

THE DEVELOPMENT OF A MANUFACTURED, CANINE-SPECIFIC BAIT SUBSTRATE¹

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SUMMARY

As part of a larger project aimed at developing a manufactured canine-specific bait, containing an enteric-coated 1080 tablet, 17 field trials comprising 17 949 bait nights were conducted to test and produce a bait carrier. This paper summarises the development of the unpoisoned bait-substrate formulation to its present commercial stage.

Attractiveness (the baits' ability to attract canines to the bait station) and palatability (whether or not the animal investigating the bait consumed it) were determined from spoor left at bait stations.

Results suggest that the unpoisoned commercial substrate is equally attractive and palatable to canines, when compared with fresh meat baits, yet reduces non-target bait removal by 49-71%.

INTRODUCTION

Korn and Livanos (1986) and Kramer et al (1987) have shown that current 1080 application techniques can produce ranges of 1.2 - 13.2 mg 1080/bait from an intended dose level of 6.0mg/bait. Kramer et al (1987), McIlroy et al (1988), and others have found that a significant fraction of 1080 added during preparation is lost due to physical leakage, biochemical reaction, microbial defluorination, rainfall and maggots.

Encapsulating the 1080 toxin in a discrete tablet can overcome these problems and ensure a consistent dose within 0.5mg of the nominated level. To carry the tablet in a form which is palatable to the target animals a suitable substrate is required and this project arose from that need. The development of an enteric-coated 1080 tablet is discussed by Parker and Allen elsewhere in the proceedings.

Best et al (1974), Rathore (1985), McIlroy et al (1986) and Allen et al (1989) have reported birds to be significant scavengers of meat baits intended for wild dogs, dingoes and foxes. By having a central core of poison (ie the 1080 tablet) in an unpoisoned bait-substrate, animal species, such as birds, which are incapable of swallowing a whole bait are unlikely to consume the tablet core. Furthermore with a combination of bait colour, bait composition and attractants the bait-substrate itself can be refined to be more attractive to canines and less attractive to non-target species.

At present, bait preparation (involving butchering, transport and 1080 impregnation) and the placement of meat baits in strategic locations using both aerial and ground delivery systems, can be a slow, messy and expensive operation (Thompson and Fleming in press). A clean, quick to use and effective manufactured bait should provide an attractive, economical alternative in these situations.

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METHODOLOGY

Seventeen field trials at 9 locations and comprising 17 949 bait nights were conducted in southern and central Queensland during the development of the manufactured bait-substrate. During these trials 17 bait-substrates (see Table 1) were screened. The unpoisoned bait-substrates were compared with a 125g fresh meat bait and a control plot. One of two control treatments (either a blank plot or an inert cork block) was present in all trials.

TABLE 1. Treatments used in field trials including 17 bait-substrates listed in order of development, 2 control treatments and the fresh meat standard.

No.	Treatment	No.	Treatment
1.	Dehydrated Meat	11.	Commercial Sausage
2.	Sausage	12.	11 (above) + Lure 1
3.	2 (above) + Tuna Lure	13.	11 (above) + Lure 2
4.	2 (above) + LDC Lure	14.	11 (above) + Colour
5.	2 (above) + EC103	15.	11 (above) + Lure 3
6.	2 (above) + EC104	16.	13 (above) + Lure 3
7.	WA Factory Bait	17.	13 (above) + Lure 3 + Coating
8.	7 (above) + Tuna Lure	18.	Control (Blank)
9.	Jerky	19.	Control (Cork)
10.	9 (above) + Tuna Lure	20.	125g Fresh Meat

Each bait station consisted of a single bait placed on a 1m² raked area of sand located 1-3 m to the side of forest tracks. Bait stations were placed 300m apart and treatment order was randomised every 10 replications. Up to 50 replications of each treatment were assessed every 24 hours for four consecutive days. The species removing or visiting baits were identified from spoor left on the freshly raked surface of each bait station.

Relative attractiveness of the substrates was assessed by comparing the number of test baits removed by dingoes and wild dogs, foxes and non-target species compared to the meat bait standard. Palatability was determined from the incidence of animals visiting bait-substrates yet refraining from eating them.

RESULTS

Dehydrated meat

Fifty gram pieces of kangaroo meat were dried for four days at 50 degrees celsius and tested in four trials between November 1987 and May 1988 involving 674 bait nights per treatment. While this bait-substrate proved almost identical to fresh meat in terms of attractiveness and palatability to dingoes it was superseded by a mince sausage and jerky.

Jerky

Small, square pieces of minced kangaroo meat cured after the addition of salt, dextrose and potassium nitrate were tested in three trials in 1988 for 600 bait nights. As with dehydrated meat palatability and attractiveness to target species was essentially the same, however the bait form was discontinued in preference to the "sausage" format.

Standard sausage

This bait form has undergone a number of modifications and has been extensively tested in 13 trials and over 4 000 bait nights. After consulting with smallgoods manufacturers, a salami formulation was used incorporating salt, dextrose, potassium nitrate and GDL (Glucona Delta Lactose) into kangaroo mince and extruded in 22 or 30mm collagen casings. Field trials suggested the bait to be as attractive and palatable as fresh meat, and showed that there were non-target advantages in this bait form.

Attractants

In two trials in 1988 two lures identified by Mitchell (1988) (LDC and Tuna lure) and two lures obtained from a commercial supplier (EC103 and EC104) were incorporated into sausage and jerky substrates. The addition of lures LDC, EC103 and EC104 failed to produce a significant increase in the attractiveness or palatability of either bait. Tuna lure tested in five trials and over 2 500 bait nights showed potential to increase attractiveness ie increase the number of dingoes and foxes visiting baits. However a corresponding loss in palatability suggested no net gain resulted from the use of this lure.

Commercial sausage

In November 1989 the first commercial replica of the standard sausage was tested. To facilitate the eventual insertion of the 1080 tablet, which was being developed concurrently, the manufacturer reformulated the sausage dispensing with the collagen casing. Two flavours used in commercial pet foods were incorporated into test sausages and field-trialed along with the addition of a recognised canine "call lure". Seven field trials involving 4 500 bait nights for these commercial prototypes have concluded with the selection of a bait that wild canids find equally attractive and palatable as fresh meat (see table 2). Of equal importance has been the 49-71% reduction in the removal of sausage baits by non-target animals when compared with fresh meat baits.

Fresh Meat

Fresh 125 g pieces of kangaroo meat were tested over 2 975 bait nights in nine locations. Fresh meat baits were either removed by dingoes/wild dogs (10.9 ± 5.9 per 100 bait nights), foxes (1.3 ± 2.6 per 100 bait nights), birds (26.1 ± 15.0 per 100 bait nights), goannas (6.7 ± 8.9 per 100 bait nights), other species (3.2 ± 2.6 per 100 bait nights) and unknowns (9.7 ± 10.3 per 100 bait nights) or not taken (41.7 ± 12.4 per 100 bait nights). The attractiveness and palatability of fresh meat to non-target species continues to be a concern.

TABLE 2. Results of three field trials (between August 1990 and November 1990) where unpoisoned fresh meat was compared to 3 prototype commercial baits (11, 15 and 16 in Table 1) and a control site (19 in Table 1) in terms of target canine and non-target bait removal.

Bait Type	<u>Results</u>				Total bait
	Bait removed by dingo wild dog	Bait visited by dingo wild dog	Bait removed by non-target nights	Bait removed by unknown	
Meat	37	3	208	82	589
Commercial sausage	23	4	107	80	589
Commercial sausage + lure	46	13	63	51	589
Commercial sausage + lure + flavouring	43	13	60	49	589
Control	0	17	8	1	589

DISCUSSION AND CONCLUSIONS

The most suitable substrates for a manufactured bait were found to be the commercially produced sausages with lures and flavourings added. No difference was found in the attractiveness and palatability of commercial sausage plus lure and commercial sausage plus lure and flavouring. From a commercial point of view it would be more cost-efficient to make the bait from the least costly components. On that basis the commercial sausage plus lure is the substrate which has been selected for efficacy testing. Field

trials, which will compare the efficacy of the new bait plus 1080 tablets with that of the presently used fresh meat bait, will be completed in the near future. If the final efficacy trials show the new manufactured bait to be successful then commercial release will be possible.

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