Greg Oliver 1992?
CALM

REVIEW OF BAITING OPTIONS MONTE BELLO ISLANDS

RATTUS RATTUS PROGRAMME

PINDONE IMPREGNATED OATS
0.17mg/oat

ADVANTAGES	DISADVANTAGES
Proven effectiveness on Boodie & Middle Islands. + Bedout and Barrow Is.	Possibility that individuals acquiring poisoning symptoms early in baiting period will produce a learned bait avoidance response in less affected individuals. This can happen ☹ 1082 but not Pindone
Has delayed toxicity enabling significant period of 'free feeding', and an acquired amount of lethal dose prior to onset of symptoms.	Oats place 2 resident x 2 migrant bird species at risk (Bar-shouldered Dove, Richards Pipit. Zebra Finch, Quail). Bar-shouldered Dove probably at most risk. not affected on Boodie or Middle Is with covered bait stations
Baiting can be conducted as a 'one off' broad scale distribution followed by 'top ups'.	Secondary poisoning risk to *Hydromys chrysogaster* and raptors, particularly juveniles, being fed.
	Long lived toxin, insoluble and non-biodegradable.

1080 CONVENTIONAL METHOD
0.15mg/oat

ADVANTAGES	DISADVANTAGES
Extremely effective kill method for rabbits.	Rapid toxicity. Possibility for learned bait avoidance response in late feeders or individuals alternating oats with another food source.
Rapid de-toxification.	
Free feeding will train individuals to return to bait areas.	Need to ensure all 'free feed' oats are removed or consumed prior to placing poison oats.
	Up to 10 poisoned oats may need to be consumed to ensure kill.
	Rats display variable tolerance to 1080. One Middle Island specimen survived a 2mg/kg dose. Require high dose of 1080 to ensure kill.
	Bar-shouldered Dove, Zebra Finch at risk. LD 50's birds mostly have a 1080 resistance ?
	Secondary poisoning risk to *Hydromys chrysogaster* , Little Crow and perhaps raptors. less than Pindone -

= 0.5mg/kg Per 250g rat = 3 oats

1080 ONE SHOT METHOD
1.5mg/oat 1:50 Mix

ADVANTAGES	DISADVANTAGES
Rapid detoxification. Baiting can be conducted as a 'one off' broad scale baiting with 'top ups'. Contains an inherent free feeding component. Each poisoned oat will be sufficient to kill an individual.	A proportion of the population will be killed each night. Possibility for learned bait avoidance (this occurs in rabbits). Direct and secondary poisoning risks as per traditional methods, though slightly reduced.

DISCUSSION OF OPTIONS

TARGET SPECIES

Conventional 1080 baiting programmes for rabbits has proven to be more effective than using Pindone. The same result cannot however be assumed for rodents. Two factors complicate the equation.

Firstly rats have been found to display variable tolerances to 1080. A Middle Island specimen survived a 2mg/kg dose in the APB laboratories, 2.75 times higher than reported LD50 figures. Delivery doses will therefore need to be high (suggest 1.5mg/animal) and, given an unquantified oat consumption rate for rats, should be delivered in the minimum number of oats (suggest 0.15mg/oat). With so few oats needing to be eaten to achieve a kill it is possible that rats arriving to the bait site late will acquire a bait avoidance response after observing poisoning symptoms in early feeders.

Secondly, rat feeding habits are not well known. It is possible that only a few oats will be eaten by some individuals before wandering off to an alternate food source. Again this enables the possibility of a learned bait avoidance response.

With 1080 one shot (1.5mg/oat in free feed mix), a proportion of the population will die each night. Surviving individuals may acquire a learned bait avoidance response.

Pindone (0.17mg/oat) will enable a number of nights free feeding before poisoning symptoms appear. Poisoning symptoms are perhaps less stressful and less likely to produce bait avoidance responses on other rats, which by this time may have already consumed a lethal dose. The successful eradication on Boodie and apparent success on Middle and Barrow Islands supports the use of Pindone as a *Rattus* eradicator.

NON TARGET SPECIES

Limited data is available on 1080 and Pindone tolerances of Monte Bello animals considered to be at risk from a poisoning programme (Table 1).

The Bar-shouldered Dove is probably most at risk from direct oat ingestion.

Other than the use of broad scale bait stations (9,000 + stations, 100 + islands) little can be done to protect these birds.

Hydromys chrysogaster will be at significant risk of secondary poisoning from fresh carcasses, particularly if 1080 is used. Again, little can be done to protect these animals.

Resident raptors are probably at least risk with Pindone. No mortality of adult Ospreys, Brahminy Kites or White-breasted Sea Eagles were observed during the Middle Island programme. A juvenile Brahminy Kite was however found dead adjacent to its net. There were numerous stripped carcasses of *Rattus Rattus* on perches adjacent to this nest suggesting the adult had been feeding the young bird poisoned carcasses over a prolonged period.

A baiting programme between the months of November - July, timed to fall outside of these raptors breeding period, should prevent further juvenile deaths.

Nankeen Kestrals have been found to have a fairly high tolerance to Pindone and should not be at risk.

Carrion eating reptiles should not be at risk to either Pindone or 1080.

Some cats are likely to succumb to secondary poisoning. good.

IMPLICATIONS FOR RE-INTRODUCTIONS

If Pindone is to be used re-introductions will have to be deferred until oats have broken down through natural degradation. As it may take some time to eradicate cats this may not be an important factor. Funds for the re-introduction could be held in trust until we are satisfied that remaining oats have detoxified to a safe level and that all cats have been eradicated.

LOGISTICAL CONSIDERATIONS

The Monte Bello Islands cover an approximate area of 2050 ha and are comprised of over 100 islands. Many of the islands are less than 5 ha, are exposed and do not have suitable landings for small craft. Aerial distributions of bait packets to these islands appears to be the only practical method. Approximately 5 hours flying time on a Bell 206 would be required. The use of conventional 1080 baiting methods can be ruled out leaving Pindone or one shot as alternatives.

Of the larger islands, North West, Trimouille, South East, Ah Chong, Hermite, Crocus, Alpha, Bluebell, Primrose, Delta and Campbell (total area 1895.75 ha) hand distribution and hence the use of conventional 1080 techniques are possible.

Approximately 40 person days would be required to distribute bait by hand onto the larger islands.

The difficulty in utilising the 1080 conventional method however, is in ensuring the consumption or removal of all free feeding oats prior to the distribution of poisoned oats.

RADIATION HAZARDS

Ground Zero and the radiation risk area from HMS Plym should be baited aerially to minimise the risk to CALM staff and volunteers.

MAJOR RECOMMEDNATIONS

what about using 1080 on Hermite Is where rewtro will occur ? and Pindone on others.

1. Pindone impregnated oats (0/17mg/kg) should be used on all islands of the Monte Bellos.

2. Package sizes of 200 - 250gm should be used to minimise the need for rebaiting.

3. Health warning labels should be placed inside bags.

4. A 40% oversupply should be ordered for rebaiting (400kg is already available on Barrow).

5. Smaller islands should be baited by helicopter and a sample of these surveyed to assess the effectiveness of the programme.

6. Larger islands to be baited by hand (to ensure accurate grid placement) and topped up as required after 5 days.

7. Radiation risk zones should be baited aerially.

8. Baiting should be timed for either early summer or autumn when alternate food sources are at a minimum and resident raptor breeding has been completed. March 29 - April 12 is proposed.

9. Periodical surveys of the islands should be conducted to ensure complete eradication of rats. Rebaiting should occur as required.

10. Periodic sampling of distributed Pindone should occur to assess its detoxification.

11. Funds should be held in trust to facilitate the re-introduction of the Golden Bandicoot and Spectacled Hare-Wallaby at the appropriate time.

OTHER RECOMMENDATIONS

1. A number of the islands need to be surveyed to ensure rat tracks identified belong to *Rattus Rattus* and not *Rattus tunneyi* eg North West, Primrose, Crocus, Ah Chong.

2. Pre-baiting *Rattus rattus* densities need to be established on selected islands.

3. Pre-baiting Hydromys chrysogaster, Bar-shouldered Dove and raptor densities need to be established on selected islands.

4. WA Health Department needs to be contacted to request approval for the use of Pindone for rat control.

5. Hadson Energy, operator of the Varanus Island oilfield should be contacted to seek their assistance with helicopter flying time and transport of volunteers.

TABLE 1

SUMMARY OF THE SUSCEPTIBILITY OF MONTE BELLO FAUNA CONSIDERED TO BE AT RISK FROM A POISONING PROGRAMME

Status	Animals at risk to direct oat ingestion	Susceptibility to Pindone (0.17mg/oat)	1080 LD50 (mg/kg)	Assumed modal body weight (gm)	1080 individual to achieve LD50	1080 cat consumption for LD50 (0.15mg 1080/oat)
R	*Rattus rattus*	High	1.1 *	250	0.275	2
Re	*Isodon auratus*	High	8.9	250	2.2	14.7
Re	*Lagorchestes conspiculatus*	Very High	5	3000	15	100
R	Bar-shouldered Dove	Presumed High	16.3	100	1.6	10.7
I	Zebra Finch	Presumed High	3	10	0.03	<1
I	Little Button Quail	Presumed High				
R	Richards Pipit	Presumed High				
Status	**Animals at risk from 2° poisoning**	**Susceptibility to Pindone (0.17mg/oat)**	**1080 LD50 (mg/kg)**	**Assumed model body weight (gm)**	**1080 individual to achieve LD50**	**No. of carcasses eaten to achieve LD50 (assuming 1.5mg 1080/ carcass)**
I	Little Crow		13.4	200	2.6	1.8
R	Spotted Harrier					
R	Brahminy Kite	Juveniles killed through 2° poisoning on Middle Island.				
R	White Breasted Sea Eagle	No observed mortality on Middle Island.				
R	Osprey	No observed mortality on Middle Island.				
I	Whistling Kite					
R	Kestrel	Low risk				
I	Black Breasted Buzzard					
R	*Varanus gouldii*	Presumed Low	43.6	300	14.5	9.7
R	*Hydromys chrysogaster*		3	500	1.5	1
R	*Felis catus*		0.4	3000	1.2	<1
R	*Liasis childreni*	Presumed Low	Probably High			

R = Resident
Re = Re-introduced
I = Irregular Visitors
* = One animal from Middle Island survived 2mg/kg dose