

ABSTRACT

In Egypt, wheat (*Triticum aestivum* L.) is one of the most important cereal crops. Stem rust of wheat caused by *Puccinia graminis* f.sp. *tritici* is a widespread disease in Egypt attacking wheat plant causing a great losses in the yield. This work was carried out to make further studies to control stem rust of wheat. Race identification during different seasons using the classical method of identification was occurred indicating that race 11 was the most frequent one while pathotype PTTTT was the most frequent pathotype during 2003/2004 growing season, using the recent method of identification. Also, Gene efficiency and slow-rusting in many commercial wheat cultivars were evaluated. RAPD technique was used to determine the differences in DNA for some wheat cultivars evaluating the similarity between cultivars and between some races. Effect of spraying wheat plants in both seedling and adult stages with different chemical compounds, plant extracts, salt solutions and two kinds of polymers was studied to control stem rust of wheat. Also spraying wheat plants with two types of polymers under field conditions was carried out to control the stem rust of wheat through the lowering of rust severity and evaluation of their effect on yield components. Physiological studies on previously sprayed healthy and infected adult plants with some chemicals, plant extracts and salt solutions were carried out to estimate the activities of peroxidase and polyphenoloxidase enzymes as well as the phenol contents. Also, chlorophyll contents were determined in plants previously sprayed with two types of polymers. Scanning electron

microscopic examinations were performed to study the effect of spraying wheat plants using some inducers and some polymeric materials to control stem rust of wheat.

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الملخص العربي

LIST OF ABBREVIATION

AAB: Advanced American Biotechnology	mM: millimolar
APC: 1-amino cyclopropane -1-carboxylic acid	mm²: millimeter squar
AUDPC: area under disease progress curve	MR: moderately resistant
BABA: Dl-β-aminobutyric acid	No.p./cm²: number of pustules/cm ²
BER: blossom-end rot	OA: oxalic acid
cc: chlorophyll content	ppm: part per million
cm: centimeter	pgt: <i>Puccinia graminis</i> f.sp. <i>tritici</i>
CMV: cucumber mosaic virus	PCR: polymerase chain reaction
chl: chlorophyll	PPO: polyphenoloxidase
cv.: cultivar	PO: peroxidase
d.: day	PRA: photosynthesis rate per unit leaf area
DNA: deoxyribose nucleic acid	PS: pustule size
eq: equivalent	R: resistant
ERI: emergence rate index	RAPD: random amplified polymorphic DNA
EW: emulsion wax	S: susceptible
GS: growth stage	SA: salicylic acid
hr.: hour	SAE: styrene-acrylic emulsion
IAA: indole acetic acid	SAR: systemic acquired resistance
i.e.: that is	SCAR: sequence characterized amplified region
ISR: induced systemic resistance	SEM: scanning electron microscope
IT: infection type	TEM: transmission electron microscope
KCl: potassium chloride	TKW: thousand kernel weight
Kg: kilo gram	TNV: tobacco necrosis virus
LAR: local acquired resistance	TR: transpiration rate
L: length	µg: microgram
l: liter	µg/ml: microgram per milliliter
M: molar	UV: ultraviolet
mg: milligram	v/v: volume per volume
min.: minute	W: width
ml: milliliter	