

PLANT GALLS INDUCED BY SOME PESTS

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Abstract

Plants were studied from the University of Agronomic Sciences and Veterinary Medicine Bucharest and from the forest around Ciolanu Monastery, Buzau district. Finding and identifying the pests that produced galls to these plants was the job of the Genetics, Improvement and Plants' Protection Department, the Entomology section and the study of the morphological and histological changes that followed the attack of these pests was made inside the Botanic and Plants' Physiology Department. The material was photographed with a digital camera. We mention that there is few data in the speciality literature concerning the anatomical mutations caused by the pests that are about to be presented. It was observed that histological changes appear in the organs of the attacked plants. The anatomy of these galls were examined by microscopy (MC7). The leaf gall cells were considerably larger than normal cells, lacked well-developed chloroplasts and with prominent intercellular spaces.

INTRODUCTION

Galls are abnormal growth of plant tissue caused by microorganism, or feeding and egg-laying activity of some insects, mites, nematodes, viruses, fungi, bacteria [4]. The most common are leaf, stem and flower galls produced by insects and mites [2, 3].

Galls usually result from chemical secretion produced during feeding or egg laying. Once formed galls may remain on the plant for long time. Many insects make plant galls on woody plants [5]. The mechanism by which these chemicals induce cell division and morphogenesis is very complicated and varies with different types of plant tissue [6]. Eriophyid mites are plant parasites forming various galls on foliage or other part of their hosts which may caused physiological dysfunctions of the infested parts of the host plants and which is quite important in urban environment affecting the aesthetic features of trees [1].

MATERIAL AND METHODS

The observations and the samples were made on plants from University of Agronomic Sciences and Veterinary Medicine Bucharest and plants from the forest around Ciolanu Monastery, Buzau District, in the period 2007 – 2008. Transverse sections were made in the leaves of the studied plants inside the Botanic and Plants' Physiology Department, Botanic Section. The microscopical samples were

analysed and photographed at the optical microscope type MC-7, having attached the Sony digital camera. Observations were made after studying the galls in transverse sections made in the leaves of the attacked plants.

RESULTS AND DISCUSSIONS

Plants like: *Gleditsia triacanthos* L. and *Tilia* spp. were investigated.

On the leaves of *Gleditsia triacanthos* L., there were observed galls produced by *Dasyneura gleditschiae* O.S. (figure 1). The attacked leaves have deformed leaflets (figure 2).



Fig. 1. Purple galls caused by *Dasyneura gleditschiae* O.S. on the leaflets of the *Gleditsia triacanthos* L. leaf (Orig.)



Fig. 2. Leaf deformity by *Dasyneura gleditschiae* O.S. (Orig.)

Dasyneura gleditschiae O.S. caused by the closure and subsequent distension of leaflets, of varying size and extent within each leaflet. The mesophyll of the gall tissue is not the same as in the normal mesophyll. The midge becomes active in late April or May at about the time locust start growth. Tiny yellow eggs are inserted among young leaflets and these hatch in just a day or two. Larval feeding on the inner surface of a leaflet stops its development, continued galling and repeated defoliation may caused the death of small branches. The leaf gall cells were considerably larger than normal cells, lacked well-developed chloroplasts and with prominent intercellular spaces. At *Tilia* spp. were analyzed two types of galls produced by *Eriophyes tiliae* Pgst. and *Didymomyia reaumuriana* Loew. The galls produced by *Eriophyes tiliae* Pgst. are like a cone, often taller than 8 mm, usually coloured in red (figure 3). Through the section made in this gall it can be observed the abnormal development of the tissues that normally constitute the leaf, in a way that the epidermis presents cells atypical for this tissue, the cuticle can no longer be observed and the mesophyll presents cells that are not differentiated in palisade tissue and spongy tissue. In the leaf with a gall, the entire transverse section measured 275 μm (but no differentiated measurements were possible). The

measurements were made with the objective of 20X. Also there aren't any cells with ursines (figure 4).



Fig. 3. Galls caused by *Eriophyes tiliae* Pgst. (Orig.)

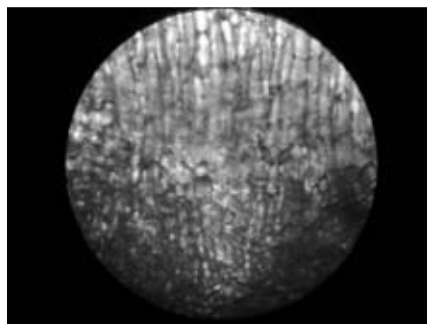


Fig. 4. Transverse section in the *Tilia* spp. Leaf through the gall produced by *Eriophyes tiliae* Pgst. (Orig.)

The galls produced by *Didymomyia reaumuriana* Loew. at the plants from *Tilia* family are small formations in a cylindrical-conical shape on the superior side of the leaf, yellow-green, with a central area more prominent than the rest of the gall, with a darker colour (figure 5). In time, the galls fall and the leaves remain perforated. Also, like in the previous case, by sectioning the gall it was observed the abnormal development of the epidermis and of the assimilating tissues from the leaf, the mesophyll not being differentiated in palisade tissue and lacunose tissue and the cells with ursines are missing (figure 6). It was noticed that in the case of the healthy leaf of *Tilia* sp., the entire transverse section measured 27.5 μm (the upper epidermis has 5 μm , the mesophyll has 20 μm and the lower epidermis has 2.5 μm). In the leaf with a gall produced by *Didymomyia reaumuriana* Loew. the entire transverse section measured 210 μm (but no differentiated measurements were possible). The measurements were made with the objective of 20X. In both cases of galls the tissues of plants present necrosis.



Fig. 5. Galls caused at *Tilia* spp. by *Didymomyia reaumuriana* Loew. (Orig.)

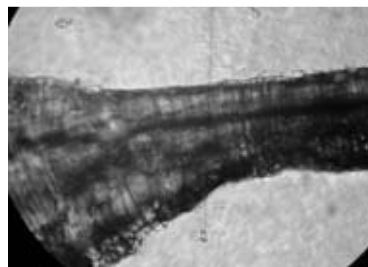


Fig. 6. Transverse section in the *Tilia* spp. leaf through the gall produced by *Didymomyia reaumuriana* Loew. (Orig.)

CONCLUSIONS

1. From the researches made, it was observed that the galls produced by *Dasyneura gleditschiae* O.S. on the leaflets of the *Gleditsia triacanthos* L. leaf cause the perturbation of the normal physiological activity of the leaf, because the assimilating tissues from the leaf are affected and the attacked leaflets fall prematurely.
2. In the galls caused by *Eriophyes tiliae* Pgst. the abnormal development of the tissues that normally constitute the leaf can be observed, in such a way that the epidermis and the mesophyll (the palisade tissue and the spongy tissue) are no longer differentiated and don't function anymore.
3. In the galls produced by *Didymomyia reaumuriana* Loew. the leaves have abnormally developed assimilating tissues and necrosis.
4. At both *Gleditsia triacanthos* L. and *Tilia* spp. the galls have an unaesthetic effect over the aspect of the attacked trees.

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