

The Rabies Reporter

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RABIES IN THE FIRST QUARTER OF 2000

The arctic fox variant of rabies was increased in volume, but perhaps decreased in area in the first quarter of 2000, as compared with a year earlier. There is raccoon rabies in eastern Ontario which we did not have at all a year ago.

Actually, if you compare the maps for the first quarters of 2000 and 1999, the distribution of fox strain rabies is very similar. In both periods, the majority of cases were in Grey and Bruce Counties. Now we have to wait. Last year the outbreak was most severe in the four counties south of Grey and Bruce, later in the year. It would be nice to think that skunk numbers suffered enough that Waterloo, Wellington and Dufferin will not see another rabies outbreak this year. However, we really have no idea whether this might be true. There is no-one out there with a clipboard counting skunks. Even if there were, we do not know how many skunks it takes to sustain a rabies outbreak. Will the exceptional amounts of rain affect skunk numbers? Again, we just do not know.

There have been several more rabid foxes in the second quarter around the settlement at Fort Severn on the Hudson Bay coast. At the moment we have no plans to follow up that situation with baits, largely because of the huge area which would require coverage.

The raccoon rabies situation in eastern Ontario developed slowly in the first part of 2000. The last two new cases on Wolfe Island were found on 18 January. There have been no cases on the island since that date, to the end of June. On the mainland, there have now been 30 cases. Since many of these occurred in the second quarter, they will be examined in the next issue. The comforting news is that despite the increasing number of cases, the outbreak seems to be contained within the area treated in 1999.

*Charlie MacInnes
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LINHART SACHET BAITS: SETTING THE RECORD STRAIGHT

The following came from Dr. Sam Linhart, inventor of the coated sachet bait:

I just received and read the latest issue of your Rabies Reporter. I always find it very informative, and it enables me to keep up to date on recent activities and results of the various ORV programs.

I am curious, however, about the origin of the comment in the middle column on page 12 to the effect that, "Captive coyotes tended to gulp the (sachet) bait and investigators could not tell whether the sachet was punctured in the mouth, or further down the digestive tract." I'd certainly like to know who volunteered the above

information and how they concluded that there was an apparent problem.

As you may recall, we conducted a series of trials, using both captive and free-ranging coyotes in 1997 and 1998. The work with captive animals was done at a NWRC field station in Logan, Utah. The results were reported on twice: once at the IXth Rabies in the Americas meeting in 1998, and again at the WDA meeting in 1999. Summaries of this work appeared in the abstracts of both meetings. In brief, we observed 30 test animals over a 3-day period. Each animal was offered 3 different size sachet baits (n = 90) filled with vaccine

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The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Rabies Research Unit of the Ontario Ministry of Natural Resources; the Food Production and Inspection Branch of the Canadian Food Inspection Agency; the Ontario Ministry of Health; and the Geographic Information Systems Laboratory of the Department of Geography at Queens University, Kingston. Articles for future issues will be welcomed by the editor. The Rabies Reporter is not refereed, and should not be cited in papers intended for refereed journals. Send contributions, letters and inquiries to:

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media and coated with menhaden fish oil and wax. Twenty-nine of the 30 coyotes responded to the 90 sachet baits offered to them. Of the 87 sachets disturbed by coyotes, 84 (97%) were ingested. We observed no indication of bolting the baits, nor did the sachet size seem to affect the results. We collected feces from the cage floors of most of the coyotes and examined them. We recovered 50 sachets, 47 from coyote feces and three more that had been chewed but not swallowed. The sachets found in the feces were washed and carefully examined. We found all 50 sachets had been ruptured and emptied, and were either torn or had tooth punctures caused by coyotes chewing or biting the sachets during ingestion. The appearance of these sachets was remarkably similar to the hundreds of sachets we have recovered after free-ranging, wild raccoons had ingested, chewed, emptied, and discarded sachets near tracking stations. Unless coyotes have developed a second set of teeth hidden away somewhere in their intestines, we think it appropriate to conclude that these vaccine media-filled sachet baits could have effectively delivered V-RG vaccine to the oral cavity of this species.

Following two field tests in south Texas to determine coyote bait flavor preferences, you will recall that the Texas Department of Health with the assistance of your unit and others, distributed some 68,000 sachet baits containing V-RG on a 950 square

mile test area in January, 1998. A subsequent sample of coyotes from this area showed that over 90% were seropositive. These exceptional results, I think, go beyond the statement in your newsletter to the effect that "Field tests in Texas indicated reasonable acceptance and seroconversion." The Texas ORV sachet bait field data indicated that free-ranging coyotes did not gulp sachet baits, nor did they pass sachet baits intact through the GI tract. I have enclosed abstracts describing the above tests as well as our detailed report on the captive coyote test we sent to the NWRC.

I felt I should write to you because the newsletter implies that there are some serious questions regarding efficacy of the sachet bait for vaccinating coyotes. You have raised questions that I believe we satisfactorily resolved two years ago. I would be most appreciative if you would include this letter in your next issue of the Rabies Reporter to correct possible misunderstandings with regard to the sachet bait for coyotes. My comments, of course, are not intended to imply that further field evaluation of this bait would not be useful. I'm sure further comparative field trials would provide much needed information regarding the future role of the sachet bait for various vector species.

I am also very interested in the results of your field test to determine the extent of bait drift when the

different bait types (OS, FP, and LS) were dropped from the fixed wing Twin Otter aircraft. While there is little doubt that lighter baits will drift further, I wish you had tested the *coated* LS bait, not the uncoated sachet. When coated with waxes and attractant, the coated sachets weigh over 40 percent more than the untreated product. The uncoated sachet, of course, would never be used in the field as a bait, thus your data are not representative of the coated product. An additional wax dip, or dipping in a more viscous wax (i.e., lower temperature) would result in an even heavier bait, presumably with less drift.

One final suggestion. To date, no one has calculated the lowered cost of using the sachet bait. In addition to their lower cost, many more sachet baits can be accommodated in the Twin Otter aircraft, or alternately, in smaller and less expensive aircraft because the sachet bait is 6-7 times smaller and lighter than the fishmeal polymer bait. The extent to which a given bait drifts from the aircraft is only one of several factors to consider when selecting a bait type for aerial distribution.

Keep up the good work with your informative newsletter.

*Samuel B Linhart
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PERSPECTIVES ON THE SACHET BAIT

First, I owe Sam an apology. I did not take a lot of notes in San Diego, as I was too interested in listening to his very compressed review. When I tried to reconstruct the main points from memory, clearly I got it wrong. There was certainly no intent to cast any doubt on the sachet bait.

Sam raises several interesting points about future use of sachet baits. I would like to comment on some of these. First, with respect to the drift experiment. I would have liked to use coated sachets, but the cost was high and the availability questionable. I do not think this made much difference, anyway. Even

though the coated sachets would have been 40 % heavier than what we used, they still would have been one third or less the weight of the OS baits, and, as Sam himself notes, 6-7 times lighter than the FP baits. Therefore, the drift compared to the other two baits we studied would still be greater. The amount of difference

between drift of coated and uncoated sachets would likely be much less than the differences compared to the other two bait types. However, we have not done the test, so this is only a personal opinion.

Drift is not necessarily a bad thing, and when I presented the results in Maryland, I was very careful not to add my opinion. There has been a great deal of emphasis on keeping baits out of sight, especially of children, for safety reasons. I think it is time to rethink priorities on this subject. While I certainly do not want any human contact with the vaccine, I think, given the large number of baits which have been dropped, that we have a better sense of the very low probability of an unfortunate incident. What I said about drift in Maryland was that we will have to learn to accept it. As I will indicate below, we could use drift to great advantage, provided we are willing to accept some baits dropping in conspicuous places.

Sam makes a good point about calculating the lower cost of using the sachet bait. First of all, the bait itself is 30% cheaper than the fish-meal polymer (FP) bait. Then, however, the picture becomes complex, because several variables come into play together. During the first five years of large-scale bait drops in Ontario, we did a lot of thinking about how to make the most efficient use of the aircraft. When the Texas operation began, and we were using a heavier, bulkier bait, we had to rethink these logistics. And the more we flew dropping baits, the more our thinking was tempered by the school of hard knocks. Then, in 1999, Ontario changed to the Ontario Slim bait (OS), which is lighter and more compact than what we were using.

The longer the flight, the sicker the crew loading baits is likely to become. Actually, there are at least four factors which must be combined to make an efficient crew. The length of flight is important, but so is

the workload. The faster the baits go out, the more the crews have to concentrate on keeping the belt loaded. That is tiring, and leaves no time to look out the window at the horizon, an important factor in avoiding airsickness. People who have flown at least twice in the previous two days are much less likely to become airsick. The length of the flight is still important; we found in Ontario that even experienced crews cannot drop baits for four hours straight. Loading crews must not fly on back-to-back flights.

In Ontario, we determined that 2.75 hour flights are ideal in September, to make the best use of the 9 hours of daylight available, but these require experienced crews. If shorter flights are used, the aircraft will not be carrying as many baits as it is rated to lift. There is an additional inefficiency resulting from short flights. Each flight requires some ferrying to get to the start of the first line, and home from the last. Shorter flights necessarily involve a higher proportion of ferry time.

Flight line spacing is a crucial variable in this equation. The farther apart flight lines are spaced, the more baits you will put out per hour of flight. We like to think that flight spacing is determined by the average home range of the target animal species. In practice, we know so little about home range and movements during the crucial week or two after baits are dropped, that most flight line spacing is determined by senior project staff. Two presentations in the past year have suggested, on empirical grounds, that closer flight lines should result in pickup by a higher percentage of the target animals. However, an experiment in Ontario in 1995 showed no difference in acceptance of baits by raccoons, when flight lines were spaced 0.5, 1.0 and 2.0 km apart. Such experiments have to cover large areas to show differences. Managers are reluctant to risk failure of vaccination due to such an

experiment. In the past, the ability to put lines further apart has been limited by our inability to push the bait machine beyond about 6 baits per second, coupled with the fact that crews could not load the machine that fast on longer flights. The Linhart Sachet bait offers a way around that limitation, as does, to a lesser extent, the OS bait.

The bait machine designed by the late Derek Mancini picks up one bait at a time from the conveyor. Therefore, we have come to be accustomed to very precise metering of baits. When each raccoon bait is worth over \$2.00CDN, that is a comforting feature. The machine cannot be adapted to dispense LS baits with that precision. What we do presently is to remove the rotating drum, and put a measured volume of baits between pairs of marks on the belt. We are going to try putting side-walls along the belt so that all the loading crew have to do is fill up to the level of the tops of the walls. This will give a consistent volume per unit of belt length. By making different height walls, we could change bait rates quite easily. This arrangement would allow the LS baits to be loaded loose in tubs. It should reduce crew fatigue compared to the tubs and trays used for FP and OS baits. One tub should hold about 5,500 baits. That compares with 1726/tub for the OS bait, and 960/tub for the square FP bait. A full load for a Twin Otter is a maximum of 33 tubs.

A 3-hour flight covers about 750 km. If flight lines were spaced at 2 km, and the bait density were 75/km² then the flight would require 20 tubs of LS baits, but an impossible 65 of OS baits. Imagine putting out 112,500 baits in a single 3-hour flight! Can a loading crew move that many baits in 3 hours and stay fit?

In order to do this, the program director would have to accept that lines 2 km apart are not too widely spaced to get baits to raccoons. One could modify this situation by using

drift of baits as a positive force. If the aircraft flew higher than the normal 500 feet, then drift would spread the baits into a belt. This would have two obvious drawbacks. First, the navigator would have less control over where the baits would fall, so one might predict higher rates of human contact with baits. That will, in turn, vary with land-use patterns. In the brush country of south Texas, where humans are few and far between, the increase would be small. However, in outer suburbs of large cities, where a lot of housing is spread across the landscape, human contact would be greater. This sort of landscape is particularly difficult for ORV. Suburban 10 to 30 acre lots contain some of the best fox and raccoon habitat, but houses, golf courses and other areas where humans will find baits easily are spread all over it. So there is pressure to get the baits to raccoons, but counter pressure not to give even coverage, if avoiding human contact is a priority. Which is the priority, getting baits to target animals, or reducing human contact?

The second problem with dropping baits from greater heights is that wind, especially cross winds, will change the extent to which the baits spread out. Therefore, spread might be very different from flight to flight. Is that a bad idea? It certainly differs from the current model of achieving uniform coverage in all types of flying weather.

Another approach, as Sam mentions, is to use a smaller aircraft, which would be cheaper to fly. The major problem with that is that it will require a completely new bait machine. It would be nice to have a big hopper instead of the current belt. My background is biology, not packaging engineering, so I find it hard to predict whether the current long, narrow and thin LS bait shape will be easy or difficult to meter smoothly and predictably out of a hopper of some sort.

Ontario is currently planning an improved control and data logging system to drive the current bait machine. We hope to make this suitable to drive almost any machine designed to dispense baits. However, there is still the actual dispenser to design and build. Who should take responsibility for that? My irreverent streak says "he who designs new bait should also make machine to throw it"! Over to you, Sam. Seriously, this will be a complex project.

This article contains new ideas not all of which will be acceptable to everyone involved in ORV. However, it is time to discuss seriously how to speed up, and make cheaper, the process of bait distribution. Sam Linhart has made a large first step forward by inventing the coated sachet bait. If we can all get together to set priorities on these ideas, it will help direct the design of new machines and tactics for their use.

Charlie MacInnes
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CAPSULE UPDATE ON RACCOON RABIES IN EASTERN ONTARIO

There have been 36 rabid raccoons confirmed since the first case on 14 July 1999. Roughly half of these cases were found by trappers working for the Rabies Research Unit including 9 cases identified from raccoons taken during population reduction trapping. The maximum spread is less than 35 km, indicating that the efforts by Rick Rosatte and staff have slowed the spread of the outbreak. There were two cases near Merrickville, which required an additional population reduction program.

Details of all operations will be given in the next issue. On 26-28 June, 297,000 baits were dropped to make a strip 30 km wide along the St. Lawrence from Napanee to Ingleside. The St. Lawrence TVR was also extended eastward, and there will be hand baiting in Kingston and Brockville.

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NEW SOFTWARE CHANGES FOR THE RABIES REPORTER

I hate changing software, but this time I was driven to it. First, AmiPro crashed, so I changed to WordPerfect. That looked nice until I tried to fit more than one graphic box per page. The last issue took at least a day longer because the maps and photos would mysteriously jump from one page to the next. After I had spent the day fixing it, I e-mailed it to Bev Stevenson, it still jumped, and Bev had to reformat the whole issue. So, this issue, starting the RR's second decade, was done in Microsoft Publisher. It will be some time before I master this new format, but I hope the present issue is more readable than the last few.

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Animal Rabies Report: January to March 2000

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals	
County or Region	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative			
		00	99		00	99		00	99		00	99		00	99		00	99		00	99		00	99	00	99
Northern																										
Muskoka																							0	0	0	
Parry Sound																							0	0	0	
Nipissing																							0	0	0	
Sudbury																							0	0	0	
Cochrane	1	1																					1	1	0	
Timiskaming																							0	0	0	
Algoma																							0	0	0	
Thunder Bay																							0	0	0	
Rainy River																							0	0	0	
Kenora																							0	0	0	
Regional Totals																										
Eastern				16	16								1	1	1								17	17	1	
Central																							0	0	0	
Western	1	1				15	15	5										3	3	7	19	19	12	12	12	
Southern																							0	0	0	
Northern	1	1																					1	1	0	
TOTALS	2	2	0	16	16	0	15	15	5	0	0	0	1	1	1	0	0	0	0	0	0	3	3	7	37	

Notes for this quarter:





