

Supplementary material

Reproductive biology of the blue shark (*Prionace glauca*) in the western North Pacific Ocean

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Table S1. Maturation stages of male and female blue sharks in the present study

Adapted from Stehmann (2002), McAuley *et al.* (2007) and Chin *et al.* (2013)

Sex	Organ	Description	Maturity status	Stage
Male	Clasper, testis, and semen in the seminal vesicle	Claspers un-calcified, testis thin, and semen not present	Immature	Juvenile
		Claspers partially calcified, testis thickened, and semen may be present	Immature	Adolescent
		Claspers rigid and fully calcified, testis enlarged and predominant, and semen may be present	Mature	Adult
Female	Uterus, ovary, and ovarian follicle	Uterus thin and whit, and ovary very small	Immature	Juvenile
		Uterus thin and white but partly enlarged posteriorly, and ovary developing but no mature follicles	Immature	Adolescent
		Uterus enlarged but empty, and ovary enlarged with developed follicles	Mature	Adult
		Uterus enlarged with embryos or fertilised eggs present	Mature	Pregnant
		Uterus greatly enlarged, flaccid, and distended Placenta or umbilical cord may be present in uterus	Mature	Postpartum

Table S2. Numbers of samples to determine reproductive parameters by year, sex and sampling area (1–4 and unknown)

Year	Male					Female					Total	
	1	2	3	4	Unknown	1	2	3	4	Unknown		
2010												0
2011	2	25	5			1	1	5				39
2012	137	4	7		1	67		8				224
2013	37	2	6			34	24	8				111
2014	102	17	8	2	1	71	26	3	38	6		274
2015	101	6	7		3	58	12	29		10		226
2016	17					29				2		48
Total	396	54	33	2	5	260	63	53	38	18		922

Table S3. Monthly numbers of observed blue sharks by maturity status

Sex	Maturity status	Stage	Month												Total	
			Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec		Unknown
Male	Immature	Juvenile	1	5		30	25	22	17			6	48	30		184
	Immature	Adolescent			1	14	48	36	7	1	5	40	6	2		160
	Mature	Adult	3	1	5	6	18	39	7	1	14	36	12	4		146
Female	Immature	Juvenile				10	17	19	20			2	8	14	2	92
	Immature	Adolescent	2	5	4	14	12	15			12	20	17	12		113
	Mature	Adult			1	4	15	17	25		4					66
	Mature	Pregnant	18	16	16	12	8	1			3	42		22	1	139
	Mature	Postpartum	1		1	10	4	6								22
Total			25	29	30	111	149	163	51	2	38	146	91	84	3	922

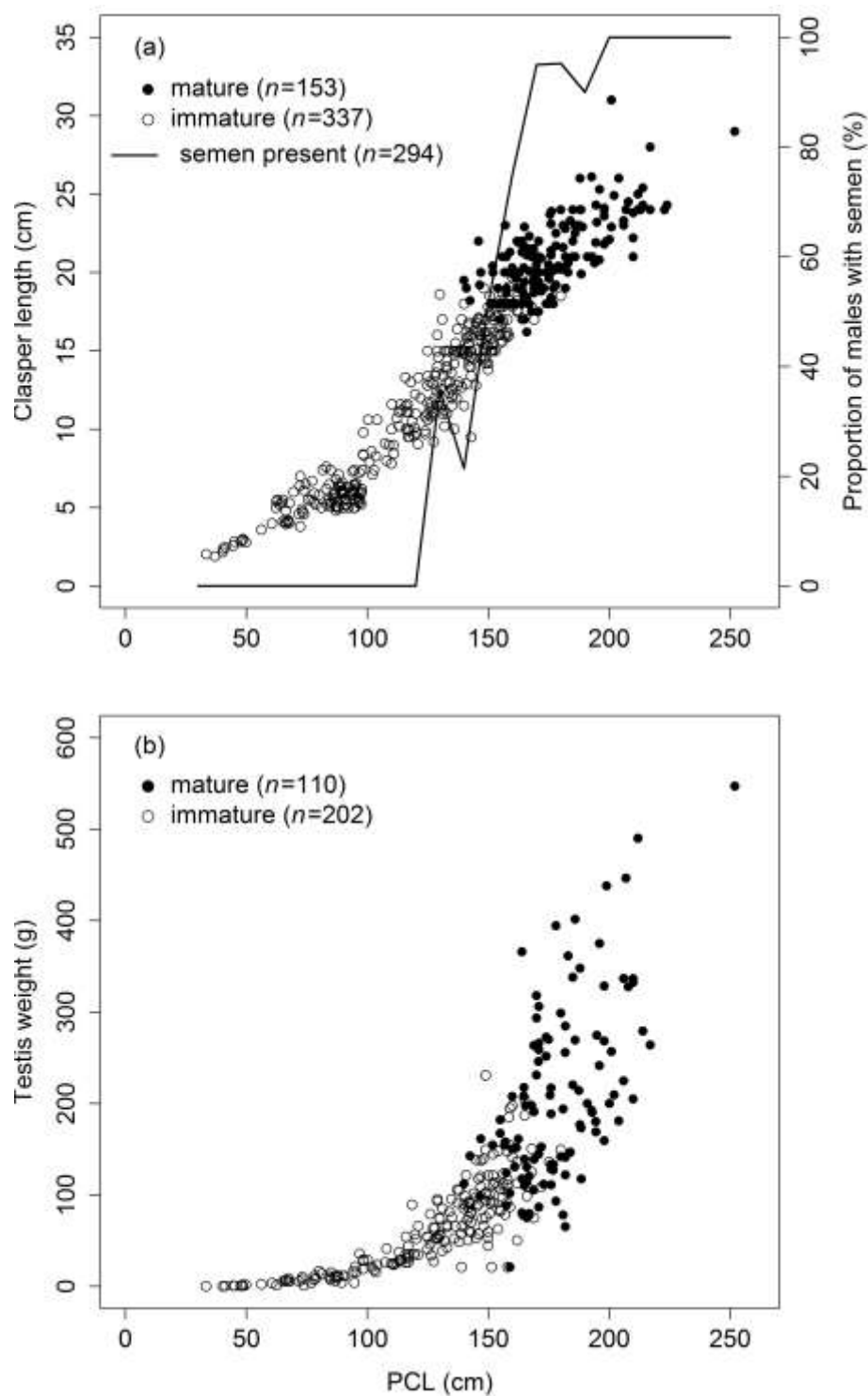


Fig. S1. Relationships between precaudal length (PCL, cm) and (a) clasper length (cm), the proportion of males with semen (%) and (b) testis weight (g) of male blue sharks.

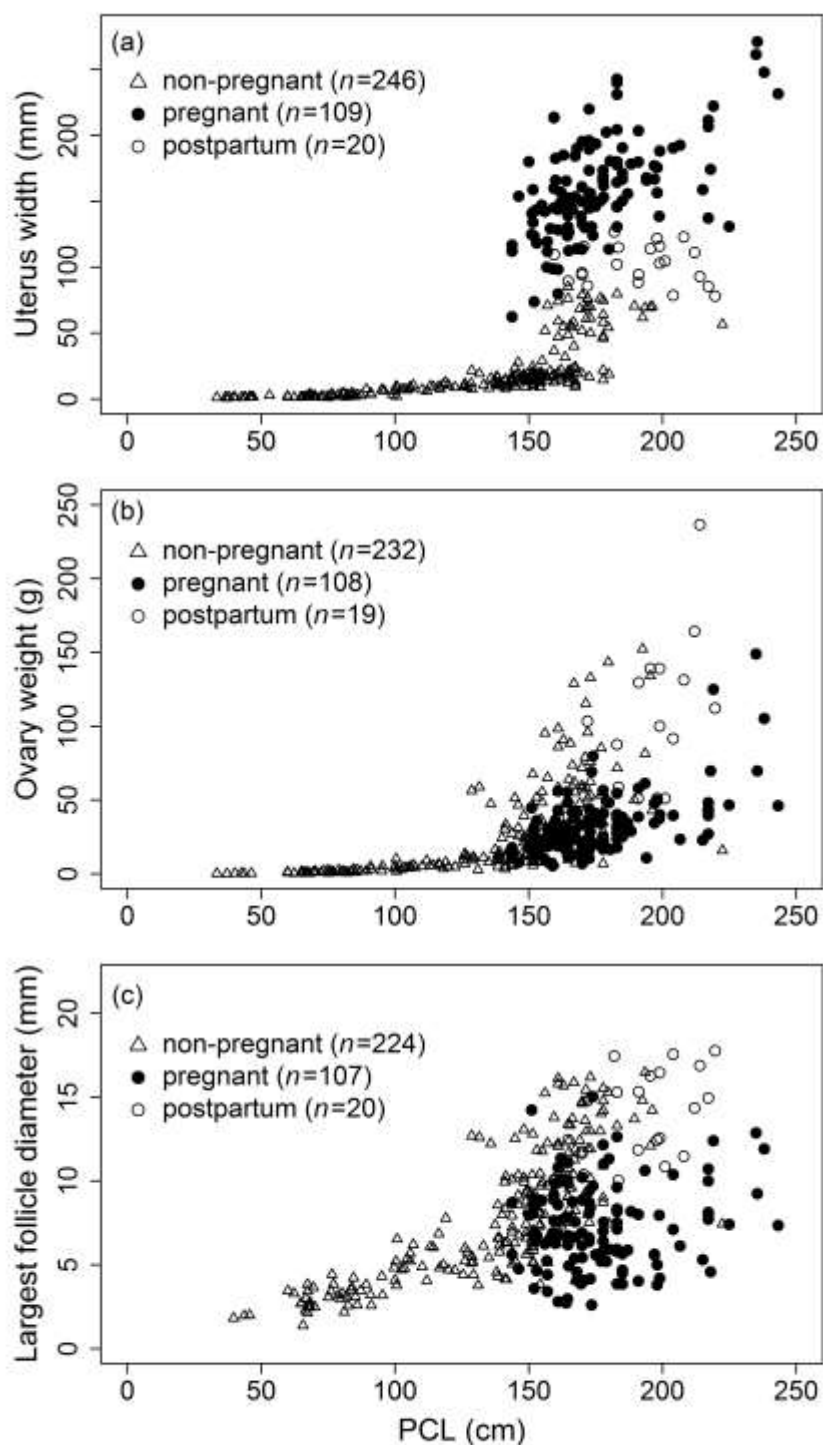


Fig. S2. Relationships between precaudal length (PCL, cm) and (a) uterine width (mm), (b) ovarian weight (g) and (c) the largest-follicle diameter (mm) of female blue sharks.

References

- Chin, A., Simpfendorfer, C., Tobin, A., and Heupel, M. (2013). Validated age, growth and reproductive biology of *Carcharhinus melanopterus*, a widely distributed and exploited reef shark. *Marine and Freshwater Research* **64**, 965–975. [doi:10.1071/MF13017](https://doi.org/10.1071/MF13017)
- McAuley, R. B., Simpfendorfer, C. A., Hyndes, G. A., and Lenanton, R. C. (2007). Distribution and reproductive biology of the sandbar shark, *Carcharhinus plumbeus* (Nardo), in Western Australian waters. *Marine and Freshwater Research* **58**, 116–126. [doi:10.1071/MF05234](https://doi.org/10.1071/MF05234)
- Stehmann, M. F. W. (2002). Proposal of a maturity stages for oviparous and viviparous cartilaginous fishes (Pisces, Chondrichthes). *Archiv für Fischerei- und Meeresforschung* **50**, 23–48.