**Appendix**

Table S1. The field data used in fitting the models.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| First Author | Publication Year | Habitat Type | Mean Temperature (°C) | Initial Length (mm) | Final Length (mm) | Duration (days) | Growth Rate (mm/day) |
| Sommer | 2001 | floodplain | 12.8 | 57.5 | 93.7 | 46.2 | 0.784 |
| Sommer | 2001 | river | 11.6 | 57.5 | 85.7 | 55.4 | 0.509 |
| Sommer | 2001 | floodplain | 11.3 | 56.8 | 89 | 58.2 | 0.553 |
| Sommer | 2001 | river | 10.2 | 56.8 | 58.2 | 58.6 | 0.024 |
| Jeffres | 2007 | river | 13 | 55.4 | 69.4 | 32 | 0.438 |
| Jeffres | 2007 | floodplain | 15.7 | 54.8 | 71.3 | 32 | 0.516 |
| Jeffres | 2007 | floodplain | 15.7 | 54.8 | 72.2 | 32 | 0.544 |
| Jeffres | 2007 | floodplain | 15.7 | 54.8 | 66.1 | 32 | 0.353 |
| Jeffres | 2007 | river | 13 | 55.4 | 65.4 | 32 | 0.313 |
| Jeffres | 2007 | floodplain | 14.4 | 53.8 | 86.4 | 56 | 0.582 |
| Jeffres | 2007 | floodplain | 14.4 | 54.1 | 79.7 | 56 | 0.457 |
| Jeffres | 2007 | floodplain | 14.4 | 53.8 | 74.4 | 56 | 0.368 |
| Jeffres | 2007 | river | 12.6 | 54.7 | 64 | 56 | 0.166 |
| Katz | 2013 | floodplain | 14.6 | 52.9 | 77.8 | 25 | 0.996 |
| Jeffres | 2017 | floodplain | 14.2 | 55.6 | 63.7 | 9 | 0.900 |
| Jeffres | 2017 | floodplain | 16.4 | 63.7 | 69.8 | 7 | 0.871 |
| Jeffres | 2017 | floodplain | 15.4 | 69.8 | 76.7 | 7 | 0.986 |
| Jeffres | 2017 | river | 12.3 | 54 | 55.8 | 9 | 0.200 |
| Jeffres | 2017 | river | 13.8 | 55.8 | 55.9 | 7 | 0.014 |
| Jeffres | 2017 | river | 12.9 | 55.9 | 58.2 | 7 | 0.329 |
| Katz | 2017 | floodplain | 11.5 | 47.7 | 75 | 41 | 0.666 |
| Katz | 2017 | floodplain | 11.5 | 48.7 | 78 | 41 | 0.715 |
| Takata | 2017 | floodplain | 12.9 | 61 | 85 | 55 | 0.436 |
| Takata | 2017 | floodplain | 12.3 | 56 | 82.8 | 19 | 1.411 |
| Takata | 2017 | floodplain | 12.8 | 57 | 74.9 | 31 | 0.577 |
| Takata | 2017 | floodplain | 14.5 | 59 | 67.3 | 8 | 1.037 |
| Takata | 2017 | floodplain | 15 | 59 | 69 | 25 | 0.400 |
| Takata | 2017 | floodplain | 15.1 | 59 | 66.8 | 10 | 0.780 |
| Takata | 2017 | floodplain | 13.9 | 57 | 70.9 | 23 | 0.604 |
| Takata | 2017 | floodplain | 14.2 | 60 | 66.4 | 6 | 1.067 |
| Takata | 2017 | floodplain | 13.6 | 47 | 81.3 | 37 | 0.927 |
| Takata | 2017 | floodplain | 15.4 | 54 | 73.3 | 25 | 0.772 |
| Takata | 2017 | floodplain | 13.5 | 56 | 64.6 | 18 | 0.478 |
| Takata | 2017 | floodplain | 15.1 | 52 | 60.3 | 6 | 1.383 |
| Takata | 2017 | floodplain | 14.4 | 57 | 75.2 | 26 | 0.700 |
| Takata | 2017 | floodplain | 12.5 | 51 | 76.7 | 27 | 0.952 |
| Takata | 2017 | floodplain | 13.6 | 60 | 70.8 | 12 | 0.900 |
| Takata | 2017 | floodplain | 11.7 | 64 | 73.5 | 10 | 0.950 |
| Katz | 2019 | river | 11.5 | 48 | 49.8 | 20 | 0.090 |
| Katz | 2019 | floodplain | 14.7 | 48 | 59 | 20 | 0.550 |
| Cordoleani | 2020 | floodplain | 13.1 | 47.7 | 71.5 | 43 | 0.553 |
| Cordoleani | 2020 | floodplain | 13.1 | 47.7 | 70.7 | 43 | 0.535 |
| Cordoleani | 2020 | floodplain | 13 | 47.7 | 69.4 | 43 | 0.505 |
| Cordoleani | 2020 | floodplain | 12.1 | 47.7 | 69.2 | 43 | 0.500 |
| Cordoleani | 2020 | floodplain | 13 | 47.7 | 68.4 | 43 | 0.481 |
| Cordoleani | 2020 | floodplain | 12.7 | 47.7 | 66.6 | 43 | 0.440 |
| Cordoleani | 2020 | river | 11.1 | 47.7 | 66.9 | 43 | 0.447 |
| Cordoleani | 2020 | river | 10.9 | 47.7 | 62.7 | 43 | 0.349 |
| Cordoleani | 2020 | floodplain | 12.7 | 47.7 | 61.1 | 43 | 0.312 |
| Cordoleani | 2020 | river | 10.9 | 47.7 | 58.8 | 43 | 0.258 |
| Cordoleani | 2020 | river | 10.9 | 47.7 | 55.4 | 43 | 0.179 |
| Cordoleani | 2020 | river | 10.3 | 47.7 | 55 | 43 | 0.170 |
| Cordoleani | 2020 | river | 10.9 | 47.7 | 54 | 43 | 0.147 |
| Holmes | 2021 | floodplain | 16.4 | 53 | 87 | 34 | 1.000 |
| Holmes | 2021 | floodplain | 13.5 | 43 | 80 | 37 | 1.000 |
| Holmes | 2021 | floodplain | 14.4 | 50 | 67 | 22 | 0.772 |
| Holmes | 2021 | floodplain | 14.5 | 40 | 87 | 38 | 1.236 |
| Cordoleani | 2021 | river | 14.1 | 51.1 | 53.7 | 37 | 0.070 |
| Cordoleani | 2021 | floodplain | 14 | 51.1 | 72.3 | 37 | 0.573 |
| Cordoleani | 2021 | river | 14.1 | 51.1 | 62 | 37 | 0.295 |
| Cordoleani | 2021 | floodplain | 14 | 51.1 | 88.1 | 37 | 1 |
| Cordoleani | 2021 | river | 14.1 | 51.1 | 56.4 | 37 | 0.143 |
| Cordoleani | 2021 | floodplain | 14 | 51.1 | 76.1 | 37 | 0.676 |
| Cordoleani | 2021 | river | 13.2 | 51.1 | 62.7 | 37 | 0.314 |
| Cordoleani | 2021 | river | 13.2 | 51.1 | 59.3 | 37 | 0.222 |

Table S2. The mean parameter values and 95% highest density interval (HDI) for each model.

|  |  |  |  |
| --- | --- | --- | --- |
| model | parameter | value | 95% HDI |
| Perry | TdiffRiver | 10.924 | 7.155-15.461 |
| Perry | TdiffDelta | 6.158 | 2.25-9.384 |
| Perry | Tmin | 1.889 | 0.239-3.769 |
| Perry | b | 1.574 | 1.362-1.779 |
| Perry | dRiver | 40.724 | 13.465-77.411 |
| Perry | dDelta | 30.493 | 5.133-58.239 |
| Perry | g | 0.434 | 0.005-1.293 |
| Perry | tau | 126.73 | 86.229-166.698 |
| Manhard | TdiffRiver | 10.15 | 7.239-14.313 |
| Manhard | TdiffDelta | 7.427 | 3.154-11.378 |
| Manhard | Tmin | 1.866 | 0.099-3.596 |
| Manhard | b | 1.58 | 1.396-1.75 |
| Manhard | gRiver | 0.092 | 0.021-0.201 |
| Manhard | gDelta | 0.408 | 0.001-1.188 |
| Manhard | d | 68.042 | 25.581-115.72 |
| Manhard | tau | 126.566 | 89.132-169.859 |
| Kielbassa | Tmin | 2.444 | 0.136-5.081 |
| Kielbassa | ToptRiver | 6.939 | 1.559-12.579 |
| Kielbassa | ToptDelta | 3.717 | 0.378-7.046 |
| Kielbassa | TmaxRiver | 7.254 | 2.192-13.416 |
| Kielbassa | TmaxDelta | 4.148 | 0.389-7.852 |
| Kielbassa | koptRiver | 0.232 | 0.015-0.51 |
| Kielbassa | koptDelta | 1.39 | 0.055-3 |
| Kielbassa | phi0 | 4.423 | 3.749-5.023 |
| Kielbassa | phi1 | 0.037 | 0-0.075 |
| Kielbassa | tau | 121.177 | 83.899-161.973 |
| Kim | Tmin | 1.954 | 0.073-3.734 |
| Kim | TmaxRiver | 17.43 | 13.222-22.313 |
| Kim | TmaxDelta | 11.191 | 8.707-14.324 |
| Kim | koptRiver | 13.417 | 0.67-29.28 |
| Kim | koptDelta | 13.897 | 0.727-28.973 |
| Kim | L\_inf | 110.581 | 87.875-140.128 |
| Kim | alpha | 10.124 | 3.794-16.819 |
| Kim | beta | 12.32 | 3.382-23.333 |
| Kim | tau | 130.982 | 92.689-174.608 |