THE RELATIVE SELECTION OF THREE MESH SIZES OF FRASER RIVER SOCKEYE GILLNETS FOR CHINOOK SALMON

by K.H. Wilson and B.C. Pearce

Department of Fisheries & Oceans
549 Columbia Street
New Westminster, B.C.
V3L 1B3

February, 1984

Canadian Technical Report
of Fisheries and Aquatic Sciences
No. 1250

Canadian Technical Report of
Fisheries and Aquatic Sciences 1250

February, 1984

The Relative Selection Of Three Mesh Sizes Of Fraser River Sockeye Gillnets For Chinook Salmon

by

K.H. Wilson

and

B.C. Pearce

Department of Fisheries and Oceans
549 Columbia Street
New Westminster, B.C.
V3L 1B3

Cat. No. Fs 97-6/1250 ISSN 0706-6457

Correct citation for this publication:

Wilson, K.H. and B.C. Pearce. 1984. The relative selection of Three mesh sizes of Fraser River sockeye gillnets for chinook salmon. Can. Tech. Rep. Fish. Aquat. Sci.1250: ix + 71p.

TABLE OF CONTENTS

ACKNOWLEDGMENTS

We would like to thank Mr. Allen Baker and Jerry Faulkner for their help and valuable advice and Messrs. Morley Farwell and Robin Harrison for their editorial assistance. Joyce McCart and Francine Kwiecien deciphered and typed the manuscript and Dianna Day supplied the graphics. This program was funded by the Fisheries Development Program.

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Wilson, K.H. and B.C. Pearce. 1984. The relative selection of three mesh sizes of Fraser River sockeye gillnets for chinook salmon. Can. Tech. Rep. Fish. Aquat. Sci. 1250: ix + 71p.

The relative selection for chinook salmon of three different gillnet mesh sizes was investigated in the Fraser River between August 16 and October 1, 1983. Three gillnet panels (12.4, 14.0 and 14.9 cm mesh) each 120.7 m in length, and hung at a ratio of 3:1, were connected to form a test-net. To minimize effects of panel order relative to the shore, panels could be connected together in any order. Panel order was selected using a randomized block design.

During 12 days of fishing, 24 sets were completed. Total catch was 1,834 pink salmon (*Oncorhynchus gorbuscha*), 966 sockeye salmon (*O. nerka*), 129 chinook salmon (*O. tshawytscha*), 107 coho salmon (*O. kisutch*), 72 chum salmon (*O. keta*), and 9 steelhead (*Salmo gairdneru*). Chinook, sockeye and pink salmon were sampled for sex, weight, length, girth and location of first net mark.

Significantly ($p \leq 0.05$) more large chinook (>2.3 kg) were captured in the 14.9 cm mesh than in either of the smaller meshes. There was no significant difference ($p < 0.05$) between the three meshes in catches of pink or sockeye. No significant difference in fish weight with increasing mesh size was observed. The sex ratio of chinook captured in each mesh was not significantly different, but the proportion of pink and sockeye males increased with mesh size.

The data show that a 14.0 cm maximum mesh size is effective in reducing the by-catch of large chinook. A smaller size would have no positive effect on chinook by-catch and would increase the relative harvest of female pink and sockeye salmon.

Key words: net, gillnet, selectivity, mesh size, tangling, chinook conservation, by-catch, girth, fish shape.

Résumé

Wilson, K.H. and B.C. Pearce. 1984. The relative selection of three mesh sizes of Fraser River sockeye gillnets for chinook salmon. Can. Tech. Rep. Fish Aquat. Sci. 1250: ix + 71p.

Le pouvoir de sélection de différents filets maillants pour le saumon quinnat a frait l'objet d'une étude dans le fleuve Fraser, du 16 août au 1er octobre 1983. Trois filets de mailles de 12.4, 14.0 et 14.9 cm et de 120.7 m de longueur ont été réunis et suspendus dans un rapport de 3:1 pour former un filet expérimental. Pour minimiser l'effet de l'ordre relatif des filets par rapport à la rive, il était possible de relier ceux-ci dans toute séquence désirée. Les séquences on été déterminées à l'aide d'un plan en blocs aléatoires.

Vingt-quatre essais ont été effectués en 12 jours de pêche. L'ensemble des prises comprenait 1,834 saumons roses (Oncorhynchus gorbusha), 966 saumons rouges (O. nerka), 129 saumons quinnats (O. tshawytscha), 107 saumons cohos (O. kisutch), 72 saumons kêtas (O. keta) et 9 truites arc-en-ciel (Salmo gairderi). On a détermine le sexe, le poids, la longueur, la circonférence et l'emplacement de la première marque de filet chez un échantillon de saumons quinnats, kêtas et roses.

Un nombre nettement plus élevé (p 0.05) de gros saumons quinnats (2.3 kg) ont été capturés à l'aide du filet à mailles de 14.9 cm, comparativement aux filets à mailles plus petites. Les prises de saumons roses et rouges ne présentaient pas de différenc significative (p 0.05) entre les trois maillages. On n'a noté aucun écart important du poids des poissons correspondant à une augmentation du maillage. Le sex-ratio des saumons quinnats ne variait pas de façon significative en fonction du maillage, mais la prortion de mâles de saumons roses et rouges augmentait.

Les données montrent qu'un maillage ne dépassant pas 14.0 cm réduit efficacement les prises fortuites de gros saumons quinnats. Une taille inférieure ne réduirait pas les prises fortuites de ces saumons et se traduirait par une augmentation des prises relatives de femelles de saumons roses et rouges.

Mots clés: filet, filet maillant, sélectivité, maillage, emmêlage, conservation du quinnat, prises fortuites, circonférence, profil.

1.0 INTRODUCTION

Chinook salmon returns to the Fraser River have declined to a level at which they can no longer support a target gillnet fishery. However, significant numbers of chinook salmon are still taken by gillnet in the Fraser River during fisheries intended to harvest sockeye and pink salmon. In 1981, Fisheries and Oceans reduced the maximum allowable mesh size for the Fraser River from 14.9 to 14.0 centimetres (5 7/8 to 5 1/2 inches) to reduce chinook by-catch during sockeye fisheries.

Mesh restrictions are a common method of managing catch, because gillnets are selective, efficiently capturing fish over a relatively narrow range of mesh sizes. As a rule of thumb, relatively few fish are caught where length differs from the optimum by more than 20% (Hamley 1975). However, most by-caught adult chinook salmon are substantially larger than the target species, and are well outside the normal selective range of the gear. Large chinook salmon are not normally gilled or wedged in sockeye or pink salmon gillnets, but rather their mouth parts become tangled in the web. Consequently, the probability of capturing large chinook salmon may not be sensitive to small changes in mesh size over the range of mesh sizes normally used to harvest sockeye or pink salmon.

Anything which causes the probability of capture to vary with fish size results in selection. The most important factors include the size, shape, and behaviour of the fish; and mesh size, construction, and method of setting the net. A relatively rich literature exists regarding the selective nature of gillnets, including some excellent reviews (Hamley 1975, von Brandt 1974). Unfortunately, these studies

concern themselves with gilling or wedging and rarely assess tangling capture of large fish in small mesh, probably because no one intentionally fishes for large fish with a small-mesh net.

The three recognized modes of capture (gilling, wedging, and tangling) were described by Baranov (1914). Wedged fish are held tightly around the body, gilled fish are prevented from backing out of the web by mesh behind their gill covers, and tangled fish are captured by teeth, maxilla, or other projections from the head or body. In general, fish whose heads are small enough to pass through the mesh, but whose bodies are too large to pass completely through, are gilled or wedged. Baranov (1914) observed that gilling and wedging are highly selective processes which depend on mesh size, while tangling was less selective and much less important.

For fish which are gilled or wedged in nets, fish girth relative to mesh size is the most important determinant of selectivity. For fish which become tangled, the situation is more complex, and the probability of capture depends on the morphology of the fish's head as well as the construction of the net. Intuitively, when girth of a fish's head greatly exceeds the stretched perimeter of the mesh, the fish can only be captured by other facial complexities such as jaws, teeth, or, not uncommonly, fish hooks remaining in the jaw. No effective method has yet been devised to describe or quantify these characteristics.

Three aspects of net construction affect a net's capacity to tangle fish: mesh size, hang ratio, and suppleness. More loosely hung and more supple nets tangle more fish (von Brandt 1975, Hamley 1975). Thinner and more flexible twine should also tangle more fish

and catch larger fish (Hamley 1975), but few supporting data are available. Riedel (1963) presented the following data showing the relationship between hang ratio and capture of Tilapia (Tilapia Mossambica), where both net efficiency and size range of fish captured increased with hang ratio:

Hang Ratio	Average Number Captured/Day	% Tangled	Size Range of 95% of Catch
1:1	9.3	0	18-23 cm
2:1	29.5	24	13-23 cm
3:1	81.0	80	8-22 cm

This study examines the relationship between mesh size and chinook salmon catch in a three-panel, multiple-mesh gillnet.

2.0 METHODS

Three test gillnet panels were constructed using 12.4, 14.0, and 14.9 cm (4 7/8, 5 1/2, and 5 7/8 inch) mesh river gillnet, composed of light green #19 multifilament nylon twine. Each panel was hung 60 meshes deep at a ratio of 3:1, and was 66 fathoms in length. The panels could be connected together in any order to form a gang.

The three-panel net was set twice a day on 12 days between August 16 and October 1, 1983 on a reach of the Fraser River just above the Albion ferry, in a location known locally as "the graveyard drift" (Figure 1). To reduce variability due to set time and duration, the net was set just before and again just after low tide on each fishing day, and was retrieved beginning 30 minutes after the set was completed. However, when catches were high, a long period of time was required to haul the net, consequently soak times for each panel varied considerably (Appendix 1).

To minimize the effects of net order, the order of the panels relative to shore was assigned using a random number table, and the net was reversed on the second set of the day. Panel order was selected without replacement until all six possible combinations had been fished. In this manner, all possible set combinations were fished every three fishing days.

The fish captured in each panel on each set were identified to species, tallied, and segregated for later analysis. On completion of the set, and as time permitted, the sex, weight, orbital-hypural length, distances from the orbit to the rear of the gill cover, the

front of the dorsal fin, and the first net mark and the corresponding girths (Figure 2) were recorded for all chinook salmon captured and for a subsample of sockeye and pink salmon, selected at random. When time was limited, only the sex, weight, and orbital-hypural length were recorded.

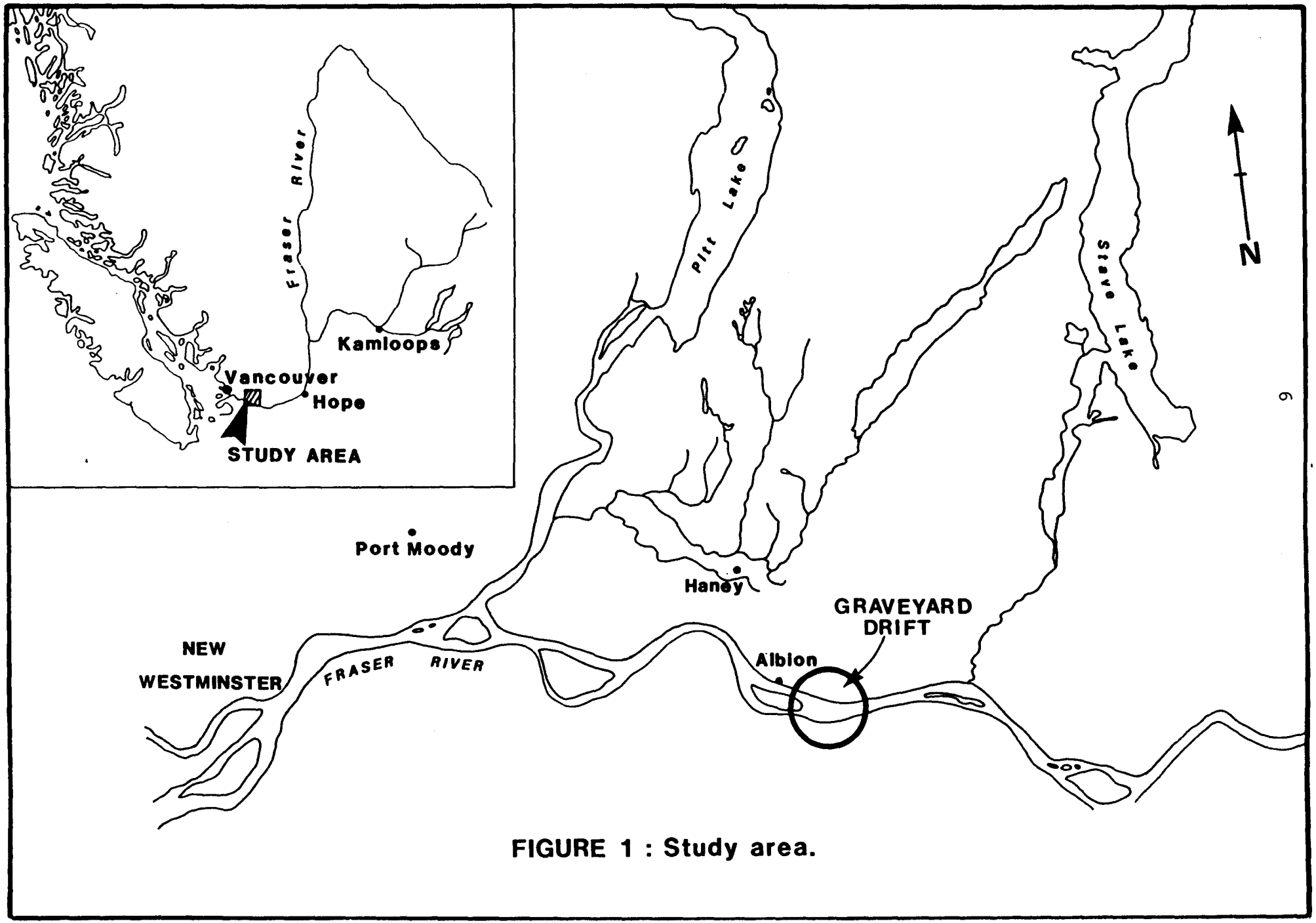
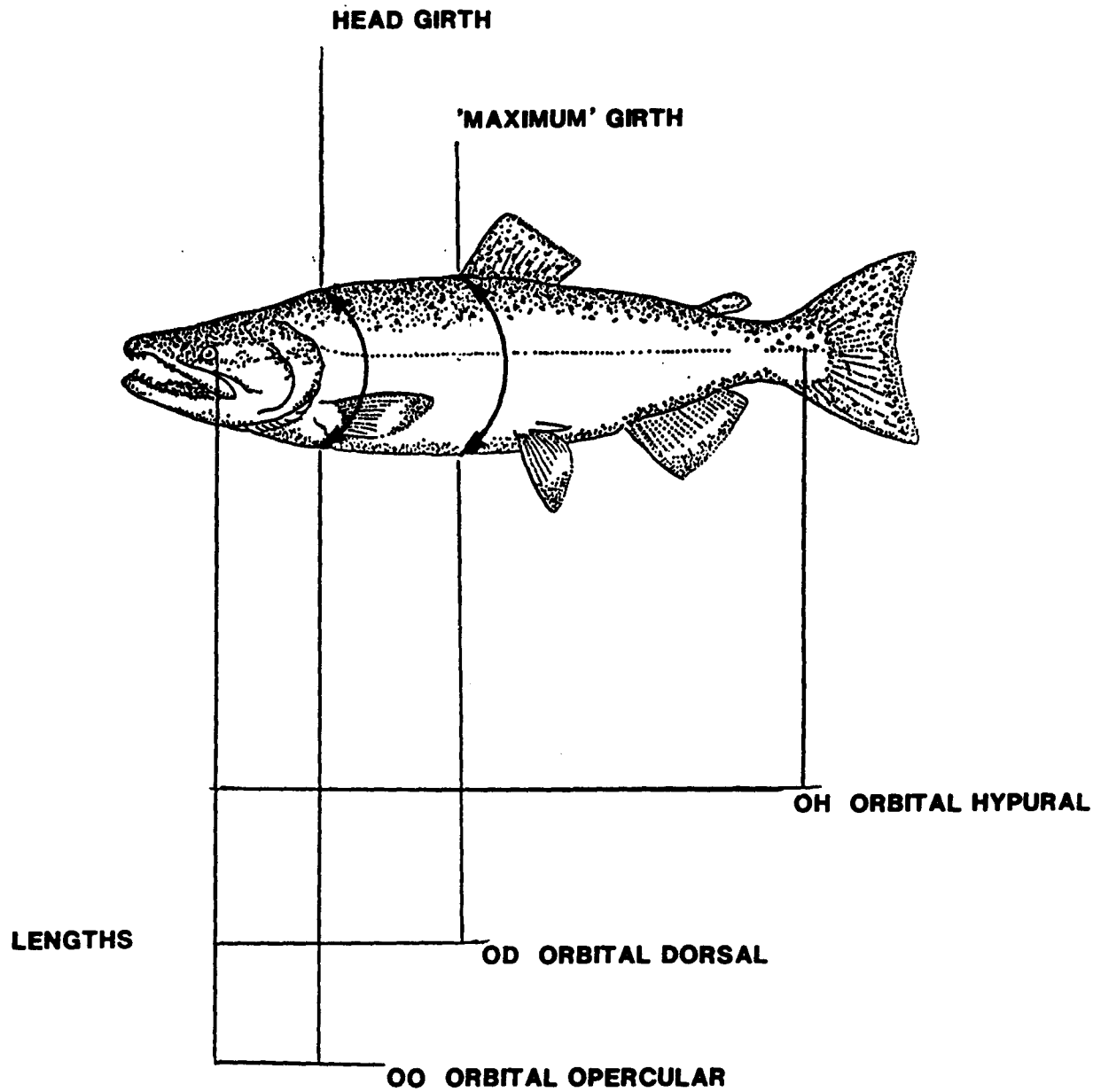


FIGURE 1 : Study area.



ON distance from orbit to 'MAJOR' net mark

FIGURE 2 : Measurements taken during Fraser River gillnet selectivity study.

3.0 RESULTS AND DISCUSSION

The numbers, weight, length, sex ratio, and shape of chinook, sockeye, and pink salmon captured will be discussed separately. The catches of coho, chum, and steelhead have not been analyzed, except that their numbers are included in the total catch when assessing gear saturation.

3.1 Numbers Captured

Seven species of fish were taken in 24 sets, including 1834 pink salmon (*Oncorhynchus gorbuscha*), 966 sockeye salmon (*O. nerka*), 129 chinook salmon (*O. tschawytscha*), 107 coho salmon (*O. kisutch*), 79 chum salmon (*O. keta*), and 9 steelhead (*Salmo gairdnerii*). Several sturgeon, probably white (*Acipenser transmontanus*), were also captured and released, but were not included in the tallies. Data concerning each species taken in each set are presented by both mesh size and date in Appendix 1. These data are summarized in Table 1.

Soak times for each mesh vary considerably for any given set (Appendix 1), but average set times are very similar: 49.64 minutes for 12.4 cm mesh; 51.12 minutes for 14.0 cm mesh; and 47.35 minutes for 14.9 cm mesh. This small discrepancy probably results because on days with high catches, the last nets hauled have extremely long set times.

One-way analysis of variance (ANOVA) was performed on the catches of large chinook salmon (>2.3 kg), jack chinook (<2.3 kg), pink, and sockeye salmon corrected for soak time by calculating the catch per thousand fathom minutes (KFM). ANOVA tables for these comparisons are presented in Appendix 2. Figure 3 shows the relationship between numbers of chinook captured and mesh size.

TABLE 1

NUMBERS OF CHINOOK, PINK, AND SOCKEYE SALMON
CAPTURED IN EACH MESH SIZE
FRASER RIVER SELECTIVITY STUDY 1983

Species	Mesh (cm)	Large Chinook (Minus Jacks)	Jack	Male	Female	Total Catch
Chinook	12.4	26	19	16	10	45
	14.0	30	3	21	9	33
	14.9	44	5	26	20	51
Pink	12.4		--	48%	52%	655
	14.0		--	57%	43%	526
	14.9		--	74%	27%	653
Sockeye	12.4		--	36%	64%	342
	14.0		--	56%	44%	289
	14.9		--	63%	37%	326

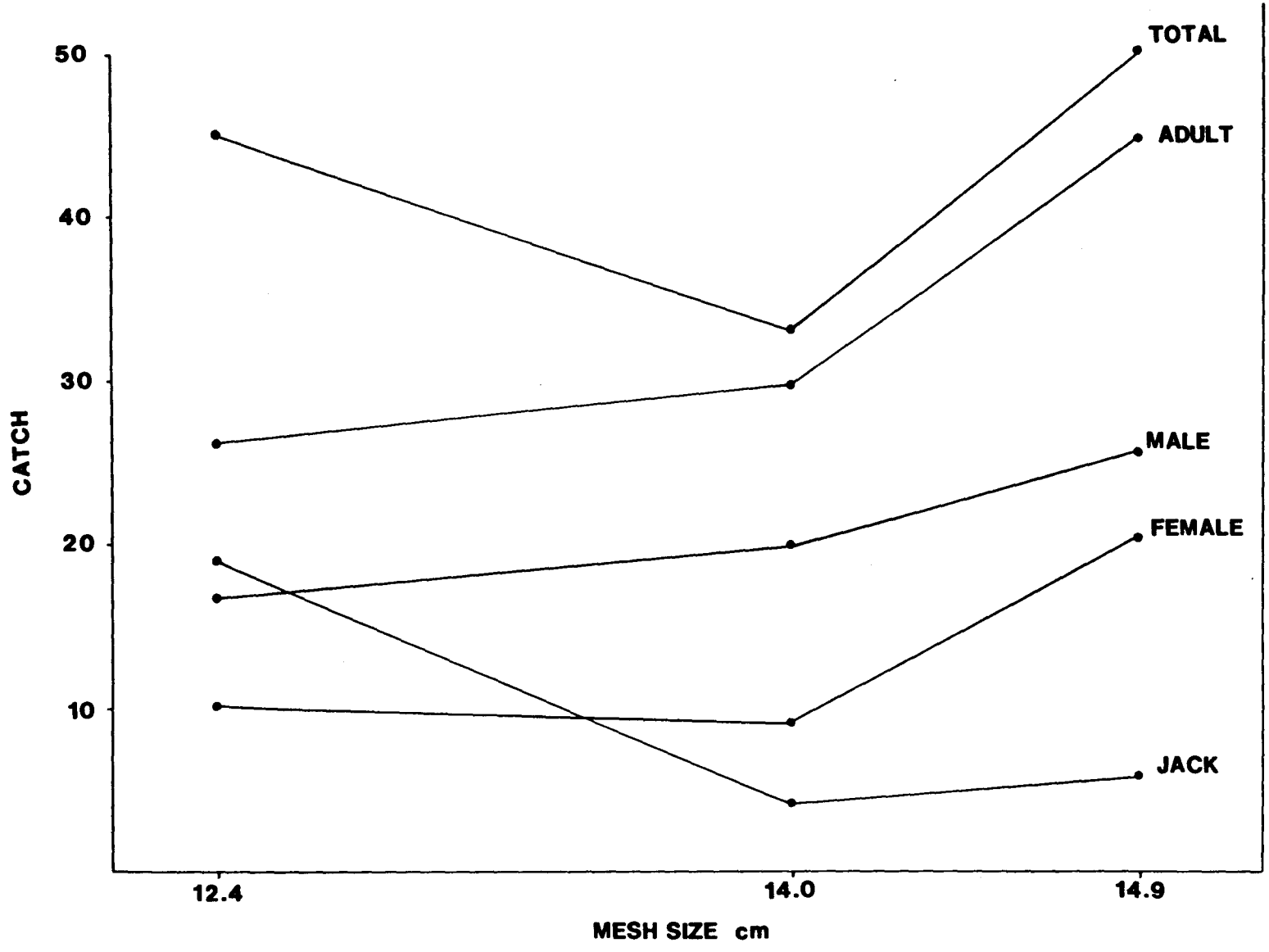


FIGURE 3 : Catch of Chinook salmon versus mesh size.

These analyses showed significantly more large chinook (greater than 2.3 kg) were captured in the 14.9 cm (5 7/8 inches) mesh than in either of the smaller meshes. While the 12.4 cm (4 7/8 inches) mesh captured significantly more jack chinook (<2.3 kg) than either of the larger meshes ($P = 0.05$). There was no significant difference in the fishing performance of the three meshes for pink or sockeye salmon. The number of fish captured in each panel were not corrected for net saturation, or net depth for the preceding analysis.

Efficiency of a gillnet decreases as fish accumulate in the web because the mesh in which the fish is captured is unavailable to other fish, surrounding meshes may be distorted and less available to other fish, and because the fish in the net may cause other fish to avoid the gear. Saturation may affect estimates of selectivity where the meshes being compared saturate at different levels or rates. Bias will only result if catches in each mesh are significantly different or if saturation occurs at different levels in each panel.

No independent sample of the fished populations is available, consequently, only relative selection can be assessed with these data. Plots of total catch per KFM versus total catch for each mesh are presented in Figure 4. While these plots show some indication of saturation, there is no indication that the nets are saturating at different levels and net saturation *per se* is not a problem. Saturation for chinook salmon should be even less evident, because the capture of a chinook is a relatively rare event and consequently is less likely to be interfered with. In most cases, less than three chinook were captured per set (Figure 5). This argument is supported by plots of chinook catch/KFM versus total catch, which show no indication of saturation (Figure 6).

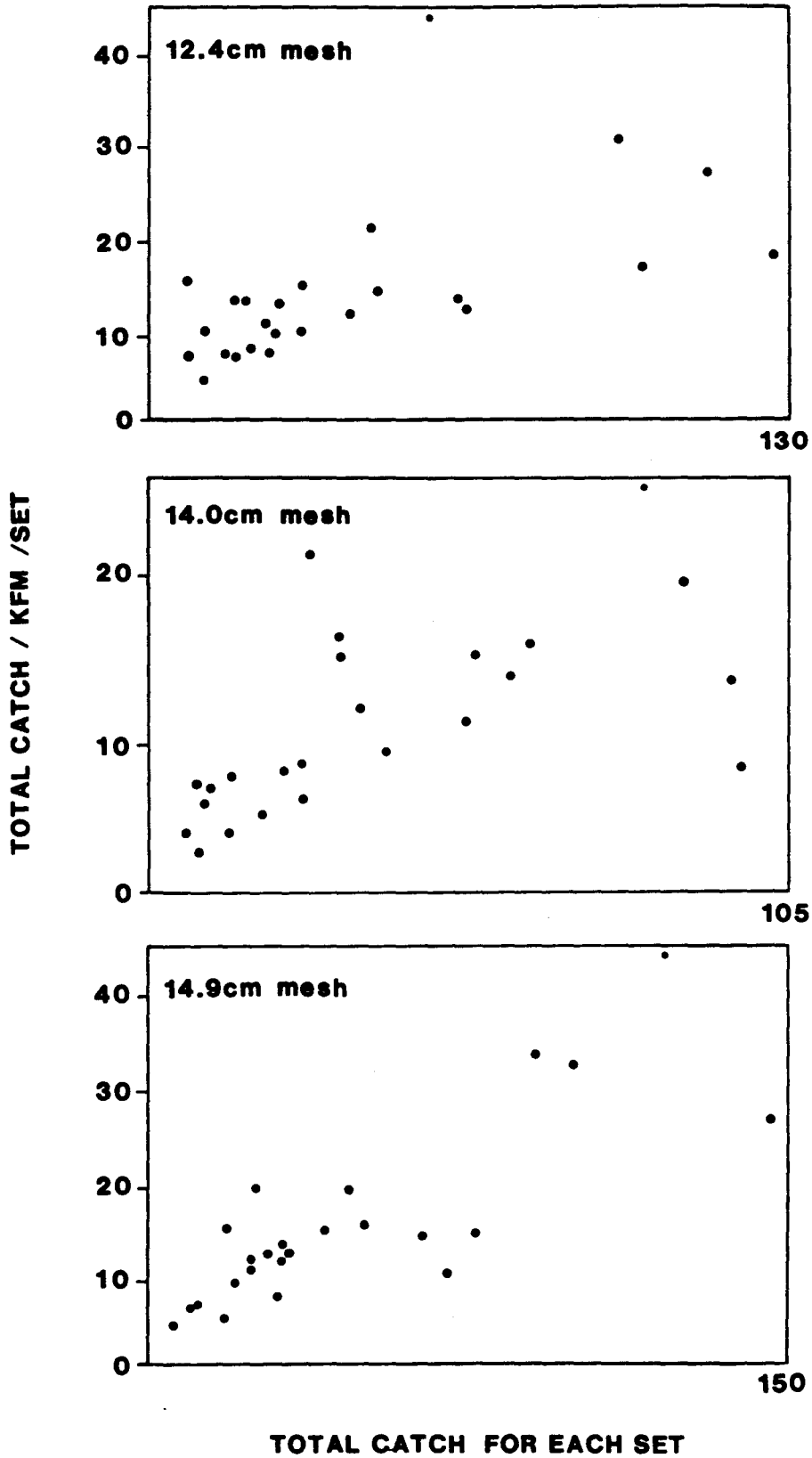


FIGURE 4 : Catch of all species per thousand fathom minutes (KFM) in each mesh vs total catch.

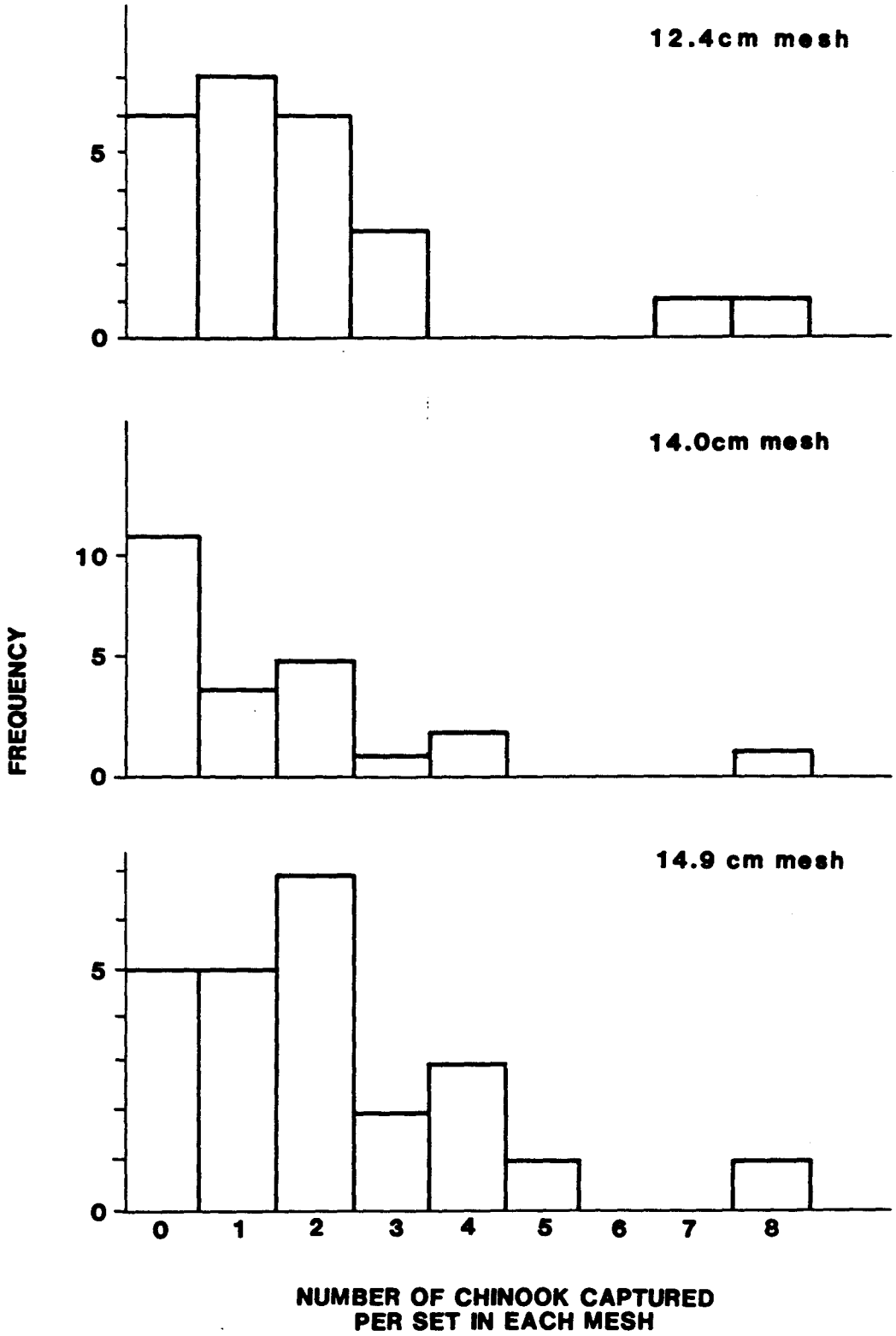


FIGURE 5 Frequency of numbers of chinook captured per set for each set.

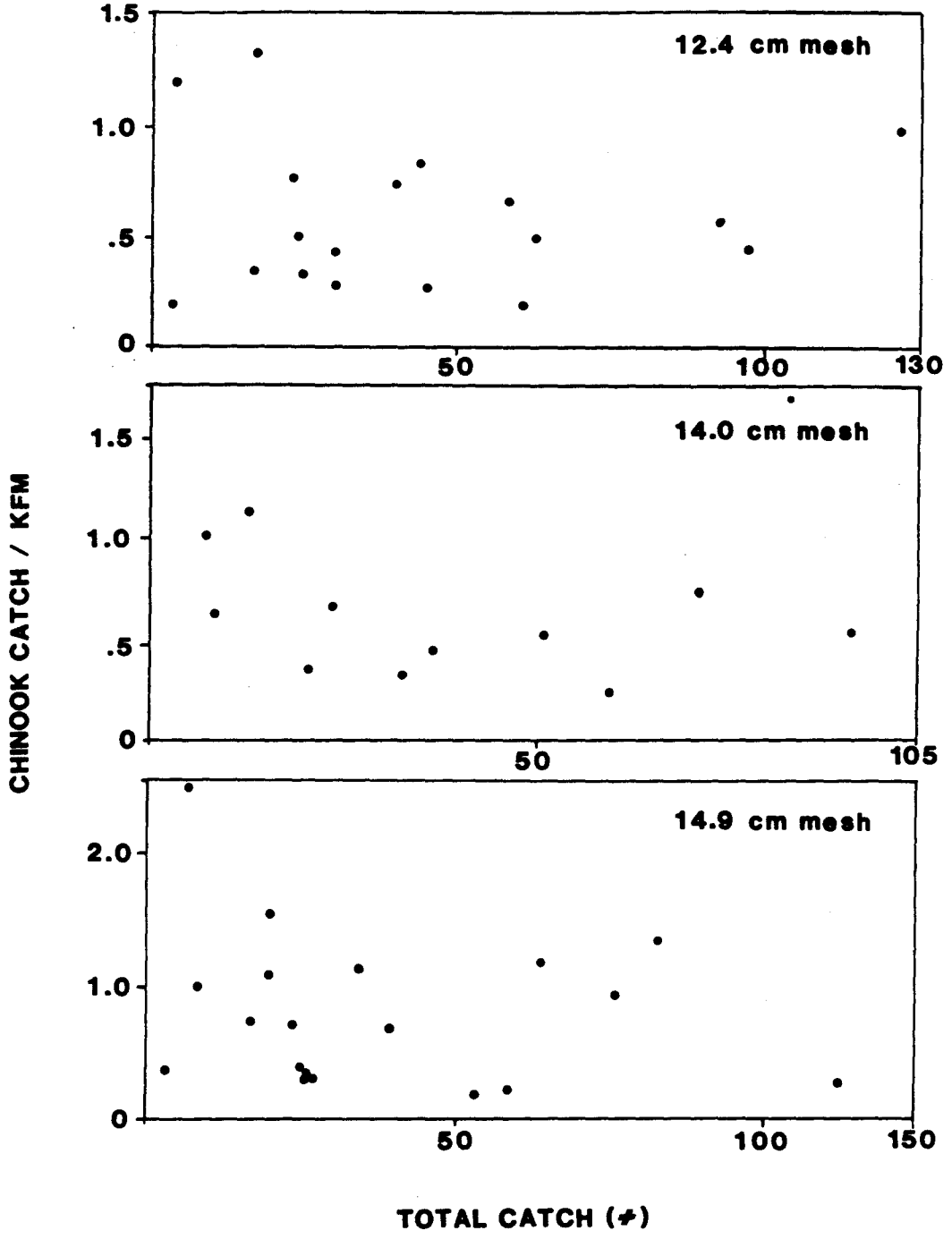


FIGURE 6 : Catch of chinook salmon per thousand fathom minutes (KFM) versus total catch for each set.

Because the test nets were all 60 meshes deep, the 12.4 cm mesh is 11.36% shallower than the 14.0 cm mesh, and the 14.9 cm mesh is 6.8% deeper. However, fishing power may not be directly related to depth. For example, if all three nets reach the river bottom, the effect of increased net depth will be minimal. When the lead line is on the bottom, greater net depth may actually decrease efficiency by allowing the lead line to drag too far behind the float line, placing the web at a shallower angle relative to the bottom.

In any case, this study was designed to assess the effects of changes in mesh size on the capture of chinook salmon in the Fraser River gillnet fishery where nets are restricted to a maximum depth of 60 meshes. Consequently, fishermen cannot compensate for reduced net depths with smaller mesh size, and the uncorrected data accurately reflects the effects of mesh regulation on chinook by-catch.

3.2 Fish Weight and Length

Detailed physical measurements for individual fish sampled from each mesh after each set are presented in Appendix 3. The mean weights of chinook, pink, and sockeye salmon in each mesh size are presented in Table 2. ANOVA was performed on the weights of all chinook salmon, and separately for male and female chinook. No significant difference in fish weight with increasing mesh size was observed. On the contrary, the mean weight of both male and female chinook was greatest in the 12.4 cm mesh (Figure 7). The mean weight of male and female sockeye and female pink salmon increased slightly with increasing mesh size, while the mean weight of male pink salmon decreased slightly (Figure 8).

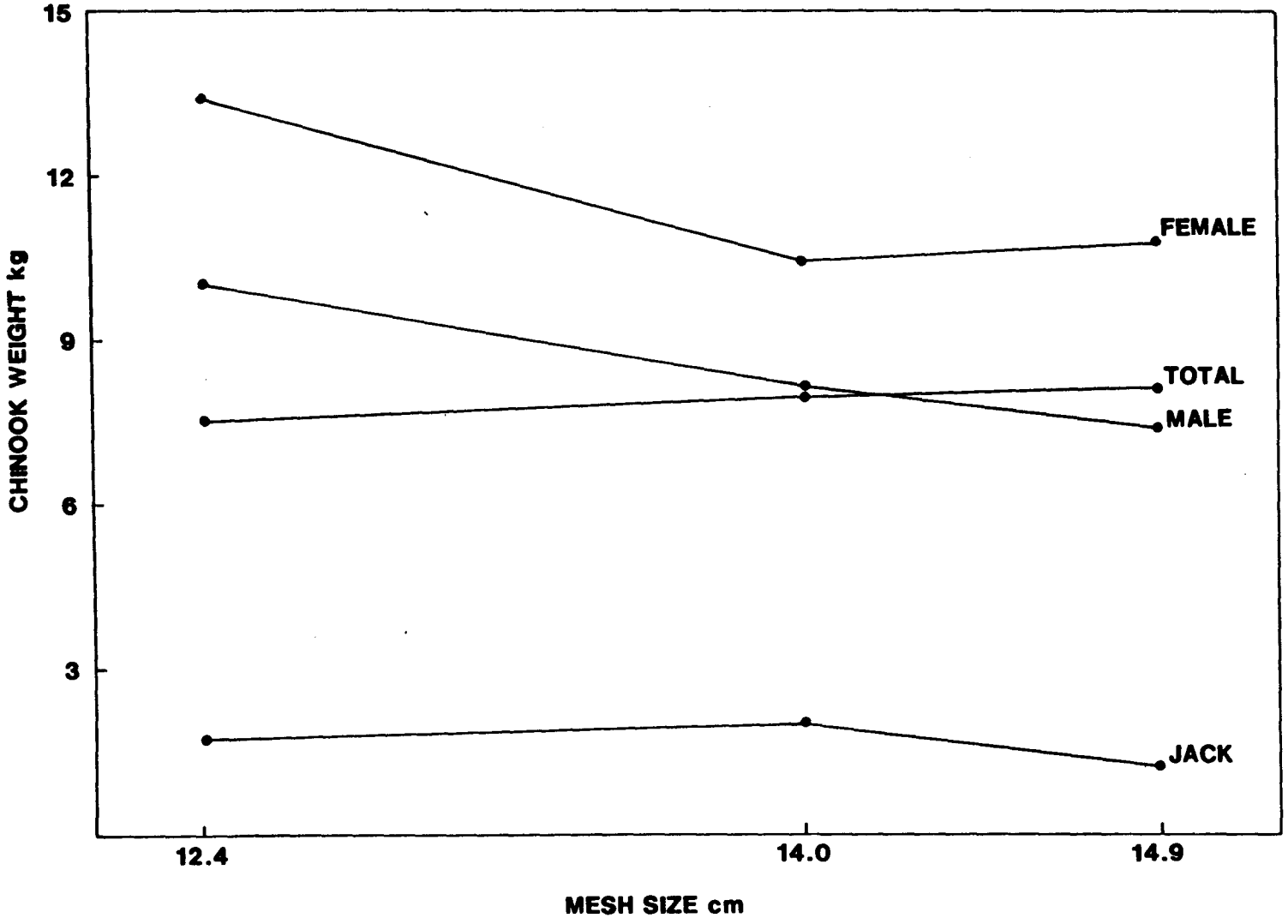


FIGURE 7 : Mean weight of chinook captured in each mesh versus mesh size.

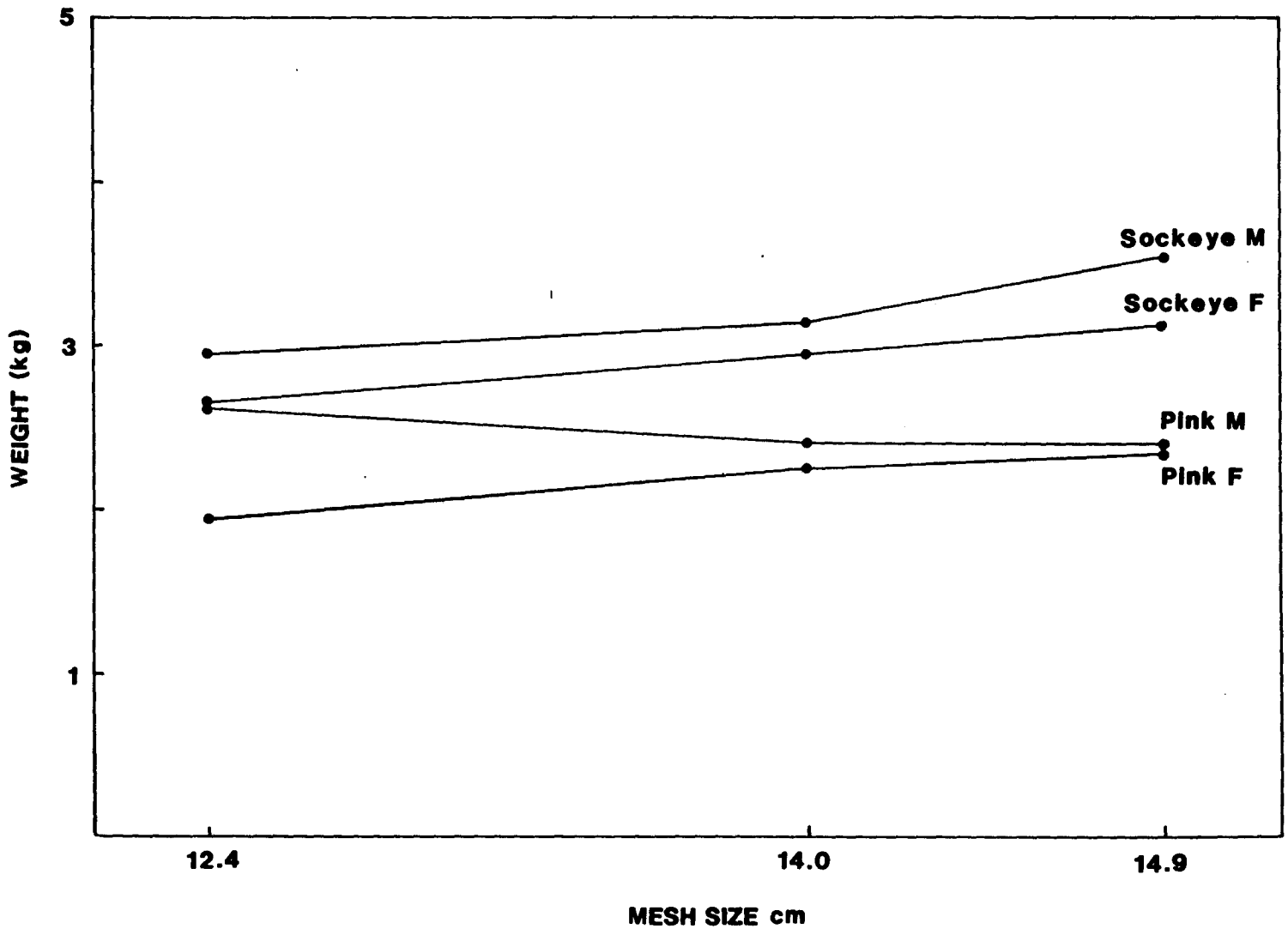


FIGURE 8 : Mean weight of pink and sockeye salmon captured in each mesh versus mesh size.

TABLE 2

MEAN WEIGHTS (KG) OF CHINOOK, PINK, AND SOCKEYE SALMON
CAPTURED IN EACH MESH SIZE
FRASER RIVER SELECTIVITY STUDY 1983

Species	Mesh (cm)	Jack	Male	Female	Overall
Chinook	12.4	1.650	9.99	13.40	7.50
	14.0	1.925	8.05	10.34	7.92
	14.9	1.170	7.31	10.74	8.04
Pink	12.4	--	2.59	1.93	
	14.0	--	2.38	2.20	
	14.9	--	2.37	2.32	
Sockeye	12.4	--	2.90	2.61	
	14.0	--	3.11	2.92	
	14.9	--	3.52	3.12	

Weight frequency histograms for chinook (Figure 9) give some insight into the relationship between weight and mesh size. The histogram for 12.4 cm mesh is distinctly bimodal, while those for 14.0 and 14.9 cm meshes are rather uniform. Weight frequency histograms for a given mesh are more typically normal or slightly skewed right. This skew can result because fish which are too large to be gilled by the gear tangle more readily than fish which are too small to be wedged. The weight frequency curve for sockeye captured in the 12.4 cm mesh is presented as a fairly typical example of a normal weight frequency distribution (Figure 10). While no independent estimate of the size frequency distribution of the fished chinook populations is available, these histograms suggest that, for these mesh sizes, the probability of capturing a chinook (<2.3 kg) does not vary markedly with fish size.

As might be expected from the relationship between length and weight, the length frequency histograms for chinook salmon reinforce the impression that capture is not strongly size dependent (Figure 11). The bimodal distribution of chinook captured in the 12.4 cm mesh is pronounced. We have no explanation for the absence of fish in the 55 to 65 cm range (5 to 7 kg) from the 12.4 cm catch when fish in this range were captured in the other mesh sizes. All of these fish would be too large to be gilled in any of these meshes; however, a relationship between the girth of the head at the back of the mandible and mesh size might be hypothesized.

To examine possible differences in the length-weight relationship for chinook salmon captured in each mesh, the relationship was plotted for each mesh separately, and a linear regression fitted to the data. Figure 12 and the associated regression statistics do not indicate any significant difference in the length-weight relationship for chinook captured in different mesh sizes, since the 95% confidence intervals on the slopes of each line include the others.

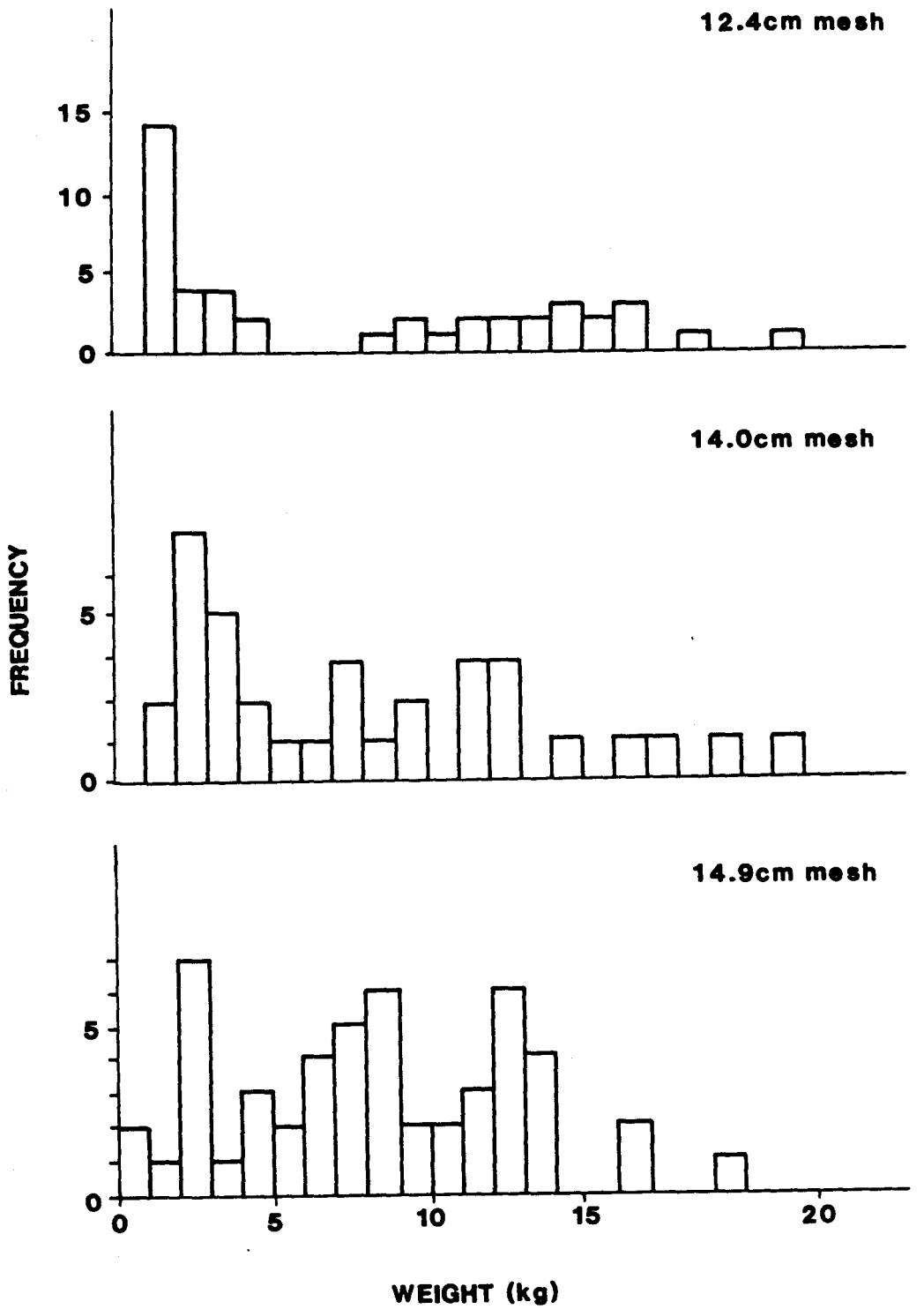


FIGURE 9 : Frequency of chinook captured in each mesh by weight class.

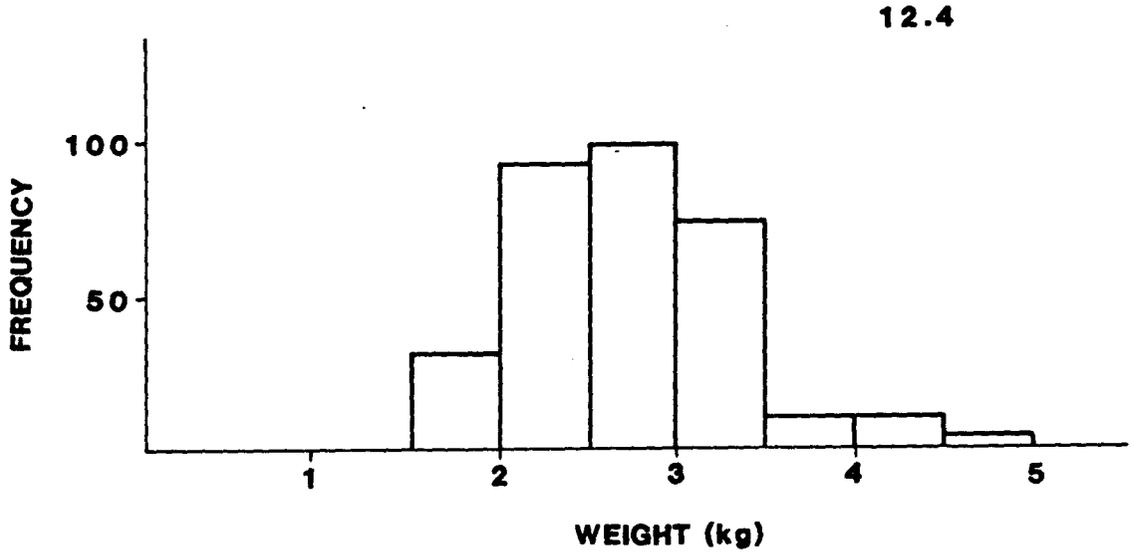


FIGURE 10 : Frequency of sockeye salmon captured in 12.4cm mesh by weight class.

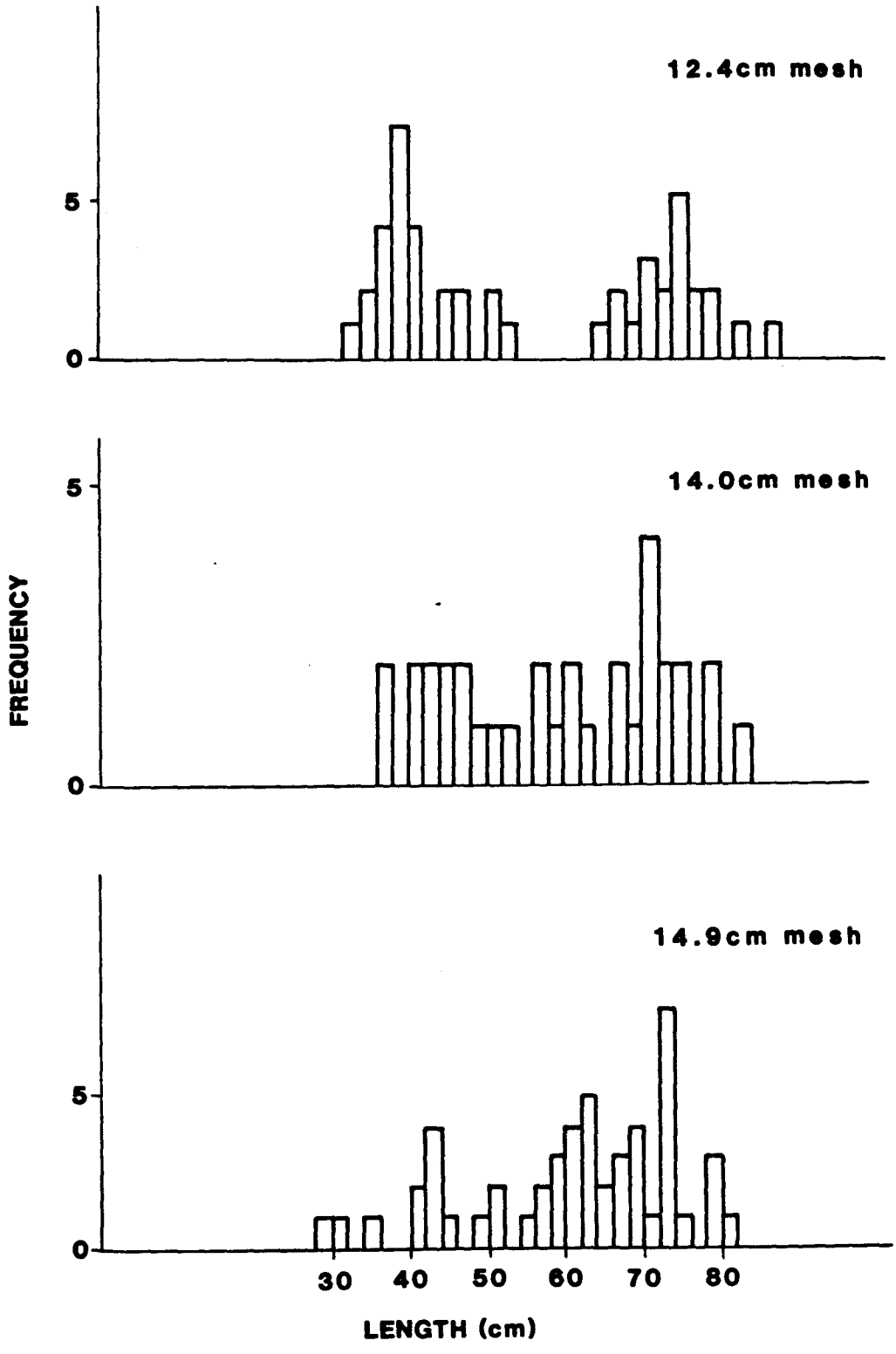


FIGURE 11 : Frequency of chinook salmon captured in each mesh by length class.

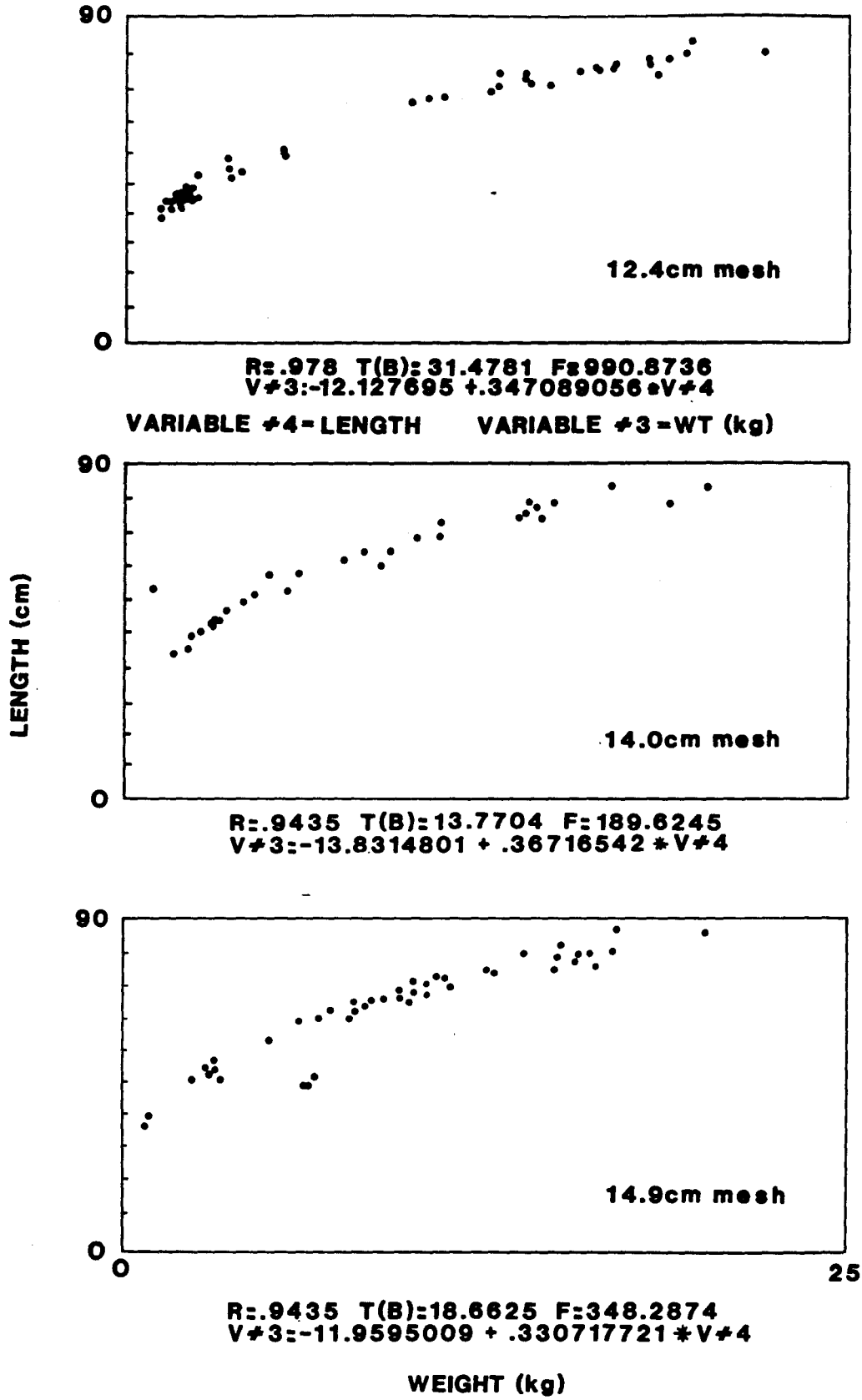


FIGURE 12 : Orbital hypural lengths versus weights of chinook salmon captured in each mesh and associated regression statistics.

3.3 Sex Ratios

ANOVA of the numbers of male and female chinook captured in each mesh size did not reveal any significant change in the sex ratio of chinook captured in each mesh. However, over a wider range of mesh sizes, it is likely that larger, heavier females would be captured preferentially in larger meshes.

Pink and sockeye catches showed a profound change in sex ratio with increasing mesh size, with the percentage of males increasing with mesh size (Figure 13). This increase probably results from the larger size of male sockeye, and the pronounced lateral compression and kyphosis of male pinks, since the mean weight of male and female sockeye and female pinks captured increased with mesh size, while the weight of male pinks decreased (Table 2).

3.4 Fish Shape and Mode of Capture

For chinook salmon, there was no difference between the maximum or head girth of males and females at any length. Although females in spawning condition appear to be somewhat thicker and heavier at length than males, the data did not show any difference in girth. In any event, because of the large size of chinook salmon captured, head shape, not body shape, is more likely to affect capture.

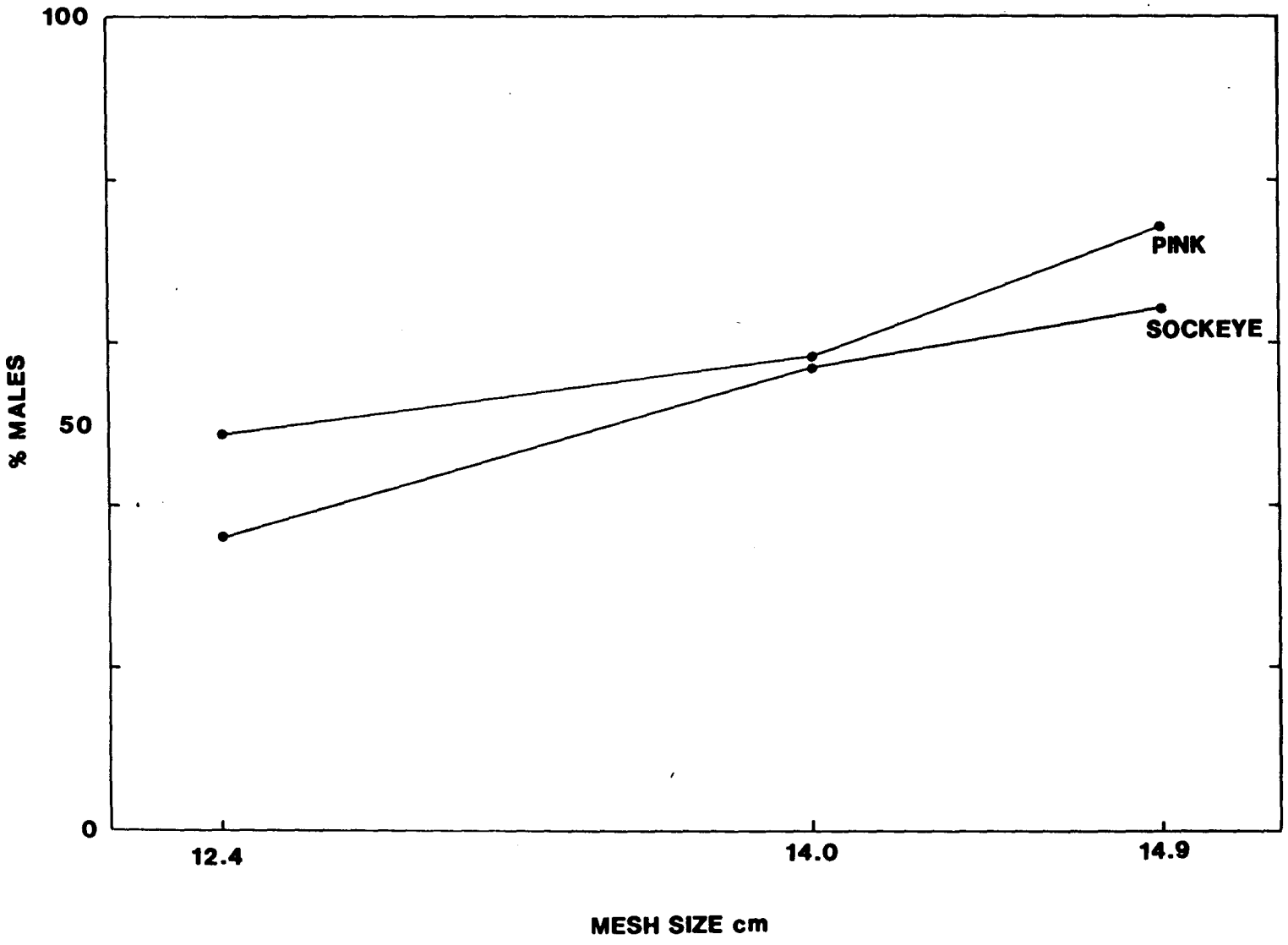


FIGURE 13 : Percent male sockeye and pink salmon captured in each mesh size

For large chinook salmon (>2.3 kg), the net mark occurred on the head before the gills for all but five relatively small males. The girth of this mesh mark is related to mesh size (Table 3, Figure 14). For chinook salmon, the net mark girth frequency histogram shows a normal distribution, although the variance of net marks for fish taken in the 12.4 cm mesh is slightly larger, containing both the largest and smallest net marks observed (Figure 15). For jack chinook and male and female pinks and male sockeye, mean mesh mark girth increased with mesh size; while, for larger chinook and female sockeye, mean mesh mark was greatest in 14.0 cm mesh. While it is likely that this results from the way in which these fish become tangled, the mechanisms of the process are not understood.

In general, increase in mesh mark girth was not proportional to increase in mesh size. A check of mesh size before and after this study indicated that the mesh sizes were correct and had not changed during the course of the study.

Finally, if swimming thrust increases net penetration, or if most chinook are captured by the net in the same manner (i.e. the mandible), there should be a correlation between fish size and mesh mark girth. This would result because large fish have greater swimming thrust, and larger diameter at any given part on the body. Plots of net mark girth versus fish weight show no relationship (Figure 16).

There is, however, a strong inverse relationship between the distance from the fish orbit to the net mark and fish weight (Figure 17), because the larger a fish is, the less distance it can penetrate into the net.

TABLE 3

MEAN GIRTH AT FIRST NET MARK FOR CHINOOK, PINK, AND SOCKEYE SALMON CAPTURED IN EACH MESH SIZE
FRASER RIVER SELECTIVITY STUDY 1983

Species	Mesh Size (cm)	Mesh Perimeter (cm)	Jack	Male	Female	Overall
Chinook	12.4	24.8	26.58	26.78	26.85	26.52
	14.0	27.9	29.18	30.82	32.59	31.06
	14.9	29.8	31.00	29.85	31.07	30.77
Pink	12.4	24.8	--	22.97	25.06	
	14.0	27.9	--	27.17	26.60	
	14.9	29.8	--	28.88	28.25	
Sockeye	12.4	24.8	--	26.06	26.73	
	14.0	27.9	--	29.86	31.70	
	14.9	29.8	--	31.39	30.59	

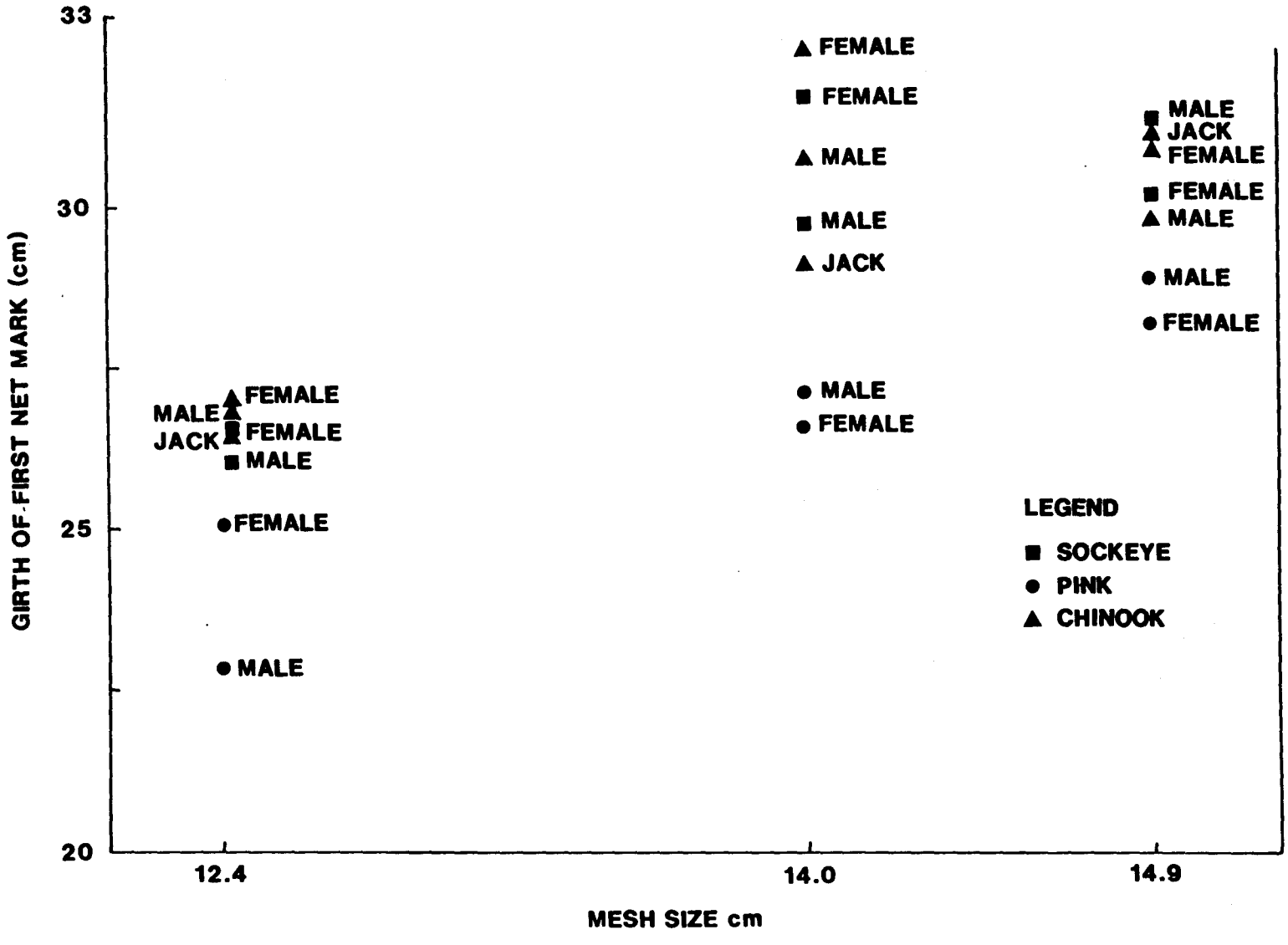


FIGURE 14 : Girth of first net mark versus mesh size.

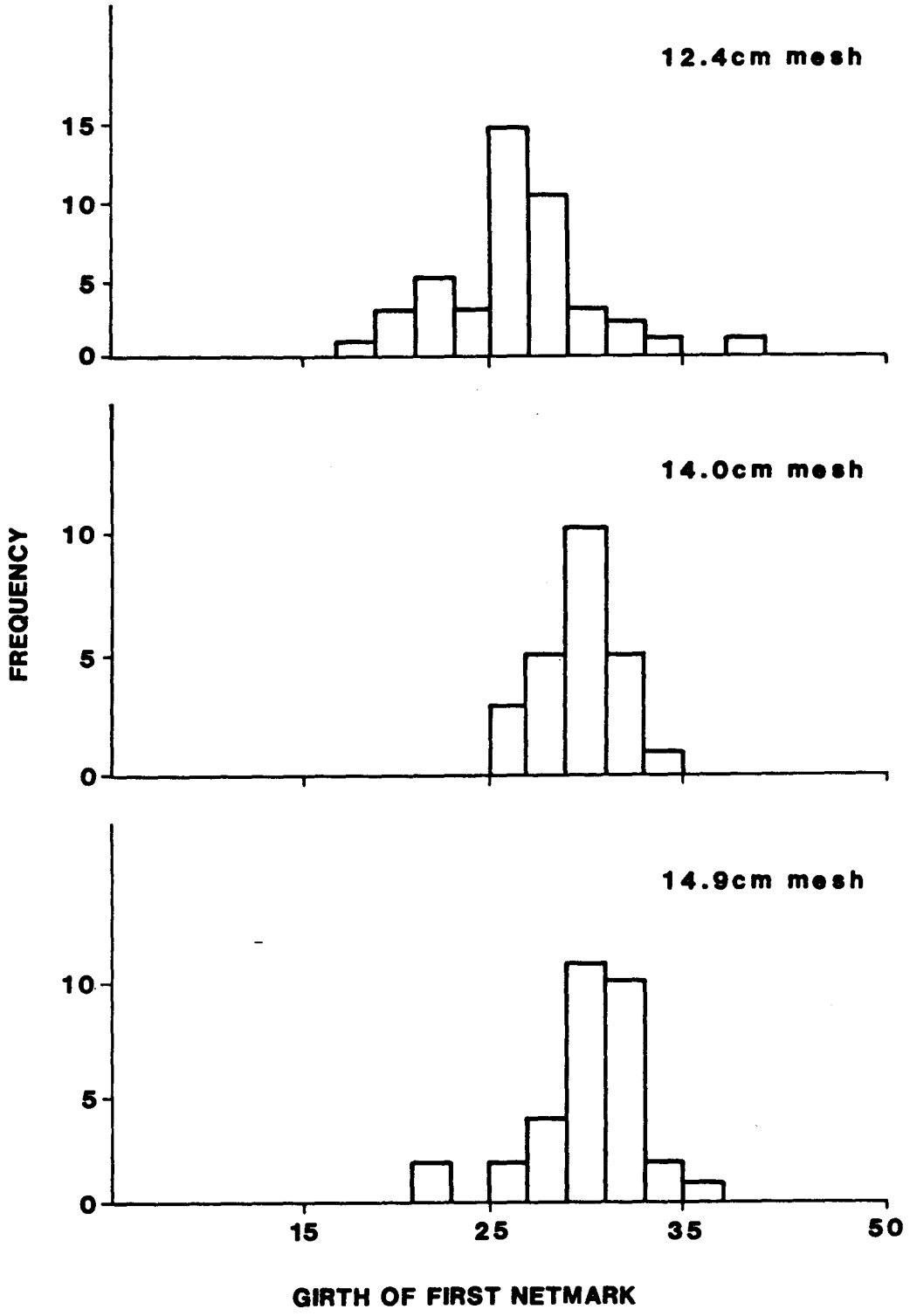


FIGURE 15: Frequency of girths of first netmarks for chinook salmon captured in each mesh by size class.

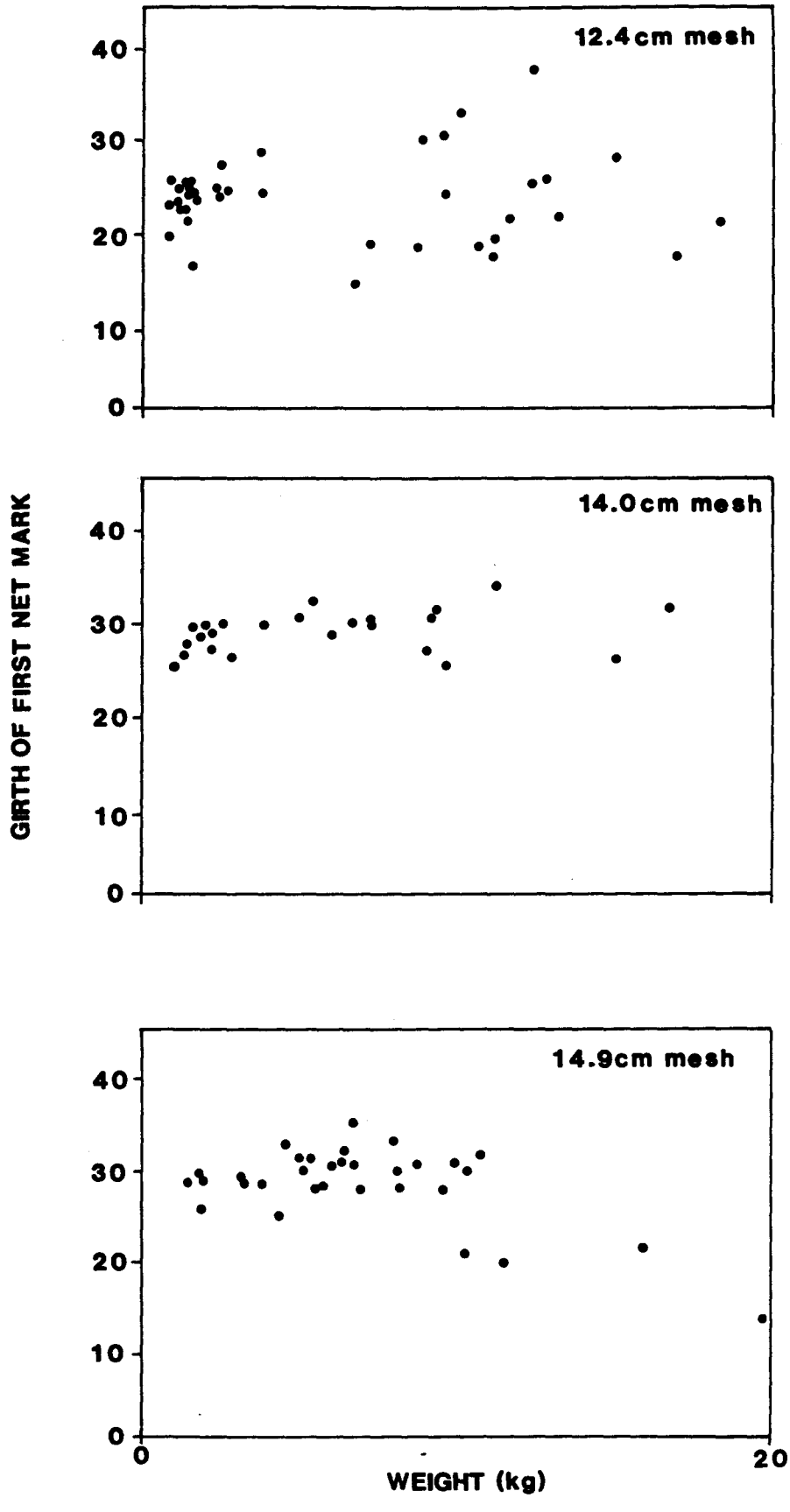


FIGURE 16 : Girth of first netmark vs. weight for chinook salmon captured in each mesh during each set.

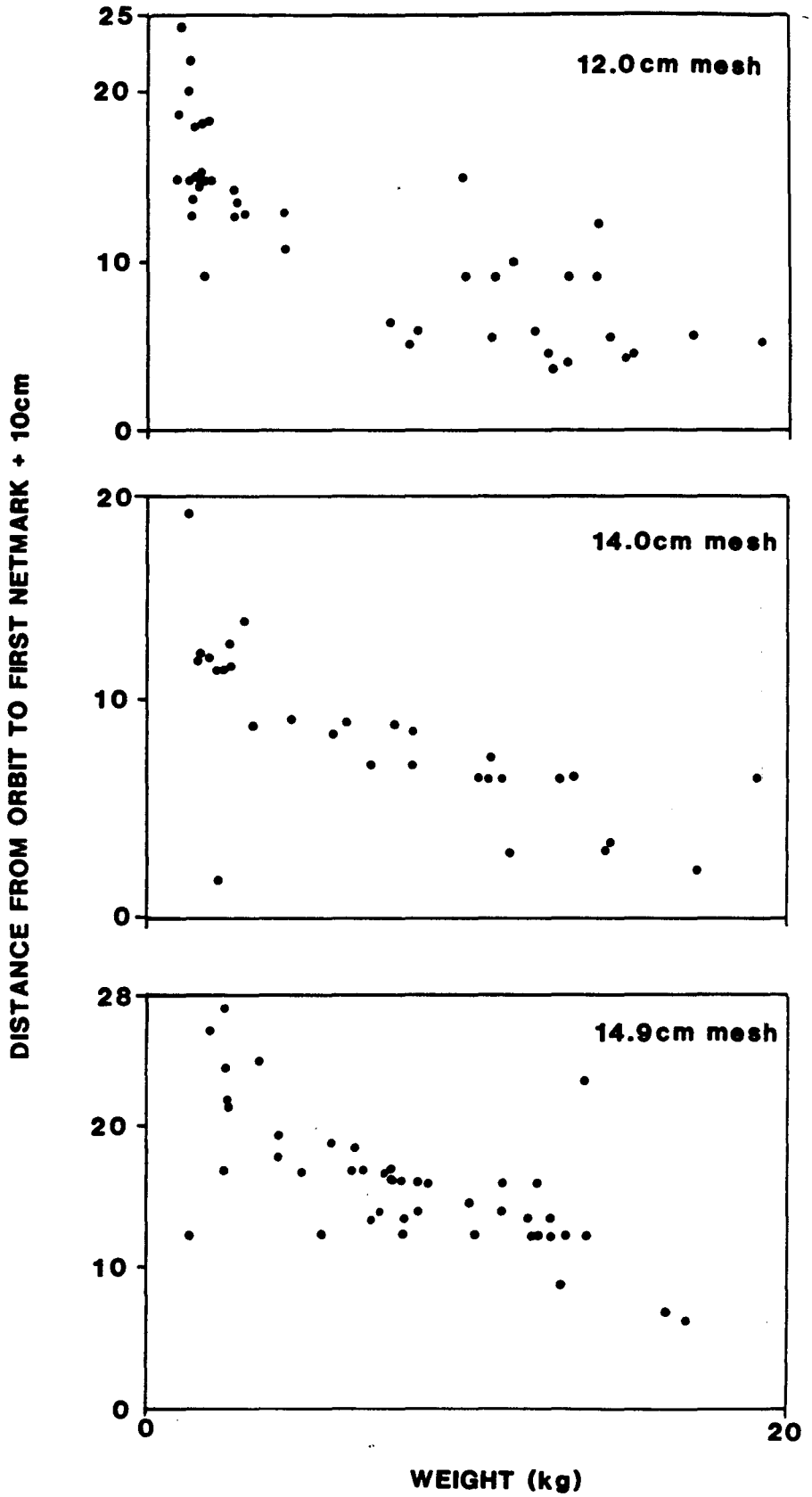


FIGURE 17: Distance from rear of orbit to first netmark plus 10 cm. , vs. fish weight for Chinook salmon captured in each mesh during each set.

4.0 CONCLUSIONS

The 14.9 cm mesh captured on the order of 40% more large chinook salmon than either the 12.4 or 14.0 cm meshes, and the difference in fishing performance, expressed as catch per KFM, was significant ($P = .05$). While the numbers of pink and sockeye salmon captured in each mesh were not statistically different, there were fewer fish captured in the 14.0 cm mesh than in either the 12.4 or 14.9 cm nets. If this trend accurately reflects the situation in the Fraser gillnet fishery, increased fishing time may be required to harvest pink and sockeye. While increased fishing time would increase chinook harvest, a reduction in mesh size from 14.9 cm to 14.0 cm would still result in a reduced chinook harvest because the ratio of chinook to pink or sockeye captured was 17% lower in the 14.0 cm net than in the 14.9 cm net. The reduction in mesh size also increases the proportion of female pink and sockeye (Table 1) in the catch and therefore egg disposition will be reduced.

While these data show that a reduction in maximum allowable mesh size from 14.9 to 14.0 cm has been effective in reducing the by-catch of large chinook, a further reduction in mesh size would have no positive effect on chinook by-catch, and would further increase the relative harvest of female pink and sockeye salmon. Further reductions in chinook by-catch may be realized by reducing net hang ratio, and using less flexible net twine, since both of these factors are related to tangling. However, such a net would almost certainly be less efficient. Unfortunately, no data are available regarding the possible effects of twine and hang ratio regulation on either the chinook by-catch or target fishery.

5.0 LITERATURE CITED

Baranov, F.I. 1914. The capture of fish by gillnets. Mater. Posnaniyu Russ. Rybolov. 3(6):56-99. Partially translated from Russian by W. E. Ricker.

Hamley, J.M. 1975. Review of gillnet selectivity. J. Fish. Res. Board Can. 32:1943-1969.

Riedel, D. 1963. Contribution to the experimental determination of the selection parameter of gillnets. Arch. Fischereiwiss. 14:85-97.

von Brandt, A. 1974. Enmeshing nets: gillnets and entangling nets--the theory of their efficiency. FAO, EIFAC/71/I/Symp. 9.

APPENDIX 1

Summary of fish captured and
set time for each set and date

Notation for appendix 1

Mesh - mesh size in inches (stretched mesh)

Set - set number for that date

Posit - Net position relative to shore (shore(s), middle(m), outside(o)).

Bset - Begining of set

Eset - End of set

Soak - Soak time in minutes

Chin - Chinook

Soc - Sockeye

Pink - Pink

Chum - Chum

Coho - Coho

Sthd - Steelhead

AUG 16 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	O	1310 1350	1312 1358	43	0	19	1			
5 1/2	1	M	1312 1340	1314 1350	32	0	32				
5 7/8	1	S	1314 1330	1316 1340	20	0	24				
4 7/8	2	S	1505 1520	1506 1528	18.5		11				
5 1/2	2	M	1506 1528	1508 1534	24		10				
5 7/8	2	O	1508 1534	1510 1539	27.5		11				

AUG 18 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	S	1507 1525	1509 1533	21	2	13	2			
5 1/2	1	O	1503 1544	1505 1552	44	1	20	1			
5 7/8	1	M	1505 1533	1507 1544	32.5	4	18	1			
4 7/8	2	O	1705 1744	1707 1750	41	1	16				
5 1/2	2	S	1700 1726	1702 1734	29	2	12				
5 7/8	2	M	1702 1734	1705 1744	35.5	3	20				

AUG 20 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	M	1545 1571	1547 1587	33	2	41	1			
5 1/2	1	O	1543 1587	1545 1598	48.5	1	33	1			
5 7/8	1	S	1547 1564	1549 1571	19.5	4	13	1			
4 7/8	2	M	1739 1766	1741 1779	32.5	1	25	1			
5 1/2	2	S	1737 1760	1739 1766	25	1	8				
5 7/8	2	O	1741 1779	1743 1790	42.5	1	29	1			

AUG 26 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	O	930 963	932 969	35		14	1			
5 1/2	1	S	934 950	936 956	18		6	2			
5 7/8	1	M	932 956	934 963	26.5	2	8				
4 7/8	2	S	1017 1035	1019 1040	19.5		5	3			
5 1/2	2	O	1020 1045	1022 1050	26.5		5	1			
5 7/8	2	M	1019 1040	1020 1045	23		5	1			

SEPT 6 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	M	1820 1866	1822 1876	50	1	6	22		1	
5 1/2	1	O	1818 1876	1820 1885	61.5		9	8		2	
5 7/8	1	S	1822 1854	1824 1866	37	2	4	21			
4 7/8	2	M	1932 1984	1934 1993	55.5	2	6	14		2	
5 1/2	2	S	1930 1975	1932 1984	48.5	3		5			
5 7/8	2	O	1934 1993	1936 2005	64	2	6	20		1	

SEPT 8 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	O	1898 1975	1900 1993	85	3	7	49		4	
5 1/2	1	M	1900 1959	1903 1975	65.5	1	8	52		2	
5 7/8	1	S	1903 1935	1905 1959	43	1	6	22		1	
4 7/8	2	S	2043 2082	2045 2094	44	1	3	19		2	
5 1/2	2	M	2045 2094	2046 2115	59	2	8	43		1	
5 7/8	2	O	2046 2115	2048 2123	72	1	3	55		2	

OCT 1 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	M	1298 1342	1300 1347	45.5	0	3	6	2	0	
5 1/2	1	O	1296 1347	1298 1356	54.5	0	5	6	1	1	
5 7/8	1	S	1300 1332	1302 1342	36	2	3	9	6		
4 7/8	2	M	1417 1463	1419 1477	52	1	2	36	3	3	
5 1/2	2	S	1415 1477	1417 1488	66.5	0	3	17	3	2	
5 7/8	2	O	1419 1451	1421 1463	37	1	8	9	12	0	

SEPT 27 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	O	947 1012	949 1033	74.5	1	17	37	1	4	1
5 1/2	1	S	951 981	953 993	35		11	16	2	3	
5 7/8	1	M	949 993	951 1012	52.5		12	36		1	
4 7/8	2	S	1204 1231	1206 1245	33	1	18	10	1		
5 1/2	2	O	1208 1305	1210 1335	111		31	14	5	2	
5 7/8	2	M	1206 1245	1208 1305	68	2	30	27	4	4	

SEPT 29 MESH	SET SET	SUMMARY POSIT	BSET	ESET	SOAK	CHIN	SOC	PINK	CHUM	COHO	STHD
4 7/8	1	S	1107 1139	1109 1148	35.5	2	4	10	4	1	2
5 1/2	1	M	1105 1148	1107 1159	47.5	2	10	10	2	1	
5 7/8	1	O	1103 1159	1105 1161	56		10	3	1	3	
4 7/8	2	O	1313 1405	1315 1445	111	8	38	63	10	3	1
5 1/2	2	M	1311 1365	1313 1405	73	8	32	37	8	2	1
5 7/8	2	S	1309 1345	1311 1365	45	4	10	14	9	2	1

APPENDIX 2

ANOVA Tables for comparisons
made in the text

A NOVA Catch of Chinook over 2.3 KG per KFM in each set for each mesh size

Mesh(in.)	Mean Catch/KFM/set
4 7/8	.277
5 1/2	.335
5 7/8	.659

-,-,-,A O V TABLE-,-,-,

SOURCE OF ERROR	DEGREES FREEDOM	SUM OF SQUARES	MEAN SUM OF SQUARES
BETWEEN	2	2.034	1.017
WITHIN	69	17.828	.258

F VALUE= 3.936 TSS 19.862

F FROM TABLES = 3.2

ANOVA Catch of Jack Chinook (less than 2.3 KG) per set) in each mesh

Mesh(in.)	Mean Catch/KFM/set
4 7/8	.249
5 1/2	.048
5 7/8	.114

-,-,-,A O V TABLE-,-,-.

SOURCE OF ERROR	DEGREES FREEDOM	SUM OF SQUARES	MEAN SUM OF SQUARES
BETWEEN	2	.504	.252
WITHIN	69	3.545	.051

F VALUE= 4.901 TSS 4.048

F FROM TABLES = 3.2

ANOVA Catch of Pink salmon per KFM in each set for each mesh size.

Mesh(in.)	Mean catch/KFM/set
47/8	8.002
51/2	5.626
57/8	7.469

-,-,-,A O V TABLE-,-,-,

SOURCE OF ERROR	DEGREES FREEDOM	SUM OF SQUARES	MEAN SUM OF SQUARES
BETWEEN	2	74.63	37.315
WITHIN	69	4268.363	61.86

F VALUE= .603 TSS 4342.993

F FROM TABLES = 3.2

ANOVA Catch of Sockeye salmon per KFM in each set for each mesh size.

Mesh(cm)	Mean catch/KFM/set
12.4	5.408
14.0	5.654
14.9	7.471

-,-,-,A O V TABLE-,-,-,

SOURCE OF ERROR	DEGREES FREEDOM	SUM OF SQUARES	MEAN SUM OF SQUARES
BETWEEN	2	60.917	30.458
WITHIN	69	3274.568	47.458

F VALUE= .642 TSS 3335.484

F FROM TABLES = 3.2

ANOVA Weight of Chinook captured in each mesh

Mesh(in.)	Mean weight/set
4 7/8	7.504
5 1/2	7.93
5 7/8	8.147

-,-,-,A O V TABLE-,-,-,

SOURCE OF ERROR	DEGREES FREEDOM	SUM OF SQUARES	MEAN SUM OF SQUARES
BETWEEN	2	9.791	4.896
WITHIN	122	3626.481	29.725

F VALUE= .165 TSS 3636.272

F FROM TABLES = 3.2

APPENDIX 3

Summary of data taken for
fish captured in each mesh

SET: 1 DATE: AUG16/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	F	2.4	56.4		21.4	6.7	27.1	30	
SX	F	2.4	46.3		20.7	5.5	27.6	30.4	
SX	M	3	49.2		21.5	4	30.3	33.5	
SX	M	2.2	46		21.1	11.1	27.4	28.9	
SX	F	2.3	45.9		20.8	8	26.6	29	
SX	M	2.9	47.3		21.5	4.4	29.6	31.9	
SX	F	2.4	48.5		22.5	4.8	26.7	31.3	
SX	F	2.7	48.5		22.2	4.9	28	29.7	
SX	F	2.6	47.9		21.7	3.8	28.3	31.3	

SET: 1 DATE: AUG.16/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	M	2.7	48			13	28.6	31.5	
SX	M	2.6	47.5			11.3	28.6	32.3	
SX	M	3.3	49.9			8.4	30.2	34.6	
SX	F	2.5	4.76			5.3	29.5	30.8	
SX	M	2.5	46.8			8.2	28.3	31.9	
SX	F	3.2	49.9			7.3	29.8	35.1	
SX	M	2.6	49.5			12.5	30.3	32.8	
SX	M	3.3	48.6			3	31.1	34.5	
SX	M	2.5	45.7			12.5	28.4	31.6	
SX	M	2.6	48.2			22.9	28.3	31.5	

SET: 1 DATE: AUG.16/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX		3.1	49.4			13.5	29.2	33.5	32
SX		2.5	47.5			8.2	26.5	20.1	30.2
SX		3.8	53.9			12.9	20.7	34.4	34.2
SX		2.9	48.9			22.6	29.2	31.5	32
SX		2.8	49.8			28.6	28.3	33	
SX		3.2	50.5			29.1	28.5	34.5	
SX		3.3	50.2			6.5	30.1	35.4	
SX		2.6	46.5			12.2	28	31.9	
SX		3.3	48.3			12.5	29.9	34	
SX		3.5	49.8			9.7	31.1	36	
SX		3	49.7			7.8	30.4	32.2	
SX		1.7	46.2			18.8	24	23.5	

SET: 2 DATE: AUG.16/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	M	3	50.5	7.8	23.1	3	30.2	32.5	
SX	F	1.9	45.3	7.1	20.4	5	26.3	28.8	
SX	M	2.2	44.8	7	20.4	6.9	26.2	29.2	
SX	M	2.7	48.7	7.3	22.4	8.7	28.8	32.2	
SX	F	2.8	48.9	1.4	22.2	4	26.9	30.5	
SX	F	2.9	50.1	7	21.8	6.5	28	33.4	
SX	F	2.8	48.6	7.5	22.2	4.5	27.1	30.9	
SX	F	2.3	46.9	6.5	21.8	8.6	26.9	29.3	
SX	F	1.9	46.6	6.5	19.7	23.8	26.2	28.1	
SX	F	2.9	47.5	6.8	21.4	9.6	27.2	30.3	
SX	F	2.8	49.4	6.3	22.6	7.6	28.5	31.6	

SET: 2 DATE: AUG.16/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	M	2.3	46.2	6.2	22.5	14.5	27.5	29.8	
SX	M	3.2	49.4	6.8	22.1	10.4	30.8	34.9	
SX	F	2.9	50	7.1	22.5	17	29.3	29.9	
SX	F	2.7	49.2	6.7	21.9	6	28.3	31.6	
SX	F	2.9	49.3	6.9	21.7	8.1	29.5	32.7	
SX	F	2.5	47.1	6.8	21.5	8.8	29.2	31.1	
SX	F	2.4	48	6.9	22.3	8.3	29	30.3	
SX	F	2.3	46.6	6.5	20.9	9.4	26.9	29	
SX	M	2.7	47.5	7	21	6.4	29.9	31	
SX	M	3.1	48.1	6.8	22.2	3.9	30.7	35.2	

SET: 2 DATE: AUG.16/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	M	3	4.9	7	22.9	14.2	30.2	33.3	
SX	F	3.4	52	7.1	24	7.8	31.6	33.7	
SX	M	2.8	49.1	7	21.9	8.9	29.9	30.5	
SX	F	3.7	54.1	7.7	24	8.8	31.8	35.4	
SX	M	3.7	53.1	7.3	24.6	15.1	33	36.6	
SX	F	3.6	53.9	8	24.4	25.1	32.1	34	
SX	M	3.3	49.1	7.2	22.7	10.2	30.4	33.9	
SX	M	3	48.5	7.1	21.2	13.7	31.6	34.1	
SX	M	2.9	49	7	22.4	23.7	29.1	31	
SX	F	3.8	53.3	7.5	24.1	7.4	33.6	35.5	
SX	F	3.2	50.1	6.2	22.9	8.3	29.4	32.9	

SET: 1 DATE: AUG.18/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	2.3	41.5	7.1	18.2	8.2	29.2	32.4	32
SX	F	2	47.9	7.2	22.3	2.5	26.4	28.5	23.7
SX	M	3.6	50.2	7	22.7	7.1	30.5	34.5	30.5
SX	F	2.9	47.9	6.6	21.5	16.5	28.8	31.6	31.5
SX	M	2.9	48.7	7	21.5	7.9	29.1	32	29.6
SX	F	3.1	50.5	6.5	22.6	17.6	29.5	32	32
SX	M	3	48.7	7.2	21.4	9	29.5	32.3	28.8
SX	F	2.8	44.1	6.7	21	21	27.9	31.2	30.8
SX	M	2.7	48.3	7	21.2	21.8	27.4	29.5	29
SX	F	2.6	47.9	6.3	22.1	23.8	27.8	30.4	31
SX	F	2.2	47.2	6.5	20.5	20.7	26.5	29.5	29.5
PK	M	2.4	47.6	7	20.9	4.7	27	28.9	25.1

SET: 1 DATE: AUG.18/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	16.2	78.5	11.6	33.6	-4.4	52.5	59.8	
CN	FR	7	61.1	9.3	25.2	1	39.4	43.9	29.8
CN	MR	8.1	66	9.2	27.6	0	41.8	47.4	28.1
CN	MR	2.6	45.8	6.1	18.9	7.5	28.2	30.9	30.9
SX	M	2.9	48.5	7.1	20.9	12.2	29.7	31.8	31.8
SX	F	2.9	48.3	7	21.9	11	28.1	33.7	32.3
SX	F	1.3	40.3	5.6	17.7	19	23.8	25.5	25.5
SX	M	3.3	50.2	6.9	22.1	16.6	30.1	32.7	33.4
SX	M	2.8	48.4	6.7	21.2	12.2	28.5	31.6	30.9
SX	F	3.3	50.1	6.9	24	10	30	31.9	31.4
SX	F	2.9	46.8	6.1	20.4	13	26.5	30.9	29.5
SX	M	4.1	54	7.8	25	3.9	32.5	36	29.8
SX	F	3.1	48.6	6.4	22.1	22.3	29.1	32.6	32.6
SX	F	2.6	47.5	6.8	22.4	9.6	27	30.2	28.8

SET: 2 DATE: AUG.18/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	1.9	41.4	5.8	17.2	9.9	25.9	29.1	27.8
SX	F	3	46.6	7.5	22.5	6	31	33.5	29.4
SX	M	3	46.6	7.1	20.7	7.1	29.5	34.1	28.7
SX	F	3	50	7.7	22.9	7.6	28.9	31.2	27.9
SX	F	3.2	51.1	7	23.7	0	29.9	32.4	
SX	F	2.7	46.4	6	22.1	6	26.9	30.5	25
SX	M	1.9	42.4	5.8	18.6	6.3	25.9	27.2	26
SX	F	2.2	46.2	6.8	20.5	6.8	26.9	29.1	27
SX	F	2.2	46.2	5.9	21.1	7	26.6	28.2	26.3

SET: 1 DATE: AUG.18/83 MESH: 4 7/8

SPECIEs	SEX	WT(KG)	LENGTH (CM) OH	DO	OD	ON	GIRTH HEAD	MAX	NET MK
CN	MR	16.7	82	12.5	35.2	-5	55.5	63.5	
CN	FW	9.4	67.8	9.3	29	-3.5	43.8	50.3	
SX	F	2.3	47.3	6.9	21.4	7	27	28.5	27.5
SX	M	2.4	45.7	7.5	21.1	6.6	26.8	29.5	26.8
SX	M	3	47.6	6.8	21	3.7	29.5	31.7	25.6
SX	F	2.4	47.1	6.6	20.5	6.9	27.1	28.8	27.1
SX	F	2.3	47.5	6.1	20.2	9.4	26.3	29.6	28.5
SX	F	3	49.8	6.2	20.9	6.4	28.3	31.7	28.3
SX	F	2.5	48	7	20.3	7.3	26.1	28.5	26.4
SX	F	3.3	51.8	7.3	23.2	9	28	32.1	31.8
SX	M	2.5	47.6	6.3	22	12.2	26	28.7	27.3
SX	F	2.4	45.7	7.3	20.2	12.2	25	27.5	26.8
PK	M	1.5	40.5	6.3	18	11.7	24.4	27.6	26.8
PK	M	1.3	39.4	6	17.9	9.8	23.4	25.7	25

SET: 2 DATE: AUG.18/83 MESH: 5 7/8

SPECIEs	SEX	WT(KG)	LENGTH (CM) OH	DO	OD	ON	GIRTH HEAD	MAX	NET MK
CN	MR	5.8	59.1	8.5	22.5	5.5	37	42	35.7
CN	FR	16.8	81.5	12.1	35.4	-4.9	52.6	60.5	
CN	FW	13.7	79.3	13	35.5	0	49.8	54.1	
SX	F	3.2	50.4	7.8	23	26.5	28.5	31.5	31.5
SX	M	2.9	47.7	7.5	21.9	25	28.6	32.4	32.4
SX	M	2.7	48.4	6.6	23.1	24.8	28.7	29.6	29.6
SX	M	3.4	49.4	7.8	23.3	17.8	31.7	34.5	34.4
SX	F	2.6	48.3	7.1	22.2	15	27.6	30.3	30.4
SX	M	3	48.1	7.2	22.5	7	29.9	33.6	29.5
SX	M	3.4	50.9						
SX	F	2.6	47.3						
SX	M	3.4	53.8						
SX	M	2.8	48.2						

SET: 2 DATE: AUG.18/83 MESH: 5 1/2

SPECIEs	SEX	WT(KG)	LENGTH (CM) OH	DO	OD	ON	GIRTH HEAD	MAX	NET MK
CN	MW	12.6	73.9	11.2	30.8	-5.5	47.6	54.1	
CN	MW	3	46.7	7	18.7	7.5	28.7	31.9	28.7
SX	F	3.3	54.2	8	23	7.3	29.2	31.9	29.7
SX	M	3.1	49.6	7.2	22.6	14.7	29.4	32.4	31.2
SX	M	2.7	47.9	6.4	22.5	15.1	28.5	31	31.2
SX	M	2.8	48.5	7.3	21.7	7.9	28.6	29.7	31.5
SX	M	2.4	46.4	6.9	20.3	8	27.4	29.5	28.7
SX	F	2.9	49.4	7.6	22.5	11	28.4	30.3	28.4

SET: 1 DATE: AUG.20/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	M	1.8	38.7	6.3	16.1	59.9	25.8	27.9	23.7
CN	M	1.7	36.2	5.6	13.9	9.7	24.2	26.3	25.3
SX	M	2.2	45.7	7.5	20.8	5	27.3	29.8	24.4
SX	F	2.5	46.7	6.9	21.3	4.9	28.7	32.3	25.7
SX	M	2.5	47.6	7.1	22.2	7.1	27.2	31.5	25.7
SX	F	2.4	46.5	6.9	21.5	4.4	26.8	30	24.8
SX	F	2.3	45.8	6.8	20.3	9.2	26.6	28.9	24.5
SX	M	2.7	49	8.3	23.1	8.3	27.5	29.6	25
SX	M	2.8	48.3						
SX	F	2.3	45.7						
SX	M	3.4	49.7						
SX	F	2.9	50.1						

SET: 1 DATE: AUG 20 83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	1.4	35	5.7	14.9		24	26.2	
CN	MW	3.5	48.2	7.8	20.1	10.1	31	34.9	33.5
CN	FR	12.2	73.7	12.2	32.3	3	46.9	54.3	36.5
CN	FR	7.5	63.7	10.2	26.4	3.6	39.9	44.2	33.4
SX	F	3.6	52.2	7.5	24	10.8	31.1	33.5	32.5
SX	M	3.1	50.5	7.5	23.1	14.9	29.7	32	31.7
SX	F	1.9	45.5	5.8	18.1	6.4	24.9	3	25.5
SX	F	3	48.6	6.8	21.6	17.1	28.4	31.8	28.9
SX	F	3.1	49.4	7.1	22.3	22.3	31	33.2	33.2
SX	M	2.8	49.6	7.7	22.9	22.6	28.9	29.6	29.6
SX	M	3.6	53						
SX	M	3.2	49.5						
SX	F	4.1	54.3						
SX	F	3.5	50.9						

SET: 2 DATE: AUG.20/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	1.5	39.8	6.2	16.3	6.2	25.3	28	25.3
SX	M	3.1	48.6	7.1	21.6		30.5	33.1	
SX	M	3.6	50.8	7.4	22.7	0	31.4	34.3	25.2
SX	F	2.6	47.1	6.9	21.8	9.2	27.3	30.2	29.2
SX	F	2.8	48.5	6.7	22.1	6.7	27.4	31.8	
SX	F	2.4	47.2	6.3	21.8	7.3	26	28.9	26.5
SX	F	2.2	47.2	6.7	21.2	21.2	26.8	28.5	28.5
SX	F	2.3	47.7						
SX	F	3	48.7						
SX	M	2.9	49.5						
SX	F	2.9	47.4						

SET: 1 DATE: AUG20 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	3.5	48.8	8.1	21.6	11	32.6	36.5	32.1
SX	M	3	49.3	8.3	23.8	10.9	29.6	31.2	28.3
SX	M	3.9	54.5	7.5	23.8	5.5	31.1	34.7	29.8
SX	M	2.9	49.4	7	21.6	22.3	29.3	31.1	29.2
SX	M	2.9	49.7	6.7	22.6	6.5	28.4	30.8	28.1
SX	F	2.4	47.1	6.7	20	12	27.2	29.2	29.7
SX	F	4	54.3	7.5	24.7	5.8	32.2	35	30.6
SX	F	2.5	47.6						
SX	F	2.5	48.5						
SX	F	2.9	47.3						
SX	M	3.4	51.1						

SET: 2 DATE: AUG.20/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	1.5	36.5	5.7	14.7	18.7	24.8	26.9	26.9
SX	M	2.7	47.8	7	22.6	24.7	29.7	30.6	30.3
SX	F	3.6	50.4	7.1	22.3	7.1	30.4	34.1	31
SX	M	2.4	46.8	7	20.9	12.9	26.9	27.1	28.2
SX	M	2.4	46.2	6.3	20.7	6.9	27.4	29.9	28.3
SX	M	2.3	48.7	7	22.5	7.4	27	29.5	29.4
SX	F	3.3	49.8	6.8	22.4	9.8	29.3	33.3	30.8
SX	M	2.8	48.7						
SX	M	3.4	51.2						

SET: 2 DATE: AUG.20/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	12.2	74.5	11.7	31.8	0	49.6	55.3	
SX	F	3.9	53.5	7.3	24.4	4.9	32.2	34.1	31.2
SX	F	2.5	47.6	6.9	22	9.5	30	31.7	31.1
SX	F	2.7	48.5	6.8	21.9	11.6	28.4	29.8	29.5
SX	M	3.2	50.7	7.3	24.2	12	30.9	32.5	32.4
SX	M	4.3	54	8.3	23.6	5.5	33.7	36.3	33.5
SX	F	3.2	52.2	7	24.8	27.5	30	32.5	32.5
SX	M	3.5	51.2						
SX	M	3.4	51.5						
SX	F	3.2	48.3						
SX	M	3.2	49.8						

SET: 1 DATE: AUG.26/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FR	11.1	73.6	10.9	30.3	3	46.3	51.9	33.6
CN	FR	11.9	72.4	10.7	29.5	1	46	53.7	34.1

SET: 1 DATE: SEP. 6/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	8.4	65.5	12.4	39	-3	42.6	48	15.4
SX	F	2.5	50.3	8.1	22.8	6.4	28.1	28.5	27.5
SX	F	2.2	47.5	7.9	20.1	8.6	27.2	27.8	27.4
SX	F	2.1	49.1	6.7	21.6	4.9	24.9	26	25.1
SX	F	2.3	46	6.7	19.6	7.4	24.8	26.5	25.1
SX	F	1.8	45.5	6.7	19.2	7.6	24.8	26.9	25.5
SX	M	2.1	44.7	7	19.4	5.9	27.9	29.5	27.9

SET: 1 DATE: SEP.6/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	F	3.1	49.7	8.6	22.7	18.2	27.9	32.4	32.4
SX	M	2.5	49.4	8.5	22	16.9	28.6	30.8	30.7
SX	M	2.8	48.6	8.2	21.5	21.5	29.4	31.3	31.3
SX	M	2.9	48.1	8.3	21.5	22.5	28.5	31.3	31.3
SX	M	3.2	49.9	8.4	22.6	1.5	31.5	32.8	26
SX	F	4.3	53.9	8.5	23.8	3	31.8	38.1	26.4

SET: 1 DATE: SEP.6/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FW	7.7	62	11	26.5	3.8	38.7	45.9	33
CN	MR	.7	29.1	4.5	13		17.3	19	
SX	M	4.9	56.1	8.5	25.8	3	32	38.5	29.6
SX	M	4	54.8	8	24.5	7.7	30.4	33.6	31.8
SX	F	3.5	51.7	6.7	21.6	8.6	28.5	34	30.2
SX	M	2.5	47.2	7.3	21.3	15	26.7	29.9	27.8

SET: 2 DATE: SEP.6/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	2.2	45.2	7.4	19.5	10	27	30.8	28.9
CN	MW	2	41.9	6.7	18.4	6.2	26.7	30.9	27.2
SX	F	3.6	54.3	8.7	23.4	2.6	30.6	32.7	23.5
SX	F	1.8	48	7.3	21.4	8.3	24	25.5	25.2
SX	F	3	50.5	7.1	23.9	19.4	27	31.8	29.4
SX	M	2.1	48.8	7.3	20.7	6.8	26.1	26.9	26.7
SX	M	2.2	49.9	7.6	22.3	8.5	26.5	27.4	26.5
SX	M	1.9	42.7	6.3	19.3	5.2	24	25.5	24

SET: 2 DATE: SEP.6/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	2	40.3	6.2	16.9	8.5	27	30.4	29.6
CN	FW	9.3	69.7	12.4	29.9	1	40.9	47.8	31.7
CN	FR	11.8	71.6	10.8	31.1	0	47.1	53.6	32.8

SET: 2 DATE: SEP.6/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	6.5	58.2	10.3	25	5.1	36.4	43.8	32.3
CN	FW	12.6	71.1	11.5	29.3	0	47.5	54.5	32.9
SX	F	4.2	57.4	9	26.6	17.4	30.5	34.4	32.5
SX	M	3.7	50.4	8.7	23	10.4	32.5	35.1	32.4
SX	F	2.1	47.8	6.8	21.5	13.5	25.4	29.5	28
SX	M	4.3	55.5	9.3	25.6	5.5	31.9	35.4	31.9
SX	M	2.8	49.3	7.3	22.9	14.7	29.5	33.4	32
SX	M	2.7	50.2	7.3	23.2	10.2	29.5	31.3	31.4

SET: 1 DATE: SEP.8/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	3.1	47.5	8	20	4.9	33.7	35.7	30.6
CN	MW	1.5	39.1	6.2	16.2	4	24.7	27.4	25.6
CN	MW	1.7	40.1	6.1	16.2	6.4	25.3	29.8	28.6
SX	F	2.7	48	6.8	21.7	6.4	26.1	29.6	27.3
SX	M	2.1	45.7	7.8	19.6	4.5	26.6	27.5	23.2
SX	F	3.6	54.8	8.2	24.1	2	31.7	35.3	26.5
SX	F	1.7	45.3	6.7	20.1	1	25.5	26.7	23.4
SX	F	2	47.3	7.2	20.3	6.2	25.5	27.4	26.5
SX	F	2.2	46.8	6.5	19.7	11.3	26.6	29.7	28.3

SET: 1 DATE: SEP.8/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	7.8	62.4	10.3	25	1	43	48.8	31
SX	M	4	52.1	8.5	23.2	9.8	32.3	35.5	31.8
SX	M	3.3	50.3	8.5	22.4	7.7	29.7	34	30.3
SX	M	3.2	50	7.2	21.5	6.5	29.6	33	30.3
SX	M	2.8	48.7	6.9	21.3	9.2	31.1	34.4	31.5
SX	F	2.8	48	6.5	20.8	9	27.3	30.7	28
SX	M	3.1	50.3	7.6	22.3	11.5	30.9	33.8	31.4

SET: 1 DATE: SEP.8/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	2.8	40.5	6.7	16		28.6	33.1	
SX	M	2.6	46.8	7.5	21.5	13.6	28.5	30.4	30.1
SX	M	2.5	48.4	6.8	22.2	22.2	28.7	30.5	30.5
SX	F	3.4	54.4	7.9	24	8.5	29.5	33	31

SET: 2 DATE: SEP.8/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	11	70.5	14	30.5		49	52.5	
SX	F	3.1	50.9	7.2	23.6	3	28.2	30.5	23.8
SX	M	4.8	55.4	9.1	24.9	1	36.9	37.7	28
SX	F	2	47.6	6.6	22.2	7.3	26.2	27	26.4

SET: 2 DATE: SEP.8/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MR	3.8	51.2	9	21.9	3.5	32	36.5	27.7
CN	MW	5.1	56	10.2	22.9	4	36	41.2	31.8
SX	M	2.8	48.7	7.1	21.4	8.9	29.1	30.4	29.5
SX	F	2.7	48.4	7	21.2	9.7	27.7	30.4	29.5
SX	F	3.8	55.2	7.6	24.1	7.5	30.2	33.5	30.5
SX	M	2.7	50.7	7.1	21.7	8.3	29	31	30.4
SX	M	2.4	47.1	7.2	21.2	13.9	28.3	30	29.6
SX	F	3.2	52.2	8	23.4	10	29.8	31.2	30.3

SET: 2 DATE: SEP.8/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	19.9	78.7	14	35.4	-3.8	57.4	71	22
SX	M	3	50.7	7.7	23.4	32	30.6	33.1	
SX	M	2.8	50	7.7	24.1	15.6	29.5	31	30.5
SX	F	3.9	55.4	8.4	24.5	13	30.2	33.2	32.5
SX	M	4.2	55.5	8.6	24.6	7.1	33.5	36.4	33.5
SX	F	2.7	48.7	7.9	22.2	9.8	28.5	30.7	30.1
SX	M	3.3	53.5	8.1	23.9	6.6	31	32.3	31.4

SET: 1 DATE: SEP.10/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FW	16.6	78.9	13.2	32.4	-5.2	53.5	59.9	23.9
CN	MW	3	50	8.2	21.1	5.5	27.1	31.9	27.8
CN	MW	1.9	39.6	6.3	16.7	6.8	25.9	29.4	28.6
SX	F	3.4	50.8						
SX	M	3.2	50.5						
SX	F	3.5	53.5						
SX	M	4.1	53.7						
SX	F	1.7	45						
SX	F	2.3	48.1						
PK	M	2.5	50.5						
PK	F	1.6	43.7						
PK	M	2	43.7						
PK	F	1.9	42.9						
PK	M	2.1	44.5						
PK	M	1.2	40						
PK	M	1.9	43						
PK	F	1.6	43.2						
PK	F	2.1	46.1						
PK	M	1.8	44.7						
PK	M	3	47.1						

SET: 1 DATE: SEP.10/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	21.1	71.7	11.6	29.4	0	50.4	53.4	33.9
CN	FW	11.9	74.4	11.1	29.5	1.5	45.8	53.2	33.7
SX	F	2.4	50.2						
SX	M	2.7	48.8						
SX	F	3.5	52.5						
SX	F	2.2	47.2						
SX	F	2.4	49.4						
SX	M	1.7	46						
PK	M	1.5	41.3						
PK	M	3.4	50.7						
PK	M	2.3	46.9						
PK	M	2.4	47.5						
PK	M	2.1	43						
PK	M	2.1	46.3						
PK	M	1.9	45.2						
PK	F	2.8	49.8						
PK	M	2.4	46.4						
PK	F	2.8	46.6						
PK	F	2.2	45						
PK	M	1.7	45.3						

SET: 1 DATE: SEP.10/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	4.9	55.5	9.7	24.3	3.7	34.5	40.7	30.4
CN	MW	2	41	6.6	18.1	11.9	26.2	31.2	31
SX	F	3.6	51.3						
SX	F	4.1	55.4						
SX	M	3.7	54.2						
SX	M	2.9	49						
SX	M	3.1	50.9						
SX	F	3.3	52.7						
PK	M	2.7	47.2						
PK	M	1.5	40.4						
PK	M	2.5	47.5						
PK	F	3	49.5						
PK	M	2.3	45.9						
PK	M	1.8	43.5						
PK	F	2.5	46.1						
PK	M	2.2	44.5						
PK	M	2.2	45.6						
PK	F	2.4	45.9						
PK	M	1.7	43.1						
PK	M	1.8	44.7						

SET: 2 DATE: SEP.10/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FW	9	67	10.6	27.4	-4.5			20.5
CN	MR	1.1	32.6	5.8	15.2	10.4			26
CN	MR	1.4	37.3	5.7	14.2	11.8			27.8
CN	MW	1.4	35.2	6.1	13.9	13.9			26.3
CN	MW	3.1	44.9	7.5	18.2	4			26.7
CN	MW	2.2	39	6.4	17.8	6.2			26.1
SX	F	2.1	45.3						
SX	F	3.5	52.1						
SX	F	2.3	46						
SX	F	1.9	43.6						
SX	M	3.2	48.5						
SX	M	3.3	49.5						
PK	M	3.4	49.3						
PK	F	1.6	42.8						
PK	F	2.1	44.4						
PK	M	1.3	48.9						
PK	M	3.8	50.1						
PK	M	3	47.5						
PK	F	2.1	45.2						
PK	F	2	42.3						
PK	M	2.3	45.6						
PK	M	2.5	45.4						

SET: 2 DATE: SEP.10/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	DO	OD	ON	HEAD	MAX	NET MK
CN	MW	6.5	60	9.7	24.3	3			32.9
CN	MR	2.7	44.5	7.1	17.9	7.2			32
SX	M	2.4	49.2						
SX	M	3.7	52.6						
PK	M	1.7	40						
PK	M	3.3	50.5						
PK	M	1.8	43.1						
PK	F	1.7	42.8						
PK	F	1.8	44.1						
PK	M	2.2	43.7						
PK	M	1.7	42.4						
PK	M	2.1	43.9						
PK	F	2.9	48						
PK	M	2	42.8						

SET: 2 DATE: SEP.10/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	DO	OD	ON	HEAD	MAX	NET MK
CN	FW	13.6	73.4	13.8	31.4	9	49.3	57.2	34.2
CN	FW	8.8	67	13.1	28.5	3	42.4	46.9	29.7
CN	MW	2.6	43.3	7.5	19.3	7.8	29.4	35.8	31.3
CN	MW	10.3	68	11.6	27.5	0	46.9	55.4	31.7
CN	MR	10.1	68.5	10.8	29.8	2	44.1	50.5	35.7
CN	MW	6.4	56.6	9.9	23.2	3.8			33.9
CN	FW	11.1	73	13.3	31.7	1.5			33
CN	MR	4.1	50.6	8	21.1	5.8			31.5
SX	M	3.1	51.6						
SX	M	3.5	53.2						
SX	M	3.5	53.3						
SX	F	2.1	46.1						
SX	F	4.1	56						
SX	M	2.6	46.7						
PK	M	1.6	41						
PK	F	2.4	46						
PK	F	2.7	46.3						
PK	M	2.7	45.9						
PK	F	1.6	45.8						
PK	M	3.1	42.5						
PK	M	2.7	48.8						
PK	M	3.5	46.4						
PK	M	2.5	49						
PK	M	2.5	45.4						

SET: 1 DATE: SEP.13/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FW	13.4	73.9	12.7	30.9	-3.6	49.9	57.5	20.2
CN	MW	3.4	46.4	7.2	19.8	4.1	31	35.5	27.5
CN	MW	14.5	75.7	13.2	32.1	-5.5	53.5	57.3	23.8
CN	MW	4.7	52.4	8	22	4.2	35.2	40.6	32.3
CN	MW	1.1	35.3	5.7	14.5	6.3	20.4	22.2	21.9
SX	M	3.1	47.8						
SX	F	2.7	47.3						
SX	F	2.7	48.2						
SX	M	2.8	48.6						
SX	M	2.6	45.5						
SX	F	2.4	45.9						
PK	F	1.6	42.5	7.3	18.9	189	22.6	26.7	26.7
PK	M	2.6	45.9	7.5	20.7		32.2	36.9	
PK	M	2.7	48	8.5	21.2	-3.5	32	35.5	16.1
PK	F	1.6	41.6	7.5	18.5	7.5	23.3	26.3	24.3
PK	F	1.4	41.1	5.7	17.5	5.8	22.5	24.3	21.9
PK	M	3.3	49.7	8.6	22.2	1	30.8	38.8	24
PK	F	2	44	6.3	20	7	25	29.2	24.9
PK	F	1.6	41.6	6.2	17.9	4.1	22.5	26.9	23.5
PK	M	3.4	50.5	8.9	23	3.7	31.5	36.7	27.9

SET: 1 DATE: SEP.13/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	19	83.9	14.8	35.6	-6.7	61.2		27.5
CN	MW	2.6	43.9	7.6	18.7	7.2	28	36.1	30.5
CN	MW	12.3	71	12.1	28.5	0	47.3	56.5	26.9
CN	MW	1.9	37.7	6.5	16.3	8	26	31.1	28.2
SX	M	3.4	50.5						
SX	F	2.7	49.3						
SX	M	3.7	49.7						
SX	F	3.1	49.6						
SX	M	2.1	46.9						
SX	F	2.5	47						
PK	M	2.5	44.5	7.3	18.7	2	27.5	32.9	25.6
PK	F	1.7	39.5	5.7	17.6	7.3	24.8	27.5	25.6
PK	M	1.9	40.3	6.5	18	10.4	27.1	31.9	31.6
PK	M	2.4	46.1	7.2	20.5	-3	30.8	33.7	16.6
PK	F	1.9	44.9	6.7	19.2	12.5	27.3	31.3	29.7
PK	F	2.1	45.8	6.9	20.9	2.9	27.7	30.5	24.6
PK	M	1.7	42.2	7.3	17.6	9.9	26.8	30.5	29
PK	M	1.7	44.1	6.7	19.8	9.2	26.8	30.7	28.6
PK	M	2.2	42.5	7.1	17.9	7.5	26.9	32.2	28.2
PK	M	2.9	44.5	7.7	18.5		31.2	38.7	

SET: 1 DATE: SEP.13/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	8.5	65.7	12.3	27.5	3.2	42.8	49.3	38.1
CN	FR	7.3	61.8	11	24.3	1.5	40.2	47.9	30.1
CN	MW	2.5	42.4	6.7	17.1	9.6	28	33.1	32
SX	M	3	44.6						
SX	M	3.8	49.7						
SX	M	3.2	49.2						
SX	M	2.7	47						
SX	M	3.9	53.2						
PK	M	2.6	48.4	7.8	21.5		30.3	36	
PK	F	1.9	42.5	6.5	19.9	8.9	30.3	31	29
PK	F	2.2	45.1	6.6	19.8	15.1	26.5	31.2	31.2
PK	F	1.4	40.2	6	17.7	17.7	24.5	27.5	27.5
PK	M	2.2	42.8	7.1	19	8.8	28.5	33.8	29.7
PK	M	2.2	45.6	7.2	21.3	6.9	29.5	33.1	28.9
PK	M	1.8	40	6.7	18	4.5	26.8	31.8	27.8
PK	F	2.3	47.5	7	20.5	20.5	26.2	30.7	27.1
PK	M	2.1	43.2	7.5	18.5	7.6	29.6	32	30.5
PK	M	1.7	39.5	7.4	16.5		26.7	29.7	
PK	F	2.3	46.1	6.7	20.2	4.9	26.8	31.2	29.2
PK	M	1.7	41.2	7.4	18.5	14.3	24.3	27.7	26.5

SET: 2 DATE: SEP.13/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	4.8	51	9	21.8	1.8	35.7	42	27.2
CN	MW	1.8	38.2	5.5	16.4	6.8	25.5	30.4	27.1
SX	F	2.7	47.3						
SX	F	1.6	43.1						
PK	M	2.2	42.9	7.2	19.9	0	26	30.3	18.1
PK	F	2	41.7	6.5	16.7	3.8	24	27	27.4
PK	F	1.7	41.6	6.5	19.3	19.3	23.7	25.9	27
PK	M	3.4	49.8	7.6	23.9	0	31.5	40.1	22.7
PK	M	2.7	46.5	7.5	20.4	3.2	30.6	33.7	25.8
PK	M	2.5	41.8	6.4	19.4	4.7	26	30.1	26
PK	F	2.9	42.5	6.7	18.5	6.5	24.8	27.9	25.6
PK	F	1.6	42.2	6.2	18.1	6.3	24.5	27	24.3
PK	M	2.5	45.3	7.4	20		27	30.5	
PK	M	2	42.6	6.7	18.5	1	24.9	28.4	20.3
PK	F	2	40.1	6.3	17.6	9.7	23.5	26.1	25
PK	M	2.2	43.2	7.3	17.7	3.8	25.6	30.5	25.8

SET: 2 DATE: SEP.13/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	FW	11.6	70.7	11.6	28.2	0	48	54.3	28.5
CN	FW	9.3	66.2	10.6	25.7	3.1	44.5	52	32.5
CN	FW	8.6	66	10.7	28.1	3.5	41.1	48	32.3
CN	MW	3	46.9	7.5	20	9.3	28.8	35	30.8
SX	M	2.6	46.5						
SX	F	3.1	51.2						
SX	F	2.8	49.9						
PK	F	2	41.4	6.2	19.2	10.9	24.2	28.8	27.7
PK	F	2	44.3	7.2	18.7	18.7	24.9	28.3	28.3
PK	M	2.3	44.3	7.2	20		23.7	34.2	
PK	M	3.4	49	8.2	22	0	35	39	20.1
PK	M	2.9	46.2	7.8	21.2	4.5	29.9	38.4	28.2
PK	M	1.7	41.5	6.9	17.9	8.2	25.6	29.1	25.8
PK	M	2.2	42.8	6.8	19	8.8	26	30.9	27.2
PK	M	2	43.6	6.5	18.5	14.4	28	30.9	31.1
PK	F	1.9	43.9	6.8	19.4	7.9	24.2	27.8	23.8
PK	M	2.3	45.1	7.5	19.7		27.5	30.1	
PK	M	1.5	39.3	6.7	17.2	7.5	26.6	29.6	28.6
PK	M	2.7	48.2	7	20.3	4.6	27.5	32	29.2

SET: 2 DATE: SEP.13/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	FW	13	72.7	11.3	30.4	-2.8	49.7	57.4	21.5
CN	MW	.8	31.5	4.7	13.2		19.9	22.5	
SX	F	3.5	55.1						
SX	F	3.1	52.3						
SX	M	3.1	49.6						
SX	M	2.3	47.6						
SX	M	3.3	49.5						
SX	M	2.2	47.9						
PK	M	1.9	45	4.7	20.1	6.4	27.5	30	26.7
PK	M	2.1	44.5	6.7	19.1	7.4	28.9	31	28.2
PK	M	3	49.1	7.2	23		30.5	38.8	
PK	M	1.9	45.5	7.4	21.7	7.9	27.8	33.2	29.1
PK	M	2.6	46.2	8	21.1	7.6	30.9	34.9	30.5
PK	M	2	44.8	7.2	19.7	8.2	27.8	32.7	29.4
PK	M	2.6	45.7	7.4	21.5	5.9	32.9	33.7	31.4
PK	M	2.2	44.1	6.9	20	8.6	30	33.7	30.9
PK	M	1.7	41.2	6.3	17.5	10.6	29	31.2	28.7
PK	M	1.6	41.1	7.2	17.5	11.6	26.5	30.2	29.2
PK	F	2.2	46.5	6.7	21	9.2	24.9	28.5	25.5
PK	M	1.6	40.1	7	17.3	8.7	24.5	29	25.7

SET: 1 DATE: SEP.20/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	2	38.4	6	16.3	0	25	29.9	17.9
SX	M	4.2	51.5						
SX	F	3.4	49						
SX	M	3.4	49.5						
SX	M	2.9	47.3						
SX	M	3.5	49.5						
SX	F	2.9	47.2						
PK	F	2.1	44.3						
PK	F	2.3	46.1						
PK	M	3.1	50.5						
PK	F	2	43.5						
PK	F	3.3	44.4						
PK	F	1.7	43.2						
PK	M	2.8	47.1						

SET: 1 DATE: SEP.20/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
SX	F	3	48.2						
SX	F	3	49.6						
SX	F	2.7	49.1						
SX	M	2.5	46.3						
SX	M	2.7	49.1						
SX	M	3.7	52.2						
SX	M	3.3	51.3						
SX	F	3.7	50						
SX	F	2.5	48.1						
SX	F	2.5	48.9						
PK	M	2.1	44.9						
PK	M	2.2	43.5						
PK	F	2.1	43.9						
PK	M	2	43.5						
PK	M	2.1	44						
PK	F	2	43.2						
PK	F	2	45.1						
PK	M	2.2	43.7						
PK	M	1.9	44						
PK	M	2	43.2						

SET: 1 DATE: SEP.20/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	13.1	69.8	12.3	28.6	0	5.2	52.5	31.9
CN	MW	8.5	62.9	10.8	27.2	1.5	44	50	32.9
CN	FW	12.6	72.5	11.1	29.4	1	47.1	54.6	33.3
CN	MW	8	61.1	12.1	26.9	3.2	43.4	49.5	33.2
CN	MW	7.7	63.8	11	27.2	3.4	43.4	45	32.9
CN	MW	2.5	42	7.1	17.7	3.6	29.7	34.8	27.4
SX	M	3.9	51.5						
SX	M	3.4	49.6						
SX	F	2.9	49.4						
SX	M	4.5	53						
SX	M	3	48.5						
SX	M	3.6	49.6						
PK	F	2.4	47.1						
PK	M	3.5	52.3						
PK	F	2.9	47.7						
PK	F	2.2	44						
PK	M	1.8	41.9						
PK	M	2.8	44.2						

SET: 2 DATE: SEP.20/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FW	14.5	75.3	13	31.1		53	58.5	
CN	MW	12.6	70.4	12.4	30.2	1	49.2	57.6	36.8
SX	M	3	46.9						
SX	M	2.5	45.2						
SX	F	3	49.8						
SX	F	3.1	48.7						
SX	F	2.6	47.5						
PK	M	2.4	43.2						
PK	F	1.7	42						
PK	F	2.2	41.9						
PK	F	1.8	42.1						
PK	F	1.8	42.6						
PK	M	2.3	44.1						
PK	M	3	49.1						
PK	F	2	43.1						
PK	M	2	42.8						
PK	F	1.6	41						
PK	M	2.6	44.4						
PK	M	2.8	46.6						
PK	F	1.9	42.3						

SET: 2 DATE: SEP.20/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
SX	M	3.1	49.9						
SX	M	4.9	58.3						
SX	M	3.1	48.8						
SX	M	3.8	53.6						
SX	M	3	47						
SX	F	2.8	49.4						
SX	M	3.8	53.2						
PK	F	2.5	46						
PK	F	2.1	43.5						
PK	F	2.2	43.5						
PK	F	2.8	46.4						
PK	M	3	47.1						
PK	F	2.1	43.2						
PK	M	1.8	43.4						
PK	F	2.7	44.3						

SET: 2 DATE: SEP.20/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	FW	8.1	63.2	10.3	25.1	1	42.7	55.8	34.9
SX	M	3	50.2						
SX	M	3	48						
SX	M	4	52.5						
SX	F	2.1	48.4						
SX	M	2.7	47.4						
SX	M	3.4	49.5						
SX	F	2.7	50.8						
SX	M	3.5	51.8						
SX	F	2.2	47.1						
SX	M	3	50						
PK	F	2.2	43.8						
PK	F	2.3	46.1						
PK	M	2.8	47.5						
PK	M	2.8	47.1						
PK	M	2.9	45.9						
PK	M	1.9	41.2						
PK	M	2.9	47						
PK	M	2	44.3						
PK	M	3.4	50.4						

SET: 1 DATE: SEP/27/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	FW	15.5	77	12.5	31.7	0	52.1	59.7	28.2
SX	M	2.8	50.9						
SX	M	3	49						
SX	F	2.7	46.5						
SX	M	3.3	50						
SX	F	2.4	48.4						
SX	M	2.5	48.3						
SX	F	2.7	48.1						
SX	F	2.8	48.9						
SX	M	3.3	53.6						
SX	F	2.5	47.4						
PK	M	1.9	43.4						
PK	M	3.5	49.2						
PK	M	3.6	50						
PK	F	2.3	46.3						
PK	F	2.1	44.2						
PK	F	1.7	44.9						
PK	F	2.1	45.6						
PK	F	2	44.1						
PK	M	1.7	44.3						
PK	M	2	41.8						

SET: 1 DATE: SEP.27/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
SX	M	3.2	50.3						
SX	M	4.2	52						
SX	M	3.6	49.1						
SX	M	3.4	49.6						
SX	M	2.6	48.5						
SX	F	2.8	48						
SX	M	4.3	53.8						
SX	F	2.9	48.2						
SX	F	4	55.7						
SX	F	2.8	45.5						
SX	F	2.9	50.1						
PK	F	2.1	44.3						
PK	M	1.7	43.5						
PK	M	3.1	48.5						
PK	M	2.9	44.4						
PK	F	2	44.7						
PK	M	2.6	46.9						
PK	F	1.9	43.1						
PK	F	2.2	47.3						
PK	F	2.2	45.3						

SET: 1 DATE: SEP.27/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIES	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	F	3.2	49.5						
SX	M	3.4	50.4						
SX	M	3.8	52.3						
SX	M	3.2	48.8						
SX	M	3.4	50.1						
SX	M	4	52.3						
SX	M	3.5	49.2						
SX	F	3.2	49.6						
SX	F	3.5	51						
SX	M	3.1	47.9						
PK	M	2.2	44.4						
PK	M	3	48						
PK	F	2.3	45.2						
PK	M	3	49.3						
PK	M	3.5	48.5						
PK	M	2.5	46.1						
PK	M	3.6	48.8						
PK	M	2.2	44.7						
PK	M	2	44.7						
PK	M	3.3	50.4						

SET: 2 DATE: SEP.27/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIES	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	1.9	41.8	6.5	17.1	6.2	28.2	30.5	28.6
SX	F	2.7	47						
SX	F	2.3	46.4						
SX	F	3.3	50.6						
SX	F	2.9	51.1						
SX	M	3.3	50						
SX	F	2.5	47.3						
SX	F	2.4	45.5						
SX	F	2	44.8						
SX	F	3.5	53.7						
SX	M	3	48.3						
PK	M	2.9	47.7						
PK	F	1.6	39.7						
PK	F	2.3	45.7						
PK	M	2.4	44.3						
PK	M	2.9	46.8						
PK	M	2.7	46.1						
PK	F	1.4	40.6						
PK	F	2	42						
PK	F	1.6	40.9						

SET: 2 DATE: SEP.27/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIES	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
SX	F	4	53.3						
SX	F	2.4	46.2						
SX	F	2.5	47.5						
SX	M	2.7	47.7						
SX	M	2.7	48.1						
SX	M	3.6	49.3						
SX	F	3.4	51.3						
SX	F	2.7	48.7						
SX	M	3.2	48.9						
SX	F	3.1	49.3						
PK	M	1.5	40.2						
PK	F	2.1	44.3						
PK	M	1.9	42.4						
PK	M	2.1	44.5						
PK	F	2.4	44.5						
PK	M	2.5	44.9						
PK	F	2	45.4						
PK	M	2.3	43.9						
PK	M	2.7	46.2						
PK	M	1.9	44.5						

SET: 2 DATE: SEP.27/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIES	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	6.8	59.9	10.9	25.1	3.8	40.4	45.5	33.9
CN	MW	2.4	43.7	6.9	17.1	13.1	28.6	32.4	31.8
SX	F	2.9	48.7						
SX	F	2.8	49.3						
SX	M	4.2	54						
SX	M	3.3	48.1						
SX	M	3.2	49.6						
SX	F	2.8	49.7						
SX	F	2.9	46.6						
SX	M	3.3	47.8						
SX	F	3.4	50.5						
PK	M	2.8	46						
PK	F	2.6	45.8						
PK	M	3.4	48.7						
PK	M	2.4	44.3						
PK	M	2.3	43.1						
PK	M	2.5	44.5						
PK	M	3.1	47.4						
PK	M	2.6	46.1						
PK	F	2	45.5						

SET: 1 DATE: SEP.29/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	18.8	78.5	13.2	34.7	-3.8	58.2	68.5	31.3
CN	FW	21.2	87.7	13.5	37.4	-4.2	59.8	71.8	18.8
SX	F	2.4	46.2						
SX	M	3.1	49.4						
SX	F	4.4	53.5						
PK	F	2.7	48.7						
PK	M	2.7	46.8						
PK	M	2.9	47.9						
PK	F	1.4	40.2						
PK	M	2.3	46						
PK	F	1.9	46.2						
PK	F	1.8	43.3						
PK	F	1.8	42.7						
PK	F	2.5	46						
PK	M	2.8	47.5						

SET: 1 DATE: SEP.29/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	FW	14.3	78.5	12.2	32.7	0	49	58.2	36.6
CN	MW	7	61.8	11.3	26.5	3.7	40.3	46	34.9
SX	M	2.6	48						
SX	F	3.3	49.6						
SX	M	3.2	48.8						
SX	F	2.8	48.7						
SX	M	3.1	48.2						
SX	F	3	58.1						
SX	M	4.3	53.7						
SX	M	3.3	49.4						
PK	F	2.6	47.6						
PK	M	2.5	48.1						
PK	M	3	49.3						
PK	F	2.7	49.1						
PK	M	2.8	47						
PK	F	2.2	45.2						
PK	M	2.3	45.9						
PK	F	2.3	45.5						
PK	F	2.2	44.9						
PK	M	2.6	45						

SET: 1 DATE: SEP.29/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
SX	M	3.5	51.1						
SX	F	3.3	51.1						
SX	F	3.6	52.3						
SX	F	4	55.5						
SX	M	3	49.4						
SX	F	3	49.5						
SX	M	3.9	53.7						
SX	M	3.1	49.2						
SX	F	3.3	50.2						
SX	M	3.4	49.9						
PK	M	1.8	43.5						
PK	M	1.7	43.5						
PK	M	2.4	47.3						

SET: 2 DATE: SEP.29/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	FW	15.5	75.6	13.8	33.9	3.5	54.5	62	42
CN	FW	12	71.2	11.9	32.1	0	49.1	51.2	27
CN	MW	13.9	75	14.5	33.5	-5	39.7	56.4	19
CN	FW	10.8	68.5	10.4	29.4	6.5	47.4	53	20.2
CN	MW	11.9	73.2	14.5	31.5	-4	50.7	53.2	27
CN	MW	14	74.8	12.5	32.8	-6	55	58.2	21.2
CN	MW	16	77	14	34.8	-4	55.5	61	28.4
CN	MW	1.2	37.5	7.5	16	16	25.5	29.6	29
SX	M	3.4	49.6						
SX	F	3.1	49.4						
SX	M	3.5	50.9						
SX	F	2.4	46.2						
SX	F	2.3	46.9						
SX	M	4.2	55						
PK	F	1.4	41.4						
PK	F	1.7	42						
PK	M	2.9	48						
PK	M	3.2	48						
PK	F	1.8	42						
PK	M	1.7	43.1						
PK	F	1.6	43.8						

SET: 2 DATE: SEP.29/83 MESH: 5 1/2

			LENGTH (CM)					GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	!	HEAD	MAX	NET MK
CN	MW	4.8	52							
CN	MW	7.6	58.2							
CN	FW	4.2	56.4							
CN	MW	2.8	44.5							
CN	MW	2.6	42.8							
CN	MW	16	74							
CN	MW	17.1	78.4							
CN	FW	12.1	73.8							
SX	F	2.6	49							
SX	M	3.1	49.1							
SX	M	3.8	52.5							
SX	M	5.3	57.4							
SX	F	3	51							
SX	M	2.8	47.5							
PK	F	1.8	45.4							
PK	F	2.2	45.9							
PK	M	2.2	43.6							
PK	M	2.7	46.8							
PK	F	2	45.4							
PK	F	2.2	44.3							

SET: 2 DATE: SEP.29/83 MESH: 5 7/8

			LENGTH (CM)					GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	!	HEAD	MAX	NET MK
CN	FW	6.5	60.5							
CN	FW	12	68.6							
CN	MW	9.1	65.1							
CN	FW	9	66.4							
PK	M		43.5							
PK	F	2.6	48.6							
PK	M	3.3	47.2							
PK	F	1.7	40.1							
PK	M	2.2	42.3							
PK	F	2.3	45.9							
PK	F	2.4	46.7							
PK	M	2.8	47.3							
SX	F	3.4	50.9							
SX	F	3	47.9							
SX	F	3	48.8							
SX	M	3.8	50.4							
SX	M	3.9	47.5							
SX	M	3.1	47.8							
SX	M	2.8	46.7							

SET: 1 DATE: OCT.1/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	F	2.9	50						
SX	F	2.2	47.2						
SX	M	3.2	51						
PK	M	2.1	42.9						
PK	F	2	44.5						
PK	M	2.8	48.2						
PK	F	2.2	44.9						
PK	F	1.9	44.7						
PK	F	1.6	41						

SET: 1 DATE: OCT.1/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
SX	F	2.7	49.4						
SX	F	3	49.5						
SX	F	3.6	53.9						
SX	F	2.4	48						
SX	M	4.7	57.6						
PK	F	2	45.6						
PK	M	3.2	47.3						
PK	M	1.8	43.1						
PK	M	2.6	45.2						
PK	F	2.2	45.5						
PK	M	2.2	45.2						

SET: 1 DATE: OCT.1/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	5.5	56.8	9.7	23.7	0	37.8	45.2	26.4
CN	FW	12.1	72.2	11.2	29.7	0	46.7	55.1	29.4
SX	F	3.4	49.1						
SX	M	4.2	55.1						
SX	M	2.9	48.4						
PK	M	2.4	44.4						
PK	M	2	43.6						
PK	M	2	43.8						
PK	M	2.8	48						
PK	M	1.7	42.9						
PK	F	2.2	44.5						
PK	M	2.9	46.7						
PK	M	2	44.1						
PK	M	2.3	44.5						

SET: 2 DATE: OCT.1/83 MESH: 4 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
CN	MW	1.6	37.4	6.5	14.4	5	25.3	28.4	25.3
SX	M	3.1	48.4						
SX	M	2.4	47.2						
PK	F	2.3	44.5						
PK	M	3	46.5						
PK	M	2.2	44.4						
PK	F	2.2	43.4						
PK	F	1.4	39.9						
PK	M	3.3	48.5						
PK	F	1.6	42.1						
PK	F	3.4	48.4						
PK	M	2.7	47.1						
PK	M	3.3	48.4						
PK	M	2.1	42.9						
PK	F	2.1	44.1						
PK	M	3.2	48.4						
PK	F	2.2	43.5						
PK	F	1.4	40.5						
PK	F	1.7	43.1						
PK	M	2.5	44.3						

SET: 2 DATE: OCT.1/83 MESH: 5 1/2

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OD	OD	ON	HEAD	MAX	NET MK
SX	M	3.7	53.9						
SX	M	4.3	55.1						
SX	F	4	53.9						
PK	F	2.6	47.2						
PK	M	3.3	49.4						
PK	M	2.5	46.3						
PK	M	3.2	46.9						
PK	F	2	43.9						
PK	M	2.6	48.5						
PK	M	2.3	43.9						
PK	M	2	42.9						
PK	F	2.5	46.6						
PK	M	2	42.1						
PK	M	2.4	44.7						
PK	M	2.8	49.1						
PK	M	2.4	46.5						
PK	M	2	42.7						
PK	F	2.4	44.1						

SET: 2 DATE: OCT.1/83 MESH: 5 7/8

			LENGTH (CM)				GIRTH		
SPECIEs	SEX	WT(KG)	OH	OO	OD	ON	HEAD	MAX	NET MK
CN	MW	4.1	50.9	8	21.5	4.6	33.8	40.1	30.9
SX	M	3.1	48.4						
SX	M	4.7	57						
SX	F	2.7	46.7						
SX	M	5.4	57.5						
SX	M	3	46.8						
SX	M	4.4	54.3						
SX	M	3.8	53.7						
SX	M	2.8	48.2						
PK	F	2.8	47.3						
PK	F	2.5	46.7						
PK	M	2.2	45.6						
PK	F	2.8	46.7						
PK	M	2.4	44						
PK	F	2.3	46.1						
PK	M	2.2	43.2						
PK	M	2.6	46						
PK	M	2.1	44.4						