

CHANGES IN WATER STATUS OF MAIZE LEAVES INFLUENCED BY DROUGHT AND TWO-SPOTTED SPIDER MITE (*TETRANYCHUS URTICAE* KOCH) FEEDING

ANNA CZAPLA, MICHAŁ ŚWIĄTEK, MAŁGORZATA KIELKIEWICZ

Warsaw University of Life Sciences (SGGW)
Faculty of Horticulture and Landscape Architecture
Department of Applied Entomology
Nowoursynowska 159, 02-776 Warsaw
anna_czapla@wp.pl

I. INTRODUCTION

Maize (*Zea mays* L.) is a cultivated plant with high yield potential. In Poland, the acreage under maize cultivation has been increasing systematically since 1995. The size and quality of yields can, however, be reduced by many climatic factors, including long-term periods of drought (Michalski 2009), during which an additional threat is posed by phytophages (Bereś 2007).

Under conditions of soil drought, reduction of relative water content (RWC) occurs earliest in leaves (Kacperska 2002). Water deficit in maize plants has an adverse effect on cell growth, efficiency of the photosynthetic apparatus, transpiration and nutrient uptake and transport (Tanguilig *et al.*, 1987; Ephrath and Hesketh, 1991; Reddy *et al.*, 2004; Michałek and Borowski, 2005). In addition, osmoprotectant levels rise and overproduction of reactive oxygen species (O_2^- , 1O_2 , OH, H_2O_2) occurs, which results in damage to cell membranes and disruption of metabolism and leads to greater activity of protective proteins and accumulation of secondary metabolites (Gershenzon, 1984; Zhang and Kirkham, 1994; English-Loeb *et al.*, 1997; Hasegawa and Bressan, 2000; Jung 2004; Reddy *et al.*, 2004; Moussa and Abdel-Aziz, 2008).

Drought stress modifies the growth, survival and rate of development of pests in a variety of ways (Mellors *et al.*, 1984; Klubertanz *et al.*, 1990; English-Loeb *et al.*, 1997; Sadras *et al.*, 1998; Inbar *et al.*, 2001; Huberty and Denno, 2004).

There are no data in the literature comparing the responses of maize to short-term drought stress and pest herbivory.

The aim of this research was to determine the water status of maize leaves of different cultivars in relation to the duration of soil drought and feeding by the two-spotted spider mite

(*Tetranychus urticae* Koch) (Acarina: Tetranychidae), an acarid which alongside insect pests readily infests maize crops.

II. MATERIALS AND METHODS

The experiments were conducted under greenhouse conditions in two series. Three cultivars of common maize (*Z. mays*) were used in the study: