

THE FINAL REPORT OF THE PROJECT - RG/86/B/01

PROJECT TITLE

BIOLOGY OF PRAWNS IN THE JAFFNA LAGOON AND THE
EVALUATION OF THE PERFORMANCE OF THE GEARS USED
IN PRAWN FISHERY

BY

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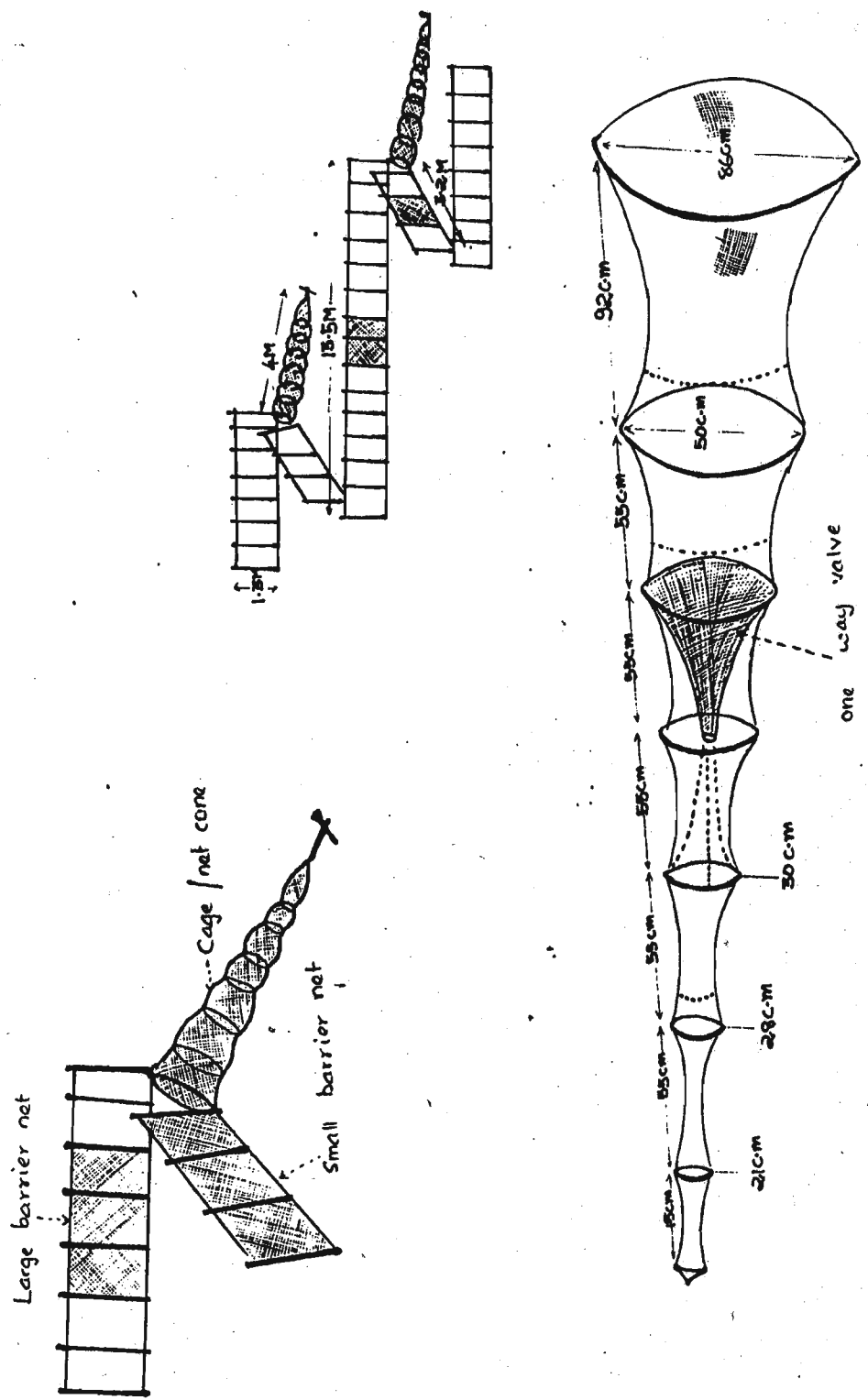


Fig. 5(e): Raal Koodu (Hoop net)

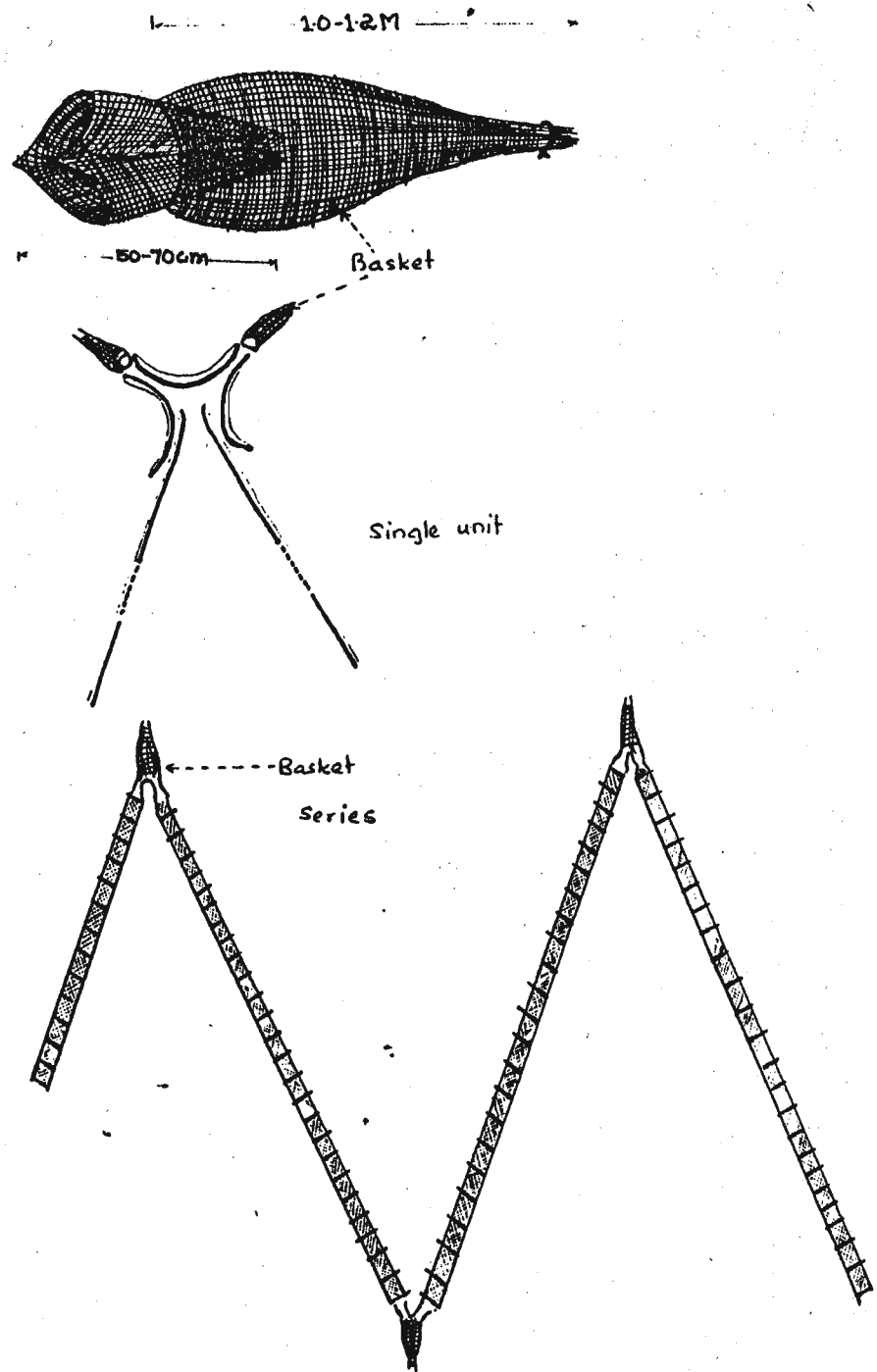


Fig. 5(d): Kandi or Tidal weirs or Traps.

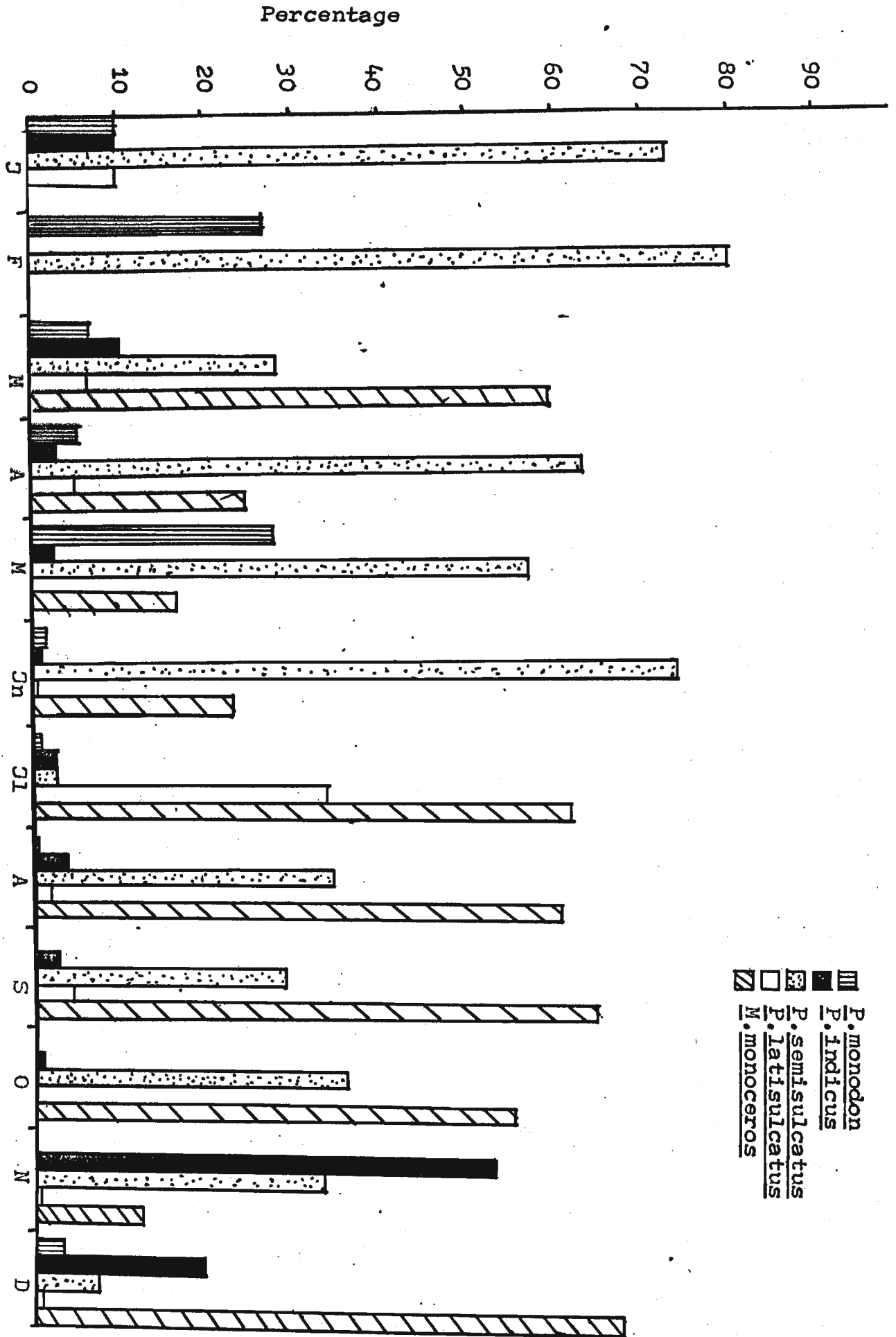


Fig. 6(●): Monthly variations of species composition of catches from Sirahu Valai in 1986.

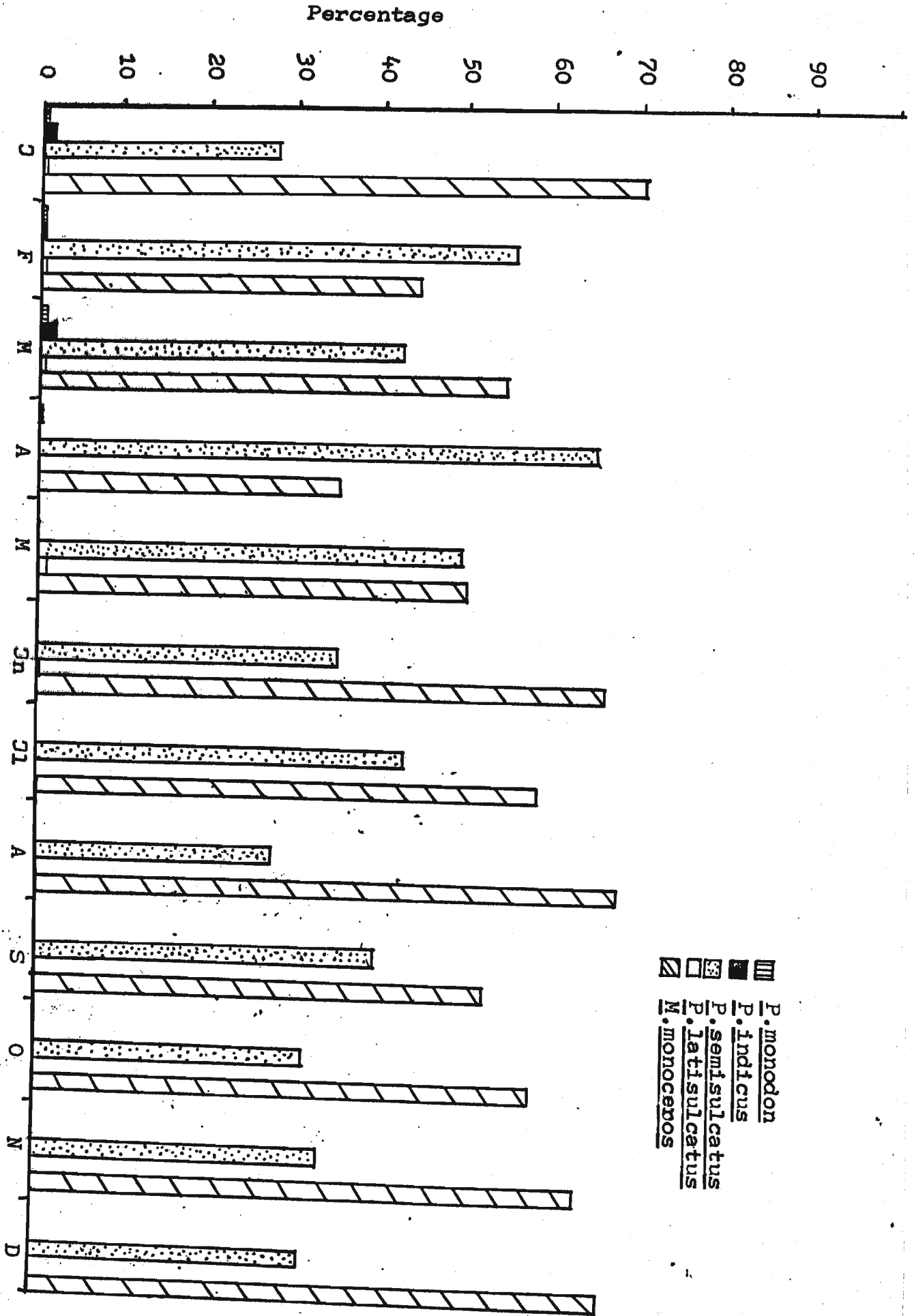


Fig.6(b): Monthly variations of species composition of catches from Drag net in 1986.

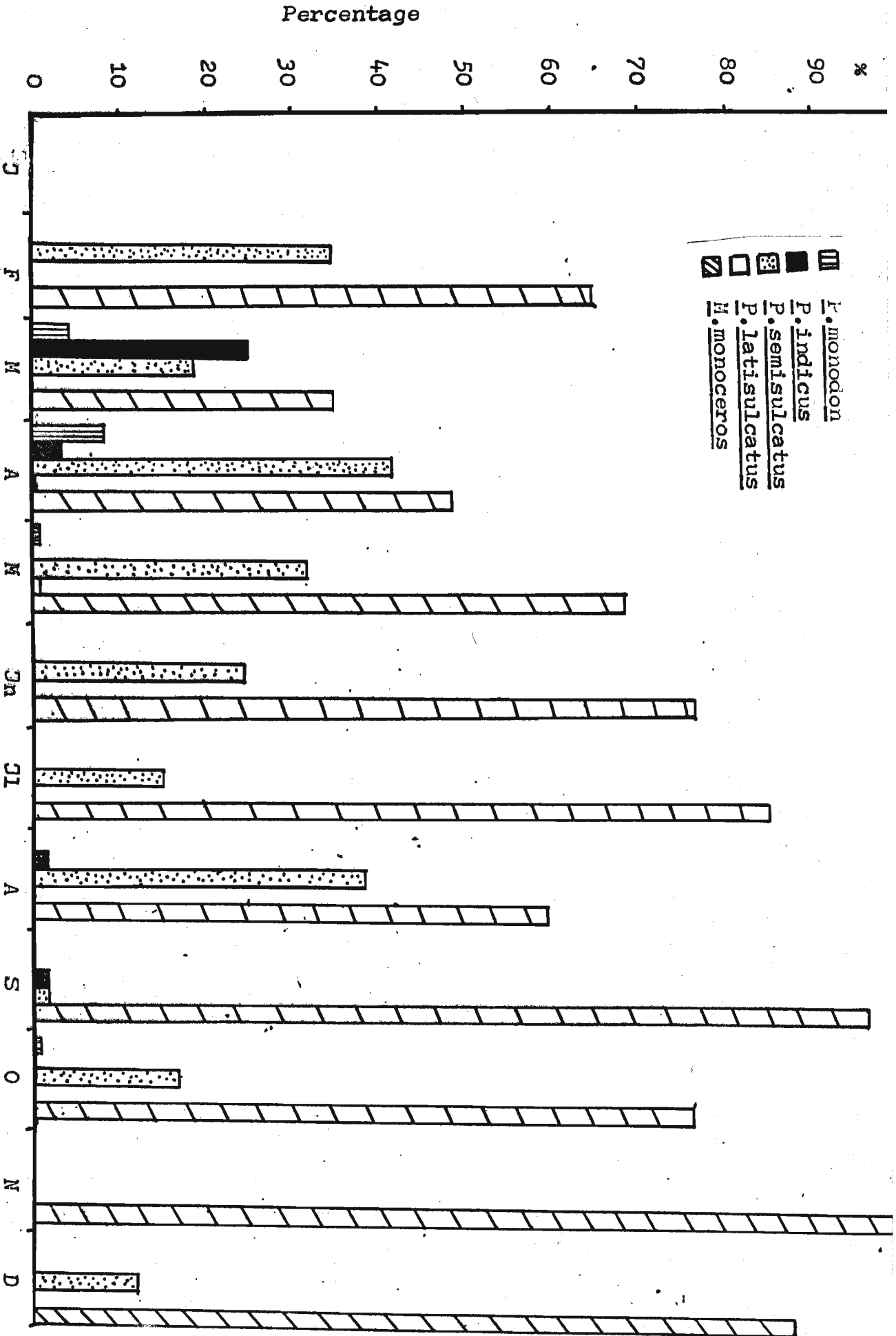


Fig.6(e): Monthly variations of species composition of catches from Reel Koodu in 1986.

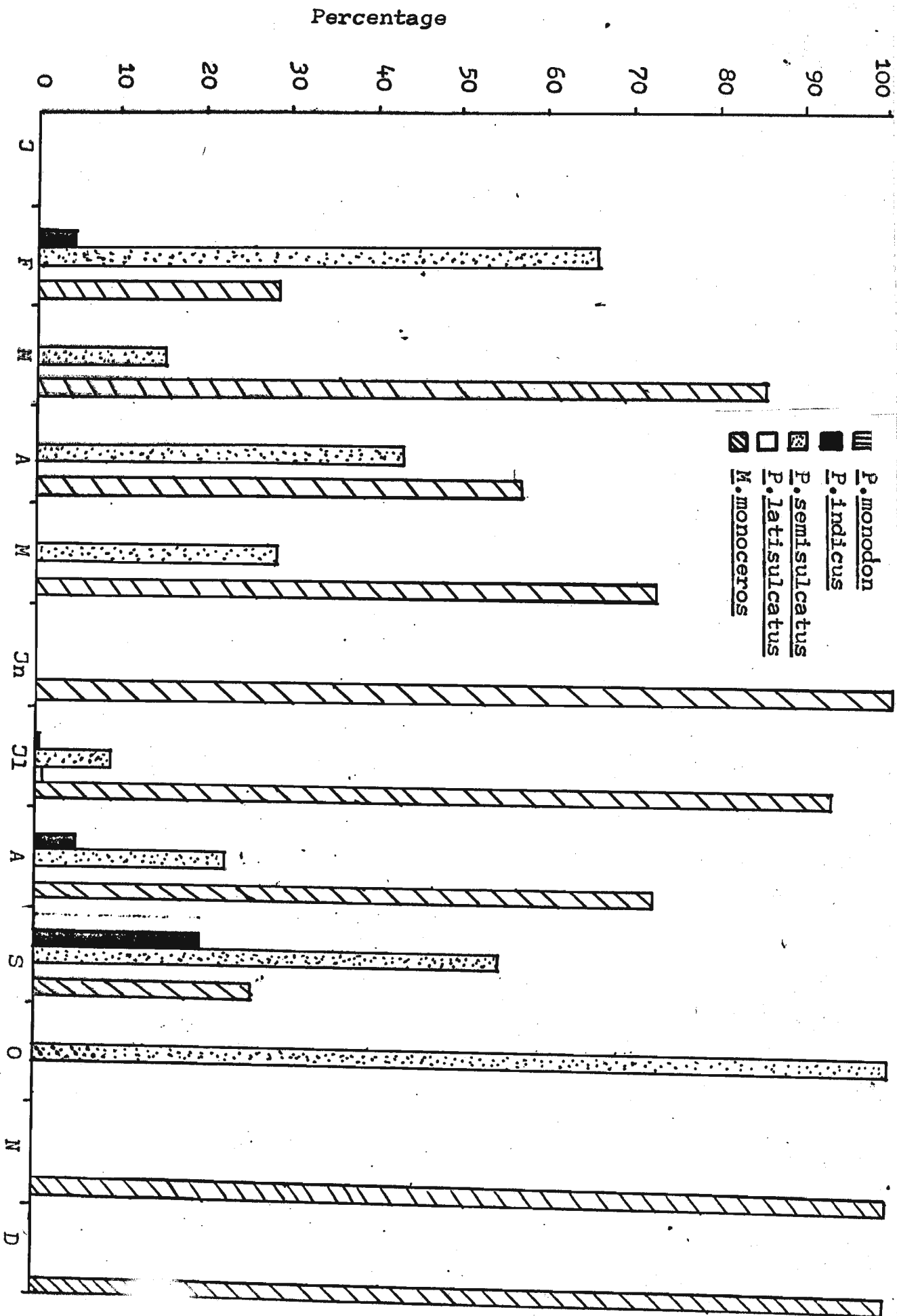


Fig.6(d): Monthly variations of species composition of catches from Kandl in 1986.

species composition

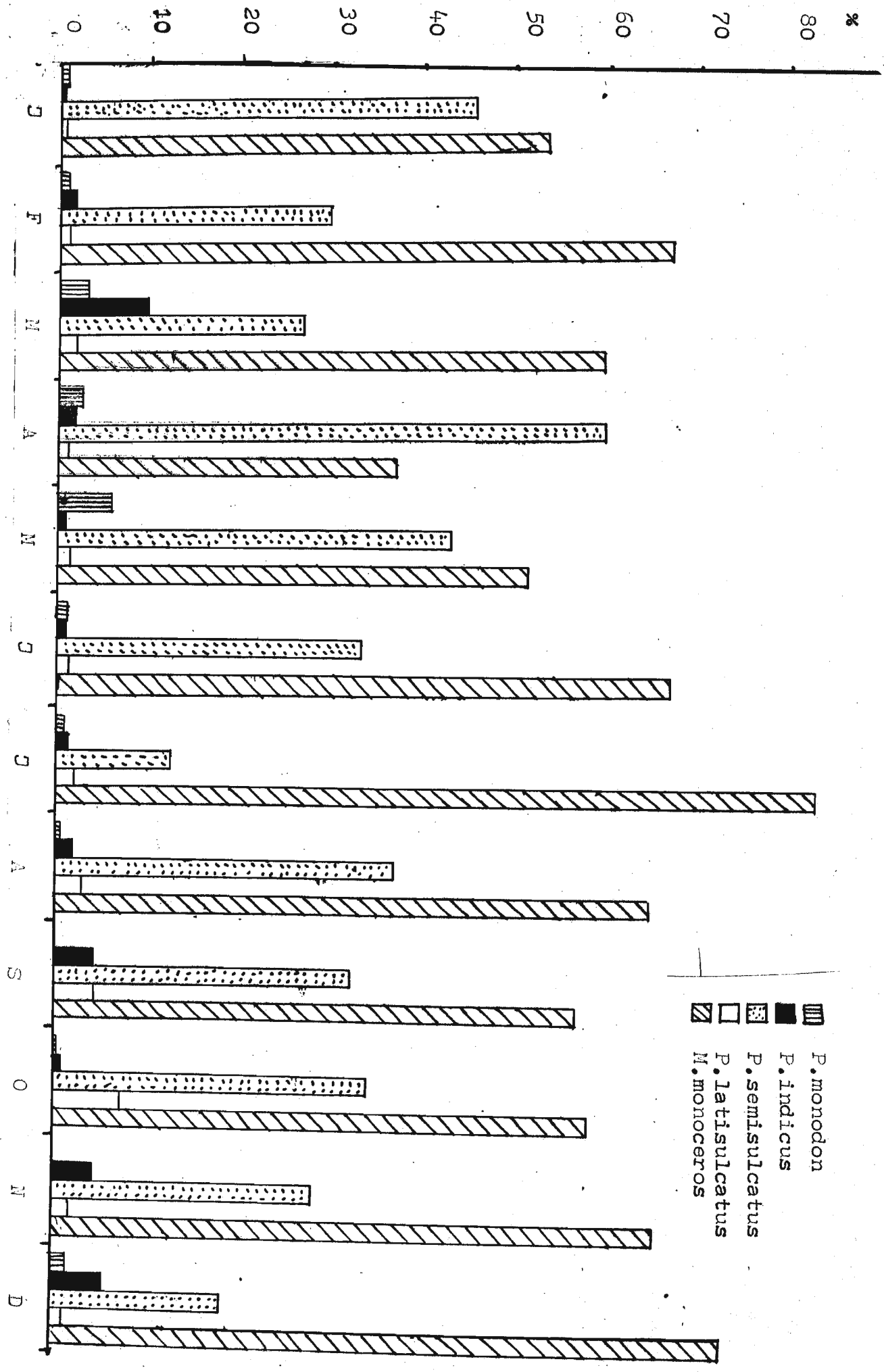


Fig.6(e): Average monthly variations of species composition of cumulative catches from all gears in the Jaffa fishery in 1986.

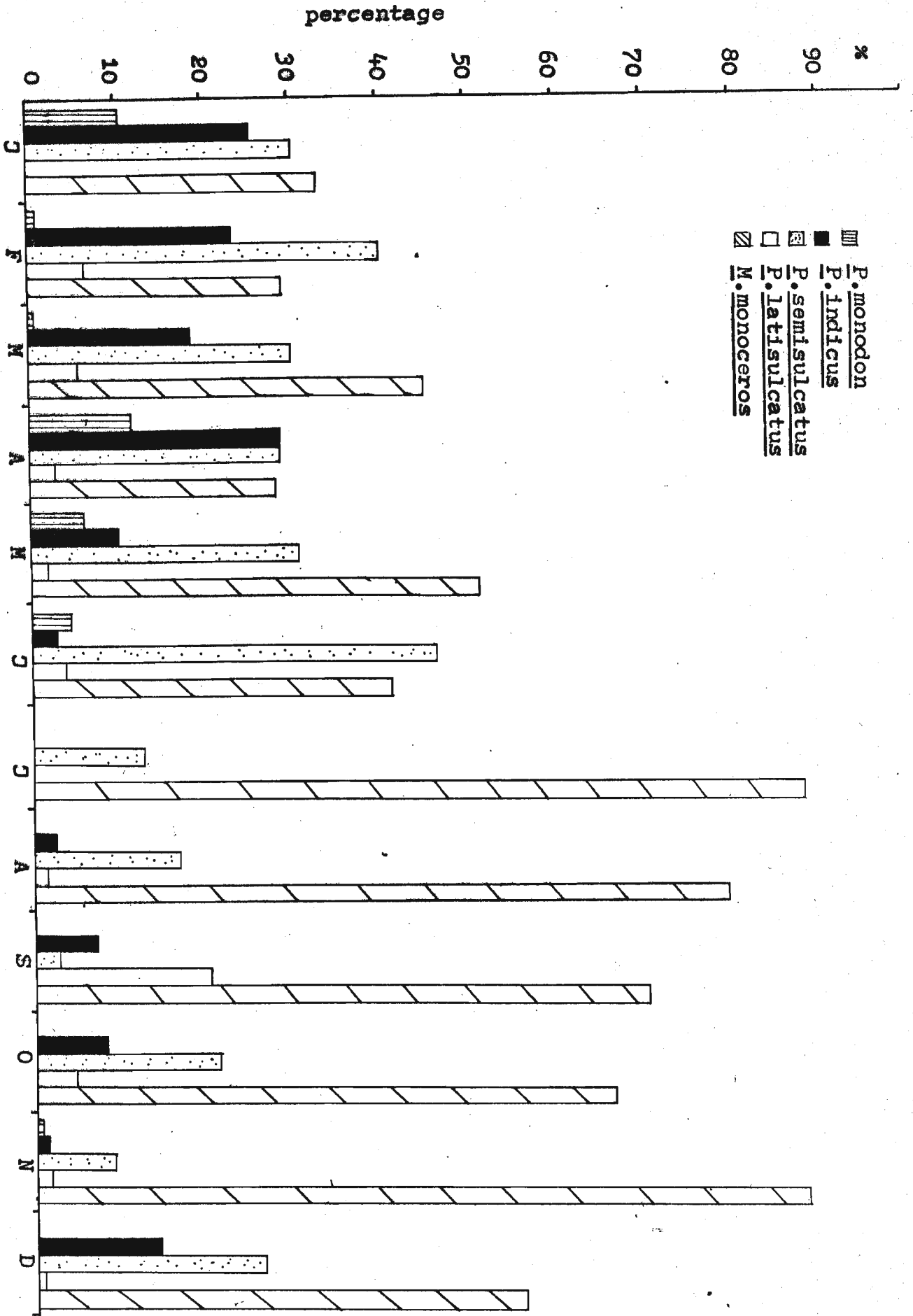


Fig.7(a): Monthly variations of species composition of catches from Sirahu valai in 1987.

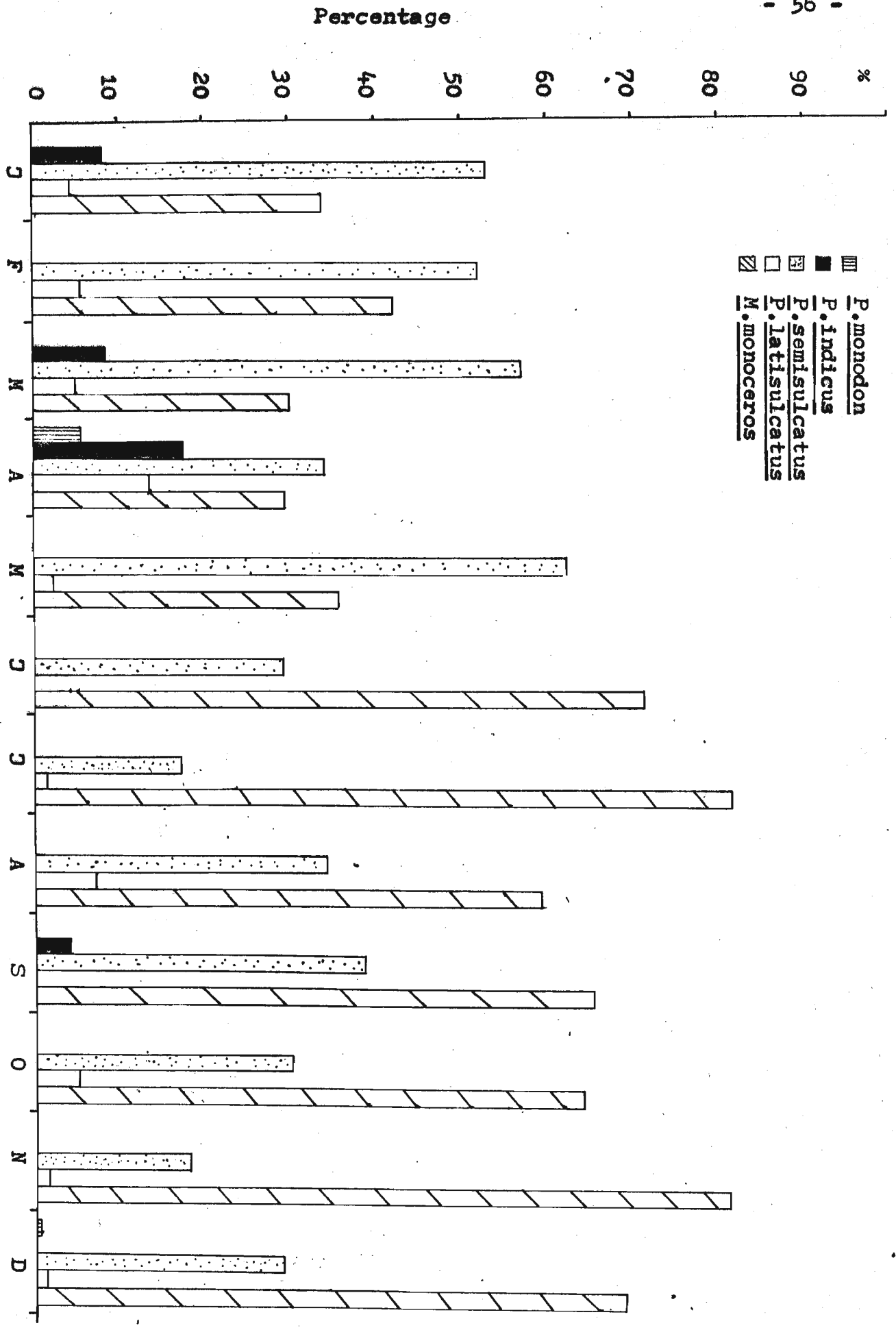


Fig.7(b): Monthly variations in species composition of catches from Drag net in 1987.

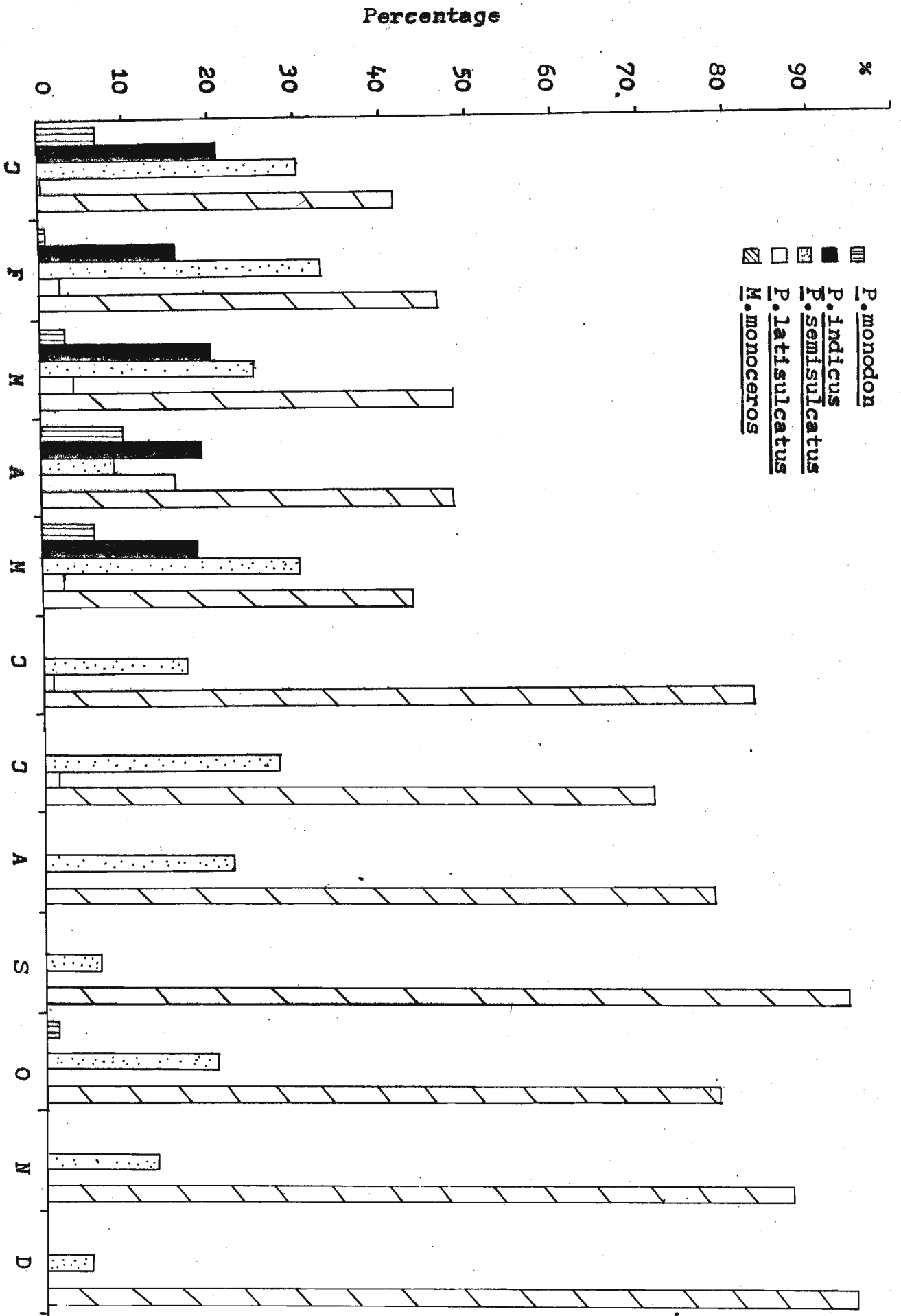


Fig.7(c): Monthly variations of species composition of catches from Hoop net in 1987.

Percentage

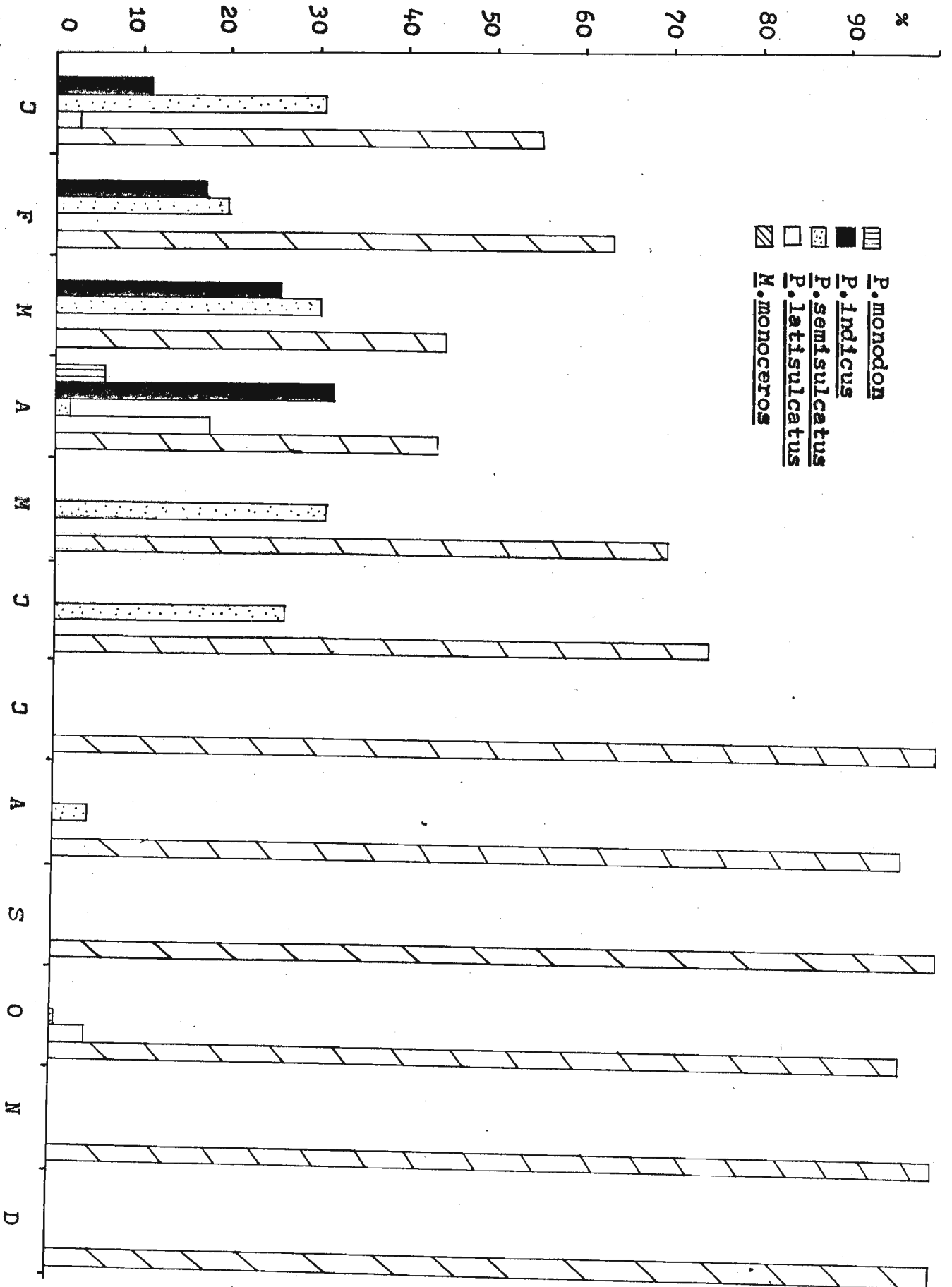


Fig.7(d): Monthly variations of species composition of catches from Kandi in 1987.

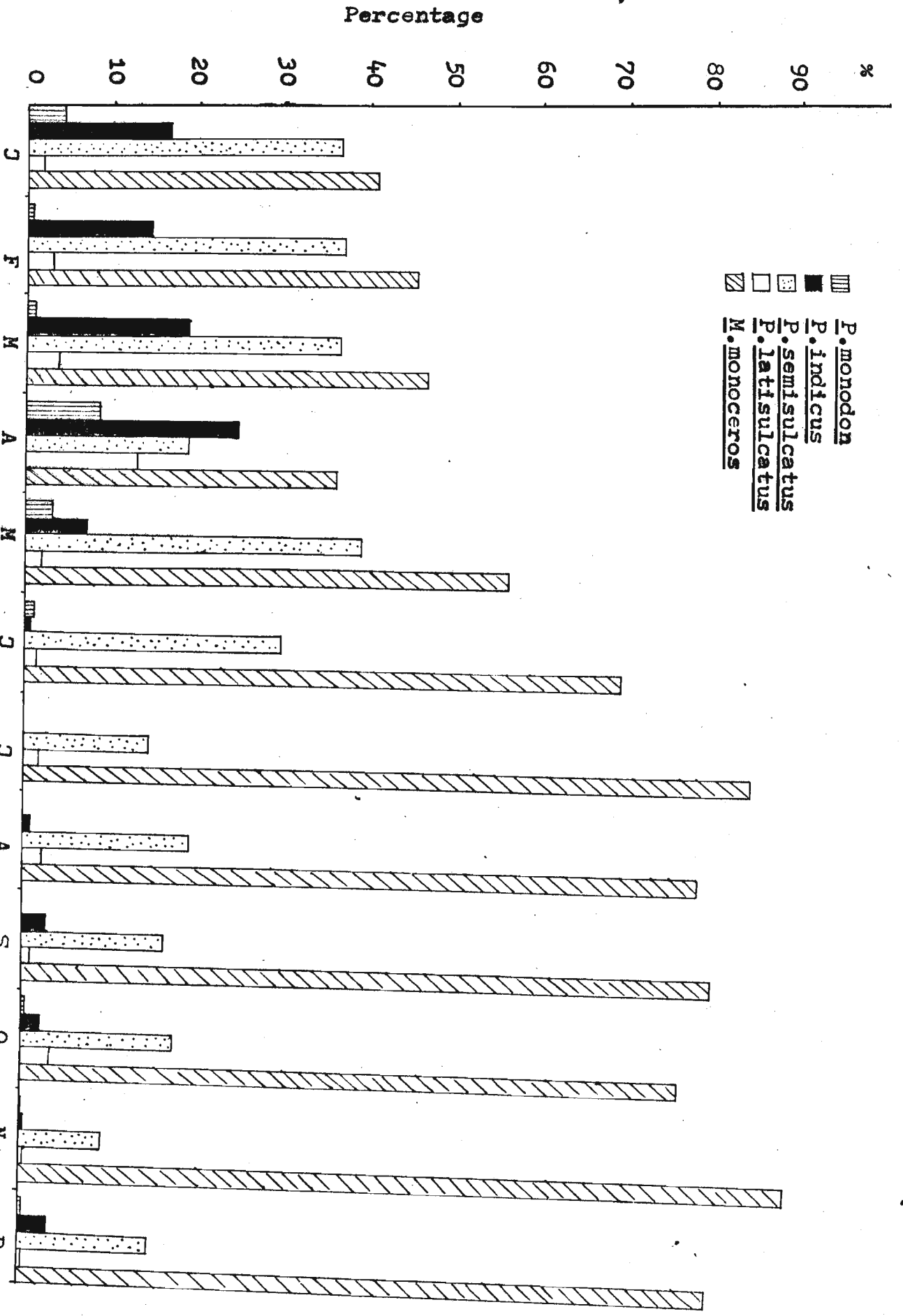


Fig.7(e): Average monthly variations of species composition of cumulative catches from all gears in the Jaffna lagoon in 1987.

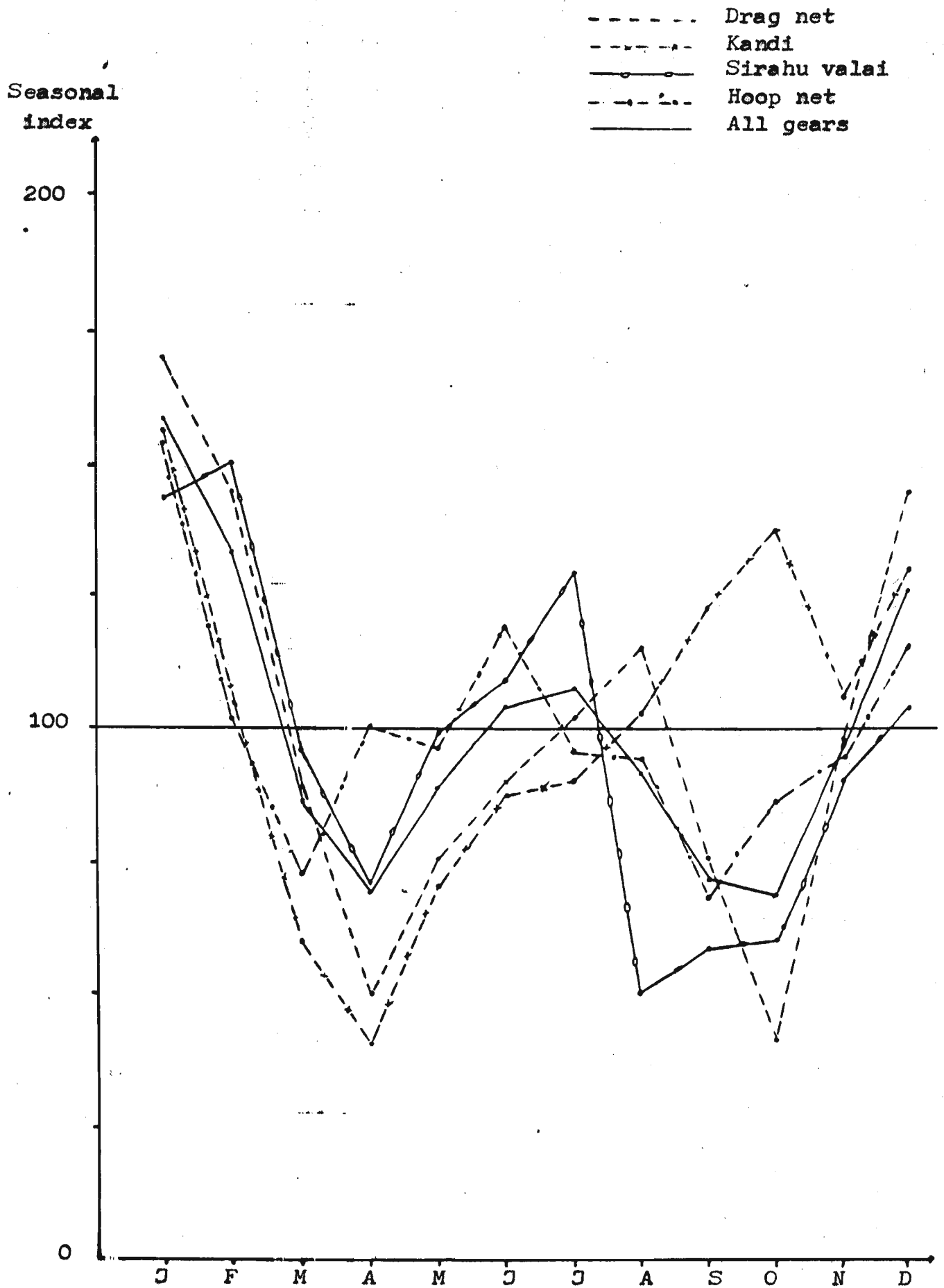


Fig.8(a): Monthly trends of CPUE in the Jaffna lagoon in 1986, using seasonal indices.

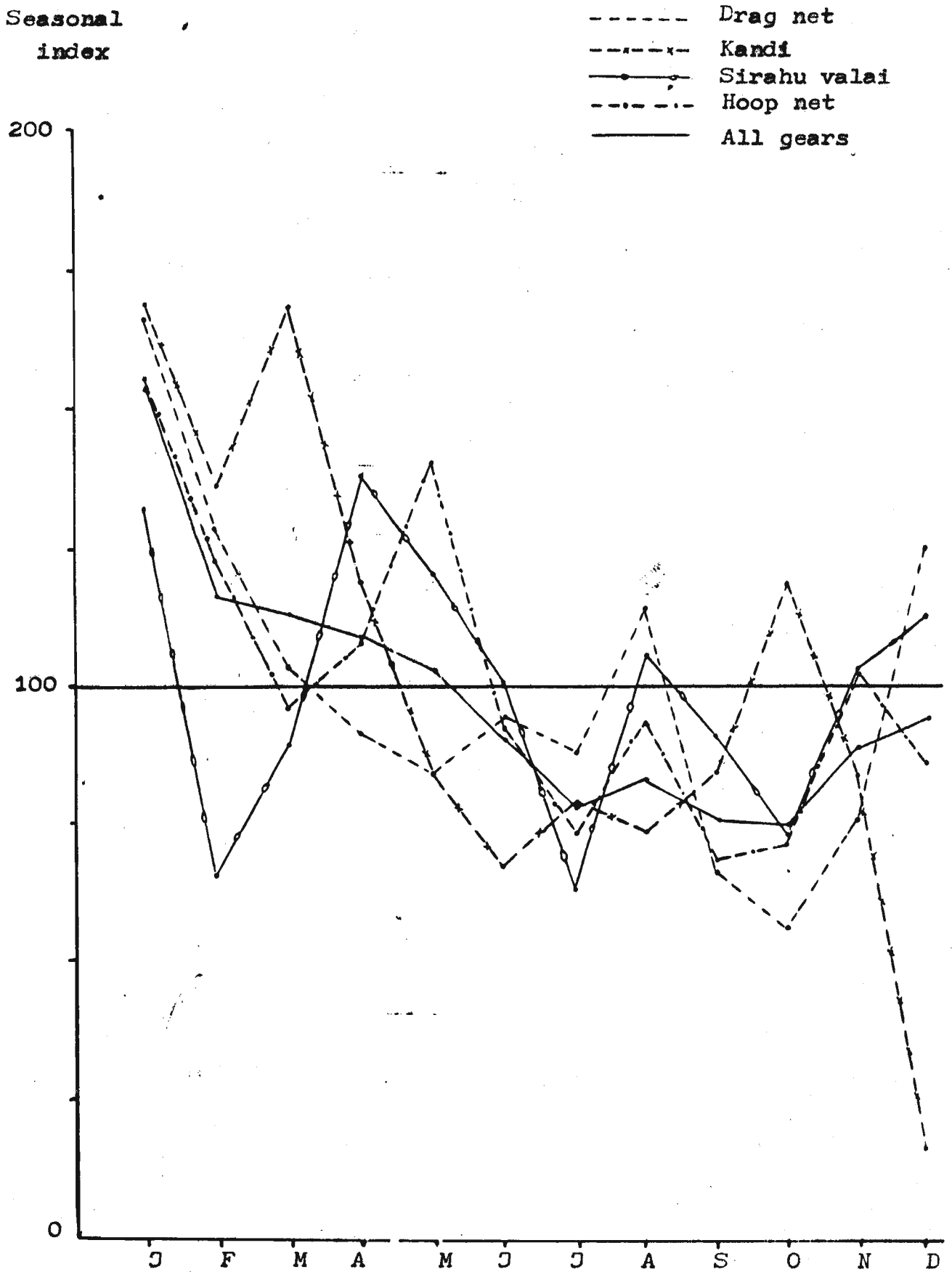
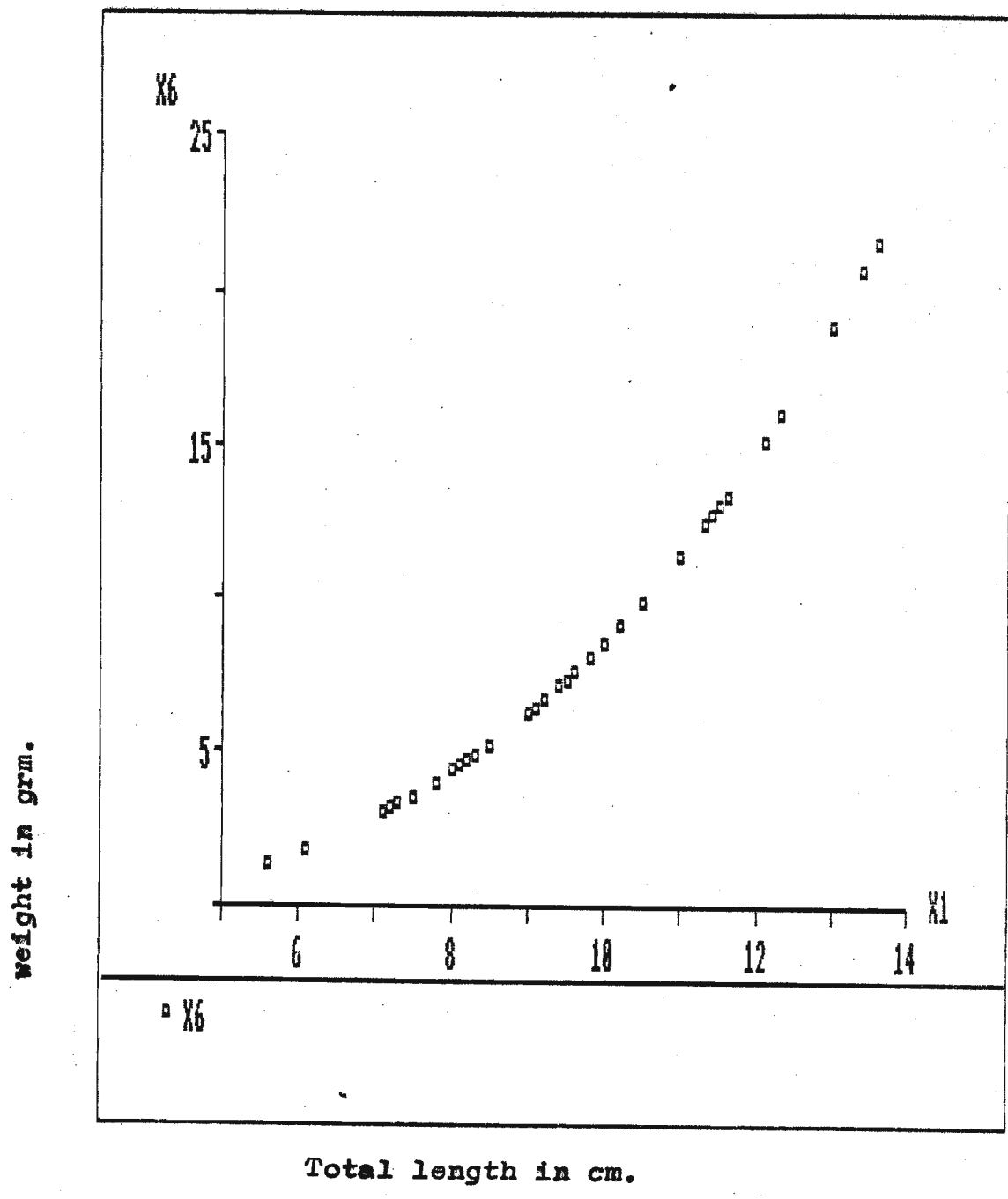


Fig.8(b): Monthly trends of CPUE in the Jaffna lagoon in 1987, using seasonal indices.

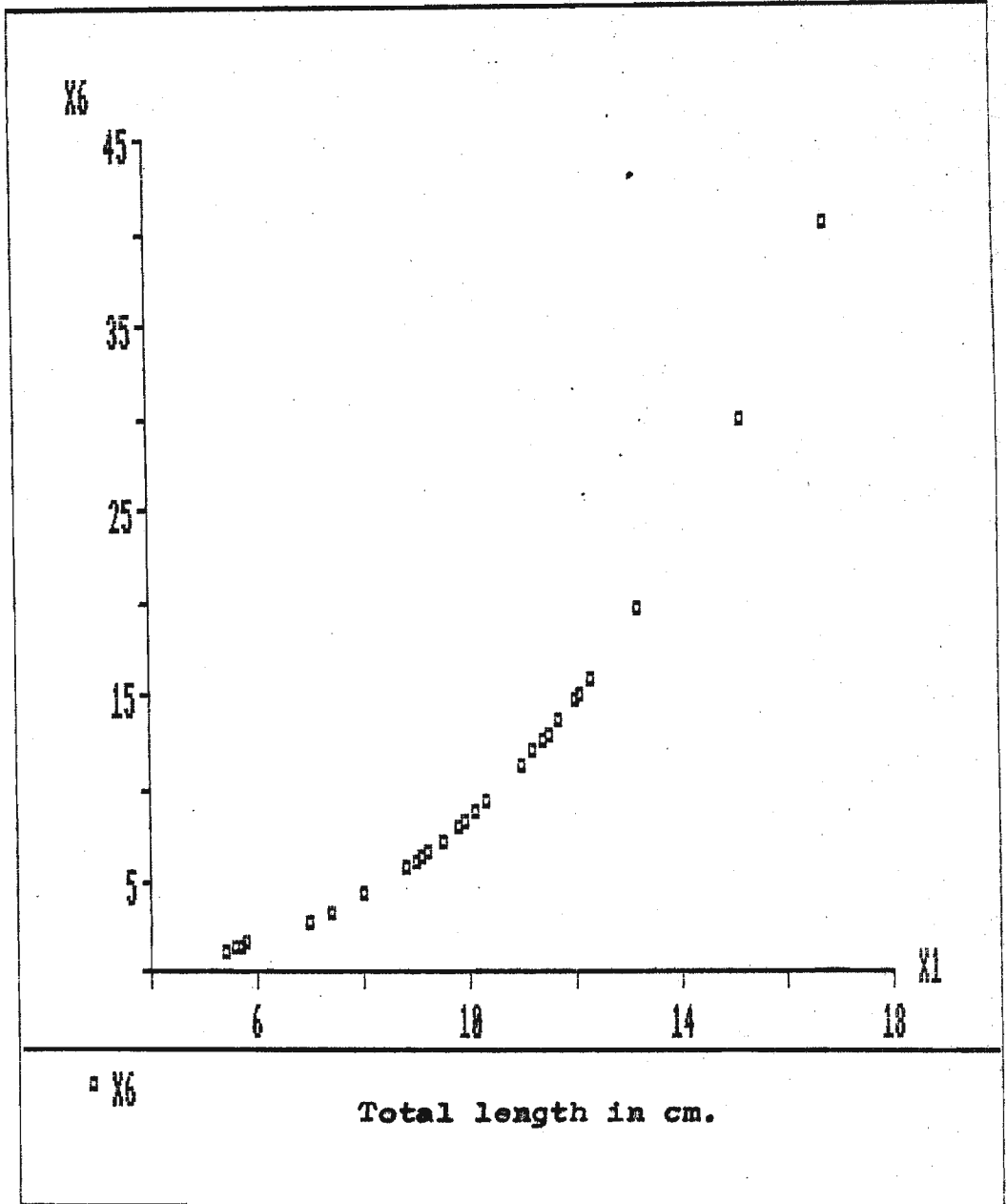


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: *DTEXT

Fig.9(a): Total length - weight relationship of male P.monodon.

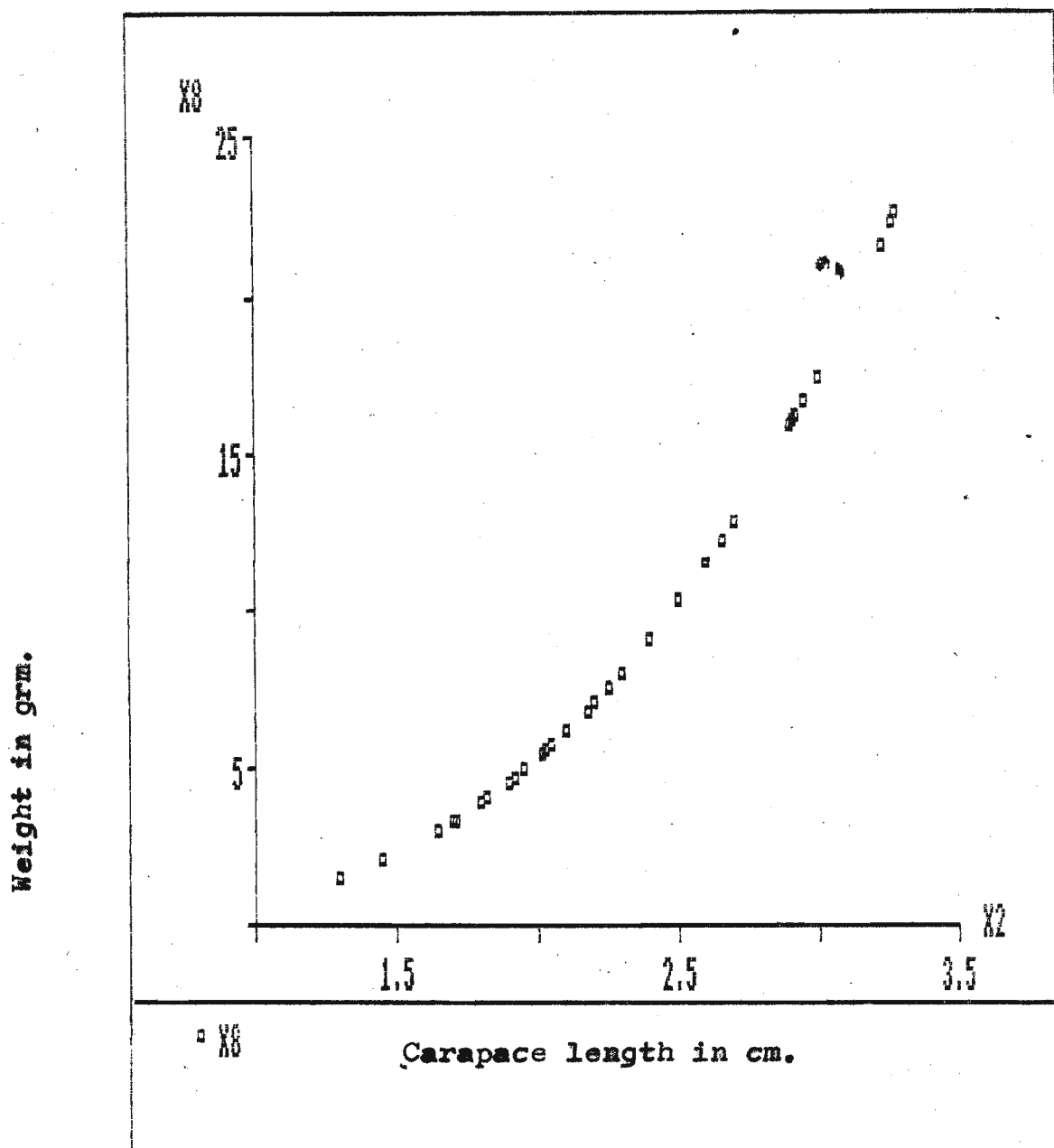
Weight in grm.



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: NOTE.P.MONODON_FEMALE
: NOTE_ a=0.0083445 b=3.0078 T/L VS T/W*DTEXT
: *DTEXT

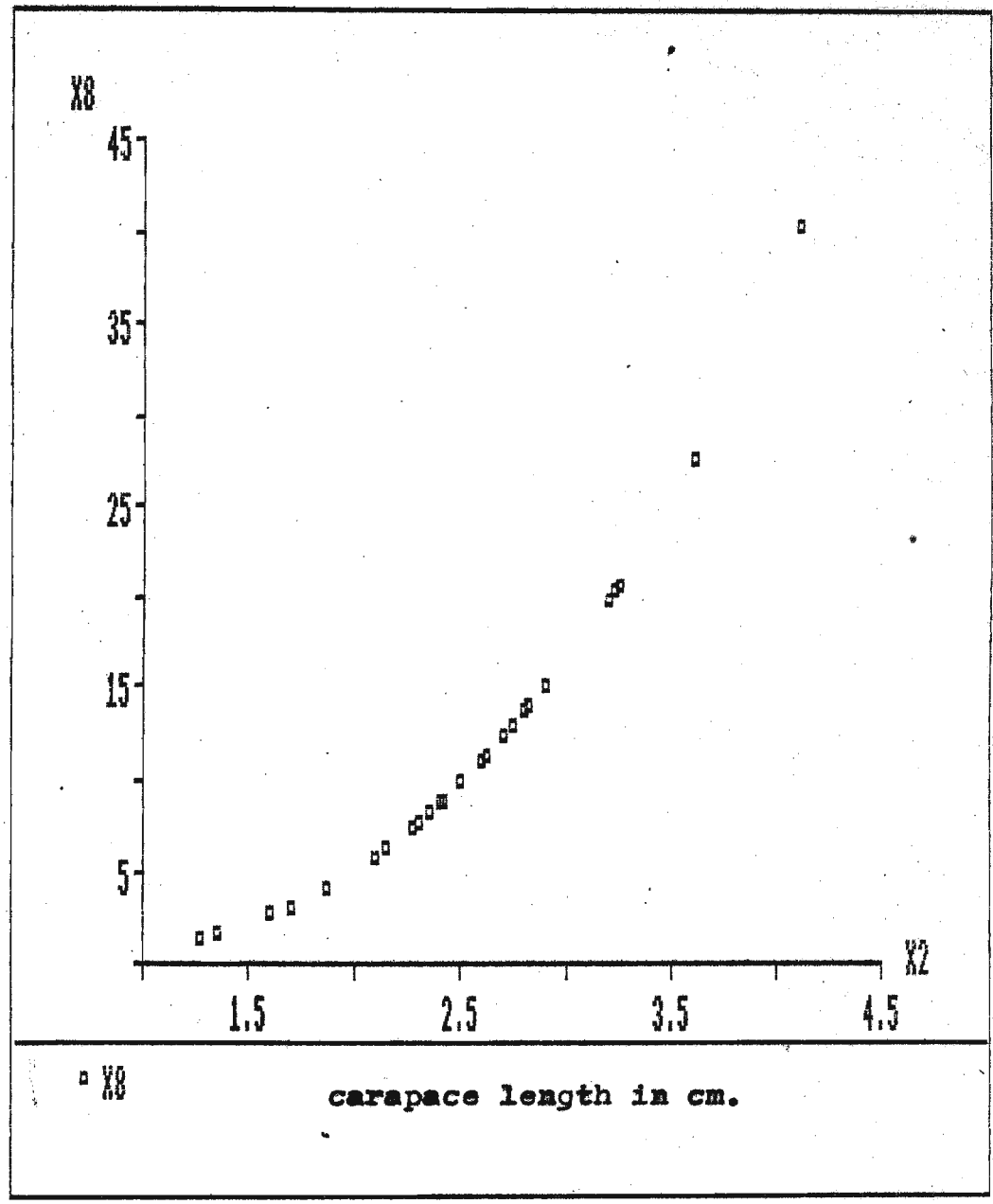
Fig.9(b): Total length - weight relationship of female P.monodon.



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: NOTE P.MONODON MALE
: NOTE_ a=0.71973 b=2.9022*DTEXT
: *DTEXT

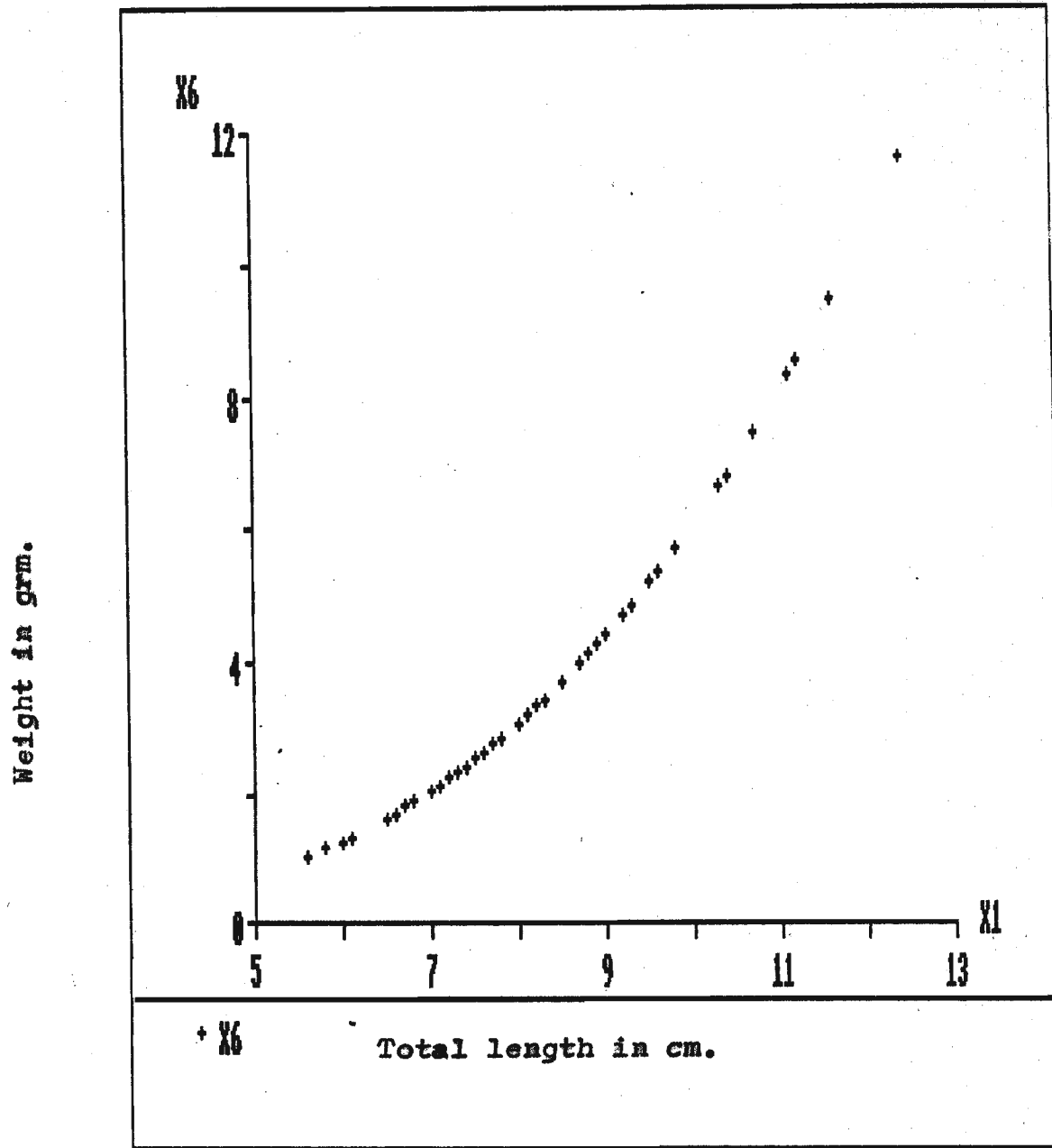
Fig.9(c): Carapace length - weight relationship of male P.monodon.



INSTAT Err :On War :On Ech :On WS:P.MONO_F Mem :9717

: NOTE _ P.MONODON _ FEMALE
: NOTE _ a=0.7108 b=2.8634 C/L VS T/W
: *DTEXT

Fig.9(d): Carapace length - weight relationship of female P.monodon.

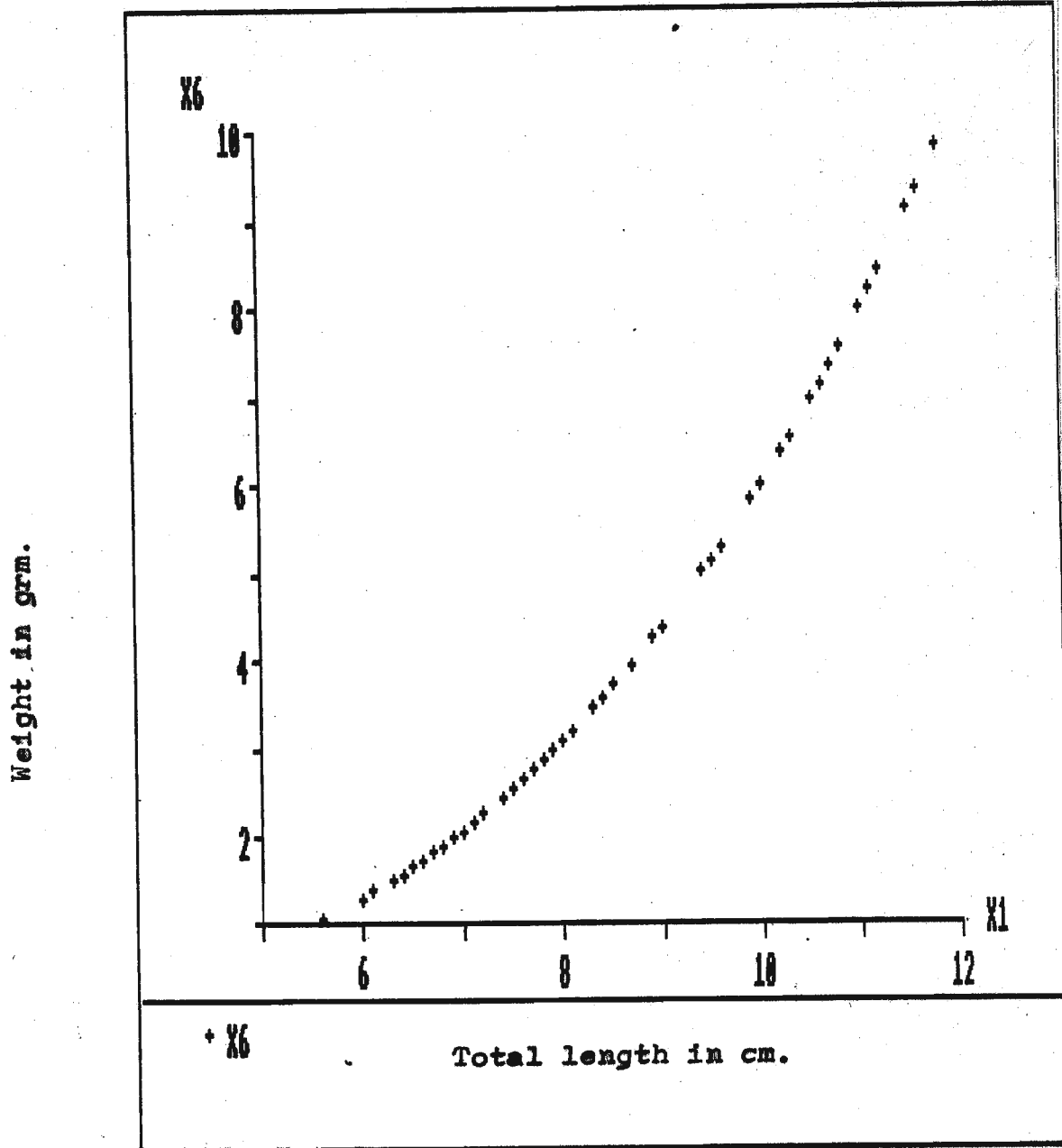


INSTAT Err :0n War :0n Ech :0n WS:INDI_M(m) Mem :4692

Fig.10(a): Total length - weight relationship of male P.indicus.

INSTAT Err :0n War :0n Ech :0n WS:INDI_M(m) Mem :4692

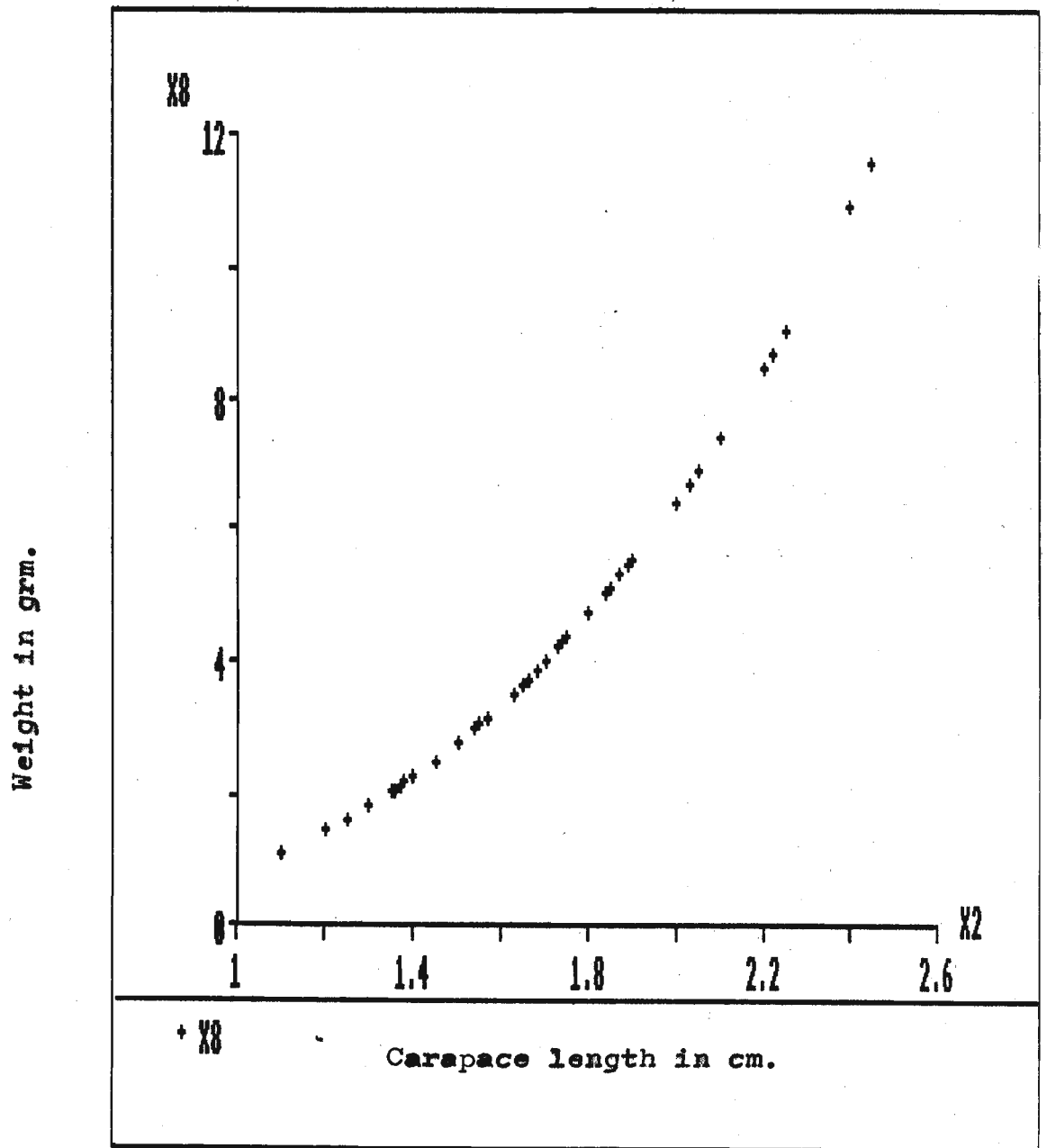
: NOTE _ P.indicus _ MALE
: NOTE _ a=0.0057597 b=3.0242 T/W VS T/L
: *DTEXT



INSTAT Err :On War :On Ech :On WS:INDI_F Mem :9662

: NOTE _ P.indicus _ FEMALE
: NOTE _ $W=a \cdot L^b$ a=0.0063285 b=2.9794 T/W VS T/L
: *DTEXT

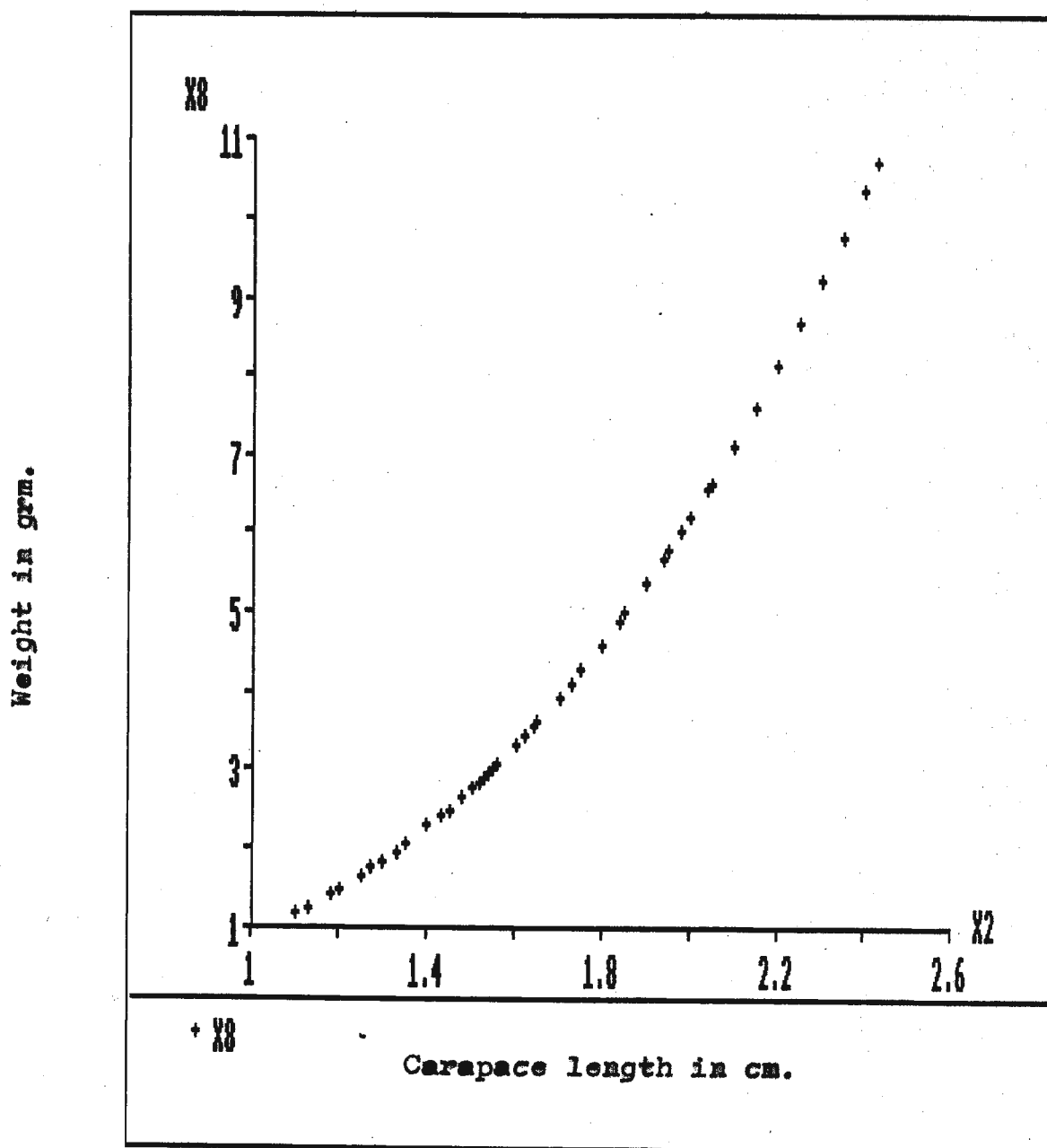
Fig.10(b): Total length - weight relationship of female P.indicus



INSTAT Err :On War :On Ech :On WS:INDI_M(m) Mem :4735

: NOTE _ P.indicus _ MALE
: NOTE _ a=0.84917 b=2.9202
: NOTE _ T/W VS C/L
: *DTEXT

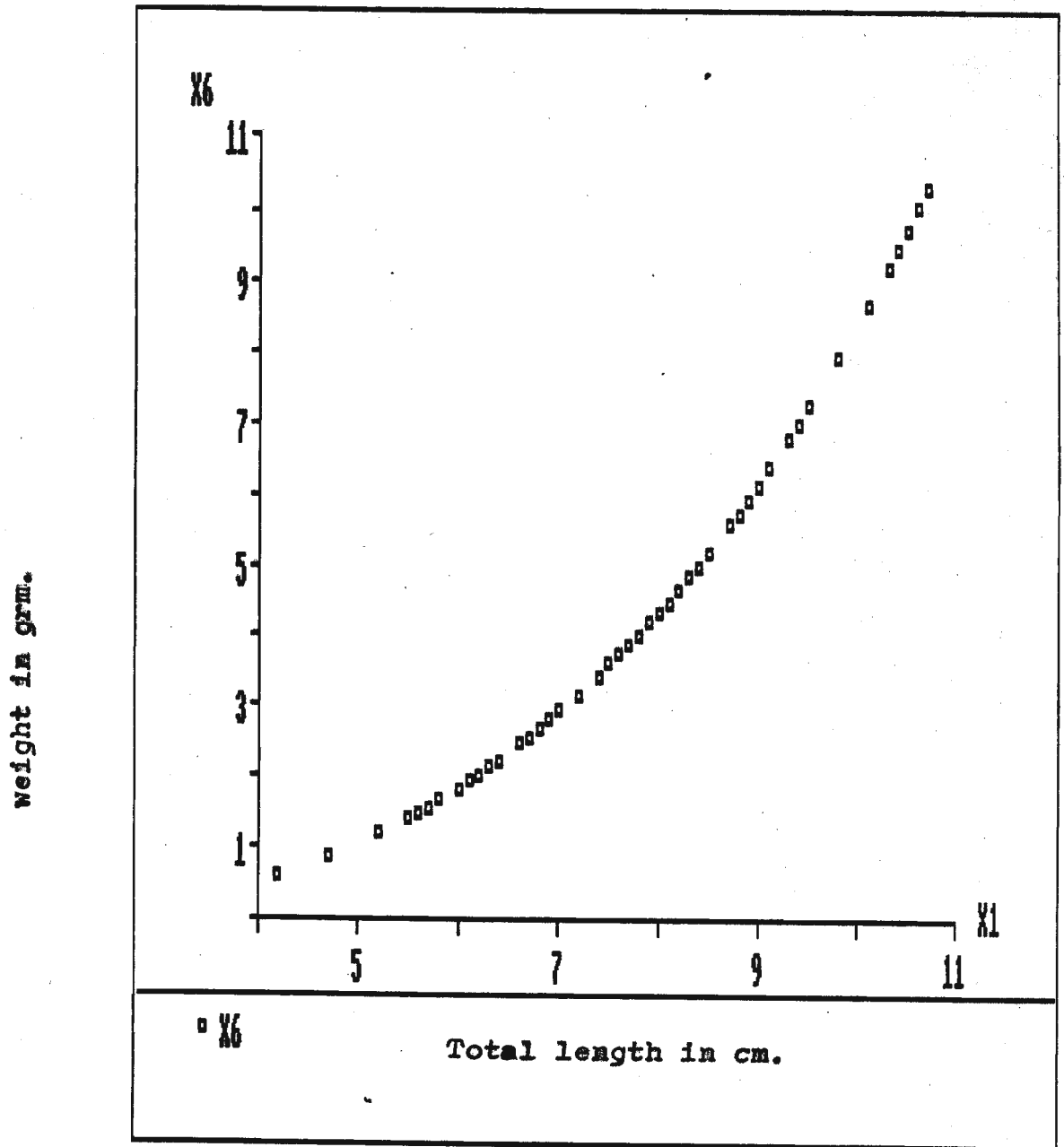
Fig.10(c): Carapace length - weight relationship of male P.indicus



INSTAT Err :On War :On Ech :On WS:INDI_F Mem :9661

: NOTE _ P. indicus _ FEMALE
: NOTE _ a=0.87791 b=2.8213 T/W VS C/L
: *DTEXT

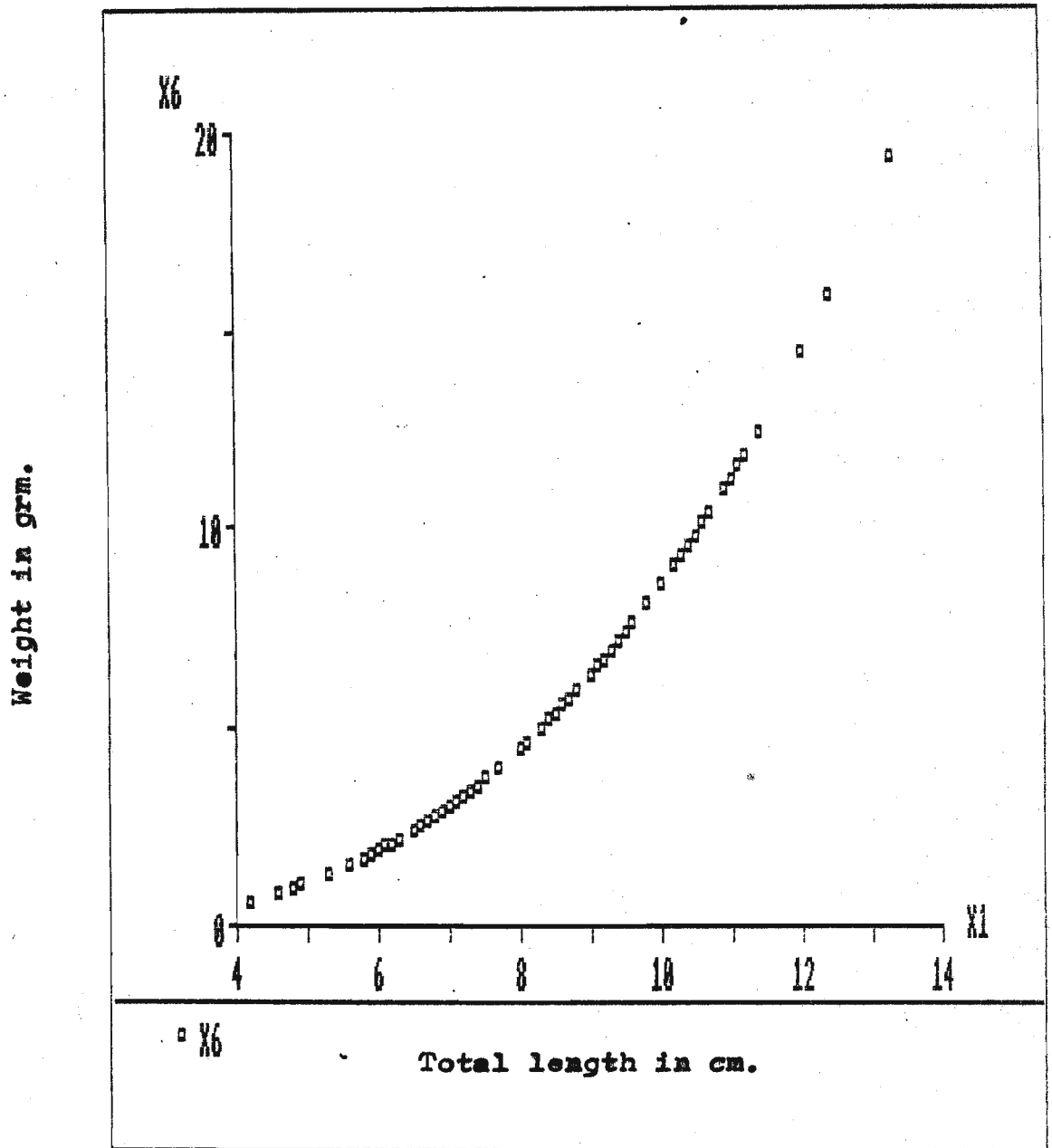
Fig.10(d): Carapace length - weight relationship of female P.indicus.



INSTAT Err :On War :On Ech :On WS:P.SEMI_M(m) Mem :2960

: NOTE _ P.semisulcatus _ MALE
: NOTE _ a=0.009074 b=2.9674
: *DTEXT

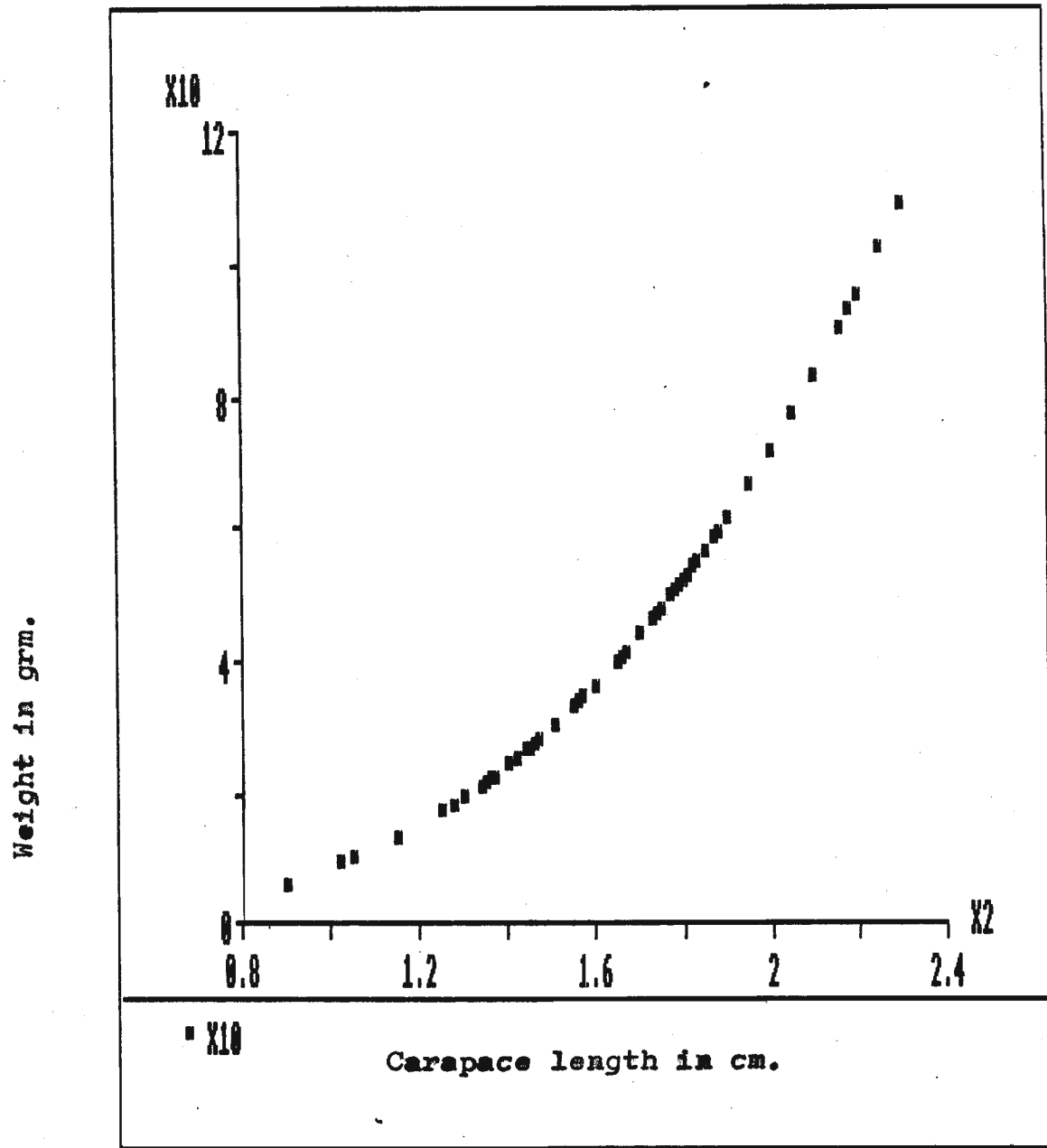
Fig.11(a): Total length - weight relationship of male P.semisulcatus.



INSTAT Err :On War :On Ech :On WS:SEMI_F Mem :9718

: NOTE _ P.Semisulcatus _ FEMALE
: NOTE _ a=0.011205 b=2.8836*DTEXT
: *DTEXT

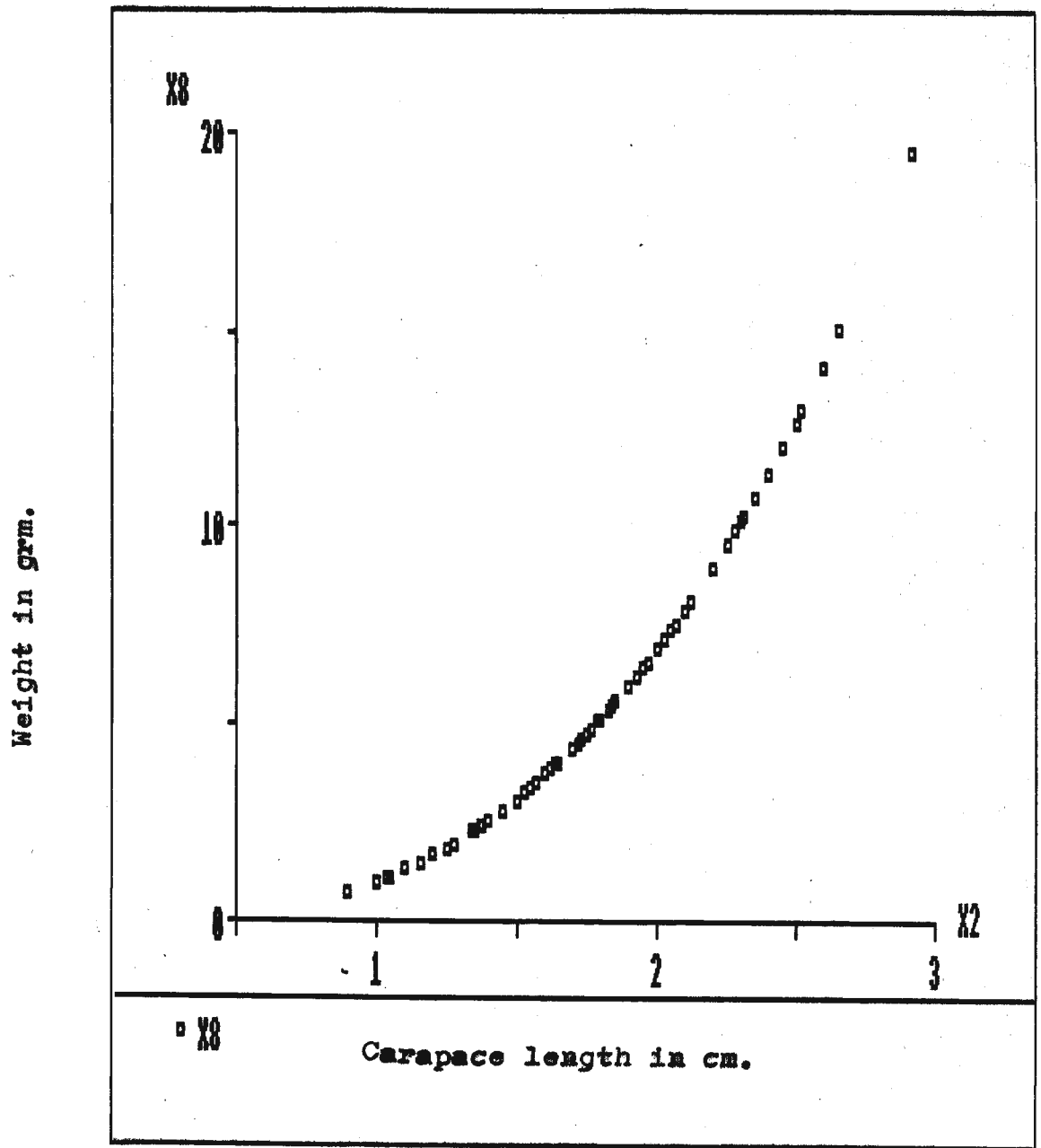
Fig.11(b): Total length - weight relationship of female P.semisulcatus.



INSTAT Err :On War :On Ech :On WS:P.SEMI_M(m) Mem :2998

: NOTE _ P.semisulcatus _ male
: NOTE _ a=0.89326 b=3.0125 T/W VS C/L
: *DTEXT

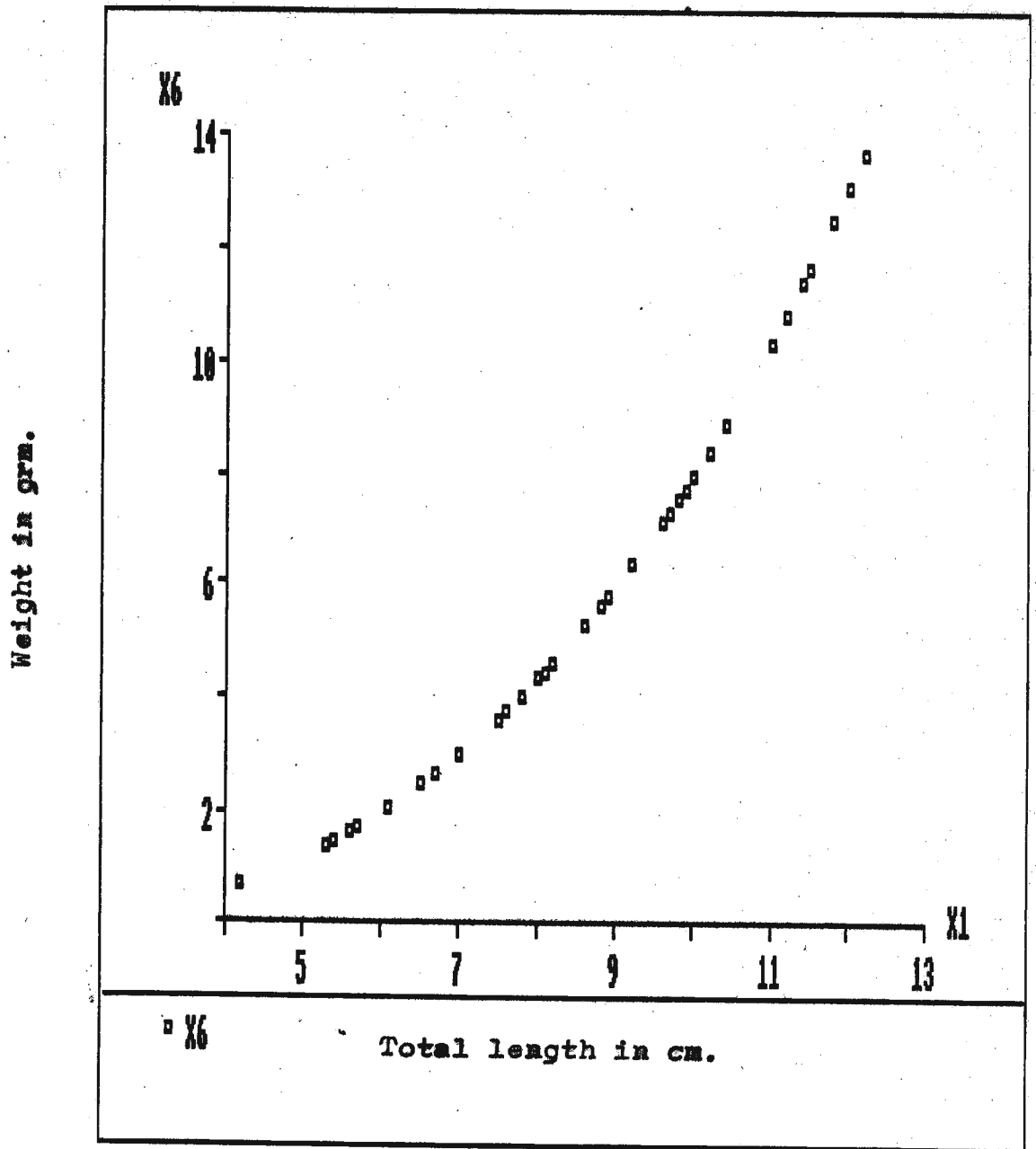
Fig.11(c): Carapace length - weight relationship of male P.semisulcatus.



INSTAT Err :On War :On Ech :On WS:SEMI_F Mem :9597

: NOTE_ P.semisulcatus _ FEMALE
: NOTE_ a=1.0262 b=2.7501
: *DTEXT

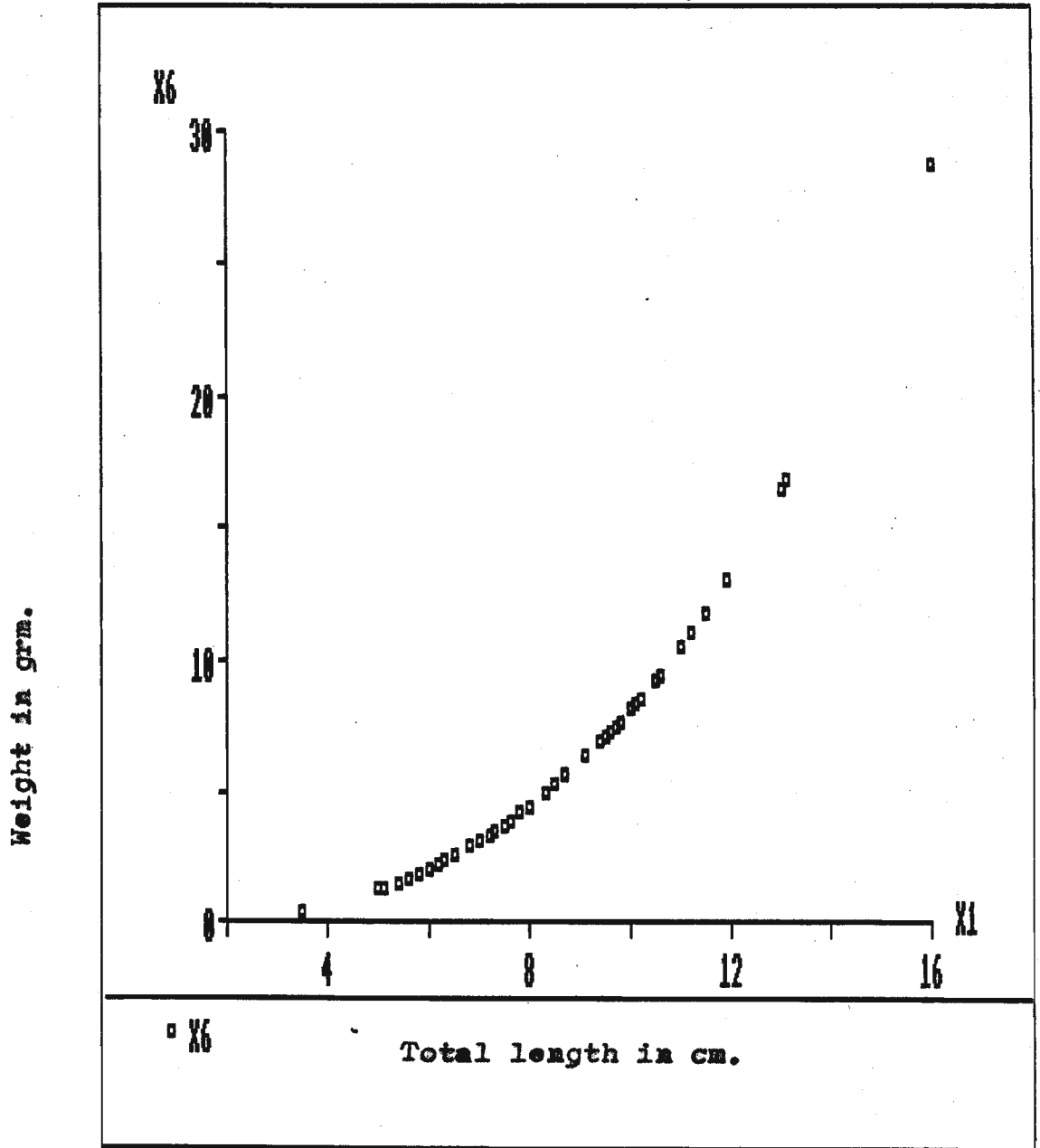
Fig.11(d): Carapace length - weight relationship of female *P.semisulcatus*.



INSTAT Err :On War :On Ech :On WS:LATI_M(m) Mem :8367

: NOTE _ P.latisulcatus _ MALE
: NOTE _ a=0.014531 b=2.7386 T/W VS T/L
: *DTEXT

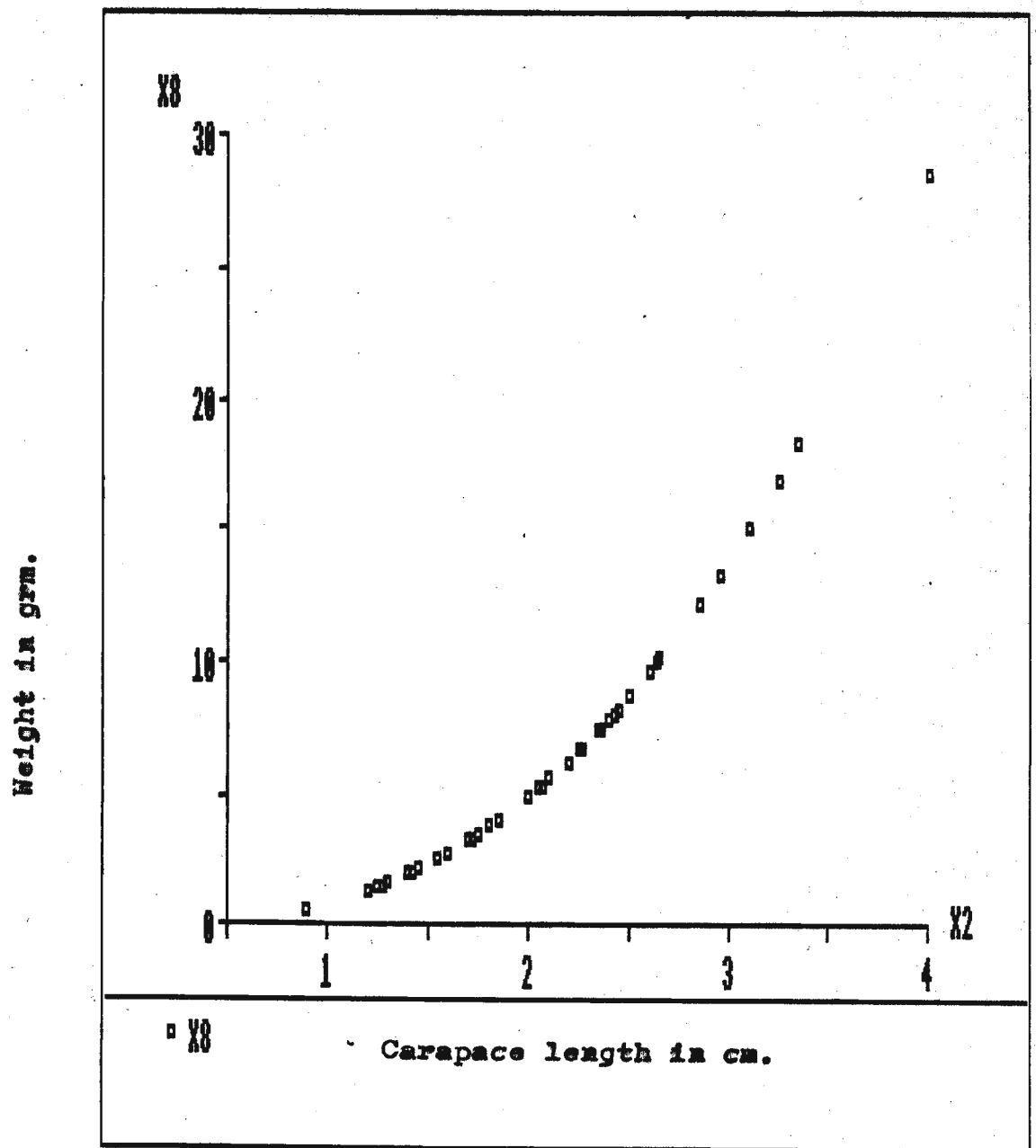
Fig.12(a): Total length - weight relationship of male P.latisulcatus.



INSTAT Err :On War :On Ech :On WS:LATI_F(m) Mem :6697

: NOTE _ P.latisulcatus _ FEMALE
: NOTE _ a=0.016994 b=2.6827 T/W VS T/L
: *DTEXT

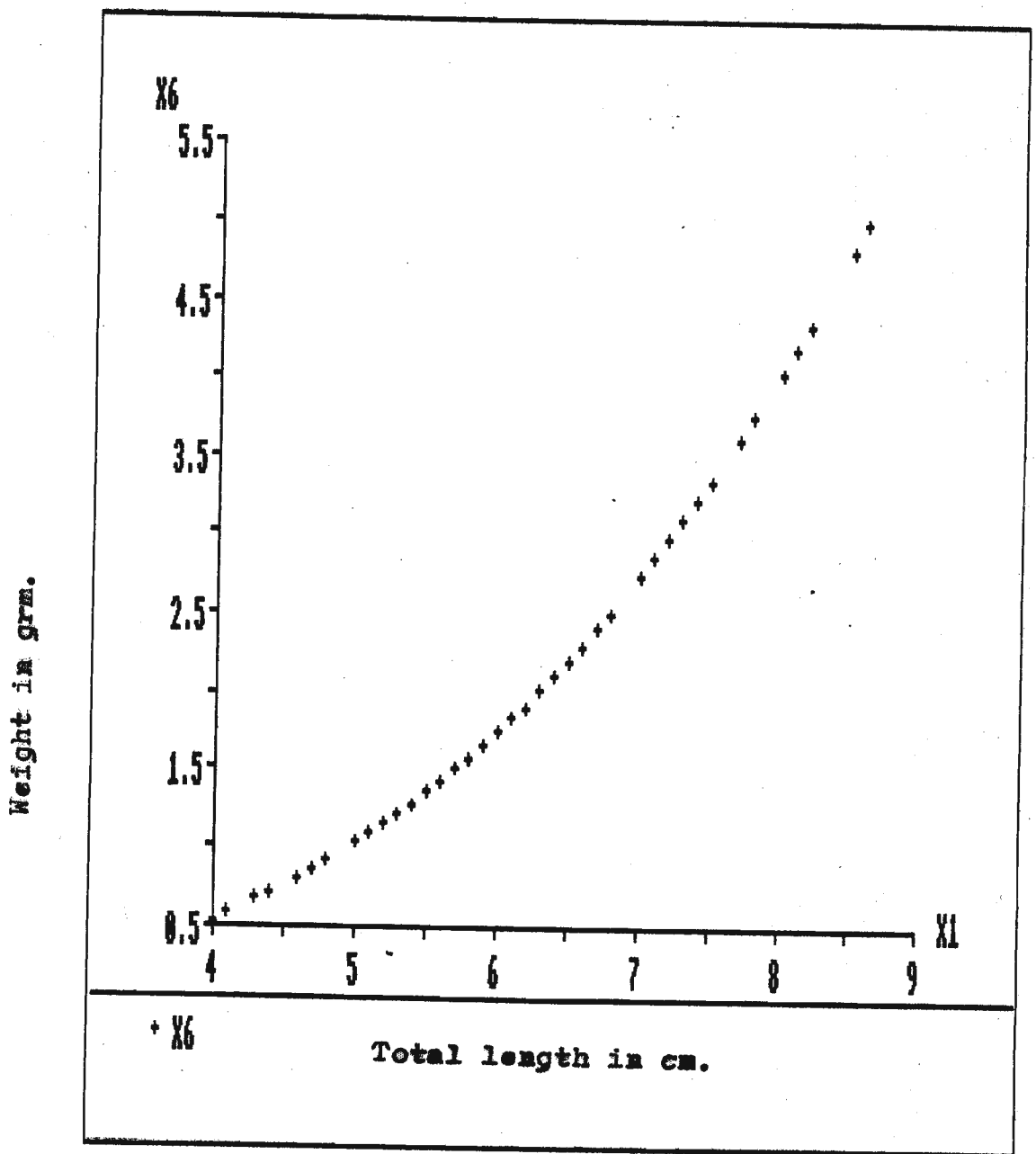
Fig.12(b): Total length - weight relationship of female P.latisulcatus.



INSTAT Err :On War :On Ech :On WS:LATI_F(m) Mem :6636

: NOTE _ P.latisulcatus _ FEMALE
: NOTE _ a=0.85994 b=2.5303 T/W VS C/L
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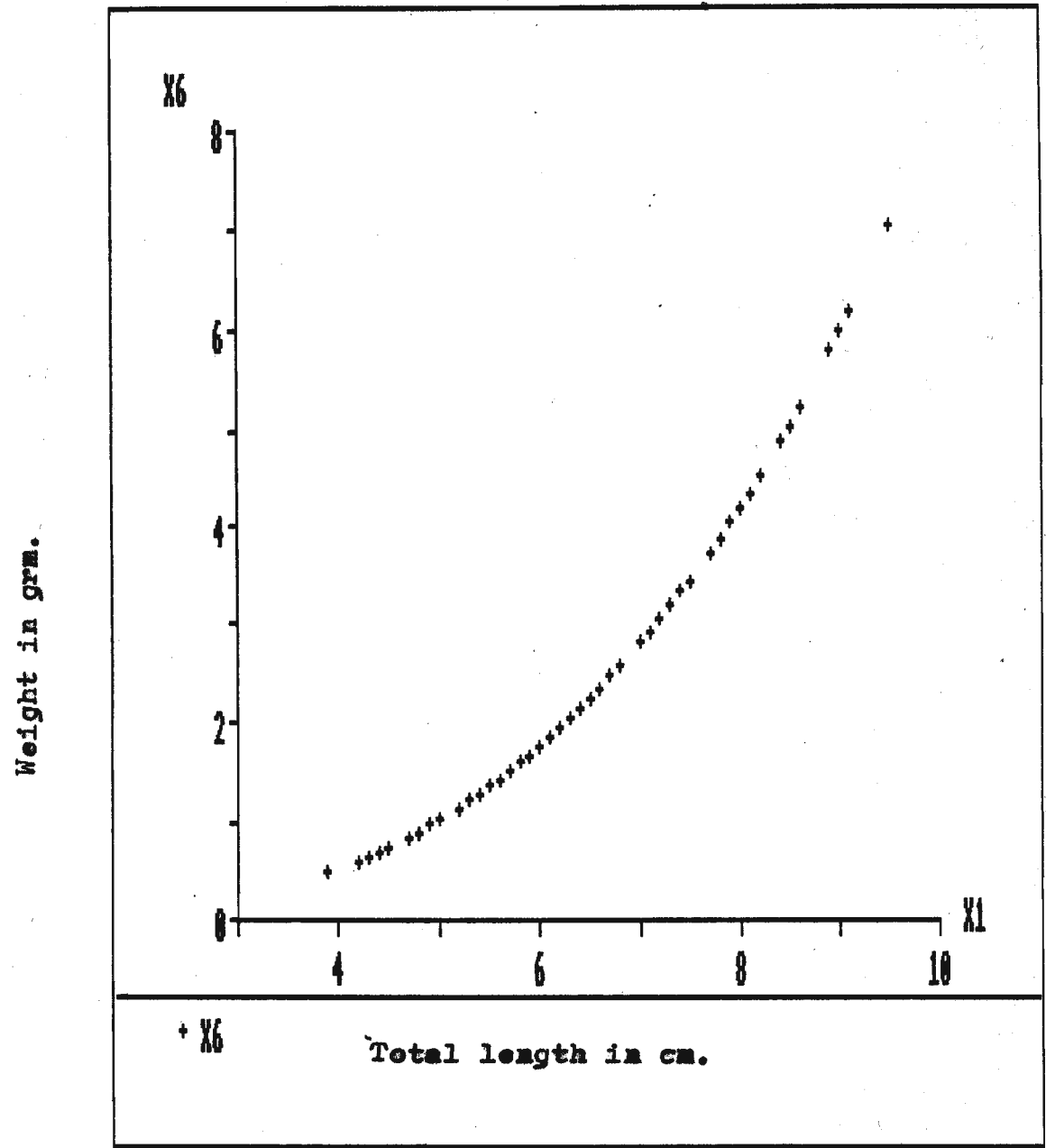
Fig.12(d): Carapace length - weight relationship of female P.latisulcatus.



INSTAT Err :On War :On Ech :On WS:MONO_M Mem :9661

: NOTE _ M.monoceros _ MALE
: NOTE _ a=0.0090469 b=2.9351 T/W VS T/L
: *DTEXT

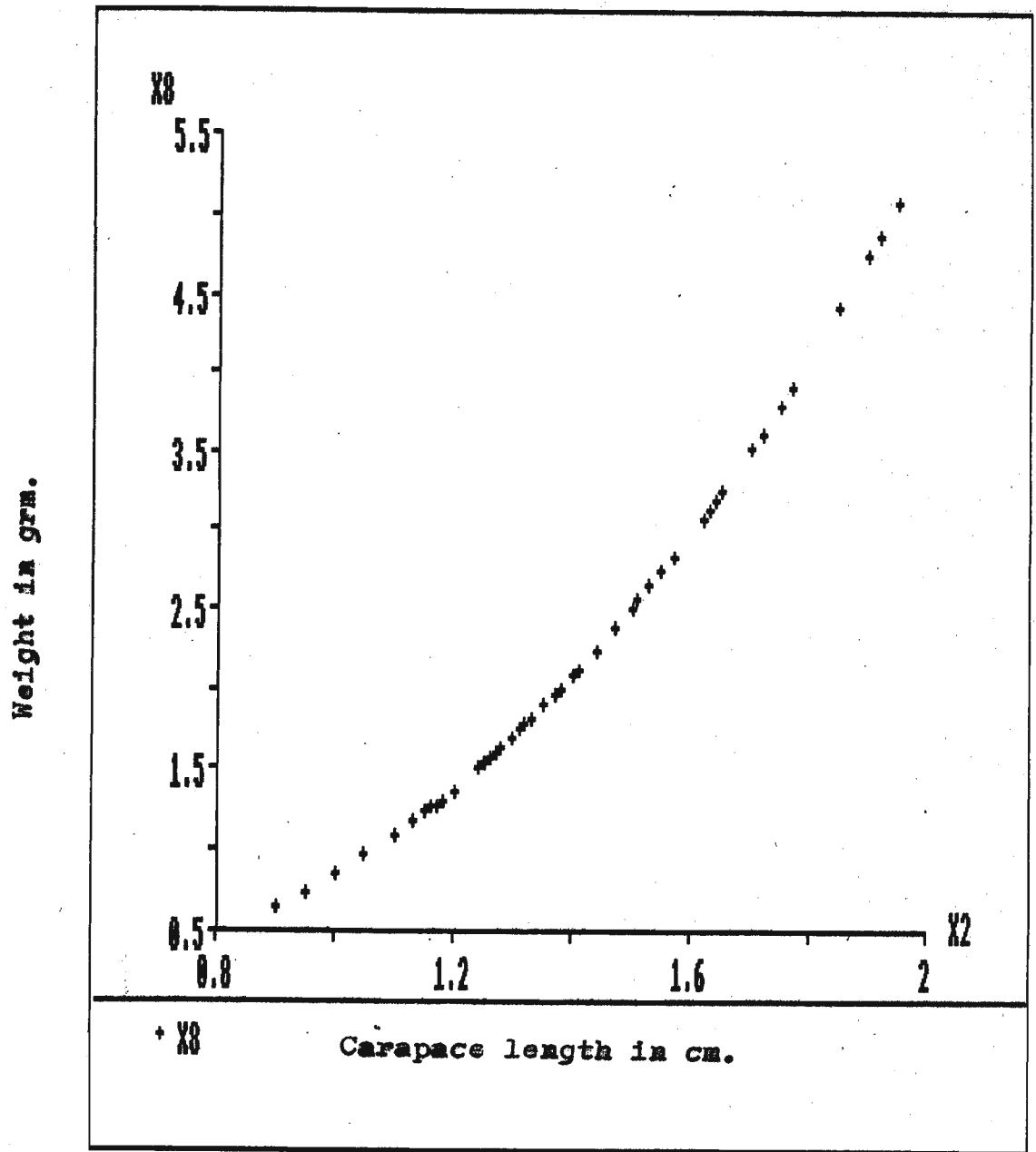
Fig.13(a): Total length-weight relationship of male M.monoceros.



INSTAT Err :On War :On Ech :On WS:MONO_F Mem :9662

: NOTE _ M.monoceros _ FEMALE
: NOTE _a=0.008147 b=3.0041 T/W VS T/L
: *DTEXT

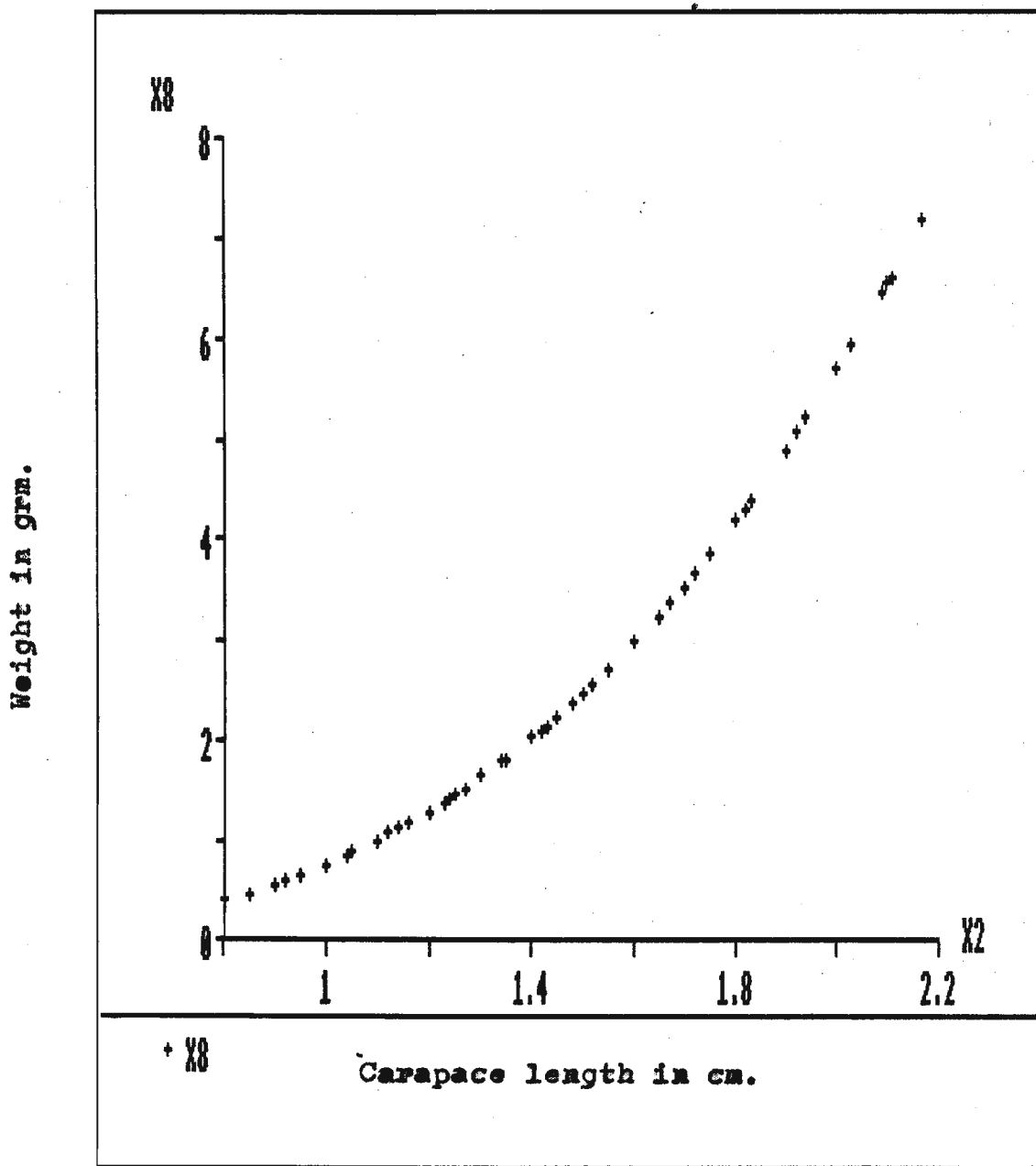
Fig.13(b): Total length - weight relationship of female M.monoceros.



INSTAT Err :On War :On Ech :On WS:MOND_M Mem :9606

: NOTE _ M.monoceros _ MALE
: NOTE _ a=0.83946 b=2.7002 T/W VS C/L
: *DTEXT

Fig.13(c): Carapace length - weight relationship of male M.monoceros.



INSTAT Err :On War :On Ech :On WS:MOND_F Mem :9661

: NOTE _ M.monoceros _ FEMALE
: NOTE _ a=0.76809 b=2.8908 T/W VS C/L
: *DTEXT

Fig.13(d): Carapace length - weight relationship of female M.monoceros.

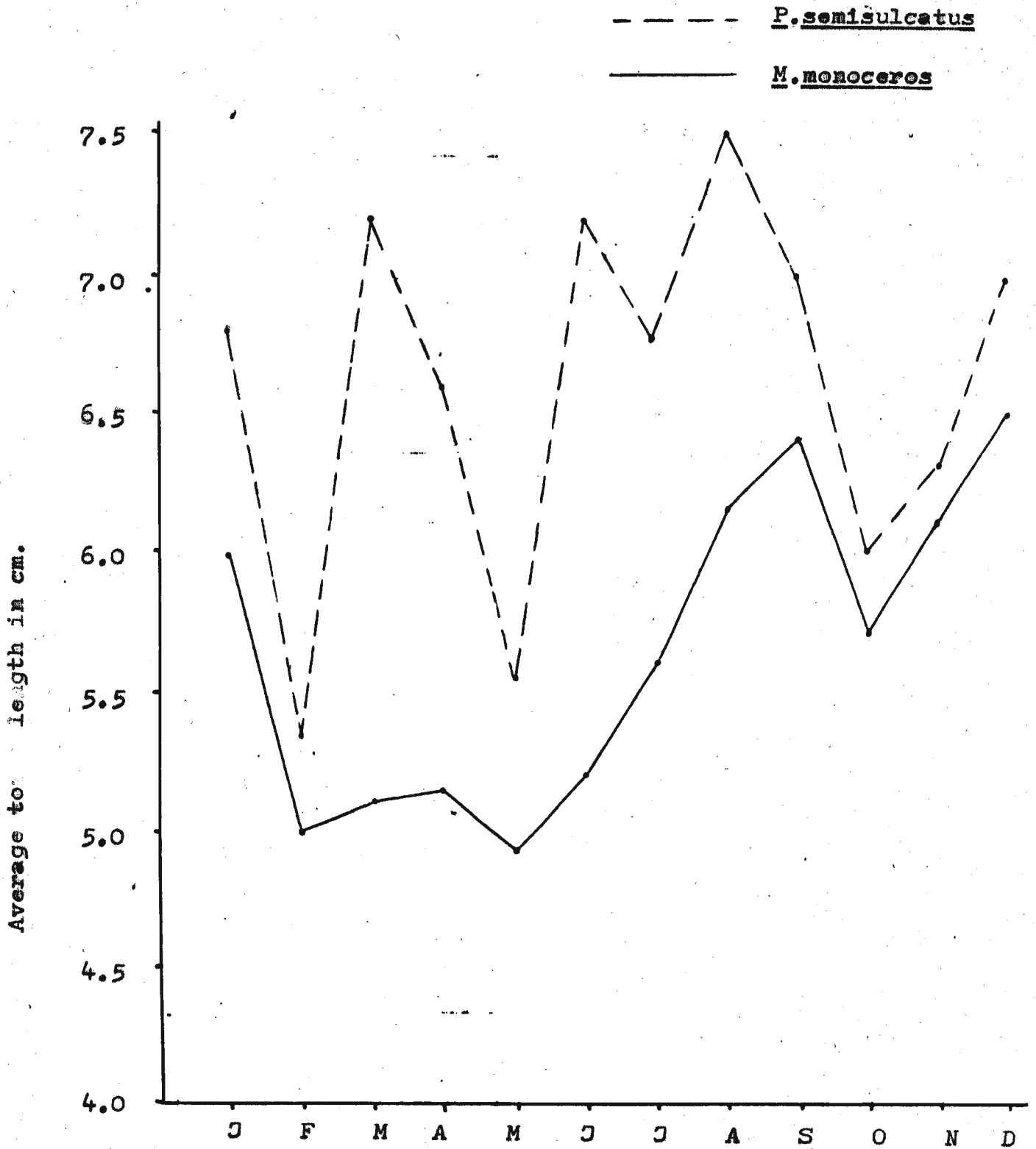


Fig.14(a): Monthly variation in average total length of *M.monoceros* and *P.semisulcatus* caught in Drag net in the Jaffna lagoon in 1986.

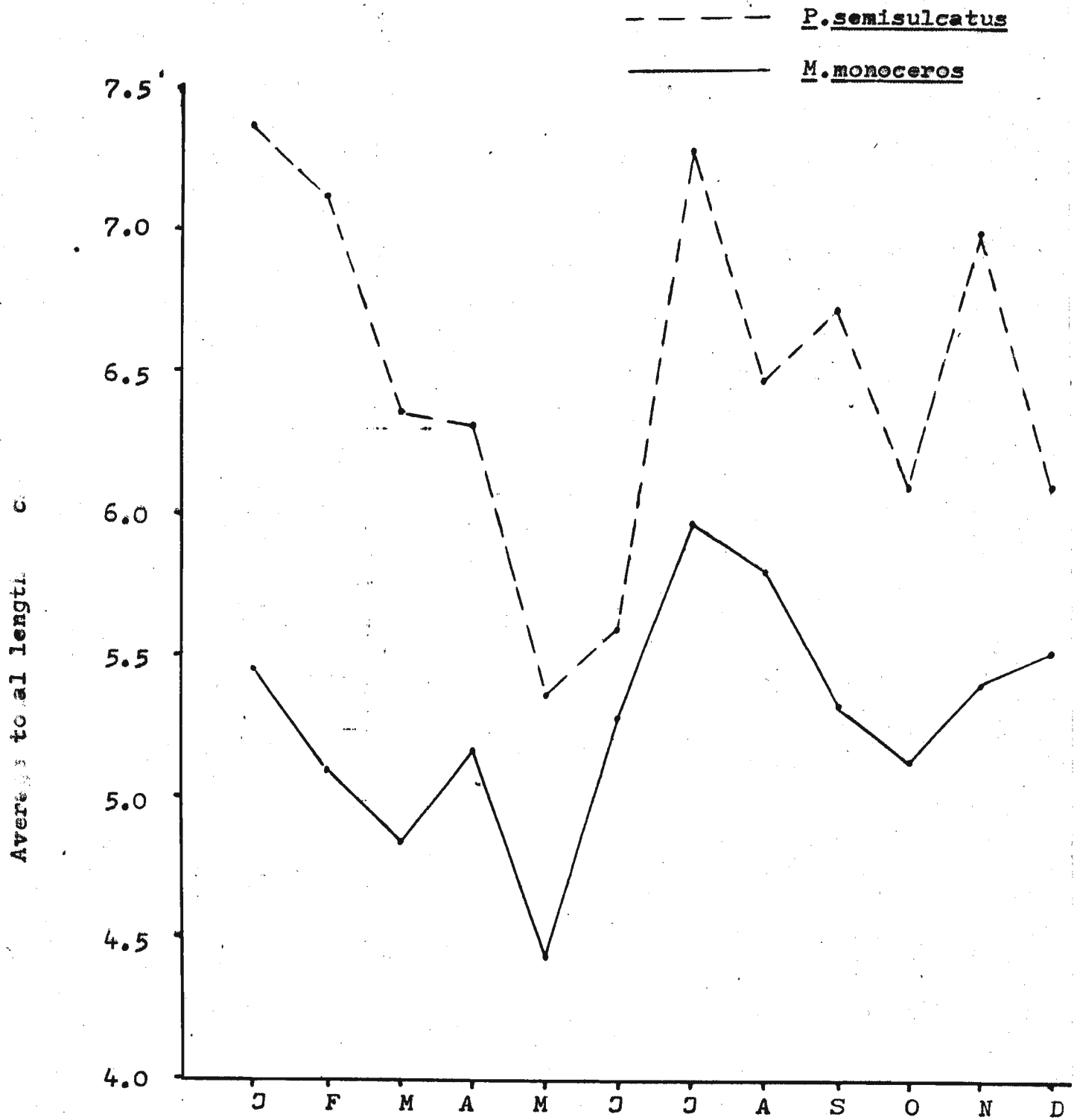


Fig.14(b): Monthly variation in average total length of M.monoceros and P.semisulcatus caught in Drag net in the Jaffna lagoon in 1987.

Bays	Landing centres	Main gears in operation
Ponnalai	Uri	Sirahu valai
	Ponnalai	Sirahu valai, Drag net Hoop net
Kallundai	Araly	Drag net, Sirahu valai
Vellicha-vedu	Pannai	Sirahu valai, Drag net hoop net
	Karaiyoor	Drag net
Ariyalai	Ariyalai	Sirahu valai, Drag net, Kandi
	Navatkuli	Sirahu valai, Drag net, Kandi, hoop net
Kachchai	Kachchai	Kandi, Sirahu valai
	Chavakachcheri	Kandi, Drag net
	Keerativu	Sirahu valai, Drag net, Hoop net, Kandi

Table 1: Landing centres in different Bays and main gears in operation in the Jaffna lagoon.

MONTHS	Rainfall in mm	
	1986	1987
January	289.2	27.1
February	24.1	--
March	28.2	--
April	43.7	--
May	11.5	--
June	5.2	--
July	0.0	--
August	28.2	--
September	14.9	12.0
October	358.8	‡
November	260.1	‡
December	227.1	‡

Table 2: Rainfall data of 1986 and 1987
obtained from the Meteorological
Office at Kankesandurai.

‡ Data not available

YEAR	Average percentage species composition and range				
	<u>P. monodon</u>	<u>P. indicus</u>	<u>P. semisulcatus</u>	<u>P. latissulcatus</u>	<u>M. monoceros</u>
1986	1.46 0.0 - 12.0	2.22 0.5 - 9.5	33.15 18.5 - 59.5	2.05 0.5 - 6.0	61.12 36.5 - 82.5
1987	1.55 0.0 - 8.21	7.46 0.25 - 24.0	23.86 9.93 - 38.34	2.75 0.58 - 12.30	64.38 37.25 - 89.0
Annual average	1.51	4.84	28.50	2.40	62.75

Table 3: Annual average percentage species composition of prawns in the Jaffna lagoon computed from cumulative catches of all the gears for 1986 and 1987.

Months	CPUE in Kg. gear ⁻¹ day ⁻¹				
	Sirahu valai	Drag net	Hoop net	Kandi	Average
Jan	6.00	10.00	6.75	1.2	5.99
Feb	6.22	8.52	4.50	0.80	5.01
Mar	3.95	5.20	3.20	0.50	3.21
Apr	3.00	2.90	4.40	0.25	2.63
May	4.10	4.50	4.25	0.55	3.35
Jun	4.50	5.30	5.16	0.65	3.90
Jul	5.30	6.00	4.20	0.70	4.05
Aug	2.19	6.78	4.10	0.80	3.47
Sep	2.41	4.50	3.00	0.95	2.72
Oct	2.50	2.60	3.80	1.50	2.60
Nov.	3.72	5.76	4.20	0.80	3.62
Dec	4.43	8.50	5.00	1.00	4.73
Average	4.03	5.88	4.38	0.80	3.77

Table 4: Average monthly CPUE of the different gears in 1986, in the Jaffna lagoon.

Month	CPUE in Kg. gear ⁻¹ day ⁻¹				
	Sirahu valai	Drag net	Hoop net	Kandi	Average
Jan	4.38	10.60	4.95	5.00	6.23
Feb	2.25	8.14	4.29	4.00	4.67
Mar	3.02	6.85	3.35	5.00	4.55
Apr	4.65	5.80	3.75	3.50	4.43
May	4.08	5.35	4.90	2.50	4.20
Jun	3.38	6.00	3.25	2.00	3.66
Jul	2.15	5.55	2.58	2.35	3.15
Aug	3.58	7.30	3.25	2.20	3.33
Sep	3.10	4.20	2.40	2.50	3.05
Oct	2.50	3.60	2.50	3.50	3.03
Nov	3.50	4.80	3.60	2.50	3.60
Dec	3.80	8.00	3.00	0.50	3.82
Average	3.37	6.35	3.48	2.96	4.04

Table 5: Average monthly CPUE of the different gears in 1987, in the Jaffna lagoon.

Species	<u>P. monodon</u>	<u>P. indicus</u>	<u>P. semisulcatus</u>	<u>P. latisulcatus</u>	<u>M. monoceros</u>
Numbers investgated	132	124	126	107	113
	% composition of food items				
Angiosperm	29.50	28.60	38.35	29.31	31.30
Algae:					
Centric diatoms	0.64	0.83	1.80	0.05	1.41
Pennate diatoms	0.61	0.77	0.15	0.61	0.21
<u>Oscillatoria</u> sp.					0.18
<u>Gleocapsa</u> sp.					0.11
<u>Lyngbya</u> sp.		0.42			
<u>Cladophora</u> sp.		2.03			1.10
<u>Chlorella</u> sp.	0.44	0.21	0.08	0.40	0.51
<u>Cosmarium</u> sp.		0.12	0.08		
<u>Padina</u> sp.		0.25			
Annelida		1.80	2.37	5.41	2.10
Mollusca	7.33	2.40	5.57	11.40	3.14
Insecta	15.40	3.35	10.60	3.31	10.66
Crustacea	10.51	24.51	3.40	7.46	7.18
Miscellaneous chitin		2.34			0.37
Animal matter unidentified	12.16	8.07	8.00	2.45	9.49
Detritus	24.01	24.30	29.60	39.60	32.24
Total					

Table 6: Percentage composition of food of the different species of Penaeid prawns from the Jaffna lagoon during 1986 and 1987.

Species	<u>P. monodon</u>	<u>P. indicus</u>	<u>P. semisulcatus</u>	<u>P. latisulcatus</u>	<u>M. monoceros</u>
	% composition of food categories				
Plant material:					
Angiosperm	29.50	28.60	38.35	29.31	31.30
Algae	1.09	4.63	2.11	1.06	3.52
Animal material	45.40	42.47	29.94	30.03	32.94
Detritus	24.01	24.30	29.60	39.60	32.24
Total					

Table 7: Percentage composition of the different food categories in the different species of Penaeid prawns in the Jaffna lagoon during 1986 and 1987.

Species	Sex	Total length - weight relationship	Total length - weight relationship
<u>P.monodon</u>	M	$w = 0.0084567 L^{3.0058}$	$w = 0.71973 C^{2.9022}$
	F	$w = 0.0083445 L^{3.0078}$	$w = 0.71080 C^{2.8634}$
<u>P.indicus</u>	M	$w = 0.0057597 L^{3.0242}$	$w = 0.84917 C^{2.9202}$
	F	$w = 0.0063285 L^{2.9794}$	$w = 0.87791 C^{2.8213}$
<u>P.semisulcatus</u>	M	$w = 0.0090740 L^{2.9674}$	$w = 0.89326 C^{3.0125}$
	F	$w = 0.0112050 L^{2.8836}$	$w = 1.02620 C^{2.7501}$
<u>P.latisulcatus</u>	M	$w = 0.0145310 L^{2.7386}$	$w = 0.68344 C^{2.7758}$
	F	$w = 0.0169940 L^{2.6827}$	$w = 0.85994 C^{2.5303}$
<u>M.monoceros</u>	M	$w = 0.0090469 L^{2.9351}$	$w = 0.83946 C^{2.7002}$
	F	$w = 0.0081470 L^{3.0041}$	$w = 0.76809 C^{2.8908}$

Table 8: Length - weight relationship of the different species of Penaeid prawns from the Jaffna lagoon.

w = weight in grm. L = total length in cm
C = carapace length in cm.

Species	Percentage of shedders during different months													Average & range
	J	F	M	A	M	J	J	A	S	O	N	D		
<u>P.monodon</u>	40.0	00.0	32.3	5.6	22.5	00.0	00.0	00.0	---	100	--	40.0	24.0 (00.0 - 100)	
<u>P.indicus</u>	20.0	35.6	49.7	37.8	45.0	00.0	52.4	42.0	48.0	100	72.8	54.5	46.5 (00.0 - 100)	
<u>P.semislucatus</u>	27.8	31.8	44.9	40.8	64.2	76.2	49.0	46.5	49.0	48.0	49.2	33.5	46.7 (27.8 - 76.2)	
<u>P.latisulcatus</u>	50.0	43.2	28.5	00.0	31.5	--	45.2	54.6	48.0	55.0	66.7	47.6	42.7 (00.0 - 66.7)	
<u>M.monoceros</u>	67.4	39.2	31.5	52.7	31.8	--	29.8	53.7	52.4	52.5	29.8	59.8	45.5 (29.8 - 67.4)	

Table 9: Percentage of shedders in the cumulative catches during different months in 1986.

Species	Percentage of shedders during different months													Average & range
	J	F	M	A	M	J	J	A	S	O	N	D		
<u>P. monodon</u>	32.3	6.25	00.0	36.5	5.6	00.0	--	--	--	20.0	00.0	--	12.6 (00.0 - 36.5)	
<u>P. indicus</u>	34.5	17.9	15.4	17.6	9.9	00.0	--	100	79.3	43.1	21.1	15.3	32.2 (00.0 - 100)	
<u>P. semisulcatus</u>	49.6	30.4	27.2	15.9	28.2	14.0	22.8	13.4	26.6	22.5	29.7	26.74	25.6 (14.0 - 49.6)	
<u>P. latissulcatus</u>	60.0	31.8	27.8	6.7	22.2	00.0	00.0	20.3	00.0	50.0	52.3	22.4	24.6 (00.0 - 60.0)	
<u>M. monoceros</u>	15.9	16.2	13.7	12.3	10.0	7.3	8.9	4.9	26.2	23.6	20.3	19.5	14.9 (4.9 - 26.2)	

Table 10: Percentage of shedders in the cumulative catches during different months in 1987.

Species	Percentage of females during different months													Average & range
	J	F	M	A	M	J	J	A	S	O	N	D		
<u>P. monodon</u>	18.5	50.0	59.2	28.0	29.6	00.0	66.7	00.0	--	100	--	40.0	39.2 (00.0 - 100)	
<u>P. indicus</u>	46.0	46.7	55.0	34.0	36.7	100	52.4	62.0	45.3	100	50.0	52.4	56.7 (34.0 - 100)	
<u>P. semisulcatus</u>	40.7	43.5	42.9	46.3	50.0	51.0	58.1	52.8	50.0	60.5	49.5	52.6	46.1 (40.7 - 60.5)	
<u>P. latissulcatus</u>	25.0	54.2	42.0	71.4	48.5	--	53.0	42.4	49.0	51.8	50.0	47.6	48.6 (25.0 - 71.4)	
<u>M. monoceros</u>	33.2	64.9	40.3	61.2	46.0	--	58.0	53.7	57.7	48.5	55.5	41.8	50.9 (33.2 - 61.2)	

Table 11: Percentage of females in the cumulative catches during different months in 1986.

Species	Percentage of females during different months													Average & range
	J	F	M	A	M	J	J	A	S	O	N	D		
<u>P. monodon</u>	83.8	37.5	00.0	69.0	44.4	27.3	--	--	--	95.0	52.0	--	51.1 (00.0 - 95.1)	
<u>P. indicus</u>	60.4	51.1	48.6	54.0	42.6	100	--	100	100	90.6	42.6	57.5	67.9 (42.6 - 100)	
<u>P. semisulcatus</u>	51.4	24.9	49.7	55.5	47.3	42.1	64.9	88.9	89.4	63.0	55.6	58.4	57.6 (24.9 - 89.4)	
<u>P. latissulcatus</u>	11.4	47.5	38.9	66.7	44.4	50.0	81.3	45.0	88.9	53.0	50.2	47.3	52.1 (11.4 - 88.9)	
<u>M. monoceros</u>	46.9	70.5	75.4	67.1	70.6	70.3	66.9	50.9	61.7	57.6	61.3	62.0	63.4 (46.9 - 75.4)	

Table 12: Percentage of females in the cumulative catches during different months in 1987.

Gear	Average and range in total length in cm														Grand average
	J	F	M	A	H	C	G	A	*S	O	K	D			
Sirehu velei	9.13	9.80	6.69	9.22	7.32	7.30	6.36	5.51	8.94	7.90	7.80	6.70		8.57	
	5.0-13.8	5.8-13.0	5.0-13.0	4.8-13.0	5.2-13.5	5.0-10.5	6.2-11.7	6.2-12.2	5.4-11.2	4.8-11.0	3.2-11.3	4.9-12.5			
Drag net	7.15	7.17	5.94	6.36	5.10	5.43	6.62	6.36	6.41	5.61	6.20	5.80		6.17	
	4.4-9.2	3.8-11.5	3.4-9.9	3.9-8.6	3.5-6.5	3.6-5.0	4.7-8.6	3.4-10.4	3.9-11.5	3.8-12.0	3.7-8.9	3.9-8.9			
Hoop net	8.08	7.29	6.93	5.60	6.70	8.68	8.13	6.87	8.64	8.42	7.80	8.40		7.63	
	5.1-10.5	5.0-9.0	3.2-11.3	4.9-9.0	6.5-7.9	7.1-10.5	6.5-13.1	6.3-8.5	5.0-11.2	6.0-11.2	6.0-11.0	5.3-9.8			
Kandi	7.00	6.84	5.80	4.74	6.10	6.30	6.66	8.71	5.70	6.40	6.20	7.50		6.49	
	4.5-10.2	4.2-8.6	4.0-7.3	4.2-6.3	4.6-6.9	4.5-6.8	6.0-5.5	6.0-11.0	3.9-7.7	5.0-7.5	4.9-6.4	6.0-9.7			

Table 14: Average and range in total length of Penaeid prawns caught in the different gears in the Jaffne lagoon in 1987.

Species	Maximum total length in cm				
	Present investigation 1986 and 1987		Reported by Fischer and Bianchi (1984)	Reported by Chitravadi- velu and Selvavinayagam, (1969)	
	Male	Female	Male	Female	Unsexed
<u>P. monodon</u>	16.0	18.9	26.8	33.7	18.5
<u>P. indicus</u>	13.0	13.5	18.4	23.0	13.5
<u>P. semisulcatus</u>	13.8	17.8	18.0	23.0	--
<u>P. latiusulcatus</u>	13.0	16.0	16.2	20.2	--
<u>M. monoceros</u>	10.2	10.5	15.0	20.0	--

Table 16: Maximum total length of the different species caught in the Jaffna lagoon during 1986 and 1987 compared with other data.

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RG/86/B/01

Form: P/01

EVALUATION OF THE PERFORMANCE OF THE FISHING GEARS
USED IN PRAWN FISHERY IN THE JAFFNA LAGOON

Landing place:.....Date:.....
 Time of collection:..... Gear used:.....
 Duration of operation:..... Mesh size:.....
 Salinity:.....pH:.....
 Water current:..... Depth of water:.....
 Temp. of water:.....Temp. of air:.....Phase of moon:.....
 Total weight:..... No. engaged:.....
 Plankton sample No:.....Substratum sample No:.....

Species	No.	% Composi- tion	Av. Total length cm.	Av. carapace length cm.	Av. weight grams.
1. P.monodon					
2. P.semisulcatus					
3. P.latis ulcatus					
4. P. indicus					
5. M.monoceros					
6.					
7.					
8.					
9.					
10.					
Total					

Remarks:

BIOLOGY OF PRAWNS IN THE JAFFNA LAGOON

SUMMARY FROM R/SHEET NOS:.....

Species:.....

Month:.....

Landing place:.....

	Sex	Nos.	T/1 cm.	L/1 cm.	Wt. in gram	Size of ova	Fecun- dity	Wt. of gonad gram.
Shedders	M							
	F							
	Un							
Busters	M							
	F							
	Un							
Others	M							
	F							
	Un							
Average								
Total								

Remarks:

Form: /

RS/36/2/01 Biology of prawns in the Jaffna Lagoon. Evaluation of the performance of the gears used in prawn fishery.

Lagoon/Eay: Gear: Month:

Month	Species	T/length cm			C/length cm			Weight grm		Sps.comp %	Sex comp. %		Moult cond. %		Av. Tot. catch/operation day (Kg)	Salinity	pH	Temp. C	
		Av.	Ran.	Av.	Ran.	Av.	Ran.	M	F		Sh	N	Sh	Air				H ₂ O	
	P.monodon 1																		
	P.indicus 2																		
	P.semisulcatus 3																		
	P.latisulcatus 4																		
	M.monoceros 5																		
	1																		
	2																		
	3																		
	4																		
	5																		
	1																		
	2																		
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	4																		
	5																		

Date: Compiled by: Checked by: