Section S1. Approach

Growth rates of larval longfin smelt were based on values observed in known-age cultured fish and using otolith-based age estimates in wild fish. Cultured (F1) longfin smelt larvae were previously produced and archived in 2017 by the UC Davis Fish Conservation and Culture Laboratory (FCCL) following established protocols (Yanagitsuru et al. 2021). In short, eggs from wild broodstock were strip-spawned, with fertilized eggs incubated in columns until hatch. Larvae were held in 2 ppt salinity, 12-16 °C, and received live rotifers and *Artemia sp.* Nauplii as feed, *ad libitum*. Larvae (n = 66) age 1 to 113 days-post-hatch (dph) were randomly selected, imaged on an Olympus dissecting scope, and archived in 95% ethyl alcohol (Table S1). Digital measurements of the standard (or notochord) length (SL) were collected for each fish using ImageJ (version 1.8.0). Standard lengths of each larva were then combined with respective known ages to estimate larval growth rates.

Table S1. Total numbers and sizes of longfin smelt larvae used in growth analyses.

Age	Source	N	SL (mm)
0-10	cultured	20	6.4 (0.81)
10-20	cultured	19	9.0 (0.94)
20-30	cultured	5	11.1 (0.36)
30-60	cultured	17	12.7 (1.25)
30-60	wild	20	16.4 (1.74)
>60	cultured	15	23.2 (5.92)
>60	wild	36	22.4 (3.78)

Growth rates of wild fish were estimated using established otolith-based techniques (Xieu et al. 2021). In a prior study, the above archive of known-age cultured longfin smelt larvae was used to calibrate otolith aging protocols for longfin smelt, with age estimates resulting in 95% aging accuracy and 97% precision among independent analysts (Lewis et al. 2019). To estimate growth rates of wild longfin smelt larvae, these calibrated aging protocols were applied to a random subsample (n = 66) of archived wild-caught longfin smelt larvae from 20 mm net surveys conducted in the San Francisco Estuary in 2017 (Lewis et al. 2019, 2020) (Table S2). Lengths of each fish were measured as described above and adjusted for preservation effects (Xieu et al. 2021). Standard lengths (in mm) were paired with otolith-based age estimates to assess *in situ* growth rates of wild larval longfin smelt.

Growth rates of cultured and wild longfin smelt were examined using linear models of size (SL, in mm) versus age (in dph), with age being known for cultured fish and estimated from otoliths for wild fish. Growth rates (in mm d^{-1}) were quantified by extracting the estimated slopes of the size-at-age relationships. To explore a broad range of possible growth rates exhibited by longfin smelt larvae, we modeled (1) all wild and cultured fish together, (2) wild fish alone assuming size-at-hatch of 6.2 mm, and (3) cultured fish alone. Since the present study focused on smaller larvae, growth rates of cultured larvae we modeled separately for fish 0-60 dph and 60-113 dph. Wild larvae of the smallest size classes were not collected. All models were constructed in R version 3.6.3 (R Core Team 2020).

Section S2. Growth Rates

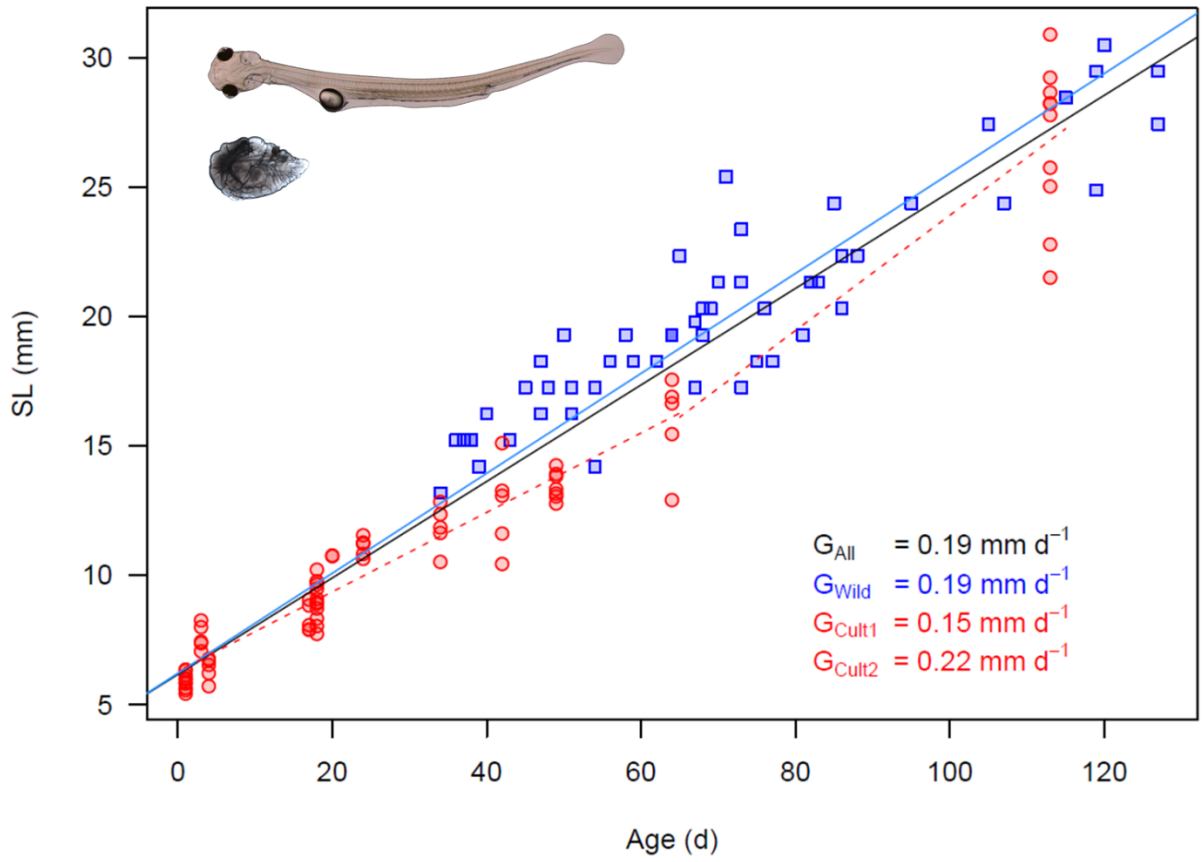

Fig. S1. Size at age and growth rate of larval longfin smelt. Standard length (SL, in mm) for of cultured (red circles) and wild (blue squares) were examined as functions of known ages for cultured fish and otolith-based age estimates for wild fish, with growth rate (G in mm d^{-1}) estimated as the slope of each model. Several slopes were examined separately for models including all fish, wild fish, small-cultured fish (≤ 64 dph, "Cult1"), and large-cultured fish (≥ 64 dph, "Cult2").

Table S2. Results of linear models examining the growth rates (slope) of larval longfin smelt.

Model	N	Slope	Error	t	P	R^2
All	132	0.19	0.0044	42.74	< 0.001	0.930
Wild	56	0.19	0.0034	56.28	< 0.001	0.980
Cult1	66	0.15	0.0063	24.36	< 0.001	0.900
Cult2	15	0.22	0.0299	7.45	< 0.001	0.810

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