A recently developed BioEnergetic Growth (BEG) model for blue mussels (Mytilus edulis), valid for juvenile mussels, has been further developed to an 'extended model' and an alternative 'ad hoc BEG model' valid for post-metamorphic mussels, where the latter accounts for changing ambient chl a concentration. It was used to predict the growth of M. edulis on optimally thinned farm-ropes in Great Belt (Denmark), from newly settled post-metamorphic mussels of an initial shell size of 0.8 mm to marketable juvenile 30–35 mm 'mini-mussels'. Such mussels will presumably in the near future be introduced as a new Danish, smaller-sized consumer product. Field data for actual growth (from Day 0 = 14 June 2011) showed that size of 'mini-mussel' was reached on Day 109 (Oct 1) and length 38 mm on Day 178 (Dec 9) while the corresponding predictions using the extended model were Day 121 (Oct 13) and Day 159 (Nov 20). Similar results were obtained by use of the ad hoc BEG model which also demonstrated the sensitivity of growth prediction to levels of chl a concentration, but less to temperature. The results suggest that it is possible (when the conditions are optimal, i.e., no intraspecific competition ensured by sufficient thinning) to produce 'mini-mussels' in Great Belt during one season, but not the usual marketable 45-mm mussels. We suggest that the prediction model may be used as a practical instrument to evaluate to what degree the actual growth of mussels on farm ropes due to intraspecific competition may deviate from the potential (optimal) growth under specified chl a and temperature conditions, and this implies that the effect of thinning to optimize the individual growth by eliminating intraspecific competition can be rationally evaluated.