

Temperature and Cutthroat Trout Growth Rate

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Species Information

Common Name: Cutthroat Trout
Genus: *Oncorhynchus clarkii*

Stressor Details

Stressor Name: Temperature
Units: °C
Metric: Tank Temperature
Scale: linear
Function Type: continuous
Vital Rate/Process: Growth Rate

Life Stage & Context

Life Stages: Fry

Descriptions

Overview

Percent daily relative growth rate of juvenile westslope cutthroat trout in relation to temperature during a 60-d experiment. In this laboratory experiment, Westslope cutthroat trout used in experiments were either eggs or age-0 fish from a wild stock at Rogers Lake, Montana, or age-0 fish from wild stock maintained at the Westslope Trout Company, a private fish hatchery near Ronan, Montana. Both sources are derived from a mixture of pure populations of westslope cutthroat trout from Montana.

Growth formula is as follows:

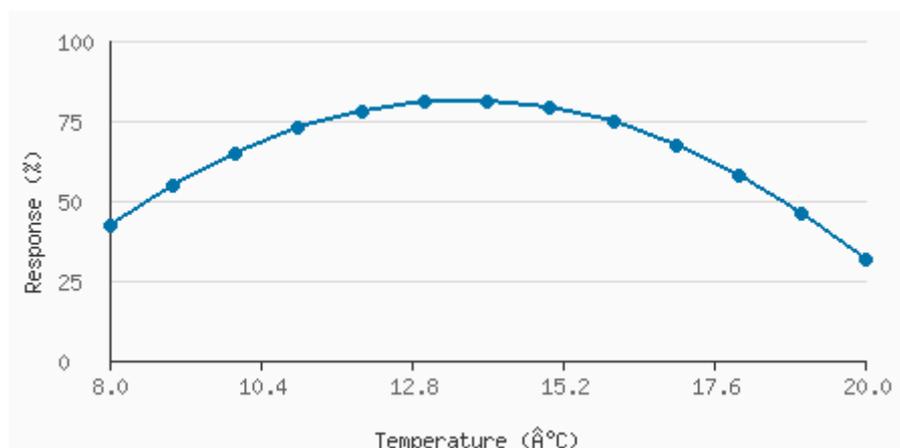
$$\text{Growth} = -4.1727 + 0.9496 * \text{temp} - 0.0348 * (\text{temp})^2$$

Scaled from the original curve so that the highest upper limit value equals to 100%.

Function Derivation

laboratory experiment

Stressor Response Data



| Stressor (X) | Mean System Capacity (%) | SD | low.limit | up.limit |
|--------------|--------------------------|----|-----------|----------|
|--------------|--------------------------|----|-----------|----------|

| | | | | |
|----|------|-----|------|------|
| 8 | 42.1 | 0 | 22.5 | 62.3 |
| 9 | 54.8 | 5.6 | 35.9 | 73.6 |
| 10 | 64.9 | 9.9 | 45.4 | 86.3 |
| 11 | 72.6 | 7.7 | 53.5 | 90.8 |
| 12 | 77.9 | 8.1 | 58.5 | 97.2 |
| 13 | 80.7 | 7.4 | 62 | 99.6 |
| 14 | 81 | 7.4 | 62 | 100 |
| 15 | 78.9 | 7.7 | 60.9 | 97.9 |
| 16 | 74.4 | 4.6 | 56.7 | 93.3 |
| 17 | 67.4 | 6.3 | 49.3 | 85.9 |
| 18 | 57.9 | 5.6 | 39.8 | 78.9 |
| 19 | 46 | 4.9 | 26.8 | 66.2 |
| 20 | 31.7 | 0 | 12.3 | 52.5 |

Citations

Bear, E. A., McMahon, T. E., & Zale, A. V. (2007). Comparative thermal requirements of westslope cutthroat trout and rainbow trout: implications for species interactions and development of thermal protection standards. *Transactions of the American Fisheries Society*, 136(4), 1118.

References

Bear et al. - <https://afspubs.onlinelibrary.wiley.com/doi/10.1577/T06-072.1>