The effects of emetics on wild birds

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Introduction

In the past several years, there have been numerous papers published in the ornithological literature dealing with the food and feeding habits of birds. One of the major difficulties in these types of studies is the lack of a practical technique to acquire detailed data on the diet of a species. Very often the data on food preference is gathered by intermittent field observation of a few individuals, a technique which can lead to broad and inaccurate generalizations about the type and quantity of the food resources utilized by the birds. The sacrifice of large numbers of birds would yield some information (see Beal, 1914) but this method is neither practical nor acceptable to most workers today.

A relatively new technique for obtaining food samples is the application of emetics to induce regurgitation. Since the same individual can be recaptured and yield a food sample several times, data obtained by this technique would be more representative of the bird's actual diet.

There have been a number of studies of the use of emetics on various species of birds. Examples are listed in Table 1.

Table 1. Recent Emetic Studies

Author	Species	Emetic(s)
Chaney and Kare (1966)	Columa livia	copper sulfate
	Gallus domesticus	apomorphine
	Molothrus ater	hydergine
		lanatoside C.
Kadochnikov (1967)	Corvus frugilegus	tartar emetic
	Sturnus vulgaris	
Moody (1970)	Hirundo rustica	saline
	Petrochelidon pyrrhonota	
Radke and Frydendall (1974)	Passer domesticus	copper sulfate
		apomorphine
		ipecac
		digitalis
Tomback (1975)	Cyanocitta stelleri	tartar emetic
	various Fringillidae	
Herrera (1976)	various insectivorous	
	and granivorous species	tartar emetic
Zach and Falls (1976)	Seiurus aurocapillus	tartar emetic

The results of these studies indicate that emetic techniques should be applied with caution for the following reasons: some species are more sensitive to certain chemicals and show a higher mortality rate; stomach or crop contents may not be totally regurgitated; some food items are digested very rapidly and are not regurgitated in a recognizable form; some emetics may accumulate in the birds' tissues and/or produce serious side effects. Zach and Falls (1976) suggest that shooting birds and dissecting out their stomachs is preferable to the use of emetic.

We feel, however, in spite of the mixed results, that the use of some sort of emetic could be refined so that it yields valid data and has a minimum impact on the birds. This paper reports a study of the effect of emetics on *Passer domesticus* in the field.

Methods

We erected a series of mist nets in a rural area near Hamilton City, CA, by some cattle pens. We captured and studied House Sparrows *(Passer domesticus)* and White-crowned Sparrows *(Zonotrichia leucophrys)*. Birds were taken into the laboratory and fed a commercial mixture of seeds. Tartar emetic, tincture of digitalis, and crystalline digitalis were all tested for their effectiveness as emetics and their effects on the birds. These compounds were prepared as reported in Radke and Frydendall (1974).

The drugs were administered orally with the use of a 1.0 cc syringe with plastic tubing over the needle. Four concentrations of each solution were tested at 3 dosages for a total of 36 different combinations. Birds that exhibited no side effects (other than regurgitation) for a week after being dosed were dosed again. No bird was treated with an emetic more than twice.

After the laboratory studies were completed, the most promising compound and dosage were tested on wild birds. Over two hundred House Sparrows were mist-netted and banded with numbered bands. One hundred and six of these birds, chosen at random, were administered the emetic. One hundred and forty-eight were banded but never

treated. Each time a banded bird was recaptured, it was immediately released; recaptured experimental birds were allowed to recover and then released.

Mist nets were set only once a week to prevent the birds from being conditioned to avoid the nets. Additionally, experimental birds were treated a maximum of once weekly. We mist-netted for eleven days over a period of 3 months in the late spring and early summer.

Results

Of the 36 combinations of drug concentrations and dosages, the most promising was a .5% solution of tartar emetic (antimony potassium tartrate) administered in a .5 cc dose. At this concentration, all birds tested (10) regurgitated and 20% (2) died. Other combinations either produced no regurgitation or resulted in high mortality. The average time between administration of the drug and regurgitation was 3.6 min.

There seemed to be no difference in the effects between the two species of birds tested although the White-crowned Sparrow sample sizes were too small to be tested statistically.

The results of the field study are reported in Table 2.

Table 2. Results of Field Study

		Control Group	Experimental Group
Number banded		148	106
Number recaptured	1X	49	42
	2X	37	38
	3X	27	22
	4X	20	4
	5X	8	0
	6X	6	0
	7X	1	0

There is a significant difference ($p < .005$) between the number of control and experimental birds recaptured according to Chi-square analysis.

Discussion

The results of this study indicate that the recapture rate for birds treated with an emetic and released in an apparently healthy state is less than that for birds released without treatment. Since both the control and experimental birds were treated similarly, either the procedure for applying the emetic or the emetic itself had an effect on recapture rates. There are 3 possible explanations for a lower recapture rate for treated birds: 1) they left the area, 2) they learned to avoid the nets because of the trauma caused by treatment, or 3) their mortality was higher. We found 4 dead banded birds, all of which belonged to the treated groups. This indicates to us that the emetic affected the survival rate which decreased the recapture rate. Zach and Falls (1976) indicate that tartar emetic may have a cumulative effect.

Herrera (1976) studied the effects of tartar emetic on the recapture rate of 2 species of granivorous and 5 species of insectivorous birds and concluded that the use of an emetic lowers recapture rates of insectivorous birds but not of granivorous birds. We believe the discrepancy between Herrera's and our study is due to the fact that Herrera based his results on birds that "provided at least one recapture." One or two recaptures, especially if over a short period of time, may not indicate the long-term effects of the emetic. Analyzing our results on the basis of 2 recaptures, there is no significant difference between the experimental and control group birds. Prys-Jones et. al. (1974) found no significant difference in recapture rates of treated and untreated House Sparrows, although the percent of recapture of emetic birds was lower. Again, sample size may make the difference.

Our data, along with several previous studies, suggest that emetics are difficult to use safely because each type of emetic at various dosages and concentrations affect different species of birds unpredictably. Additionally, the food samples collected from the vomitus may not be representative of the birds' diet.

However, the importance of determining the food habits of birds is great enough to justify further investigation so that a safe and effective application of emetics is found. Perhaps bird banders could gather data on the long range effects of emetics as well as food information by treating captured birds and reporting the data to the U.S. Fish and Wildlife Service. Banded birds are given Codes for Additional Information (North American Bird Banding Manual, 1976) such as "blood sample taken", "throat culture taken" and "treated with testosterone." A code for "emetic applied" could be initiated. But considerably more research in the laboratory and field must be done before the use of emetics becomes a common practice.

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An interesting winter with Evening Grosbeaks

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This past winter in Whiting, NJ, proved to be my most interesting winter yet with Evening Grosbeaks. The first birds arrived on 12 December 1976 and, as usual, were looking for their favorite food, sunflower seeds. From that date until 12 April 1977, I banded a total of 1,192 Evening Grosbeaks.

As all banders who have banded grosbeaks know, there is a problem with the birds removing the bands. I did not realize the extent of the problem until I started working with black dye. There were several cases in which I placed a band on a marked bird, only to have the band removed again. After noticing the bands which were being removed most often were the latest bands issued by the BBL, I decided to use two hundred older bands that I had left. Surprisingly, the older bands seemed to hold on better. I contacted the BBL supply clerk regarding my discovery in the hope of acquiring more of the older bands. The only older bands in stock were the pre-opened kind which I then ordered. Immediately upon receipt of these bands I began using them. In only a short time, the rate of removal began dropping off sharply.

The older bands seem to have a slightly greater metal content then the latest issue. One can feel the difference when opening and closing the bands. I am of the opinion that the only way to stop Evening Grosbeaks from removing them is to incorporate a harder alloy into the bands when manufactured.

Another interesting fact I would like to note is, that of the thirteen grosbeaks I trapped with foreign bands, five of the thirteen had bands which were spread apart and just about holding on. Some of these birds had been banded for several years. They apparently don't give up easily in their attempt to remove the bands.

The accompanying charts show the birds banded and the foreign birds trapped.

Birds banded	
December	141
January	643
February	198
March	198
April	12
Total	1192

Sex data	
Females	755
Males	437

Date Banded	Date Trapped	Banded by and Location
12-24-75	01-13-77	Dr. N.R. Whitney, Savoy, SD
11-08-74	01-12-77	H.R. Hanson, Walker, MN
02-15-70	01-28-77	Dr. M.A. Byrd, Yorktown, VA
03-18-76	03-21-77	Dr. M.A. Bydr, Yorktown, VA
12-24-76	02-10-77	Mr. & Mrs. G. Loery, Litchfield, CT
01-15-76	03-04-77	Mr. & Mrs. G. Loery, Litchfield, CT
01-31-76	01-30-77	Ken Hodgdon, Cumberland, MD
03-28-74	01-28-77	Mrs. E.B. McGregor, Forest, NY
04-12-74	01-27-77	Mrs. R.W. Patterson, Trenton, ME
01-04-73	01-05-77	E.C. Clyde, Jr., Effingham, SC
02-23-75	01-01-77	Mrs. G.C. Metcalf, Plainfield, VT
03-01-76	12-31-76	Raccoon-Ridge Bird Obs., Bevans, NJ
01-22-77	04-11-77	H.R. Spendlow, Marlton, NJ

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