Temperature and Rainbow Trout Survival

Function Updated by mbayly on Tue, 12/31/2024 - 21:20.

Species Information

Common Name: Rainbow Trout
Genus: Oncorhynchus mykiss

Stressor Details

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

Life Stage & Context

Life Stages: Fry

Descriptions

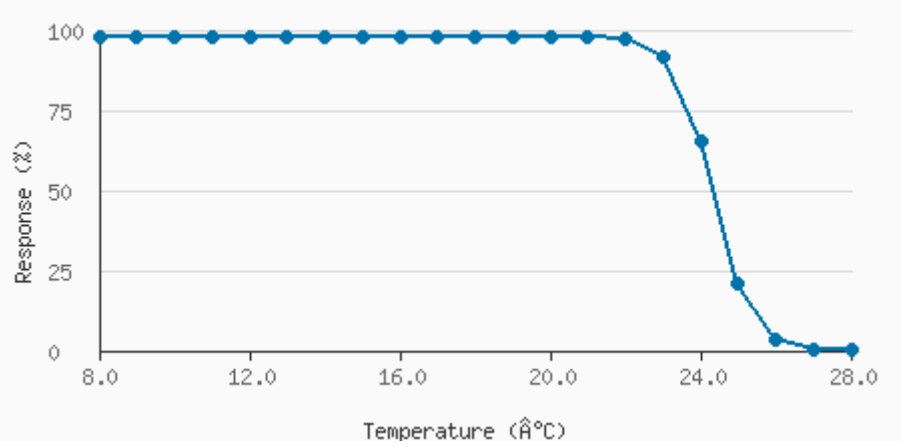
Overview

> Percent survival of rainbow trout (gray circles, gray line in image) in relation to test temperature during a 60-d experiment.
> Rainbow trout survival was similar (98.6–100%) among temperatures of 8–22C but declined significantly (P , 0.05) at higher temperatures: survival was 72.8% at 24C, 2% at 26C, and 0% at 28C.
> In this laboratory experiment, Rainbow trout were obtained as eggs from the Ennis National Fish Hatchery near Ennis, Montana.
> Survival formula is as follows:
> Survival = 97.8846/1+e^-((temperature-24.3522)/-0.5033)

Function Derivation

> laboratory experiment

Stressor Response Data



Stressor (X)	Mean System Capacity (%)	SD	low.limit	up.limit
8	97.8846	3.65	76.6	100

9	97.8846	4	76.6	100
10	97.8846	3.65	76.96	100
11	97.8846	3.29	76.96	100
12	97.8846	2.94	76.25	100
13	97.88459998	3.29	76.25	100
14	97.88459989	3.65	76.25	100
15	97.88459917	4	76.25	100
16	97.88459392	3.65	76.6	100
17	97.88455569	2.94	76.6	100
18	97.88427682	2.94	76.6	100
19	97.8822432	2.94	76.6	100
20	97.86741492	2.94	76.6	100
21	97.75941112	2.94	76.6	100
22	96.97891252	3.29	75.89	100
23	91.64302312	5.43	73.4	100
24	65.40054943	11.12	39.95	93.46
25	21.17666805	8.27	0	51.82
26	3.5702709	2.94	4	27.62
27	0.505470152	0.09	0.44	21.57
28	0.06962114	0.8	0	21.22

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