



Tropentag, September 20-22, 2023, hybrid conference
“Competing pathways for equitable food systems transformation:
Trade-offs and synergies”

The effect of temperature and photoperiod on the full meal passage, defecation and digestion in the last larval instar of *spodoptera littoralis*

ESMAT HEGAZI¹, WEDAD E. KHAFAGI², ESSAM AGAMY³

¹*Alexandria University, Dept. of Entomology, Egypt*

²*Plant protection research institute, Biological Control,*

³*Cairo University, Dept. of Entomology, Egypt*

Abstract

It is known that climate change has provoked changes in the availability of insects, including the cotton leafworm, *Spodoptera littoralis* (Boisd.). that develops throughout the year. Its larvae are non-diapausing. So, the effects of temperature and photoperiod on full meal passage would be relevant to feeding ecology. Little information is available on time requirements for passage of a full meal through the gut of any noctuids, or other insects, the effects of temperature and photoperiod on full meal passage would be relevant to understand to justify the study. A study using the late instar of *S. littoralis* larvae was conducted to examine the impact of different ranges of temperatures and photoperiods on the time required to the passing of undigested material of a meal, defecation rate and digestion in the starving and non-starving *S. littoralis* larvae. The results suggested that temperature, photoperiod, as well as starvation, control the speed of food passage, defecation behaviour and digestion. The time elapsed between the larva was fed on the diet until first fecal pellet was ejected (speed of food passage, SFP) significantly differed among variable ranges of both temperatures and photoperiods. The SFP was longer at 15 °C and shorter at 30 °C. At 20 °C, short photoperiod drastically accelerated the SFP compared to larvae kept at long photoperiod L18:D6. At 20 °C, excretion took significantly more time at 12L:12D and less time at continuous light. The approximate digestibility values significantly varied among test conditions. This study may offer new insight into the relationship between feeding ecology and nutritional physiology in insects by examining the passage of food from the crop to the rectum, in relation to different ranges of temperatures and photoperiods. That may help in understanding the adaptability of insects to the environment and may also provide insightful information in Entomology field.

Keywords: Defecation behaviour, development time, photoperiods, *spodoptera littoralis*, temperatures, velocities of food passage