



Supplement of

**Ontogenetic development of the European basal aquatic turtle
Pleurosternon bullockii (Paracryptodira, Pleurosternidae)**

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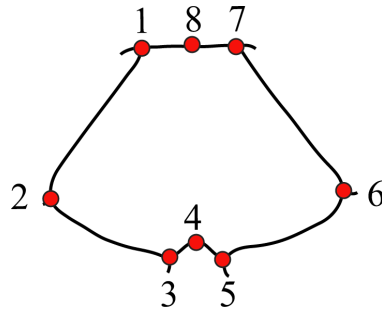
S1. Estimated shell measures of juvenile specimens of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), from the Berriasian (Early Cretaceous) of Swanage (Dorset, England). Abbreviation: N.A, not available. All the measures are in cm.

SPECIMEN	Carapace maximum length	Carapace maximum width	Plastron maximum length	Plastron maximum width
NHMUK 48262	13.5	13	N. A	N. A
NHMUK 48263	11	10.5	N. A	N. A
NHMUK 48264	8.5	8	N. A	N. A
NHMUK 48263a	5.5	5	N. A	N. A
NHMUK 48263e	5.5	5	N. A	N. A
NHMUK 48347	N. A	N. A	13	12.5
NHMUK 48343	N. A	N. A	11.5	11
NHMUK 48344	N. A	N. A	5.5	4.5

S2. Sample sizes of the analyses performed through the quantitative approach.

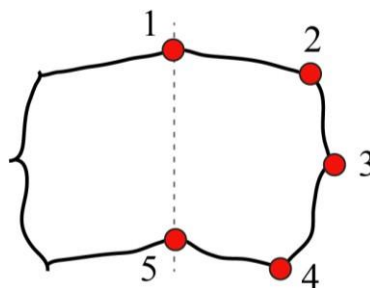
Elements	Sample size (N)
Nuchal	16
Third vertebral scute	18
Anterior plastral lobe	13
Entoplastron	21

S3. Definition of landmark location for the nuchal of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), taking into account specimens from the Berriasian (Early Cretaceous) of Swanage (Dorset, England).



View	Landmark	Anatomical definition
Dorsal	1	Anterior left contact between the nuchal and first peripheral
Dorsal	2	Posterior left contact between the nuchal and first peripheral
Dorsal	3	Posterior left contact between the nuchal and the first element of the neural row
Dorsal	4	Medium point of posterior margin
Dorsal	5	Posterior right contact between the nuchal and the first element of the neural row
Dorsal	6	Posterior right contact between the nuchal and first peripheral
Dorsal	7	Anterior right contact between the nuchal and first peripheral
Dorsal	8	Medium point of anterior margin

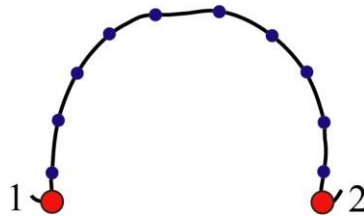
S4. Definition of landmark location for the third vertebral scute of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), taking into account specimens from the Berriasian (Early Cretaceous) of Swanage (Dorset, England).



View	Landmark	Anatomical definition
Dorsal	1	Medium point of anterior margin

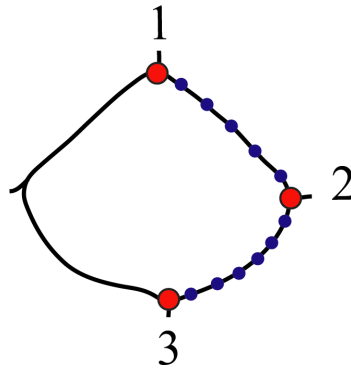
Dorsal	2	Anterior contact between the anterior and lateral margin
Dorsal	3	Contact between the antero- and postero-lateral margins
Dorsal	4	Posterior contact between the lateral and posterior margins
Dorsal	5	Medium point of posterior margin

S5. Definition of landmark and semilandmark location for the anterior plastral lobe of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), taking into account specimens from the Berriasian (Early Cretaceous) of Swanage (Dorset, England).



View	Landmark	Anatomical definition
Ventral	1	Right axially notch
Ventral	2	Left axillary notch
Ventral	3-12	Semilandmarks: plate outline between LM1-LM2

S6. Definition of landmark and semilandmark location for the entoplastron of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), taking into account specimens from both the Tithonian (Late Jurassic) and Berriasian (Early Cretaceous) of England.

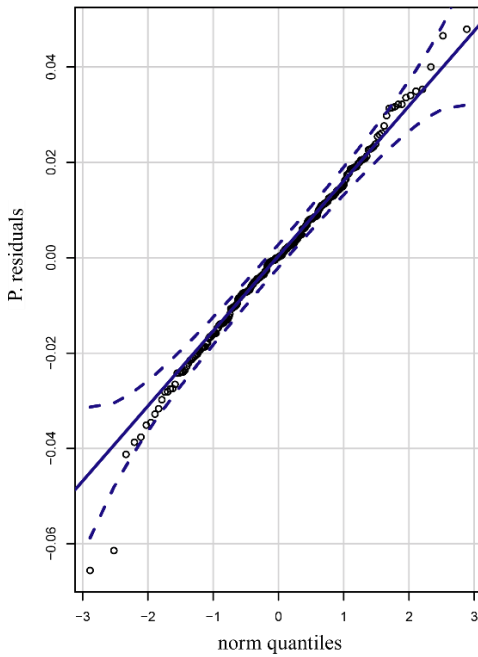


View	Landmark	Anatomical definition
Ventral	1	Anterior-most point of entoplastron
Ventral	2	Posterior contact between the entoplastron and epiplastron
Ventral	3	Posterior-most point of entoplastron
Ventral	4-14	Semilandmarks: plate outline between LM1-LM2 and LM2-LM3

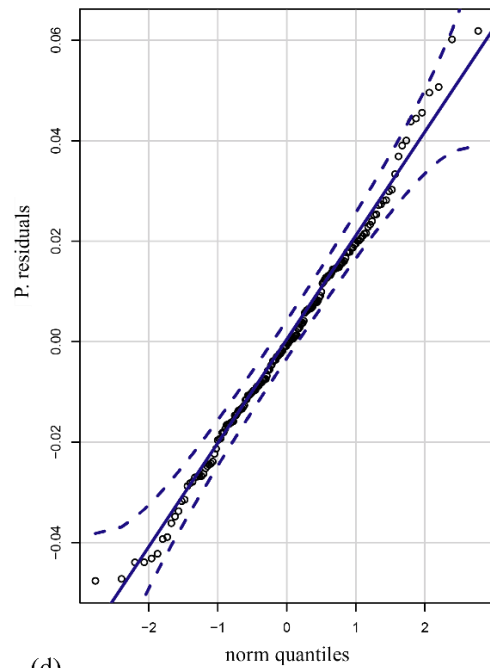
S7. Principal Component Analysis considering the allometric components of shape for the shell of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), taking into account specimens from the Berriasian (Early Cretaceous) of Swanage (Dorset, England). (a), Nuchal. (b), Third vertebral scute. (c), Anterior plastral lobe. (d), Entoplastron. Wireframes indicate the main shape changes of each PC, the light blue concerns the average shape, whereas the dark blue is the shape variance related to extreme of variation along the axis. Abbreviations: C, CAMSM; D, DORCM; N, NHMUK.

S8. P-P plots for diagnosing normal distribution of Procrustes residuals of the shell elements of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae), taking into account specimens from both the Tithonian (Late Jurassic) and Berriasian (Early Cretaceous) of England. (a), Nuchal. (b), Third vertebral scute. (c), Anterior plastral lobe. (d), Entoplastron.

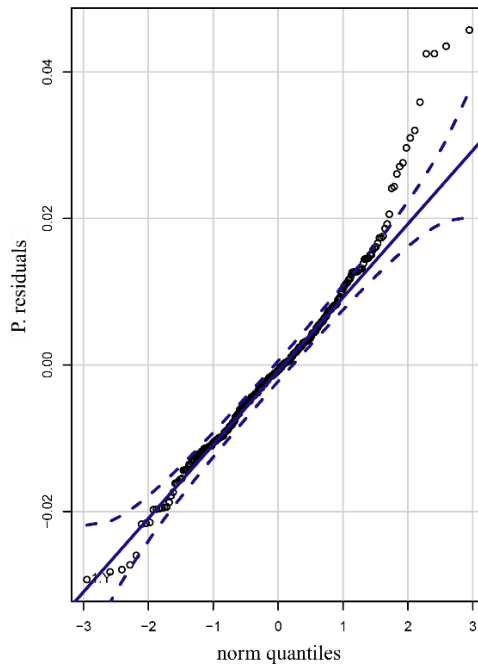
(a)



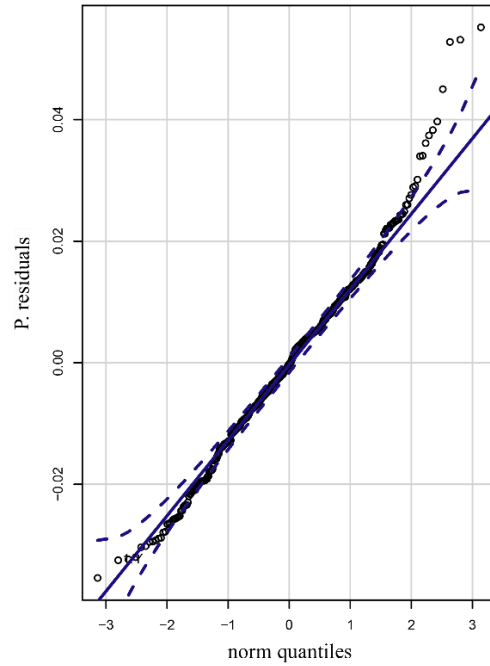
(b)



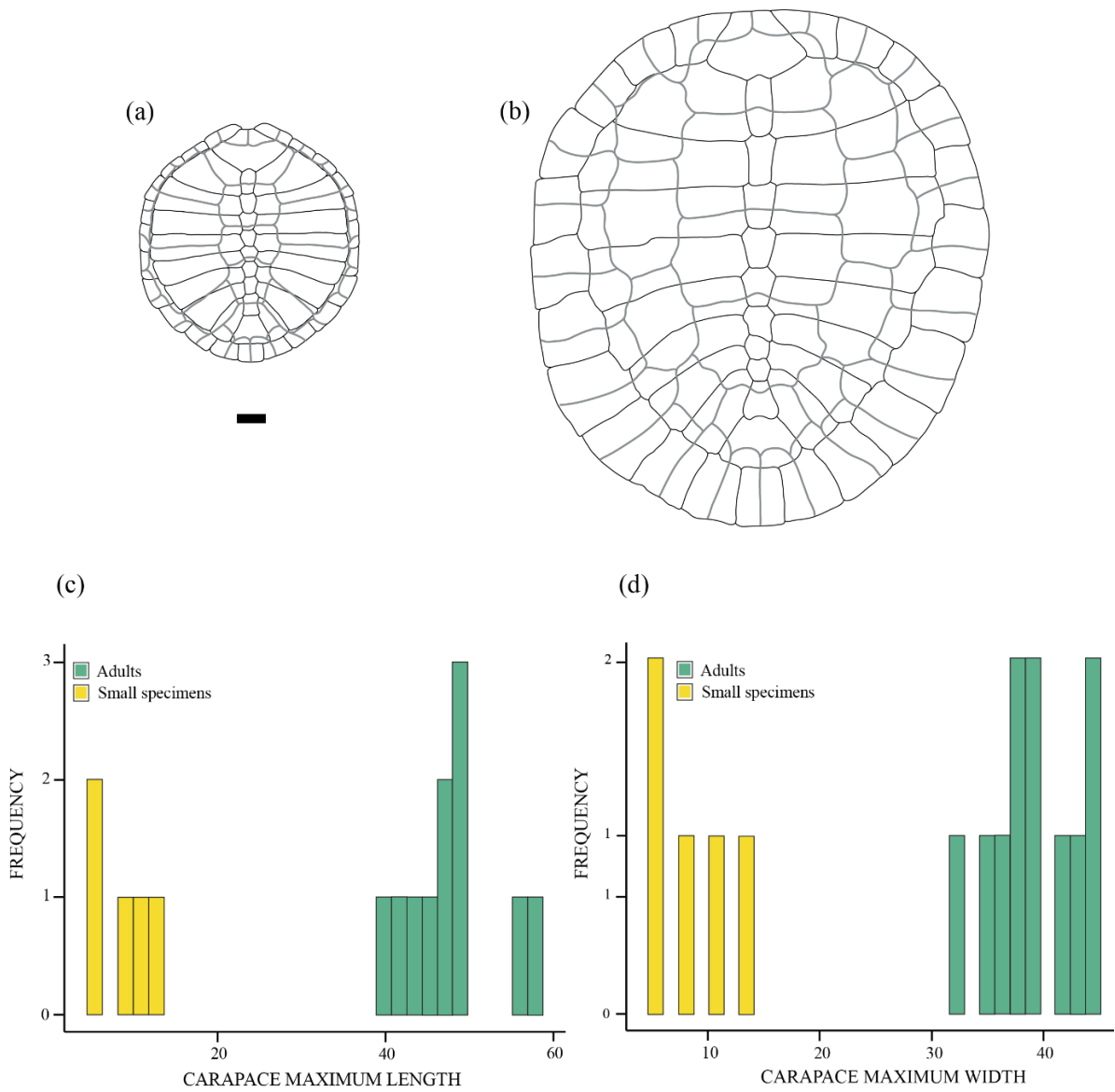
(c)



(d)



S9. Comparison of the carapace size recognized in different ontogenetic stages (adult and juvenile) of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae) from the Tithonian (Upper Jurassic) and Berriasian (Lower Cretaceous) of the United Kingdom. (a), Reconstruction of dorsal view of the juvenile carapace based on NHMUK 48262 and NHMUK 48263. (b), Reconstruction of dorsal view of the adult carapace based on CAMSM J5327. (c)-(d), Histogram of the carapace length (c) and width (d). Scale bar equals 2cm.



S10. Comparison of the plastron size recognized in different ontogenetic stages (adult, subadult and juvenile) of *Pleurosternon bullockii* (Paracryptodira, Pleurosternidae) from the Tithonian (Upper Jurassic) and Berriasian (Lower Cretaceous) of the United Kingdom. (a), Reconstruction of ventral view of the juvenile plastron based on NHMUK 48262, NHMUK 48343 and NHMUK 48347. (b), Reconstruction of ventral view of the subadult plastron based on NHMUK OR 28433. (c), Reconstruction of ventral view of the adult plastron based on NHM UK R 3413. (d)-(e), Histogram of the plastron length (d) and width (e). Scale bar equals 2cm.

