

Temperature and Westslope Cutthroat Trout Survival

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Species Information

Common Name: Westslope Cutthroat Trout
Genus: *Oncorhynchus lewisi*

Stressor Details

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

Life Stage & Context

Life Stages: Fry

Descriptions

Overview

Percent survival of juvenile westslope cutthroat trout (white circles, black line in image) in relation to test temperature during a 60-d experiment. Mean survival of westslope cutthroat trout declined significantly ($P < 0.05$) to 35.7% at 20C, 12.5% at 22C, and 0% at 24C.

In this laboratory experiment, Westslope cutthroat trout 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.

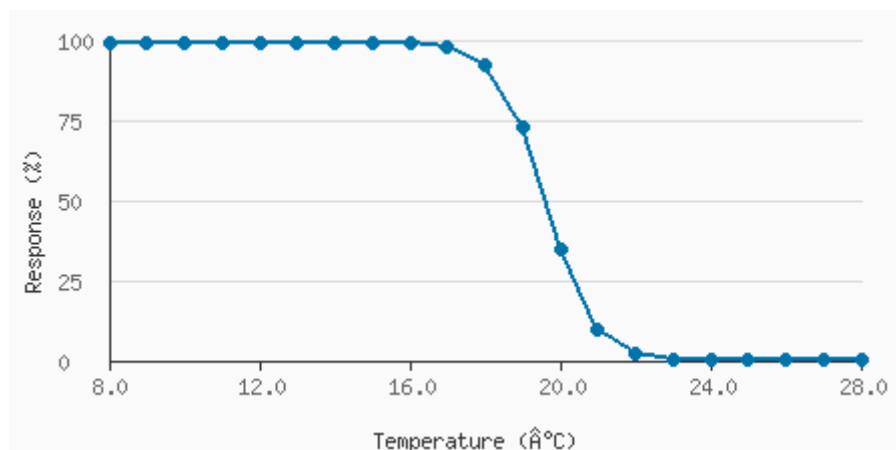
The survival rate is as follows:

$$\text{Survival} = 97.8846 / (1 + e^{-((\text{temperature} - 24.3522) / -0.5033)})$$

Function Derivation

laboratory experiment

Stressor Response Data



Stressor (X)	Mean System Capacity (%)	SD	low.limit	up.limit
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8	99.07679939	5.8	63.75	99.96
9	99.07679688	5.8	63.75	99.96
10	99.07678415	5.8	63.75	99.96
11	99.07671946	6.16	63.75	99.96
12	99.07639066	6.52	63.75	99.96
13	99.07471965	6.52	63.75	100
14	99.06622808	7.23	63.75	100
15	99.02309436	7.23	63.75	100
16	98.80445774	6.88	63.75	100
17	97.70805061	6.88	63.39	100
18	92.49185485	12.59	55.89	97.46
19	72.75272938	18.3	15.54	94.24
20	34.89967684	2.23	0.54	66.03
21	9.576574791	1.16	0	44.96
22	2.042933961	0.09	0	38.53
23	0.408745022	0.98	0	33.88
24	0.080693572	2.59	0	33.88
25	0.015887957	2.59	0	33.53
26	0.003126576	2.59	0	33.88
27	0.000615212	3.66	0	33.88
28	0.000121052	3.66	0	34.6

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), 1116.

References

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