# Differentiation-related proteins of the wheat yellow rust fungus (*Puccinia striiformis)* as revealed by high resolution two-dimensional polyacrylamide gel electrophoresis

*(Accepted: 14.11.2000)*

**M.M. Saber* and M.A. Shallan**.**
*Plant Pathology Department, Faculty of Agriculture., Cairo University.
**Biochemistry Department, Faculty of Agriculture., Cairo University.

## ABSTRACT

*Uredospores of the wheat yellow rust fungus (Puccinia striiformis West) differentiated, on artificial polyethylene membranes, providing a thigmotrophic signal, a series of infection structures which in nature are necessary to invade the host tissue through the stomata. Within 24 hr germ tubes, appressoria, substomatal vesicles, infection hyphae and haustorial mother cells were developed successively. Alterations in protein metabolism during infection structure differentiation of this obligate plant pathogen were analyzed in the absence of the host plant by high resolution two-dimensional polyacrylamide gel electrophoresis (2-DE) and silver staining. The norm pattern representing the 2-DE protein patterns of the whole developmental sequence of infection structures of Puccinia striiformis showed 723 spots. During infection structure differentiation, 55 proteins were newly formed which altered in quantity, or disappeared. Major alteration in the protein pattern occurred during uredospore germination and when infection hyphae were formed. Uredospore germination was characterized by a decrease of acidic proteins and an increase mainly of proteins with isoelectric points ranging from weakly acidic to basic. The results improved our understanding of the interaction of rust fungi and their host plants. In addition, they provide an alternative method to the molecular approach in which stage-specific genes must be isolated to identify and functionally characterize differentiation-related proteins, especially those occurring or disappearing during developmental stages immediately before biotrophy.*

***Keywords:*** *Wheat yellow rust, Puccinia striiformis West, differentiation-related proteins, two-dimensional polyacrylamide gel electrophoresis.*

## INTRODUCTION

While monokaryotic basidiosopores of the majority of rust fungi, like many other plant pathogenic fungi, infect their host plant cells by direct penetration of cuticle and cell wall, dikaryotic uredospores differentiate a complex series of infection structures in order to invade the leaf through the stomata (Hoch and Staples, 1987 and Saber *et al*., 1998). The signal upon which germ tube growth ceases and infection structures differentiation is induced, is provided by the surface topography (Wynn 1976, Hoch *et al.,* 1987). When, in nature, the tip of the germ tube senses the stomatal lip of the guard cell, formation of appressorium is induced (Hoch *et al.,* 1987) and as a