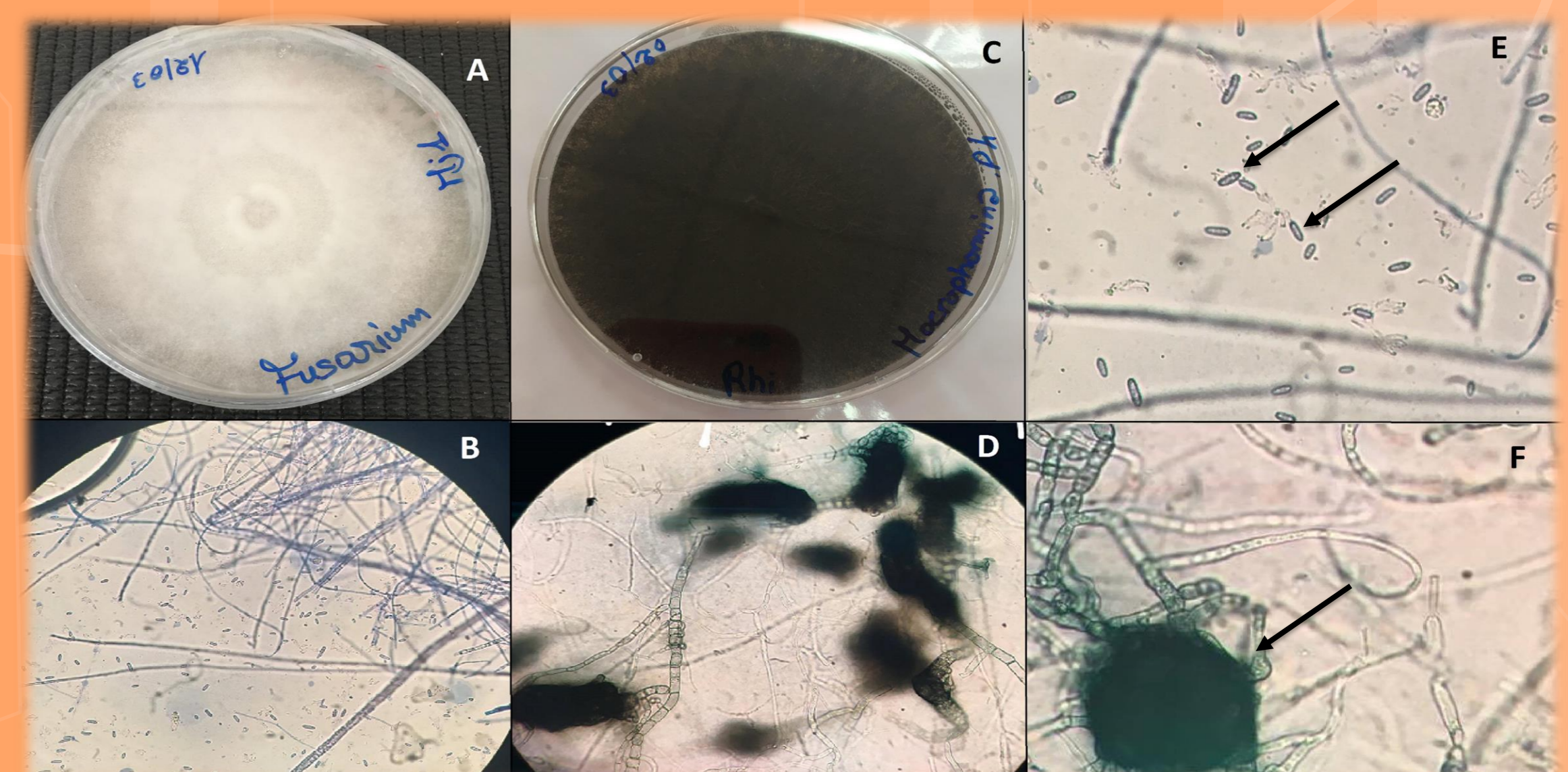


Figure 3 : Culture characteristics of two WRR pathogens examined in this study
A: *Fusarium* spp on PDA B: *Fusarium* spp showed under microscope C: *Rhizoctonia bataticola* on PDA
D: *R. bataticola* showed under microscope E : *Microconidia* of *Fusarium* spp F: Sclerotia of *R. bataticola*

Conclusion

From the present survey, it was evident that WRR is one of the major factors that leads to yield reduction. Chickpea breeding program should target *Fusarium* wilt and dry root rot.

References

Barnett, H. L., & Hunter, B. B. 1972. Illustrated Genera of Imperfect Fungi. (3rd ed).