THE STUDY OF THE PHYTOPATHOGENIC FUNGUS RHYTISMA ACERINUM MORPHOLOGY AND ASCI FORMATION

Efremova V. Y., Shapovalova O. V., Strelnikov L. S.
National University of Pharmacy, Kharkiv, Ukraine
efremova.valeria2016@yandex.ru

Introduction. *Rhytisma acerinum* is the microscopic ascomycete that locally affects the leaves of the trees and is a biotrophic parasite. The fungus is parasitic mainly on Acer platanoides leaves and can affects young pine needles. Infection is especially noticeable in urban areas, squares and parks of major cities. The Teleomorphic stage of this microorganism is called *Rhytisma acerinum,* Anamorphic stage is called *Melasmia acerina.* This fungus is belongs to kingdom - *Fungi*, class - *Leotiomycetes,* family - *Rhytismataceae,* genus - *Rhytisma*, species - *P. acerinum.*

The disease manifests itself in the leaf spot formation. Vividly symptoms are seen in the second half of the summer. Spots are black, shiny, slightly protruding, surrounded by a yellowish border, size (10-15) mm. They appear on leaves. The spots appear on the upper leaf side and can be very numerous. Plant infection occurs most intensively in high humidity and temperature changes. The fungus survives in the fallen leaves, and next spring there is an infection of young leaves.

Contact with the affected leaves is not a danger to human and animal. The main harmfulness of the disease is to reduce the ornamental trees.

One of the main measures to combat this fungus is raking fallen leaves and composting them in closed pits, or burning. There are also *P. acerinum* infection control chemical methods. They are spraying fungicide, copper sulfate, bordoss mixture, kuprikol. But their use is limited in localities.

Despite the fact that the fungus is a phytopathogenic, several disease cases and mortality from atypical myopathy of horses that were grazing near the maple trees infected with fungus *Rhytisma acerinum* have been known in the Netherlands.

Removing fallen leaves from the city's parks and the impact of the dry wind may affect the *Rhytisma acerinum* presence in urban centers.

The absence of this fungus in large cities may also be due to the its ascospores sensitivity to contaminants (especially sulfur dioxide) during germination. An abundance of black spots on the leaves is used as a visual indicator of air quality.

Aim. To investigate the teleomorfa stage of the fungus life cycle we have conducted a series of experiments, the purpose of which was the natural processes, in which the formation of *Rhytisma acerinum* asci and ascospore maturation have been modeled under laboratory conditions.

In the course of the experiments we studied:

- for the detection of the fruiting bodies of the fungus - leaves with characteristic lesions, collected in the fall;

- for the experimental induction of asci formation- leaves subjected to freezing at minus 10c to simulate the natural conditions for 1 month, followed by thawing and holding at room temperature with intermittent lighting for 14 days;

- to study the release of ascospores - leaves, overwintered in a natural way, and after freezing in laboratory conditions.

The asci formation we studied by using the biological material cutting into small pieces, bearing one or more lesions (spots) each. The prepared material was placed upper epidermis up into a Petri dish with wet filter paper.

The light microscopy techniques of temporary agents we used to evaluate the results of experiments.

Results and discussion. As a result of asci inducing experiment conducted in the laboratory in "crushed drop" preparation we seen the formation of asci.

During the study on the infected leaves surface we observed black spots stroma using a stereoscopic microscope.

Apothecia combs had curved extensions. The hymenium was in places of such discontinuity ridges.

Asci were with a typical elongated shape with a thickening at one end, were colorless, filled with ascospores. Their were filamentous paraphysis between them. In some asci the ascospores yield that have needle-like shape and arranged around the periphery of the ascus and the smear was observed.

In the study of the surface of infected leaves, overwintered in nature a similar picture was observed.

Conclusions. *Rhytisma acerinum* is an excellent model object for studying the characteristics of the ascomycetes lifecycle. The life cycle of this biotrophic parasite is finely adapted to the owner, as well as to the seasons changing.

Rhytisma acerinum is particularly attractive to investigate in a university laboratory in the study of many disciplines such as mycology, plant pathology, microbiology, ecobiotechnology, the biology of biologically active substances producers, as the fungus has the anamorphic and teleomorfic state change which can easily be demonstrated.