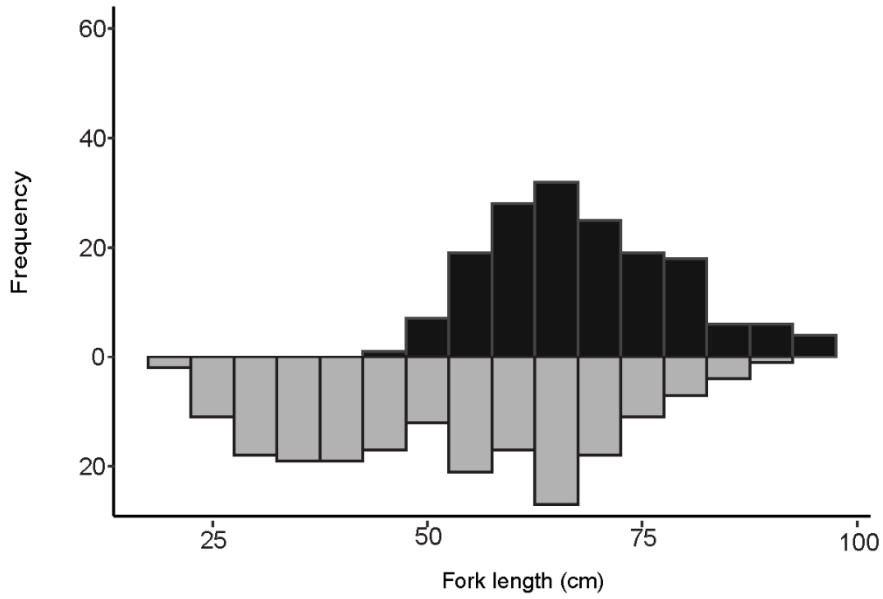
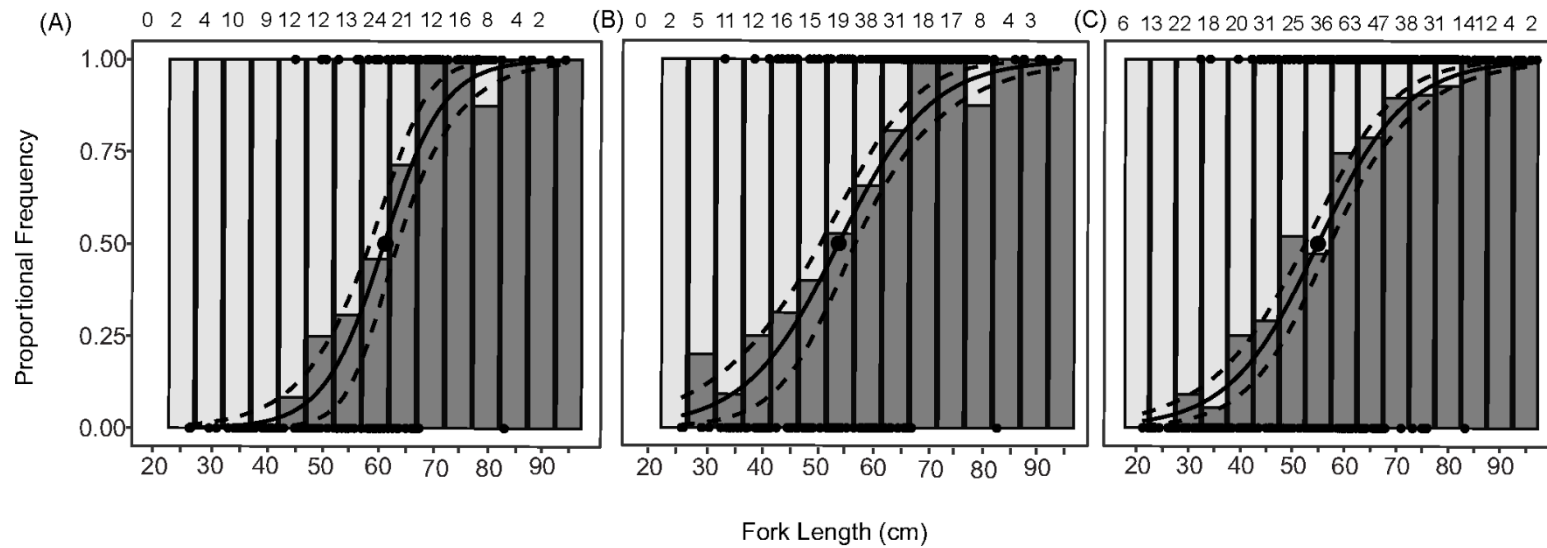


### Supplementary materials

Supplementary Figure 1: Length frequency distribution of sampled female *Etelis coruscans* collected during October 2007 to December 2020, from the main Hawaiian Islands, in 5-cm size bins. The black bars above the x-axis indicate the range in sizes of functionally mature individuals and the grey bars below the x-axis indicate range in sizes of functionally immature individuals.



Supplementary Figure 2: Fitted logistic regression for the proportion of functionally mature female *Etelis coruscans* with Early Developing fish distinguished between repeat spawners (mature) and recruit spawners (immature). The bars show the proportional frequency of immature (light grey) and mature (dark grey) by 5-cm length bins. Dashed lines indicate  $\pm 95\%$  confidence intervals. Dark circles indicate  $L_{50}$ . Sample size for each length bin is indicated on top of each graph. Maturity classification is based on the histological criteria, functional vs. physiological maturity determination, and inclusion or exclusion of the September–December spawning period. Hybrid estimates include fish in the regenerating reproductive phase. (A) Functional maturity during spawning period;  $L_{50F} = 61.54$  cm FL. (B) Functional hybrid maturity criteria during the spawning period;  $L_{50P} = 54.69$  cm FL. (C) Functional maturity during all months of the year sampled;  $L_{50FH} = 54.92$  cm FL.



Supplementary Table 1. Oocyte cellular stage, description, and size range for female Onaga (*E. coruscans*). The most advanced gamete stage (MAGS) observed in each phase are included include CA—cortical alveolar oocyte; PG—primary growth oocyte; Vtg1, Vtg3, Vtg3—primary, secondary and tertiary vitellogenic oocytes. Late MN- including germinal vesicle breakdown, germinal vesicle migration; Hy indicates hydration.

MAGS Cellular stage	Description	Diameter ( $\mu\text{m}$ )	Mean and S.D. ( $\mu\text{m}$ )
PG	Chromatin nucleolar and perinucleolar stage	102.18 - 131.91	117.3 $\pm$ 10.63
CA	Previtellogenic, oil droplets and cortical alveolar vesicles	133.23 - 235.56	193.52 $\pm$ 26.87
Vtg1	Early stage of yolk deposition; oil droplets scattered in the ooplasm	189.43 - 343.17	259.02 $\pm$ 36.13
Vtg2	Larger lipoprotein yolk globules and oil droplets	253.31 - 352.63	306.37 $\pm$ 25.54
Vtg3	Early oocyte maturation; Lipoprotein yolk in the ooplasm and cortical alveolar vesicles at the periphery; up to germinal vesicle breakdown	332.76 - 490.74	386.54 $\pm$ 40.29
Late MN	Germinal vesicle breakdown has occurred and the nucleus has migrated poleward	419.52 - 642.40	546.21 $\pm$ 55.64
Hy*	Globules fuse to form yolk plates	1007.15 - 1440.08	1243.2 $\pm$ 114.64

\*Hydrated oocytes measurements were made from preserved specimens.

Supplementary Table 2. Summary of descriptive statistics for bootstrapping results for functional maturity models distinguishing between repeat spawners and virgin females in the Early Developing phase based on secondary characteristics. The  $L_{50}$  is the length at 50% maturity parameter and  $a$  which describes the length of the interval of the model are the model parameters for each logistic curve. The  $L_{95}$ , the length at 95% maturity, was derived from the output of the model. Each of the functional maturity classification criteria are described by their subscript: Functional maturity during the spawning period ( $FS$ ), Functional maturity hybrid during the spawning period ( $FHS$ ), Functional maturity during all months of the year collected ( $FYS$ ). Standard error (SE), mean value (stated in cm FL), coefficient of variation ( $CV$ ), bias (B), and the percent bias (%B).

<b>Bootstrapped parameters</b>	<b>N</b>	<b>SE</b>	<b>Mean value</b>	<b>CI</b>	<b>CV</b>	<b>B</b>	<b>% B</b>
$L_{50FS}$	149	1.28	61.54	59.03–64.05	0.25	0.06	5.74
$L_{95FS}$	149	2.87	77.34	71.72–82.96	0.45	-0.19	-18.57
$a_{FS}$	149	0.04	0.19	0.11–0.27	2.48	0.01	0.97
$L_{50FHS}$	198	1.68	54.69	51.40–57.98	0.43	-0.03	-3.37
$L_{95FHS}$	198	3.36	79.21	72.62–85.80	0.60	-0.14	-14.20
$a_{FHS}$	198	0.02	0.12	0.083–0.16	2.23	0.00	0.34
$L_{50FYS}$	382	1.18	54.92	52.61–57.23	0.42	-0.05	-5.14
$L_{95FYS}$	382	2.49	79.88	75.01–84.75	0.61	-0.08	-7.80
$a_{FYS}$	382	0.01	0.12	0.097–0.14	1.91	0.00	0.13