

Short Communications

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Length-Weight Relationship of Fish from Shallow Waters of Candarli Bay (North Aegean Sea, Turkey)

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Abstract. Length-weight relationships were calculated for 22 fish species caught from Candarli Bay in the north Aegean Sea, Turkey. Between December 2006 and January 2008 beach seine net was used to capture specimens and sampling was made in vegetated and sandy bottoms at the depths up to 1.5 m. A total of 2605 fish specimens were weighed and measured. The sample size ranged from 4 for *Symphodus cinereus*, *Symphodus doderleini* to 1558 for *Atherina boyeri*. The values of exponent b in the length-weight regressions ($W=aL^b$) varied between 1.93 (*Belone belone*) and 3.475 (*Symphodus ocellatus*). Linear regressions of length-weight relationships were significant for all species. The length-weight relationships given here for *Symphodus doderleini*, *Symphodus cinereus*, *Symphodus ocellatus* and *Pomatoschistus minutus* were the first time for the north Aegean Sea.

Key words: Length-weight relationship, Candarli Bay, Aegean Sea.

The length-weight relationship is widely used in the analysis of fish stocks and populations (Ricker, 1968), to calculate of condition indices (Anderson and Gutreuter, 1983), to estimate growth rate, length and age structures (Ozaydin and Taskavak, 2006) and morphological comparison of populations from different locations (Petraakis and Stergiou, 1995; Gonçaves *et al.*, 1997).

Although fishes of the Aegean Sea has been

relatively well studied in terms of length-weight relationships (Moutopoulos and Stergiou, 2002; Koutrakis and Tsikliras, 2003; Filiz and Bilge, 2004; Ozaydin and Taskavak, 2006; Karakulak *et al.*, 2006; Gurkan and Taskavak, 2007; Gökçe *et al.*, 2007; Bayhan *et al.*, 2008), samples of the studies were generally limited to data obtained from trawling and purse seine operations.

The aim of this study was to contribute to the knowledge of the length-weight relationships of 22 fish species common in vegetated and sandy bottoms (<1.5 depth) of shallow coastal habitats in the north Aegean Sea.

Materials and methods

The study was carried out between December 2006 and January 2008 in Candarli Bay, northern Aegean Sea (coordinates: 38° 52' 51" N-27° 03' 58" E, 38° 52' 59" N-27° 03' 50" E and 38° 53' 39" N-27° 03' 07"). Beach-seine net with mesh sizes-bar length 22, 24, 26 and 28 mm was utilized to capture specimens in shallow coastal waters (0.5-1.5m).

Total length (TL) of 2593 individuals and standard length (SL) of 12 specimens of two seahorse species (*Hippocampus hippocampus* and *Hippocampus guttulatus*) were measured to the nearest 0.01 cm and all specimens were weighed (W) to the nearest 0.01 g. Since beach seine fishing was prohibited throughout year on the Turkish coasts, a formal permission was obtained from Ministry of Agriculture for fishing. Standard length (SL) of seahorse is expressed as sum of head length, trunk length and tail length, using a curved measurement of trunk length from the midcleithral ring to the last trunk ring (Lourie *et al.*, 1999).

Total length of all specimens was used in order to calculate the length-weight relationship (LWR), which was calculated by log transformed data $\log: W=\log a+b \log L$ where W is weight (expressed in grams), L is length (TL and SL expressed in cm), a is the intercept, and b is the slope or allometric coefficient. Allometric coefficient (b) larger or smaller than 3.0 shows an allometric growth (Bagenal and Tesch, 1978). Value $b>3$ shows a positive allometric growth, while value $b<3$ indicates a negative allometric

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Table I.- Descriptive statistics and estimated parameters of length-weight relationships for 22 fish species in Candarli Bay (north Aegean Sea) December 2006 to January 2008 (n: sample size, min.: minimum, max.: maximum, a and b: parameters of length-weight relationships, r²: regression coefficient, TL: Total length, SL: Standard length).

Species	n	Length range (cm)	Length type	Weight range (g)	a	b	r ²
<i>Belone belone</i>	5	1.05-8.50	TL	1.23-0.52	0.0058	1.933	0.764
<i>Hippocampus hippocampus</i>	5	4.00-11.60	SL	0.10-2.51	0.0013	3.187	0.988
<i>Hippocampus guttulatus</i>	7	1.90-11.60	SL	0.009-2.19	0.0014	3.097	0.991
<i>Syngnathus abaster</i>	9	2.78-10.60	TL	0.08-0.78	0.0015	2.859	0.739
<i>Syngnathus acus</i>	77	5.40-21.20	TL	0.06-4.98	0.0003	3.256	0.912
<i>Syngnathus typhle</i>	61	1.61-22.70	TL	0.08-3.48	0.0004	2.980	0.860
<i>Mullus barbatus</i>	13	4.60-9.90	TL	0.55-8.01	0.0040	3.344	0.954
<i>Diplodus annularis</i>	25	3.90-13.50	TL	0.72-41.56	0.0085	3.288	0.995
<i>Diplodus sargus</i>	22	2.50-4.40	TL	0.20-1.09	0.0120	3.000	0.960
<i>Diplodus vulgaris</i>	119	2.50-10.10	TL	0.18-11.60	0.0111	3.060	0.922
<i>Lithognathus mormyrus</i>	160	1.00-4.20	TL	0.005-0.76	0.0064	3.449	0.942
<i>Sarpa salpa</i>	12	4.70-8.20	TL	0.74-10.53	0.0087	3.127	0.928
<i>Diplodus</i> sp.	93	1.00-3.00	TL	0.01-0.28	0.0052	3.363	0.987
<i>Symphodus cinereus</i> *	4	5.90-7.60	TL	2.09-6.03	0.0066	3.237	0.963
<i>Symphodus doderleini</i> *	4	7.30-9.60	TL	4.93-8.92	0.0874	2.028	0.909
<i>Symphodus ocellatus</i> *	10	4.30-6.60	TL	0.59-2.79	0.0041	3.475	0.989
<i>Symphodus tinca</i>	10	4.70-10.50	TL	1.00-12.09	0.0131	2.893	0.965
<i>Gobius</i> sp.	165	1.90-9.80	TL	.02-10.24	0.0042	3.299	0.963
<i>Zosterisessor ophiocephalus</i>	4	6.50-7.00	TL	2.03-2.77	0.0041	3.339	0.888
<i>Pomatoschichtus minutus</i> *	130	1.80-7.00	TL	0.03-3.01	0.0037	3.289	0.966
<i>Mugil</i> sp.	112	1.70-6.60	TL	0.02-2.64	0.0052	3.363	0.987
<i>Atherina boyeri</i>	1558	1.00-9.40	TL	0.004-5.59	0.0043	3.187	0.972

*length-weight relationships not previously reported for north Aegean Sea (Turkey)

growth. It is isometric growth when value b is equal to 3.0 (Bagenal and Tesch, 1978).

Results and Discussion

In this research 2605 fish samples belonging to 8 families were caught and examined. The most abundant families were Atherinidae (59.81 %), Sparidae (16.5 %), Gobiidae (11.48 %) and Syngnathidae (6.10 %). Table I shows length-weight relationships and length characteristics for 22 species.

The exponent b often has a value close to 3, but varies between 2 and 4 (Tesh, 1971). According to Table I, the values of b ranged from 1.933 for *Belone belone* to 3.475 for *Symphodus ocellatus*. Growth was isometric in *Syngnathus typhle*, *Diplodus sargus* and *Diplodus vulgaris*, whereas negative allometry was found in *Belone belone*, *Syngnathus abaster*, *Symphodus doderleini* and *Symphodus tinca*. The length-weight relationships given here for *Symphodus doderleini*, *Symphodus ocellatus*, *Symphodus cinereus* and *Pomatoschichtus*

minutus were the first time for the north Aegean Sea.

In addition, 9 out of 22 fishes examined (*Belone belone*, *Mullus barbatus*, *Diplodus annularis*, *Diplodus sargus*, *Diplodus vulgaris*, *Lithognathus mormyrus*, *Sarpa salpa*, *Mugil* sp., and *Atherina boyeri*) were economically important.

The length-weight relationship in fishes is affected by a number of factors including season, habitat, gonad maturity, sex, diet and stomach fullness, health, preservation conditions and annual differences in environmental conditions (Bagenal and Tesch, 1978; Froese, 2006)

There have been various studies on the length-weight relationships in the north Aegean Sea and nearby localities (Valle *et al.*, 2003; Moutopoulos and Stergiou, 2002; Koutrakis and Tsikliras, 2003; Ozaydin and Taskavak, 2006; Karakulak *et al.*, 2006; Gurkan and Taskavak, 2007; Gökçe *et al.*, 2007) and a and b values as well as minimum and maximum length values reported in these studies are presented in Table II for a comparison. Dissimilarities seen between present

Table II.- Comparison of the length-weight relationships of fishes described in the study with those from different localities (TL: Total length, SL: Standard length, FL: Fork length; a and b: parameters of length-weight relationships).

Species	Author(s)	Length range (cm)	Length type	A	b
<i>Belone belone</i>	Koutrakis and Tsikliras (2003)	16.40-27.00	TL	0.0090	3.040
	Ozaydin and Taskavak (2006)	26.00-60.50	TL	0.0003	3.365
	Present study	1.05-8.50	TL	0.0058	1.933
<i>Hippocampus hippocampus</i>	Gurkan and Taskavak (2007)	8.00-14.00	SL	0.0010	3.140
	Present study	4.00-11.60	SL	0.0013	3.187
<i>Hippocampus guttulatus</i>	Gurkan and Taskavak (2007)	10.00-16.50	SL	0.0100	2.470
	Present study	1.90-11.60	SL	0.0014	3.097
<i>Syngnathus abaster</i>	Koutrakis and Tsikliras (2003)	7.80-13.20	TL	0.0003	3.156
	Present study	2.78-10.60	TL	0.0015	2.859
<i>Syngnathus acus</i>	Valle <i>et al.</i> (2003)	11.00-29.30	TL	0.0007	2.883
	Koutrakis and Tsikliras (2003)	8.30-12.40	TL	0.0001	3.729
	Ozaydin and Taskavak (2006)	6.10-20.70	TL	0.0001	3.630
<i>Syngnathus typhle</i>	Present study	5.40-21.20	TL	0.0003	3.256
	Valle <i>et al.</i> (2003)	9.70-28.10	TL	0.0003	3.170
	Ozaydin and Taskavak (2006)	7.50-20.30	TL	0.0002	3.217
	Gurkan and Taskavak (2007)	4.00-25.80	TL	**	3.000
<i>Mullus barbatus</i>	Present study	1.61-22.70	TL	0.0004	2.980
	Moutopoulos and Stergiou (2002)	19.10-29.00	TL	0.0177	2.832
	Valle <i>et al.</i> (2003)	7.40-12.40	TL	0.0120	2.939
	Karakulak <i>et al.</i> (2006)	12.50-22.30	TL	0.0049	3.273
	Ozaydin and Taskavak (2006)	7.50-20.00	FL	0.0102	3.176
	Gökçe <i>et al.</i> (2007)	8.00-19.60	TL	0.0193	3.100
	Present study	4.60-9.90	TL	0.0040	3.344
<i>Diplodus annularis</i>	Moutopoulos and Stergiou (2002)	11.00-25.30	TL	0.0186	2.954
	Valle <i>et al.</i> (2003)	4.20-19.50	TL	0.0164	2.985
	Koutrakis and Tsikliras (2003)	6.30-17.40	TL	0.0122	3.142
	Ozaydin and Taskavak (2006)	7.90-16.80	TL	0.0245	2.973
	Karakulak <i>et al.</i> (2006)	7.70-17.70	FL	0.0068	3.315
	Gökçe <i>et al.</i> (2007)	8.30-20.80	TL	0.0177	2.990
	Present study	3.90-13.50	TL	0.0085	3.288
<i>Diplodus sargus</i>	Moutopoulos and Stergiou (2002)	11.60-29.60	TL	0.0130	3.055
	Present study	2.50-4.40	TL	0.0120	3.000
<i>Diplodus vulgaris</i>	Moutopoulos and Stergiou (2002)	11.60-29.60	TL	0.0130	3.055
	Valle <i>et al.</i> (2003)	5.90-23.30	TL	0.0142	3.028
	Ozaydin and Taskavak (2006)	8.00-15.40	FL	0.0184	3.094
	Gökçe <i>et al.</i> (2007)	10.80-13.30	TL	0.0193	2.910
	Present study	2.50-10.10	TL	0.0111	3.060
<i>Lithognathus mormyrus</i>	Koutrakis and Tsikliras (2003)	2.10-14.30	TL	0.0110	3.196
	Ozaydin and Taskavak (2006)	15.50-22.00	FL	0.0094	3.181
	Gökçe <i>et al.</i> (2007)	14.10-26.00	TL	0.0084	3.100
	Present study	1.00-4.20	TL	0.0064	3.449
<i>Sarpa salpa</i>	Moutopoulos and Stergiou (2002)	14.90-25.10	TL	0.0144	2.946
	Valle <i>et al.</i> (2003)	10.60-28.60	TL	0.0134	2.977
	Koutrakis and Tsikliras (2003)	7.90-11.70	TL	0.0104	3.195
	Karakulak <i>et al.</i> (2006)	11.10-31.20	TL	0.0087	3.134
	Ozaydin and Taskavak (2006)	13.90-27.50	FL	0.0063	3.373
	Present study	4.70-8.20	TL	0.0087	3.127
<i>Symphodus ocellatus</i>	Valle <i>et al.</i> (2003)	3.00-9.00	TL	0.0091	3.170
	Present study	4.30-6.60	TL	0.0041	3.475
<i>Symphodus tinca</i>	Moutopoulos and Stergiou (2002)	14.70-23.70	TL	0.0278	2.733
	Valle <i>et al.</i> (2003)	11.40-30.40	TL	0.0258	2.787
	Karakulak <i>et al.</i> (2006)	10.00-26.80	TL	0.0109	3.046
<i>Symphodus doderleini</i>	Present study	4.70-10.50	TL	0.0131	2.893
	Valle <i>et al.</i> (2003)	4.20-9.90	TL	0.0083	3.196
<i>Symphodus cinereus</i>	Present study	7.30-9.60	TL	0.0874	2.028
	Valle <i>et al.</i> (2003)	3.60-15.40	TL	0.0100	3.132
	Present study	5.90-7.60	TL	0.0066	3.237
<i>Zosterisessor ophiocephalus</i>	Koutrakis and Tsikliras (2003)	10.20-16.50	TL	0.0110	2.998
	Ozaydin and Taskavak (2006)	9.30-20.50	TL	0.0044	3.306
	Present study	6.50-7.00	TL	0.0041	3.339
<i>Atherina boyeri</i>	Koutrakis and Tsikliras (2003)	1.10-11.50	TL	0.0003	3.470
	Ozaydin and Taskavak (2006)	4.80-9.80	FL	0.0048	3.165
	Present study	1.00-9.40	TL	0.0043	3.187

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study and results given by various researchers may be attributed the fishing methodology (beach seine) and physical conditions of the habitat (water depth

and temperature, sandy and vegetated bottom structures, turbidity, oxygen, saturation and water motility). Consequently, the length-weight

relationships for 22 fishes presented here could serve for comparison with similar studies of bays and coasts of north Aegean Sea, and could be of use when fish populations and shallow waters are subjected to illegal fishing, part of recovery programs, or other management and conservation activities.

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Selective Precipitation Based Economical Methods for Purification of Human Serum Albumin From the Out-Dated Blood Bank Samples

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Abstract.- Based on the studies of solubility of serum albumin in the organic solvents in the presence of trichloroacetic acid and its heat stability in the presence of octanoic acid, two methods have been developed for its purification by selective ammonium sulphate and cold ethanol precipitations. The purification methods used in the present study gave 32% recovery with up to 97% pure final product. The purity and molecular weights of final product was confirmed by SDS-PAGE and gel-exclusion chromatography.

Key words: Human serum albumin, blood bank samples, TCA/acetone precipitation, ammonium sulphate precipitation.

Albumin constitutes about 60% of the serum proteins and at normal concentrations it contributes 80% of the colloidal osmotic (oncotic) pressure of the plasma. Its function as a carrier for hormones, enzymes, fatty acids, metal ions and medicinal products is much reported (Peters, 1996). Human Serum Albumin (HSA) is widely used in research and pharmaceutical industry. The albumin therapy is advised in the case of hypovolemia or shock, burns, hypoalbuminemia, surgery or trauma, cardiopulmonary bypass, acute respiratory distress syndrome, hemodialysis, meningococcal disease and

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sequestration of protein-rich fluids (Patey *et al.*, 1999). The use of this relatively expensive therapy accounts for up to 30% of the total pharmacy budget in certain hospitals in United States (Christian *et al.*, 2005). Extremely pure product is required in large-scale to be used in albumin therapy. Ammonium sulphate and ethanol precipitation, pH adjustment, ion exchange, hydrophobic chromatography (Lu and Su, 2002; Wenbing *et al.*, 2004), and triazine dyes (Cibacron Blue 3G-A, Pricon Red HE-3B and Pricon Red H-3B) affinity chromatography and CM-Trisacryl chromatography have been successfully used for the purification of serum albumin (Muhammad *et al.*, 1995; Xu and Ding, 2004). The present study deals with the development of economical, non-chromatographic and high yield procedures for the purification of HSA to be used in local research laboratories. The conditions for the two methods developed have been optimized and compared for the purity and percentage yield of final product.

Materials and methods

Chemicals

Acetone and ethanol were purchased from Riedel-deHaen; Sodium salt of 8 carbon fatty acid was obtained from Calzyme Laboratories Inc. California. USA. Frozen human plasma pre-screened for Hepatitis-B and C, Tuberculosis, and AIDS was obtained from a local blood bank.

Protein purification

Total protein content of plasma sample was measured by modified Lowry method (Lowry *et al.*, 1951) or by determining absorbance of protein solution at 280 nm (based on the fact that 1 mg per ml sample of albumin gives an absorbance of 1.0 at 280 nm). The procedure described by Tanaka *et al.* (2001) was used to remove hemoglobin at the very beginning of the process. A mixture of ethanol and chloroform was slowly mixed with the sample to a final concentration of 19% ethanol and 0.6% chloroform. This mixture was kept at 4°C and was homogenized for an additional 20 min in order to obtain complete hemoglobin precipitation.

Two precipitation methods were used for the purification of HSA and final products were compared for the efficiency of these methods. One

method was derived from the basic information provided by Chen *et al.* (2005) for the removal of albumin from the plasma samples. The human plasma was treated with trichloroacetic acid (TCA)/acetone. The albumin was precipitated after dialysis of the supernatant with different concentrations of ammonium sulphate. The purified sample was analyzed for the percentage yield, lyophilized and stored at -20°C.

The second method was developed according to Henin *et al.* (1988) and Hosseini *et al.* (2002), and involves selective heat-denaturation and cold ethanol precipitation of proteins. It has been experimentally proved that the sodium salt of octanoic acid (caprylic acid) is a useful stabilizer that minimizes the protein denaturation during pasteurization of human albumin in aqueous solutions (Arakawa and Kita, 2000). The method used in the present study is based. The sample was heated at 60°C, then eight carbon fatty acid was added and the mixture was heat denatured at 65 °C. The mixture was centrifuged and albumin precipitated from the supernatant with ice cold ethanol. After centrifugation the supernatant was dialyzed against distilled water.

Gel filtration

Gel-filtration chromatography of purified product was carried out on an FPLC. The column: Superdex-200-10/300-GL, with a bed volume of 24 mL, void volume (V_0) 8 mL, column volume 25 mL, and particle size 13 μ m was used in the process. 50 mM sodium phosphate buffer pH 7.5 containing 150 mM NaCl was used as an elution buffer and flow rate was maintained at 400 μ L per min.

Results and discussion

Two methods for the purification of serum albumin from the expired blood bank sample have been developed.

Method I

Frozen plasma (300 mL) was brought to 4°C and 3 volumes of TCA/acetone (10% TCA in analytical grade acetone stored at -20°C) was mixed with it in the ice-box. The sample was centrifuged at 9000x g for 20 min at 4°C. The precipitate was resuspended in 10 mM Tris-HCl buffer pH 7.4

Table I.- Percentage yield of serum albumin at different purification stages in method-I and II.

Purification stages	Sub-Stages in albumin purification	Volume (ml)	Protein content (g)	Percentage yield	
Method-I	1	Fresh frozen plasma	300	18.0	100 %
	2	TCA/Acetone supernatant	1200	7.0	38.8%
	3	35 % ammonium sulfate PPT	100	1.8	10.0%
	4	80 % ammonium sulfate PPT	180	3.7	20.5%
Method-II	1	Fresh frozen plasma	300	18.0	100%
	2	Heat denatured supernatant	240	7.5	41.6%
	3	Final ethanol precipitate	100	5.8	32.2%

(buffer-A) and treated with TCA/acetone as above. The supernatants of both steps were mixed and kept for dialysis in 5 liters of buffer-A at 4°C for 24 hours. The dialysis step was repeated twice. The dialyzed sample was brought to 30% ammonium sulphate (164 g of salt per liter of solution) and centrifuged at 10,000 X g at 4°C for 20 min. The precipitate was discarded, the supernatant was brought to 80 % ammonium sulphate saturation and centrifuged as above; 80 % ammonium sulphate precipitate was the final product.

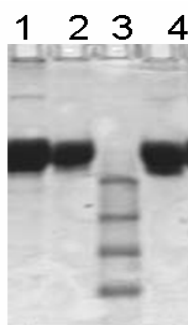


Fig. 1. SDS-PAGE (12.5) analysis of purified human serum albumin, Lane 1, 2 purified albumin; Lane 3- protein marker; Lane 4- Bovine serum albumin (BIO BASIC INC.).

Method II

The frozen plasma (300 mL) was brought to room temperature and its pH was adjusted at 6 with 0.5 M acetic acid. The sample was brought to 60°C and 8 carbon fatty acid was added (200 mg of fatty acid per 100 ml of plasma sample) and mixed well. The temperature of solution was raised to 65°C and maintained for 3 h. The heat denatured sample was

centrifuged at 9000 X g at 4°C for 20 min, the precipitate was discarded. The supernatant was brought to 4°C and made 50% with ice-cold ethanol, kept at 4°C for 3 hr and centrifuged as above. The precipitate was dissolved in 200 ml of 10 mM Tris-HCl buffer pH 7.5 and dialyzed in distilled water to remove the precipitant. The percentage yield of albumin was calculated, sample freeze-dried and stored at -20°C.

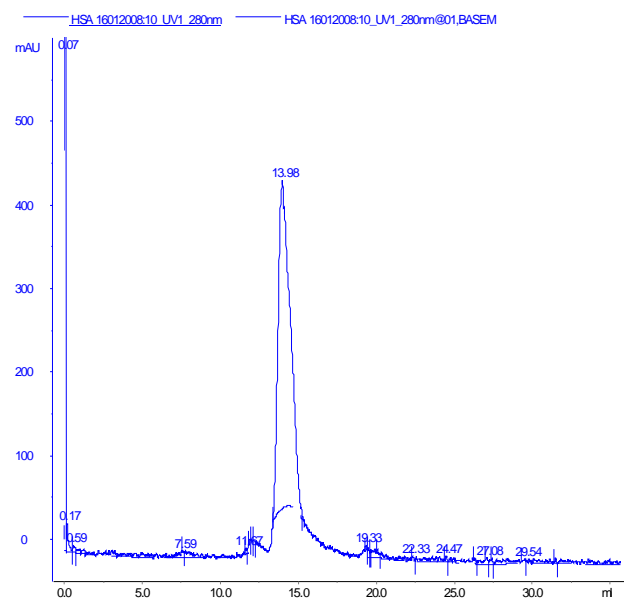


Fig. 2. FPLC gel filtration chromatography of purified human serum albumin. Single resolving peak confirmed the purity of protein and molecular weight of purified protein.

In method-II, most of the unwanted proteins were removed by selective heat denaturation at low

pH and in the presence of 8-carbon fatty acid. It is reported that the selective heat denaturation under the conditions used in this method can eliminate the blood-born viruses *i.e.* hepatitis B, hepatitis C and HIV (More and Harvey, 1991; McClelland, 1998). The albumin purified in the present study can be safely used in local research laboratories such as animal cell culture media and also in the pharmaceutical industry. The percentage yield of final product of both procedures have been compared in Table I and the purity of final product confirmed with 12.5% SDS-PAGE (Laemmli, 1970) (Fig. 1). The final product gave a single peak on gel-filtration chromatography with a molecular weight of 70 kDa (Fig. 2). More than 20 g of albumin was purified to electrophoretic homogeneity, lyophilized and stored at -20°C. In conclusion, the purification method based on selective heat-denaturation of unwanted proteins in the presence of octanoic acid can be used for bulk production of albumin from the out-dated blood bank samples.

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New Record of Genus *Gynacanthaeshna* Fraser, 1922 (Odonata: Anisoptera: Aeshnidae) from Pakistan

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Abstract.- Only six species of Aeshnidae have been reported from Pakistan. *Gynacanthaeshna* genus of Aeshnidae family was recognized by Fraser in 1922. It is indeed a monotypic genus because of their character of pterostigmal brace vein which is slightly distal to the level of inner border of pterostigma. A new species *Gynacanthaeshna sikkima* (Karsch) was collected from Rawalpindi. This species is new record from Pakistan.

Key words: Biosystemics, Himalayan, dragonflies, Sanghuri dam.

The aeshnid dragonflies of the genus *Cephalaeschna* and its allies extend over the Himalayan and West Chinese area. *Gynacanthaeshna sikkima* (Karsch) is the second oldest example of this group of aeshnids. Karsch (1891) identified a female of this particular species and include it in *Cephalaeschna*, later on Martin (1909), identified a male of this species with synonym *Cephalaeschna lugubris*. In 1922 Fraser removed this species from *Cephalaeschna* to *Gynacanthaeshna* (Asahina 1981). This species was also reported by MacLachlan (1896) as *Cephalaeschna sikkima*, Laidlaw (1921) as *Cephalaeschna sikkima* and Needham (1932) as *Gynacanthaeshna sikkima*.

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Yousaf (1972) collected and identified 46 species and subspecies belonging to 24 genera of 6 subfamilies of anisopterous dragonflies from various localities of West Pakistan. Kanth (1985) described 39 species of dragonfly belonging to 22 genera from Azad Jammu and Kashmir. Ahmad (1994) identified 21 dragonfly species belonging to 14 genera and 4 families from N.W.F.P. Arshad (1994) recorded 14 dragonflies species belonging to 9 genera from Balochistan. Rehman (1994) described 35 species of dragonfly belonging to 22 genera of 12 subfamilies in 3 families from Punjab. Ullah (1994) recorded 12 dragonfly species belonging to 10 genera and two families from Sindh. Jehangir (1997) collected and identified 20 dragonfly species belonging to 13 genera from Gilgit and Baltistan areas.

Materials and methods

A single female *Gynacanthaeshna* (Fig. 1) was collected while perched on vegetation at Sanghuri Dam, Mandra, Rawalpindi, Pakistan in July 2006 by the first author. The Sanghuri Dam is 29 km from Rawalpindi near the main stop of Kalyam Sharif on G.T. Road. The specimen was identified as *Gynacanthaeshna sikkima* by comparing it with the descriptions of Fraser (1936) and Subramanian (2005). This species has not previously been recorded from Pakistan. Terminology for odonate anatomy used here follows that used in Fraser (1936). The identified specimen has been placed in the biosystematics lab. Department of Entomology, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi.

Results and discussion

Descriptive notes

Frons greenish yellow, occiput yellowish brown, Prothorax brown with greenish yellow band on front side. Legs brown to black, anal loop 5-6 celled wings are not palely enfumed towards apices, membrane blackish white. Pterostigmal brace vein attached slightly distal to the level of inner boarder of Pterostigma 15 antenodal, 9 postnodal and 13 antenodal, 11 postnodal nerves present in forewings and hind-wings respectively, pterostigma black, wings hyaline having basal yellow markings, triangle three celled in fore-wing and hind-wings,

median space traversed 4-5 time in fore and hind wings. Abdomen cylindrical, second abdominal segments have inverted T shape greenish yellow spots as shown in (Fig. 2). Measurement is as follow

Abdomen: 45mm Fore wing: 41mm
Hind wing: 41mm



Fig. 1. *Gynacanthaeshna sikkima* (Karsch).

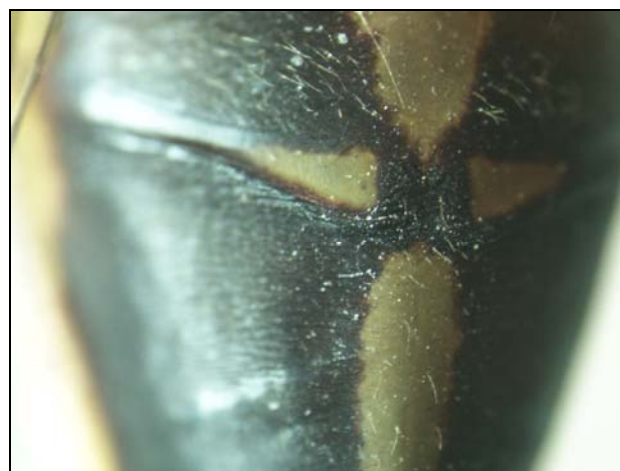


Fig. 2. Second abdominal segment.

Distribution

A single specimen was collected from Sanghuri Dam, situated near Kalyam Sharif stop on G.T. road, in Rawalpindi, Pakistan. The average mean maximum and minimum temperature of the area in the month of July is 35°C and 26°C respectively and average relative humidity in July

remain around 50%. The area lies between 33.25 N and 73.14 E, and elevation is 522 meter above sea level. This species was collected at mid-day in July 2006 and the temperature was warm. This species is also described from Sikkim, Assam, Nepal and also reported from Bangladesh.

Remarks

This species was collected sitting on the vegetation near the edges of small dam having well-established small weeds. These species are also found near waters having muddy edges (Fraser, 1936). The habitat includes *Eucalyptus* plants artificially planted, *Thyph* sp., *Cynodon dactylon* Linn. and *Acacia modesta* Wall. The other species of dragonflies found in this location is *Epophthalmia vittata vittata* Burmeister, *Crocothemis servilia* Drury and *Trithemis festiva* Rambur.

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First Record of Spotted Munia (*Lonchura punctulata*) from Karachi

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Abstract.- Order Passeriformes is represented by three hundred and ten species in Pakistan belonging to 32 families. Passerine birds pose serious research problems for ornithologist as they are smaller in size, cryptic and not easily identifiable. Three munia species viz. red munia, silver-bill munia and spotted munia are known to occur in Pakistan. Spotted munia was so far only reported from the northern parts of the country up to Lahore. However, a recent sighting of spotted munia in Karachi is the first record of this species not only from Karachi but province Sindh as well.

Key words: Estrilididae, spotted-munia, Passeriformes.

Passerine birds belonging to order Passeriformes constitute 47.69% (n = 310) of 650

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bird species reported by Mirza (2007). The Order Passeriformes is represented by 32 families in Pakistan. Being smaller in size, with cryptic habit and of greater complexity in their identification, passerine birds pose serious research problems for ornithologists.

Placed in the family Estrilididae, the three munia-species viz. red munia, silver-bill munia and spotted munia have so far been reported from Pakistan (Roberts, 1992).

Both sexes of spotted munia (*Lonchura punctulata*) are alike. Upper parts (including head and neck) are chestnut red. Breast and belly are white with chestnut scaling (hence another name scaly-breasted munia is given). Bill is bluish grey while the tail is wedge-shaped. Juveniles differ markedly, as they are olive brown above, whitish below streaked with olive brown (Mirza, 2007). Generally they are gregarious in non-breeding season and usually groups consist of a dozen birds but sometimes up to 30-40 individuals. Breeding period extends from late summer up to November. Primarily they are grainivorous and also like to feed on berries, especially *Ziziphus mauritiana* and *Z. nummularia* (Roberts, 1992)

Spotted munia is distributed throughout India, Sri Lanka, Myanmar, eastward of Bangladesh, Indo-Chinese regions, the Malaysian Archipelago, Philippines, Sulawesi and into South-west China (Ripley, 1982). In the handbook series of Ali and Ripley (1974), Pakistan was surprisingly excluded from the distributional range of the species, but it was corrected in the revised edition on the basis of a note by Roberts (1974).

Materials and methods

Authors accidentally came into contact with a relatively unfamiliar bird species foraging in the lawn of Department of Zoology, University of Karachi, during surveys being undertaken to document the diversity, distribution, ecology and status of the avifauna in the city of Karachi, Sindh, Pakistan. Birds were further studied with binocular. Photographs were taken using Power Shot A430 Digital Canon Camera (4.0 Mega Pixels, 4X Optical Zoom). A field guide to birds of Pakistan by Mirza (2007) was consulted for species identification. Habitat and feeding behavior was noted. Nearby

area was thoroughly searched to get breeding evidence.

Results and discussion

This was the first record of the presence of spotted munia not only from the city of Karachi, but from the whole province of Sindh as well. Spotted munia was observed (Fig. 1) on few occasions from April to early August, 2008 feeding in the evening (4:00 to 5:00 pm) in the lawns of the Marine Reference Collection Centre (N 24° 47' .693" and E 67° 57' .576") which is situated adjacent to the Department of Zoology, University of Karachi. They were observed feeding in the lawn carpeted with *Cynodon dactylon* (lawn grass). They hid in *Polyalthia longifolia* (Ashoke tree) when feeling the presence of the authors. Lawn is surrounded by trees such as *Roysitonia regia*, *Indigofera* spp., *Tridax procumbens*, and *Euphorbia hirta*. No nest was found in the vicinity of their feeding ground.



Fig. 1. A group of Spotted Munia feeding in the lawn of Department of Zoology, University of Karachi.

Mirza (2007) reported the species as a resident of Swat, southern Kaghan and Murre Hills. While during non-breeding season it occurs in Margalla Hills, Salt Range, Mangla, Kharian, Gujrat, Sialkot, along River Ravi in Lahore. Roberts (1992) reported it as recent colonist from northwestern part of Punjab because it was not recorded from the Salt Range by Waite (1948). Roberts (1992) also reported its breeding from

Abbottabad and near Rawal-Lake, Islamabad.

However, the present study confirmed that the distribution of this species had extended well up to southern parts of the country. The range extension of the species probably was due to the present day global climatic changes. There is a need to design a scientific study to investigate the current distribution of the species in other parts of province Sindh as well as in Baluchistan.

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