

Battle of the Beetle Strains: assessing *Tenebrio molitor's* resistance against fungal threats

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Abstract

Among edible insects, *Tenebrio molitor*, commonly known as yellow mealworm, is one of the most farmed in the European Union (EU). Although little information is available on colony health, insect pathogens are relevant threats to the industry. For instance, *Beauveria bassiana* is a commonly used entomopathogen in the EU as an alternative to pesticide treatment in crop fields and storage, e.g. grains and cereals.

After inoculating on plant tissues, spores may spill over from crop fields into insect farms. Additionally, in terms of biosecurity measures, the selection of resistant strains making use of the genetic variability of the mealworm may decrease the impact on the rearing facilities, if biosecurity measures fail to contain the spread of the infection.

The study aimed to investigate the resistance of larvae of 7 different production-adapted strains of *T. molitor* to infection by *B. bassiana*. The disease challenge test was performed at 25°C, a relative humidity of 65%, and 24:0 (dark to light) lighting. Evaluations of the pathogen infection considered the impact on larval survival rates, larval growth, and successful metamorphosis. Additionally, morphological alterations induced by the infection were examined by using high-resolution cameras. Preliminary results obtained 72 hours after infection indicate a decline in mobility and feeding activity when compared to a control group. These observations could serve as early symptoms and signs for detecting disease in insect farms. Consequently, monitoring these indicators as potential parameters for early disease detection in rearing facilities is important.