

Impact of Different Rearing Diets on the Performance of Adult Mealworms *Tenebrio molitor*

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Abstract : Production of insects for human and animal consumption is an increasingly important activity in Canada. Protein production is more efficient and less harmful to the environment using insect rearing compared to the impact of traditional livestock, poultry and fish farms. Insects are rich in essential amino acids, essential fatty acids and trace elements. Thus, insect-based products could be used as a food supplement for livestock and domestic animals and may even find their way into the diets of high performing athletes or fine dining. Nevertheless, several parameters remain to be determined to ensure efficient and profitable production that meet the potential of these sectors. This project proposes to improve the production processes, rearing diets and processing methods for three species with valuable gastronomic and nutritional potential: the common mealworms (*Tenebrio molitor*), the small mealworm (*Alphitobius diaperinus*), and the giant mealworm (*Zophobas morio*). The general objective of the project is to acquire specific knowledge for mass rearing of insects dedicated to animal and human consumption in order to respond to current market opportunities and meet a growing demand for these products. Mass rearing of the three species of mealworm was produced to provide the individuals needed for the experiments. Mealworms eat flour from different cereals (e.g. wheat, barley, buckwheat). These cereals vary in their composition (protein, carbohydrates, fiber, vitamins, antioxidant, etc.), but also in their purchase cost. Seven different diets were compared to optimize the yield of the rearing. Diets were composed of cereal flour (e.g. wheat, barley) and were either mixed or left alone. Female fecundity, larvae mortality and growing curves were observed. Some flour diets have positive effects on female fecundity and larvae performance while each mealworm was found to have specific diet requirements. Trade-offs between mealworm performance and costs need to be considered. Experiments on the effect of flour composition on several parameters related to performance and nutritional and gastronomic value led to the identification of a more appropriate diet for each mealworm.

Keywords : mass rearing, mealworm, human consumption, diet

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