

INFLUENCE COTTON LEAF APHID (APHIS GOSSYPHII GLOVER) PHENOLOGICAL DEVELOPMENT ON COTTON

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ABSTRACT

During the 2014-2015 period a field experiment has been carried out at the Institute of field crops - Chirpan the influence on phenological development of the cotton species, naturally infected with cotton leaf aphid (*Aphis gossypii* Glov.).

The result of the investigation noticed that the species Barut-2000, Nazilli-84/5, Nazilli-663, Nazilli-954 and Avantgard-264 are the most preferred by the cotton leaf aphid and could be used with in cotton selected programmers.

Key words: *Cotton leaf aphid, Phenological development, Cotton species.*

INTRODUCTION

The greatest economic importance of all enemies of cotton production in the country has aphids in particular cotton aphid (*Aphis gossypii* Glov.) (Radev, Stefanov, 1976; Rashev, 2012). Damages caused by a cotton aphid on cotton depend on its appearance during the phenological development of the crop. The pest is found in cotton plants in the phenophases of germination, budding, flowering and ripening. It appears on the cotton with its emergence (10-15 May) – in the phase cotyledons. From the germination to the phase of budding of the cotton, the adult forms and larvae develop on the cotyledons, the leaves and the growing tip of the plant, feeding themselves on plant juices, they cause the hydrocarbon discharge of the plants, the deformation and breakage of the leaf lamina and depression in plant development. In the full budding phase (typically 20 to 30 June) peak in the development and multiplication of the species was observed. During the flowering stage of cotton (after July 10) a cotton aphid becomes depressed. In autumn, the species returned into crops in the late August, in the early September, in the phenophase of ripening and remains there until the fall of frosts (Radev, 1967).

A cotton aphid shows some preference for the species with a longer vegetation period. It can be explained by the fact that during the attack of aphids, the later mature wool has a more delicate and fresher leaves (Radev, 1967).

Later, some foreign authors (Nibouche et al., 2008) have found that cotton species of the type *Gossypium arboreum* are attacked less by the cotton aphid than cotton varieties of the species *Gossypium barbadense* and *Gossypium hirsutum*.

The objective of this study is to examine the impact of the cotton aphid to local and foreign varieties of cotton, for their most effective use in selecting programmes.

MATERIAL AND METHODS

In the period 2014-2015 at the Institute of field crops – Chirpan was enshrined a field experience using the block method in four repetitions and harvesting plot of 20 m², according to the accepted technology for the cotton cultivation.

They were included some Bulgarian and some foreign species of cotton in the this study: Chirpan-539 (standard of precocity and productivity), Beli Iskar, Veno, Trakia, Helius, Avangard-264, Perla, Natalia, Darmi, Kolorit and Vega, the Macedonian 5140 and the Turkish - Barut 2000, Nazilli-84/5, Nazilli-663 and Nazilli-954. We have also set a control on

- Chirpan-539, which was treated with Mospilan 20 SP (200 g/da acetamiprid) at a dose of 0.0125 g/da.

Phenological observations and biometric measurements have been carrying out during the vegetation. Observations on growth and development of cotton in different phenophases and dynamics of population density of cotton aphid were carried out on 40 plants (10 of each repetition) for each variety and the control.

We have reported the emergence and multiplication of cotton aphid on dates by 4 - speed grade scale (Radev, 1967).

"0" - completely free of aphids plants;

"1" - there is a single plant aphid;

"2" - presence of 1-2 colonies of aphids on the plants;

"3" - the whole plant is covered with colonies of aphids.

The data are mathematically worked up with a statistical programme ANOVA 123 (Lidanski, 1988).

RESULTS AND DISCUSSIONS

Bulgarian varieties are created by two differently directed selection programmes - by intraspecific hybridization and experimental mutagenesis, which in their productivity are catching up, but they differ in length and yield of a fiber (Stoilova and Valkova, 2009). Avangard-264 was obtained by interspecific hybridization of *Gossypium hirsutum* × *Gossypium barbadense*, which strongly is attacked by the cotton aphid. The varieties Perla, Natalia, Darmi, Kolorit and Vega are obtained by combining stabilized lines *Gossypium hirsutum* × *Gossypium barbadense* with the varieties of *G. hirsutum*.

Turkish varieties Barut 2000, Nazilli-84/5, Nazilli-663 and Nazilli-954 are parts of the type *Gossypium hirsutum* and they are used in selection to increase the yield of the cotton.

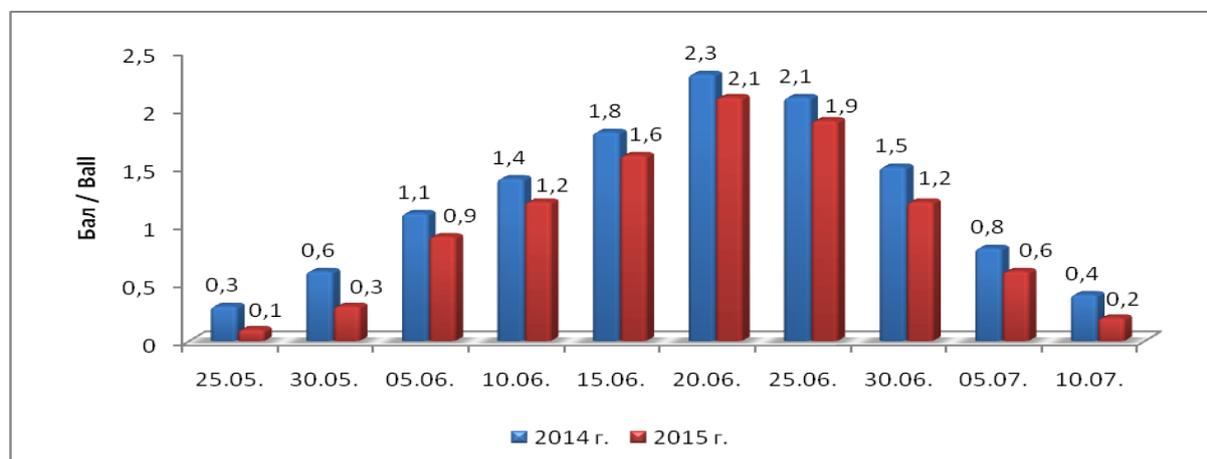


Figure 1. Dynamics of population density of cotton leaf aphid in the observed area during the period 2014-2015

In 2014, the cotton aphid appeared on the cotton in the observed area on May 23 when the plants were in the 2-3 real leaf stage, and in 2015 on 24 May during the phase cotyledons - the formation of the first real leaf (Figure. 1).

The preference of the cotton aphid for different varieties is different. Most preferred by

the pest were the Turkish varieties Barut-2000, Nazili-84/5, Nazilli-663 and Nazilli-954; the Bulgarian ones: Avangard-264 and Chirpan-539.

Graph 1 presents the results of the attack of the cotton aphid and the measured heights of plants in phase's 2-3 real leaf and the budding for different cotton varieties. At the beginning of the emergence of the cotton aphid, the lengths of plants in the observed area section were: a Bulgarian - from 12.52 cm in variety Veno (127), to 17.32 cm in variety Darmi (364), 15.95 cm in Macedonia - 5140 and from 14.72 to 16 cm in Turkish varieties.

Table 1

The impact of the attack from the cotton leaf aphid on the plant height of various cotton varieties in different phases of its development in the period 2014 - 2015.

Variety Line №	Plant height in phase 2-3 true leaf cm	Ball of cotton leaf aphid	Plant height in the phase of mass budding cm
Чирпан/Chirpan-539	14.80	2.0	48.00
Бели Искър/Beli iskar (800)	15.54	2.0	41.45
Вено/Veno (127)	12.52	2.0	44.35
Тракия/Trakia (240)	16.00	1.8	51.42
Хелиус/Helius (288)	16.65	1.6	55.46
Авангард/Avantgard-264	16.54	2.2	51.72
Перла/Perla (267)	16.35	2.0	50.55
Наталия/Natalia (361)	16.75	1.7	54.92
Дарми/Darmi (364)	17.32	1.7	53.85
Колорит/Kolorit (409)	17.25	1.9	49.65
Вега/Vega (412)	16.54	1.7	53.42
5140-Македония/Macedonia	15.95	2.0	46.84
Барут/Barut-2000	14.72	2.2	46.92
Назили/Nazilli-84/5	15.00	2.2	47.35
Назили/Nazilli-663	16.00	2.2	44.35
Назили/Nazilli-954	15.45	2.2	45.90
Чирпан/Chirpan-539 – третирана/treated	14.95	0.0	52.14

CONCLUSIONS

As the most preferred varieties found the highest density of the cotton aphid (*Aphis gossypii* Glov.) are the Turkish ones: Barut-2000, Nazilli-84/5, Nazilli-663 and Nazilli-954 and the Bulgarian one: Avangard-264.

These studies and observations can be used in the selection activities for creating new varieties tolerant of the attack from cotton aphids and which will be better for the economics and will have better technological qualities.

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