

## WEEDS AS HOST PLANTS TO TOBACCO DISEASES AND PESTS

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### ABSTRACT

Weeds compete with tobacco for water, soil space, light and nutrient elements. They serve as hosts to pathogenic agents which contribute to development of various diseases. They also harbor a great number of harmful insects - vectors that transmit diseases from weeds to tobacco. For this reason, implementation of effective and timely measures in the control of weeds is of crucial importance for obtaining a healthy and high yield raw material.

**Key words:** Weeds, tobacco, *Myzus persicae* Sulz., *Portulaca oleracea* L., *Chenopodium album* L., Potato virus Y

### ПЛЕВЕЛИТЕ КАКО ДОМАЌИНИ НА БОЛЕСТИ И ШТЕТНИЦИ КАЈ ТУТУНОТ

Плевелите се конкуренти на тутунот за вода, животен простор, светлина и хранливи елементи. Тие служат и како домаќини на патогените агенси и придонесуваат за развојот на разни болести. Исто така, тие претставуваат засолниште на голем број штетни инсекти - вектори кои ги пренесуваат болестите од плевелите на тутунот. Поради тоа, воведувањето на ефикасни и навремени мерки за контрола на плевелните растенија е од суштинско значење за добивање на здрава и квалитетна тутунска суровина.

**Клучни зборови:** плевели, тутун, лисни вошки, тучница, лобода, компиров Y вирус

### INTRODUCTION

Weeds can cause economically important loss of tobacco, because they compete with this crop for living space and nutrients. They usually have a strongly developed root system and their water intake is 2 to 3 times greater than that of their tobacco host. They are also more capable of using the available mineral matters and organic fertilizers than the tobacco (1,3,4,7).

Weeds themselves appear as hosts to various pathogens - disease causing agents (6,8). They might also harbor a number of harmful insects which often move to tobacco fields, causing significant damage on tobacco leaf and transmitting dangerous viruses from diseased to healthy plants (2, 5).

## MATERIAL AND METHODS

Investigations of the most frequently found weeds on tobacco fields were made in 2008 and 2009. Tobacco of the type Prilep (P 23) was transplanted on 10.6.2008 and 11.6. 2009.

The results about diseases and pests were recorded over a period of several years. The intensity of disease attacks was estimated by the methods of CORESTA.

## RESULTS AND DISCUSSION

The most frequently represented weeds in the investigation period were *Amaranthus retroflexus* L (redroot peegweed), *Chenopodium album* L (lamb's quarters), *Digitaria sanguinalis* L (Scop.) (hairy crabgrass), *Solanum nigrum* (black nightshade), *Hyosciamus niger* L (black henbane) and *Portulaca oleracea* L (little hogweed).

***Amaranthus retroflexus* L (redroot peegweed)**, family Amaranthaceae, genus *Amaranthus*. Annual terrophytic plant with woody stem, which can grow up to 1 m in height. The leaves are broad, ovate, with pointed tips. The inflorescence is dense cluster consisting of thick uninterrupted ears and the fruit is an

ellipsoid capsule. Redroot pigweed can reproduce by seed (Photo 1).

***Chenopodium album* L (Lamb's quarters)**, family Chenopodiaceae, genus *Chenopodium*. Annual plant that grows in late spring and summer, distinguished by its cosmopolitanism and great potential of adaptability. The stem is erected and usually grows up to 1m in height. The leaves are elongated-ovoid, spirally arranged on the stem. The lower leaves are often toothed, not much longer than wide. The flowers are clustered in a brush-shaped inflorescence. The fruit has a shape of radiant black soybean. It reproduces by seed (Photo 2).



Photo 1. *Amaranthus retroflexus* L.



Photo 2. *Chenopodium album* L.

***Digitaria sanguinalis* L (Scop.) (hairy crabgrass)**, family Poaceae, genus *Digitaria*. Annual weed that grows in late spring. It has

many stems, creeping or erected, high about 30 cm and over. The leaves are long, linear to lanceolate, covered with short hairs. The

inflorescence is ear-like brush consisted of 4-10 fingers, about 12 cm long. The seed is poorly transparent, ovoid and elongated. The weed reproduces by seed (Photo 3).



Photo 3. *Digitaria sanguinalis* L. (Scop.)

***Solanum nigrum* (black nightshade)**, family Solanaceae, genus *Solanum*. Annual, herbaceous weed that grows in late spring. The stem is erected and branched, 10-15 cm high. The leaves are with irregular shape, rhomboid or ovate, with long petioles. The flowers are usually white, forming a shield-like sparse inflorescence. The fruit is black berry, and the seed is flat, kidney-like, with uneven surface. They reproduce by seed (Photo 4).



Photo 4. *Solanum nigrum* L.

***Hyosciamus niger* L (black henbane)**, family Solanaceae, genus *Hyosciamus*. Annual plant, grows in late spring. The stalk is erected, up to 1 m high. The leaves are broad and irregularly toothed. The flowers are large, formed in the axilla of the upper leaves. They are yellowish, with pink nervature. The fruit is a many seed capsule, and the seed is irregular and ovate. Reproduction is made by seed (Photo 5).



Photo 5. *Hyosciamus niger* L.

***Portulaca oleracea* L (little hogweed)**, family Portulacaceae, genus *Portulaca*. Annual succulent weed, occurring in late spring, prostrate, smooth and branched from the bottom. The stem is 10-30 cm in length and often forms adventive roots. The leaves are shoveled to ovate, succulent and sessile. The flowers are small, yellow, single or 2-3 together, formed in the leaf axilla or at the top of the stem. It reproduces from the seed, which is kidney-like, tiny, flat and dark-brown (Photo 6).



Photo 6. *Portulaca oleracea* L.

At present, tobacco weed is controlled by application of selective non-phytotoxic herbicides.

Due to their exceptional viability, many weeds start to develop in spring and later, prior to tobacco transplanting. They are hosts to various harmful insects, like green tobacco aphid (*Muzus persicae* Sulz) and tobacco flea beetle (*Epithrix hirtipennis* Melsh).

**Green tobacco aphid** has a worldwide distribution. It appears as a pest on tobacco every year. The main host to this aphid is peach, but it also appears on tobacco, potato, tomato, peppers etc. It has a high reproductive ability and has several generations in one year. It damages tobacco directly, by sucking the sap from young leaves, and indirectly - by contamination of leaves with “honeydew” and with shed skins of numerous generations (Photo 10).

This aphid is economically most dangerous as a vector of **PVY (Potato virus Y)** - the causing agent of tobacco vein necrosis. The aphid is hosted by vegetable crops of Solanaceae family and by almost all cultivated varieties of tobacco. The PVY symptoms vary depending on the host plant and virus race. Tobacco varieties which are attacked by the less aggressive races usually develop a mild mosaic on the leaves,

without any deformations. In the beginning, discoloration among veins of leaf lamina is noticed, with dark green zones remaining on each side of the vein. 2-3 weeks later the appearance of mosaic and deformation of leaves is noted. The aggressive race of the virus shows strong symptoms on the veins, which obtain a dark brown or black color. Sometimes the infection spreads towards the conduction system of the stem. Leaves become yellow before maturation, necrosis spreads along the stem and the plant dies (Photo 9).

Another economically important pest is **tobacco flea beetle** (Photo 11). It is a small insect which imagos hibernate in the trash around plant beds or in weed plants. The beetle attacks both seedlings and transplanted tobacco in a form of larva, imago and virus vector. It makes small rounded holes on tobacco leaves which give them a sieve-like appearance. When the attack is stronger, i.e. when pest population is higher, the rounded holes on seedlings and transplanted tobacco plants merge and only the veins remain on the leaf.

Leaves affected by the above mentioned pests or by other mechanical damages can be easily infected by tobacco mosaic virus and brown spot disease.

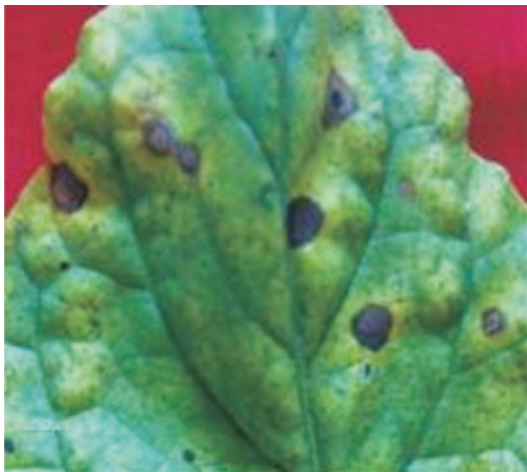


Photo 7. *Alternaria* sp.



Photo 8. TMV

**Tobacco mosaic virus (TMV)** is one of the oldest viral diseases on tobacco. It can be hosted by all tobacco types, vegetable plants of the Solanaceae family (tomato, pepper, potato), woody plants (pear, apricot, plum), the weeds of the Convolvulaceae, Chenopodiaceae, Labiateae

and Asteraceae families, etc. The mosaic symptoms can be stronger or weaker, depending on the tobacco growth stage, weather conditions and aggressiveness of TMV race. Characteristic symptom of virosis is the occurrence of mosaic pattern with lighter and darker zones on the leaf,



Photo 9. PVY

by which the disease was named. The virus attacks almost all parts of tobacco plant. The infected plants have stunted growth and deformations and they lose their quality characteristics (Photo 8).

**Brown spot** is mycosis caused by the fungus *Alternaria* sp. (Photo 7). Its host range



Photo 10. *Myzus persicae* Sulz.



Photo 11. *Epitrix hirtipennis* Melsh.

includes oriental, semi-oriental and large-leaf tobaccos.

Symptoms appear in a form of small circular spots colored from light green to yellow. With spreading of disease, the spots increase and occupy a larger part of leaf area. As spots enlarge, their central parts become necrotic and turn brown in color. In dry conditions, sharp lines divide the infected from the healthy tissue. In lower insertions the brown spots develop concentric circles. The disease can attack aphids, stems, flowers and seed capsules. In cases when topping is performed, the disease also attacks the late-appearing suckers. As disease spreads, the infected leaves age prematurely, lose their quality and die.

Protection of tobacco involves application of systemic insecticides in control of viral vectors and systemic fungicides in control of the brown spot disease.

## CONCLUSION

Weeds compete with tobacco for water, soil space, light and nutrient elements. They serve as hosts to pathogenic agents which contribute to development of various diseases. They also harbor a great number of harmful insects - vectors

that transmit diseases from weeds to tobacco. For this reason, implementation of effective and timely measures in the control of weeds is of crucial importance for obtaining a healthy and high yield raw material.

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