

SUSCEPTIBILITY OF DIFFERENT CROTON CULTIVARS TO SPIDER MITE FEEDING (ACARI: TETRANYCHIDAE)

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Abstract. The development of spider mite populations (*T. urticae* and *T. cinnabarinus*) as well as plant injuries on different croton cultivars were studied. Observations were conducted in commercial and experimental glasshouse conditions. The highest spider mite populations were noticed on cultivars Norma and Petra, the lowest on Golden Sun. *Tetranychus urticae* was the dominant species in commercial glasshouses. Croton cv. Norma was severely injured by *T. urticae*. The leaf damage index (LDI) for this cultivar was almost 4 after sixteen weeks of mite infestation.

Key words: *Codiaeum variegatum*, *Tetranychus urticae*, *Tetranychus cinnabarinus*, injury, population development

I. INTRODUCTION

Croton (*Codiaeum variegatum* L. Blume) is one of the most decorative pot ornamentals, being represented by more than a hundred commercial cultivars differing in colour and shape. This is, however, a plant of considerable cultivation requirements and a high susceptibility to pest infestation. Its severe injuries can be caused by spider mite which, when feeding even in low numbers, are able to significantly reduce a decorative value of infested plants. Affected leaves first get dull, then turn yellow and drop off. In a short time almost the entire plant become defoliated and its shoots are covered by a thin web. Although a significance of such infestation to croton crop has been previously pointed out by several authors (Scopes 1981; Van de Vrie 1985; Osborne 1986, 1987; Piątkowski 1996) there has been very little information on the cultivar susceptibility or harmfulness of particular mite species to croton plants.

Therefore the present study was undertaken to supplement data in this field.

II. MATERIAL AND METHODS

The study was conducted under glasshouse conditions over two consecutive growing seasons. In 1996 observations were carried out in a commercial glasshouse (co-operative horticultural enterprise in Warsaw) subjected to regular chemical treatments. Quantitative analysis of mite populations was performed on one-year-old plants of five croton cultivars: Golden Sun, Golden Finger, Excellent, Norma and Petra. From May 30 until December 20, 1996 at weekly intervals 60 leaves were sampled at random from each cultivar to determine the mite species and number of mobile specimens. Each leaf was taken as a separate replicate.

In 1997 the research was conducted on three croton cultivars: Golden Sun, Excellent and Norma, grown in the experimental glasshouses of the Warsaw Agricultural University. One-year-old plants potted into peat substrate supplemented with OSMOCOTE® fertilizer (3 g/l) were divided into two groups: trial and control, both consisting of six plants of each cultivar. In mid-June, plants of the first group were initially infested with *Tetranychus urticae* females (previously reared on bean) using 5 specimens per leaf. The first records of the pest quantity and extend of plant injuries were taken after two weeks and continued every 7 days for 16 consecutive weeks.

The leaf damage index (LDI) for each plant was calculated from the formula

$$LDI = \frac{\sum (A \times B)}{n}$$

where: A – number of leaves damaged to the same degree (upon a 1-5 scale),

B – damage degree of a particular leaf,

n – number of leaves on a given plant.

To estimate the extent of leaf damage, the following 1-5 scale was used according to Sadof and Alexander (1993):

						
Degree of leaf damage	O	I	II	III	IV	V
Leaf area damaged	0	0-10%	11-20%	21-40%	41-70%	71-100%

III. RESULTS

Fig. 1 presents the dynamics of mite populations (total mobile specimens of *T. urticae* and *T. cinnabarinus*) on various croton cultivars grown in a commercial glasshouse. Mite populations were present on the foliage of all studied cultivars over the entire observation period, showing a preference towards the younger leaves.

Norma and Petra were found the most attractive cultivars for spider mites as during the whole experiment these pests outnumbered by several times those feeding on Golden Sun and Golden Finger.

Towards the end of growing season *T. cinnabarinus* was gradually expanding in the total mite population and in early December it became the dominant species (Fig. 2). However, at that time the mean number of mites on croton plants was relatively low.

The development of *T. urticae* populations on three croton cultivars in the experimental glasshouses is presented in Fig. 3. Likewise in commercial production, Norma appeared to be the most attractive cultivar for this species. On cv. Golden Sun the pest population was initially increasing very slowly, not exceeding 7 specimens per leaf. On this cultivar the mites reached their peak number (ca. 25 specimens per leaf) 8 weeks after introduction, however their maximum level was almost half that on cv. Norma.

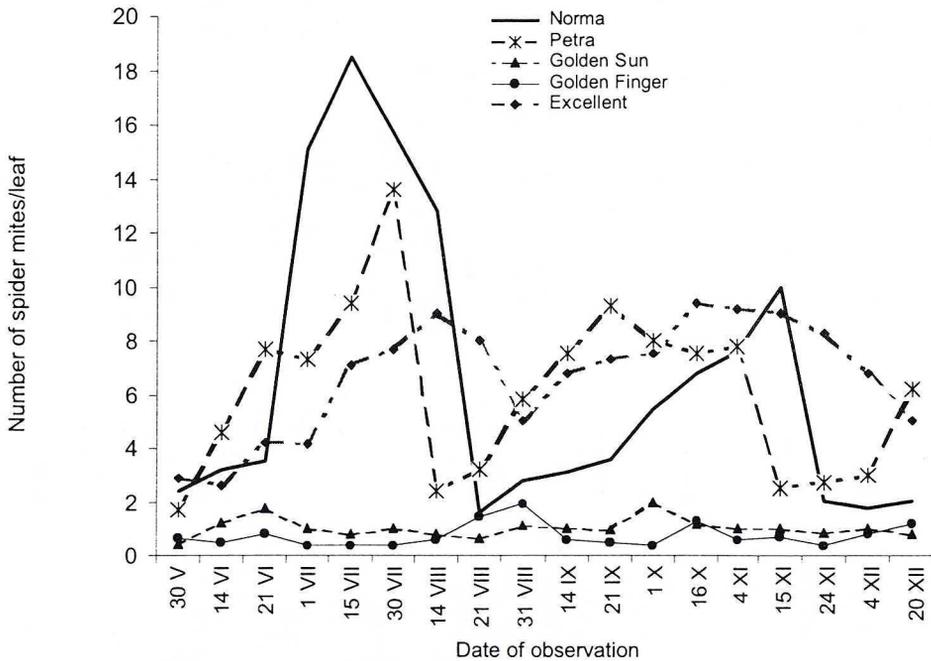


Fig. 1. Development of spider mite populations on various croton cultivars (commercial glasshouse) 1996

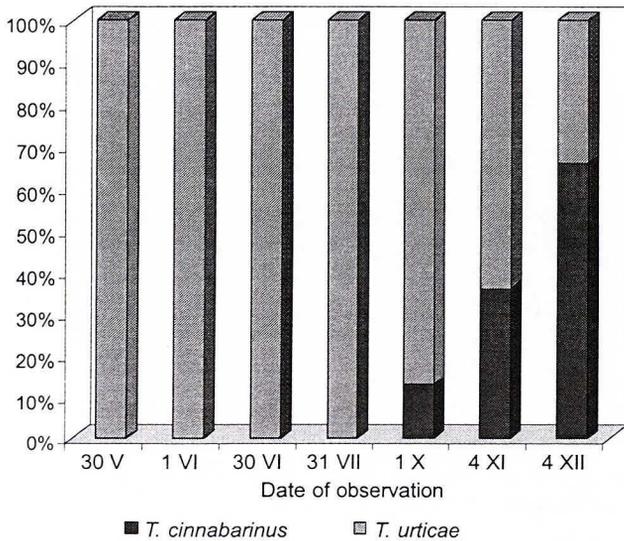


Fig. 2. Percentage proportions between *T. urticae* and *T. cinnabarinus* populations on *Codiaeum* plants cultivated in a commercial glasshouse, 1996

The leaf damage index (LDI) enhanced in time of *Tetranychus urticae* feeding (Fig. 4). Norma was the most severely affected cultivar as after 16 weeks of mite infestation its LDI value reached almost 4.

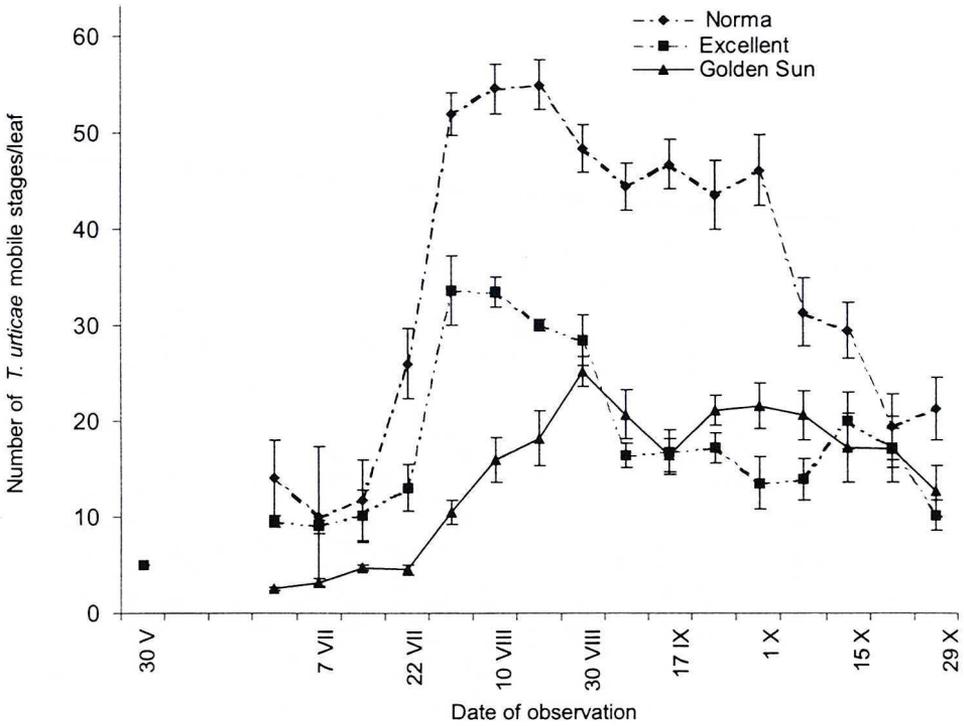


Fig. 3. Development of *T. urticae* populations on selected croton cultivars (experimental glasshouses), 1997

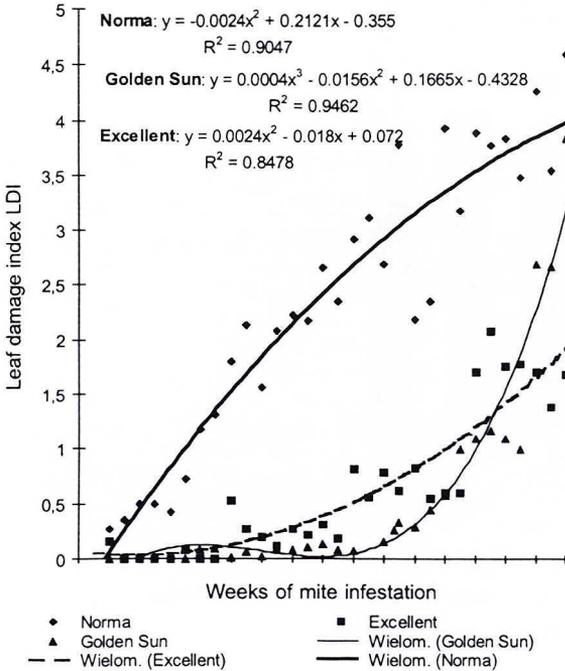


Fig. 4. Development of plant injuries (LDI) during *T. urticae* feeding on different croton cultivars, 1997

IV. DISCUSSION

Two spider mite species: *Tetranychus urticae* and *Tetranychus cinnabarinus* were found on croton plants in commercial production, however, only the first was present over the whole growing season. *T. cinnabarinus* appeared relatively late (in autumn) and its early absence may have been a response to chemical treatments during spring and summer months since this species is more susceptible to pesticides than *T. urticae*.

Norma was found the most attractive cultivar for *T. urticae* as both experimental and commercial glasshouses this pest developed the largest population and caused more extensive leaf injuries than when feeding on cvs. Excellent and Golden Sun. Although the importance of mites as the croton pests was pointed out by several authors (Scopes 1981; Van de Vrie 1985; Osborne 1986, 1987; Piątkowski 1996) their harmfulness on different croton cultivars have not been described.

V. LITERATURE

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PODATNOŚĆ RÓŻNYCH ODMIAN KROTONA (*CODIAEUM VARIEGATUM* L. BLUME) NA ŻEROWANIE PRZĘDZIORKÓW

STRESZCZENIE

Badano dynamikę rozwoju populacji przędziorków oraz stopień uszkodzenia roślin na wybranych odmianach krotona (*Codiaeum variegatum* (L.) Blume). Badania prowadzono w warunkach szklarni produkcyjnych i doświadczalnych. Najbardziej atrakcyjne dla przędziorków okazały się rośliny odmiany Norma, na której zanotowano najwyższą liczebnie populację roztoczy zarówno w warunkach produkcyjnych, jak i doświadczalnych. Rośliny tej odmiany były również najsilniej uszkodzane. Średni indeks uszkodzeń po 16 tygodniach żerowania *T. urticae* osiągnął na tej odmianie wartość prawie 4. Najmniejsza liczebnie populacja *T. urticae* obserwowana była na roślinach odmiany Golden Sun. Dominującym gatunkiem przędziorka na wszystkich badanych odmianach krotona był *Tetranychus urticae* Koch.