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# Investigation on the Colour Preference of *Thrips tabaci* Lindeman (Thysanoptera: Thripidae)

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Yellow proved to be the most reliable colour for monitoring of *Thrips tabaci.* White and blue could be used with weak, but still reasonable effectiveness.

Keywords: *Thrips tabaci,* coloured traps, monitoring *Thrips tabaci.*

Since *Thrips tabaci* has a significant role in the epidemic of tomato spotted wilt virus under Hungarian climatic conditions (Jenser et al., 1996) it was required to evaluate the monitoring of its flight period and activity. According to former investigations and experiences the coloured traps proved to be suitable for this purpose (Lewis, 1959; Beckham, 1969; Kirk, 1984; Yudin et al., 1987; Fernández and Lucena, 1990; Broadsgaard, 1993; Jenser, 1993). Because different colours (white, yellow, blue) were reported to attract *T. tabaci* (Czencz, 1987) we decided to conduct comparative experiment to determine its colour preference.

## Materials and Methods

The experiments were done in two tobacco fields at Bököny (north-east Hungary) in August and Kiskunhalas (in the Danube-Tisza Interfluve) in September in 1999. The differently coloured (CSALOMON) traps (white, yellow, blue and greenish-yellow) were hung on a trap-rack four on each. The sequence of the colours was systematically varied, five times. The trap-racks were placed out 15 m from one another, at a height of 180 cm, at the top level of the plants. Both sides of the traps were coloured and covered by sticky material. The size of trap was 10 x 16 cm (320 $cm^2$). After 6 days of exposition the caught *T. tabaci* specimens were counted by Wild dissecting microscope.

The trap colours were measured by the Hunterlab Ultrascan spectro-colorimeter at the Szent István University, Department of Physics-Control, Budapest. The instrument was set in reflectance mode as described in followings.

Small area of view – round opening with a diameter of 1⁄4 inch (6.2 mm). Mounted without UV light source. Total reflectance, specular included (mirroring effect). Calibrated using the standard method: light trap, white and grey officially calibrated standards.

The instrument built using the O/d observation standard: diffuse illumination, and observing (measuring) in 0 degree direction (perpendicular to the plane of the sample). The original observation standard was modified by Hunterlab using the 8 degrees standard. This method is developed for excluding the specular part of the light flux *(Fig. 1).*

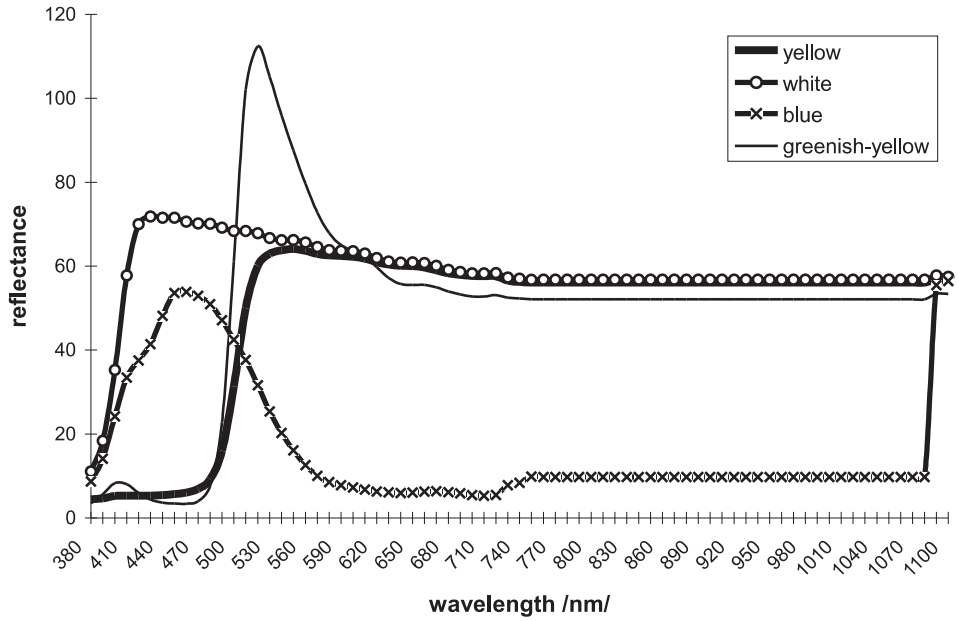


Fig. 1. Spectrum of the colours of the traps

The acquired data was stored as spectra from 380 to 1100 nm wavelength in 10 nm steps. The results were calculated by the original software belonging to the instrument in CIE 1931 XYZ system and in the CIE 1976 CIELAB system, computed according the 2 degrees standard observer the C standard illuminant (correlated colour temperature of 6774 K).

More colorimetry data were calculated by a locally developed software and this way the COLOROID type colour numbers were also computed. (This system has three basic data: A for the hue, T for the saturation and V for the lightness).

The statistical procedure was performed by Ministat 2.4 as follows: total caches of the different colour sticky sheets placed near each other were used for the comparison as related samples. After testing the hypothesis of stochastic homogeneity by Friedman test and ANOVA on ranks. Tukey-type pairwise comparison of means was performed.

# Results and Discussion

Traps caught altogether 477 *T. tabaci* specimens at Kiskunhalas and 333 at Bököny. More than 36% of the specimens was attracted by the yellow traps and the rest of them distributed among the white, blue and greenish-yellow colours. Significant difference was established in the number of captured specimens between the yellow and the other colours in Bököny. Although yellow traps caught the specimens in high number, significant differences were not established in the attractiveness between yellow and blue colours in Kiskunhalas. The white and blue attracted the specimens in varying to a certain degree. No significant differences were established between the number of the attractiveness of the two colours. Greenish-yellow traps were the least effective *(Figs. 2, 3).*

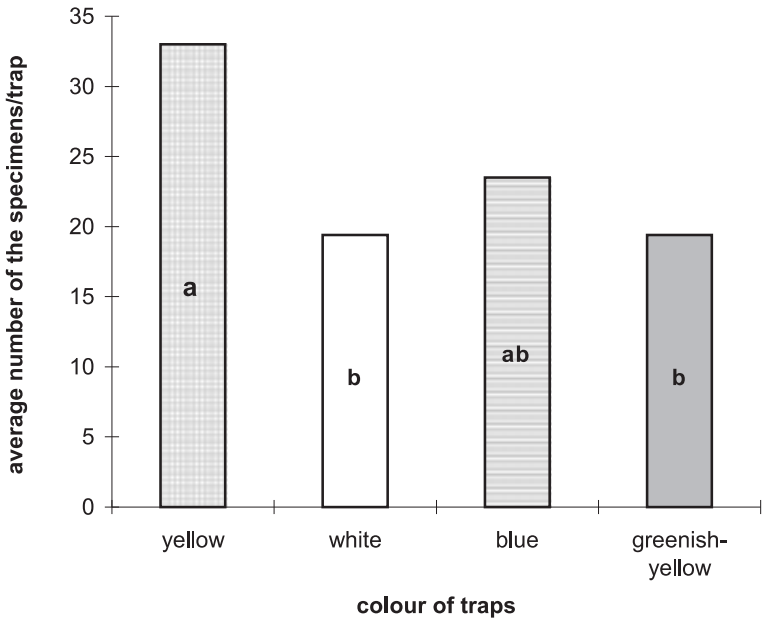


Fig. 2. Average number of *Thrips tabaci* specimens caught by the colour traps (Kiskunhalas, 1999) (Columns denoted by different letters are significantly different at a significant level $p < 0.05$)

Regarding the attractiveness of colours to *T. tabaci* is to some extent different. According to the data of Kirk (1984) as well as Yudin and co-workers (1987) white is the most attractive colour. On the other hand yellow and white (Fernández and Lucena, 1990), yellow and blue (Kirk, 1984; Broadsgaard, 1993), yellow, white and blue (Czencz, 1987) attract the specimens approximately with similar effectiveness. For the monitoring yellow (Bognár and Shanab, 1969), blue (Pénzes, 1994) and white (Jenser, 1993) were used.

According to the results of our experiments the yellow proved to be the most reliable colour for its monitoring. White and blue could be used with weaker, but still

reasonable effectiveness. Where *T. tabaci* and *Frankliniella occidentalis* are required to be monitored the application of the combined yellow and blue CSALOMON trap is advantageous.

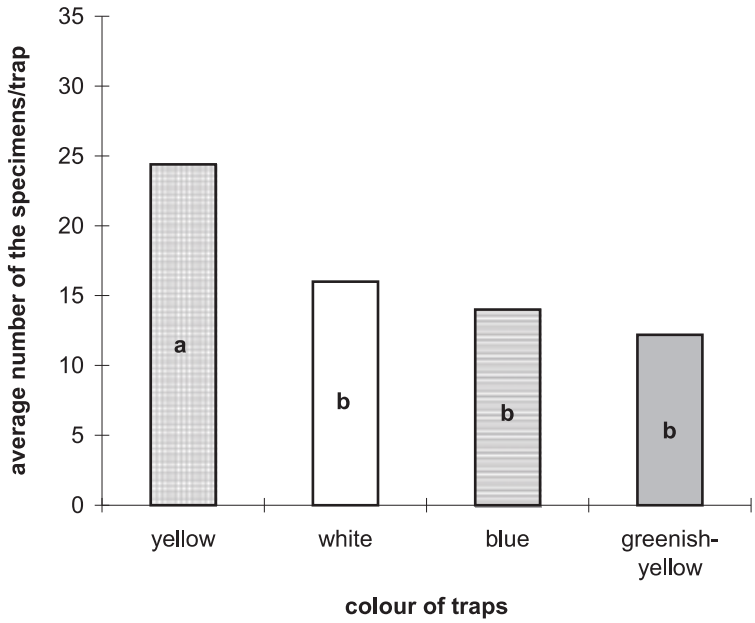


Fig. 3. Average number of *Thrips tabaci* specimens caught by the colour traps (Bököny, 1999) (Columns denoted by different letters are significantly different at a significant level $p < 0.05$)

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## Literature

Beckham, C. M. (1969): Color preference and flight habits of Thrips associated with cotton. Journal of Economic Entomology 62, 591–592.

Bognár, S. and Shanab, L. M. (1969): Investigations on onion thrips (*Thrips tabaci* Lind.) populations. Acta Phytopath. Acad. Sci. Hung. 4, 153–161.

Broadsgaard, F. H. (1993): Coloured sticky traps for Thrips (Thysanoptera: Thripidae) monitoring on glasshouse cucumbers. Bull. OILB. SROP 16, 19–22.

Czencz, K. (1987): The role of coloured traps in collecting thrips fauna. In: Homan, J., Pelikán, J., Dixon, A. F. G. and Weismann L. (eds): Population Structure, Genetics and Taxonomy of Aphids and Thrips. Proc. Int. Symp. (1982), Smolenice, Czechoslovakia, pp. 426–435.

Fernández, S. A. and Lucena, C. (1990): Evaluacion de trampas adhesivas de diferentes colores en la atraccion de *Thrips tabaci* Lindeman (Thysanoptera: Thripidae). Agronomia tropical 40, 309–315.

Jenser, G. (1993): Studies on the vertical distribution of some Thysanoptera species in an oak forest. Zoology (Journal of Pure and Applied Zoology) 4, 233–238.

Jenser, G., Gáborjányi, R., Vasdinnyei, R. and Almási, A. (1996): Tospovirus infections in Hungary. Acta Horticulturae 431, 51–56.

Kirk, W. D. J. (1984): Ecologically selective coloured traps. Ecological Entomology 9, 35–41.

Lewis, T (1959): A comparison of water traps, cylindrical sticky traps and suction traps for sampling thysanopteran populations at different levels. Entomologia exp. appl. 2, 204–215.

Pénzes, B. (1994): A dohánytrips (*Thrips tabaci* Lind.) kártétele és biológiája a szántóföldi zöldségféléken (Damages and biology of *Thrips tabaci* on vegetables) (In Hungarian). Ph.D. Thesis. Univ. of Horticulture, Budapest

Yudin, L. S., Mitchell, W. C. and Cho, J. J. (1987): Color preference of Thrips (Thysanoptera: Thripidae) with reference to aphids (Homoptera: Aphididae) and leafminers in Hawaiian lettuce farms. J. Econ. Entomol. 80, 51–55.