

Predation Expt 7/10/84 - 14/10/84. [PE 001]

Tank size 50cm x 50cm

6cm water depth

thin layer washed sand.

Time start 10.00 Sat 6/10/84 Predators placed in tank
no prey.

10.15 Sun 7/10/84 Prey placed in tank.

Time end 10.15 Sun 14/10/84 → 7 days.

Water temp at end = ?

No. predators = 4

Sizes = 1.35, 1.35, 1.15, 1.25 cm.

No. prey = 30

No. eaten = 29

No being eaten at finish = ?

Prey preserved in PE 001

1.036 prey/predator day

6/11/84 Predm trials in large arena.

high density of prey. Preds isolated overnight with no prey.
Preds collected 1/11

No 1 1.42 cm W.Temp 23.8 . picked up whilst moving on
slide of perspex. a) 1114-1126 enc 1 prey. exhibited trail following.
b) repeated attack and chase obs, captured
another item 1132-1157

No 2 1.45 cms Temp 24.3. picked up on slide
a) 1304-1330 1 prey captured 0.36 cm.
b) 1353-1401 1 prey captured 0.38 cm

*Note - both appeared to be slower than held specimens
except when prey chased in 1(b)

No 3 1449 In position 1.344 cms
1451 burrowed
→ no further movement

No 4 1.282 cms

*Note - Pentel Marker wears off quickly.

7/11/84 Continuation of prev days trial. Snails mount in holding tank, but no water for exp tny.

① 0942 IP
0944 B
0950 S
0951 PC
0954 B

② 0955 IP
1001 B
1339 (S) *
1430 PC
1432 B
1435 S ^{carrying prey.} out of arena, continued movement on surface - one water followed well and burrowed.

③ 1009 IP
1017 B
1317 S *
3 unsuccessful attacks
PC & B

* Water allowed to drain - top surface just exposed. at 1230
* 1430 flow resumed.

④ 1012 IP
1019 B
searched and B whist at ten break

⑤ 1014 IP
1019 B
as in ④

⑥ 1013 IP
1022 B
as in ④

7/11/84 - 11/11/84

6 predators left in arena to feed on prey. Removed at 10am 11/11 and isolated in holding tank. Prey removed from arena counted and No. eaten determined.

Arena cleaned / sand washed. Examine undisturbed search each day when no prey present, from 12th - 16th.

Then add prey and examine behavior.

11/11/84 0945 - Commenced draining water.

1015 - draining almost complete - prey items active and moving around surface of substrate. (n 27)

1023 - One predator surfaced. commenced searching with 1 prey in tow. Captured another prey and recommenced search? with two prey in tow. ? how 2nd (older prey) kept in tow?
As pred burrowed older prey item left behind. Examination showed hole bored size 4.14 mm

1044 Prey items still active where some surface water visible but where NO SW visible most have stopped whilst still exposed.

1100 Commenced removing and sieving sand. predators placed in clean tank with 3.5 cm sand.

prey presv in
70% alcohol Cabel
PE 002

1130 All prey & preds removed. prey placed in used seawater to kill. 1 lost during sieving, which was a captured item.

Water temp 24.6°C

1136 54 preds observed to be actively moving around surface of substrate all at Dφ or D1. Obs of encounter of two preds moving in opposite directions showed no apparent interaction. Virtually ignored each other with one moving over the top of the other.

1530 2 tanks set up 3 / tank 1 tank overflow from arena other from reserve.

Sizes of prey eaten 10.00 7.11.84 to 15.00 11.11.84

~~4.16~~

~~4.14~~

~~3.34~~

~~4.10~~

$n = 40$ 6 preds

$\bar{x} = 3.76$

$s = 0.416$

1.66 prey / predator day

4.26 3.80

3.98 4.56

3.4 4.15

3.62 4.40

3.76 4.34

3.46 3.84

4.44 3.50

3.79 3.80

3.66 3.94

4.26 4.05

2.94 4.00

4.15 3.50

3.70 2.95

3.28 3.20

4.05

3.50

4.16

4.00

3.64

3.25

3.80

3.05

3.65

3.12

3.58

3.80

12/11/84 Predators located in two tanks (30x30x10)
one with overbowl in arena, other with low turn recirc.
(A) (B)

1200: Water temp 24.0 - 24.5°C

All six ~~pred~~ peds placed in arena center
approx 10 cms apart (see truck sheet). All burrowed within
5 mins. 3 trucks obtained

- a) 1219-1402 remained at D4 all the time.
- b) between 1600-17¹⁵ not observed but truck traced.
- c) 1720-1810 good truck showed spiral pattern.

13/11/84 same procedure as 12th two trucks obtained

- a) 0940-1111 good spiral
- b) ~~0940~~ 1055-1113 bit shaky possibly two
detections of other burrowed premise
- ∴ should test singly

Note At 0930 4 pred obs searching in holding tanks, trucks covered
surface ∴ search between 1800-0900.

17/11/84 Prey collected at 1030

1130 - 50 prey items placed in perspex cont and
run off water allowed to drain into tank A

1430 3 preds in tank A placed in arena.

* Note when runoff from prey first allowed into A response of the
preds showed a clear increase in activity.

1600 After initial burrowing no further movement
retired to tank A.

19/11/84 Mon 3 pred from B placed in arena 0917
0922 burrowed.

Temp 24.0

One pred active beneath sand. When water from
prey container dropped from eye-dropper pipette
over animal response decreased after ~ 10 secs
instigate tight search pattern.

20/11/84 1400 All preds placed with XS prey allowed
to feed ad lib.

21/11/84 Wednesday - Prelim size selectivity.

Preds and prey collected 1330 at lower bay (2nd car park).

1500 5 preds + 30 age + 30 sm prey placed in 30x30 cm tank with 2-3 cm sand.

0900 27th/11/84 (Tues) One snail found in tray press in tank but placed in holding tank. (not in exp tank. - 28th/11)

Pred size	1.	1.223	0.845
	2.	1.210	0.805
	3.	1.082	0.800
	4.	1.186	0.769
	5.	1.189	0.764

Stored in PE $\phi\phi 3$

$$\begin{array}{r} 22 \\ 15 \\ \hline 7 \overline{) 37} \end{array}$$

5
1/day

LB 22

LNB 8
30

$$\hat{\alpha}_L = 0.6539$$

SB 19(-4) = 15

SNB 15 (15)
34 (30)

$$\hat{\alpha}_S = 0.3461 \leftarrow$$

LB

4.5

4.77

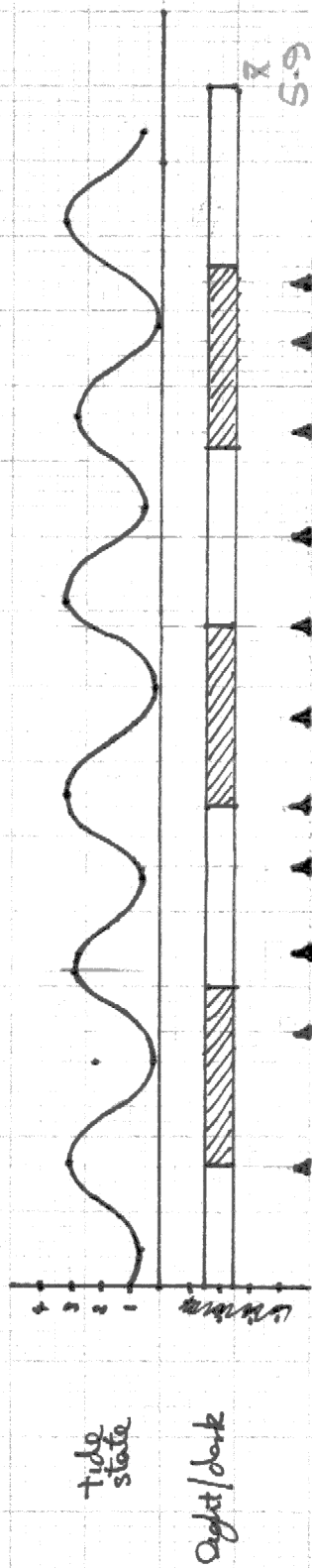
① Activity Rhythms Mon 19/11/84 Two tanks 22 x 14 x 14 cm, 5 Polymes convers each tank
 50 prey (Isanda coronata) in tank (B). Placed in tank at 1400 commenced
 video 1445.

Time	A	B	Time	A	B	Time	A	B
1500	0	0	0000 20th 20th	0	0	0900	3	3
	0	0		0	0		-	-
	0	0		0	0		4	1
	0	0		0	0		3	1
1600	0	0	0100	0	0	1000	2	0
	0	0		0	0		2	2
	0	0		0	0		3	2
	0	0		0	0		1	1
1700	0	0	0200	0	0	1100	2	1
	0	0		0	0		2	1
	0	0		0	0		0	0
	0	0		0	0		0	0
1800	0	0	0300	0	1	1200	0	0
	0	0		0	1		0	0
	0	1		0	1		0	0
	0	0		1	1		0	0
1900	0	0	0400	1	1	1300	0	0
	0	0		0	1		0	0
	0	0		0	0		0	0
	0	0		0	0		0	0
2000	0	0	0500	0	0	1400	0	1
	0	0		0	0		0	0
	0	0		0	0		0	1
	1	0		0	0		0	1
2100	1	0	0600	0	0	1500	0	0
	0	0		0	0		0	0
	1	0		0	0		0	0
	1	0		0	0		1	0
2200	1	0	0700	0	0	1600	1	0
	1	0		0	0		1	0
	0	0		0	0		0	0
2300	0	0		0	0		0	0
2300	0	0	0800	1	0	1700	0	0
	0	0		2	1		0	0
	0	0		3	3		0	1
	0	0		4	3		1	2

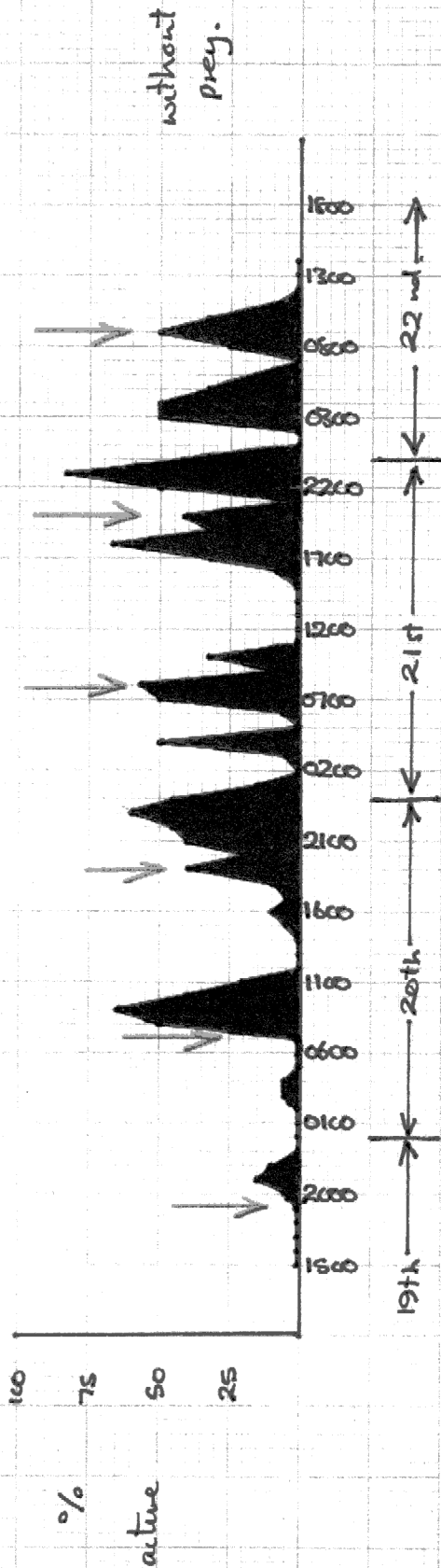
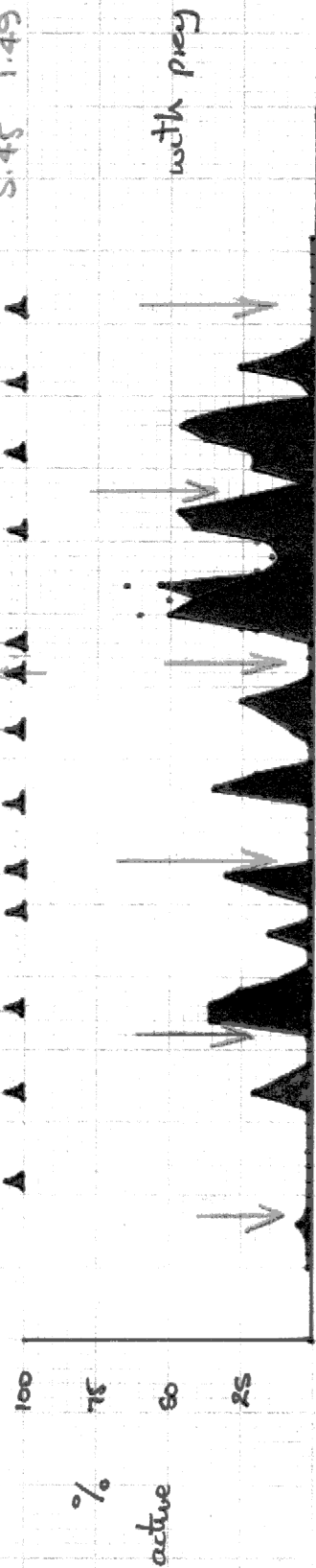
Time	A	B	Time	A	B	Time	A	B
1800	1	3	0300	0	0	1200	0	3
	0	2		0	0		0	3
	0	1		0	0		0	3
	1	0		1	0		0	3
1900	2	0	0400	2	0	1300	0	3
	2	0		3	0		0	2
	2	0	climbed in A → B	3	0 (+1)		0	2
	2	0		1	2		0	3
2000	1	0	0500	2	2 (-1)	1400	0	4
	1	0	stuck in overflow pipe	2	0		0	3
	1	0		1	0		0	3
	1	0		0	1		0	3
2100	1	0	0600	0	1	1500	0	1
	2	0		0	1		0	1
	2	0		0	1		0	1
	3	0		0	2		0	1
2200	3	0	0700	0	2	1600	0	1
	2	0		0	0		0	1
	1	0		0	0		0	1
	3	0		1	0		1	0
2300	2	0	0800	1	0 (+1)	1700	1	1
	4	0	released in overflow	2	0		1	1
	4	0		2	0		1	1
	2	0		3	0		1	1
0000 0000 21st	2	0	0900	3 (-1)	0	1800 1800	2	1
	4	3	free out	2	0		2	3
	1	2		3	0		2	3
	2	2		1	0		2	3
0100	2	2	1000	0	0	1900 1900	1	3
	1	2		0	0		1	4
	0	0		0	0		1	2
	0	0		1	0		1	2
0200	0	0	1100	1	0	2000 2000	1	1
	0	0		1	1		1	2
	0	0		1	2		2	2
	0	0		1	2		1	1

Time	A	B	Time	A	B	Time	A	B
2200	0	1	0600 0600	1	2		0	2
	0	0		1	0			
	0	0		0	0			
	0	0		0	0			
2300	0	0	0700 0700	0	0			
	2	1		0	0			
	2	2		0	0			
	2	2		0	0			
2300 2300	3	2	0800 0800	0	0			
	3	1		1	0			
	2	1		1	0			
	2	1		1	0			
0000 22nd 22nd	2	1	0900 0900	2	0			
	2	3		2	0			
	1	2		1	0			
	0	3		1	0			
0100 0100	0	3	1000 1000	1	0			
	0	3		1	0			
	0	3		1	0			
	0	2		1	0			
0200 0200	0	3	1100 1100	1	0			
	0	3		0	0			
	0	1 (-1)		0	0			
	0	0		0	0			
0300 0300	1	0	1200 1200	0	0			
	1	0		0	0			
	2	0		0	0			
	2	0		0	0			
0400 0400	2	0	1300 1300	0	0			
	1	0		0	0			
	2	0		0	0			
	1	1		0	0			
0500 0500	1	1	1400 1400	0	0			
	1	1		0	0			
	1	1		0	0			
	1	1	1500	0	0			

Polinices conicus activity 19th - 22nd Nov under constant conditions.



\bar{x} S 5.9 1.45 10
S 5.45 1.49 11



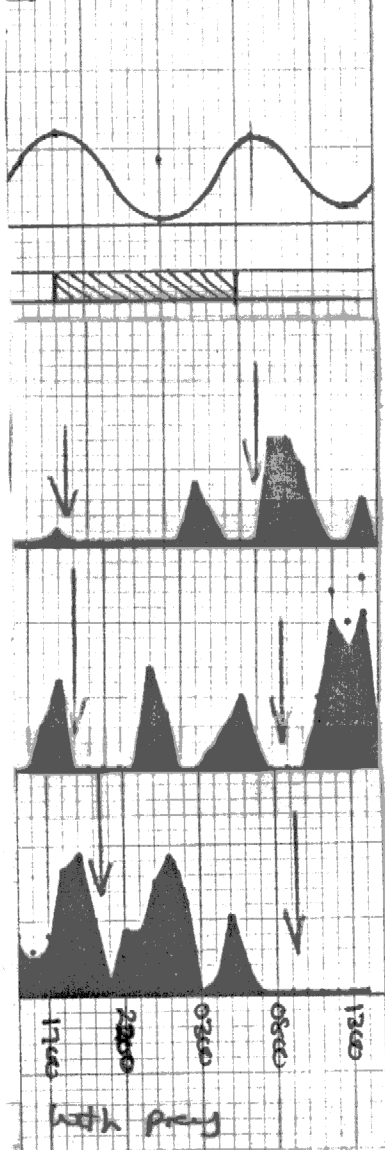
19th

20th

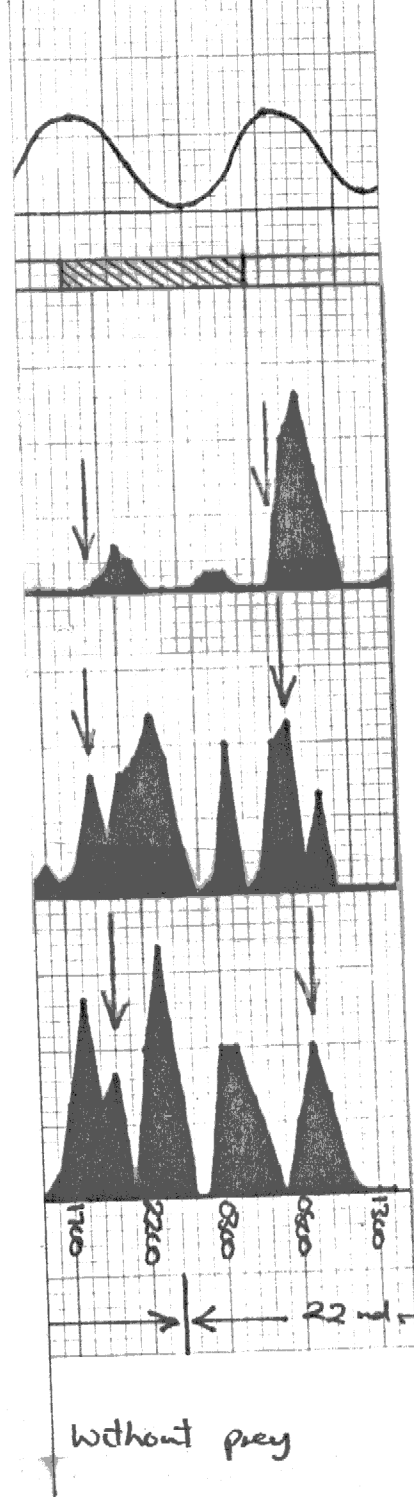
21st

22nd

ices conicus activity



19th - 22nd Nov



Record	Prey evaluation time (secs)	Detection range time of prey	Time stopped for re-approach (secs) poss det of prey
061184 1304 1332 112	180 90	24.5 36.8 34.8	150 75
061184 1353 1401 112	60	19.2	45 } poss detection 45 of prey
131184 1616 1629 102	—	—	45, 90, 15
111184 1024 1050 112	90	3.0 16.4	30
101184 1453 195 112	75	16.5 24.8 21.0 58.2 16.0 60.0 22.0 18.0 30.0 30.0	pred hurd wad s meaning
091184 1532 1546 112	60	5.5 28.0	
71184 1317 1342 112	105		
71184 1339 1435 112	90		
71184 0942 0954 112	60		
61184 1137 1142 112	75	12.0	
61184 1114 1126 112	—	12.0	
	$\bar{x} = 78.33$ $s = 16.39$ $n = 9$	24.44 (mm) $s = 14.78$ $n = 20$	

- 19/2/85 - 20 x Chinese feed containers. [CCs]
 - \approx 15mm depth sand in each

Groups	1-5	5 prey items
	6-10	10 "
	11-15	15 "
	16-20	20 "

Snails placed into containers 1450-1500

* Snails & prey collected 18/2/85 at 1500 & placed in sn indiv cants.

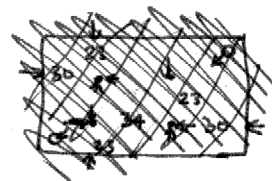
* One escaped from container unknown which placed into

Temp @ 1505 = 27.6°C

* Container No 20 - ~~no~~ ~~predator~~.

Wednesday 20/2/85

1300 20 prey items placed into large arena 4 groups 5/group



1345 4 predators placed into arena. Nos 7, 8, 9, 10.

arena Temp 26.2 from holding tank 28.4.

1630 No 10 commenced movement - tracked to 1705

predators left overnight

21st

1139 arena drained

1140 1 pred surfaced with 2 prey in tow 1 prey being commenced 1 " unbored.

1145 2nd " commenced movement

1157 2nd ~~stayed~~ picked up & found to be carrying 2 prey not bared, 1 bared.

Predator sizes: ~~10.65mm~~ 11.12mm, 9.24mm
 11.7, 10.20

returned to containers 7-10.

Total 5 prey captured (ie bared)

17 recovered - 3 lost?

Friday 22/2/85

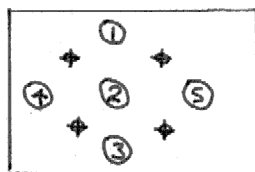
Tides

0335	0.63
1020	2.70
1643	1.18
2233	2.21

1020 20 prey ⁴ groups of ⁵ in arena
arena temp = 27°C Pred holding tank = 29.5 [aeration appears to have fallen off during night].
Water depth in arena 18mm. Sand depth 12mm.
holding tank temp after aeration on = 28°C.

Predators

1052	No 11	11.0 mm	Posn 1	1054	B 1103
1055	No 12	12.9 mm	Posn 2	1056	with prey when removed B 1103
1057	No 13	13.65 mm	Posn 3	1058	—— " —— B 1103
1100	No 14	11.4 mm	Posn 4	1101	B 1105
1102	No 15	12.91 mm	Posn 5	1103	B 1113



No 11 ~~11~~ → Total No prey 16 5 ~~11~~ bored → Yield 25 : 22/2/85
No 12 — " — 17 5 bored → " 17 : 22/2/85
No 13 — " — 17 10 bored, 2 boring commenced 46 : 22/2/85
* 2nd P. conicus found in container 10.85 mm placed into container 6 at 1202
No 14 Total No Prey 17, 7 bored, 1 partially bored. 40 : 22/2/85
No 15 Total No Prey 20, 9 bored 2 : 22/2/85

1345 15 prey placed in each of 11, 12, 13, 14, 15 C.C.s
temp 25.5°C.

1403 Tide out.

1411 Surface just exposed: 1418 S.No. 15 trucked : 1424 S.No. 12, Trucked

1432 Snail No 15 removed after reaching arena edge placed in CL No 15 with prey and returned to holding tank

1434 As with 15 above. Sn 12

Fn 22nd cont

1435 arena allowed to drain completely.

1505 ~~the~~ tide coming in

1514 Sn 11, 13, 14 removed from arena and placed in CCs with prey.

16 prey removed, 4 still in creases.

Mon 25th / 2/85

0900 a number of snails obs on surface of sand with feet extended (ie upside down). Aeration had stopped and so may be due to O₂ lock? After aeration restored most returned to sand.

Check out

Prey

<u>Vial</u>	[42]	16	1041	11.44mm	1042	Posn 1	B1052	SE + 3A + 12U = 20T
	[29]	17	1043	9.81	1044	" 2		8E + 1A + 12U = 21T
	[33]	18	1046	10.72	1047	" 3		6E + 2A + 12U = 20T
	[15]	19	1048	11.14	1049	" 4		6E + 2A + 14U = 22T
	[50]	20	1050	11.86	1051	" 5		SE + 1A + 15U = 21T

* Most of prey on surface of sand looking rather unhappy. In feet almost moribund.

Sand given two uses but 8 1 of sw.

1400 20 prey 4 gps 5 placed in arena
commenced "tide out"

1405 Arena temp 27.5°C, pred holding 27.8°C, prey holding 25.6°C

1427 No 17 moving, 1437 stopped and recommenced swim later track not recorded.
as vds and no encounters.

1615 20 prey each placed into CC's 16-20

1620 Preds removed from arena and placed into CC's

Tues 26/2/84

Checkout

mm

[Vide]

No 1	0923	10.65	0924	Posn 1	[14]	5E + 1U = 6T
2	0928	11.75	0931	2	[8]	6E + 1U = 7T
3	0930	9.72	0932	3	[48]	4E + 1U = 5T
4	0934	12.82	0935	4	[10]	6E + 1U = 7T
5	0936	11.70	0937	5	[44]	1E + 2A + 2U = 5T

* one of U died

1020 Water flow to arena stopped.

1045 4 gps of 10 prey placed in arena.

1147 Pred No 4 obs moving reached edge of tank. Passed within 70 cm of prey clump with no apparent change in track

1200 arena temp 25°C : Pred holding 27.5°C

1253 No 4 obs back in arena. - trucked to 1258 00A

1301 No 1 moving trucked to 1304 - 00A.

1309 *1 and *4 enc each other along edge. 1 moved around 4, no other or obvious interaction.

1313 *4 back in arena trucked to 1318 - 00A.

1401 encounter between edge following snails - politely moved around each other.

1546 Snails removed, prey left. [3 not found - left]

No further prey placed with preds.

Wednesday 27/2/85

Vide

No 6	1302	10.86	1305	Posn 1	[45]	4E + 1A + 7U = 12T
7	1305	10.20	1306	2	[16]	3E + 7U = 10T *1
8	1307	11.69	1307	3	[41]	5E + 1A + 5U = 11T
9	1308	9.35	1308	4	[24]	11E 11E = 11T
10	1310	11.14	1311	5		4E + 6U = 10

*1 Most uneaten prey dead / decayed!!

*2 1 prey item 2x bared.

Thurs 25th/2/85

all peds placed in arena ~~with prey~~ ^{with prey.}

Wed 6th March 85

Tracking at 31 creek.

Thurs 7th/3/85

Tracking at 31 creek.

Sun 10th/3/85

arena cleaned out 1600.

10 oversized peds replaced in arena

5 others preserved.

2 periods of tracking prior to cleaning out

Mon 11th/3/85

1300 Lights switched off. [sand surface leveled out prior to]
to test for magnetotactic response to artificial light
as explanation for circular movement of snails.
No response expected as trials during night showed
same circular movement.

Tues 12th

1500-1700 : tracking. note observed circularity not same for
all snails, others have less turning rate.

Wed 13th/3/85

0830 - : tracking

Thurs 14th/3/85

0800 - 0830 tracking

1300 sand surface smoothed over (knocked 3 peds).

50 med L. coronatus placed haphazardly into arena.

1314 1 ped surfaced - commenced tracking

1316 1 ped " - " "

2 further peds searching

1331 all peds⁽⁴⁾ caught prey and buried.

- 1334 2 preds surkea (had prev caught pred) and continuing movement. not apparently search movements for prey as before but as prior to prey being introduced. May be an artifact of arena as we looking for suitable spot to burrow.
- 1352 both above still moving. other 2 which captured prey have not moved again.
- 1418 1 pred still moving in circles with p.i.t. approx 20-25 cm dia. [pred No 10]
- 1420 with pipette water squirted onto No 10 to reveal no subsequently pred burrowed and did not resurface.
- 1436 Sand smoothed
- 1700 No further movement by predators. Water temp 24.8°C .
- 1800-1819 3 pred moving two trucked. 1 caught 2 prey.

Observations on trucking 1800-1900

Predator-predator interactions:

- (1) trail following of one predator with captured prey by ~~at~~ another predator
- (2) ~~lepto~~ kleptoparasitism: trail following predator burrowed down and removed one prey previously captured ~~down~~ by other predator (had captured two) also encounter by another pred of klepto pred resulted in loss of one prey item, recently captured.
- (3) after capture of prey item predators continue moving
This may be a response to avoid kleptoparasitic behavior.

Friday 15/3/85

0800 - Sand smoothed over.

0800 - 1300 trucking

1400 - sand smoothed over.

Saturday 16/3/85

Sunday 17/3/85

0850 Salt water recirc stopped (obs. time not actual)

Temp dropped to 21.7, water flow ceased

no trucking expt terminated.

Monday 18/3/85

1530 Arena cleaned out - expt stopped. prey into vial 62

Pred sizes

20 - 11.96 mm

7 - 10.20

2 - 11.70

19 - 11.20

8 - 11.68

10 - 11.10

18 - 10.95

5 - 11.70

1 - 10.81

6 - 11.44

Thurs 21/3/85

1400 predators and prey collected from Rowes Bay 3rd car park.

1600 "Hugs" glued into 5 peds and placed into arena.
No prey in arena.

Tues 26/3/85

1500 - one track

* apparently less active, + no response to "low tide"