

BODY SURFACE AREA OF JUVENILE HARBOUR PORPOISE, *Phocoena phocoena*.

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Information on the body surface area in dolphins are rare in literature (SLIJPER, 1958; KERMAK, 1948; PARRY, 1949; RIDGWAY, 1972). With the increasing interest in physiology of marine mammals this parameter is of value for e.g. studies on energy metabolism, temperature regulation and water balance.

For the purpose of our investigations on water balance we measured the body surface area in 4 harbour porpoises.

Material and methods

4 harbour porpoises, *Phocoena phocoena*, aged 1/2-1 year, taken from inner Danish waters in 1978-1979, have been measured. They were all in normal state of nutrition judging from the thickness of blubber in the neck region which varied between 2 and 2.5 cm and lack of concavity over the dorsal muscle complex. Sex, weights and lengths are given in table 1.

The dead animal was totally covered with selfadhesive surgical tape (3M type MICROPORE No 1530). Thereafter the wrapping was cut into small pieces which could be flattened without wrinkles and mounted on paper to avoid shrinkage. To obtain defined contours the sites selected for cutting were covered with an extra layer of tape. The small pieces were later cut free and their contours copied on graph paper.

The area of the small pieces were either determined by weight or by means of an optic area-meter (LAMBDA model L 1 - 3000). The reproducibility of the instrument was measured to be 2 %.

The greatest inaccuracy was introduced with the very method. Several areas of the porpoises surface are virtual three-dimensional and need strictly to be cut into so small pieces that their number and size cannot be handled. Tentatively, the surface area of a 1.5 litre bottle has been determined 5 times with the mentioned technique with an accuracy of ± 2.5 %.

Inhomogeneities in the weight of the graph paper introduced an inaccuracy of ± 2.5 %.

I will suggest that this method can be used with an accuracy of about ± 5 %.

Results

Results of the measurements are listed in table 1. In two animals both methods have been applied and the weighing method seems to give values that are slightly greater than the optic method. The values are all covered by the ± 5 % accuracy.

The mean area of tailfluke, dorsal fin, and pectorals amounts to 9.2 %, 2.6 % and 5.4 % of total area respectively.

Table 1. Body surface area in 4 juvenile Harbour Porpoises, *Ph. phocoena*.

Animal no.	Sex	Body length cm	Body weight kg	Area m ² , optic method	Area m ² , weighing method	Tailfluke area %	Dorsal fin area %	Pectorals area %
062	♀	117	27.1	0.7382	—	8.5	2.3	5.1
063	♀	108	23.3	0.6081	0.6254	7.9	2.8	5.8
064	♂	113	18.5	0.5930	—	9.7	3.2	5.7
067	♂	115	27.7	0.6795	0.7017	6.7	2.3	5.1

Table 2. Body surface of Delphinids, data from literature.

Species	Body length cm	Body weight kg	Surface area m ²	Reference
Dolphin <i>Tursiops truncatus</i>	183	—	1.3935	KERMACK, 1948
<i>Lagenorhynchus obliquidens</i>	—	100*	1.85*	RIDGWAY, 1972
<i>Phocoenoides dalli</i>	—	100*	1.70*	RIDGWAY, 1972
<i>Ph. phocoena</i>	155	—	1.50*	RIDGWAY, 1972
<i>Ph. phocoena</i> (♀)	162	59.5	1.1560	PARRY, 1949
<i>Ph. phocoena</i> (♀)	171	75.0	1.1550	SLIJPER, 1958
			1.3500	SLIJPER, 1958

* average for a 100 kg animal.

Discussion

Results from literature are listed in table 2 but since none of the authors have described their methods and their measurements from the harbour porpoises are all from adult animals, comparison is difficult. Our juvenile harbour porpoises have body surfaces which are about 50 % of the adult ones. PARRY (1949) also gives the area of tailfluke, dorsal fin and pectorals as % of total area: 7.1 %, 2.3 % and 4.7 %, respectively. It seems as if the tailfluke grows slower than the other appendices.

In the juveniles the area of dorsal fin, pectorals and tailfluke amounts to about 17 % of the total body surface and with this area they are able to regulate their temperature as it is in these appendices we find the counter current mechanism responsible for thermoregulation (SCHOLANDER and SCHEWILL, 1955).

Summary

A method is described suited to measure the total body surface area in dolphins. The method has been applied on 4 juvenile harbour porpoises, *Ph. phocoena* and percentage areas for tailfluke, dorsal fin and pectorals are given.

References

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