Cranial characters of the bottlenose dolphin (*Tursiops truncatus*) from the Adriatic Sea

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Abstract
The bottlenose dolphin (*Tursiops truncatus*) is a widely spread cetacean species with significant morphological differences between the populations. The Adriatic Sea, a semi closed area in the eastern basin of the Mediterranean Sea, inhabits a bottlenose dolphin population which morphological characters have not been described yet. Out of 87 bottlenose dolphins found dead in the Croatian part of the Adriatic Sea in the period from September 1995 till December 2004, we analyzed 23 dolphins (14 females, 7 males and 2 of unknown sex) that were physically mature based on the criterion of fused epiphyses on all vertebrae. We present their body mass, body length, age and 47 craniometric values and meristics. The main craniometric values and meristics of the bottlenose dolphins form the Adriatic Sea are as follows: condylobasal length: 51.06±1.64 cm, length of rostrum: 29.01±0.89 cm, width of rostrum at base: 13.45±0.49 cm, width of rostrum at midlength: 8.95±0.44 cm, least supraorbital width: 22.94±0.73 cm, greatest width across zygomatic processes of squamosal: 26.43±0.72 cm, greatest parietal width: 20.57±0.80 cm, vertical external height of braincase: 15.00±0.39 cm, greatest width of internal nares: 7.62±0.42 cm, number of teeth-upper left: 20.89±1.88, number of teeth-lower left: 20.11±1.13. The skulls of the Adriatic bottlenose dolphins are longer and wider with a longer and wider rostrum than the skulls of bottlenose dolphins from eastern Florida. Bottlenose dolphins from north-west Africa, North Sea, coastal eastern Pacific, South African and British shores have significantly longer skulls than Adriatic specimens. When compared to Adriatic bottlenose dolphins all above named populations have higher number of teeth in each jaw. Considering condylobasal length and skull width, rostrum length and width Adriatic bottlenose dolphins are the most similar to the specimens from the seas around China, but those animals have up to seven teeth more in each jaw.

Introduction
The bottlenose dolphin (*Tursiops truncatus*) is a widely spread cetacean species with significant morphological differences between the populations. The Adriatic Sea, a semi closed area in the eastern basin of the Mediterranean Sea, inhabits a bottlenose dolphin population which morphological characters have not been described yet. Our regional study on craniometric values and meristics of the Adriatic bottlenose dolphin contributes to its stock identity. We compare our findings to other bottlenose dolphin populations to rise knowledge on geographic variation.

Materials and Methods
Out of 87 bottlenose dolphins found dead in the Croatian part of the Adriatic Sea in the period from September 1995 till December 2004, we analyzed 23 dolphins (14 females, 7 males and 2 of unknown sex) that were physically mature based on the criterion of fused epiphyses on all vertebrae. Body mass and body length were determined during postmortal examinations. Teeth sections for age determination were prepared according to Slooten (1991). The age was determined by counting GLG-s according to Hohn (1989). After preparation the skulls were measured as described in Perrin (1975) (Fig.1). Craniometric values of bottlenose dolphins from different seas (Ross 1977, Walker 1981, Hersh et al. 1990, Tolley et al. 1995, Robineau and Vely 1997, Wang et al. 2000) were compared, using t-test ($p<0.05$, $p<0.01$) with craniometric characters of Adriatic specimens to establish their similarities and differences.

Results
Average age, body mass, body length and craniometric values and meristics of physically mature Adriatic bottlenose dolphins are presented in table 1 and compared to craniometric values and meristics of bottlenose dolphins from different seas (Ross 1977, Walker 1981, Hersh et al. 1990, Tolley et al. 1995, Robineau and Vely 1997, Wang et al. 2000). Significant differences to Adriatic specimens are marked (*).

Discussion
The skulls of the Adriatic bottlenose dolphins are longer and wider with a longer and wider rostrum than the skulls of bottlenose dolphins from eastern Florida. Bottlenose dolphins from north-west Africa, North Sea, coastal eastern Pacific, South African and British shores have significantly longer skulls than Adriatic specimens. When compared to Adriatic bottlenose dolphins all above named populations have higher number of teeth in each jaw. In the Adriatic Sea there is only one morphological type of bottlenose dolphins which is, considering the condylobasal length and skull width, rostrum length and width, most similar to the bottlenose dolphin form the seas around China but those animals have up to seven teeth more in each jaw.

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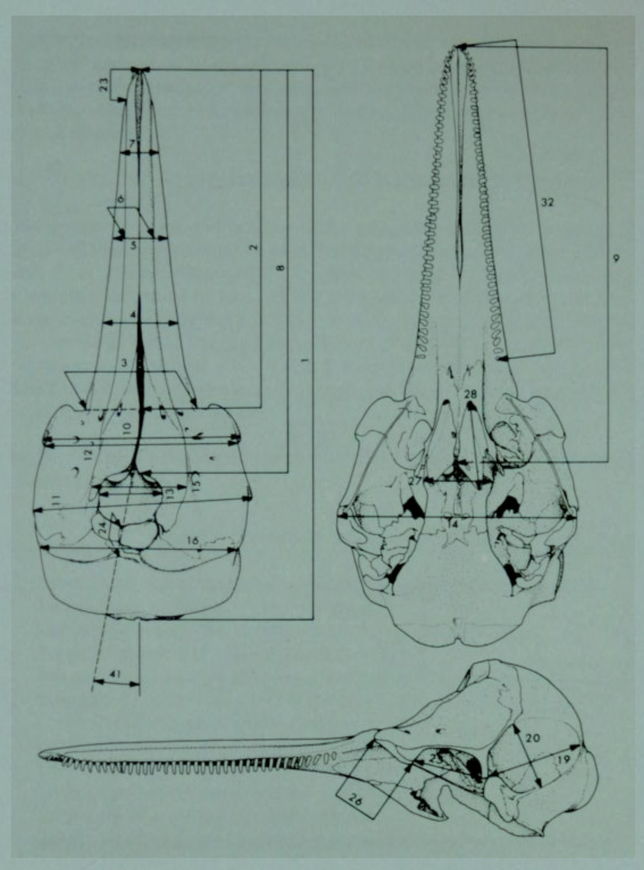
Acknowledgments
This research was funded by the Ministry of Science, Education and Sport of Republic of Croatia (Project No. 0053317) and Gesellschaft zur Rettung der Delphine, Munich, Germany with annual permits of Croatian authorities.

Figure 1. Craniometric characters according to Perrin (1975)



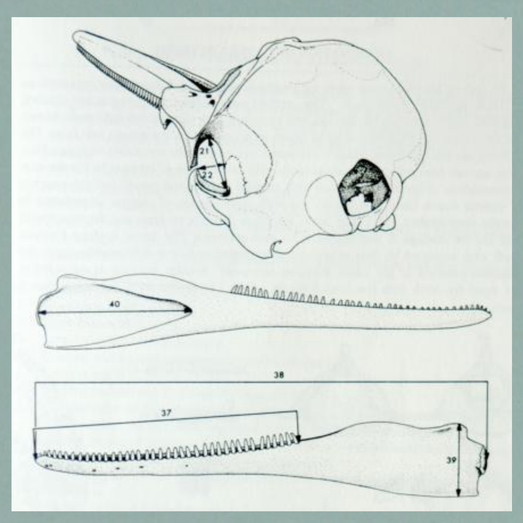


Table1: Descriptive statistics for craniometric measurements and meristics of bottlenose dolphins (Tursiops truncatus) from the Adriatic Sea compared to bottlenose dolphins from other seas. Significant difference (p) is marked * ($p<0.05$) and ** ($p<0.01$).

Measurements (cm) and meristics	Bottlenose dolphins from the Adriatic Sea			Bottlenose dolphins from Chinese waters (WANG et al 2000)	Bottlenose dolphins from north-west Africa (ROBINEAU i VELY 1997.	Bottlenose dolphins from the North Sea (ROBINEAU i VELY 1997)	Offshore bottlenose dolphins from eastern tropic Pacific (WALKER 1981)	Offshore bottlenose dolphins from north temperate Pacific (WALKER 1981)	Coastal bottlenose dolphin from eastern Pacific (WALKER 1981)	Bottlenose dolphins from Indian and Banana River, eastern Florida (HERSH et al. 1990)		Adriatic bottlenose dolphins (% of condylobasal length)	South African bottlenose dolphins (ROSS 1977) (% of condylobasal length; 1 and 30 in cm)	Bottlenose dolphins from British shores (ROSS 1977) (% of condylobasal length; 1, and 30 in cm)
	females	males	total							females	males			
Body mass (kg)	219,00±22,25 N=8 (192,0-261,0)	258,60±54,22 N=5 (205,0-324,0)	234,23±40,87 N=13 (192,0-324,0)											
Body length (cm)	278,31±6,64 N=13 (262,0-288,0)	297,83±13,47 N=6 (277,0-312,0)	284,47±12,91 N=19 (262,0-312,0)											
Age (years)	19,00±5,11 N=14 (7,0-26,0)	16,33±2,94 N=6 (11,0-20,0)	18,20±4,66 N=20 (7,0-26,0)											
Condylobasal length from tip of rostrum to hindmost margin of occipital condyles (1)	50,85±1,26 N=13 (48,8-54,2)	52,13±1,46 N=6 (49,6-53,5)	51,06±1,64 N=20 (47,3-54,2)	50,62±3,33 N=50 (39,4-56,1)	** 56,9±1,7 N=53 (54,0-61,0)	** 55,4±1,0 N=34 (54,0-57,3)	** 47,34 N=20 (44,8-49,2)	50,72 N=12 (47,6-57,0)	* 52,09±1,53 N=28 (49,7-55,6)	** 45,16±2,13 N=33	** 44,71±1,73 N=36		** 54,68±2,79 N=8 (50,4-57,8)	** 54,15±1,94 N=17 (50,0-57,5)
Length of rostrum from tip to line across hindmost limits of antorbital notches (2)	29,01±0,85 N=13 (27,7-31,0)	29,37±0,51 N=6 (28,8-30,0)	29,01±0,89 N=20 (26,9-31,0)	28,38±2,34 N=49 (20,4-32,0)	** 33,2±1,2 N=53 (30,8-36,2)	** 30,8±0,8 N=34 (29,7-32,4)	** 26,27 N=20 (24,8-27,8)	** 27,48 N=12	* 28,31±1,22 N=28 (26,6-30,9)	** 24,75±1,34 N=33	** 24,51±1,16 N=36	56,82±0,75 N=20 (55,78-58,06)	56,75±0,77 N=8 (55,7-58,3)	57,24±1,06 N=17 (55,4-59,0)
Width of rostrum at base (3)	13,52±0,52 N=14 (12,8-14,4)	13,50±0,30 N=6 (13,1-13,8)	13,45±0,49 N=22 (12,5-14,4)	13,45±1,12 N=49	13,7±0,7 N=52	** 16,5±0,6 N=34 (14,0-16,5)	** 11,92 N=20 (11,1-12,8)	** 12,81 N=12 (11,7-14,5)	13,66±0,60 N=28 (12,6-15,1)	** 10,81±0,67 N=33	** 10,70±0,83 N=36	26,39±1,01 N=20 (24,85-28,69)	26,11±0,98 N=8 (24,5-27,3)	** 27,33±1,10 N=17 (25,6-30,3)
Width of rostrum at 60 mm anterior to hindmost limits of antorbital notches (4)	10,17±0,36 N=14 (9,6-10,8)	10,78±0,29 N=6 (10,4-11,2)	10,36±0,46 N=22 (9,6-11,2)				** 9,33 N=20 (8,3-10,1)	(9,4-11,8)	** 10,80±0,59 N=28 (9,7-12,5)	** 8,50±0,51 N=33	** 8,56±0,63 N=35	20,26±0,71 N=20 (19,00-21,66)	20,60±1,44 N=8 (18,3-22,5)	
Width of rostrum at midlength (5)	8,88±0,50 N=13 (8,1-9,6)	9,15±0,25 N=6 (8,9-9,5)	8,96±0,44 N=20 (8,1-9,6)	* 8,40±0,89 N=46			** 7,48 N=20 (6,5-8,2)	** 7,87 N=12 (7,3-8,9)	9,22±0,54 N=28 (8,3-10,3)	** 7,22±0,45 N=31	** 7,31±0,53 N=35	17,54±0,95 N=20 (16,14-18,93)	** 16,14±1,37 N=8 (14,5-18,3)	18,21±1,28 N=16 (16,3-20,5)
Width of premaxillaries at midlength of rostrum (6)	4,75±0,36 N=13 (4,1-5,5)	4,97±0,42 N=6 (4,5-5,4)	4,80±0,39 N=20 (4,1-5,5)				** 4,23 N=20 (3,5-4,9)	** 4,47 N=12 (3,7-4,9)	** 5,14±0,41 N=28 (4,2-5,8)	** 3,76±0,27 N=33	** 3,83±0,36 N=36	9,39±0,71 N=20 (8,40-10,85)	8,91±0,83 N=8 (7,5-9,9)	** 10,08±0,77 N=17 (8,5-11,3)
Width of rostrum at 3/4 length. measured from posterior end (7)	7,10±0,61 N=13 (6,2-8,0)	7,27±0,27 N=6 (6,8-7,5)	7,13±0,53 N=20 (6,2-8,0)	** 6,43±0,78 N=47			** 5,48 N=20 (4,8-6,1)	** 5,63 N=12 (5,0-6,3)	7,28±0,48 N=26 (6,4-8,0)			13,95±0,86 N=20 (12,35-15,35)	** 12,23±1,42 N=8 (10,8-14,7)	
Distance from tip of rostrum to external nares (8)	33,99±1,22 N=13 (31,9-36,5)	34,40±1,20 N=6 (33,1-36,3)	34,00±1,29 N=20 (31,6-36,5)	33,52±2,67 N=49			** 30,82 N=20 (28,5-32,5)	** 32,77 N=12 (30,1-37,6)	33,99±1,37 N=27 (32,3-37,3)	** 29,82±1,57 N=33	** 29,53±1,33 N=36	66,58±1,38 N=20 (63,55-68,51)	66,90±0,55 N=8 (65,9-67,5)	66,25±1,50 N=16 (62,5-68,0)
Distance from tip of rostrum to internal nares (9)	34,57±1,22 N=12 (33,2-38,0)	35,08±1,07 N=6 (33,6-36,5)	34,67±1,17 N=19 (33,2-38,0)				** 31,86 N=18 (28,9-35,4)	** 33,23 N=11 (30,2-38,3)	** 33,53 N=23 (31,8-36,1)	** 29,70±1,62 N=32	** 29,24±1,40 N=36	67,89±1,28 N=19 (66,09-70,82)	68,03±1,21 N=7 (66,0-69,7)	67,72±1,14 N=16 (65,9-69,7)
Greatest preorbital width (10)	22,71±0,62 N=14 (21,6-24,1)	23,38±0,86 N=6 (22,7-25,0)	22,90±0,74 N=22 (21,6-25,0)	23,18±1,86 N=49			** 21,27 N=20 (19,5-23,0)	23,02 N=12 (21,6-27,2)	** 23,64±1,01 N=28 (22,0-26,2)	** 19,69±1,10 N=33	** 19,68±1,19 N=36	44,84±1,26 N=20 (42,62-46,73)	* 46,30±1,63 N=8 (43,2-48,4)	
Greatest postorbital width (11)	25,48±0,63 N=13 (24,8-27,3)	26,37±0,57 N=6 (25,8-27,4)	25,73±0,74 N=21 (24,7-27,4)	25,46±1,95 N=50			** 23,75 N=20 (21,4-25,7)	25,54 N=11 (24,0-29,2)	** 26,62±1,20 N=28 (24,5-29,4)	** 22,85±1,39 N=33	** 22,86±1,45 N=36	50,40±1,02 N=19 (48,53-52,22)	50,68±1,97 N=8 (47,7-53,0)	
Least supraorbital width (12)	22,81±0,65 N=14 (21,7-24,5)	23,33±0,76 N=6 (22,5-24,7)	22,94±0,73 N=22 (21,7-24,7)	22,45±1,81 N=50						** 19,56±1,10 N=33	** 19,48±1,36 N=36	44,92±1,10 N=20 (42,62-46,72)	46,10±1,45 N=5	** 47,69±2,10 N=16 (43,0-51,7)
Greatest width of external nares (13)	5,69±0,26 N=14 (5,3-6,2)	5,83±0,18 N=6 (5,6-6,1)	5,74±0,23 N=22 (5,3-6,2)	5,77±0,38 N=50			** 5,43 N=20 (4,8-7,6)	5,68 N=12 (5,1-6,6)	** 6,36±0,55 N=28 (5,8-8,8)	** 5,49±0,33 N=33	** 5,41±0,22 N=35	11,22±0,49 N=20 (10,37-12,32)	11,60±0,41 N=5 (10,9-11,9)	
Greatest width across zygomatic processes of squamosal (14)	26,21±0,49 N=12 (25,5-27,0)	27,12±0,60 N=6 (26,5-28,2)	26,43±0,72 N=20 (25,0-28,2)	25,73±2,05 N=50			** 23,82 N=20 (21,6-25,6)	** 25,68 N=12 (24,0-30,4)	27,03±1,25 N=28 (24,8-29,5)	** 22,83±1,39 N=33	** 22,83±1,44 N=36	51,74±1,18 N=18 (49,63-53,43)	51,60±2,19 N=8 (48,6-55,1)	** 54,20±2,73 N=16 (48,3-58,4)
Greatest width of premaxillaries (15)	9,46±0,42 N=14 (8,9-10,2)	9,68±0,64 N=6 (8,6-10,3)	9,50±0,47 N=22 (8,6-10,3)	9,35±0,69 N=50			** 8,41 N=19 (7,5-9,1)	9,41 N=12 (8,6-10,7)	** 9,95±0,33 N=28 (9,2-10,8)	** 8,62±0,42 N=33	** 8,60±0,39 N=35	18,66±0,84 N=20 (17,28-19,81)	18,59±0,90 N=8 (17,2-19,6)	** 19,72±0,75 N=17 (18,4-20,8)
Greatest parietal width within postemporal fossae (16)	20,45±0,87 N=13 (19,3-21,7)	20,75±0,80 N=6 (19,8-21,7)	20,57±0,80 N=21 (19,3-21,7)		** 19,0±0,8 N=52	** 22,0±0,8 N=34	** 18,15 N=20 (17,1-19,8)	** 18,29 N=12 (16,8-19,4)	** 19,02±0,64 N=28 (19,2-21,2)	** 17,77±0,59 N=33	** 18,05±0,58 N=35	40,40±1,87 N=19 (37,01-44,06)	** 35,00±1,59 N=8 (33,1-37,7)	
Vertical external height of braincase (17)	14,96±0,44 N=14 (14,2-15,8)	15,15±0,24 N=6 (14,9-15,5)	15,00±0,39 N=22 (14,2-15,8)				** 13,92 N=18 (12,9-15,1)	** 15,62 N=11 (13,2-17,2)	** 16,32±0,68 N=27 (15,0-18,0)			29,44±1,06 N=20 (27,57-31,71)	** 31,11±0,85 N=8 (30,2-32,5)	
Internal length of braincase (18)	15,50±0,56 N=14 (14,7-16,5)	16,23±0,72 N=6 (15,1-17,1)	15,65±0,69 N=22 (14,7-17,1)				** 7,95 N=17 (5,0-9,6)	** 8,27 N=11 (5,8-9,8)	** 7,62±1,31 N=25 (5,5-9,9)			30,70±1,07 N=20 (29,11-32,95)	31,15±0,44 N=4 (30,8-31,7)	
Greatest length of left posttemporal fossa (19)	11,46±0,44 N=14 (10,5-12,0)	11,73±0,93 N=6 (10,5-13,2)	11,51±0,60 N=22 (10,5-13,2)				** 10,38 N=20 (9,6-11,8)	11,77 N=12 (10,7-13,0)	** 12,34±0,91 N=28 (10,7-14,2)	** 10,14±0,75 N=33	** 10,10±0,64 N=36	22,55±1,25 N=20 (20,23-25,53)	** 21,19±0,91 N=8 (19,9-22,8)	22,84±1,98 N=17 (19,7-26,3)
Greatest width of left posttemporal fossa (20)	8,64±0,64 N=14 (7,4-9,4)	8,97±0,41 N=6 (8,4-9,4)	8,66±0,61 N=22 (7,4-9,4)				** 7,56 N=20 (6,5-8,2)	** 8,15 N=12 (7,3-9,1)	8,87±0,72 N=28 (6,9-9,6)	** 7,89±0,60 N=33	** 7,89±0,60 N=36	16,98±1,10 N=20 (14,65-18,45)	** 15,40±0,90 N=8 (14,4-16,6)	16,64±1,54 N=17 (13,7-19,3)
Major diameter of left temporal fossa proper (21)	7,12±0,36 N=14 (6,5-7,7)	7,15±0,36 N=6 (6,7-7,8)	7,10±0,34 N=22 (6,5-7,7)									13,92±0,68 N=20 (12,90-15,19)		
Minor diameter of left temporal fossa proper (22)	5,36±0,41 N=14 (5,0-6,1)	5,92±0,37 N=6 (5,5-6,5)	5,53±0,49 N=22 (5,0-6,5)									10,73±0,83 N=20 (9,77-12,57)		
Projection of premaxillaries beyond maxillaries (23)	1,32±0,52 N=13 (0,2-2,3)	1,83±0,64 N=6 (0,9-2,8)	1,49±0,58 N=20 (0,2-2,8)									2,91±1,11 N=20 (0,40-5,23)		
Distance from foremost end of junction between nasals to hindmost point of supraoccipital crest (24)	5,04±0,94 N=14 (4,2-7,9)	5,80±0,99 N=6 (4,6-7,4)	5,27±0,95 N=22 (4,2-7,9)									10,29±1,92 N=20 (8,22-15,58)		
Length of left orbit (25)	6,49±0,32 N=13 (6,0-7,0)	6,63±0,24 N=6 (6,2-6,9)	6,54±0,30 N=21 (6,0-7,0)				** 6,26 N=20 (6,0-6,7)	6,53 N=12 (6,0-7,3)	** 6,84±0,33 N=28 (6,0-7,3)	** 6,16±0,27 N=33	** 6,24±0,20 N=35	12,76±0,43 N=19 (12,08-13,40)		
Length of antorbital process of left lacrimal (26)	5,20±0,72 N=13 (3,7-6,2)	5,58±0,19 N=6 (5,4-5,9)	5,34±0,60 N=21 (3,7-6,2)	** 6,00±0,64 N=49			5,48 N=20 (4,2-6,4)	5,50 N=12 (5,0-7,1)	5,56±0,43 N=28 (4,7-6,4)	** 4,67±0,42 N=32	** 4,73±0,46 N=35	10,40±1,17 N=19 (7,47-12,47)		
Greatest width of internal nares (27)	7,57±0,48 N=14 (6,7-8,5)	7,82±0,13 N=6 (7,7-8,0)	7,62±0,42 N=22 (6,7-8,5)				7,66 N=20 (6,4-8,4)	** 8,46 N=12 (7,7-9,5)	* 8,03±0,70 N=28 (6,2-9,5)	** 6,42±0,62 N=33	** 6,38±0,38 N=36	14,95±0,84 N=20 (13,27-16,77)		
Greatest length of left pterygoid (28)	7,70±0,47 N=12 (7,1-8,4)	7,75±0,62 N=6 (7,1-8,9)	7,71±0,48 N=20 (7,1-8,9)				** 6,54 N=18 (5,9-7,4)	7,67 N=12 (6,3-8,6)	** 6,97 N=24 (6,2-8,1)	** 6,63±0,54 N=28	** 6,46±0,44 N=33	15,03±0,89 N=18 (13,68-16,92)		
Greatest width of the supraoccipital crest (29)	1,81±0,93 N=14 (0,9-4,7)	2,27±0,55 N=6 (1,6-2,9)	1,96±0,82 N=22 (0,9-4,7)									3,80±1,66 N=20 (1,78-9,27)		
Greatest length of bulla of left tympanoperiotic (30)	3,83±0,14 N=12 (3,6-4,1)	3,88±0,12 N=6 (3,7-4,0)	3,85±0,12 N=20 (3,6-4,1)							* 3,73±0,10 N=30	** 3,74±0,11 N=30		3,83±0,06 N=3 (3,8-3,9)	
Greatest length of periotic of left tympanoperiotic (31)	3,42±0,12 N=12 (3,2-3,6)	3,45±0,14 N=6 (3,2-3,6)	3,41±0,13 N=20 (3,2-3,6)							** 3,22±0,16 N=31	** 3,15±0,10 N=28			
Length of upper left tooth row (32)	24,01±0,88 N=13 (22,7-26,0)	24,68±0,41 N=6 (24,2-25,4)	24,11±0,94 N=20 (22,0-26,0)	24,36±2,05 N=49			** 22,62 N=20 (21,0-24,3)	24,05 N=11 (21,8-27,3)	** 24,95±1,11 N=28 (23,0-27,5)	** 21,54±1,21 N=33	** 21,33±1,05 N=36	47,22±1,03 N=20 (45,22-49,40)		
Number of teeth-upper left (33)	20,42±1,62 N=12 (17,0-23,0)	21,83±2,14 N=6 (19,0-24,0)	20,89±1,88 N=18 (17,0-24,0)	** 23,9±1,4 N=54	** 23,0±1,2 N=52	** 24,0±1,6 N=50	** 22,7±1,2 N=28 (20-25)	** 23,6 N=12 (22-25)	* 22,0±1,4 N=32 (19-25)	** 23,8±1,0 N=33	** 24,7±1,1 N=32		** 24,25±0,71 N=8 (23-25)	
Number of teeth-upper right (34)	19,75±1,82 N=12 (16,0-23,0)	20,83±2,86 N=6 (17,0-24,0)	20,11±2,19 N=18 (16,0-24,0)	** 23,8±1,4 N=54	** 22,9±1,3 N=53	** 24,0±1,3 N=52	** 22,6±1,76 N=29 (21-25)	** 23,6 N=12 (22-25)	** 21,8±1,3 N=34 (20-24)	** 23,7±1,1 N=30	** 24,6±1,0 N=33		** 23,75±0,89 N=8 (22-25)	
Number of teeth-lower left (35)	19,83±0,94 N=12 (19,0-22,0)	20,67±1,37 N=6 (19,0-23,0)	20,11±1,13 N=18 (19,0-23,0)	** 23,1±1,5 N=54	** 22,3±1,5 N=26	** 23,6±1,3 N=52	** 21,4±1,4 N=26 (18-24)	** 22,4 N=12 (21-24)	** 21,8 N=22 (19-24)	** 23,3±1,5 N=33	** 24,1±1,0 N=34		** 22,50±0,76 N=8 (22-24)	** 22,30±2,06 N=10 (18-25)
Number of teeth-lower right (36)	19,58±1,56 N=12 (17,0-22,0)	20,00±1,79 N=6 (17,0-22,0)	19,72±1,60 N=18 (17,0-22,0)	** 23,0±1,5 N=54	** 22,4±1,5 N=25	** 23,6±1,3 N=50	** 21,4±1,4 N=26 (18-24)	** 22,4 N=12 (21-24)	** 21,6 N=22 (19-23)	** 23,4±1,3 N=33	** 24,3±1,1 N=35		** 22,38±0,92 N=8 (21-23)	** 22,10±2,08 N=10 (17-24)
Length of lower left tooth row (37)	23,93±0,76 N=13 (22,9-25,9)	24,50±0,51 N=6 (23,8-25,0)	24,06±0,74 N=20 (22,9-25,9)	24,34±1,81 N=51 (18,8-27,9)			** 22,42 N=20 (20,5-23,7)	** 23,15 N=12 (21,5-26,4)	* 24,95 N=22 (22,9-27,2)	** 21,78±1,15 N=32	** 21,75±1,04 N=33	47,14±1,32 N=20 (44,90-48,99)	47,05±0,30 N=4 (46,8-47,4)	47,79±1,44 N=16 (46,0-50,4)
Greatest length of left ramus (38)	43,94±1,05 N=13 (42,2-46,9)	44,38±0,97 N=6 (43,2-45,4)	44,00±1,06 N=20 (42,2-46,9)	43,43±2,96 N=51 (34,1-48,1)			** 40,31 N=20 (38,7-42,0)	** 46,73 N=12 (40,1-49,4)	44,01 N=22 (42,2-46,9)	** 38,02±2,00 N=32	** 37,75±1,75 N=33	86,19±1,41 N=20 (83,62-89,64)	85,25±1,07 N=8 (83,8-87,1)	87,05±1,39 N=15 (84,6-90,5)
Greatest height of left ramus (39)	9,79±0,33 N=13 (9,2-10,2)	9,87±0,22 N=6 (9,6-10,2)	9,80±0,30 N=21 (9,2-10,2)	** 9,14±0,78 N=51 (6,1-10,4)			** 8,39 N=20 (8,0-9,1)	** 9,46 N=12 (8,5-11,0)	** 10,05 N=22 (9,2-10,7)	** 8,30±0,42 N=26	** 8,45±0,43 N=29	19,18±0,65 N=20 (18,08-20,00)	* 18,40±0,76 N=8 (17,0-19,3)	
Length of left mandibular fossa (40)	14,57±0,86 N=13 (13,7-16,7)	14,48±0,37 N=6 (14,1-15,1)	14,48±0,77 N=20 (13,2-16,7)							** 12,38±0,77 N=33	** 12,20±0,64 N=34	28,37±1,62 N=20 (26,38-32,75)		
Deviation of skull from symmetry in dorsal view, in degrees (41)	4,15±1,28 N=13 (3,0-6,0)	3,33±1,21 N=6 (2,0-5,0)	3,81±1,25 N=21 (2,0-6,0)											
Length of basihyal along midline (42)	5,61±0,71 N=13 (4,1-6,9)	6,07±0,62 N=7 (5,3-6,9)	5,71±0,71 N=22 (4,1-6,9)									11,15±1,33 N=19 (8,28-13,75)		
Greatest width of basihyal (43)	6,67±0,67 N=13 (4,7-7,3)	7,33±0,63 N=7 (6,7-8,5)	6,89±0,69 N=22 (4,7-8,5)									13,46±1,36 N=19 (9,13-15,89)		
Greatest width of left thyrohyal proximally (44)	2,85±0,23 N=13 (2,3-3,2)	3,01±0,16 N=7 (2,8-3,2)	2,96±0,24 N=22 (2,3-3,4)									5,72±0,45 N=19 (4,65-6,77)		
Greatest length of left thyrohyal (45)	8,95±0,81 N=13 (7,7-10,3)	9,63±0,59 N=7 (8,7-10,3)	9,14±0,77 N=22 (7,7-10,3)									18,01±1,40 N=19 (15,66-20,52)		
Greatest width of left stylohyal (46)	2,08±0,12 N=13 (1,9-2,3)	2,14±0,11 N=7 (1,9-2,2)	2,10±0,12 N=21 (1,9-2,3)									4,08±0,24 N=18 (3,55-4,47)		
Greatest length of left stylohyal (47)	10,90±0,68 N=13 (9,8-12,3)	12,11±0,55 N=7 (11,5-13,0)	11,32±0,84 N=21 (9,8-13,0)									22,00±1,43 N=18 (19,33-24,71)		