

# APPLYING SCOPE FOR GROWTH ESTIMATES TO COMPARE THE SUITABILITY OF FEEDS OF THE WHITE SHRIMP *Penaeus vannamei*

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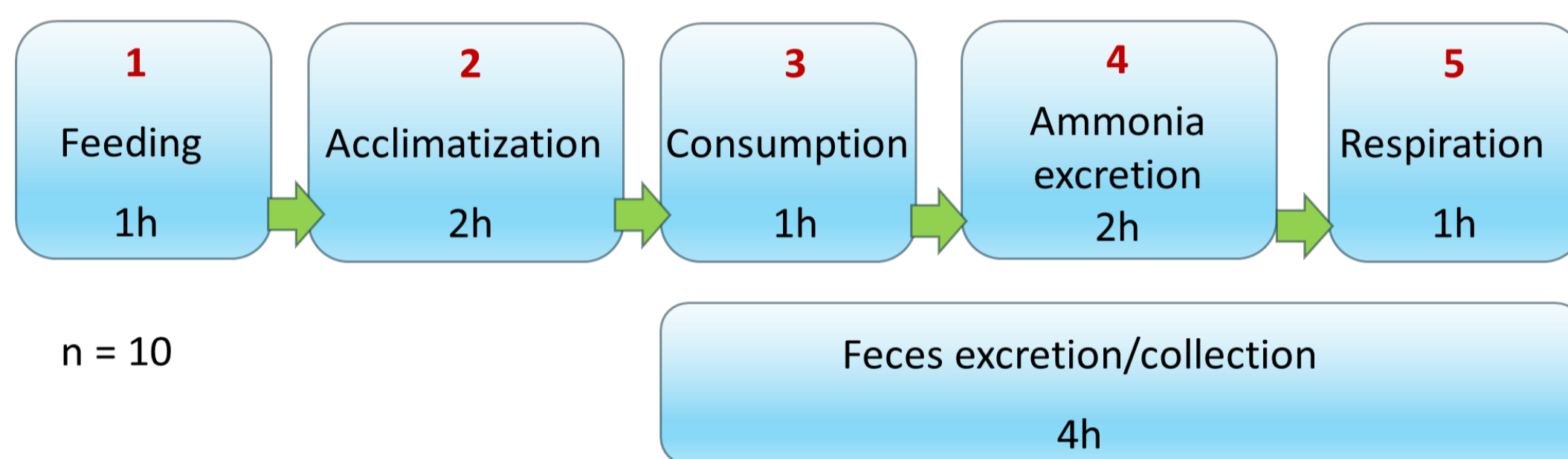
*P. vannamei* (Foto: P. Nowakowska)

## Introduction

The Scope-for-growth (SFG) of an organism is the amount of assimilated energy available for individual production e.g. growth or reproduction after the maintenance requirements of organisms have been met. This method applies an energy balance equation based on an experimentally determined rate of physiological processes. The SFG of *P. vannamei* was calculated as the difference between absorption (A), and the sum of the respiration (R) and excretion (U) [SFG = A - (R+U)]. In the present study, we investigated the effects of two commercial diets: one used as a pre-growing diet for marine fish and juveniles (diet A) and a second specially designed for shrimps (diet B) on the SFG of *P. vannamei* to compare their suitability.

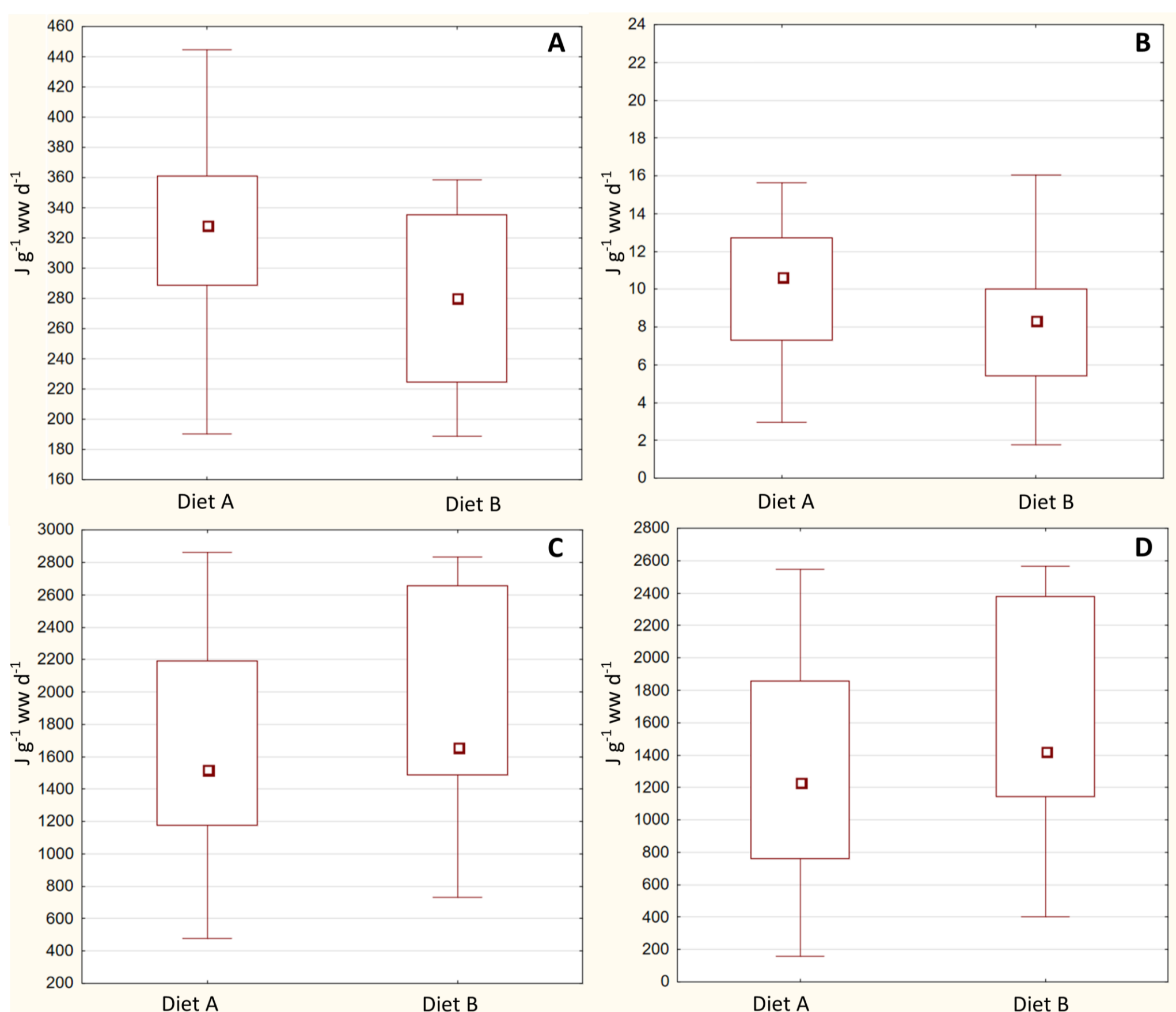
## Materials and methods

According to the scheme each diet trial, was performed on 10 specimens of average wet weight of  $13.99 \pm 2.74$  g. The food consumption as well as faeces excretion rate were determined by weight, ammonia excretion rate was determined using the salicylate method and the respiration rate was measured using an optical oxygen electrode.



n = 10

*P. vannamei* trial scheme.



The amount of energy allocated to A – respiration, B – ammonia excretion, C- assimilation and D- production of *P. vannamei* fed with different diets.

## Results

*P. vannamei* fed on diet B were characterized by a higher food consumption rate as well as assimilation efficiency (5.0 %) in relation to diet A. In the case of diet A, the average proportion of energy allocated to production was 74.3%, energy allocated to respiration was 24.9%, and excreted as ammonia was 0.8% in relation to the amount of energy assimilated from the food. Whereas for diet B the average proportion of energy allocated to production was 81.6%, energy allocated to respiration was 17.9%, and excreted as ammonia was 0.5% in relation to the amount of energy assimilated from the food. The estimated SFG of cultured shrimps was 8% higher when fed on diet B than diet A.

## Discussion and conclusions

A commercial diet designed for shrimp cultivation seems to be more suitable for *P. vannamei*. Thus, higher SFG values were recorded in shrimps fed on diet B due to the higher amount of assimilated energy, with the lowest energy expenditure on metabolic processes. It can be assumed that the composition of diet B, was more attractive and easier digestible for *P. vannamei* than feed composed for marine fish and juveniles. Such differences between diets might suggest the relevance of diet composition and the need for further optimization to achieve high production in white shrimp aquaculture.