Evaluation of floating cages as an experimental tool for marine shrimp culture studies under practical earthen pond conditions

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The New Caledonia blue shrimp Litopenaus stylirostris is commercially produced under semi-intensive rearing conditions. The size of the farming earthen ponds (5-10 ha) and the subsequent production constraints make it difficult to use them as experimental units for random experiments. Moreover, since every pond has its own characteristics, ponds’ effects cannot be ruled out, thus making it hard to define true replicates. In order to design future experiments under conditions resembling those used in production, we evaluated the possible use of floating cages as experimental units with the aim of assessing treatment effects with a reasonable statistical power. To this end, two sets of floating cages were placed respectively in two different ponds in a commercial farm. The aim of the study was to evaluate on a technical basis the possibility of rearing shrimps in floating cages set up in earthen ponds and to assess this method from a statistical standpoint. Shrimps reared in and outside the cages showed comparable growth and survival rates. Variability in the zootechnical parameters between cages, expressed as the estimated coefficient of variation (CV) was calculated for survival rate, total final biomass, final body weight, daily increment in body weight and FCR. On the basis of these figures, we calculated for a given statistical power (80%) the number of replicates (cages) that would be required to reveal significant differences between two treatments, at a 5% level of significance. Our results illustrated the within-farm variability among ponds, and confirmed that the specific characteristics of each pond from the same farm make it difficult to use the ponds themselves as experimental units. This study demonstrates that rearing in floating cages is an economical, powerful and sensitive experimental tool for shrimp culture studies specifically carried out under conditions close to semi-intensive production.