

**BIOLOGICAL CHARACTERISTICS OF THE GALL-FORMING PEST
DIPLOLEPIS ROSAE ON THE BRANCHES OF ROSEHIP (*ROSA CANINA*
L.)**

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Abstract This article analyzes the biological characteristics, life cycle, and plant-insect interactions of the gall-forming pest *Diplolepis rosae* on the dog rose (*Rosa canina* L.) plant. Based on a literature review, the taxonomic position, distribution range, host plants, and the mechanism of gall formation of the pest are elucidated.

Keywords: *Diplolepis rosae*, *Rosa canina*, gall-forming insects, dog rose, Cynipidae, pest, gall, plant-insect interaction, biology, ecology.

**БИОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ГАЛЛООБРАЗУЮЩЕГО
ВРЕДИТЕЛЯ *DIPLOLEPIS ROSAE* НА ПОБЕГАХ ШИПОВНИКА (*ROSA*
CANINA L.)**

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Аннотация: В данной статье анализируются биологические особенности, жизненный цикл и взаимодействие растения и насекомого галлообразующего вредителя *Diplolepis rosae* на растении шиповника (*Rosa canina* L.). На основе обзора литературы раскрываются таксономическое положение, ареал распространения, кормовые растения и механизм образования галлов данного вредителя.

Ключевые слова: *Diplolepis rosae*, *Rosa canina*, галлообразующие насекомые, шиповник, Cynipidae, вредитель, галл, взаимодействие растение–насекомое, биология, экология.

Dog rose (*Rosa canina* L.) is considered a true medicinal treasure of nature, being more than just a beautiful flower (wild rose). Its fruits, flowers, leaves, and even roots are widely utilized in folk medicine and modern pharmacology. However, several insect species reduce yield and damage the plant. Among these pests, gall-formers are particularly prominent, as their impact remains visible for years. Gall-forming insects are organisms with complex ecological relationships with plants. One such insect is *Diplolepis rosae*, a gall-forming wasp belonging to the order Hymenoptera and the family Cynipidae. This species frequently induces galls on wild roses and dog rose plants.

The gall produced by this insect is commonly referred to as "rose bedeguar gall," "moss gall," or "Robin's pincushion gall." Galls are formed as a result of changes in plant tissues induced by the pest, within which the insect larvae develop. This pest primarily occurs on plants of the genus *Rosa*, particularly on *Rosa canina*, *Rosa rubiginosa*, and other wild rose species.

Research indicates that *Diplolepis rosae* is widely distributed mainly in Europe, Asia, and parts of North America. This pest has adapted to various rose species, and its development may depend on the morphological and chemical characteristics of the plant. Some studies suggest that the relationship between the pest and different host plants may lead to genetic differentiation. For instance, studies conducted on three rose species—*Rosa canina*, *Rosa corymbifera*, and *Rosa rubiginosa*—have examined the genetic differences among insect populations.

According to scientific data, *Diplolepis rosae* is typically a univoltine insect, producing one generation per year. In spring, adult insects emerge from the galls and lay eggs on the young shoots or buds of the plant. The female insect uses a specialized egg-laying organ—the ovipositor—to penetrate the plant tissue. Larvae

develop within the plant tissues, causing the formation of galls. The gall contains several chambers, with a separate larva developing in each chamber. Additionally, parthenogenesis is observed in this species, meaning females can reproduce without males.

Gall formation results from complex molecular interactions between the plant and the insect. Modern molecular research shows that biologically active substances, which regulate the growth of plant cells, are present in the ovaries and venom glands of gall-forming insects. These substances accelerate plant cell division, leading to the formation of a new structure in the plant tissue—the gall. Consequently, the gall creates a nutritional and protective environment for the larvae.

Diplolepis rosae galls form a unique micro-ecosystem. Along with the primary pest, many other insect species develop within the gall. These include parasitoids, hyperparasitoids, and inquiline species. For example, parasitoids such as *Orthopelma mediator* attack the larvae inside the gall and can destroy a significant portion of them. According to some studies, up to 70–75% of the larvae may perish due to the impact of parasitoids.

Recent genetic studies have focused on the geographic distribution and evolutionary history of *Diplolepis rosae* populations. Molecular research conducted in European regions has shown that the evolutionary relationships between the pest and its parasitoids are complex. In some cases, the geographic distributions of the pest and parasitoid species do not fully overlap, suggesting that ecological adaptation processes have developed independently.

Literature analysis indicates that *Diplolepis rosae* is one of the most widespread and well-studied species among gall-forming insects. It develops primarily on plants of the genus *Rosa*, inducing galls with a complex structure in plant tissues. Gall formation occurs as a result of molecular and physiological interactions between the insect and the plant. Furthermore, these galls create a habitat for many other insects, resulting in the formation of a complex ecological system. Therefore,

Diplolepis rosae is considered an important model organism for studying plant-insect interactions.

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