# Identification of resistant sources in Durum wheat to Hessian fly *(Diptera: Cecidomyiidae)*

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## Introduction

Hessian fly (Mayetiola destructor) is the major pest in cereal areas and can cause up to 32 % yield losses on durum wheat (Lhaloui et al. 1992).

Host plant resistance is a very effective approach for controlling this insect. Hessian fly (HF) has many biotypes, so far more than 37 HF resistance genes are deployed and incorporated into wheat varieties (Tang et al; 2018) to minimize the negative impacts of the pest. Some resistance genes were found ineffective due to appearance of new biotypes in HF population that break resistance genes in some countries (e.g. Morocco) (El Bouhssini et al. 2009). The main objective of the work is to identify new sources of resistance in durum wheat.

## Materials and methods

*Insect rearing*

A population of HF was collected and reared on susceptible durum wheat variety (*Karim*) at 20°C, 14:10 (L:D) h photoperiod, and 70 ± 5% relative humidity in the greenhouse (Fig. 1).

*Plant material*

A panel of 480 durum wheat genotypes was exposed to the virulent biotype of HF at ICARDA Entomology Laboratory under greenhouse conditions.


Fig. 1: Life cycle of Hessian fly

Ten seeds of each genotype with susceptible (cv. *Karim*) and resistant (*Faraj*) checks were sown in rows in standard plastic flats (54 x 36 x 8 cm) containing peat moss in randomized complete design. Seedlings were infested with 70 mated females and allowed to lay eggs and the evaluation was made 21 days after infestation.

Resistant genotypes showed normal growth and first-instar larvae are dead. Susceptible genotypes showed stunting with live larvae.

Plants with no dead or live larvae were considered escapes (Fig.2).


Figure 2: a & b) Resistant and susceptible durum wheat genotypes;
c & d ) larvae & pupae of hessian fly

## Results and discussion

The durum wheat panel showed varying levels of resistance to HF population. About 4% of the genotypes showed resistance and 7% were moderately resistant (Fig, 3 & 4).

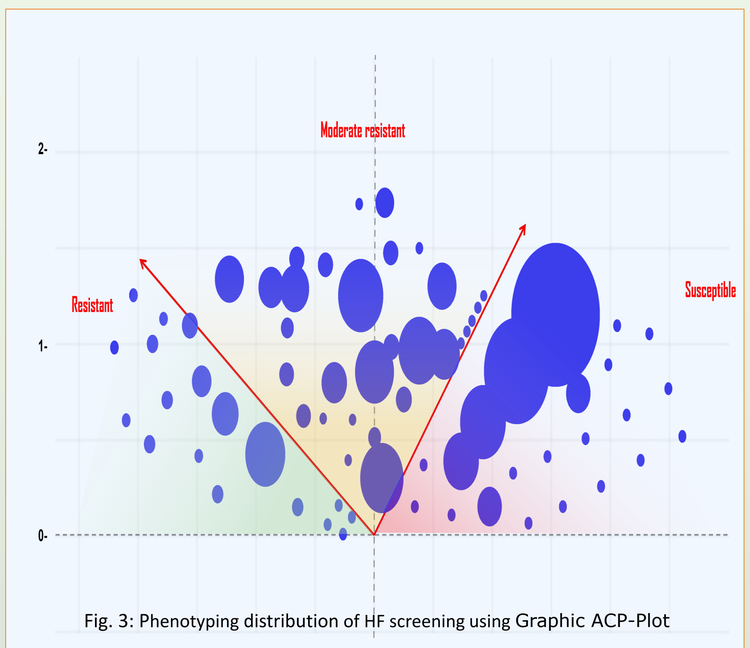


Fig. 3: Phenotyping distribution of HF screening using Graphic ACP-Plot

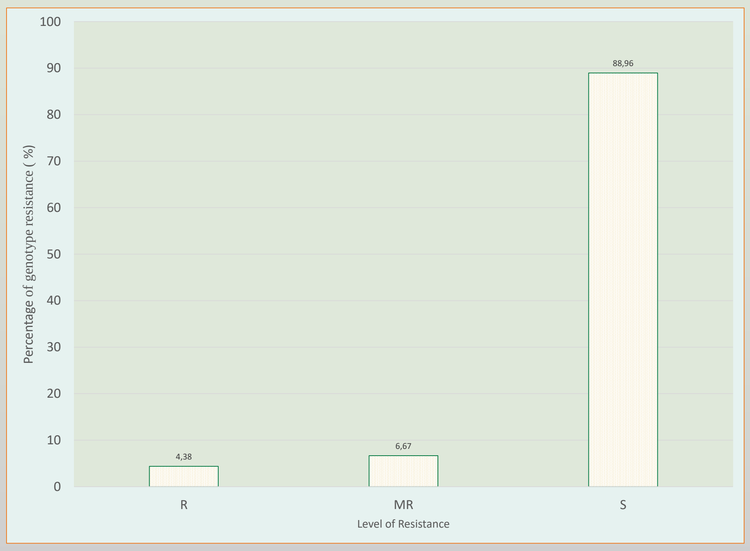


Fig. 4: Percentage of genotypes under different HF reaction groups
(R) resistant, (MR) Moderate resistant & (S) Susceptible

## Conclusion

- HF remains a challenge in wheat producing countries and new virulent biotypes can appear that threaten effective resistance genes.
- The resistant genotypes identified can be used in the breeding program.
- Monitoring the population changes of the insect pest is required to look for new sources of resistance.

## Cited literature


- El Bouhssini M, Chen M, Lhaloui S, Zharmukhamedova G, Rihawi F (2009) Virulence of Hessian fly (Diptera: Cecidomyiidae) in the Fertile Crescent. J Appl Entomol 133:381–385
- Lhaloui, S., Buschman, L., El Bouhssini, M., Amri, A., Hatchett, J. H., Keith, D., Starks, K., & El Houssaini, K. (1992). Control of Mayetiola species (Diptera: Cecidomyiidae) with carbofuran in bread wheat, durum wheat and barley with yield loss assessment and its economic analysis. Al Awamia, 77, 55–73.
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