

# Studies on Black Spot Disease on Wheat Grains in Egypt

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## ABSTRACT

Wheat (*Triticum aestivum* L.) is the most important winter cereal crop in Egypt in terms of planted area and crop production. In Egypt, pathogens associated with wheat kernel black-point disease has become the most serious problems of wheat, causing losses in quality of wheat grain yield. Environmental side effects of fungicides and resistance of pathogens against fungicides stimulate search for other methods. In recent years biological control methods have increased attention as a promising alternative to chemical control ones.

### The obtained results could be summarized as following:

- 1- Survey of kernel black-point disease on wheat cultivars from different Governorates revealed that the as the rate of infection with the disease ranged from (2.3 to 59.3 %), grains of the wheat cultivars commonly grown in the Nile-Delta Governorates showed higher parameters to the black-point disease than the wheat cultivars commonly grown in the Governorates of upper Egypt.
- 2- The isolated pathogen of black-point disease were identified as *Alternaria alternata*, *Helminthosporium sorokiniana*, *Fusarium moniliforme*, *Asperigillus flavus*, *A. niger*, *Penicillium* sp. and *Epicoccum* sp. and *Alternaria alternata* which recorded most highly frequent.
- 3- Relative power of antibiosis (RPA) of bacterial showing antagonistic effect against the causal pathogen of the kernel black-point disease appearing two isolates as bacteria, *Bacillus subtilis* 1, *Bacillus subtilis* 2 and two isolates of fungi, *Trichoderma harzianum* and *T. virede*.
- 4- The Germination testing of different wheat cultivars showing higher germination of effected grains and length of shoot and root, and dry weight. Effect of cultural filtrate pathogens were used in this study *A. alternata*, *H. sorokiniana* and *F. moniliforme* at three concentrations, fungi grow on media at two time at 20 days and 30 days. Data showing highly effected of rate germination at pathogen *A. alternata* on length of both shoots and length of roots.
- 5- Biological control for bioagents against black-point fungi in green house of two methods (spray and injection) showing isolate *B. subtilis* 2 decreased of infection (0.67 – 190 % respectively) compared with control (non inoculated) (9.33 %), isolates of *T. virede* appearing highly effected of decreased of infection rate by two methods, injection and spray (0.33 – 5.67, resp.). isolates of bioagents showing significantly in parameters of yield (1000 weight) *T. virede*, *T. harzianum*, *Bacillus subtilis* 1 and *Bacillus subtilis* 2) to (33.90, 42.36, 35.83, and 23.43 gm resp.) (23.33, 23.46, 22.60, and 6.56, resp.) fungicides sumi-8 gave data in two methods injection and spray followed (31.00 and 23.46, respectively).
- 6- Under field conditions, the tested antagonistic isolates *Bacillus subtilis* 1, *B. subtilis* 2, Mixture, *T. virede*, *T. harzianum*. Compost tea compared fungicides sumi-8 to spray at booting stage data showing that isolates *B.subtilis* 1 and *T. harzianum* highly effected for infection rate of (72.7 and 64.86 respectively) sumi-8 appearing highly significantly (53.74%).
- 7- Antagonistic isolates decreased the disease incidence, the isolate *Bacillus subtilis* 1 and mixture (6.03 and 15.23 %) compared with control (non inoculated) (23.13 %) to the chemical fungicide sumi-8 (10.67).
- 8- Regarding to the grain yield parameters that biocontrol agents significantly increased of wheat grains as 1000 kernel weight compost tea and isolates *T. harzianum* (64.50 – 63.80 gm) compared with the fungicides sumi-8 (64.57 gm) and control (non inoculated) (60.93 gm).
- 9- Weight of discoloration grains of black-point the rate of discoloration in isolates *T. virede* and *Bacillus subtilis* 1 (166.00 – 172.60 gm respectively) compared with control (268.54 gm) fungicides sumi-8 (209.80 gm).

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