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Improving estimates of recruitment and catchability of Jumbo squid *Dosidicus gigas* in the Gulf of California

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We analyzed the effect of outliers of the catch-per-unit effort on the catchability coefficient estimated by using a depletion model. When we used catch-per-unit effort in the Delury model, we observed a curve in the regression of depletion against time. When we then solved the model with a normal probability distribution, the catchability coefficient was poorly estimated. We improved the estimation of catchability using an algorithm that used a two-component-mixture probability distribution. The estimations for catchability (q) and recruitment (N_0) were q = 0.41 X 10^{-3}, N_0 = 9.13 X 10^6, and the estimated likelihood was 2.65 X 10^4 using an algorithm of the normal probability distribution, whereas the estimations made using the algorithm of a two-component-mixture probability distribution were q = 0.23 X 10^{-3}, N0 = 18.07 X 10^6, and the estimated likelihood was 4.89 X 10^6. The maximum likelihood estimated with the mixture-distribution algorithm was greater than the maximum likelihood estimated with the normal-distribution algorithm. We believe the two-component-mixture probability distribution fit the data better than the normal probability distribution. From this we determined the consequences on management when overestimations or underestimations of catchability are estimated.

Palabras clave: Dosidicus gigas, Recruitment, Management, outliers, catchability, depletion model, squid