

BIOMETRIC OBSERVATIONS ON SPADILLA CEPHALOPTERA IN TENERIFE (CANARIES)

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With 2 figures and 18 tables

ABSTRACT. In the present essay biometric studies on Chaetognatha relating to *Spadilla cephaloptera* found among samples collected in the waters of Tenerife (Canaries, Spain) are carried out.

INTRODUCTION

The study of the populations of the planktonic Chaetognatha in the waters of the Archipelago of the Canaries (Hernandez, 1985a, 1985b, 1986; Hernandez & Lozano, 1984) prompted us to start investigations on the benthic Chaetognatha. In a preliminary study (Hernandez & Jimenez, unpublished) the genus *Spadilla* was mentioned for the first time from the Canaries, more specifically from Tenerife, the species in question being *S. cephaloptera*.

In the present essay a series of biometric data of interest are given for the above mentioned species both for the total of specimens and for each sexual stage. The specimens were collected in the sampling site (see fig. 1) during the month of April 1986.

MATERIAL AND METHODS

The material of this study was collected in two epibenthic hauls carried out with a net with 200 μ meshes on the 4th and 12th April 1986 at a station situated to the east of the island of Tenerife (Canaries) in the coastal zone of Barranco Hondo (see fig. 1).

The sampling site was an artificial trough about 35m long and 12m wide, directly connected with the open sea and thus permitting a continuous renovation of its waters and whose sandy-muddy bottom was covered with patches of *Caulerpa prolifera* harbouring the organisms we were studying. In this trough, sheltered from the impact of waves and

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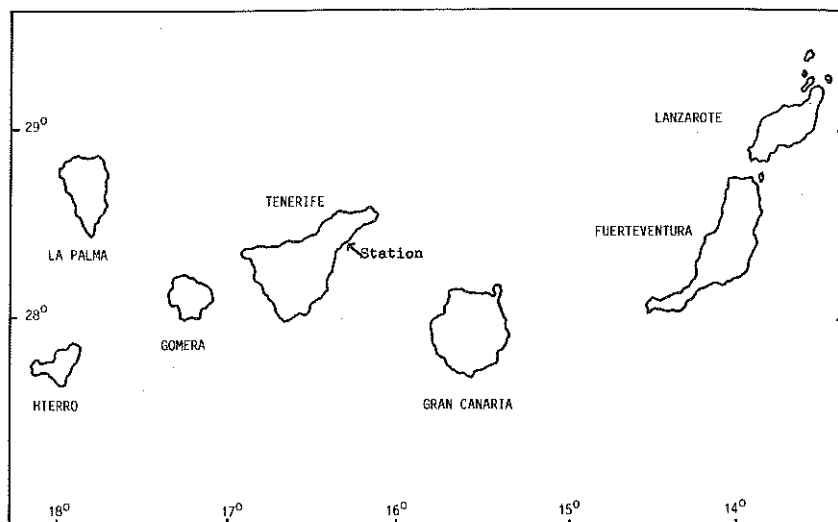


Fig. 1.— Location of the sampling site in Tenerife (Canary Islands).

stress caused by currents these organisms seem to find ideal conditions to develop.

The samples were collected by sweeping the net over the patches of the above mentioned algae (*C. prolifera*), while, contrary to accounts by other authors (Alvariño, 1981), not a single specimen was taken from samples of the said algae when washed in buckets filled with water. Once collected the said samples of Chaetognatha were fixed at the sampling station in 4% neutralized formalin. As soon as the samples were at the laboratory of the Department of Marine Sciences the specimens were sorted by means of continuous sifting through sieves with 1mm, 500 μ and 250 μ meshes and were observed under a binocular microscope, a fairly complicated task due to the small size of the specimens (about 3mm) and the characteristics of the sampled substrate. All specimens were identified taxonomically using the keys and papers by Alvariño (1981), Michel (1984) and Owre (1963, 1972). We must point out here that the ciliary loop of our specimens is somewhat coarser than the one of specimens collected in the Caribbean (Michel, 1984). The said author has just confirmed this observation (pers. com.) after examining some specimens of our collection at the University of Miami (Rosenstiel School of Marine and Atmospheric Science).

To each one of the specimens a sexual stage was assigned based on a simplified scale as presented by Russel (1932) and Furnestin (1957) which establishes three stages. At the same time each specimen was subjected to a series of measurements under the binocular microscope with the aid of a micrometric slide on which the specimens were placed in a perfectly extended position. The measurements taken and other data were as follows: —

Total length (mm). — From foremost point of head to the end of caudal region without caudal fin. (TL).

Caudal length. — Measured from the septum between the trunk and the caudal region to the end of the latter, without caudal fin. (CL).

Ovarian length. — Measured from the basal zone of the ovaries to the anterior end of them. In case of differences in lengths of the ovaries the median length of the two is used.

Because of their taxonomic importance the lengths of the ovarian and caudal regions in percent of total length were taken into account. (see fig. 2).

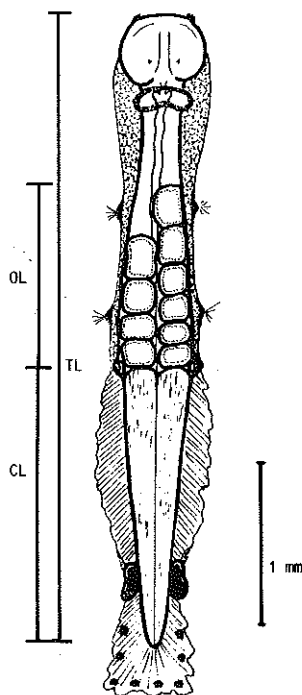


Fig. 2 — Measurements used on all specimens.

TREATMENT OF DATA

The biometric and meristic data of each one of the 49 specimens of *Chaetognatha* examined were fed into a data-bank in the central computer of the University of La Laguna (DIGITAL VT 100 connected with C.P.U. VAX/VMS DIGITAL version 4.1). To facilitate the processing these data were fed into the said terminal, utilizing the DATA TRIEVE V2.0 and V3.0 system as data base. Once the data were stored we proceeded to apply a series of programs of the BMDP statistic pack, in other words, the 2D (DETAILED DATA DESCRIPTION INCLUDING FREQUENCIES) for the total of specimens and of each of its sexual stages as well as the 6D (BIVARIATE SCATTER PLOTS) for the calculation of the correlations in the total of specimens, taking into account the parameters such as total, caudal and ovarian lengths (see tables 1-18).

CONCLUSIONS

In this study 49 specimens of *Chaetognatha* belonging to *Spadella cephaloptera* of the Coastal Zone to the east of the island of Tenerife (Canaries) are examined.

The statistical study of the total, caudal and ovarian length parameters as well as the ovarian and caudal percentages in relation to size is carried out both for the total of specimens and for each of the three stages under consideration.

Regarding the total of specimens a maximum size of 4mm with a median size of 3.32mm has been observed. The tail reached a maximum size of 2mm, the mean size being 1.48mm. The caudal percentage oscillated between 33.33% and 60% with a median of 45.14% and 50%.

In stage I the size has been observed to range from 3 to 2.5mm. The tail measured 1.5mm in all specimens. Percentages ranged from 60 to 50% with an average of 52.50%.

In stage II the size ranged from 3.50 to 3mm, the greater part being of the higher value. The ovary reaches values situated between 0.5 and 0.2mm, most cases being of the maximum value. The caudal percentage is around 42.86% in all specimens, the extremes being 57.14% and 33.33%. The ovarian percentage varied between 16.66% and 5.7%.

In stage III the maximum size was 4mm. The tail presented 1.5mm, generally not showing any appreciable variation with regard to the former stages (I and II). The ovary measured 1mm. The caudal percentage was 42.86% in the majority of all cases — the same as in stage II. The ovarian percentage oscillated between 33.33% and 25%, the majority of specimens being that of 28.57%.

ACKNOWLEDGEMENTS

We wish to thank Dr. H.B. Michel of the University of Miami for kindly commenting on the specimens of our region and D. Ignacio Lozano for his assistance with the data procedure by computer.

	<u>COR</u>	<u>STANDARD DEV.</u>	<u>REGRESSION LINE</u>	<u>RES. MS.</u>	<u>P</u>
TL(x)- CL(y)	0.3191	x= 0.29790 y= 0.14469	x= 0.65699y+ 2.3416 y= 0.15499x+ 0.9751	0.08140 0.01920	0.05
TL(x)- OL(y)	0.5953	x= 0.29790 y= 0.35296	x= 0.50239y+ 3.0262 y= 0.70530x- 1.7562	0.05852 0.08215	0.01
CL(x)- OL(y)	0.0583	x= 0.14469 y= 0.35296	x= 0.02389y+ 1.4758 y= 0.14216x+ 0.3739	0.02131 0.12680	> 0.05

Tab. 1.— Correlations and regression lines of the total, caudal and ovarian length parameters in all specimens of the present study.

S. cephaloptera

TOTAL LENGTH (mm)

MAXIMUM 4.000000
MINIMUM 2.500000
RANGE 1.500000
VARIANCE 0.0887415
ST.DEV. 0.2978951
(Q3-Q1)/2 0.2500000
MX.ST.SC. 2.28
MN.ST.SC. -2.75

ST.ERROR
0.0425564
0.0000000

MEAN 3.3204081
MEDIAN 3.5000000
MODE 3.5000000

H
H
H
H
H
H
H
H
EACH "H"
REPRESENTS
4
COUNT(S)

H H H H H
L-----U

EACH "-" ABOVE = 0.1000
L= 2.5000
U= 4.1000

CASE NO. OF MIN. VAL. = 41
CASE NO. OF MAX. VAL. = 21

SKEWNESS -0.83
KURTOSIS 0.37
VALUE VALUE/S.E. Q1= 3.0000000
-0.83 -2.37 Q3= 3.5000000
0.37 0.52 S- = 3.0225129
S+ = 3.6183033

VALUE	COUNT	PERCENTS	CELL	CUM
2.500	2	4.1	4.1	
3.000	14	28.6	32.7	

VALUE	COUNT	PERCENTS	CELL	CUM
3.200	1	2.0	34.7	
3.500	31	63.3	98.0	

VALUE	COUNT	PERCENTS	CELL	CUM
4.000	1	2.0	100.0	

S. cephaloptera
CAUDAL LENGTH (mm)

MAXIMUM 2.0000000
MINIMUM 1.0000000
RANGE 1.0000000
VARIANCE 0.0209354
ST.DEV. 0.1446906
(Q3-Q1)/2 0.0000000
MX.ST.SC. 3.53
MN.ST.SC. -3.39

ST.ERROR
0.0206701
0.0000000

MEAN 1.4897959
MEDIAN 1.5000000
MODE 1.5000000

H
H
H
H
H
H
H
H
EACH "H"
REPRESENTS
5
COUNT(S)

H H H H H
L-----U

EACH "-" ABOVE = 0.0750
L= 0.9000
U= 2.1000

CASE NO. OF MIN. VAL. = 6
CASE NO. OF MAX. VAL. = 11

SKEWNESS
KURTOSIS

VALUE 0.58
6.77
VALUE/S.E. 1.65
9.67
Q1= 1.5000000
Q3= 1.5000000
S- = 1.3451053
S+ = 1.6344966

VALUE	COUNT	PERCENTS	
		CELL	CUM
1.000	1	2.0	2.0
1.200	2	4.1	6.1

VALUE	COUNT	PERCENTS	
		CELL	CUM
1.300	2	4.1	10.2
1.500	42	85.7	95.9

VALUE	COUNT	PERCENTS	
		CELL	CUM
2.000	2	4.1	100.0

MAXIMUM	1.0000000
MINIMUM	0.7000000
RANGE	1.0000000
VARIANCE	0.1245833
ST.DEV.	0.3529637
(Q3-Q1)/2	0.2500000
MX.ST.SC.	1.17
NN.ST.SC.	-1.66

EACH "H"
REPRESENTS
3
COUNT(S)

	H		
	H		
	H	H	
	H	H	
	H	H	
H	H	H	
H	H	H	
H H	H	H	
L-----U			

```

      EACH "-" ABOVE *      0.0750
                        L*      0.0000
                        U*      1.2000
CASE NO. OF MIN. VAL. *    24
CASE NO. OF MAX. VAL. *     1

```

	VALUE	VALUE/S.E.	Q1=	0.5000000
			Q3=	1.0000000
SKWENESS	-0.22	-0.62	S+=	0.2327506
KURTOSIS	-1.07	-1.53	S+=	0.9386780

VALUE	COUNT	PERCENTS	
		CELL	CUM
0.0000	8	16.3	16.3
1.0000	17	34.7	100.0

VALUE	COUNT	PERCENTS	
		CELL	CUM
0.2000	1	2.0	18.4

VALUE	COUNT	PERCENTS	
		CELL	CUM
0.5000	23	46.9	65.3

S. cephaloptera

CL X 100

TL

MAXIMUM 60.0000000
MINIMUM 33.3333321
RANGE 26.6666679
VARIANCE 28.5192280
ST.DEV. 5.3403397
(Q3-Q1)/2 3.5714283
MX.ST.SC. 2.78
MN.ST.SC. -2.21

ST.ERROR
0.7629057
0.0000000

MEAN 45.1451683
MEDIAN 42.8571434
MODE 42.8571434

H
H
H
H
H
H H
H H
H H
HHHH H HH HH
L-----U

EACH "H"
REPRESENTS
3
COUNT(S)

EACH "-" ABOVE = 2.0000
L= 32.0000
U= 64.0000

CASE NO. OF MIN. VAL. = 6
CASE NO. OF MAX. VAL. = 41

SKENNESS
KURTOSIS

VALUE VALUE/S.E. Q1= 42.8571434
0.77 2.20 Q3= 50.0000000
1.11 1.58 S-= 39.8048286
S+= 50.4855080

VALUE	COUNT	CELL	CUM
33.33	1	2.0	2.0
34.29	1	2.0	4.1
37.14	1	2.0	6.1
60.00	2	4.1	100.0

VALUE	COUNT	CELL	CUM
40.00	1	2.0	8.2
42.86	28	57.1	65.3
43.33	1	2.0	67.3

VALUE	COUNT	CELL	CUM
46.88	1	2.0	69.4
50.00	12	24.5	93.9
57.14	1	2.0	95.9

Tab.5

S. cephaloptera
 TOTAL LENGTH (mm)
 STAGE: I

MAXIMUM 3.0000000
 MINIMUM 2.5000000
 RANGE 0.5000000
 VARIANCE 0.0535714
 ST.DEV. 0.2314550
 (Q3-Q1)/2 0.1250000
 MX.ST.SC. 0.54
 MN.ST.SC. -1.62

ST.ERROR
 0.0818317
 0.1443376

MEAN 2.8750000
 MEDIAN 3.0000000
 MODE 3.0000000

EACH "H"
 REPRESENTS
 1
 COUNT(S)

H
 H
 H
 H
 H
 H

L-----U

EACH "-" ABOVE = 0.0750
 L= 2.4000
 U= 3.0750

CASE NO. OF MIN. VAL. = 4
 CASE NO. OF MAX. VAL. = 1

VALUE VALUE/S.E. Q1= 2.7500000
 SKEWNESS -0.95 -1.09 Q3= 3.0000000
 KURTOSIS -1.21 -0.70 S+= 2.6435449
 S+= 3.1064551

PERCENTS
 VALUE COUNT CELL CUM
 2.500 2 25.0 25.0

PERCENTS
 VALUE COUNT CELL CUM
 3.000 6 75.0 100.0

S. cephaloptera

CAUDAL LENGTH (mm)

STAGE: I

MAXIMUM 1.5000000
MINIMUM 1.5000000
RANGE 0.0000000
VARIANCE 0.0000000
ST.DEV. 0.0000000
(Q3-Q1)/2 0.0000000
MX.ST.SC. 0.00
MN.ST.SC. 0.00

ST.ERROR

MEAN 1.5000000 0.0000000
MEDIAN 1.5000000 0.0000000
MODE 1.5000000

H
H
H
H
H
H
H
EACH "H"
REPRESENTS
1
COUNT(S)

L-----U

EACH "-" ABOVE = 0.0000
L= 1.5000
U= 1.5000

CASE NO. OF MIN. VAL. = 1
CASE NO. OF MAX. VAL. = 1

VALUE VALUE/S.E. Q1= 1.5000000
0.00 0.00 Q3= 1.5000000
SKEWNESS 0.00 0.00 S-= 1.5000000
KURTOSIS 0.00 0.00 S+= 1.5000000

PERCENTS
VALUE COUNT CELL CUM
1.500 8 100.0 100.0

Tab.7

S. cephaloptera

CL X 100

TL

STAGE: I

MAXIMUM	60.0000000
MINIMUM	50.0000000
RANGE	10.0000000
VARIANCE	21.4285698
ST.DEV.	4.6291003
(Q3-Q1)/2	2.5000000
MX.ST.SC.	1.62
MN.ST.SC.	-0.54

ST.ERROR

MEAN	52.5000000	1.6366341
MEDIAN	50.0000000	2.8867528
MODE	50.0000000	

EACH "H"
REPRESENTS
1
COUNT(S)

H
H
H
H
H
H

H
H

L-----U

EACH "-" ABOVE = 1.5000

L= 48.0000

U= 61.5000

CASE NO. OF MIN. VAL. = 1

CASE NO. OF MAX. VAL. = 4

Q1= 50.0000000
Q3= 55.0000000
S= 47.8708992
S+= 57.1291008

	VALUE	VALUE/S.E.
SKEWNESS	0.95	1.09
KURTOSIS	-1.21	-0.70

		PERCENTS	
VALUE	COUNT	CELL	CUM
50.	6	75.0	75.0

		PERCENTS	
VALUE	COUNT	CELL	CUM
60.	2	25.0	100.0

Tab.8

MAXIMUM	3.5000000
MINIMUM	3.0000000
RANGE	0.5000000
VARIANCE	0.0494022
ST.DEV.	0.2222660
(Q3-Q1)/2	0.1999999
MX.ST.SC.	0.62
MN.ST.SC.	-1.63

[illegible]

		ST.ERROR
MEAN	3.3625002	0.0453699
MEDIAN	3.5000000	0.0000000
MODE	3.5000000	

U

EACH "-" ABOVE =	0.0500
L=	2.9500
U=	3.6000

CASE NO. OF MIN. VAL. = 1
CASE NO. OF MAX. VAL. = 2

```
Q1=      3.1000001
Q3=      3.5000000
S-=      3.1402342
S+=      3.5847661
```

SKEWNESS
 KURTOSIS

VALUE	VALUE/S.E.
-0.93	-1.87
-1.12	-1.12

		PERCENTS	
VALUE	COUNT	CELL	CUM
3.000	6	25.0	25.0

		PERCENTS	
VALUE	COUNT	CELL	CUM
3.200	1	4.2	29.2

		PERCENTS	
VALUE	COUNT	CELL	CUM
3.500	17	70.8	100.0

Tab. 9

S. cephaloptera

CAUDAL LENGTH (mm)

STAGE: II

MAXIMUM	2.0000000
MINIMUM	1.0000000
RANGE	1.0000000
VARIANCE	0.0312319
ST.DEV.	0.1767254
(Q3-Q1)/2	0.0000000
MX.ST.SC.	3.07
MN.ST.SC.	-2.59

ST.ERROR	0.0360739
	0.0000000

MEAN	1.4583334
MEDIAN	1.5000000
MODE	1.5000000

H	EACH "H" REPRESENTS 2 COUNT(S)
H	
H	
H	
H	
H	
H	
H HH H H	
L-----U	

EACH "--" ABOVE =	0.1000
L=	0.9000
U=	2.2000

CASE NO. OF MIN. VAL. =	1
CASE NO. OF MAX. VAL. =	6

	VALUE	VALUE/S.E.	Q1=	1.5000000
	0.16	0.33	Q3=	1.5000000
SKEWNESS			S=-	1.2816080
KURTOSIS	3.00	3.00	S+=	1.6350589

VALUE	COUNT	PERCENTS	
		CELL	CUM
1.000	1	4.2	4.2
1.200	2	8.3	12.5

VALUE	COUNT	PERCENTS	
		CELL	CUM
1.300	2	8.3	20.8
1.500	18	75.0	95.8

VALUE	COUNT	PERCENTS	
		CELL	CUM
2.000	1	4.2	100.0

Tab.10

S. cephaloptera
 OVARIAN LENGTH (mm)
 STAGE: II

MAXIMUM	0.5000000
MINIMUM	0.2000000
RANGE	0.3000000
VARIANCE	0.0037500
ST.DEV.	0.0612372
(Q3-Q1)/2	0.0000000
MX.ST.SC.	0.20
MN.ST.SC.	-4.69

ST.ERROR	
0.0125000	
0.0000000	

MEAN	0.4875000
MEDIAN	0.5000000
MODE	0.5000000

H
 H EACH "H"
 H REPRESENTS
 H 3
 H COUNT(S)
 H
 H
 H

H
 L-----U

EACH "U" ABOVE = 0.0250
 L= 0.2000
 U= 0.5250

CASE NO. OF MIN. VAL. = 6
 CASE NO. OF MAX. VAL. = 1

	VALUE	VALUE/S.E.	Q1=	0.5000000
SKEWNESS	-4.30	-8.61	Q3=	0.5000000
KURTOSIS	17.24	17.24	S=	0.4262627
			S+=	0.5487372

VALUE	COUNT	PERCENTS CELL	CUM
0.2000	1	4.2	4.2

VALUE	COUNT	PERCENTS CELL	CUM
0.5000	23	95.8	100.0

Tab.11

S. cephaloptera

CL X 100

TL

STAGE: II

MAXIMUM 57.1428566
MINIMUM 33.3333321
RANGE 23.8095245
VARIANCE 24.8200321
ST.DEV. 4.9819708
(Q3-Q1)/2 0.1190472
MX.ST.SC. 2.75
MN.ST.SC. -2.02

ST.ERROR

MEAN 43.4213753
MEDIAN 42.8571434
MODE 42.8571434

H
H
H
H
H
H

EACH "H"
REPRESENTS
2
COUNT(S)

H H
HHH H HH H
L-----U

EACH "-" ABOVE = 2.0000
L = 34.0000
U = 60.0000

CASE NO. OF MIN. VAL. = 1
CASE NO. OF MAX. VAL. = 6

SKENNESS
KURTOSIS

VALUE VALUE/S.E.
0.47 0.94
1.07 1.07

Q1= 42.8571434
Q3= 43.0952377
S-= 38.4394035
S+= 48.4033470

VALUE	COUNT	PERCENTS	CELL	CUM
33.33	1	4.2	4.2	
34.29	1	4.2	8.3	
37.14	1	4.2	12.5	

VALUE	COUNT	PERCENTS	CELL	CUM
40.00	1	4.2	16.7	
42.86	14	58.3	75.0	
43.33	1	4.2	79.2	

VALUE	COUNT	PERCENTS	CELL	CUM
46.88	1	4.2	83.3	
50.00	3	12.5	95.8	
57.14	1	4.2	100.0	

Tab.12

S. cephaloptera

OL X 100

TL

STAGE: II

MAXIMUM 16.666660
MINIMUM 5.7142859
RANGE 10.9523802
VARIANCE 4.6610274
ST.DEV. 2.1589413
(Q3-Q1)/2 0.9300599
MX.ST.SC. 0.97
MN.ST.SC. -4.11

H
H EACH "H"
H REPRESENTS
H 2
H COUNT(S)

ST.ERROR

MEAN 14.5796127 0.4406920
MEDIAN 14.2857141 0.0000000
MODE 14.2857141

H H
H H
HHH

L-----U

EACH "H" ABOVE = 1.0000
L= 5.0000
U= 18.0000

CASE NO. OF MIN. VAL. = 6
CASE NO. OF MAX. VAL. = 1

SKEWNESS
KURTOSIS

VALUE VALUE/S.E. Q1= 14.2857141
-2.66 -5.31 Q3= 16.1458340
9.07 9.07 S= 12.4206715
S+= 16.7385540

VALUE	COUNT	PERCENTS CELL CUM
5.714	1	4.2 4.2
16.667	6	25.0 100.0

VALUE	COUNT	PERCENTS CELL CUM
14.286	16	66.7 70.8

VALUE	COUNT	PERCENTS CELL CUM
15.625	1	4.2 75.0

Tab.13

S. cephaloptera
 TOTAL LENGTH (mm)
 STAGE: III

MAXIMUM	4.0000000
MINIMUM	3.0000000
RANGE	1.0000000
VARIANCE	0.0459559
ST.DEV.	0.2143732
(Q3-Q1)/2	0.0000000
MX.ST.SC.	2.47
MN.ST.SC.	-2.20

MEAN	3.4705882	ST.ERROR	0.0519931
MEDIAN	3.5000000		0.0000000
MODE	3.5000000		

EACH "H"
 REPRESENTS
 2
 COUNT(S)

H
H
H
H
H
H
H
H

L-----U

EACH "-" ABOVE = 0.1000
 L= 2.9000
 U= 4.1000

CASE NO. OF MIN. VAL. = 3
 CASE NO. OF MAX. VAL. = 10

	VALUE	VALUE/S.E.	Q1=	3.5000000
SKEWNESS	-0.36	-0.60	Q3=	3.5000000
KURTOSIS	1.92	1.62	S=-	3.2562151
			S+=	3.6849616

PERCENTS			
VALUE	COUNT	CELL	CUM
3.000	2	11.8	11.8

PERCENTS			
VALUE	COUNT	CELL	CUM
3.500	14	82.4	94.1

PERCENTS			
VALUE	COUNT	CELL	CUM
4.000	1	5.9	100.0

Tab.14

S. cephaloptera
 CAUDAL LENGTH (mm)
 STAGE: III

MAXIMUM	2.0000000
MINIMUM	1.5000000
RANGE	0.5000000
VARIANCE	0.0147059
ST.DEV.	0.1212678
(Q3-Q1)/2	0.0000000
MX.ST.SC.	3.88
MN.ST.SC.	-0.24

MEAN	1.5294118	ST.ERROR	0.0294118
MEDIAN	1.5000000		0.0000000
MODE	1.5000000		

H
 H
 H
 H
 H
 H
 L-----U

EACH "H"
 REPRESENTS
 2
 COUNT(S)

EACH "-" ABOVE = 0.0500
 L= 1.4500
 U= 2.0500

CASE NO. OF MIN. VAL. = 1
 CASE NO. OF MAX. VAL. = 10

	VALUE	VALUE/S.E.	Q1=	1.5000000
SKENNESS	3.42	5.76	Q3=	1.5000000
KURTOSIS	10.34	8.70	S+=	1.4081440
			S+=	1.6506796

		PERCENTS	
VALUE	COUNT	CELL	CUM
1.500	16	94.1	94.1

		PERCENTS	
VALUE	COUNT	CELL	CUM
2.000	1	5.9	100.0

Tab.15

S. cephaloptera

OVARIAN LENGTH (mm)

STAGE: III

MAXIMUM	1.0000000
MINIMUM	1.0000000
RANGE	0.0000000
VARIANCE	0.0000000
ST.DEV.	0.0000000
(Q3-Q1)/2	0.0000000
MX.ST.SC.	0.00
MN.ST.SC.	0.00

ST.ERROR

MEAN	1.0000000	0.0000000
MEDIAN	1.0000000	0.0000000
MODE	1.0000000	

H
H
H
H
H
H
H
H

EACH "H"
REPRESENTS
2
COUNT(S)

L-----U

EACH "-" ABOVE =	0.0000
L=	1.0000
U=	1.0000

CASE NO. OF MIN. VAL. =	1
CASE NO. OF MAX. VAL. =	1

SKEWNESS
KURTOSIS

VALUE	VALUE/S.E.
0.00	0.00
0.00	0.00

Q1=	1.0000000
Q3=	1.0000000
S- =	1.0000000
S+ =	1.0000000

VALUE	COUNT	PERCENTS	
		CELL	CUM
1.	17	100.0	100.0

Tab.16

S. cephaloptera
 CL X 100
 TL
 STAGE: III

MAXIMUM	50.0000000
MINIMUM	42.8571434
RANGE	7.1428566
VARIANCE	7.8781495
ST.DEV.	2.8068042
(Q3-Q1)/2	0.0000000
MX.ST.SC.	2.10
MN.ST.SC.	-0.45

MEAN	44.1176453	ST.ERROR	0.6807500
MEDIAN	42.8571434		0.0000000
MODE	42.8571434		

EACH "H"
 REPRESENTS
 2
 COUNT(S)

L-----U

EACH "-" ABOVE = 0.7500
 L= 42.0000
 U= 51.0000
 CASE NO. OF MIN. VAL. = 1
 CASE NO. OF MAX. VAL. = 3

	VALUE	VALUE/S.E.	Q1=	42.8571434
SKEWNESS	1.55	2.61	Q3=	42.8571434
KURTOSIS	0.44	0.37	S+=	41.3108406
			S+=	46.9244499

PERCENTS				PERCENTS			
VALUE	COUNT	CELL	CUM	VALUE	COUNT	CELL	CUM
42.86	14	82.4	82.4	50.00	3	17.6	100.0

Tab.17

S. cephaloptera

OL X 100

TL

STAGE: III

MAXIMUM 33.3333321
MINIMUM 25.0000000
RANGE 8.3333321
VARIANCE 3.5013990
ST.DEV. 1.8712026
(Q3-Q1)/2 0.0000000
MX.ST.SC. 2.36
MN.ST.SC. -2.10

ST.ERROR

MEAN 28.9215679 0.4538333
MEDIAN 28.5714283 0.0000000
MODE 28.5714283

H EACH "H"
H REPRESENTS
H 2
H COUNT(S)
H

H H H
L-----U

EACH "-" ABOVE = 0.7500
L= 24.7500
U= 33.7500

CASE NO. OF MIN. VAL. = 10
CASE NO. OF MAX. VAL. = 3

Q1= 28.5714283
Q3= 28.5714283
S- = 27.0503694
S+ = 30.7927704
VALUE VALUE/S.E.
SKEWNESS 1.00 1.67
KURTOSIS 1.77 1.49

PERCENTS
VALUE COUNT CELL CUM
25.00 1 5.9 5.9

PERCENTS
VALUE COUNT CELL CUM
28.57 14 82.4 88.2

PERCENTS
VALUE COUNT CELL CUM
33.33 2 11.8 100.0

Tab.18

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