Supplementary Figures

Suppl. Figure 1: Convergence diagnostics for spawning seasonality. All $\hat{R} <$ 1.1, all $n_{eff} > 1500$, and the log-posterior trace plot indicates good mixing. These models have converged to a stationary distribution.
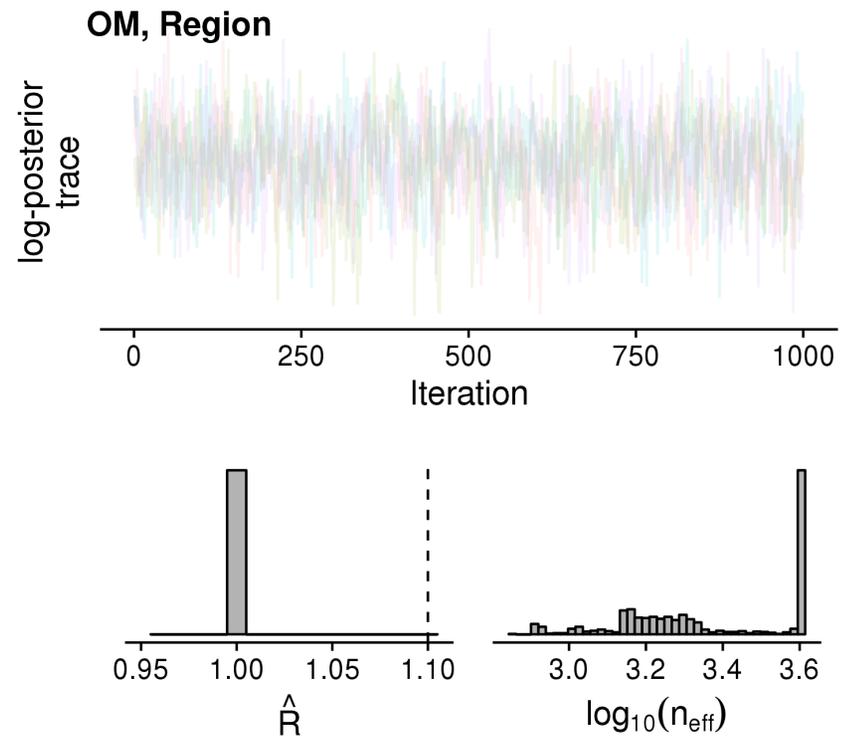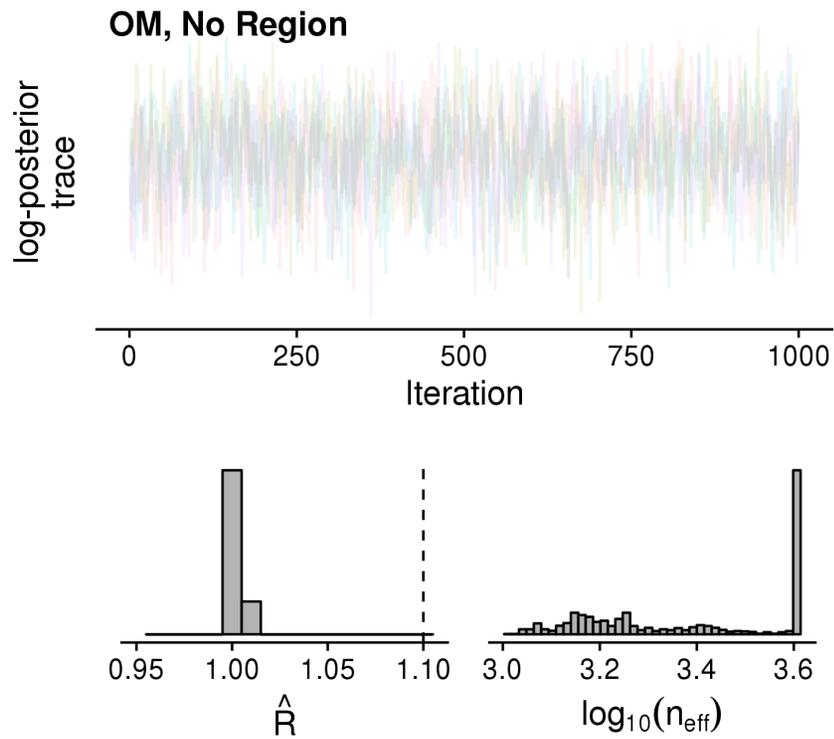
Suppl. Figure 2: Convergence diagnostics for OM spawning interval models. For both models, all $\hat{R} < 1.1$, all $n_{eff} > 700$, and the log-posterior trace plot indicates good mixing. These models have converged to a stationary distribution.
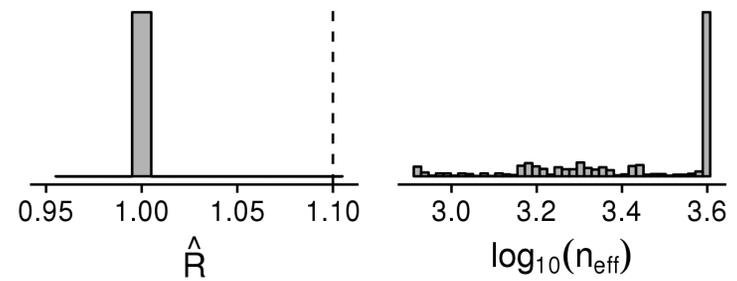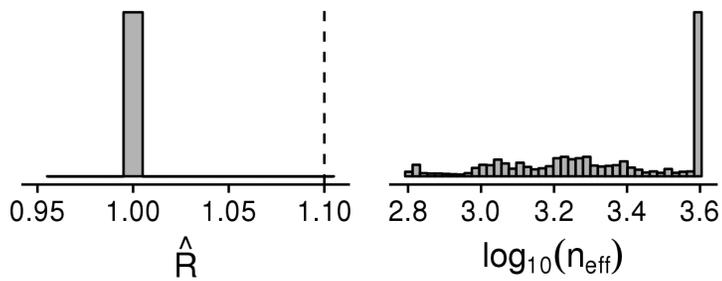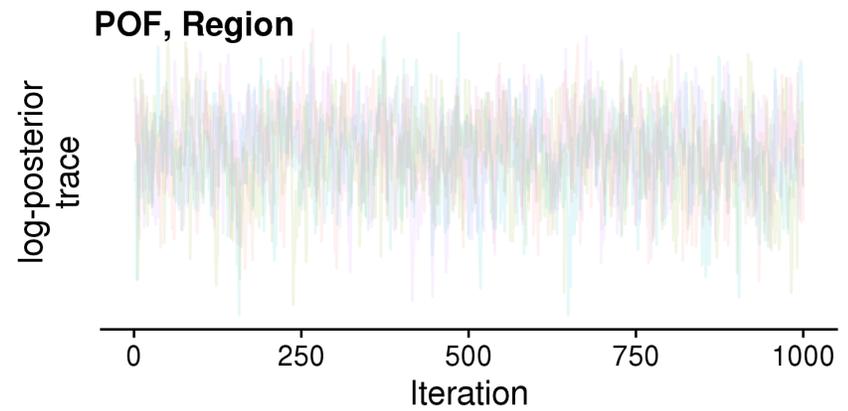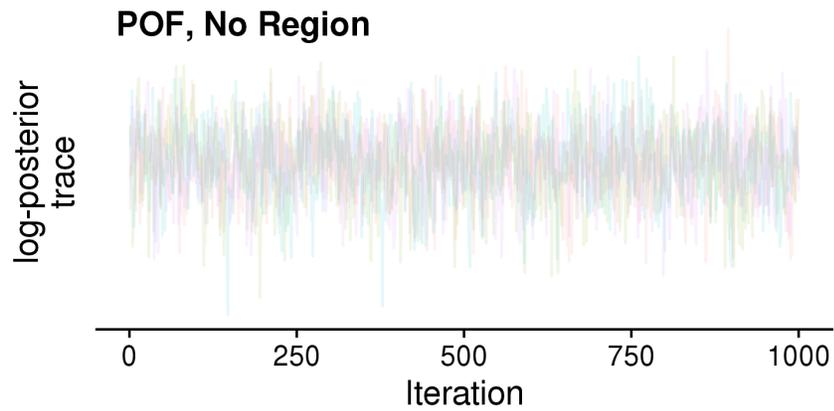
Suppl. Figure 3: Convergence diagnostics for POF spawning interval models. For both models, all $\hat{R} < 1.1$, all $n_{eff} > 800$, and the log-posterior trace plot indicates good mixing. These models have converged to a stationary distribution.
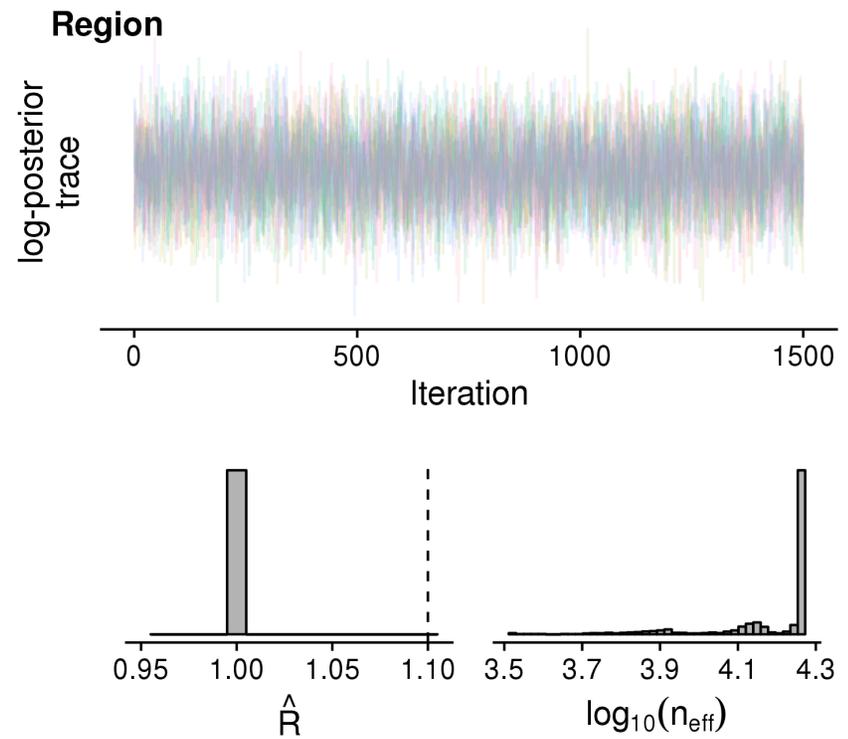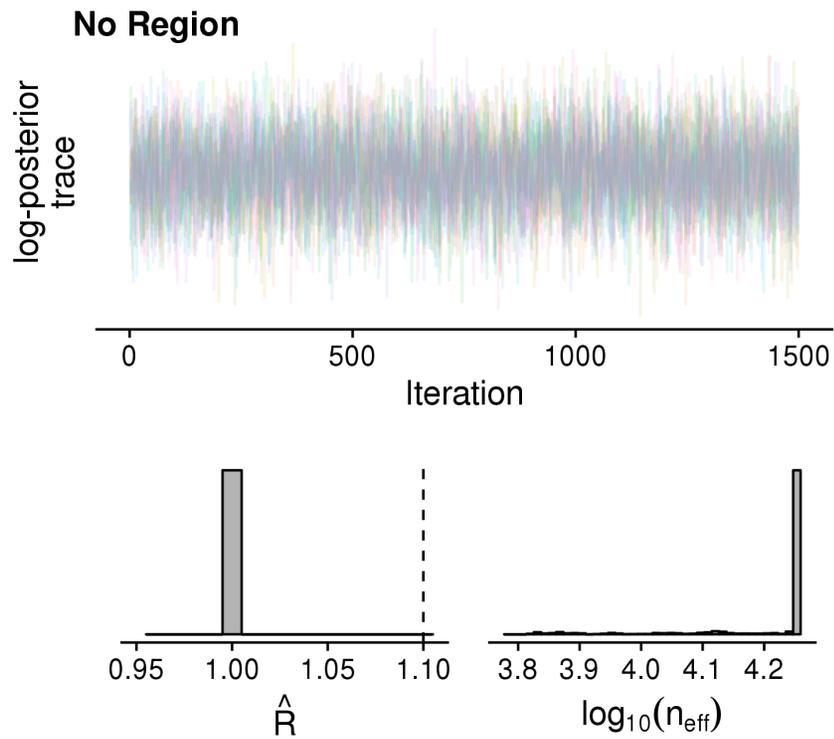
Suppl. Figure 4: Convergence diagnostics for fecundity models. For both models, all $\hat{R} < 1.1$, all $n_{eff} > 1000$, and the log-posterior trace plot indicates good mixing. These models have converged to a stationary distribution.
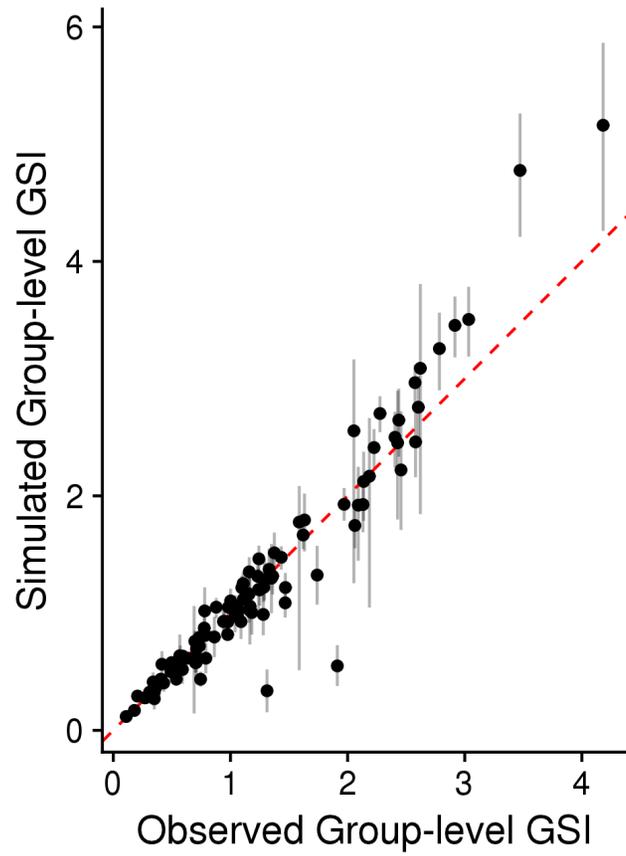
Suppl. Figure 5: Observed vs simulated data for spawning seasonality. Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
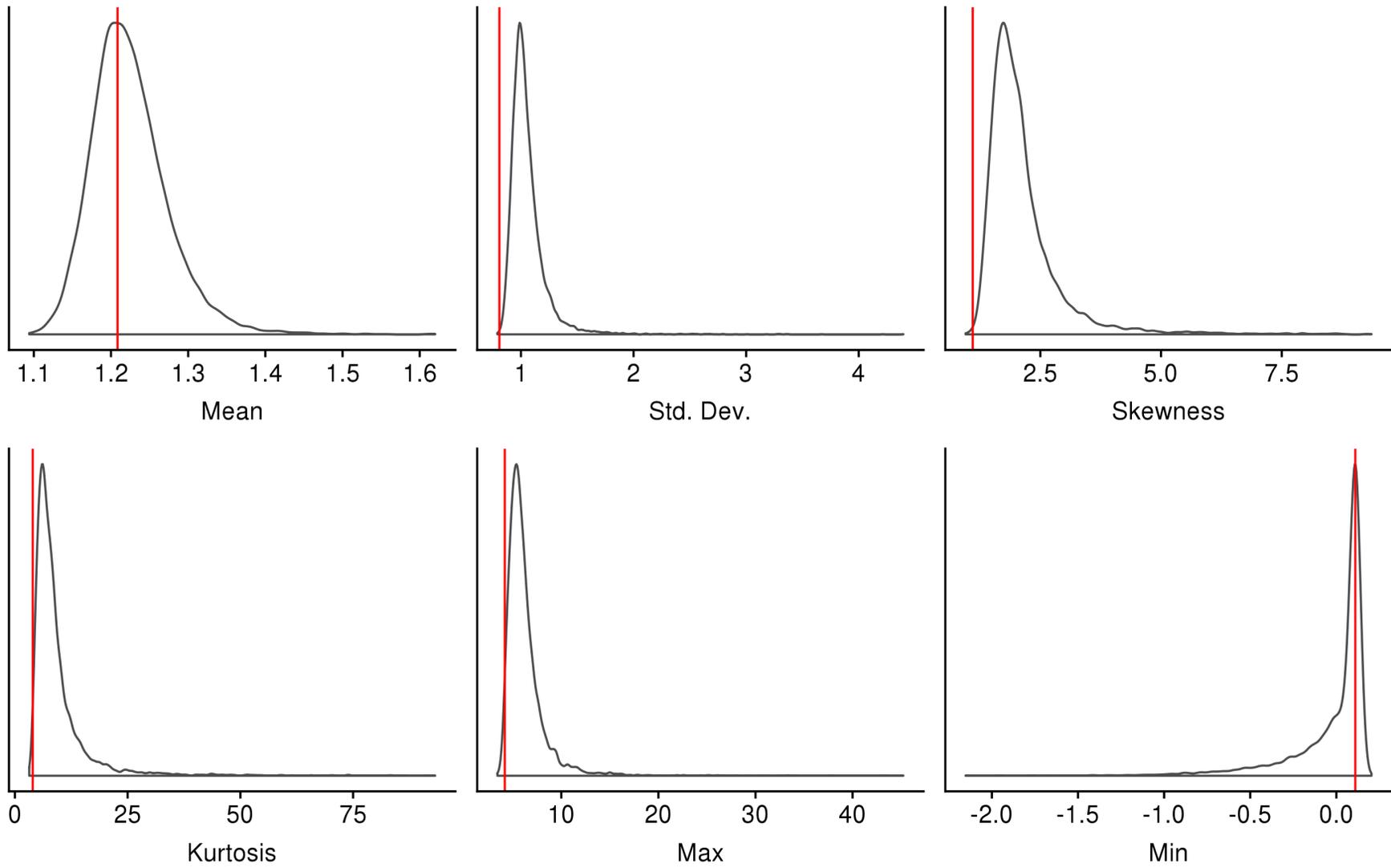
Suppl. Figure 6: Summary statistics from the posterior predictive distribution of spawning seasonality. The red line indicates the observed value, while the gray density estimate indicates the replicated values.
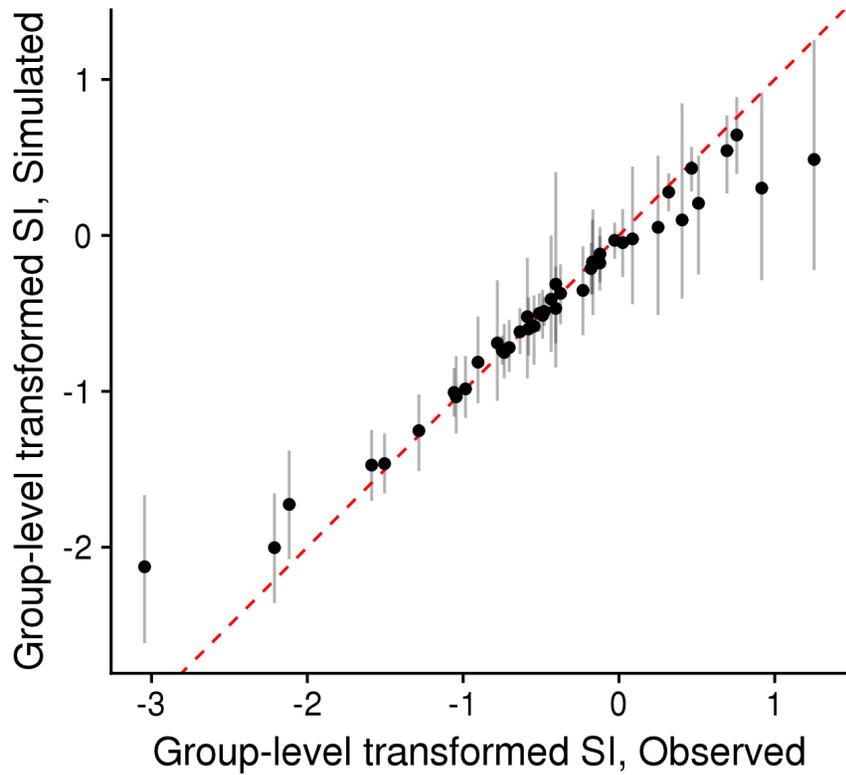
Suppl. Figure 7: Observed vs simulated data for spawning interval (OM, no region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
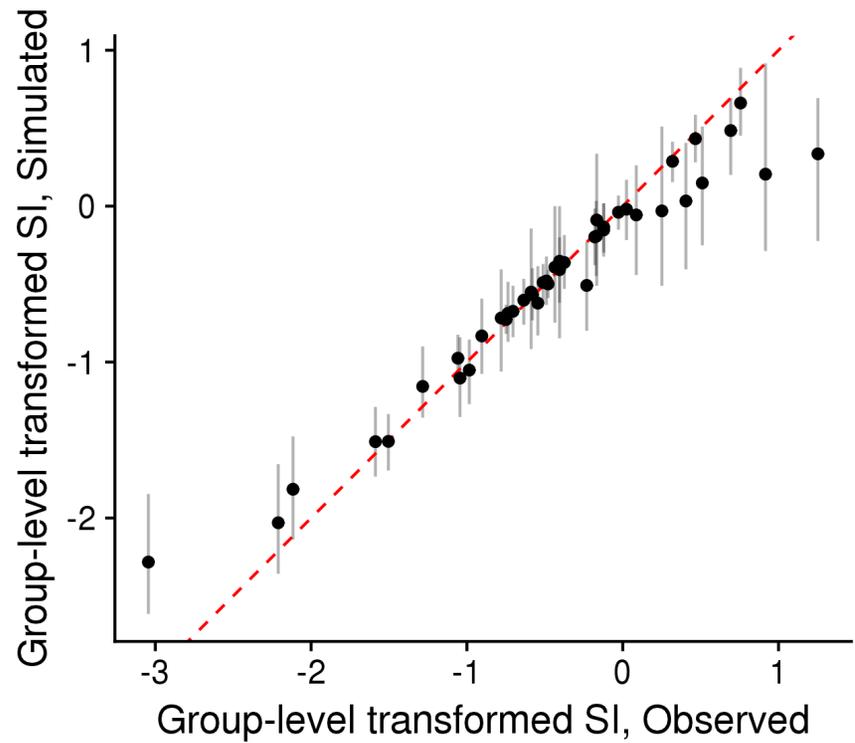
Suppl. Figure 8: Observed vs simulated data for spawning interval (OM, region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
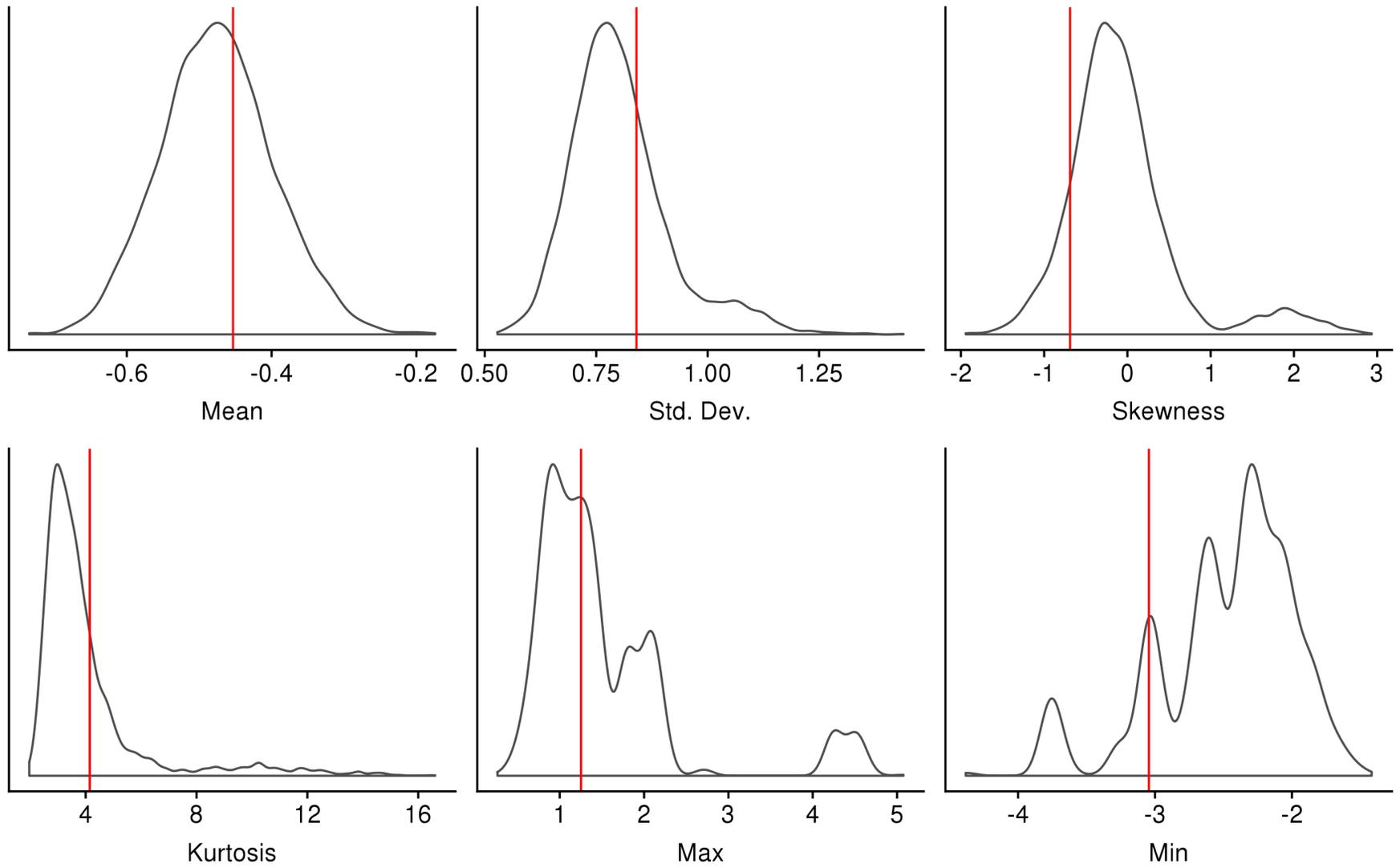
Suppl. Figure 9: Summary statistics from the posterior predictive distribution of spawning interval (OM method, no region effect). The red line indicates the observed value, while the gray density estimate indicates the replicated values.
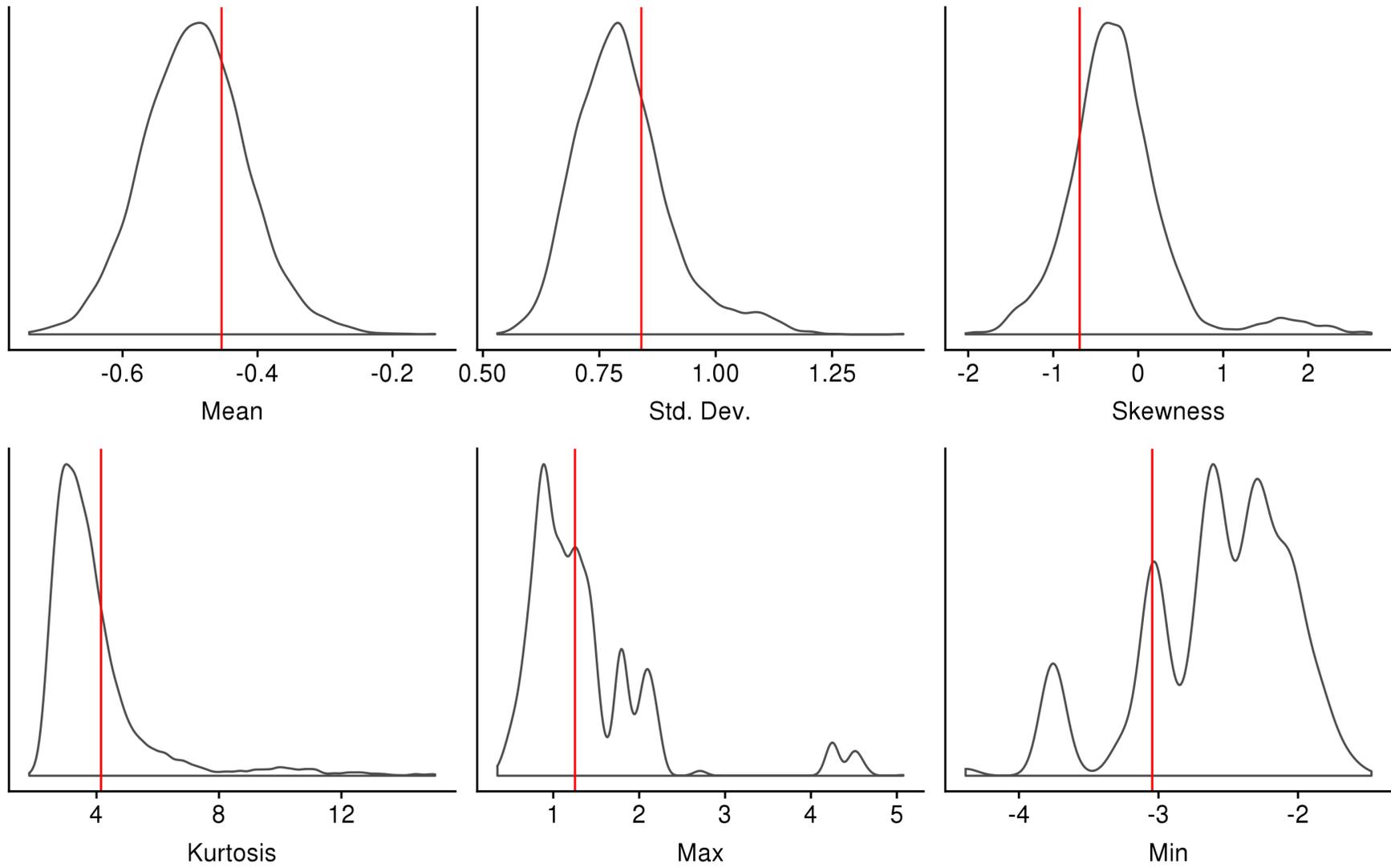
Suppl. Figure 10: Summary statistics from the posterior predictive distribution of spawning interval (OM method, region effect). The red line indicates the observed value, while the gray density estimate indicates the replicated values.

9
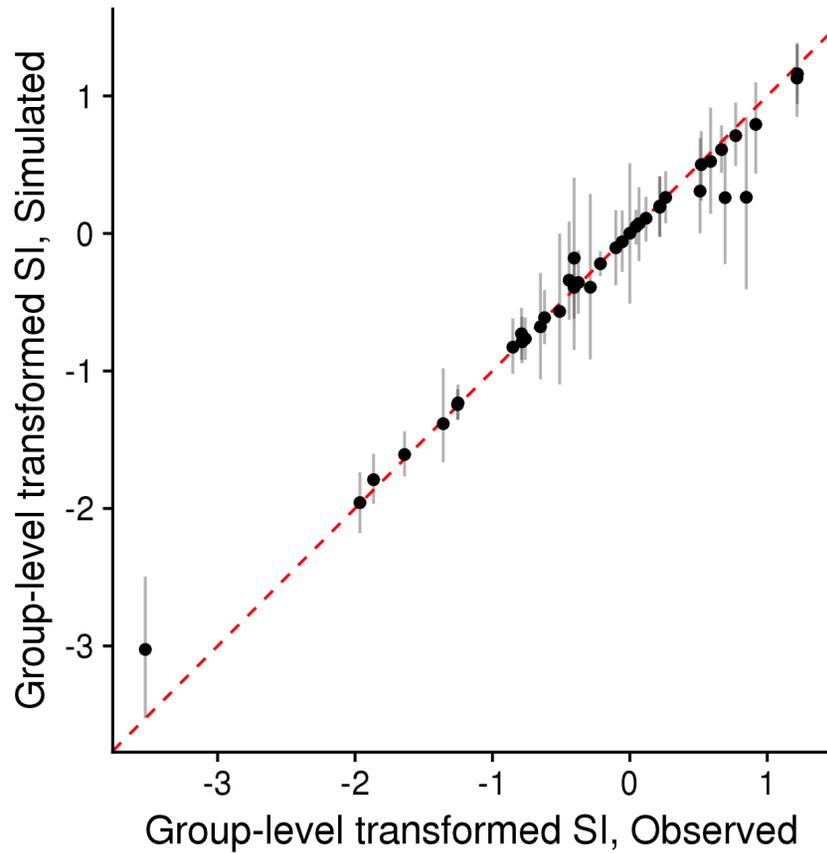
Suppl. Figure 11: Observed vs simulated data for spawning interval (POF, no region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
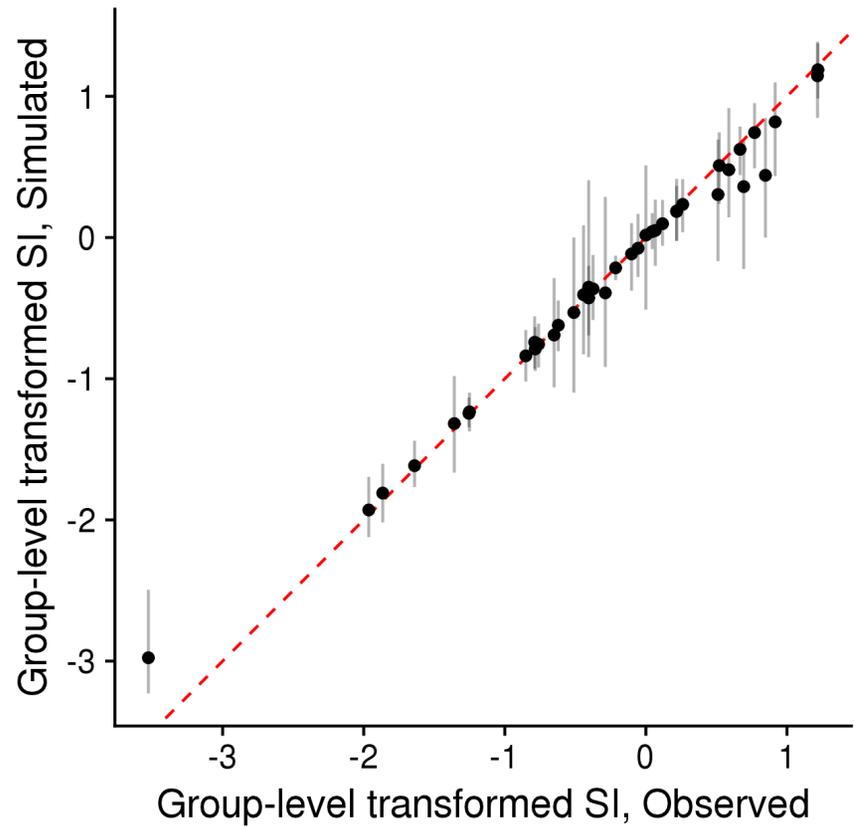
Suppl. Figure 12: Observed vs simulated data for spawning interval (POF, region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
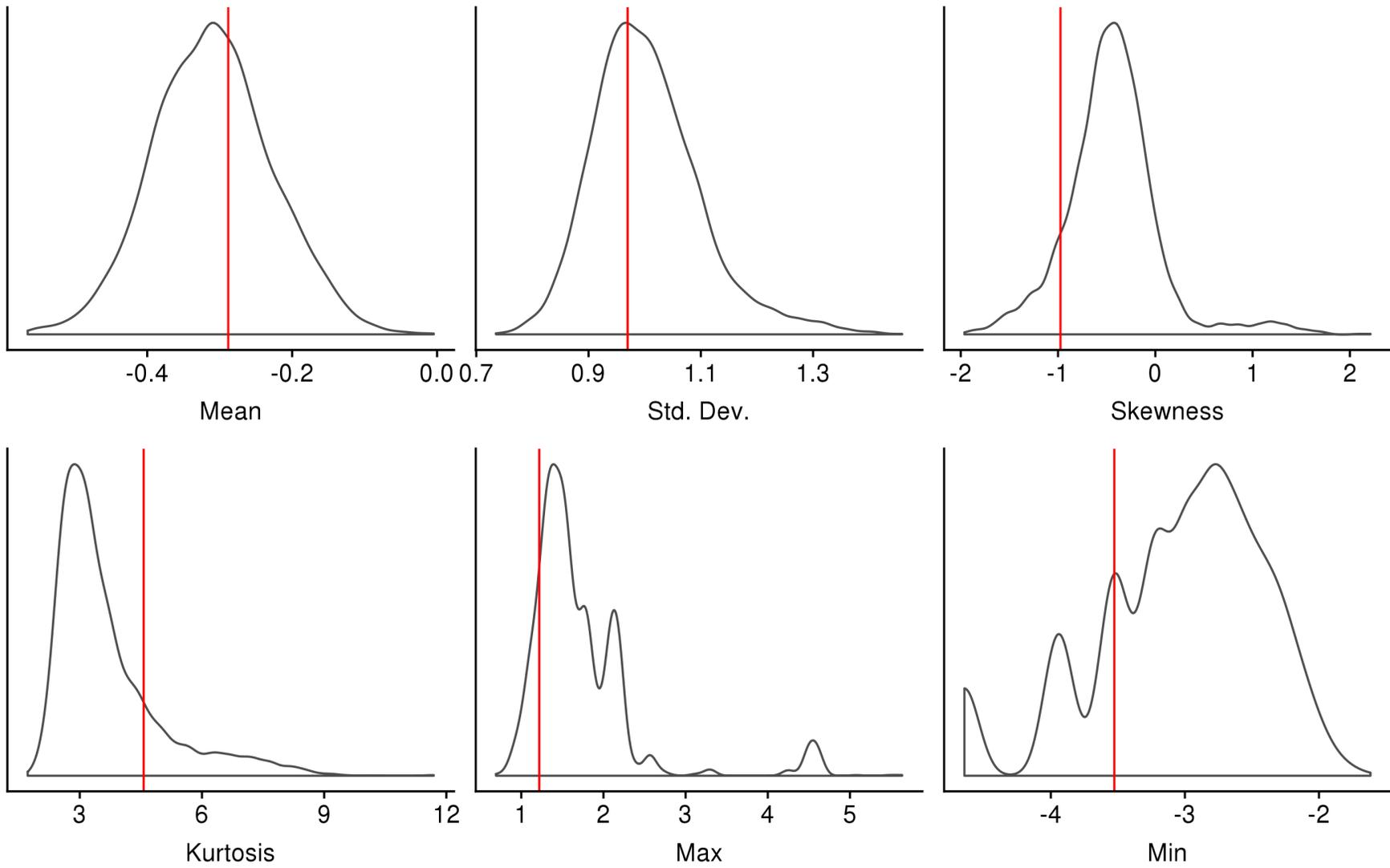
Suppl. Figure 13: Summary statistics from the posterior predictive distribution of spawning interval (POF method, no region effect). The red line indicates the observed value, while the gray density estimate indicates the replicated values.
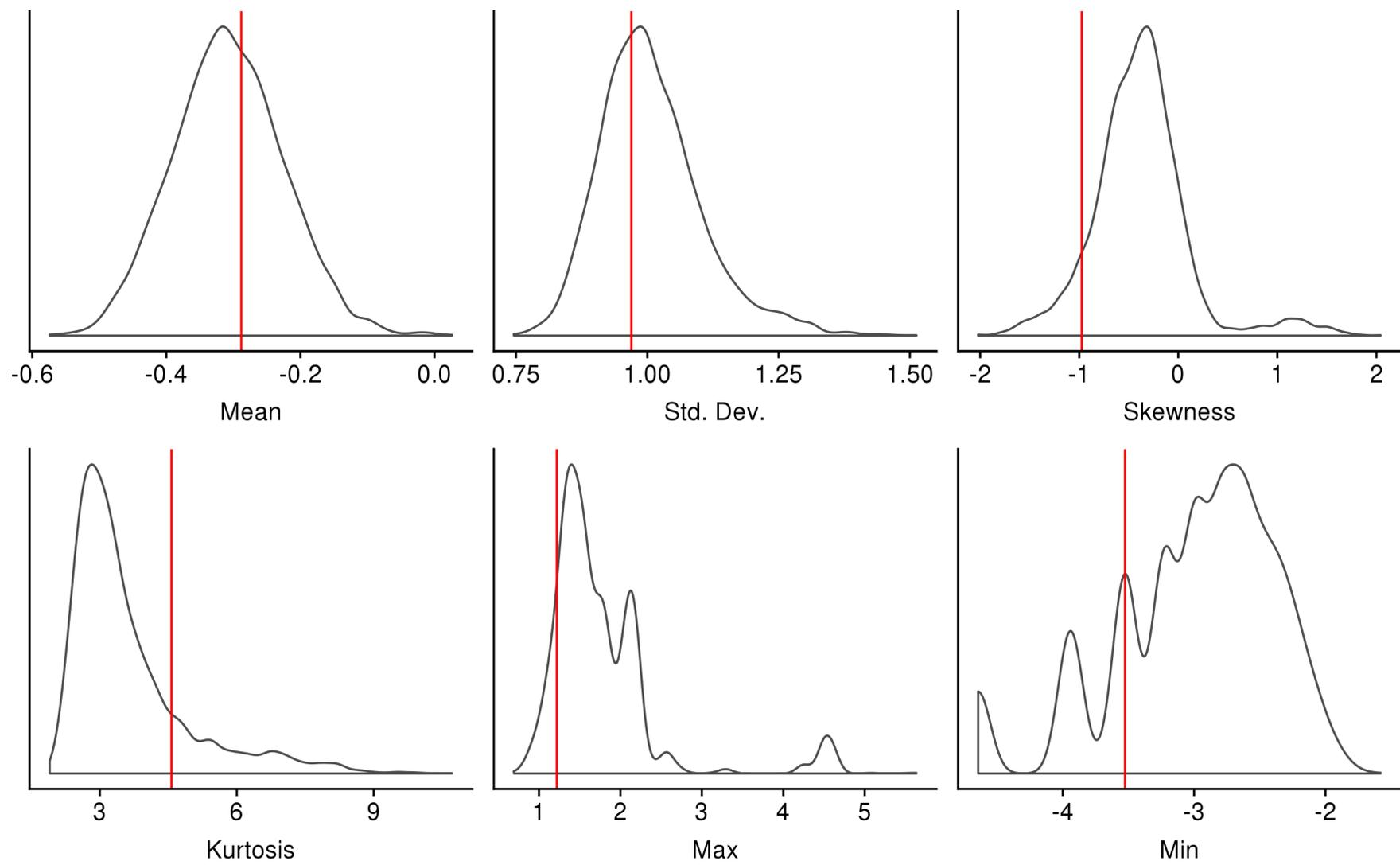
Suppl. Figure 14: Summary statistics from the posterior predictive distribution of spawning interval (POF method, region effect). The red line indicates the observed value, while the gray density estimate indicates the replicated values.
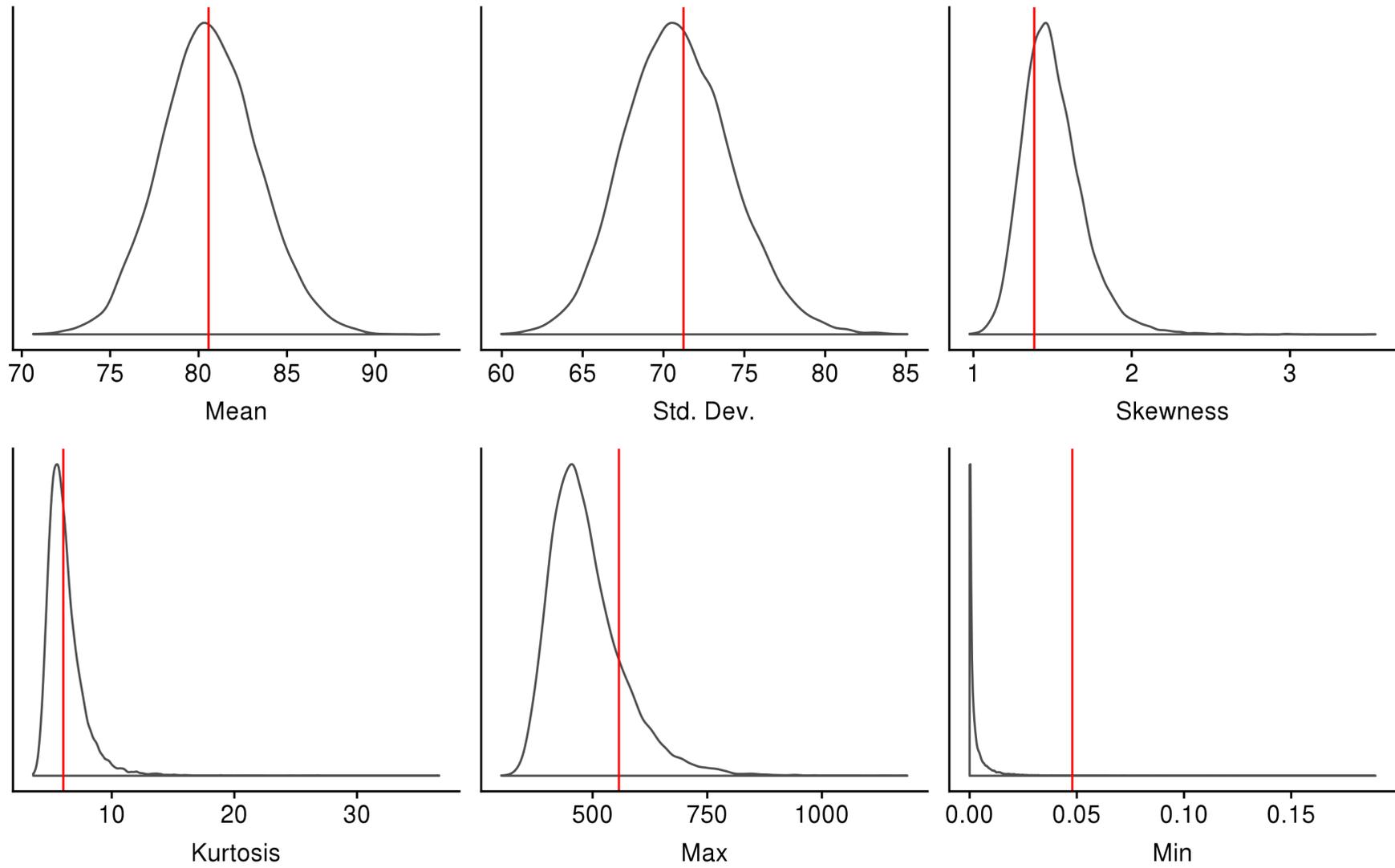
Suppl. Figure 15: Summary statistics from the posterior predictive distribution of fecundity (no region effect). The red line indicates the observed value, while the gray density estimate indicates the replicated values.
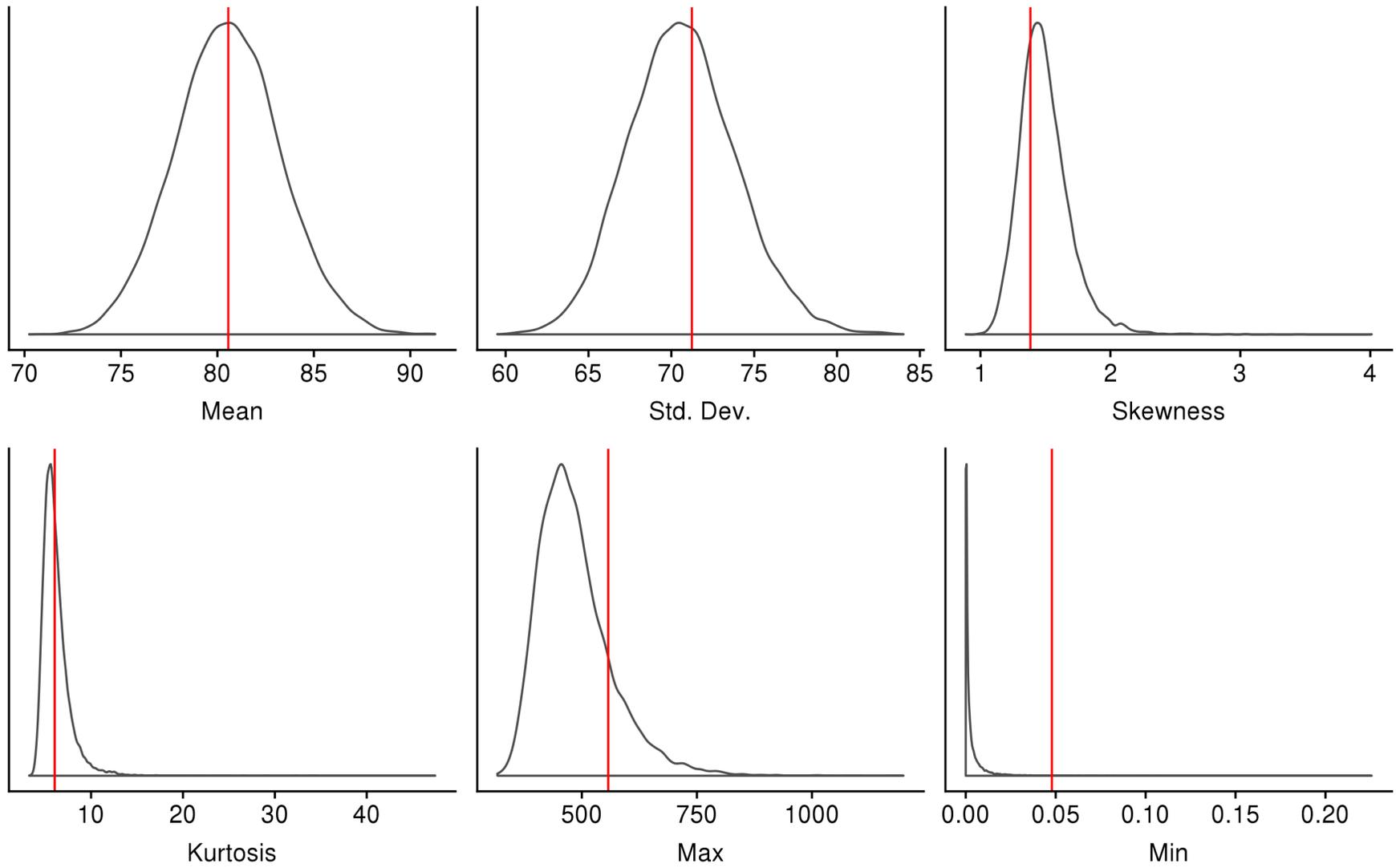
Suppl. Figure 16: Summary statistics from the posterior predictive distribution of fecundity (region effect). The red line indicates the observed value, while the gray density estimate indicates the replicated values.
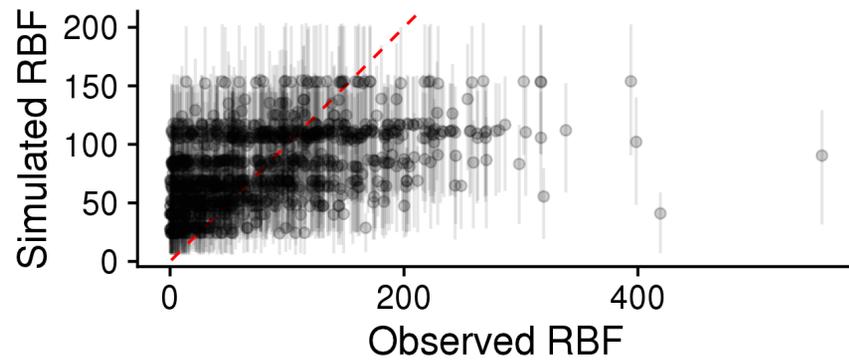
Suppl. Figure 17: Observed vs simulated individual data for fecundity (no region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
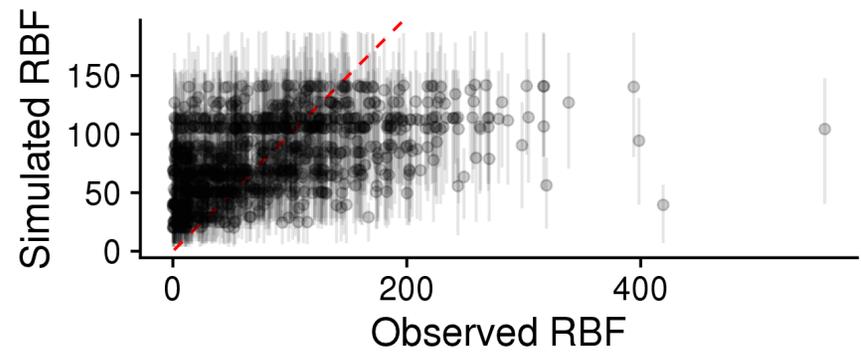

Suppl. Figure 18: Observed vs simulated individual data for fecundity (region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
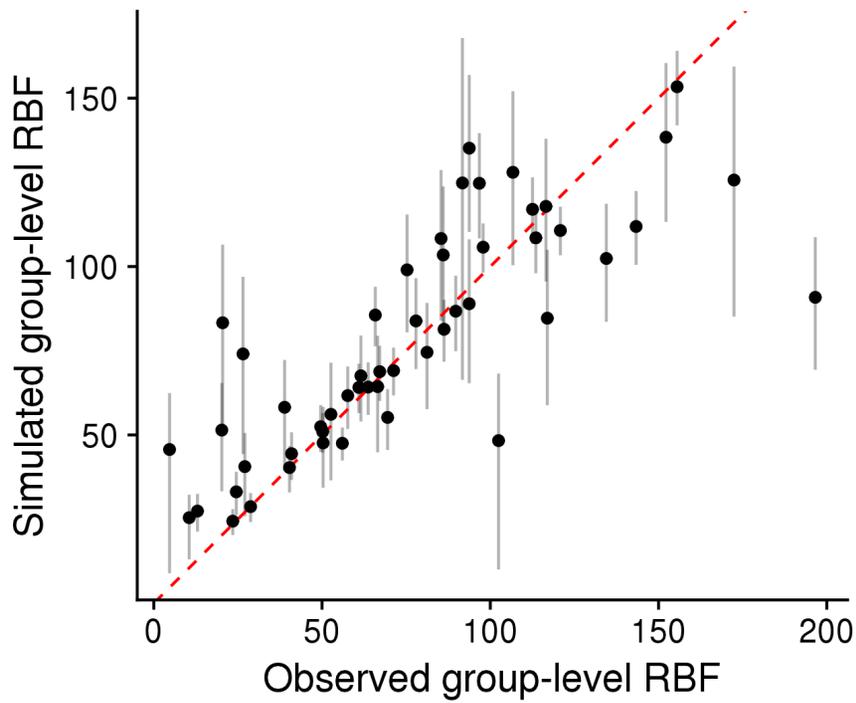
Suppl. Figure 19: Observed vs simulated group-level averages for fecundity (no region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
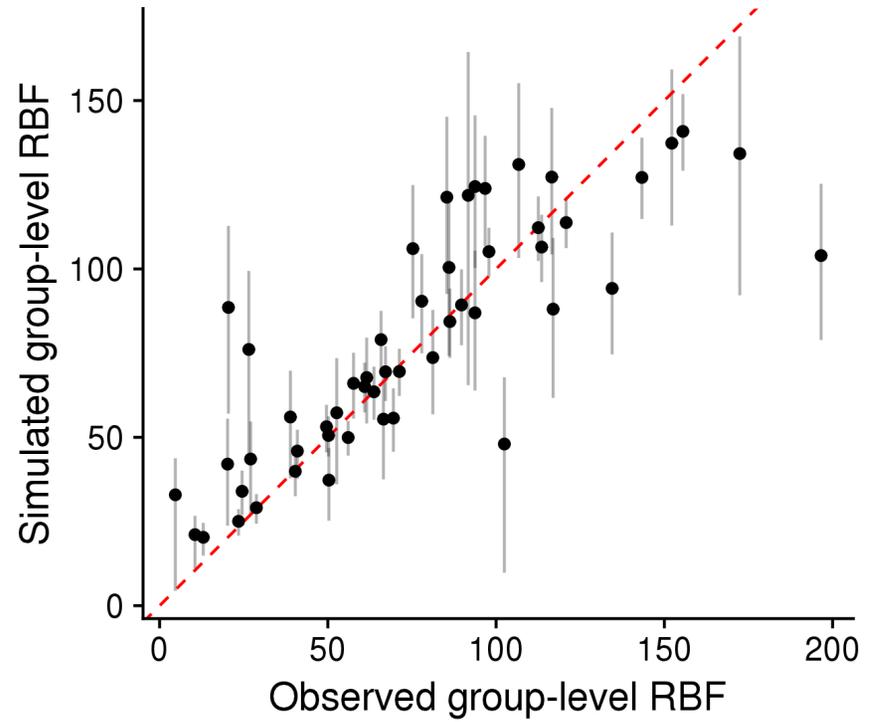

Suppl. Figure 20: Observed vs simulated group-level averages for fecundity (region effect). Black points indicate the mean simulated value, with gray bars indicating the 50% credible interval. The red line indicates the point where observed and simulated values are equal.
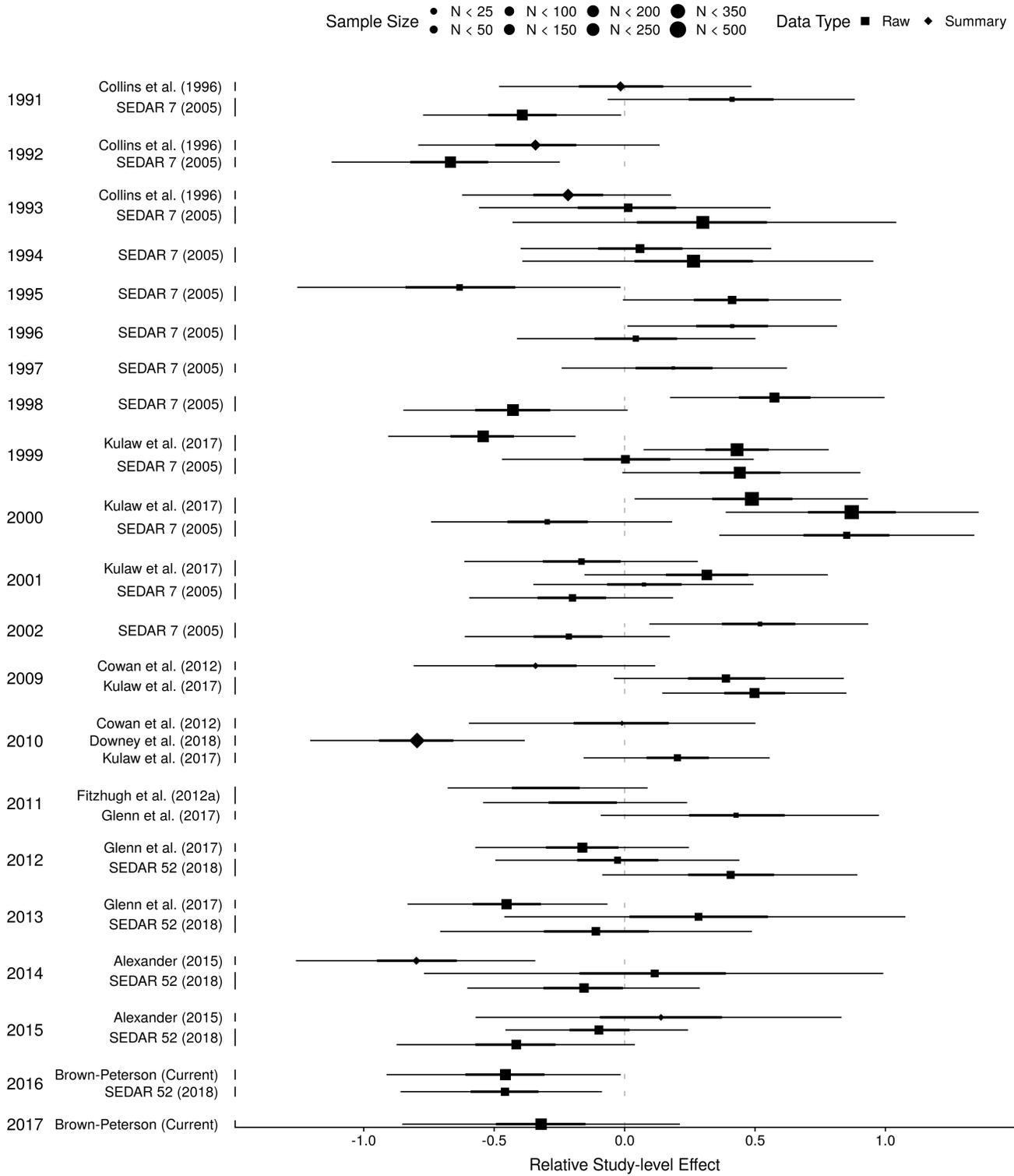
Suppl. Figure 21: Relative contribution of each data source to the spawning seasonality model. The x-axis indicates higher (positive) or lower (negative) expected GSI in the dataset when compared with the model's predicted value for the year and month. Points are the posterior distribution median value, with size and shape indicating the data's sample size and type (raw or summary). Horizontal lines indicate 50% (thick) and 95% (thin) credible intervals. The first text column indicates the year the data were collected, while the second is the study. Values are presented on the scale of the linear predictor, which is the expected value of log-GSI.
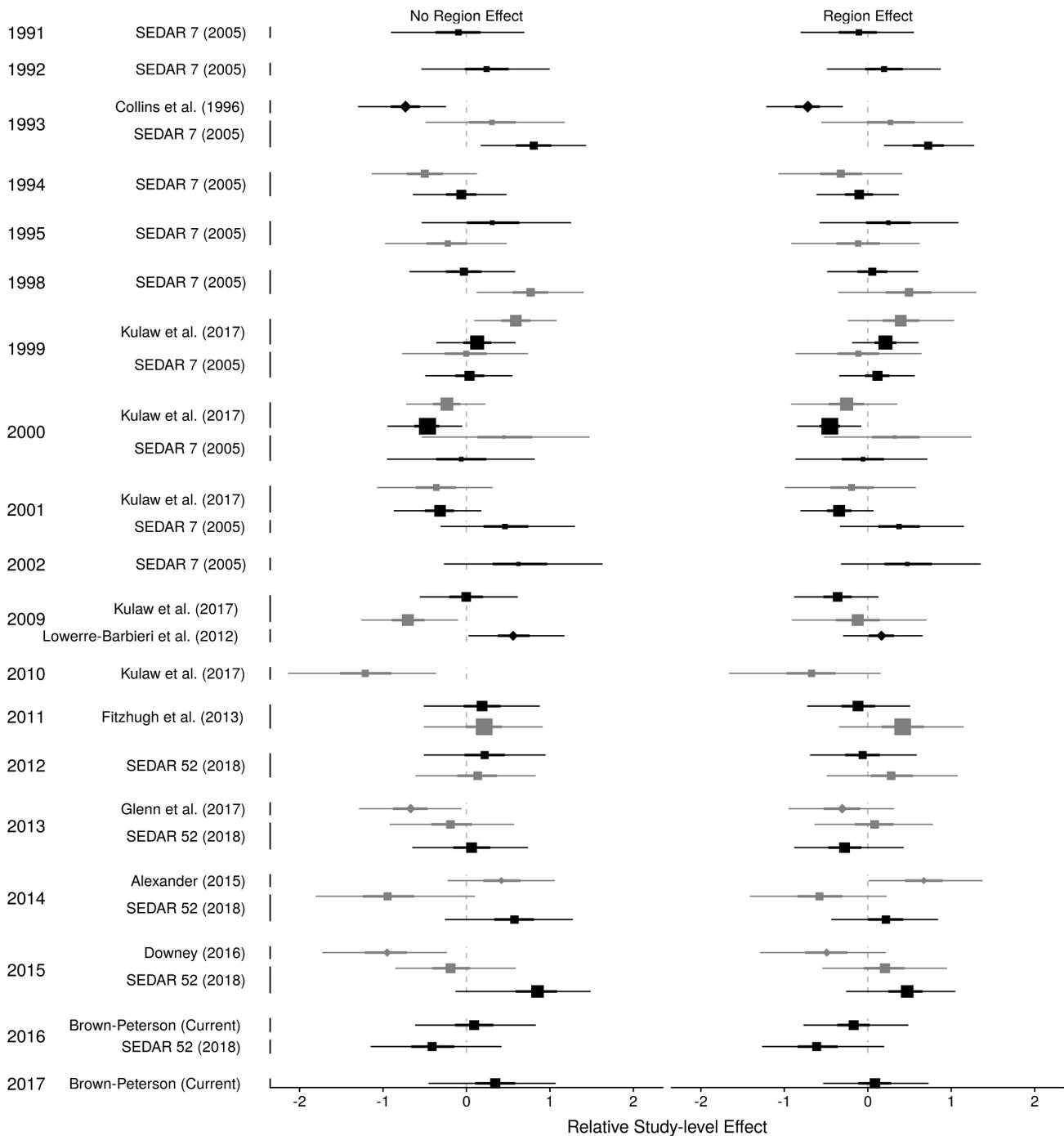
Suppl. Figure 22: Relative contribution of each data source to the spawning interval OM model with no region (left) and region (right) effect. The x-axis indicates more frequent (positive) or less frequent (negative) spawning in the dataset when compared with the model's predicted value for the year and region. Points are the posterior distribution median value, with size and shape indicating the data's sample size and type (raw or summary). Horizontal lines indicate 50% (thick) and 95% (thin) credible intervals. The first text column indicates the year the data were collected, while the second is the study. Values are presented on the scale of the linear predictor, which is the inverse-logit of the reciprocal of spawning interval.
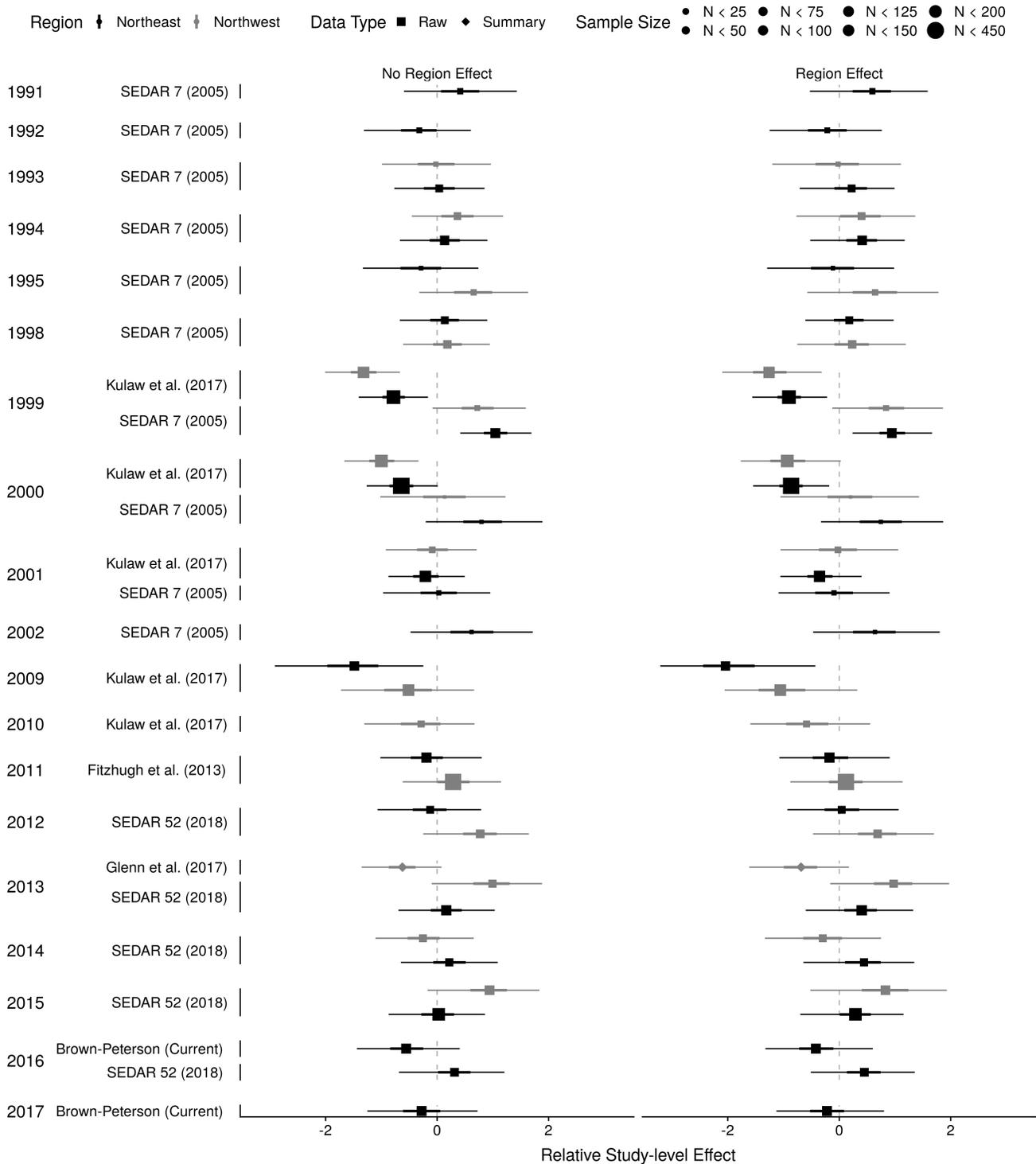
Suppl. Figure 23: Relative contribution of each data source to the spawning interval POF model with no region (left) and region (right) effect. The x-axis indicates more frequent (positive) or less frequent (negative) spawning in the dataset when compared with the model's predicted value for the year and region. Points are the posterior distribution median value, with size and shape indicating the data's sample size and type (raw or summary). Horizontal lines indicate 50% (thick) and 95% (thin) credible intervals. The first text column indicates the year the data were collected, while the second is the study. Values are presented on the scale of the linear predictor, which is the inverse-logit of the reciprocal of spawning interval.

Suppl. Figure 24: Relative contribution of each data source to the fecundity model with no region (left) and region (right) effect. The x-axis indicates higher (positive) or lower (negative) fecundity in the dataset when compared with the model's predicted value for the year and region. Points are the posterior distribution median value, with point size indicating the data's sample size. Horizontal lines indicate 50% (thick) and 95% (thin) credible intervals. The first text column indicates the year the data were collected, while the second is the study. Values are presented on the scale of the linear predictor, which is the expected value of the square-root transformed fecundity.
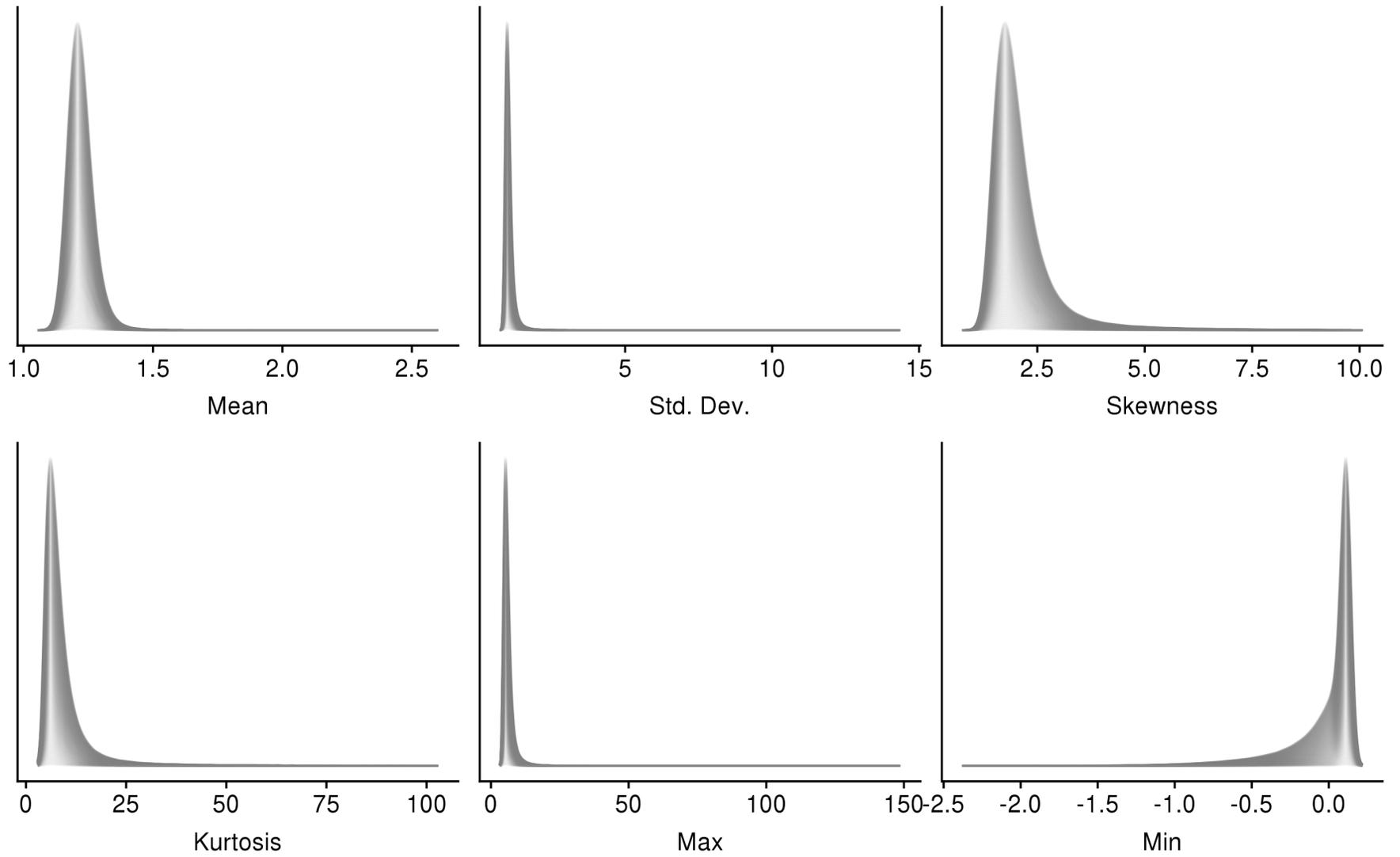
Suppl. Figure 25: Sensitivity analyses results for spawning seasonality. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.
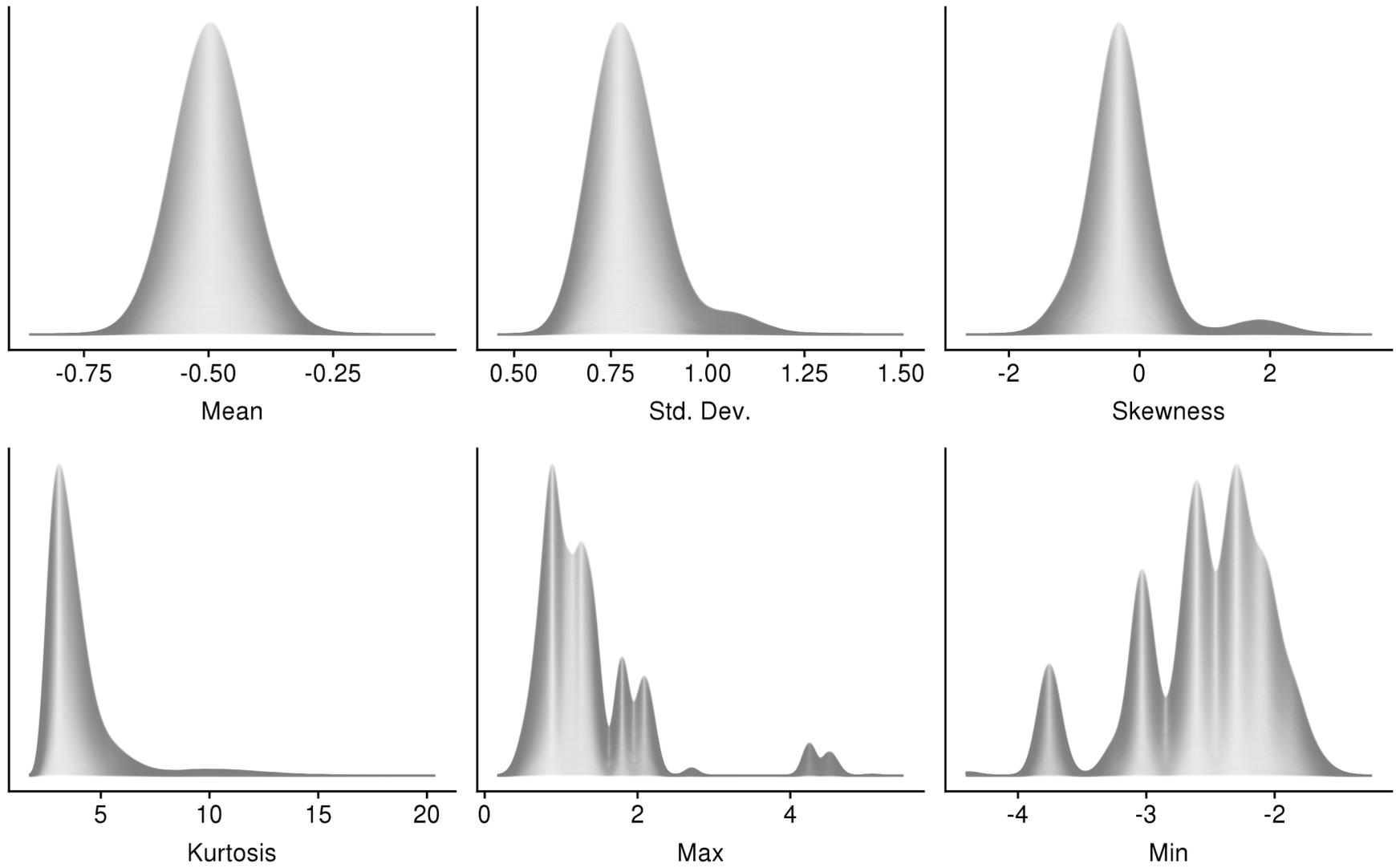
Suppl. Figure 26: Sensitivity analyses results for spawning interval, OM method, no region effect. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.
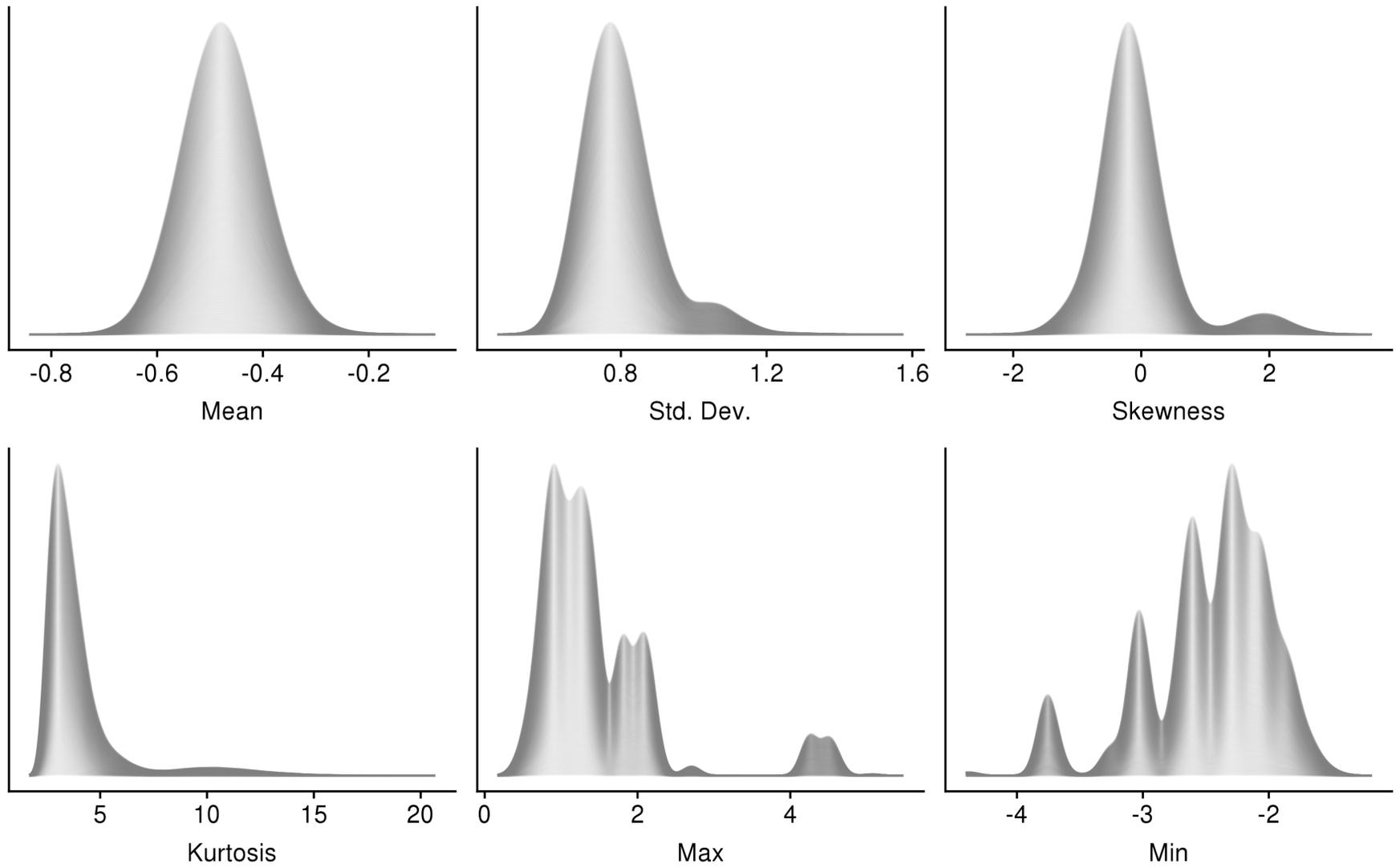
Suppl. Figure 27: Sensitivity analyses results for spawning interval, OM method, region effect. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.
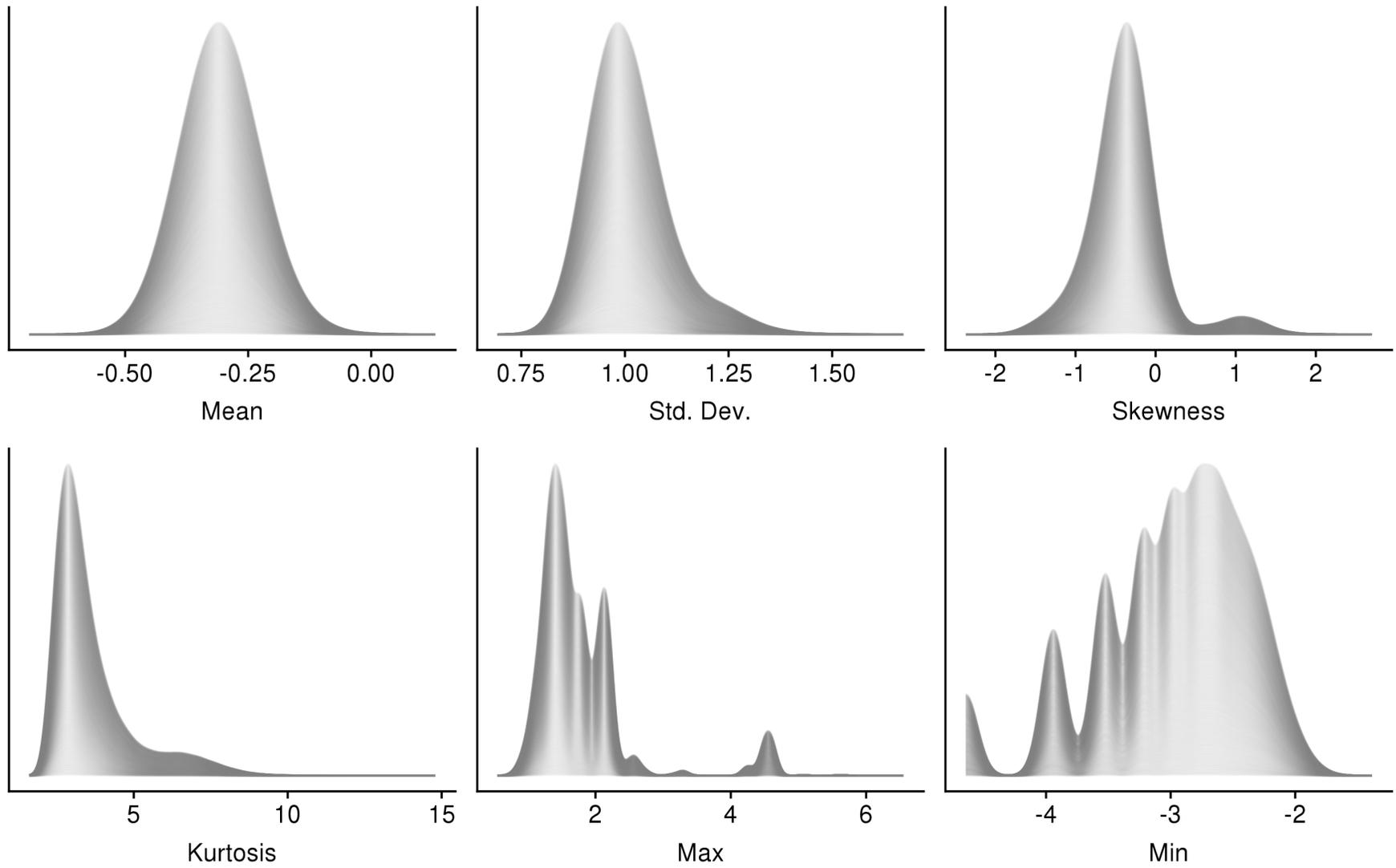
Suppl. Figure 28: Sensitivity analyses results for spawning interval, POF method, no region effect. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.
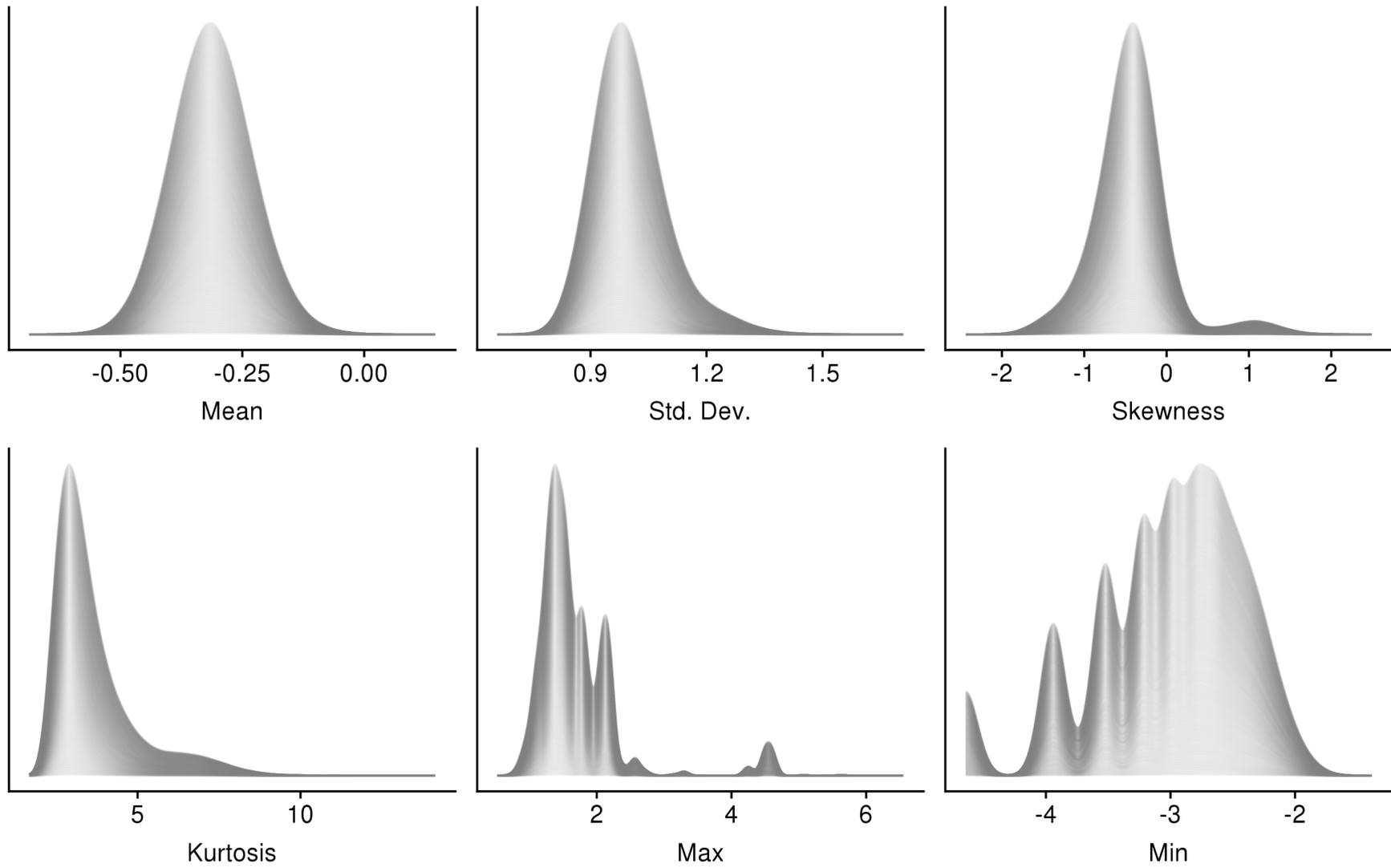
Suppl. Figure 29: Sensitivity analyses results for spawning interval, POF method, region effect. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.
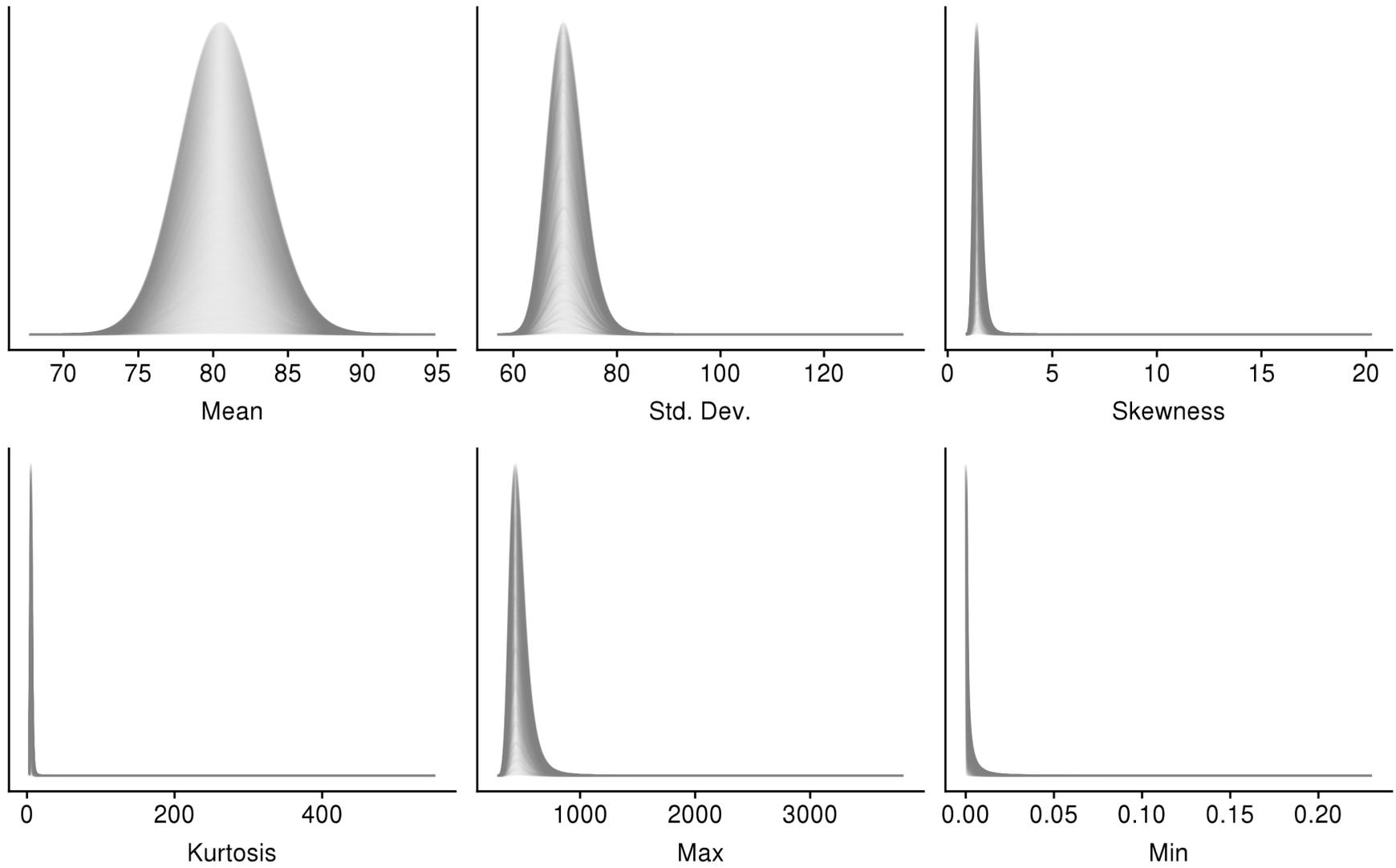
Suppl. Figure 30: Sensitivity analyses results for fecundity, no region effect. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.
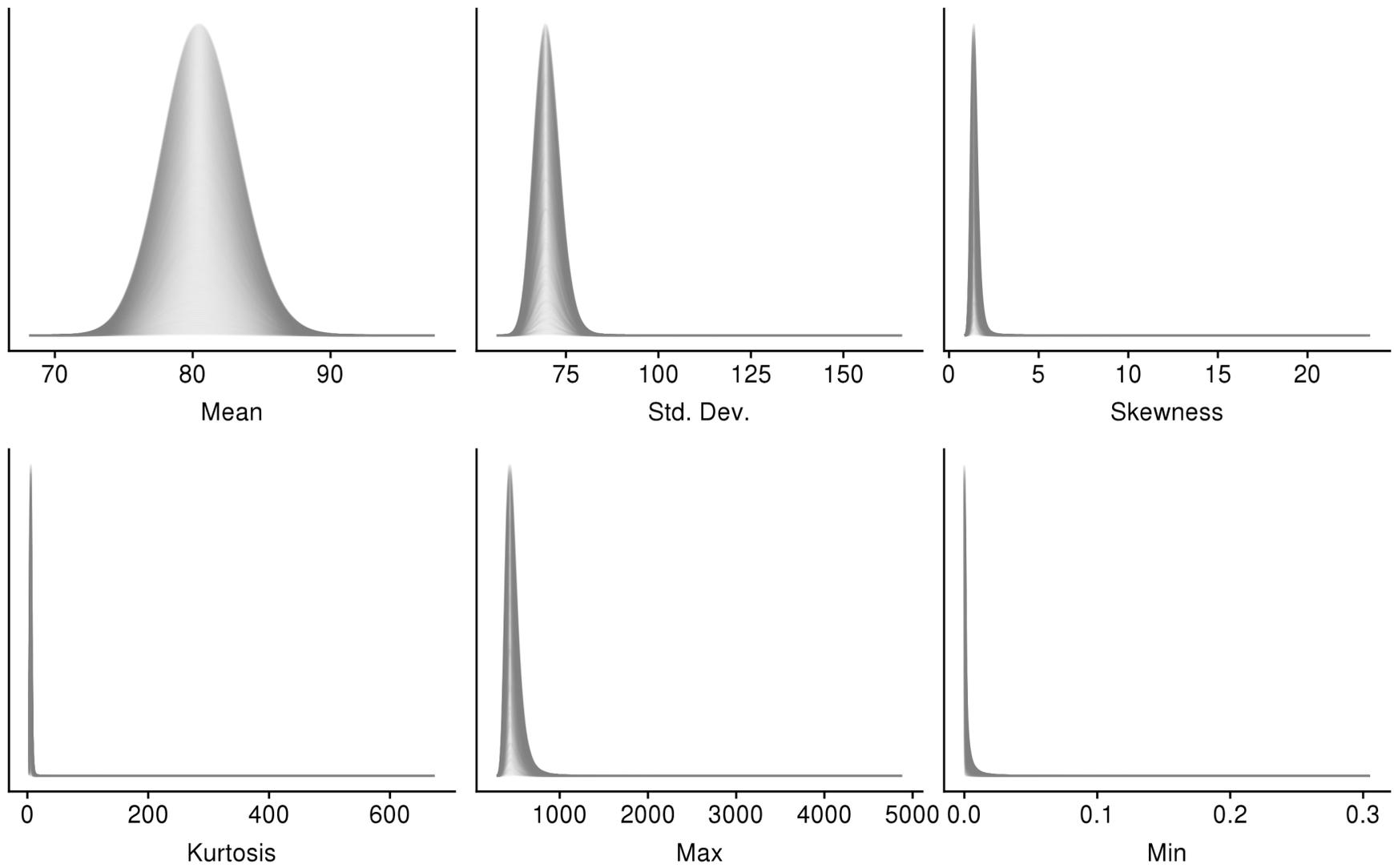
Suppl. Figure 31: Sensitivity analyses results for fecundity, region effect. Each panel contains semi-transparent superimposed density estimates of the distribution of summary statistics from each sensitivity trial. Darker areas indicate regions of agreement among trials.