Functional Response – Sm Amphs.

① Assumed to be Type II
② Use Random pred eqn.

$X = Ne$ Slope $= a'.b.p$

$Y = \ln\left(\frac{N - Ne}{N}\right)$ Intcept $= -Tt\ a'.p.$

	10		20		30		40		60
Y	Ne	Y	Ne	Y	Ne	Y	Ne	Y	Ne
0.4	6	~~0.45~~	11	0.4	18	0.35	26	0.516	29
0.6	4	0.35	13	0.63	11	0.525	19	0.433	34
0.3	7	0.25	15	0.43	17	0.475	21	0.47	32
0.5	5	0.6	8	0.5	15	0.525	19		
Mean 0.45	5.5	0.4125	11.75	0.49	15.25	0.47	21.25	0.47	31.67

-0.831
0.298

-0.936

Int = -0.781

Slope = -0.0016

r = -0.089

b/a = -0.83

Slope = 0.002836

r = 0.43

∴ Tt = 30

a = 0.028 min⁻¹

Th = 0.103 min

= 6 sec.

$y = 0.0028362 - 0.83$

③ Assume Tt = 30

∴ a = 0.026 min⁻¹ (per 3 fish)

Th = 0.06 min (per 3 fish)

= 3.69 sec.

2 sec.

6.15

2.05

Th = (4.98)
5 sec.
~~1.88 sec.~~ (from Random
1.23 or 2
(1.208)
(0.582)

1 min

23.

$$N_a = N(1 - \exp - a'(T - N_a T_h))$$

$$N_a = \frac{aTN}{1 + aT_h N}$$

$a = 0.026$

$Th = 0.06.$

10	7.68		
20	5.12		0.026
30			0.06
40			
60			

$$y = ax + b$$

$$y' = a'x + b'$$

Test if data for lge & small amps significant

	10	20	30	40	60
LGE	2.75	5.25	12.0	15.0	17.5
Sm.	5.5	11.75	15.25	21.25	31.67

$\chi^2 = 13.84$ $\chi^2_{0.05,4} = 9.488$

$\therefore$ obs values are sig different. $0.01 > P > 0.005$

Test for Goodness of fit of Predator eqns.

SM AMPS

Category	10	20	30	40	60
A_i	5.5	11.75	16.25	21.25	31.67
F_i	5.61	11.09	16.42	21.62	31.62

degrees of freedom $= r = k-1 = 4.$

$\chi^2 = 0.1323$ $\qquad \chi^2_{0.05,4} = 9.488$

Accept H_0 $\qquad P > 0.995$

LGE AMPHS

Category	10	20	30	40	60
A_i	2.75	8.25	12.0	15.0	17.5
F_i	2.98	7.69	11.83	15.11	13.39

deg of freedom $r = 4$

$\chi^2 = 0.979$ $\qquad 0.95 > p > 0.90$

Accept H_0.

TEST: SIGNIFICANCE OF TYPE III RESPONSE

	16	20	30	40	60
T Number EATN	11	21	48	60	70
	(11)	(22)	(33)	(44)	(66)
T No Left	29	59	72	100	170
	(29)	(58)	(87)	(116)	(174)
Total	40	80	120	160	240

Prop attacked	$\boxed{.275}$	.2625	.4	.375	.292
	.725				

$$\chi^2 = \Sigma\Sigma \frac{(f_{ij} - F_{ij})^2}{F_{ij}}$$

$$= \frac{(11-11)^2}{11} + \frac{(21-22)^2}{22} + \frac{(48-33)^2}{33} + \frac{(60-44)^2}{44}$$

$$+ \frac{(70-66)^2}{66} + \frac{(29-29)^2}{29} + \frac{(59-58)^2}{58} + \frac{(72-87)^2}{87} +$$

$$\frac{(100-116)^2}{116} + \frac{(170-174)^2}{174}$$

$$= 0 + 0.045 + 6.82 + 5.82 + 0.24 + 0 + 0.\overset{017}{\cancel{045}}$$

$$+ 2.586 + 2.207 + 0.092$$

$$= 17.826$$

$$\nu = (2-1)(5-1) = 4$$

$$\chi^2_{0.05,\,4} = 9.488 \qquad 0.005 < P > 0.001$$

∴ Reject H_0: at no density is the prop attacked greater than that at the lowest density.

ie Results indicate data does not fit Type II response.

Correlation bet & no eat / no present.

Test of goodness of fit for Large ampls at density 20.

	4:16	8:12	12:8	16:4
O	2.25	3.5	5.25	9.0
E	0.62	2.06	3.86	5.7

$\nu = 3.$

$\chi^2 = 7.5078$ $\qquad$ $\chi^2_{0.05,3} = 7.815$

$0.10 > P > 0.05$

$\therefore$ do not reject H_0.

A TH T.

SM : LG

		10		20		30		40		50		60	
.2		2	8	4	16	6	24	8	32	10	40	12	48
	b	1.08	2.08	1.93 4	5.70 6	2.54 2.58	9.23 9.34	2.94 2.99	12.21 12.41	3.17 3.25	14.50 14.89		
	l	1.14	2.22	2.19	5.88	1.31	[illegible] 9.41	4.50	[illegible] 12.45	5.61	[illegible] 14.91	6.72	16.84
.4		4	6	8	12	12	18	16	24	20	30	24	36
	b	2.19	1.29	4.06 4.10	3.88 3.86	5.56 5.61	6.57 6.64	6.70 6.78	9.[illegible] 9.26	7.52 7.61	11.37 11.52	8.04 8.23	13.19 13.50
	l	2.26	1.31	4.50	4.34	6.38	[illegible] 6.76	8.92	9.41	11.09	11.75	13.25	13.75
.6		6	4	12	8	18	12	24	16	30	20	36	24
	b	3.33	0.63	6.38 6.40	2.05 2.06	9.04 9.08	3.77 3.80	11.31 11.39	5.57 5.12	13.60 13.30	7.28 7.37	14.68 14.87	8.88 9.02
	l	3.39	0.65	6.72	2.05	10.01	4.34	13.25	5.83	16.44	7.68	19.58	9.41
.8		8	2	16	4	24	6	32	8	40	10	48	12
	b	4.48	0.17	8.78 8.79	0.62	12.84 12.85	1.25 1.25	16.61 16.64	1.99 1.99	20.09 20.13	2.79 2.80	23.28 23.36	3.62 3.64
	l	4.50	–	8.92	0.63	13.25	1.31	17.49	2.05	21.65	3.00	25.73	4.34

Proportion of prey eaten predicted from predator – prey eqns.

Using

Sm $T_s = 30$ $a = 0.028$ $Th = 0.103$

LG $Ts = 30$ $b = 0.00163$ $c = 0.0242$ $Th = 1.042$.

READ 10 ~~NA1 NA2~~ T1 T2 TH1 TH2 A1 C2 B2.

ENERGY RETURN = 30m, 3 fish LG & SM graphs. SM:LG

10			20			30			40			50			60			Sm.
BOTH	SM	LG	BOTH	SM	LG	BOTH	SM	LG	BOTH	SM	LG	BOTH	SM	LG	BOTH	SM	LGE	
5.66	5.98	53.53	10.13	11.49	147.22	13.33	6.87	237.63	15.43	23.62	314.4	16.64	29.44	376.52				.2
52.52			143.9			233.09			305.34			366.17						
58.18			154.03			246.42			323.77			382.81						
11.49	11.86	33.08	21.41	23.62	109.6	29.18	33.48	170.71	35.16	46.81	237.63	39.46	58.20	296.72	42.19	69.54	347.23	.4
32.58			99.24			165.91			230.56			287.13			333.09			
44.07			120.65			195.09			265.72			326.59			375.28			
17.47	17.79	15.91	33.48	35.27	51.77	47.44	52.53	109.60	59.35	69.53	147.22	71.37	86.28	193.94	77.04	102.75	237.63	.6
15.91			51.77			95.20			140.66			183.84			224.25			
33.38			85.25			142.64			200.01			255.21			301.29			
23.51	23.62	4.29	46.08	46.81	15.91	67.38	69.53	33.08	87.16	91.79	51.77	105.43	113.62	75.76	122.17	135.03	109.59	.8
4.29			15.66			31.56			50.25			70.46			91.42			
27.8			61.74			98.94			137.41			175.83			213.59			

$$\lambda_i = a_i' N_i$$

$$sm = \lambda_i = 0.028 \times N \times 30$$

$$lg \quad \lambda_i = \frac{0.00163\,N}{1 + 0.0242\,N} \times N \times 30$$

$*$ per 30 min time period

		λ_i	$\lambda_i E_i$	$\lambda_i h_i$	$\frac{E_n}{T}$	λ_i	$\lambda_i E_i$	$\lambda_i h_i$	E_n/T
·2	sm	3.36	176.33	0.35	130.61	8.4	440.83	0.87	235.74
	lg	9.02	2277.82	9.38	228.72	39.75	10038.07	41.34	242.51
·4	sm	6.72	352.67	0.69	208.68	16.8	881.66	1.73	322.95
	lg	5.46	1378.81	5.68	234.94	25.[illegible]	6462.24	26.61	258.30
·6	sm	10.08	528.99	1.04	259.31	25.2	1322.49	2.60	367.36
	lg	2.62	661.63	2.72	250.13	13.18	3328.34	13.71	268.67
·8	sm	13.44	705.33	1.38	296.36	33.6	1763.33	3.46	395.36
	lg.	0.71	179.30	0.74	283.53	3.94	994.96	4.10	322.23

$$\frac{E_n}{T} = \frac{\Sigma \lambda_i E_i^*}{1 + \Sigma \lambda_i h_i}$$

$h_{sm} = 0.103$ ~~min~~

$h_{lg} = 1.04$

$wt_{sm} = 52.48$ µgm

$wt_{lg} = 252.53$

$$\frac{E_i}{h_i}$$

sm = 509.51 µgm/min

lg = 242.81 µgm/min

$\boxed{2.098}$

Estimation of handling time for large amphs from portion of curve above inflection

FOR TYPE III

Using random pred model.

20	40	60
8	16	18
11	16	23
17	17	15
12	11	14

$Y = \ln$ (prop host surv) $\qquad X = Ne$

$\frac{N - Ne}{N}$

30		40		60	
Y	X	Y	X	Y	X
−0.310	8	−0.511	16	−0.357	18
−0.456	11	−0.511	16	−0.483	23
−0.836	17	−0.553	17	−0.288	15
−0.511	12	−0.322	11	−0.266	14
$\bar{X}$ −0.528	12	−0.474	15	−0.348	17.5

Regressions	ALL DATA	MEANS
r	−0.37	·0.96
Intercept	−0.232	−0.9282527
slope	− 0.0147	0.0322418
T_h	−1.901104	T_h = 1.042013
a	0.0077377	a = 0.0309418
T_s	30	T_s = 30

USE THIS ONE

Estimation of constants b & c for attack rate in sigmoid curve for large amphipods

Using means of raw data with T_h = 1.0 min

N	X (a)	Y (a/N)
10	0.013	0.0013
20	0.0128	0.00064
30	0.0327	0.00109
40	0.0331	0.000828
60	0.0337	0.0005608

$$a = \frac{bN}{1+cN}$$

Regression eqn

$$a/N = b - ca$$

∴ Intercept = b
Slope = −c

	ALL POINTS	EXCLUDING 20
r	−0.27	−0.77
Slope (c)	0.0073613	0.0242
Intcept (b)	0.0010697	0.00163

USE THIS ONE

ie

$$a = \frac{0.00163\,N}{1 + 0.0242\,N}$$

Constants

TYPE II (sm amps) $T_s = 30$ $a = 0.028$ $Th = 0.103$

TYPE III (lg amps) $T_s = 30$ $b = 0.00163$ $c = 0.0242$ $Th = 1.042$

SM

FOR11.DAT = A, TH, T

N	Ne	pred
10	5.5	5.61
20	11.75	11.09
30	15.25	16.42
40	21.25	21.62
50	—	26.69
60	31.67	31.62

LG

FOR11.DAT = C, B, TH, T

N	Ne	pred.
10	2.75	2.98
20	5.25	7.69
30	12.0	11.83
40	15.0	15.11
50		17.54
60	17.5	19.39

N	Na 3.12	Na 3.13	NA EXP
10	2.98	2.73	2.75
20	7.69	7.03	5.25
30	11.86	11.05	12.0
40	15.14	14.38	15.0
50	17.62	16.99	–
60	19.48	18.99	17.5

	10		20		30		40		60
1	0.0035	6	0.0125	8	0.0111	16	0.0196	18	0.0140
5	0.0241	3	0.0056	11	0.0168	16	0.0196	23	0.0200
3	0.0122	7	0.0152	17	0.0325	17	0.0215	15	0.0100
2	0.0076	5	0.0100	12	0.0149	11	0.0118	14	0.0100
$\bar{x}$	0.01185		0.0108		0.0198		.0181		.01375
σ	0.0069		0.00407		.00906		.0043		

NOT USED

Attack rate calculated from raw data of large amphs with handling time = 0.25 min T_t = 30 min.
using random pred eqn.

Attack rate calculated from raw data (lge amphs) T_h = 1.0 min
T_t = 30 min

NE	N 10		20		30		40		60
1	0.0036	6	0.0149	8	0.0141	16	0.0365	18	0.0297
5	0.0277	3	0.0060	11	0.0240	16	0.0365	23	0.0691
3	0.0132	7	0.0187	17	0.0643	17	0.0426	15	0.0192
2	0.0080	5	0.0115	12	0.0284	11	0.0169	14	0.0166
$\bar{x}_1$	0.013		0.012775		0.0327		.033125		.03365
σ	0.0105				0.021599				.0243

Iterative soln to two prey eqns.

VARIABLE LIST	CONST LIST	EQNS
NA1	T1	TII
N1	TH1	TIII
NAT1	A1	
NA2	T2	
N2	TH2	
NAT2	C2	
	b2	

1. Input estimated (or start) values for NAT1 and NAT2.

2. Input NAT1, NAT2 into TII calc → NA1

3. Input NAT2, NA1 into TIII calc → NA2

4. Check DIFF bet NA1 − NAT1 and NA2 − NAT2

5. IF Greater than 0.1 Let NAT1 = NA1 and NAT2 = NA2 and return to 2

PROGRAM FOR ITERITIVE SOLN OF RAND. PRED EQN (T. II)

Na = N(1 - EXP - a(T - NaTh)

```
      REAL N, NA, NAT, TH, T, A
      READ (10, *) TH, T, A
      DO 30 I = 10, 60, 10
      N = I
      NAT = 0.2 * N
20    NAT = NAT + 0.05
      NA = N*(1 - EXP(-A*(T - NAT*TH)))
      DIFF = ABS (NA - NAT
      IF (DIFF. GT. 0.5) GO TO 20
      WRITE (5, 12) N, NA
12    FORMAT (5X, 2F10.2)
30    CONTINUE
      STOP
      END
```

TYPEII.FOR

ITERITIVE PROGRAM TO SOLVE SIGMOID CURVE USING RAND PRED EQN

SUBSTITUTING A= BN/1+CN.

```
      REAL N, NA, NAT, A, TH, T, B, C
      READ (10,*) B,C, TH, T
      DO 30 I = 10, 60, 10
      NAT = 1.0
      N = I
      A= -B*N/(1+C*N)
20    NAT= NAT + 0.05
      NA = N*(1-EXP(A*(T-NAT*TH)))
      DIFF= ABS(NA-NAT)
      IF(DIFF.GT. 0.1) GO TO 20
      WRITE(5,12) N, NA, A
12    FORMAT (5X, 3F10.2)
30    CONTINUE
      STOP
      END
```

$$a = \frac{bN}{1+cN} \qquad \text{——— (1)}$$

$$N_e = N\left(1 - \mathrm{EXP}\left(-a\left(T - T_H N_e\right)\right)\right) \qquad \text{—— (2)}$$

sub (1) into (2)

$$N_e = N\left(1 - \mathrm{EXP}\left(-\frac{bN}{1+cN}\left(T - T_H N_e\right)\right)\right). \qquad \text{—— (3).}$$

PROGRAM TO SOLVE SIMULTANEOUS PREDATOR EQNS FOR TWO PREY SITUATION WITH ~~THEIR~~ RAND PRED EQN & HASSEL SIGMOID EQN

```
      REAL NA1, NA2, N1, N2, NAT1, NAT2
      READ (10,*) T1, T2, TH1, TH2, A1, C2, B2
      READ (5,*) N1, N2
      NAT1 = 0.2*N1
      NAT2 = 0.2*N2

20    NAT1 = NAT1 + 0.05
      NAT2 = NAT2 + 0.05

      NA1 = N1*(1-EXP(-A1*(T- NAT1*TH1 - NAT2*TH2)))

      NA2 = N2*(N2-NAT2)*(C2*ALOG((N2-NAT2)/N2) -
                B2*TH2*NAT2 + B2*T2 - NA1*TH1)

      DIFF1 = ABS(NA1-NAT1)
      DIFF2 = ABS(NA2-NAT2)

      IF(DIFF1.LT.0.5.AND.DIFF2.LT.0.5) GO TO 30
      NAT1 = NA1
      NAT2 = NA2
      GO TO 20

30    CONTINUE
      STOP    <-    WRITE(5,6) NA1, NA2
                  6 FORMAT(2, F10.2)
      END
```

DOES NOT WORK

CHOICE · FOR.

T1 = 30

T2 = 30

TH1 = 0.1

TH2 = 1.1

A1 = 0.028

C2 = 0.0243

B2 = 0.00163

ITERITIVE PROGRAM TO SOLVE SIGMOID CURVE WITH HASSEL'S EQN.

```
      REAL N, NA, NAT, C, B, TH, T
      READ (10,*) C, B, TH, T
      NAT = 1.0
      DO 30 I = 10,60,10
      N = I
20    NAT = NAT + 0.05
      NA = N*(N-NAT)*(C*ALOG((N-NAT)/N)-b*TH*NAT+b*T)
      DIFF = ABS(NA-NAT)
      IF(DIFF.GT.0.5) GO TO 20
      WRITE(5,12) N, NA
12    FORMAT(5X, 2F10.2)
30    CONTINUE
      STOP
      END
```

SIGMOD. FOR

$$N_{ha} = N(N - N_{ha})\left[c\log\left(\frac{N - N_{ha}}{N}\right) - bT_h N_{ha} + bT\right]$$

subtract time taken handling prey type i.

$= N_{ha}' T_h'$

$$N_{ha} = N(N - N_{ha})\left[c\log\left(\frac{N - N_{ha}}{N}\right) - bT_h N_{ha} - T_h' N_{ha}' + bT\right]$$

$$N_{ha}' = N'(N' - N_{ha}'\left[c'\log\left(\frac{N' - N_{ha}'}{N'}\right) - b' T_h' N_{ha}' - T_h N_{ha} + b' T\right]$$

$$\boxed{a = bN/(1 + cN)}$$

$$N_{ha} = N\left[1 - \exp\left(-a\left(T - T_h N_{ha}\right)\right)\right]$$

$$\frac{N_{ha}}{N} - 1 = -\exp\left(-a\left(T - T_h N_{ha}\right)\right)$$

$$\frac{N_{ha}}{N} - 1 = \exp\left(a\left(T - T_h N_{ha}\right)\right)$$

$$\log\left(\frac{N_{ha}}{N} - 1\right) = aT - aT_h N_{ha}$$

$$a = \frac{\log_e\left(\frac{N_{ha}}{N} - 1\right) - aT_h N_{ha}}{T}$$

give -ve no. cannot $\log_e$?

$$N_{ha} = N\left[1 - \exp\left(-a\left(T - Th\, N_{ha}\right)\right)\right]$$

$$\frac{N_{ha}}{N} = 1 - \exp\left(-a\left(T - Th\, N_{ha}\right)\right)$$

$$1 - \frac{N_{ha}}{N} = \exp\left(-a\left(T - Th\, N_{ha}\right)\right)$$

$$\log_n\left(1 - \frac{N_{ha}}{N}\right) = -a\left(T - Th\, N_{ha}\right)$$

$$a = -\frac{\log_n\left(1 - \frac{N_{ha}}{N}\right)}{T - Th\, N_{ha}}$$

0.0109

809

APPLICATION OF FUNCTIONAL RESPONSES TO TWO PREY SITUATION

① BASIC EQNS $Na = N(1 - \exp - a(T - Th\,Na))$ — Type II

$Na = N(N - NA)\left[c \log_n ((N - Na/N) - bTh\,Na + bT)\right]$ – Type III

② Two prey situation : subtract time taken in handling prey items ie $Th\,Na$ & $Th'\,Na'$

$$Na = N(1 - \exp - a(T - Th\,Na - Th'\,Na'))$$

$$* \quad Na' = N'(N' - Na')\left[c \log_n ((N' - Na'/N') - bTh'\,Na' + bT' - Th\,Na)\right]$$

* This eqn does not work in two prey situation. due to $-Th\,Na$.

17
4.8

$F_{0.05(2)\,8,8} = \frac{1.04}{0.847} = 1.23$ $F_{.05(2)} = 4.43$ accept $\underline{H_0}$

FEEDING EXPT 1

$\left.\begin{array}{l}\bar{X}\ 3.375\\ \sigma\ 1.04\end{array}\right\}$ present $\left.\begin{array}{l}\bar{X}\ 3.086\\ \sigma\ 0.847\end{array}\right\}$ eaten fish $\bar{X}$ 23

1.5
1.6

				eaten	~~eaten~~ total	TOT	EAT	SIZ
1.7	I	II	2	1	3			
1.8	I	I	1	1	2	14		
1.9		I	1	0	1		3	1.7
2.0	I	𝍸 II	7	1	8			
2.1	II	III	3	2	5			
2.2		III	3	0	3			
2.3	I	𝍸	5	1	6	22	5	2.3
2.4	II	IIII	4	2	6			
2.5		II	2	0	2			
2.6		𝍸	5	0	5			
2.7		I	1	0	1			
2.8		IIII	4	0	4	14	1	2.8
2.9		I	1	0	1			
3.0	I	II	2	1	3			
3.1	I	I	1	1	2			
3.2		I	1	0	1			
3.3			0	0	0	18	7	3.3
3.4	𝍸	𝍸 I	6	5	11			
3.5	I	III	3	1	4			
3.6	I	𝍸	5	1	6			
3.7		II	2	0	2			
3.8	I	III	3	1	4	25	4	3.8
3.9	I	𝍸 I	6	1	7			
4.0	I	𝍸	5	1	6			

4.1		|||	3	0	3			
4.2		|||	3	0	3			
4.3		||||	4	0	4	16	0	4.3
4.4		||||	4	0	4			
4.5		||	2	0	2			
4.6	||		0	2	2			
4.7			0	0	0			
4.8		||||	4	0	4	7	2	4.8
4.9		|	1	0	1			
5.0			0	0	0			
5.7		|			1			
5.8		|			1			
5.2		||			2	4	0	5.3
6.3		|			1			
5.6		|			1			
5.3		|			1			
5.5		|			1	4	0	5.8

↓

FE2

	E	R	T	T	E
18	I	I	2		
19		II	2	12	1
20		卌 III	8		
21	I	I	2		
22	I	I	2		
23	II	II	4	10	4
24					
25		II	2		
26					
27		II	2		
28	I	I	2	11	1
29		IIII	4		
30		III	3		
31	I		1		
32	I		1		
33				7	3
34	I	II	3		
35		II	2		
36		II	2		
37					
38	I		1	6	1
39		I	1		
40		II	2		

FE3.

			T	E
I	III	4		
	I	1		
IIII	II	6	21	8
II	卌 IIII	10		
II	IIII	6		
II	卌 IIII	11		
II		2	39	12
IIII	卌 IIII	12		
II	卌 I	8		
II	卌	7		
	II	2		
III	I	4	24	7
II	IIII	6		
	卌	5		
I	III	4		
I	II	3		
I	I	2	10	3
	I	1		
I	I	2		
I		1		
I	II	3	9	4
	I	1		
I	I	2		

4·1		1	1				11	2		
4·2	11	1	3			1		1		
4·3				8	5				3	1
4·4	11		2							
4·5	1	1	2							
4·6		1	1							
4·7										
4·8		1	1	4	0		1	1	1	0
4·9		11	2							
5·0										
			58					107		

~~Fish~~ eaten — $\bar{X}$ 3·25, σ 0·96

avail — $\bar{X}$ 3·07, 0·94

avail — $\bar{X}$ 2·61, σ 0·67

eaten — $\bar{X}$ 2·6, σ 0·68

Fish $\bar{X}$ 26

Fish size $\bar{x}$ 25 mm

```
 TY PRET.FOR

? PRET.FOR (0) file was not found

.TY PREY.FOR
        DIMENSION SCLASS(25),PABUN(25),ACCEPT(25)
        DIMENSION EATEN(25),SEL(25),PERPAB(25)

        REAL MEATN,MPABUN,PERPAB

        DO 12 I=1,25
           READ(25,*)SCLASS(I),PABUN(I)
12      CONTINUE

        DO 99 M=9,30,3
        NFISH=M
        ACMEAN=0.12*NFISH
        ACVAR=1.2
        XAC=ACVAR*SQRT(2*3.14159)
        ZAC=2*ACVAR**2

        N=0
        NPABUN=0
        SPABUN=0.0
        SQSPAB=0.0
        SEATEN=0.0
        SQEATN=0.0

        DO 14 I=1,25
           EATEN(I)=0
14      CONTINUE

        DO 20 I=1,25
           ACCEPT(I)=EXP(-1*((SCLASS(I)-ACMEAN)**2/ZAC))*(1/XAC)
20      CONTINUE

        DO 40 I=1,25
           L=PABUN(I)
           DO 50 K=1,L
              R=RAN(1)
              IF(R.GT.ACCEPT(I))GO TO 50
              EATEN(I)=EATEN(I)+1
              N=N+1
50         CONTINUE
40      CONTINUE

        DO 66 I=1,25
           SPABUN=SPABUN+(SCLASS(I)*PABUN(I))
           SQSPAB=SQSPAB+((SCLASS(I)**2)*PABUN(I))
           NPABUN=NPABUN+PABUN(I)

           SEATEN=SEATEN+(SCLASS(I)*EATEN(I))
           SQEATN=SQEATN+((SCLASS(I)**2)*EATEN(I))
66      CONTINUE

        MPABUN=SPABUN/NPABUN
        SDPABN=SQRT((SQSPAB-SPABUN**2/NPABUN)/(NPABUN-1))

        MEATN=SEATEN/N
        SDEATN=SQRT((SQEATN-SEATEN**2/N)/(N-1))

        WRITE(5,18)NFISH,MEATN,SDEATN
18      FORMAT(/,5X,I3,2X,F5.2,2X,F5.2)

        WRITE(16,44)NFISH,ACMEAN,ACVAR,MPABUN,SDPABN,MEATN,SDEATN
```

```
44        FORMAT(/////,5X,'FISH SIZE',2X,I3,/,5X,
     1    'OPT PREY SIZE',2X,F5.2,/,5X,'ACCEPTANCE VARIENCE',
     1    2X,F5.2,/,5X,'MEAN PREY SIZE',2X,F5.2,/,5X,
     1    'PREY SD',2X,F5.2,/,5X,'MEAN SIZE EATEN',2X,F5.2,/,
     1    5X,'EATEN SD',2X,F5.2,//,3X,'SCLASS ACCEPT PABUN',
     1    2X,'EATEN')

          DO 55 I=1,25
             WRITE(16,45)SCLASS(I),ACCEPT(I),PABUN(I),EATEN(I)
45           FORMAT(4F10.4)
55        CONTINUE

          WRITE(16,47)
47        FORMAT(//,'   SCLASS ACCEPT PABUN  EATEN  SEL')

          DO 65 I=1,25
             EATEN(I)=EATEN(I)/N
             PERPAB(I)=PABUN(I)/NPABUN
             SEL(I)=EATEN(I)-PERPAB(I)

             WRITE(16,46)SCLASS(I),ACCEPT(I),PERPAB(I),EATEN(I),SEL(I)
46           FORMAT(4F10.3,F8.4)
            WRITE(17,22)EATEN(I)
22          FORMAT(F8.4)
65        CONTINUE

99        CONTINUE
          DO 23 I=1,25
          WRITE(17,24)PERPAB(I)
24        FORMAT(F8.4)
23        CONTINUE
          STOP
          END
```

```
 TY FOR25.DAT
0.3 3666
0.5 4468
0.7 792
0.9 206
1.1 351
1.3 191
1.5 65
1.7 50
1.9 30
2.1 20
2.3 20
2.5 15
2.7 20
2.9 20
3.1 15
3.1 10
3.3 15
3.5 10
3.7 10
3.9 5
4.1 10
4.5 5
4.7 5
4.9 1
5.1 1

.K/F
Job 58, User [2371,25576]  Logged off TTY175   1344  18-Oct-83
```