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# BIOECOLOGICAL FEATURES OF *Lobesia botrana* Schiff. DEVELOPMENT AND THE EFFICACY OF MODERN INSECTICIDES IN VINEYARDS OF THE SEMI-ARID REGION OF UKRAINE

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To study the bioecological features of the development of *Lobesia botrana* Schiff. under the conditions of the Semi-Arid Region of Ukraine, determine its population dynamics, and evaluate the efficacy of modern insecticides in vineyard protection systems.

The research was conducted during 2021–2025 in vineyards of Odesa Region, Ukraine. Adult moth flights were monitored using pheromone traps (5 traps per hectare). Counts were performed daily before the peak flight period and every three days thereafter. The level of damage to inflorescences and grape clusters was assessed by examining 100 inflorescences/clusters at 3–5 sampling points. The following insecticides were tested: spinetoram (0.2–0.3 L/ha), emamectin benzoate (5 SG, 0.3–0.4 kg/ha), thiamethoxam + chlorantraniliprole (300 SC, 0.3–0.5 L/ha), and deltamethrin (EC, 0.5 L/ha) as the reference standard.

The European grapevine moth develops in three generations per year. During 2021–2025, its bioecological characteristics varied considerably. In 2021, the first-generation flight period was the longest (45 days), associated with a moderately warm spring and gradual temperature increase. In 2022–2023, the first-generation flight began on April 20–25, the second generation on June 25–29, and the third generation on August 5–10. In 2024, the earliest first-generation flight was recorded on April 10 due to elevated average daily temperatures. In 2025, the first generation was less abundant than in previous years.

Overall, the onset of first-generation flight ranged from April 10 to May 1, the second generation from June 17 to 29, and the third generation from July 30 to

August 10. Adult flight duration varied from 14 to 45 days. Oviposition began 3–5 days after the start of flight. Larval emergence of the first generation occurred from April 22 to May 15, the second generation during the first half of July, and the third generation in August. Pupation took place in the second ten-day period of May (first generation), the third ten-day period of July (second generation), and from late August to early September (third generation).

Average seasonal damage in 2024 reached 13.4% of inflorescences and 6.0% of grape clusters. During 2023–2025, spinetoram demonstrated the highest biological efficacy: 95.0% (2023), 90.1% (2024), and 85.0% (2025). Products based on emamectin benzoate and thiamethoxam + chlorantraniliprole also showed higher efficacy than the pyrethroid standard deltamethrin.

The European grapevine moth remains one of the most harmful vineyard pests in the Semi-Arid Region of Ukraine due to its high ecological plasticity and adaptability to climate change. Modern insecticides based on spinosyns, avermectins, and anthranilamides (spinetoram, emamectin benzoate, and thiamethoxam + chlorantraniliprole) provide high efficacy (85–95%) and can be successfully integrated into vineyard protection programs. The obtained results allow optimization of control measures based on pheromone monitoring data.

**Keywords:** *Lobesia botrana*, grapevine moth, vineyards, bioecology, insecticide efficacy

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