Quinoa insect pests

An exploratory survey and screening for resistance to its major insects

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Introduction

Abstract

The FAO emphasis the importance of promoting quinoa cultivation due to its high nutritional value and potential for enhancing sustainable global food security. Introducing quinoa to new geographic regions may lead to unknown agronomic challenges. Insufficient understanding of pests can result in applying inappropriate pest management techniques.

Figure 1: Quinoa crop planted in Benguerir region of Morocco

Background

Quinoa (*Chenopodium quinoa*) is an annual herbaceous plant, native to the Andes of South America. It has recently been introduced in Morocco, where it has shown excellent adaptation and drought tolerance in arid areas. Over the past five years, the market value of this alternative crop has significantly increased, reflecting its growing importance in agricultural diversification and food security strategies.

Hypothesis

Quinoa accessions each have a level of resistance to the main insect pests, and an exploratory survey in several regions will identify the most widespread pests affecting quinoa crops in the national market. Screening these quinoa varieties will allow us to select lines with inherent resistance traits that can be used in breeding programs aimed at improving pest resistance in quinoa cultivation. And the study of the appropriate metabolites and genes will also help to better manage the traits that need to be transmitted and maintained".

Objectives

The aim of this research is to identify the most prevalent insect pests affecting quinoa in Morocco, assess the severity of their impact, and analyze the types of damage they cause to the plant.

Figure 2: Quinoa pest overview in Morocco

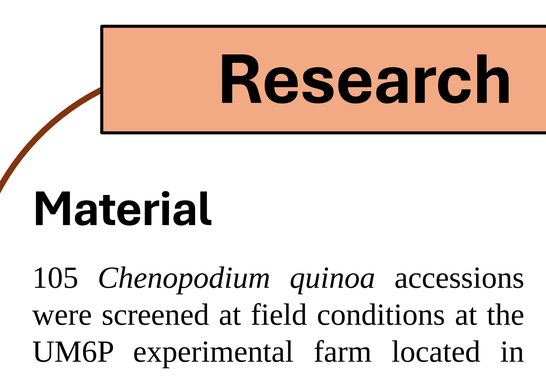
Research

Material

105 *Chenopodium quinoa* accessions were screened at field conditions at the UM6P experimental farm located in Benguerir.

Methodology

The damage was observed. The whippers was used to control bugs density and the beating methods for the Aphids and coleoptera collection. 3 sweeps was done per genotypes each weeks during the growing periods.



The second experiment with protected and unprotect plots was conducted to evaluate the effect of insect pest on the yield and the overall plant health.

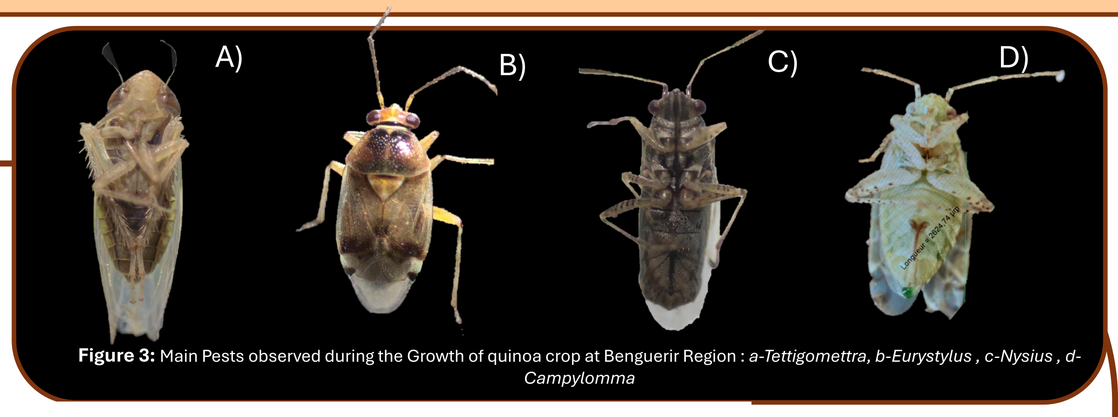
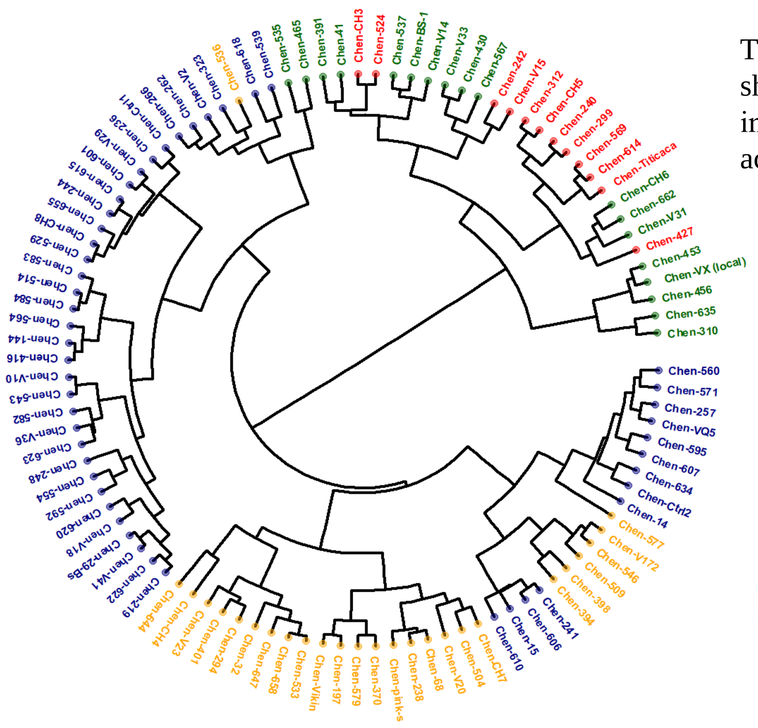


Figure 3: Main Pests observed during the Growth of quinoa crop at Benguerir Region : *a-Tettigomettra, b-Eurystylus , c-Nysius , d-Campylomma*

Results



The preliminary screening results showed a notable variability in the insect's resistance in different quinoa accessions.

Grade	Damage Index
Resistant	0 - 1.0
Tolerant	1.1 - 3.0
Susceptible	3.1 - 5.0
Hightly Susceptible	5.0 - 10

Table1. Table of the analyses scales

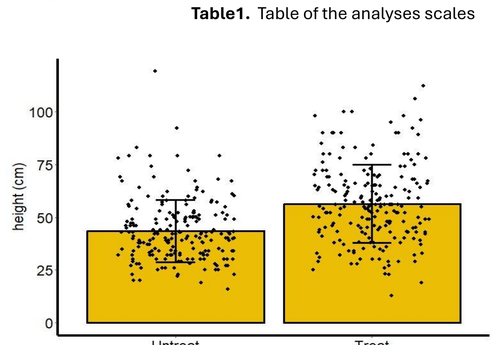


Figure 4: Clustering and classification of quinoa germplasms screened

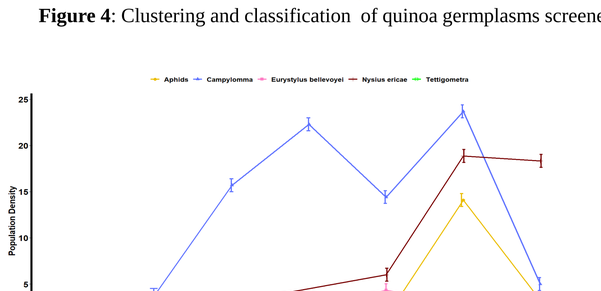


Figure 5. Population density of the Majors insect pests of quinoa crop in Benguerir region

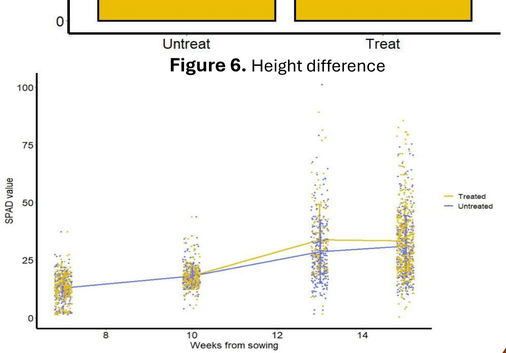


Figure 6. Height difference

Figure 7. SPAD difference

Conclusion

The key insects that affect quinoa are bugs and coleopterans species, including Tettigomettra, Eurystylus, Nysius and Campylomma. These species can cause significant damage to the crop, but they require humidity especially for some of the insect species, which reduces their risk of attack during warmer seasons. However, they can quickly multiply and affect sensitive ecotypes. The insect cycle is influenced by climate and growth stage of the plant. There are still many aspects to consider in studying the interaction between insects and quinoa, and further trials are needed to explore the interaction (insect-plant) in different region of Morocco.

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