

Pre-Lessepsian isotopic niche spaces: using paleoecological proxies to assess the impact of ongoing bioinvasions on fishes in the eastern Mediterranean Sea

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Mediterranean Marine Science, 26 (3) 2025

Table S1. Overview of the archaeological fish bones sampled in this study, (Fuller *et al.*, 2020), and (Schutkowski & Ogden, 2011) as well as the trophic groups assigned to each taxa.

Taxa	This Study (all sites)		Fuller <i>et al.</i> , 2020		Schutkowski & Ogden (2012)		Trophic Group	$\delta^{13}\text{C}$		$\delta^{15}\text{N}$	
	Sam-pled	Suc-cessful	Sam-pled	Suc-cessful	Sam-pled	Suc-cessful		Average	S.D.	Average	S.D.
<i>Balistes capriscus</i>	12	9	3	2	-	-	BC	-8.88	1.72	7.62	1.21
Belonidae	-	-	1	1	-	-	PI	-	-	-	-
Carangidae	6	2	7	2	-	-	PI	-10.56	2.66	9.32	2.26
<i>Seriola dumerili</i>	-	-	7	0	3	3	PI	-10.23	0.67	8.8	0.87
<i>Dicentrarchus</i> sp.	4	1	7	2	-	-	GC	-9.17	1.07	7.46	0.95
<i>Dentex</i> sp.	1	0	1	0	-	-	GC	-	-	-	-
<i>Pagrus</i> sp.	11	8	9	2	1	1	GC	-9.3	1.15	7.35	1.01
<i>Sparus auratus</i>	6	3	20	5	2	2	O	-8.8	1.39	6.39	1.56
Sparidae (indet.)	27	20	9	3	-	-	GC	-8.77	1.31	7.31	1.18
Epinephelidae and Serranidae	150	84	52	5	3	3	GC/PI†	-8.61	1.16	8.82	0.82
Rajiformes	4	3	3	2	-	-	GC/PI§	-9.73	1.55	8.08	2.38
Carcharinidae	5	3	3	2	-	-	PI	-11.11	1.26	10.03	1.78
Sphyrinidae	-	-	17	2	3	2	PI	-11.58	1.72	9.83	1.09
Scombridae	2	2	3	0	3	0	GC	-11.71	1.21	7.22	0.73
Mugilidae	2	2	14	4†	3	2*	O	-11.08	2.38	7.06	3.25
<i>Argyrosomus regius</i>	-	-	10	3	3	1	PI	-9.48	0.95	10.18	0.95
Sciaenidae	-	-	1	1	-	-	BC	-	-	-	-
Totals	230	137	167	32	21	12					

†Not all fishes from (Fuller *et al.*, 2020) and (Schutkowski & Ogden, 2011) were included in this analysis, fishes which had $\delta^{13}\text{C}$ values consistent with a freshwater signal were excluded to avoid skewing the data and due to the focus of our work being on marine environments.

*Trophic group classification determined by estimated size when possible.

§Trophic group informed by $\delta^{15}\text{N}$ values.

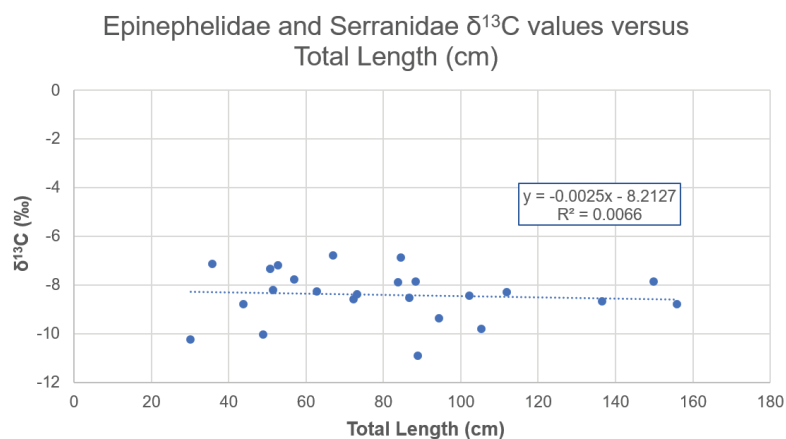


Fig. S1: Comparison of Total Length (cm) and $\delta^{13}\text{C}$ values of Epinephelidae and Serranidae from Kinet Höyük, Tell Fadous, and Tell el-Burak.

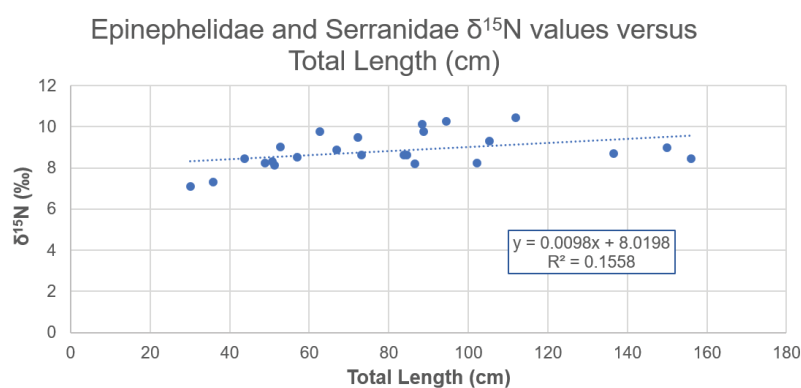


Fig. S2: Comparison of Total Length (cm) and $\delta^{15}\text{N}$ values of Epinephelidae and Serranidae from Kinet Höyük, Tell Fadous, and Tell el-Burak.

Table S2. INS at various contour levels, IPI, and sample size of trophic groups of marine fishes from eastern Mediterranean archaeological sites calculated using the KUD model in rKIN.

Taxa	Contour Level				IPI	Sample Size
	40%	50%	75%	95%		
Benthic Carnivores (BC)	6.63	9.47	20.3	41.9	6.32	12
Generalise Carnivores (GC)	4.58	6.44	12.89	27.65	6.04	90
Omnivores (O)	10.75	15.33	32.34	62.49	5.81	14
Piscivorous (PI)	4.57	7.49	16.06	37.58	8.22	51

Table S3. Overlap of INS of archaeologically derived trophic groups of marine fishes utilising the KUD model in rKIN.

Contour Level	Benthic Carnivores (BC)					Generalised Carnivores (GC)					Omnivores (O)					Piscivores (PI)				
	40%	50%	75%	95%		40%	50%	75%	95%		40%	50%	75%	95%		40%	50%	75%	95%	
Benthic Carnivores (BC)	-	-	-	-		0.20	0.30	0.39	0.55		0.27	0.60	0.57	0.86		0.12	0.19	0.40	0.55	
Generalised Carnivores (GC)	0.29	0.44	0.61	0.83		-	-	-	-		0.09	0.66	0.55	0.85		0.71	0.66	0.66	0.67	
Omnivores (O)	0.17	0.22	0.36	0.57		0.04	0.14	0.22	0.38		-	-	-	-		0.02	0.07	0.16	0.39	
Piscivores (PI)	0.15	0.23	0.50	0.61		0.61	0.57	0.53	0.49		0.04	0.12	0.33	0.65		-	-	-	-	
Averages of all trophic groups	0.20	0.30	0.49	0.67		0.28	0.34	0.38	0.47		0.13	0.46	0.48	0.79		0.28	0.31	0.41	0.54	

Table S4. Full quality control data pertaining to fish bones samples and analysed. Highlighted in light grey and *italicised* samples indicate unacceptable C% (minimum 13% by weight), N% (minimum 4.8% by weight), C:N ratio (outside of 2.9-3.6), or too much error between duplicates (indicated with * next to the problematic quality control criteria). Highlighted in grey and bold results indicate collagen yields which were too low or too low of quality for analysis.

****** Due to low collagen yield, this sample could not be run in duplicate however due to meeting quality control criteria, it was included in our analysis.

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}C\%$	$\delta^{15}N\%$
Kinet Höyük	<i>Balistes capriscus</i>			MIA	BioArCh	20166	7905		794.1	20.8	2.62	38.87	14.38	3.15	-6.23	7.93
Kinet Höyük	<i>Balistes capriscus</i>			LIA	BioArCh	20166	8136		474.9	41.4	8.72	40.36	15.1	3.12	-7.59	6.76
Tell Fadous	<i>Balistes capriscus</i>			EBIII	BioArCh	20164	11003.1		627.5	36.5	5.82	36.41	13.35	3.18	-8.93	6.74
Kinet Höyük	<i>Balistes capriscus</i>			MBA	BioArCh	20166	12343.1		452.1	9.2	2.03	41.33	14.97	3.23	-8.24	8.83
Kinet Höyük	<i>Balistes capriscus</i>			LBA	BioArCh	20166	22036.1		662	34.4	5.20	35.08	13.06	3.13	-9.05	6.84
Kinet Höyük	<i>Balistes capriscus</i>			LBA	BioArCh	20166	22886		743.7	51.6	6.94	39.45	14.66	3.14	-7.92	6.76
Kinet Höyük	<i>Balistes capriscus</i>			LBA	BioArCh	20166	23596		663.2	32.9	4.96	32.98	12.27	3.14	-8.39	8.53
Kinet Höyük	<i>Balistes capriscus</i>			LBII	BioArCh	20166	23780.1		256.8	10.67	4.15	30.56	11.36	3.14	-8.2	6.64
Tell Fadous	<i>Balistes capriscus</i>			EBIII	BioArCh	20164	30128		772.1	9.6	1.24	15.67	5.56	3.29	-9.2	6.04
Kinet Höyük	<i>Balistes capriscus</i>			MIA	CIO	4948	75194	1083.68	-	-	-	0	0	0	0	0
<i>Kinet Höyük</i>	<i>Balistes capriscus</i>			<i>LBA</i>	<i>CIO</i>	<i>23596</i>	<i>75047</i>	<i>1532.89</i>	<i>1.39</i>	<i>0.00</i>	<i>0.00</i>	<i>6.9</i>	<i>-</i>	<i>-</i>	<i>-9.88</i>	<i>-</i>
Tell Fadous	<i>Balistes capriscus</i>			EBIII	BioArCh	20164	30148	1047.5	-	-	-	-	-	-	-	-
Kinet Höyük	Carangidae			LIA	BioArCh	20166	7428		917.6	50.5	5.50	26.26	9.52	3.22	-7.58	8.9
Kinet Höyük	Carangidae			MIA	BioArCh	20166	21658.2		740.8	24.8	3.35	29.78	11.06	3.14	-12.7	11.76
<i>Kinet Höyük</i>	<i>Carangidae</i>			<i>LIA</i>	<i>BioArCh</i>	<i>20166</i>	<i>9652</i>		<i>931.1</i>	<i>27.3</i>	<i>2.93</i>	<i>5.41</i>	<i>1.79</i>	<i>3.53</i>	<i>-8.76</i>	<i>8.88</i>
<i>Tell Fadous</i>	<i>Carangidae</i>			<i>EBIII</i>	<i>BioArCh</i>	<i>20164</i>	<i>30123</i>		<i>1040.1</i>	<i>20.2</i>	<i>1.94</i>	<i>1.35</i>	<i>0.27</i>	<i>5.91</i>	<i>-20.98</i>	<i>-1.67*</i>
Tell Fadous	Carangidae			EBIII	BioArCh	20164	10558		901.5	5.7	0.63	-	-	-	-	-
Kinet Höyük	Carangidae			LIA	BioArCh	20166	15945.1		860.3	14.4	1.67	-	-	-	-	-
Tell Fadous	Carcharinidae			EBIII	BioArCh	20164	10578		591.2	17.7	2.99	35.82	12.47	3.35	-10.11	9.69
Tell Fadous	Carcharinidae			EBIII	BioArCh	20164	11022		654.2	32.7	5.00	29.5	10.47	3.29	-9.7	9.45
<i>Tell Fadous</i>	<i>Carcharinidae</i>			<i>EBII</i>	<i>BioArCh</i>	<i>20164</i>	<i>11633</i>		<i>897.8</i>	<i>31.4</i>	<i>3.50</i>	<i>20.19</i>	<i>6.98</i>	<i>3.38</i>	<i>-11.07*</i>	<i>9.98</i>
Kinet Höyük	Carcharinidae			EBA	BioArCh	20166	23837		519.9	45.5	8.75	38.24	13.61	3.28	-11.43	13.12
<i>Tell Fadous</i>	<i>Carcharinidae</i>			<i>EBIII</i>	<i>BioArCh</i>	<i>20164</i>	<i>10557</i>		<i>574.1</i>	<i>20.9</i>	<i>3.64</i>	<i>22.73</i>	<i>7.84</i>	<i>3.39</i>	<i>-10.4</i>	<i>10.47*</i>

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Tell Fadous	Carcharinidae			EBIII	BioArCh	20164	11744		623.7	8.6	1.38					
Tell el-Burak	Carcharinidae			?	BioArCh	20165	30178		398.1	4.2	1.06					
Kinet Höyük	<i>Dentex</i> sp.			MBA	BioArCh	20166	10634.3		461.1	29	6.29	35.49	13.2	3.14	-8.03	8.51
Kinet Höyük	<i>Dentex</i> sp.			LBII	BioArCh	20166	23354		430.8	22.4	5.20	38.64	13.88	3.27	-9.68	6.8
Kinet Höyük	<i>Dentex</i> sp.				BioArCh	20166	23935		504.6	10.3	2.04	38.19	13.49	3.3	-8.73	6.69
Kinet Höyük	<i>Dentex</i> sp.			LBII	BioArCh	20166	23868		845.5	30.9	3.65	28.92	10.45	3.23	-10.39	7.99
Kinet Höyük	<i>Dentex</i> sp.			EIA	BioArCh	20166	6376.1		497.6	4.3	0.86	15.74	5.15	3.57	-10.22	9.16
Kinet Höyük	<i>Dicentrarchus</i> sp.			HELL	BioArCh	20166	9722		568	36.5	6.43	34.41	12.44	3.23	-6.71	6.02
Tell Fadous	<i>Dicentrarchus</i> sp.			EBIII	BioArCh	20164	11614		1140.8	22.6	1.98	6.28	1.87	3.91	-11.07	8.04
Kinet Höyük	<i>Dicentrarchus</i> sp.			LJA	BioArCh	20166	7408		314	0.65	0.21					
Kinet Höyük	<i>Dicentrarchus</i> sp.			LJA	BioArCh	20166	15945.2		329	-	-					
Kinet Höyük	Epinephelidae	59.08		LBA	CIO		8989	75295	953.4	0.87	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	>44.6		LBII	CIO		8994	75290	766.8	3.4	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	~44.6 SL		MIA	CIO		9331	75192	821.58	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	>44.6		LJA	CIO		14531	75050	1124.85	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	44.98		MIA	CIO		17025	75034	518.95	0.43	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	>44.6		EBIII	CIO		20771	75198	853.95	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	44.69		EBIII	CIO		20771	75199	311.86	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	53.07		EBIII	CIO		20771	75200	656.65	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae		94.65		BioArCh	20166	6369		777.8	49.8	6.40	30.11	11.22	3.13	-8.72	9.11
Kinet Höyük	Epinephelidae	>44.6		EBA	CIO		22369	75033	880.58	3.54	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	>44.6		EHELL	CIO		23029	75296	1327.55	3.56	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	90.31	105.36	LJA	BioArCh	20166	7181		626.4	12.6	2.01	40.81	14.98	3.18	-9.8	9.29
Kinet Höyük	Epinephelidae	>44.6		LBII	CIO		23359	75291	691.08	3.91	0.01	0	0	0	0	0
Kinet Höyük	Epinephelidae	75.61	88.39	MIA	BioArCh	20166	7641		963.4	15.2	1.58	36.57	13.56	3.15	-7.86	10.12
Kinet Höyük	Epinephelidae	72.3	84.58	MIA	BioArCh	20166	7641.2		603.6	2.5	0.41	39.27	14.12	3.25	-6.87	8.62

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\%$	$\delta^{15}\text{N}\%$
Kinet Höyük	Epinephelidae	74.06		LBII	CIO		23455	75293	688.61	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	61.61	72.24	LIA	BioArCh	20166	8482		748.1	24.6	3.29	38.38	14.03	3.19	-8.58	9.47
Kinet Höyük	Epinephelidae	53.37	62.73	LIA	BioArCh	20166	8487		524.6	30	5.72	38.11	13.92	3.18	-8.27	9.76
Kinet Höyük	Epinephelidae	57.02	66.95	LBII	BioArCh	20166	8994		709.7	9.5	1.34	19.73	7.2	3.19	-6.79	8.87
Kinet Höyük	Epinephelidae	44.71	52.74	LBII	BioArCh	20166	9066		705.2	6.1	0.87	36.47	12.73	3.34	-7.18	9.02
Kinet Höyük	Epinephelidae	>44.6 SL		LBA	CIO		24901	75191	1419.51	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae	>44.6 SL		LBA	CIO		24977	75049	1542.94	8.55	0.01	0	0	0	0	0
Kinet Höyük	Epinephelidae	71.67	83.85	LBII	BioArCh	20166	23222		523.5	5.7	1.09	24.83	8.71	3.32	-7.9	8.61
Kinet Höyük	Epinephelidae	74.06	86.61	LBII	BioArCh	20166	23455		506.7	6.5	1.28	33.05	11.43	3.37	-8.54	8.19
Kinet Höyük	Epinephelidae	117.3	136.5	LBA	BioArCh	20166	23578.1		537.3	4.8	0.89	24.53	8.69	3.29	-8.66	8.71
Kinet Höyük	Epinephelidae	128.94	149.93	LBA	BioArCh	20166	23578.2		1129.5	5.7	0.50	33.2	12.37	3.13	-7.87	8.97
Kinet Höyük	Epinephelidae	43.03	50.8	LBII	BioArCh	20166	23780.2		256.8	10.67	4.15	38	13.67	3.24	-7.33	8.29
Kinet Höyük	Epinephelidae	>44.6 SL		EIA	CIO		20722	75046	1413.74	12.38	0.01	5.8	2.4	2.79	-8.01	7.63
Kinet Höyük	Epinephelidae	65-70		HELL	BioArCh	20166	7344		1454.9	30.7	2.11	22.46	8.24	3.18	-10.91	9.77
Tell Fadous	Epinephelidae	62.3	73.18	EBA III	BioArCh	20164	30001		693.1	14.3	2.06	29.98	11.01	3.18	-8.38	8.63
Kinet Höyük	Epinephelidae	>44.6		LIA	CIO		9106	75297	1937.84	47.97	0.02	7.8	3.2	2.87	-7.58	9.14
Tell Fadous	Epinephelidae	41.35	48.89	EBA III	BioArCh	20164	30021		642.8	4.4	0.68	33.04	11.64	3.31	-10.03	8.25
Tell Fadous	Epinephelidae	48.35	57.01	EBA III	BioArCh	20164	30029		731.9	21.3	2.91	36.15	13.08	3.22	-7.78	8.53
Tell Fadous	Epinephelidae	87.3	102.17	EBA III	BioArCh	20164	30037		622.2	17.7	2.84	34.58	12.22	3.3	-8.45	8.22
Tell Fadous	Epinephelidae	133.68	155.95	EBA III	BioArCh	20164	30053		1119.5	11	0.98	14.5	5.08	3.33	-8.78	8.46
Tell Fadous	Epinephelidae		49.72	EBIII	BioArCh	20164	30005		332	2.8	0.84	26.19	8.71	3.51	-10.54	8.58
Kinet Höyük	Epinephelidae	80.85		LIA	CIO		7841	75301	1056.44	15.88	0.02	27.1	14.5	4.34	-8.39	9.43
Tell Fadous	Epinephelidae		83.16	EBIII	BioArCh	20164	30011		733.8	7.2	0.98	2.62	0.6	5.08	-15.09*	6.84
Kinet Höyük	Epinephelidae	>44.6 SL		EIA	CIO		7053	75045	1293.71	8.12	0.01	1	-	-	-9.08	-
Kinet Höyük	Epinephelidae	>44.6		EIA	CIO		8171	75051	1387.62	3.92	0.00	-	-	-	-	-
Kinet Höyük	Epinephelidae	127.38		MIA	CIO		21658	75042	1768.62	12.58	0.01	0.9	0	-	-	-10.26

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Tell Fadous	Epinephelidae		85.74	EBIII	BioArCh	20164	30009		1038	-	-					
Tell Fadous	Epinephelidae		44.12	EBIII?	BioArCh	20164	30010		494.2	6.8	1.38					
Tell Fadous	Epinephelidae		115.71	EBIII	BioArCh	20164	30012		743.8	6.7	0.90					
Tell Fadous	Epinephelidae		61.18	EBIII	BioArCh	20164	30013		701.2	1.3	0.19					
Kinet Höyük	Epinephelidae	~1150 cm SL		LIA	CIO		10236	75298	1185.92	17.62	0.01	40.7	15.4	3.08	-13.35	7.67
Kinet Höyük	Epinephelidae	>44.6		LIA	CIO		12196	75196	1114.26	10.16	0.01	39.7	14.9	3.11	-10.23	8.91
Tell Fadous	Epinephelidae		51.37	EBIII?	BioArCh	20164	30112		688.1	3.7	0.54					
Kinet Höyük	Epinephelidae	>44.6 SL		EIA	CIO		6376	75188	1232.79	-	-					
Kinet Höyük	Epinephelidae / Serranidae	<44.6 SL		LBA	CIO		9313	75032	194.87	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae / Serranidae	<44.6		EMED	CIO		17107	75187	158.63	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae / Serranidae	<44.6		EMED	CIO		17107	75193	377.23	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae / Serranidae	26.95		MBA	CIO		21814	75299	284.32	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae / Serranidae			MBI	CIO		22309	75186	329.62	0	0.00	0	0	0	0	0
Kinet Höyük	Epinephelidae / Serranidae			LBA	BioArCh	20166	3930		634.4	18.6	2.93	27.74	10.13	3.19	-8.13	8.8
Kinet Höyük	Epinephelidae / Serranidae			LBA	BioArCh	20166	4110		385.3	6.5	1.69	31.67	11.38	3.25	-10.07	8.8
Kinet Höyük	Epinephelidae / Serranidae			LBII	BioArCh	20166	4624		691.7	32.2	4.66	19.24	6.92	3.25	-8.05	9.06
Kinet Höyük	Epinephelidae / Serranidae			LIA	BioArCh	20166	5955		433.7	14.3	3.30	38.22	14.01	3.18	-8.62	8.3
Kinet Höyük	Epinephelidae / Serranidae			MED	BioArCh	20166	6239.2		387	18.25	4.72	34.08	12.25	3.25	-8.41	9.65
Kinet Höyük	Epinephelidae / Serranidae			LIA	BioArCh	20166	6964		526.5	36.8	6.99	36.67	13.55	3.16	-7.33	9.5
Kinet Höyük	Epinephelidae / Serranidae			EIA	BioArCh	20166	7113		579.2	15.4	2.66	31.65	11.07	3.34	-9.79	8.76

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Kinet Höyük	Epimphelidae / Serranidae			LIA	BioArCh	20166	7727		528	13.7	2.59	43.39	15.44	3.28	-8.93	8.77
Kinet Höyük	Epimphelidae / Serranidae			LIA	BioArCh	20166	7841.1		522.8	1.4	0.27	21.65	7.48	3.38	-9.36	10.26
Kinet Höyük	Epimphelidae / Serranidae			LIA	BioArCh	20166	8074		537.3	25.9	4.82	40.17	14.43	3.25	-8.58	9.69*
Kinet Höyük	Epimphelidae / Serranidae			LBA	BioArCh	20166	8357		614.3	10.9	1.77	34.99	12.69	3.22	-7.95	8.74
Kinet Höyük	Epimphelidae / Serranidae			LBA	BioArCh	20166	8446		1073.5	64.1	5.97	26.58	9.92	3.13	-7.16	9.63
Kinet Höyük	Epimphelidae / Serranidae			?	BioArCh	20166	8595		653.6	26.5	4.05	33.49	11.81	3.32	-8.29	10.43
Kinet Höyük	Epimphelidae / Serranidae			MBA	BioArCh	20166	8596		614.8	4.5	0.73	40.41	14.22	3.31	-8.69	7.97
Kinet Höyük	Epimphelidae / Serranidae			LBA	BioArCh	20166	8634		692.3	8.4	1.21	39.07	14.07	3.24	-9.69	8.79
Kinet Höyük	Epimphelidae / Serranidae			LIA	BioArCh	20166	9106.1		759.7	27.1	3.57	28.79	10.74	3.13	-7.82	9.68
Kinet Höyük	Epimphelidae / Serranidae			MED	BioArCh	20166	9556**		342.4	24.3	7.10	37.73	13.74	3.2	-8.97	8.74
Kinet Höyük	Epimphelidae / Serranidae			LBA	BioArCh	20166	9747		587.3	1.6	0.27	25.65*	8.85	3.38	-8.03	8.9
Kinet Höyük	Epimphelidae / Serranidae			LBA	BioArCh	20166	9794		503.1	28.7	5.70	43.14	15.91	3.16	-9.83	9.61
Kinet Höyük	Epimphelidae / Serranidae			LBII	BioArCh	20166	9932		1009.1	31.3	3.10	19.89	7.3	3.18	-7.63	10.72
Kinet Höyük	Epimphelidae / Serranidae			MED	BioArCh	20166	10125		718.8	22.6	3.14	34.38	12.67	3.17	-7.13	7.41
Kinet Höyük	Epimphelidae / Serranidae			MIA	BioArCh	20166	10163		661.6	31.7	4.79	37.41	13.62	3.19	-8.01	8.68
Kinet Höyük	Epimphelidae / Serranidae			MIA	BioArCh	20166	10344		1024.7	37.3	3.64	29	10.88	3.11	-6.87	10.44
Kinet Höyük	Epimphelidae / Serranidae	<44.6 SL		LBA	CIO		23564	75044	346.92	0	0.00	0	0	0	0	0
Kinet Höyük	Epimphelidae / Serranidae			LBII	CIO		23570	75191	744.04	0	0.00	0	0	0	0	0

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Tell Fadous	Epinocephelidae / Seriranidae			EBIII	BioArCh	20164	10562		549.3	7.7	1.40	27.58	9.65	3.34	-8.22	8.13
Kinet Höyük	Epinocephelidae / Seriranidae	25.13	30.15	LBII	BioArCh	20166	10858		138.8	6.06	4.37	39.77	14.11	3.27	-10.25	7.09
Kinet Höyük	Epinocephelidae / Seriranidae			LIA	BioArCh	20166	10893		631.1	29	4.60	42.82	15.74	3.17	-6.5	8.93
Kinet Höyük	Epinocephelidae / Serranidae			LBII	CIO		24023	75190	1575.04	4.57	0.00	0	0	0	0	0
Kinet Höyük	Epinocephelidae / Seriranidae			MIA	BioArCh	20166	11134		715.7	22.2	3.10	39.93	14.7	3.17	-8.48	10.88
Kinet Höyük	Epinocephelidae / Seriranidae			MIA	BioArCh	20166	11237		167.8	8.4	5.01	38.82	14.13	3.2	-9.62	7.61
Kinet Höyük	Epinocephelidae / Seriranidae			MBA	BioArCh	20166	11502		627.8	29.4	4.68	43.39	15.75	3.21	-9.15	9.19
Kinet Höyük	Epinocephelidae / Seriranidae			MBA	BioArCh	20166	11564		319.4	13.41	4.20	40.38	14.64	3.21	-8.42	8.32
Kinet Höyük	Epinocephelidae / Seriranidae			MBA	BioArCh	20166	11569		506.6	9.6	1.89	37.64	13.8	3.18	-9.09	9.52
Tell Fadous	Epinocephelidae / Seriranidae			EBII	BioArCh	20164	11646		678.4	13.9	2.05	33.04	11.45	3.37	-9.74	7.57
Tell Fadous	Epinocephelidae / Seriranidae			EBII	BioArCh	20164	11672		773.1	9.1	1.18	33.14	11.26	3.43	-8.87	8.68
Kinet Höyük	Epinocephelidae / Seriranidae			LIA	BioArCh	20166	12196		834.2	28.39	3.40	26.69	10	3.11	-7.93	9.26
Kinet Höyük	Epinocephelidae / Seriranidae			MBA	BioArCh	20166	12343.2		394.7	17.7	4.48	39.63	14.44	3.2	-8.21	8.43
Kinet Höyük	Epinocephelidae / Seriranidae			MED	BioArCh	20166	12847		568.6	53.6	9.43	40.22	14.73	3.18	-10.46	6.85
Kinet Höyük	Epinocephelidae / Seriranidae			LIA	BioArCh	20166	14430		226.1	15.69	6.94	38.65	14.03	3.22	-7.93	8.91
Kinet Höyük	Epinocephelidae / Seriranidae			LIA	BioArCh	20166	14544		901	58.7	6.51	42.09	15.47	3.17	-8.13	9.51
Kinet Höyük	Epinocephelidae / Seriranidae			MBA	BioArCh	20166	16374		728.5	13.3	1.83	40.79	14.55	3.27	-8.57	9.63
Kinet Höyük	Epinocephelidae / Seriranidae			EBIII	BioArCh	20166	19420		262.7	3.6	1.37	40.32	14.22	3.32	-10.44	7.58

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Kinet Höyük	Epimphelidae / Ser-ranidae			EIA	BioArCh	20166	20698		945.1	35.9	3.80	36.9	13.42	3.21	-8.35	8.81
Kinet Höyük	Epimphelidae / Ser-ranidae			EIA	BioArCh	20166	20722		590.5	15.1	2.56	26.9	9.86	3.18	-7.2	8.61
Kinet Höyük	Epimphelidae / Ser-ranidae			EBIII	BioArCh	20166	20771.1		619	8.8	1.42	39.44	14.08	3.27	-8.08	9.86
Kinet Höyük	Epimphelidae / Ser-ranidae			EIA	BioArCh	20166	21330.2		333.2	12.58	3.78	40.82	14.64	3.25	-9.42	8.85
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23362		577.4	28.5	4.94	39.74	14.84	3.12	-6.77	9.25
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23365.2		450.5	33.4	7.41	40.65	15.05	3.15	-8.57	6.53
Kinet Höyük	Epimphelidae / Ser-ranidae			LBA	BioArCh	20166	23368		848.8	13.1	1.54	26.85	10.01	3.13	-8.42	9.37
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23470.1		749.9	27.2	3.63	4.05	1.39	3.42	-10.44	7.7
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23470.2		876	36.8	4.20	20.86	7.57	3.21	-7.68	9.36
Kinet Höyük	Epimphelidae / Ser-ranidae			LBA	BioArCh	20166	23598		663.2	32.9	4.96	36.92	13.86	3.11	-8.7	8.81
Kinet Höyük	Epimphelidae / Ser-ranidae	>44.6 SL		LBA	CIO		24036	75048	1756.57	1.44	0.00	7.1	4.2	1.98	-9.77	7.19
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23648.1		543.7	25.8	4.75	42.25	15.6	3.16	-8.48	9.01
Kinet Höyük	Epimphelidae / Ser-ranidae			LBA	BioArCh	20166	23755		628.7	23.4	3.72	34.73	12.92	3.14	-8.63	8.26
Kinet Höyük	Epimphelidae / Ser-ranidae			LBA	BioArCh	20166	23769		818.1	15.2	1.86	17.75	6.49	3.19	-7.87	9.49
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23795		370.5	17.1	4.62	40.39	15.11	3.12	-8.73	8.39
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	23859		845.5	30.9	3.65	33.21	12.41	3.12	-10.15	6.8
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	24014		518.7	6.5	1.25	23.79	7.96	3.48	-9.04	8.25
Kinet Höyük	Epimphelidae / Ser-ranidae			LBII	BioArCh	20166	24030.1		333.3	15.2	4.56	37.8	14.01	3.15	-8.44	8.04

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Kinet Höyük	Epinephelidae / Serranidae			LBII	BioArCh	20166	24030.2		551.7	14.9	2.70	31.87	11.75	3.17	-7.15	10.05
Kinet Höyük	Epinephelidae / Serranidae			LBA	BioArCh	20166	23642		671	18.7	2.79	34.31	12.7	3.15	-7.47	8.77*
Kinet Höyük	Epinephelidae / Serranidae			LBA	BioArCh	20166	23372		1126.1	14.8	1.31	24.4	8.89	3.2	-7.39	8.91*
Kinet Höyük	Epinephelidae / Serranidae			LIA	BioArCh	20166	7339		527.8	17.2	3.26	38.51*	13.92	3.23	-7.61*	9.24*
Tell el-Burak	Epinephelidae / Serranidae			MBA	BioArCh	20165	30070		590.6	9.8	1.66	36.65	13.09	3.27	-8.1	7.8
Tell el-Burak	Epinephelidae / Serranidae			MBA	BioArCh	20165	30076		491.6	10.1	2.05	38.47	13.58	3.31	-9.29	7.67
Tell el-Burak	Epinephelidae / Serranidae	30.03	35.82	?	BioArCh	20165	30079		603.9	13	2.15	27.78	10.05	3.22	-7.13	7.31
Tell el-Burak	Epinephelidae / Serranidae			MBA	BioArCh	20165	30058		575.8	8.9	1.55	23.08	7.34	3.67	-9.69	10.9
Kinet Höyük	Epinephelidae / Serranidae			MIA	BioArCh	20166	21658.1		557	3.7	0.66	19.98	6.15	3.79	-10.9	9.16
Tell Fadous	Epinephelidae / Serranidae			EBIII	BioArCh	20164	11029		724.7	6.9	0.95	5.96	1.73	4.02	-12.66	6.85
Tell el-Burak	Epinephelidae / Serranidae			IA?	BioArCh	20165	30171		734.6	20.7	2.82	30.79	10.75	3.34	-6.84	9.19
Tell el-Burak	Epinephelidae / Serranidae			IA	BioArCh	20165	30048		662.9	4.7	0.71	15.49	3.96	4.56	-11	11.34
Tell Fadous	Epinephelidae / Serranidae			EBII	BioArCh	20164	30501		988.9	19.3	1.95	27.43	10.03	3.19	-7.75	9.69
Tell Fadous	Epinephelidae / Serranidae			EBIII	BioArCh	20164	10553		712.4	8.7	1.22	9.44	2.29	4.81	-13.52	5.48
Kinet Höyük	Epinephelidae / Serranidae	<44.6		MED	CIO		12127	75038	260.08	0.16	0.00	-	-	-	-	-
Kinet Höyük	Epinephelidae / Serranidae	29.7		HELL	CIO		14896	75036	133.2	0.23	0.00	-	-	-	-	-
Kinet Höyük	Epinephelidae / Serranidae			LBA	BioArCh	20166	23995		644.6	27.3	4.24	7.88	2.63	3.49*	-9.93*	7.98
Kinet Höyük	Epinephelidae / Serranidae			EIA	BioArCh	20166	6376.2		872	2.1	0.24					

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}_{\text{‰}}$	$\delta^{15}\text{N}_{\text{‰}}$
Kinet Höyük	Epinocephelidae / Serranidae			EIA	BioArCh	20166	7053		807.2	18.7	2.32					
Kinet Höyük	Epinocephelidae / Serranidae			EIA	BioArCh	20166	8171		715.8	4.4	0.61					
Tell Fadous	Epinocephelidae / Serranidae			EBIII	BioArCh	20164	10552.2		592	2.1	0.35					
Tell Fadous	Epinocephelidae / Serranidae			EBIII	BioArCh	20164	11003.2		665.2	29.2	4.39					
Tell Fadous	Epinocephelidae / Serranidae			EBIII	BioArCh	20164	11013		250.9	0.2	0.08					
Kinet Höyük	Epinocephelidae / Serranidae			LBA	BioArCh	20166	22036.2		744	16.3	2.19					
Tell Fadous	Epinocephelidae / Serranidae			EBII	BioArCh	20164	30032		571.2	7	1.23					
Kinet Höyük	Epinocephelidae / Serranidae			MED	CIO		6239	75195	878.3	9.51	0.01	39.4	14.7	3.13	-7.77	9.12
Kinet Höyük	Epinocephelidae / Serranidae	37		MED	CIO		14262	75039	771.84	12.29	0.02	30.2	11.3	3.13	-8.79	8.44
Tell el-Burak	Epinocephelidae / Serranidae			MBA	BioArCh	20165	30066		562.3	4.9	0.87					
Tell el-Burak	Epinocephelidae / Serranidae			?	BioArCh	20165	30081		512.9	5.4	1.05					
Tell el-Burak	Epinocephelidae / Serranidae			IA	BioArCh	20165	30112		669.2	4.8	0.72					
Tell Fadous	Epinocephelidae / Serranidae			EBIII	BioArCh	20164	30124		387.1	1.5	0.39					
Tell Fadous	Epinocephelidae / Serranidae			EBIII	BioArCh	20164	30133		639.4	5.6	0.88					
Tell el-Burak	Epinocephelidae / Serranidae			IA?	BioArCh	20165	30154		242.8	1	0.41					
Tell Fadous	Epinocephelidae / Serranidae			EBIII	BioArCh	20164	30155		752.2	4.1	0.55					
Tell el-Burak	Epinocephelidae / Serranidae			IA?	BioArCh	20165	30155		217.5	1.1	0.51					
Tell el-Burak	Epinocephelidae / Serranidae			?	BioArCh	20165	30174		550.1	1.5	0.27					

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Tell Fadous	<i>Hypotremata</i>			EBIII	BioArCh	20164	30173		1389.5	27.9	2.01	20.74	6.85	3.53*	-9.95	7.12
Kinet Höyük	<i>Hypotremata</i>			LIA	BioArCh	20166	6531		305.2	22.6	7.40	42.37	14.54	3.4	-8.09	7.14
Kinet Höyük	<i>Hypotremata</i>			MED	BioArCh	20166	11377		292.9	27.1	9.25	41.73	14.11	3.45	-9.94	8.17
Kinet Höyük	<i>Hypotremata</i>			LBA	BioArCh	20166	12794		320.6	23.3	7.27	37.77	12.95	3.4	-9.52	6.97
Tell el-Burak	<i>Mugilidae</i>			IA	BioArCh	20165	30086		844	29.9	3.54	2.64	0.63	4.91	-21.12*	4.72*
Kinet Höyük	<i>Mugilidae</i>			MIA	BioArCh	20166	10282.2		175.3	6	3.42	40.13	14.29	3.28	-12.43	7.29
Tell Fadous	<i>Mugilidae</i>			EBIII	BioArCh	20164	30313		542.7	9.7	1.79	35.72	12.3	3.39	-10.7	5.46
Kinet Höyük	<i>Pagrus sp.</i>			MED	CIO		11524	75294	2078.85	42.32	0.02	0	0	0	0	0
Kinet Höyük	<i>Pagrus sp.</i>	31.64		LBII	CIO		24023	75305	675.98	0.38	0.00	0	0	0	0	0
Kinet Höyük	<i>Pagrus sp.</i>			MBA	BioArCh	20166	8596.1		709.5	4.2	0.59	2.67	0.56	5.62	-20.27	4.43
Kinet Höyük	<i>Pagrus sp.</i>			MIA	BioArCh	20166	9098		322.2	11.71	3.63	39.52	14.47	3.19	-9.42	7.27
Kinet Höyük	<i>Pagrus sp.</i>			LIA	BioArCh	20166	9106.2		319.5	22.76	7.12	37.9	14.09	3.14	-8.68	6.5
Tell Fadous	<i>Pagrus sp.</i>			EBIV	BioArCh	20164	11792		504.7	8	1.59	34.39	12.07	3.32	-8.56	7.21
Tell Fadous	<i>Pagrus sp.</i>		73.18	EBIII	BioArCh	20164	11832		481.2	14.6	3.03	34.15	12.46	3.2	-10.61	6.54
Tell el-Burak	<i>Pagrus sp.</i>			IA	BioArCh	20165	30108		781.4	10.4	1.33	25.6	9.21	3.24	-9.47	8.54
Tell el-Burak	<i>Pagrus sp.</i>			IA	BioArCh	20165	30109		495.4	7.3	1.47	14.71	5.05	3.4	-8.56	7.23
Tell Fadous	<i>Pagrus sp.</i>			EBIII	BioArCh	20164	30460		822.1	9.5	1.16	31.17	11.27	3.23	-11.33	6.85
Tell Fadous	<i>Pagrus sp.</i>			EBIII	BioArCh	20164	30147		804.1	2.9	0.36					
Kinet Höyük	<i>Pagrus sp.</i>	25.3		LIA	CIO		3897	75304	842.65	41.91	0.05	41.2	15.6	3.09	-9.42	6.87
Kinet Höyük	<i>Scombridae</i>			MBA	BioArCh	20166	11676		416.6	66.9	16.06	43.31	15.79	3.2	-10.85	6.7
Tell el-Burak	<i>Scombridae</i>			IA	BioArCh	20165	30085		560.2	12.8	2.28	18.71	6.5	3.36	-12.56	7.73
Kinet Höyük	<i>Sparidae</i>	15.1		LBA	CIO		22886	75035	168.51	0	0.00	0	0	0	0	0
Kinet Höyük	<i>Sparidae</i>			LBII	BioArCh	20166	23589		990.3	58.4	5.90	44.02*	16.22	3.18	-9.05*	7.46*
Kinet Höyük	<i>Sparidae</i>			MED	BioArCh	20166	14262		897.1	92.6	10.32	39.36	14.38	3.19	-10.98	7.91*
Kinet Höyük	<i>Sparidae</i>			EBIII	BioArCh	20166	20771.2		423.1	3.3	0.78	38.31	11.86	3.77	-11.19	8.36
Kinet Höyük	<i>Sparidae</i>			LBA	BioArCh	20166	9120		659.5	25.9	3.93	27.09	9.78	3.23	-8.3	6.96

Continued

Table S4 continued

Site	Taxa	Estimated SL (cm)	Estimated TL (cm)	Time Period	Isotope Lab	Lot No. (BioArCh Database)	Sample ID	CIO Sample Number	Sample Weight (mg)	Collagen Yield (mg)	Collagen yield (%)	C %	N %	C:N ratio	$\delta^{13}\text{C}\text{‰}$	$\delta^{15}\text{N}\text{‰}$
Kinet Höyük	Sparidae			LBA	BioArCh	20166	9537		721.7	40.7	5.64	40.59	14.92	3.17	-8.59	7.03
Kinet Höyük	Sparidae			LJA	BioArCh	20166	9650		386.5	22.05	5.71	37.87	14.15	3.12	-7.83	7.91
Kinet Höyük	Sparidae			MIA	BioArCh	20166	10548		453.2	9.7	2.14	41.53	14.7	3.3	-10	6.56
Tell Fadous	Sparidae			EBIII	BioArCh	20164	11003.3		702.4	15.5	2.21	31.74	11.43	3.24	-8.62	6.86
Tell Fadous	Sparidae			EBIII	BioArCh	20164	11693		322	13.4	4.16	35.28	12.62	3.26	-10.99	4.39
Kinet Höyük	Sparidae			LBA	BioArCh	20166	12061.2		911.2	27.5	3.02	19.93	7.4	3.14	-8.63	7.78
Kinet Höyük	Sparidae			LBI	BioArCh	20166	12786		619.3	12	1.94	37.01	13.21	3.27	-8.77	7.71
Kinet Höyük	Sparidae			LJA	BioArCh	20166	15945.3		275.6	9.8	3.56	29.88	10.63	3.28	-6.91	6.51
Kinet Höyük	Sparidae			LBII	BioArCh	20166	23648.2		628.7	23.4	3.72	22.93	8.58	3.12	-8.58	8.58
Tell el-Burak	Sparidae			MBA	BioArCh	20165	30060		493.9	11.8	2.39	33.91	11.78	3.36	-10.47	8.97
Tell el-Burak	Sparidae			IA	BioArCh	20165	30095		626.5	12.5	2.00	26.55	9.02	3.43	-8.08	7.66
Kinet Höyük	Sparidae	45.89		LBA	CIO		4016	75041	11.87	0.83%	5.32	20.8	7.8	3.13	-10.01	6.26
Kinet Höyük	Sparidae			LBA	CIO		12061	75043	6.95	0.48%	1.41	28.6	10.9	3.05	-9.46	6.75
Tell el-Burak	Sparidae			MBA	BioArCh	20165	30064		362.3	4.9	1.35					
Tell el-Burak	Sparidae			IA	BioArCh	20165	30116		521.7	12.4	2.38					
Tell el-Burak	Sparidae			IA?	BioArCh	20165	30119		384.8	7.5	1.95					
<i>Tell el-Burak</i>	<i>Sparus aurata</i>			<i>IA</i>	<i>BioArCh</i>	<i>20165</i>	<i>30052</i>		<i>626.8</i>	<i>6.4</i>	<i>1.02</i>	<i>27.5</i>	<i>9.58</i>	<i>3.35</i>	<i>-10.78*</i>	<i>10.19*</i>
<i>Tell el-Burak</i>	<i>Sparus aurata</i>			<i>IA?</i>	<i>BioArCh</i>	<i>20165</i>	<i>30172</i>		<i>834.8</i>	<i>14.6</i>	<i>1.75</i>	<i>4.81</i>	<i>1.52</i>	<i>3.7</i>	<i>-11.47</i>	<i>4.95</i>
Tell Fadous	Sparus aurata			EBIII	BioArCh	20164	11695		645.4	20.3	3.15	32.8	11.71	3.27	-6.24	6.06
Kinet Höyük	Sparus aurata			LJA	BioArCh	20166	14020		346.7	15.3	4.41	40.93	14.94	3.2	-9.72	6.88
Tell el-Burak	Sparus aurata			MBA	BioArCh	20165	30056		691.3	10.8	1.56	28.92	10.41	3.24	-9.9	9.25
Kinet Höyük	Sparus aurata			LJA	BioArCh	20166	11101		275.4	1.14	0.41					
Kinet Höyük	Sphyrnidae			LJA	BioArCh	20166	7824		1033.5	62.5	6.05	28.08*	10.01	3.27	-11.14	8.39

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