```
#Supplementary Information Document S1
#R script for Tables 1, 2, 3 and Figures 2, 4, 5 in Nakano et al.
##R-4.3.1
##openxlsx 4.2.5.2
##ggplot2 3.4.3
##cowplot 1.1.1
##ggeffects 1.3.1

library(openxlsx)
library(ggplot2)
library(cowplot)
library(ggeffects)


data <- read.xlsx("SupportingInformation_TableS1.xlsx",startRow=2)
colnames(data) <- c("month", "parasite", "SL", "TL", "FL", "weight", "condition",
"gonad", "liver", "stocach", "stomachcontents", "sex", "scale")
data$month <- factor(data$month, levels=c("July","Sep"))
data$parasite <- factor(data$parasite, levels=c("0","1"))
data$SL <- as.numeric(data$SL)
data$weight <- as.numeric(data$weight)
data$condition <- as.numeric(data$condition)
data$gonad <- as.numeric(data$gonad)
data$liver <- as.numeric(data$liver)
data$stomachcontents <- as.numeric(data$stomachcontents)
data$sex <- factor(data$sex,levels=c("Immature","Female","Male"))
data$scale <- factor(data$scale,levels=c("1","0"))

############Table 1
r_1 <- glm(parasite~SL+sex+month,data=data,family=binomial(link="logit"))
summary(r_1)

#############Figure 2
r_1_ps <- ggpredict(r_1,terms=c("SL[all]","sex","month"))
names(r_1_ps)[c(6,7)] <- c("sex","month")
g_1 <- ggplot(data)
g_1 <- g_1 + geom_point(aes(x=SL, y=as.numeric(parasite)-1,shape=sex), alpha =
0.7,position=position_jitter(height=0.03), size = 3)
g_1 <- g_1 + scale_shape_manual(values=c(17,16,15))
g_1 <- g_1 + geom_line(data=r_1_ps, aes(x=x,y=predicted, color=sex))
g_1 <- g_1 + geom_ribbon(data=r_1_ps, aes(x = x,ymin = conf.low, ymax = conf.high,
fill = sex), alpha = 0.1)
g_1 <- g_1 + theme_cowplot() + facet_wrap(~month,ncol=1)
g_1 <- g_1 + ylab("Probability of parasitic infetion") + xlab("Standard lenth
(mm)")
g_1

#############Table 2 ##############July
data07 <- data[data$month=="July",]
r_w_07 <- glm(weight~SL*parasite*sex,data=data07,family=Gamma(link="log"))
summary(r_w_07)
```

```
#################September
data09 <- data[data$month=="Sep",]
r_w_09 <- glm(weight~SL*parasite*sex,data=data09,family=Gamma(link="log"))
summary(r_w_09)

#############Figure 4
r_w_07_p <- ggpredict(r_w_07,terms=c("SL","parasite","sex"))
names(r_w_07_p)[6] <- "parasite"
names(r_w_07_p)[7] <- "sex"

#############July
g_w_07 <- ggplot()
g_w_07 <- g_w_07 + geom_point(data=data07,
aes(x=SL,y=weight,shape=parasite),size  =  2)
g_w_07 <- g_w_07 + scale_shape_manual(values=c(1,19))
g_w_07 <- g_w_07 + theme_cowplot()
g_w_07 <- g_w_07 + geom_line(data=r_w_07_p, aes(x=x,y=predicted, color=parasite))
g_w_07 <- g_w_07 + geom_ribbon(data=r_w_07_p, aes(x = x,ymin = conf.low, ymax =
conf.high,  fill  =  parasite),  alpha  = 0.1)
g_w_07 <- g_w_07 + facet_wrap(~sex)
g_w_07 <- g_w_07 + scale_y_continuous(limits=c(0,350))
g_w_07 <- g_w_07 + scale_x_continuous(limits=c(100,260))
g_w_07 <- g_w_07 + theme(legend.position = "none")
g_w_07

#############September
r_w_091 <- glm(weight~SL,data=data09,family=Gamma(link="log"))
summary(r_w_091)
r_w_091_p <- ggpredict(r_w_091,terms=c("SL"))
g_w_09 <- ggplot()
g_w_09 <- g_w_09 + geom_point(data=data09,
aes(x=SL,y=weight,shape=parasite),size  = 2)
g_w_09 <- g_w_09 + scale_shape_manual(values=c(1,19))
g_w_09 <- g_w_09 + theme_cowplot()
g_w_09 <- g_w_09 + geom_line(data=r_w_091_p, aes(x=x,y=predicted))
g_w_09 <- g_w_09 + geom_ribbon(data=r_w_091_p, aes(x = x,ymin = conf.low, ymax =
conf.high),  alpha = 0.1)
g_w_09 <- g_w_09 + facet_wrap(~sex)
g_w_09 <- g_w_09 + scale_y_continuous(limits=c(0,350))
g_w_09 <- g_w_09 + scale_x_continuous(limits=c(100,260))
g_w_09 <- g_w_09 + theme(legend.position = "none")
g_w_09
plot_grid(g_w_07,g_w_09,ncol = 1)


#############Table 3
#############July
r_c_07 <- glm(condition~SL*parasite*sex,data=data07,family=Gamma(link="log"))
summary(r_c_07)
```

```
#############September
r_c_09 <- glm(condition~SL*parasite*sex,data=data09,family=Gamma(link="log"))
summary(r_c_09)


#############Figure 5
############July
r_c_07_p <- ggpredict(r_c_07,terms=c("SL","parasite","sex"))
names(r_c_07_p)[6] <- "parasite"
names(r_c_07_p)[7] <- "sex"
g_c_07 <- ggplot()
g_c_07 <- g_c_07 + geom_point(data=data07,
aes(x=SL,y=condition,shape=parasite),size = 2)
g_c_07 <- g_c_07 + scale_shape_manual(values=c(1,19))
g_c_07 <- g_c_07 + theme_cowplot()+ theme(legend.position = "none")
g_c_07 <- g_c_07 + geom_line(data=r_c_07_p, aes(x=x,y=predicted,
color=parasite))
g_c_07 <- g_c_07 + geom_ribbon(data=r_c_07_p, aes(x = x,ymin = conf.low, ymax =
conf.high, fill = parasite), alpha = 0.1)
g_c_07 <- g_c_07 + facet_wrap(~sex)
g_c_07 <- g_c_07 + scale_y_continuous(limits=c(0,3))
g_c_07 <- g_c_07 + scale_x_continuous(limits=c(100,260))
g_c_07

############September
g_c_09 <- ggplot()
g_c_09 <- g_c_09 + geom_point(data=data09,
aes(x=SL,y=condition,shape=parasite),size = 2)
g_c_09 <- g_c_09 + scale_shape_manual(values=c(1,19))
g_c_09 <- g_c_09 + theme_cowplot()+ theme(legend.position = "none")
g_c_09 <- g_c_09 + facet_wrap(~sex)
g_c_09 <- g_c_09 + scale_y_continuous(limits=c(0,3))
g_c_09 <- g_c_09 + scale_x_continuous(limits=c(100,260))
g_c_09
plot_grid(g_c_07,g_c_09, ncol=1)


############Citations
citation("openxlsx")
citation("ggplot2")
citation("cowplot")
citation("ggeffects")
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Table S1. Data of the host fish Japanese scad, *Decapterus maruadsi*, collected in Iburi Port, Kochi, Japan.

Month	Parasite (present,1; absent, 0)	Total length (mm)	Fork length (mm)	Body wet weight (g)	Condition factor	Gonad weight (g)	Liver weight (g)	Stomach weight (g)	Stomach content weight (g)	Sex	Scale in the stomach (present,1; absent, 0)
July	0	184.6	241.6	209.6	103.61	1.647049242	0.009	0.104	0.493	0 Immature	0
July	0	171	223.8	192.2	75.308	1.506096443	0.131	0.062	0.476	0.068 Immature	1
July	0	257.4	297.7	272.7	208.95	1.225227533	7.015	1.729	1.532	0.13 Female	1
July	0	164	204.4	186.3	70.72	1.60328492	0.06	0.16	0.493	0.058 Immature	1
July	0	257.3	302.2	284.5	218.91	1.285127575	3.104	0.97	1.431	0.148 Male	1
July	0	236.4	268.3	255.5	182.41	1.380721942	10.355	0.278	1.547	0.003 Female	0
July	0	245.1	291.5	269.3	207.94	1.412238692	10.478	1.788	1.675	0.3337 Male	1
July	0	236.9	282.5	257.6	165.1	1.241800674	4.768	0.66	2.275	0.473 Female	1
July	0	234.8	270.7	254.9	157.17	1.214158474	5.604	0.687	0.894	0.028 Male	1
July	0	259.4	296.9	281.6	267.84	1.534495153	9.33	1.309	1.696	0.271 Male	1
July	0	250.5	297.8	273.5	192.05	1.221774681	14.079	0.885	1.682	0.079 Female	1
July	0	234.8	269.5	249.8	185.8	1.435328909	18.687	1.419	1.263	0.071 Female	1
July	0	248.8	291.4	271.5	235.08	1.526386632	18.004	1.545	1.931	0.066 Female	0
July	0	223.9	255.7	236.4	151.14	1.346533421	4.834	0.555	0.931	0.175 Male	1
July	0	246.6	301	269.6	189.744	1.265286385	9.536	1.022	1.586	0.16 Female	1
July	0	129.6	166.5	146.5	40.74	1.871569763	0.095	0.114	0.725	0.336 Immature	1
July	0	167.7	206.1	184.7	78.85	1.671870019	0.011	0.376	0.522	0 Immature	0
July	0	223.8	268.1	249.4	170.07	1.517216179	5.369	0.634	0.916	0.068 Male	1
July	0	135	166.4	148	45.93	1.866788599	0.072	0.33	1.916	1.081 Immature	1
July	0	172.9	212	196.2	82.73	1.600582427	0.05	0.362	0.583	0.205 Immature	1
July	0	137.2	169.5	156.7	45.76	1.771836654	0.036	0.167	0.578	0 Immature	0
July	0	131.9	161.6	146.7	42.53	1.853365165	0.021	0.306	0.231	0.043 Immature	1
July	0	109.4	137.2	126.9	25.76	1.967405552	0.026	0.136	0.38	0.148 Immature	1
July	0	216.8	253.3	234.3	145.96	1.432372654	3.856	0.801	1.478	0.323 Female	1
July	0	199.5	246.3	223	127.73	1.608659811	6.581	0.903	0.872	0.069 Female	1
July	0	220.2	266.7	248.8	125.4	1.174479911	5.553	0.666	1.361	0.038 Male	0
July	1	176.5	211.5	192.2	88.09	1.602110552	5.486	0.236	0.905	0.159 Female	0
July	1	170.3	205.1	189.1	83.715	1.694959548	3.669	0.802	0.808	0.138 Female	0
July	1	236.9	280.7	258.3	201.85	1.518216026	9.933	2.165	1.764	0.188 Female	0
July	1	152	188.6	136.9	33.21	0.945666733	0.416	0.079	0.256	0.043 Female	0
July	1	241.2	286.6	266.3	209.46	1.492688506	6.032	1.762	1.46	0.061 Female	1
July	1	154.1	191.3	172.8	60.52	1.653830524	3.065	0.364	0.43	0.058 Female	1
July	1	168	206.1	191.5	75.78	1.147782	2.213	0.83	0.627	0.054 Female	1
July	1	187.6	206.2	187.2	82.91	1.255765111	4.442	0.5	0.552	0.053 Female	1
July	1	167.4	202.5	187.8	72.74	1.55062555	1.988	0.318	0.58	0 Female	0
July	1	173.6	209.6	191.4	72.34	1.382704391	2.243	0.361	0.707	0.039 Female	1
July	1	233.8	270.6	256.4	155.65	1.217911145	1.473	0.421	1.113	0.001 Male	0
Sep	0	152.7	185.9	169.4	62.1	1.744112477	0.032	0.315	0.649	0.204 Immature	1
Sep	0	150.2	183.1	166.8	52.5	1.549349889	0.052	0.397	0.686	0.257 Immature	1
Sep	0	141.6	175.3	156.6	51.7	1.820961581	0.142	0.551	0.645	0.136 Male	0
Sep	0	142.5	175.4	160.8	55.4	1.914543206	0.064	0.4	1.01	0.536 Immature	1
Sep	0	131.5	159.2	148.6	39.1	1.719489384	0.03	0.421	0.38	0.125 Immature	1
Sep	0	154.6	192.2	171.8	64.2	1.737426972	0.012	0.486	0.879	0.3 Immature	1
Sep	0	158.3	192.4	175.1	69.7	1.757073924	0.241	0.528	0.651	0.233 Immature	1
Sep	0	129.1	163.2	145.2	39	1.812532824	0.049	0.142	0.764	0.468 Immature	1
Sep	0	145.9	179.9	161.1	54.7	1.761251803	0.072	0.433	0.661	0.234 Immature	0
Sep	0	153.6	192.2	170.6	66.8	1.843328829	0.127	0.702	0.896	0.3 Immature	1
Sep	0	137.7	171.4	154.3	46.4	1.777117566	0.112	0.16	0.529	0.219 Immature	1
Sep	0	142.1	178.9	162.7	50.8	1.770441082	0.104	0.253	0.603	0.233 Male	1
Sep	0	136.3	167.7	150.1	42.3	1.670524309	0.055	0.256	0.48	0.187 Immature	1
Sep	0	141.3	172.7	157.2	47.6	1.687254003	0.042	0.214	0.484	0.167 Immature	1
Sep	0	151.1	184.7	168.6	56.2	1.629081915	0.057	0.301	0.725	0.706 Immature	1
Sep	0	147.3	178.8	163.1	51.6	1.614512683	0.001	0.436	0.557	0.233 Immature	1
Sep	0	144.8	183.2	164.4	58.1	1.913684974	0.052	0.246	0.665	0.197 Immature	1
Sep	0	138.8	167.8	153.8	45.7	1.709022584	0.014	0.14	0.562	0.249 Immature	0
Sep	0	147.1	175.9	162.6	56.7	1.781332702	0.035	0.239	1.219	0.823 Immature	1
Sep	0	153.5	185.1	171.2	59.1	1.634038713	0.022	0.253	0.732	0.315 Immature	0
Sep	0	147.2	184.9	168.9	58.4	1.831004523	0.042	0.441	0.644	0.305 Immature	1
Sep	0	146.9	179.9	162.5	53.4	1.684518829	0.022	0.337	0.533	0.242 Immature	0
Sep	0	155.8	187.4	172.9	67.4	1.782204503	0.248	0.411	0.649	0.265 Immature	1
Sep	0	135.2	168.2	152.7	45.5	1.841116719	0.112	0.244	0.414	0.273 Immature	1
Sep	0	150.6	186.8	168.6	60.2	1.76246936	0.142	0.228	0.672	0.323 Immature	1
Sep	0	162.6	200.5	181.7	84.4	1.963273583	0.119	0.376	0.896	0.314 Immature	1
Sep	0	152.5	187.5	169.1	61.2	1.725606989	0.052	0.37	0.849	0.275 Immature	1
Sep	0	142.4	177.5	161.4	50.7	1.755811913	0.034	0.222	0.585	0.184 Immature	1
Sep	0	142.1	168.6	157.5	54.8	1.909845891	0.049	0.208	0.681	0.273 Immature	1
Sep	0	149.1	185.4	165.4	62.9	1.897656993	0.056	0.432	0.716	0.279 Immature	1
Sep	0	128.7	161.2	146.6	40.4	1.895159315	0.08	0.165	0.44	0.155 Immature	1
Sep	0	130.7	159.1	145.3	39	1.746778526	0.048	0.185	0.927	0.658 Immature	1
Sep	0	147.6	183.4	163.6	55.6	1.729082515	0.037	0.25	0.615	0.132 Immature	0

Month	Parasite (present,1; absent, 0)	Total length (mm)	Fork length (mm)	Body wet weight (g)	Condition factor	Gonad weight (g)	Liver weight (g)	Stomach weight (g)	Stomach content weight (g)	Sex	Scale in the stomach (present,1; absent, 0)
Sep	1	143.6	188.8	171.1	64.5	2.178193185	0.056	0.201	0.565	0.193 Immature	1
Sep	1	174.8	210.7	193.7	91.3	1.709410993	0.79	0.672	0.718	0.223 Female	1
Sep	1	139.7	170.1	154.8	39	1.430458915	0.012	0.106	0.382	0.14 Immature	1
Sep	1	156.7	189.6	172	65.3	1.697095148	0.206	0.41	0.799	0.327 Male	0
Sep	1	148.8	181.2	164.7	52.7	1.599564738	0.001	0.35	0.499	0.212 Immature	1
Sep	1	161.3	196.6	181.7	70.3	1.675144296	0.179	0.369	0.748	0.209 Male	1
Sep	1	175.9	211.5	193	93.8	1.723476317	0.443	0.72	0.857	0.108 Female	1
Sep	1	160.1	197.3	179.7	82.4	2.007951487	0.156	0.519	0.763	0.145 Male	1
Sep	1	151	190.9	169.7	63.6	1.847252546	0.828	0.241	0.717	0.271 Female	1
Sep	1	155.7	181.2	173	63	1.669070617	0.07	0.16	0.73	0.218 Immature	0
Sep	1	156.2	192.5	175.4	94	2.466520702	0.082	0.534	0.755	0.246 Immature	1
Sep	1	161.6	197.9	177.5	74.2	1.758246801	0.091	0.652	0.813	0.315 Immature	1
Sep	1	151.9	186.7	164.4	57.2	1.632009593	0.059	0.41	0.582	0.217 Male	1
Sep	1	171.4	210.1	189.9	84.8	1.684082642	0.153	0.477	0.695	0.152 Female	1
Sep	1	161.8	201.8	180.9	73.4	1.732848154	0.348	0.507	0.827	0.202 Male	1
Sep	1	140.3	171.6	154.4	45.5	1.647549166	0.11	0.446	0.495	0.225 Immature	1
Sep	1	146.1	151	162.1	51.8	1.661036256	0.114	0.304	0.53	0.174 Immature	1
Sep	1	141.6	169.7	154.8	45.7	1.609631417	0.015	0.223	0.637	0.24 Immature	1
Sep	1	146.3	176.7	162.2	53.4	1.705329397	0.023	0.312	0.591	0.2 Immature	1
Sep	1	136.4	163.1	150.5	41.5	1.635328425	0.066	0.467	0.389	0.095 Immature	1
Sep	1	158.3	194.9	176.6	63	1.588172987	0.092	0.351	0.507	0.154 Immature	1
Sep	1	156.2	187.2	169.4	61.7	1.618982206	0.025	0.371	0.586	0.196 Male	1
Sep	1	156.4	188.8	176.5	57	1.489925693	0.092	0.323	0.589	0.192 Male	1
Sep	1	142.1	174.6	157	46.8	1.631036272	0.022	0.317	0.464	0.118 Immature	0
Sep	1	154.4	186.1	173.8	54.4	1.477940709	0.077	0.277	0.439	0.105 Immature	1
Sep	1	146.1	173.5	161.2	49.5	1.587283681	0.156	0.375	0.52	0.122 Immature	1
Sep	1	132.1	163.6	150.7	40.5	1.756898089	0.001	0.193	0.374	0.13 Immature	1
Sep	1	137.2	173.5	157.2	45.5	1.7617694	0.04	0.221	0.547	0.22 Immature	1
Sep	1	152.9	186.6	170.1	60.8	1.700909172	0.108	0.299	0.974	0.461 Female	0
Sep	1	151.4	182.3	168.4	59.2	1.705862732	0.064	0.411	0.561	0.108 Immature	1
Sep	1	144.6	173.8	160.1	45.2	1.494973712	0.013	0.056	0.369	0.066 Immature	1
Sep	1	142.7	170.7	158.8	41.7	1.435040426	0.043	0.227	1.005	0.616 Immature	1
Sep	1	140.7	168.5	157.5	45.1	1.619176714	0.056	0.251	0.61	0.23 Immature	1
Sep	1	122.8	148.9	134.6	28.1	1.517438922	0.035	0.014	0.236	0.15 Immature	1
Sep	1	137.8	166.5	153.1	44.7	1.708283202	0.057	0.205	0.503	0.257 Immature	1
Sep	1	136.9	169.9	155.7	43.5	1.695426287	0.176	0.28	0.461	0.111 Immature	1
Sep	1	138.7	170.7	156.1	41	1.536577514	0.022	0.517	0.591	0.171 Immature	0
Sep	1	162.3	195.9	179.4	73.4	1.716882209	0.027	0.065	0.275	0.1 Immature	1
Sep	1	178.1	228.3	200	97.2	1.720578559	0.807	0.691	0.942	0.332 Female	1
Sep	1	162.7	196.7	182.1	92.1	2.138439517	0.366	0.974	0.906	0.248 Male	1
Sep	1	169.4	207.9	189.8	71.7	1.474955568	0.096	0.511	0.69	0.241 Immature	1
Sep	1	127.5	153.1	144.1	33.3	1.606621888	0.029	0.109	0.235	0.014 Immature	1
Sep	1	134.8	159.8	146.1	36.2	1.477879054	0.011	0.099	0.963	0.604 Immature	1
Sep	1	140.8	170.5	153.9	40.2	1.440184355	0.05	0.337	0.442	0.209 Immature	1
Sep	1	138.4	161.6	151.7	43.5	1.640895736	0.06	0.087	0.441	0.163 Immature	1
Sep	1	145.3	179.4	161.1	51.4	1.675584276	0.058	0.228	0.819	0.503 Immature	1
Sep	1	141.1	174.1	153.7	46.4	1.651721946	0.182	0.354	1.058	0.617 Male	1
Sep	1	140.7	174.7	158.7	52	1.866899981	0.06	0.369	0.469	0.153 Immature	0
Sep	1	141.2	174.4	157.3	45.4	1.61269323	0.057	0.143	0.441	0.157 Immature	1
Sep	1	144.5	180.9	164.9	51.9	1.720140085	0.095	0.359	0.862	0.554 Immature	1
Sep	1	145.8	179.1	161.4	46.5	1.500307848	0.006	0.206	0.409	0.201 Immature	1
Sep	1	144.9	175.6	162.4	50	1.643481607	0.047	0.242	0.691	0.327 Immature	1
Sep	1	156.6	193.5	177.3	65.3	1.700348365	0.318	0.214	0.854	0.417 Male	1
Sep	1	145.6	172.9	159.1	50.4	1.632850455	0.207	0.453	0.545	0.207 Male	0
Sep	1	155.2	190.8	176.2	69.7	1.864479563	0.046	0.233	0.605	0.133 Immature	0
Sep	1	142.3	170.1	157.8	41.9	1.454116903	0.058	0.062	0.578	0.171 Immature	1
Sep	1	174.3	219.2	197.2	114.3	2.15851002	0.659	1.054	4.735	2.914 Female	1
Sep	1	211.6	260.6	234.4	168.9	1.782718041	1.424	1.152	1.878	0.683 Male	1

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Table S2. The result of a generalized linear model with the presence or absence of parasitic *Ceratothoa carinata* on the host fish, *Decapterus maruadsi* , as the response variable, standard length (SL), collected season, and sex of host fish as explanatory variables. CI, confidence interval; Std_Coefficient, standardized coefficient.

Parameter	Coefficient	CI	CI_low	CI_high	z	p	Std_Coefficient
(Intercept)	0.60	0.95	-4.05	4.68	0.27	0.783	-3.41
SL	-0.02	0.95	-0.05	0.00	-2.22	0.027	-0.85
sex [Female]	4.68	0.95	2.58	7.86	3.70	0.000	4.68
sex [Male]	2.27	0.95	0.69	4.43	2.46	0.014	2.27
month [Sep]	3.20	0.95	1.40	6.22	2.83	0.005	3.20

Table S3. Results of generalized linear models with the wet weight of host fish, *Decapterus maruadsi*, as the response variable, a cymothind parasite *Ceratothoa carinata* present/absent, standard length (SL) and sex of host fish as explanatory variables. CI, confidence interval; df_error, degree of freedom for the error term, Std_Coefficient, standardized coefficient.

Month		Coefficient	CI	CI_low	CI_high	t	df_error	p	Std_Coefficient
July	(Intercept)	1.44	0.95	0.99	1.90	6.24	28	0.000	4.87
	SL	0.02	0.95	0.01	0.02	11.38	28	0.000	0.76
	parasite [present]	-1.60	0.95	-2.78	-0.44	-2.70	28	0.007	-0.32
	sex [female]	1.54	0.95	0.43	2.66	2.71	28	0.007	-0.04
	sex [male]	0.31	0.95	-1.07	1.69	0.44	28	0.662	-0.24
	SL:parasite [present]	0.01	0.95	0.00	0.01	2.60	28	0.009	0.28
	SL:sex [female]	-0.01	0.95	-0.01	0.00	-2.98	28	0.003	-0.35
	SL:sex [male]	0.00	0.95	-0.01	0.00	-0.87	28	0.384	-0.12
	parasite [present] :sex [female]	0.20	0.95	-0.09	0.48	1.37	28	0.172	0.20
Sep.	(Intercept)	1.01	0.95	0.43	1.60	3.39	81	0.001	4.06
	SL	0.02	0.95	0.02	0.02	9.97	81	0.000	0.27
	parasite [present]	-0.40	0.95	-1.16	0.35	-1.05	81	0.292	-0.06
	sex [female]	0.68	0.95	-0.57	1.95	1.06	81	0.291	0.07
	sex [male]	7.91	0.95	-69.52	85.35	0.20	81	0.841	-0.36
	SL:parasite [present]	0.00	0.95	0.00	0.01	0.88	81	0.377	0.03
	SL:sex [female]	0.00	0.95	-0.01	0.00	-1.04	81	0.298	-0.05
	SL:sex [male]	-0.06	0.95	-0.60	0.49	-0.20	81	0.842	-0.72
	parasite [present] :sex [male]	-7.22	0.95	-84.67	70.21	-0.18	81	0.855	0.40
	(SL:parasite [present]) :sex [male]	0.05	0.95	-0.49	0.60	0.18	81	0.854	0.67

Table S4. Results of generalized linear models with the condition factor of host fish, *Decapterus maruadsi*, as the response variable, a cymothoid parasite *Ceratothoa carinata* present/absent, standard length (SL) and sex of host fish as explanatory variables. CI, confidence interval; df_error, degree of freedom for the error term; Std_Coefficient, standardized coefficient.

Month	Parameter	Coefficient	CI	CI_low	CI_high	t	df_error	p	Std_Coefficient
July	(Intercept)	1.03	0.95	0.57	1.50	4.32	28	0.000	0.39
	SL	0.00	0.95	-0.01	0.00	-2.04	28	0.040	-0.14
	parasite [present]	-1.26	0.95	-2.47	-0.07	-2.06	28	0.040	-0.27
	sex [female]	0.19	0.95	-0.94	1.35	0.33	28	0.740	0.06
	sex [male]	-1.20	0.95	-2.63	0.22	-1.65	28	0.100	-0.17
	SL:parasite [present]	0.00	0.95	0.00	0.01	1.94	28	0.050	0.22
	SL:sex [female]	0.00	0.95	-0.01	0.00	-0.23	28	0.820	-0.03
	SL:sex [male]	0.01	0.95	0.00	0.01	1.58	28	0.110	0.23
	parasite [present] :sex [female]	0.19	0.95	-0.11	0.48	1.25	28	0.210	0.19
Sep.	(Intercept)	0.63	0.95	0.06	1.20	2.14	81	0.030	0.57
	SL	0.00	0.95	0.00	0.00	-0.20	81	0.840	-0.01
	parasite [present]	-0.44	0.95	-1.18	0.29	-1.18	81	0.240	-0.06
	sex [female]	0.33	0.95	-0.89	1.58	0.53	81	0.600	0.06
	sex [male]	7.94	0.95	-68.08	83.98	0.21	81	0.840	-0.37
	SL:parasite [present]	0.00	0.95	0.00	0.01	1.01	81	0.310	0.03
	SL:sex [female]	0.00	0.95	-0.01	0.01	-0.48	81	0.630	-0.02
	SL:sex [male]	-0.06	0.95	-0.59	0.48	-0.20	81	0.840	-0.73
	parasite [present] :sex [male]	-7.81	0.95	-83.85	68.21	-0.20	81	0.840	0.39
	(SL:parasite [present]) :sex [male]	0.06	0.95	-0.48	0.59	0.20	81	0.840	0.72

Table S5. Results of generalized linear models with gonadosomatic index of host fish, *Decapterus maruadsi*, as the response variable, a cymothoid parasite *Ceratothoa carinata* present/absent, standard length (SL) and sex of host fish as explanatory variables. CI, confidence interval; Std_Coefficient, standardized coefficient.

Month	Parameter	Coefficient	CI	CI_low	CI_high	t	df_error	p	Std_Coefficient
July	(Intercept)	-0.08	0.95	-2.55	2.59	-0.06	28	0.948	-3.14
	SL	-0.02	0.95	-0.03	0.00	-1.99	28	0.046	-0.68
	parasite [present]	-0.74	0.95	-7.24	5.13	-0.24	28	0.807	-1.24
	sex [female]	0.66	0.95	-4.94	6.95	0.23	28	0.819	4.67
	sex [male]	3.05	0.95	-4.41	10.43	0.85	28	0.396	4.67
	SL:parasite [present]	0.00	0.95	-0.03	0.02	-0.20	28	0.843	-0.11
	SL:sex [female]	0.02	0.95	-0.01	0.05	1.49	28	0.136	0.89
	SL:sex [male]	0.01	0.95	-0.03	0.04	0.50	28	0.616	0.36
	parasite [present] :sex [female]	1.10	0.95	-0.51	2.50	1.49	28	0.136	1.10
Sep.	(Intercept)	-2.74	0.95	-6.35	0.99	-1.28	81	0.200	-2.10
	SL	0.00	0.95	-0.02	0.03	0.29	81	0.768	0.06
	parasite [present]	1.19	0.95	-3.86	6.15	0.43	81	0.664	-0.13
	sex [female]	2.27	0.95	-5.81	11.56	0.49	81	0.621	1.90
	sex [male]	84.67	0.95	-512.97	683.27	0.30	81	0.764	-3.34
	SL:parasite [present]	-0.01	0.95	-0.04	0.03	-0.47	81	0.637	-0.12
	SL:sex [female]	0.00	0.95	-0.06	0.05	-0.09	81	0.929	-0.03
	SL:sex [male]	-0.59	0.95	-4.81	3.62	-0.30	81	0.766	-7.70
	parasite [present] :sex [male]	-86.43	0.95	-685.04	511.23	-0.31	81	0.760	4.35
	(SL:parasite [present]) :sex [male]	0.61	0.95	-3.61	4.83	0.31	81	0.759	7.94

Table S6. Results of generalized linear models with hepatosomatic index of host fish, *Decapterus maruadsi*, as the response variable, a cymothoid parasite *Ceratothoa carinata* present/absent, standard length (SL) and sex of host fish as explanatory variables. CI, confidence interval; Std_Coefficient, standardized coefficient.

Month		Coefficient	CI	CI_low	CI_high	t	df_error	p	Std_Coefficient
July	(Intercept)	1.45	0.95	-0.55	3.58	1.49	28	0.135	-1.79
	SL	-0.02	0.95	-0.03	0.00	-2.55	28	0.011	-0.71
	parasite [present]	-2.28	0.95	-7.04	2.20	-0.91	28	0.362	-0.84
	sex [female]	-1.98	0.95	-6.25	2.61	-0.83	28	0.407	1.22
	sex [male]	-3.60	0.95	-9.73	2.51	-1.21	28	0.225	0.85
	SL:parasite [present]	0.01	0.95	-0.01	0.03	0.69	28	0.489	0.32
	SL:sex [female]	0.02	0.95	-0.01	0.04	1.44	28	0.151	0.70
	SL:sex [male]	0.02	0.95	-0.01	0.05	1.67	28	0.095	0.98
	parasite [present] :sex [female]	1.08	0.95	-0.21	2.23	1.78	28	0.075	1.08
Sep.	(Intercept)	-1.75	0.95	-4.27	0.85	-1.34	81	0.180	-0.52
	SL	0.01	0.95	-0.01	0.03	0.92	81	0.357	0.11
	parasite [present]	0.23	0.95	-3.20	3.59	0.14	81	0.892	-0.09
	sex [female]	-2.90	0.95	-8.26	2.95	-1.04	81	0.299	-0.30
	sex [male]	217.26	0.95	-129.57	564.45	1.26	81	0.206	-10.14
	SL:parasite [present]	0.00	0.95	-0.03	0.02	-0.19	81	0.851	-0.03
	SL:sex [female]	0.02	0.95	-0.02	0.05	1.03	81	0.303	0.23
	SL:sex [male]	-1.53	0.95	-3.98	0.92	-1.26	81	0.207	-19.89
	parasite [present] :sex [male]	-215.97	0.95	-563.18	130.88	-1.26	81	0.209	10.38
	(SL:parasite [present]) :sex [male]	1.52	0.95	-0.92	3.97	1.26	81	0.209	19.80

Table S7. Results of generalized linear models with the stomach content weight of host fish, *Decapterus maruadsi*, as the response variable, a cymothoid parasite *Ceratothoa carinata* present/absent, standard length (SL) and sex of host fish as explanatory variables. CI, confidence interval; Std_Coefficient, standardized coefficient.

Month		Coefficient	CI	CI_low	CI_high	t	df_error	p	Std_Coefficient
July	(Intercept)	0.84	0.95	0.03	1.66	2.03	28	0.042	-0.80
	SL	0.00	0.95	-0.01	0.00	-1.58	28	0.113	-0.97
	parasite [present]	-0.54	0.95	-2.63	1.55	-0.51	28	0.612	-1.00
	sex [female]	-0.47	0.95	-2.46	1.52	-0.46	28	0.644	1.05
	sex [male]	-1.73	0.95	-4.22	0.75	-1.37	28	0.171	-0.02
	SL:parasite [present]	0.00	0.95	-0.01	0.01	0.39	28	0.696	0.39
	SL:sex [female]	0.00	0.95	-0.01	0.01	0.71	28	0.478	0.76
	SL:sex [male]	0.01	0.95	0.00	0.02	1.52	28	0.128	1.96
	parasite [present] :sex [female]	0.10	0.95	-0.41	0.61	0.38	28	0.704	0.51
Sep.	(Intercept)	0.29	0.95	-1.55	2.14	0.31	81	0.755	0.05
	SL	0.00	0.95	-0.01	0.01	0.01	81	0.991	0.00
	parasite [present]	-0.14	0.95	-2.50	2.23	-0.11	81	0.911	-0.28
	sex [female]	-2.01	0.95	-5.97	1.95	-0.99	81	0.320	0.41
	sex [male]	-27.63	0.95	-271.20	215.94	-0.22	81	0.824	3.76
	SL:parasite [present]	0.00	0.95	-0.02	0.02	0.04	81	0.970	0.01
	SL:sex [female]	0.01	0.95	-0.01	0.04	1.17	81	0.240	0.59
	SL:sex [male]	0.19	0.95	-1.52	1.91	0.22	81	0.825	7.92
	parasite [present] :sex [male]	27.06	0.95	-216.52	270.63	0.22	81	0.828	-3.62
	(SL:parasite [present]) :sex [male]	-0.19	0.95	-1.91	1.53	-0.22	81	0.829	-7.75

Table S8. Results of generalized linear models with the presence/absence of scales inside the stomach of host fish, *Decapterus maruadsi* , as the response variable, a cymothoid parasite *Ceratothoa carinata* present/absent, standard length (SL) and sex of host fish as explanatory variables. CI, confidence interval; Std_Coefficient, standardized coefficient.

| Month	Parameter	Coefficient	CI	CI_low	CI_high	z	p	Std_Coefficient
July	(Intercept)	9.15	0.95	-13.39	50.04	0.64	0.521	1.99
	SL	-0.03	0.95	-0.20	0.06	-0.56	0.576	-1.15
	parasite [present]	-10.04	0.95	-51.48	13.88	-0.68	0.498	-1.82
	sex [male]	-2234.23	0.95	-246510.52	-28814.10	-0.01	0.996	-54.13
	SL:parasite [present]	0.04	0.95	-0.07	0.21	0.60	0.546	1.32
	SL:sex [male]	10.06	0.95	-221.14	1127.05	0.01	0.996	350.26
	parasite [present] :sex [male]	-139.63	0.95	-36280.14	9705.11	0.00	0.998	-139.63
Sep.	(Intercept)	4.36	0.95	-11.67	22.97	0.51	0.608	1.60
	SL	-0.02	0.95	-0.14	0.07	-0.32	0.749	-0.24
	parasite [present]	0.71	0.95	-17.45	22.39	0.06	0.950	0.28
	sex [female]	-35.77	0.95	NA	6.50	-1.05	0.294	-2.45
	sex [male]	-9403.95	0.95	NA	186186.10	-0.01	0.992	448.89
	SL:parasite [present]	0.00	0.95	-0.15	0.12	-0.04	0.970	-0.04
	SL:sex [female]	0.22	0.95	-0.04	0.79	1.01	0.313	2.91
	SL:sex [male]	66.28	0.95	-1315.62	NA	0.01	0.992	861.79
	parasite [present] :sex [male]	9384.10	0.95	-185184.44	NA	0.01	0.992	-449.95
	(SL:parasite [present]) :sex [male]	-66.16	0.95	NA	1306.70	-0.01	0.992	-860.15
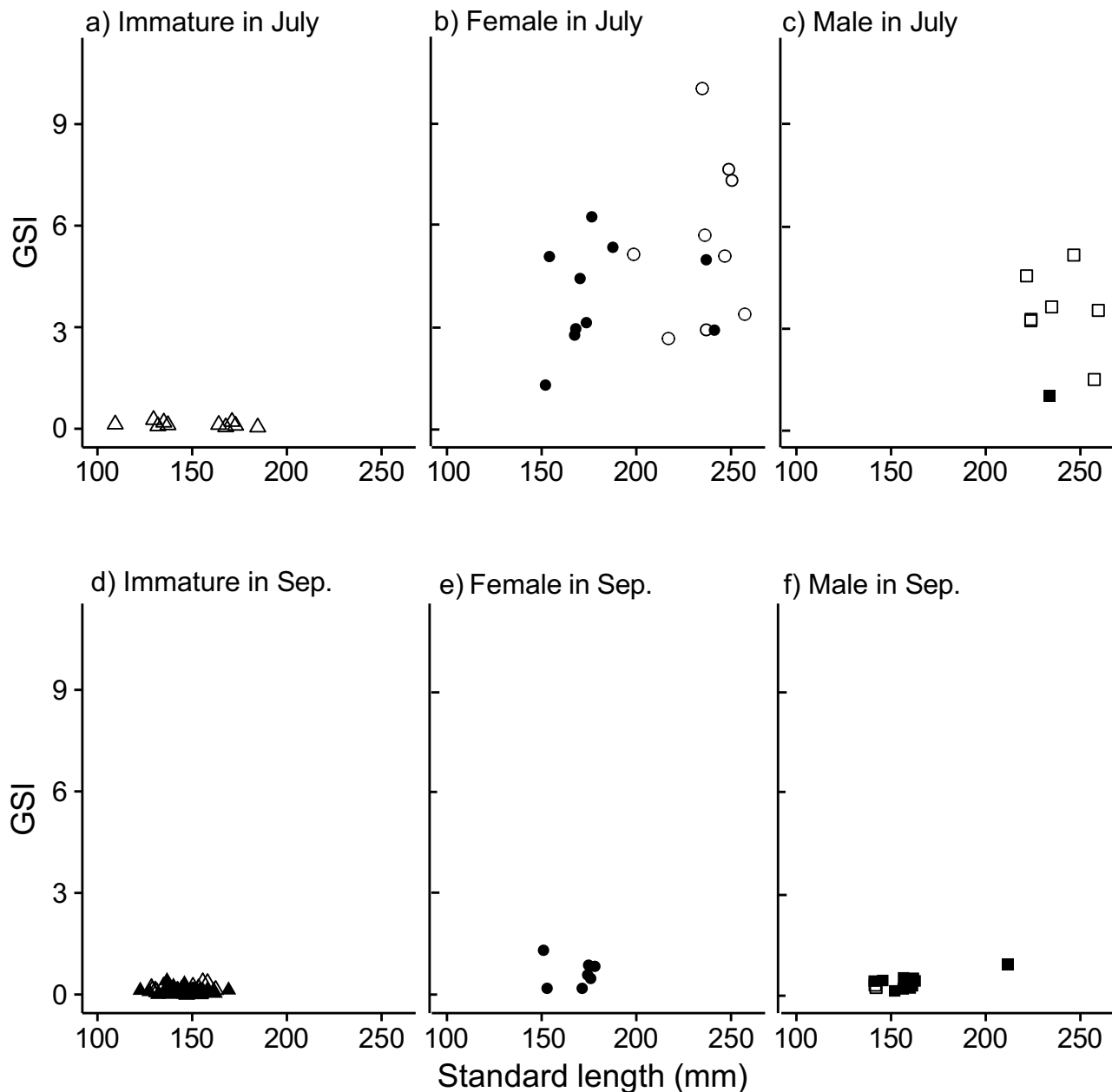
FIGURE S1 The impact of parasitism by the buccal parasite, *Ceratothoa carinata*, on gonnadsomatic index (GSI) of the host fish Japanese scad, *Decapterus maruadsi*, of various standard lengths. The symbols filled in black represent fish individuals that have been parasitized, while the symbols left in white represent individuals that have not been parasitized.
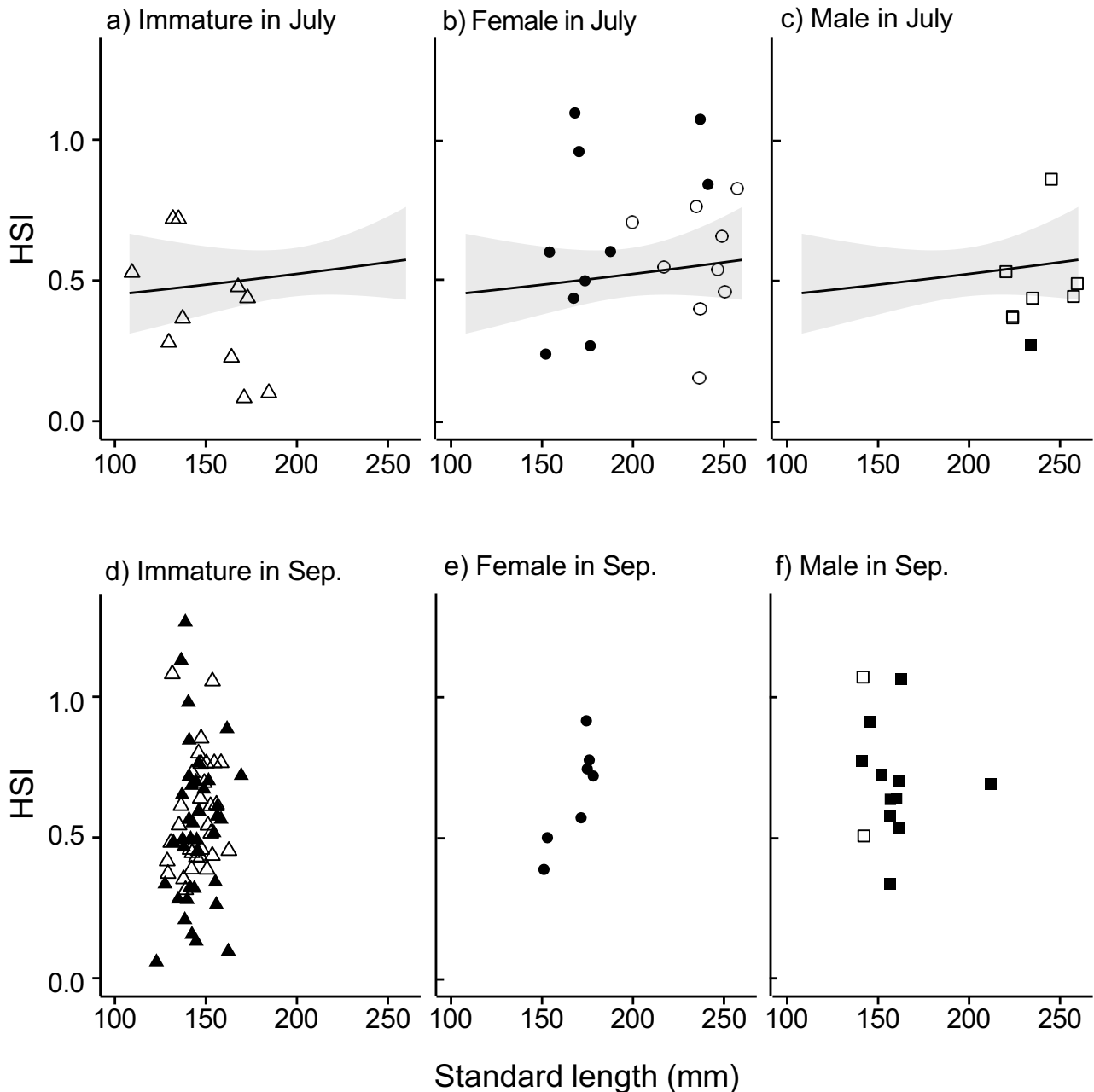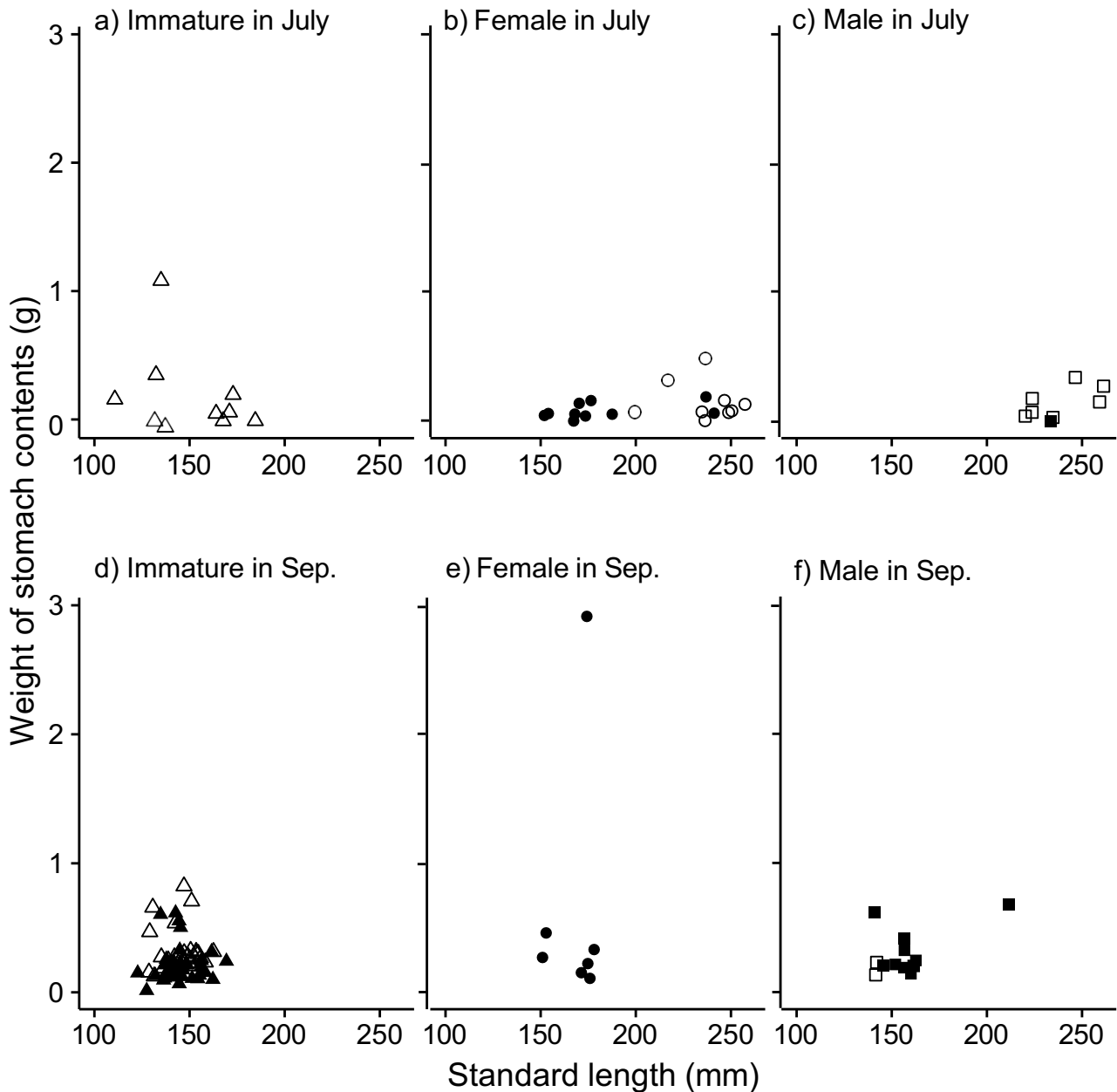
FIGURE S2 The impact of parasitism by the buccal parasite, *Ceratothoa carinata*, on the hepatosomatic index of the host fish Japanese scad (*Decapterus maruadsi*), of various standard lengths. The symbols filled in black represent fish individuals that have been parasitized, while the symbols left in white represent individuals that have not been parasitized.

FIGURE S3 The impact of parasitism by the buccal parasite, *Ceratothoa carinata*, on the weight of stomach contents in the host fish Japanese scad (*Decapterus maruadsi*), of various standard lengths. The symbols filled in black represent fish individuals that have been parasitized, while the symbols left in white represent individuals that have not been parasitized.
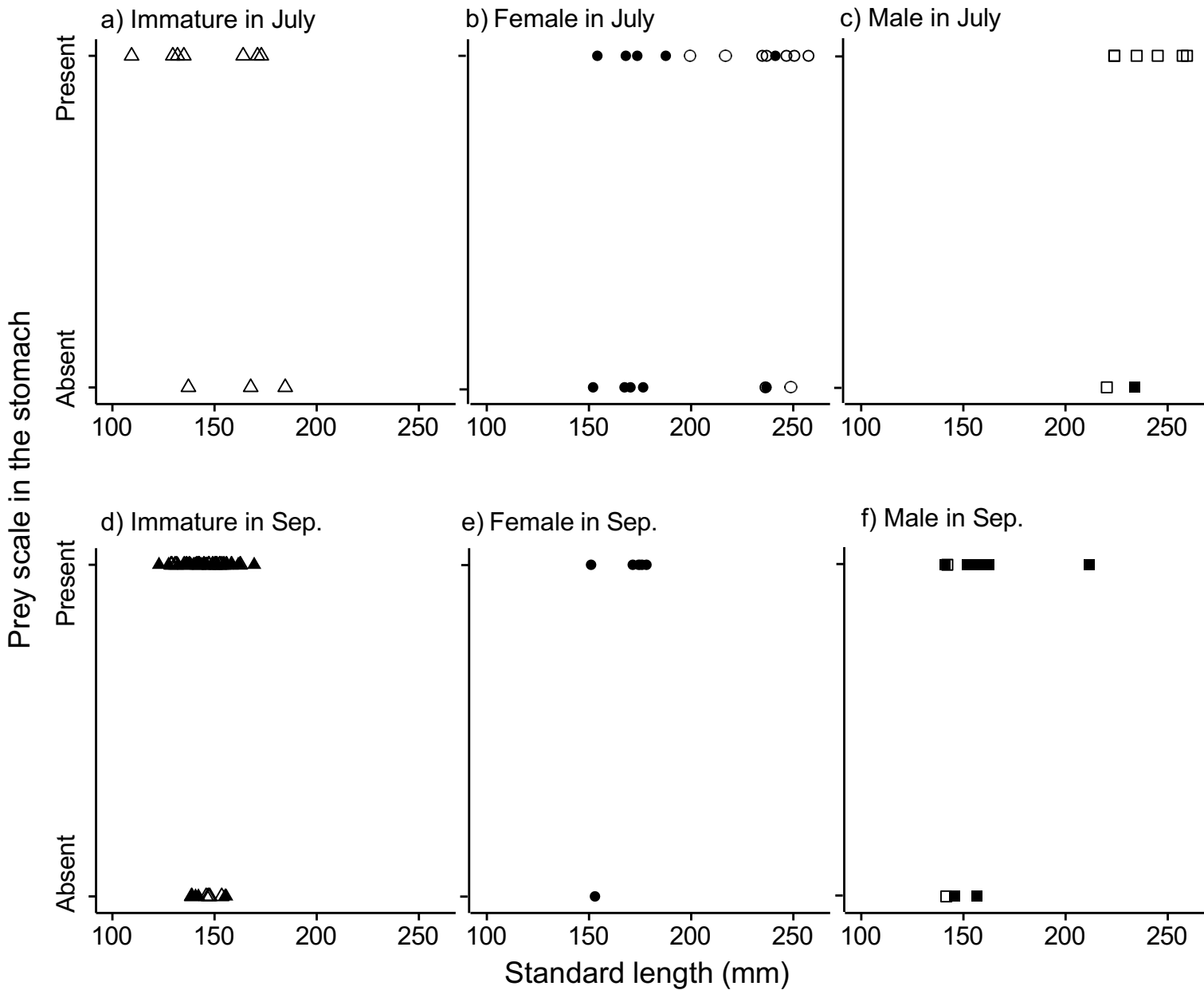
FIGURE S4 The impact of parasitism by the buccal parasite, *Ceratothoa carinata*, on the presence/absence of prey fish scale in the stomach of the host fish Japanese scad (*Decapterus maruadsi*), of various standard lengths. The symbols filled in black represent fish individuals that have been parasitized, while the symbols left in white represent individuals that have not been parasitized.