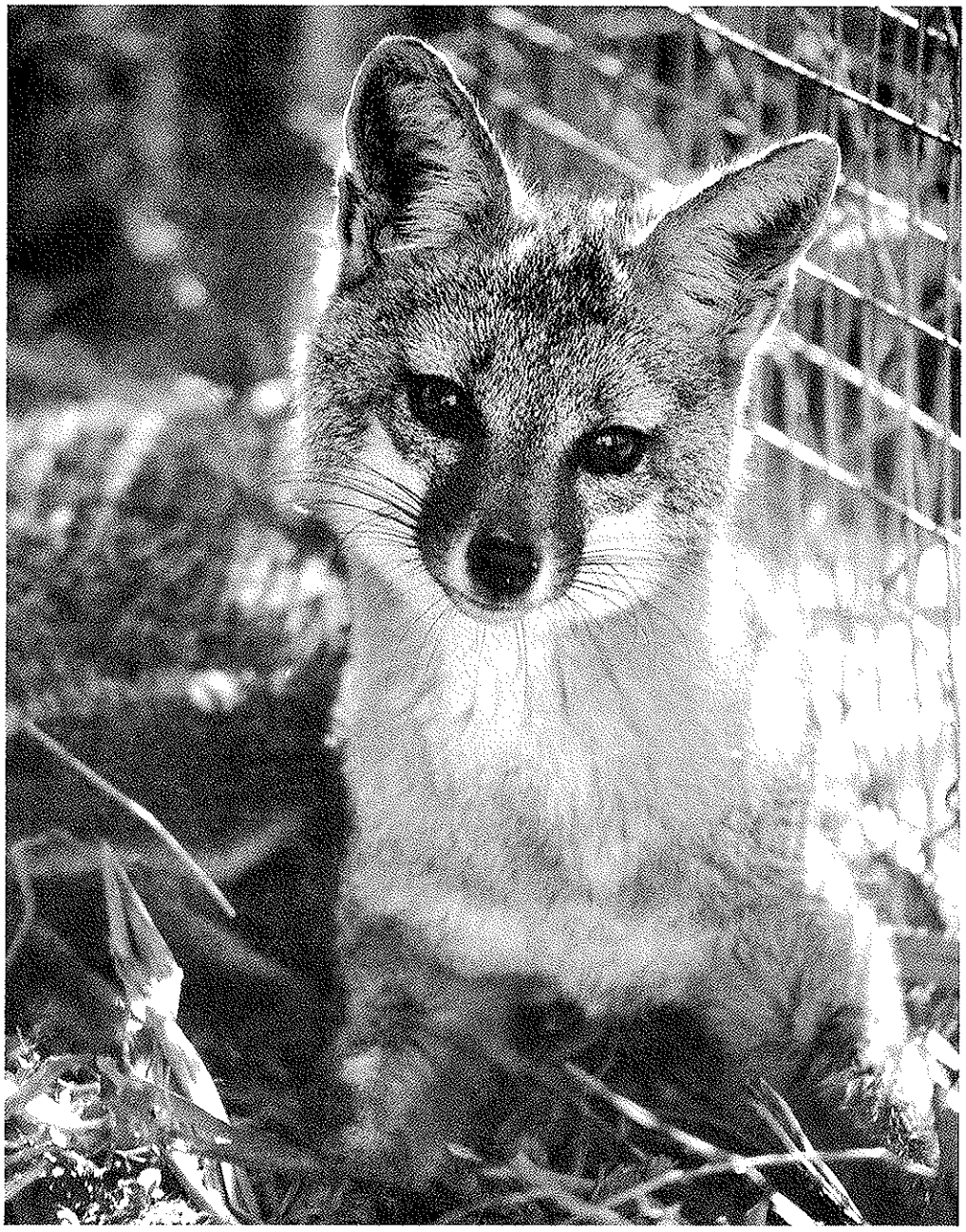
Vol. 20, No. 2

# JOURNAL of Wildlife Rehabilitation

*A Publication of the International Wildlife Rehabilitation Council*



**Distemper Vaccinations in Gray Foxes . . . . . p. 3**

## Guidelines for Authors

The *Journal of Wildlife Rehabilitation* is designed to provide useful information to wildlife rehabilitators and others involved in the care and treatment of native wild species with the purpose of returning them to the wild. All feature articles are subject to a review process, and our staff and reviewers work with authors to produce the most accurate information possible in our ever-changing field.

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1. An original and three copies of the manuscript should be submitted to the Editor, IWRC, 4437 Central Place, Ste. B-4, Suisun, California 94585, USA. The manuscript should include references, photo legends, and footnotes, and should be typewritten, double-spaced, if possible. The author's name, address, and phone number should be placed on at least the first page of the article so it can be readily identified and the author contacted. Please note that each article should be accompanied by an abstract and a set of key words. If tradenames are used for products mentioned the author must indicate whether the product is ™ or ®. A product table at the end of the article should give readers the name and address of the companies involved and generic name or category of product. If space allows, we like to include a one paragraph author profile.

2. The *Journal of Wildlife Rehabilitation* is prepared on a Macintosh personal computer with desktop publishing software. If papers are already on a personal computer disk, the submission cover letter should include that information, as well as what type of hardware and software systems were used. Obviously, being able to use the author's disk directly or translate it by machine to Macintosh format prevents input errors and speeds up the process. We are able to translate many IBM files provided that the software (including version) are written on the disk. Articles may also be emailed to the editor at: janwhite@ucdavis.edu

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4. A separate page should be submitted with a short synopsis of information on the background of the author. Included should be the name, address, rehabilitation organization, phone number of the author and a biographical paragraph. Where appropriate, please list any academic degrees, special training, or experience that is relevant to the article (i.e., physical therapy—RPT, etc.) Articles pertaining to areas of veterinary medicine that involve tasks or decisions requiring a licensed veterinarian (e.g., soft tissue or orthopedic surgery) require a veterinarian as either the author or a co-author.

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6. Acknowledgments are limited to people who have contributed to the article in a major way.

7. References should be noted in the text with the last name of the author and the year published (i.e., Leighton 1983) and listed at the end of the manuscript in alphabetical order in the following style:

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Spring 1997 Vol. 20, No. 2

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## Features

**Effects of Modified Live-Virus Canine Distemper Vaccines in Gray Foxes**
Scott E. Henke, Ph.D.
*Caesar Kleberg Wildlife Research Institute*
*Texas A & M University-Kingsville*
Kingsville, Texas . . . . . 3

**Information on Current Vaccine Use in Rehabilitation**

Compiled by Jan White, DVM . . . . . 8

**Case History: Bumblefoot in Four Oil-rehabilitated American Coots**
Ian Stone and Jan White, DMV
*Institute of Toxicology and Environmental Health*
*University of California*
Davis, California . . . . . 9

**Simple Things That Make A Difference: Squirrel Caging**
Raine Carson
*Highlands Wildlife Rehabilitation Center, Inc.*
Milford, New Hampshire . . . . . 14

## Departments

Editorial. . . . . 2
*In Memoriam:* Nan Pipestem . . . . . 15
Book Review. . . . . 16
*"Because They Matter"*
*Conference News* . . . . . Outside Back Cover

**Cover Photo: Scott Henke**

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# Editor's Notes . . .

## On the road to Florida and Costa Rica

The spring was a busy one for me as I launched a new class on wildlife disease through my business, *Wildlife Publications*, gave a poster presentation at the International Oil Spill Conference in Fort Lauderdale, Florida and attended a week-long workshop on wildlife rehabilitation in San Jose, Costa Rica. For a while, it seemed like the old 'oil spill days' when I spent more time on the road than at home!

The bi-annual International Oil Spill Conference is a large-scale joint conference among the US Coast Guard, American Petroleum Institute, US Environmental Protection Agency, the International Maritime Organization and the International Petroleum Industry Environmental Conservation Association. With over 1,000 participants from around the world, this is a mammoth effort that has developed into a fine art. Conference topics this year included: training for spill response, planning, case studies, technology, research and development of products and methods for spill clean-up, spill management, environmental effects, risk issues and a symposium on the *Sea Empress* Oil Spill.

Wildlife rehabilitation plays only a minor role in the conference but over time, a presence has evolved in the exhibit hall. The "wildlife theater," usually situated in the exhibit hall, offers several panel discussions each day featuring wildlife rehabilitators discussing with industry employees topics of mutual concern. It serves as a good platform for those actively involved in this specialized area of wildlife care. Poster papers, including mine, were also on display in the exhibit area where a lot of the networking for the conference takes place. My poster entitled "*Earthquakes and Oil Spills: Lessons from the Santa Clara Spill*" was the first one I ever put together and was really fun and pretty informal. The paper sessions were focused by selected topic or symposia and were more formal. The proceedings for this conference is also mammoth and is available at registration. This takes a great deal of effort on the part of organizers because this document is just over 1000 pages of tightly packed papers and poster text. Most rehabilitators don't go to this conference because it is decidedly expensive ( $395) and does not offer papers oriented towards training wildlife rehabilitators. A conference that is more oriented to wildlife care is the *Effects of Oil on Wildlife* which is scheduled for November 3-6 in Monterey, CA. The registration to this conference is at least $200 with no price break offered to wildlife rehabilitators, however, students can attend for $75.00. If you are interested in getting registration information, contact Nancy Ottum at ndottum@ucdavis.edu or by phone (916) 752-3809. The next International Oil Spill Conference will be held in Seattle, WA in April of 1999.

My next trip was to Rockville, Maryland/Annandale, Virginia for a weekend of lecture class on wildlife diseases followed by a triangulated flight from Dulles, VA to San Jose, Costa Rica where I was invited to spend a week with wildlife rehabilitators, biologists and American personnel from the Humane Society of the United States (HSUS) and the Wildlife Center of Virginia. This was a genuinely enlightening experience for me as I had never been to Central America and had only a vague idea of the kinds of wildlife rehabilitation programs that had developed south of the border. The HSUS sponsored the workshop in association with the National University who set it up and ran it. They provided simultaneous translation for all participants which facilitated easy and accurate information exchange.

*Continued on page 17*

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J. Wildlife Rehab. 20(2):3-7
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# Effects of Modified Live-Virus Canine Distemper Vaccines in Gray Foxes[1]

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*ABSTRACT*

Thirty Gray Foxes (*Urocyon cineroargenteus*) were inoculated with a modified live-virus canine distemper vaccine of avian and canine cell origin to determine the efficacy of such vaccines in Gray Foxes. Five additional Gray Foxes were used as controls and received a placebo containing 5% dextrose solution in place of the vaccine. Foxes were considered normal, adult animals prior to inoculation; titers of serum antibody to canine distemper virus were ≤ 1:64 for each fox. Serum antibody titers were considered significant at ≥1:100. Within 5 days post-vaccination, Gray Foxes within the vaccinated groups began exhibiting symptoms of vaccine-induced canine distemper virus infection. All foxes that received modified live-virus distemper vaccines died within 17 days post-vaccination. Control animals remained healthy throughout the 3-week post-vaccination period. It is not advisable to vaccinate Gray Foxes with modified live-virus distemper vaccines, regardless of cell origin.

**KEY WORDS**: Canine distemper virus, Gray Fox, modified live-virus, *Urocyon cineroargenteus*, vaccine

## Introduction

Canine distemper is a serious, often fatal, viral disease of domestic dogs (*Canis familiaris*) and many wildlife species. It is caused by an RNA virus of the genus *Morbillivirus* (Appel and Gillespie 1972) that has infected wild carnivores of the mustelid (weasel), procyonid (raccoons, pandas) viverrid (mongoose), hyenid families (Budd 1981), and large felines (lions of the Serengeti). Vaccines against canine distemper, either modified live-virus or killed-virus, have been developed and experimentally evaluated in several species of exotic carnivore. Use of canine distemper vaccines in Red Foxes (*Vulpes vulpes),* Bush Dogs *(Speothos venaticus),* Maned Wolves *(Chrysocyon brachyurus), and* Fennec Foxes *(Fennecus zerda)* was successful in producing virus-neutralization titers (Montali et al. 1983); however, fatal canine distemper virus infection was induced by modified live-virus vaccines in Lesser Pandas *(Ailrus fulgens;* Bush et al. 1976*),* Black-footed Ferrets *(Mustela nigripes;* Carpenter et al. 1976), Kinkajous *(Potos flavus;* Kazacos et al. 1981), Cape Hunting Dogs *(Lycaon pictus;* McCormick, 1983*),* and Gray Foxes *(Urocyon cineroargenteus;* Halbrooks et al. 1981*).* Unfortunately, the only commercially licensed canine distemper vaccines presently available are modified live-virus products, which are licensed only for use in domestic dogs, ferrets, and minks *(Mustela vison).* Although considered safer for use in wild canids, killed-virus canine distemper vaccines have not been produced by the commercial animal vaccine industry due to low marketability of the product (Wobeser 1994).

Reports on the efficacy of modified live-virus canine distemper vaccines in Gray Foxes have been disparate (Budd 1981, Halbrooks et al. 1981, Montali et al. 1983). In spite of this, modified live chicken embryo-derived canine distemper vaccine has been recommended (Sedgwick and Young 1968, Montali et al. 1983). White (1983) commented that sample sizes in the vaccine challenge trials with Gray Foxes by Halbrooks et al. (1981) were inadequate and that additional research in the use of canine distemper vaccines in this species was warranted.

[1]This is MS #97-111 of the Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville.

I became interested in distemper in Gray Foxes while conducting a companion study that determined bait preferences of captive, wild Gray Foxes (Steelman 1996). At the recommendation of the Texas A&M University-Kingsville (TAMUK) Animal Use and Care Committee, Gray Foxes held in captivity at TAMUK (n = 35) were vaccinated against canine distemper virus. However, prior research (Halbrooks et al., 1981) warranted caution in indiscriminately vaccinating gray foxes against canine distemper virus. Therefore, the objective of this study was to determine the response of Gray Foxes to modified live-virus canine distemper vaccines of various cell origins.

## Methods

Thirty-five Gray Foxes were captured in Havahart™ live-traps (Forestry Suppliers, Inc., Jackson, Mississippi 39284-8397) by Texas Animal Damage Control (San Antonio, Texas 78201) personnel during spring, 1995. Foxes were brought to the TAMUK South Pasture facility. Foxes were housed individually in 1.8 x 1.2 x 2.4-m kennels. Kennels were constructed with concrete floors, chain link walls and doors, and a tin roof. Doors, door frames, and the lower 0.5 m of each kennel were reinforced with 2.3 x 4.9-cm rectangular fencing to reduce the probability of contact with neighboring foxes. Tarps were used as weather breaks and attached to the top half of exterior walls. Open-ended plywood boxes measuring 30 x 30 x 60 cm were placed 45 cm above the kennel floor and attached to the back wall of the kennels to give the foxes a place to hide during cleaning. Dursban™ (1%) and Sevin™ (10%) dust (Gro Tech Inc., Madison, Georgia 30650) periodically were spread around the kennel perimeter to reduce ant populations. Foxes were allowed a 3-week acclimation period before vaccination. Foxes were fed canned dog food (Ole Roy™, Wal-Mart Inc., Bentonville, Arkansas 72712) daily and given water *ad libitum*. Kennels were thoroughly cleaned three times a week and each fox was given fresh straw for bedding. Daily notes were recorded concerning food and water consumption, physical appearance, and behavior of each fox.

After 24 days of captivity, each fox was anesthetized with a combination of 11 mg/kg body weight of ketamine hydrochloride (Aveco Co., Inc., Fort Dodge, Iowa 50501) and 0.5 mg/kg body weight of acepromazine maleate (Lloyd Laboratories, Shenandoah, Iowa 51601) given intramuscularly. Acepromazine maleate was given to reduce the possibility of convulsions caused by ketamine hydrochloride. Blood samples were taken from each fox and sent to the Center for Disease Control (Atlanta, Georgia 30333) to determine baseline titers of serum neutralizing antibody to canine distemper virus. Each fox was given a vaccination subcutaneously in the scruff of the neck. Vaccinations consisted of a randomly assigned modified live-virus canine distemper vaccine of selected cell origin or a placebo. Ten Gray Foxes received an avian cell origin vaccine (Fromm D™, Fromm Laboratories, Inc., Grafton, Wisconsin 53024), and 20 foxes received vaccines of canine cell origin; 10 received the Rockbourne Strain (Synbiotics Corp., San Diego, California 92127) and 10 foxes received Duramune™ (Fort Dodge Animal Health, Overland Park, Kansas 66225). The remaining 5 Gray Foxes received a 3 mL injection of 5% dextrose solution (Fisher Scientific, Houston, Texas 77251). Foxes were observed for 3 weeks post-vaccination to determine their response to vaccines. Euthanasia was not performed on animals at the onset of clinical signs in order to document the rapidity and extent of the induced disease. Necropsies were performed by the author on foxes that died during the study to determine gross pathology. Brains from foxes that died were examined for rabies virus by immunofluorescence at the Texas Department of Health (Austin, Texas 78756).

A completely randomized one-way analysis of variance procedure (PROC GLM, SAS Inst., Inc., 1989) was used to test the effect of vaccine type on the number of days to onset of morbidity and mortality in Gray Foxes. Sexual differences between Gray Foxes in the number of days to onset for morbidity and mortality were tested by Chi-square analyses. The Yates Correction factor was used in the Chi-square analyses due to a single degree of freedom. Statistical significance was inferred at $P < 0.05$.

## Results

Foxes brought to the TAMUK South Pasture facility appeared clinically normal throughout the acclimation period. There was no evidence of nasal or ocular discharges, swollen limbs, and erythema of skin. Daily food (range = 365 to 681 g) and water consumption (range = approximately 300 to 500 mL, includes evaporation and spillage) for each animal was consistent. Fox behavior was considered normal for adult, wild-caught animals; foxes exhibited a wariness of humans and aggressive tendencies toward humans who entered the kennel to clean.

Titers of serum neutralizing antibody to canine distemper virus were <1:64 for each fox (range = 1:16 to 1:64). Serum neutralizing antibody titers were considered significant at >1:100

Table 1. Post-vaccination responses of gray foxes to modified live-virus vaccines of avian and canine cell origins.

| | | | Post-vaccination onset of clinical signs (Days) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ocular | | | | |
| Vaccine[1] | Fox # | Sex | Thirst | Anorexia | Discharge | Diarrhea | Ataxia | Dyspnea | Death |
| A | 2 | M | 3 | 5 | 6 | 8 | 11 | 11 | 15 |
| A | 5 | M | 5 | 4 | 6 | 8 | 10 | 10 | 16 |
| A | 6 | F | 3 | 6 | 9 | 8 | 10 | 10 | 12 |
| A | 13 | F | 4 | 4 | 8 | 8 | 10 | 10 | 13 |
| A | 18 | M | 5 | 6 | 7 | 7 | 10 | 10 | 15 |
| A | 23 | F | 5 | 6 | 6 | 7 | 9 | 9 | 16 |
| A | 27 | M | 4 | 7 | 8 | 8 | 9 | 9 | 17 |
| A | 28 | F | 6 | 6 | 8 | 8 | 10 | 10 | 14 |
| A | 30 | F | 4 | 5 | 8 | 7 | 10 | 10 | 15 |
| A | 35 | M | 5 | 5 | 7 | 7 | 9 | 9 | 14 |
| B | 1 | F | 3 | 5 | 8 | 7 | 8 | 8 | 15 |
| B | 3 | F | 4 | 5 | 6 | 8 | 9 | 9 | 15 |
| B | 7 | M | 5 | 5 | 5 | 7 | 11 | 11 | 14 |
| B | 8 | F | 5 | 4 | 7 | 8 | 11 | 11 | 13 |
| B | 15 | M | 5 | 6 | 7 | 8 | 10 | 10 | 14 |
| B | 20 | M | 5 | 6 | 7 | 8 | 10 | 10 | 14 |
| B | 22 | F | 4 | 5 | 8 | 8 | 10 | 10 | 15 |
| B | 25 | F | 4 | 5 | 9 | 8 | 10 | 10 | 15 |
| B | 26 | M | 4 | 6 | 8 | 8 | 11 | 11 | 17 |
| B | 32 | M | 3 | 8 | 8 | 7 | 9 | 9 | 12 |
| C | 9 | M | 4 | 7 | 8 | 8 | 9 | 9 | 13 |
| C | 10 | F | 3 | 7 | 7 | 8 | 10 | 10 | 13 |
| C | 14 | F | 3 | 7 | 7 | 8 | 10 | 10 | 15 |
| C | 16 | F | 5 | 6 | 9 | 8 | 10 | 10 | 15 |
| C | 17 | M | 5 | 6 | 8 | 8 | 9 | 9 | 14 |
| C | 19 | M | 5 | 8 | 8 | 8 | 11 | 11 | 15 |
| C | 24 | F | 4 | 8 | 8 | 8 | 11 | 11 | 16 |
| C | 29 | F | 4 | 6 | 6 | 7 | 11 | 11 | 17 |
| C | 31 | M | 4 | 6 | 8 | 8 | 10 | 10 | 15 |
| C | 34 | M | 4 | 6 | 8 | 8 | 10 | 10 | 15 |
| P | 4 | M | - | - | - | - | - | - | - |
| P | 11 | M | - | - | - | - | - | - | - |
| P | 12 | F | - | - | - | - | - | - | - |
| P | 21 | F | - | - | - | - | - | - | - |
| P | 33 | F | - | - | - | - | - | - | - |

[1]All vaccines were modified live-virus vaccines. Vaccine A was of avian cell origin (Fromm D™, Fromm Laboratories, Inc.), vaccine B was of canine cell origin (Rockbourne Strain, Synbiotics Corp.), vaccine C was of canine cell origin (Duramune™, Fort Dodge Animal Health), and vaccine P was a placebo (5% dextrose solution, Fisher Scientific).

(Halbrooks et al. 1981); however, this procedure has not been verified with Gray Foxes and species specificity and cross reaction problems may exist.

There was a marked behavioral difference between foxes that received modified live-virus vaccines of either cell origins and those animals that received placebos (Table 1). Gray Foxes within the placebo group remained clinically and behaviorally normal as previously described throughout the 3 week post-vaccination period. However, five days after vaccination,Gray Foxes that received modified live-virus vaccines exhibited an increased thirst (i.e., > 600 mL water consumed/day), loss of appetite (i.e., < 200 g food consumed/day), and a "crusty" appearance of the nose. By day 8, vaccinated foxes had a purulent lacrimal discharge and diarrhea, were anorexic, and their fur appeared "unkept". Vaccinated Gray Foxes exhibited paralysis in hind quarters, ataxia, and dyspnea 10 days post-vaccination. Neurological signs such as screaming and convulsions became more evident 11 days after vaccination. All Gray Foxes that were vaccinated with modified live-virus vaccine died between 12 and 17 days post-vaccination.

There was no difference in the number of days to onset for morbidity ($F = 0.33$; $df = 2,27$; $P > 0.719$) and mortality ($F = 0.23$; $df = 2,27$; $P > 0.793$) between the types of modified live-virus vaccines. Average number of days post-vaccination to morbidity and mortality was $4.2 \pm 0.3$ and $14.6 \pm 0.3$ days, respectively. There was no difference in the number of days to onset for morbidity ($X^2 = 0.053$; $df = 1$; $P > 0.83$) and mortality ($X^2 = 0.029$; $df = 1$; $P > 0.89$) between male and female Gray Foxes that were vaccinated against distemper. All Gray Foxes that died during our study ($n = 30$) were negative for rabies virus.

Necropsies of each fox revealed bronchopneumonia that typically involved all lobes of the lungs. Lungs were swollen, firm, and most were mottled in color. The bronchi and bronchioles contained excessive mucus. Most foxes ($n = 23$) also exhibited digital hyperkeratosis.

## Discussion

Gray foxes are susceptible to vaccine-induced canine distemper virus infection regardless of the cell origin of the modified live-virus. The results of this study suggested that both avian and canine cell origin modified live-virus distemper vaccines are hazardous to gray foxes. Halbrooks et al. (1981) suggested that avian cell origin modified live-virus distemper vaccines were probably safe for adult gray foxes; however, 20% (i.e., 1 of 5) of the gray foxes in their study died 19 days after inoculation. I agree with Halbrooks et al. (1981) that canine cell origin vaccines produced fatal vaccine-induced canine distemper virus infection in adult Gray Foxes. Reviews of canine distemper suggest that modified live-virus distemper vaccines are effective for immunizing foxes (Budd 1981); however, it should be noted that the original research was conducted on the use of canine distemper vaccines in Red Foxes, not Gray Foxes.

Sedgwick and Young (1968) recommended the use of a killed canine distemper virus vaccine to protect susceptible animals in zoological collections. Unfortunately, only modified live-virus products currently are commercially available. An experimental killed-virus canine distemper vaccine for exotic carnivores was available to zoological parks through Cornell University (M.D. LaRosh, D.V.M.; Fort Dodge Animal Health; pers. comm.); however, the university is no longer producing the vaccine.

Canine distemper is a significant mortality factor for Gray Foxes (Davidson et al. 1992); however, this study showed that it is not advisable to vaccinate Gray Foxes with modified live-virus distemper vaccines. Rather, rehabilitators of Gray Foxes should quarantine new animals for 30 days to ascertain their health status. Extreme care should be taken to avoid cross-contamination between living areas of potentially susceptible animals. Equipment capable of carrying virus particles should be disinfected before reuse. Foot washes should be available to workers who clean living areas of potentially susceptible animals. Distemper virus can be inactivated by heat, formalin, and appropriate disinfectants (e.g., Roccal®) (Dickson et al. 1955). Minimize the possibility of free-ranging, distemper-susceptible wild and domestic animals from entering your facility. This can be achieved with partially buried fences equipped with electric wires. Although these measures are more expensive and time consuming to the rehabilitator, results should prove less lethal than vaccination.

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**Contact:** Mary Reynolds, Executive Director, IWRC, 4437 Central Pl., Ste B-4, Suisun, CA 94585, USA, 707-864-1761, or e-mail at iwrc@inreach.com.

## *IWRC Annual Awards/Special Recognition*

Do you know someone who should be recognized for special efforts or accomplishments in the field of wildlife rehabilitation? IWRC will be presenting its annual awards and citations at its 20th Annual Conference in Concord, California, October 4, 1997. If you would like to nominate someone for special recognition, please send your nominations to IWRC, 4437 Central Pl., B-4, Suisun, CA 94585, USA, Attention: Awards Committee. Nominations should reach the office by September 19, 1997 in order to be considered.

## *Current Vaccination Use in North American Wildlife Rehabilitation*

This is a compilation of vaccine information currently in use by selected wildlife rehabilitators. This chart cannot vouch for efficacy against disease or challenge. Only *killed* rabies vaccines should ever be used in wildlife. Two were mentioned frequently (Rabvac-3™ and Imrab-3™ both produced by *Solvay*). Please note that for the purposes of public health exposure, wild animals are considered to be non-vaccinates. If there is a bite or other exposure, the animal is treated as unvaccinated and often killed due to the undefined and variable incubation period in wild species. Rabies vaccinations are given to vector species by locale. Know what species are a problem in your area.

The — sign indicates vaccination is not necessary for the disease in that column. "Do not vaccinate" means that while that species *is* succeptible, we do *not* know of a safe vaccine at this time. Killed feline panleukopenia vaccines are *preferred*, but some modified live vaccines have been used in raccoons. Killed canine distemper vaccine is *not* commercially available so only species that can tolerate live distemper vaccines can be safely vaccinated. A new recombinant vaccine has not yet been tested in Gray or Kit Foxes. Many of these vaccines have a canine parvovirus component (√). (K)=killed vaccine. (R)=recombinant vaccine.

| Species | Feline Panleukopenia | Canine Distemper + Parvo Virus | |
|---|---|---|---|
| Raccoon | Felocell CVR® (*SmithKline Beecham*) | Vanguard 5/L ®(*SmithKline Beecham*) | √ |
| | | Fervac-V™(*United Vaccine*) | no |
| | Fel-o-vax LVKIII® (K) (*Ft. Dodge*) | Duramune 5 Way®(*Ft. Dodge*) | √ |
| | | Recombitek C-4™(*Rhone-Merieux*)(R) | √ |
| | | Distemink® (*United Vaccine*) | no |
| | | Biovac® (K)(*United Vaccine*) | |
| Coati | Fel-o-vax LVKIII® (K) (*Ft. Dodge*) | Duramune 5 Way® (*Ft. Dodge*) | √ |
| Skunk | Fel-o-vax PCT®(K) (*Ft. Dodge*) | Vanguard 5/L®(*SmithKline Beecham*) | √ |
| | | Recombitek C-4™(*Rhone-Merieux*)(R) | √ |
| Kit Fox | — | *Do Not Vaccinate* | No data |
| Gray Fox | — | *Do Not Vaccinate* | No data |
| Red Fox | — | Duramune 6 Way® (*Ft. Dodge*) | √ |
| Coyote | — | Duramune 6 Way®(*Ft. Dodge*) | √ |
| | | RecombitekC-4™(*Rhone-Merieux*)(R) | √ |
| Bobcat/Lynx Cougar | Fel-o-vax LVKIII® (K) (*Ft. Dodge*) | — | — |

J. Wildlife Rehab. 20(2):9-13
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# Case History: Bumblefoot in Four Oil-rehabilitated American Coots (*Fulica americana)*

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## Abstract

On February 20, 1995, seventy-five live American Coots were rescued from the Metrolink oil spill near Long Beach, CA. Twenty-two birds were released approximately 30 days after intake. The remaining fifty-three birds were referred into a post-release survival study. Four of the study birds did not meet study criteria due to nosocomial health problems. This report details the hospitalization and rehabilitative care at the Wildlife Health Center and Institute of Toxicology and Environmental Health and the subsequent release of two of those birds.

**Key words:** American Coot, *Fulica americana,* bumblefoot, *Staphylococcus* sp., captive care, oil-rehabilitated birds, Metrolink Oil Spill, oiled bird rehabilitation, release criteria.

## Introduction

The American Coot, *Fulica americana,* is a member of the rail family and is a widespread, commonly occurring bird presented for care in wildlife rehabilitation centers. Their usual habitat is shallow freshwater lakes, ponds, and marshes. Feathering is a uniform slate gray, the bill is white and legs and feet are green with four separate lobed, clawed toes. Their feet are highly sensitive and important instruments in the search for food. Coots generally feed on aquatic plants and small aquatic prey such as fish, tadpoles, and insects. They are social birds: an important factor to be considered in their housing during rehabilitation. They can also be aggressive and will bite and scratch during handling.

The birds which became the subject of this case study originated from an inland 1,090 barrel crude oil spill into the San Gabriel River in southern California. Seventy-five live birds were captured by International Bird Rescue Research Center (IBRRC) staff and stabilized by the California Department of Fish and Game, Office of Oil Spill Prevention and Response (CDFG-OSPR), Veterinary Services. Once stabilized, birds were transported to the IBRRC facility in Berkeley, CA. They were washed and remained there for approximately 30 days until deemed healthy upon which twenty-two of the birds were released into the wild. The remaining birds were transferred to Dan Anderson, Ph.D., and Scott Newman, DVM, (under contract with CDFG-OSPR) to be included in a post-release survival study at the University of California at Davis.

Fifty-three birds were brought to the U.C. Davis campus and housed in a large enclosure where general health parameters could be observed. Many of the birds had chronic lesions on the ventral surface of the tarsometarsal and phalangeal joints. The lesions were probably caused by holding them longer than customary while the study was being prepared. The birds were noted by IBRRC staff to be "climbers" that attempted to scale wooden pen sides resulting in trauma to both the nails and digits.

A special pen was quickly constructed for the study birds at the Institute of Toxicology and Environmental Health (ITEH), which is adjacent to the Wildlife Health Center. It was approximately thirty-three feet wide and one hundred feet long and was enclosed by a chain link fence

lined with Visqueen™ (heavy plastic sheeting) to prevent further digital injuries caused by climbing. The pen floor was natural plant material such as fennel, filaree, star thistle, miner's lettuce, etc. Approximately one fourth of the area was covered with a mixture of sand and pea gravel and a shallow pond (5' x 15' x 6" deep) was dug and lined with plastic sheeting. Birds had one side of their wing feathers clipped and were placed in the open pen for approximately three weeks to allow their foot lesions to heal.

Following a three week stay in the natural enclosure at ITEH, the birds were re-examined and blood collected to determine whether they were healthy enough to be included in the study. Many of the birds showed marked improvement of foot lesions following maintenance on an improved substrata and the decision was made to include 49 in the study.

Within that cohort of oiled birds, 37 lived long enough to be radio-tagged subcutaneously in the intrascapular region and released into a larger enclosed area with a pond managed by the wildlife and fisheries department on the Davis campus. They were provided with supplemental food in addition to foraging naturally. The birds had their primaries clipped initially but were allowed to leave the enclosure in several months following their post-nuptial molt. Forty-nine percent (n=18) of these birds survived through their molt and flew out of the enclosure. Non-oiled control birds had a survival rate of 76% (n=38) (Anderson et al. 1996).

However, four coots continued to have severe foot lesions and were judged to need further individual veterinary attention and therefore could not be included in the study. This case report details their care and subsequent disposition.

## Background Information

Upon being admitted to the intensive care unit at ITEH on April 21, 1995, all birds were given physical examinations and had initial blood samples taken to assess their health status. Body weights and keel were used to estimate body condition. Birds were categorized as having sharp (emaciated), OK (moderately fleshed) or well-fleshed keels. Each foot was individually examined and categorized in the following manner: Category 1= swollen but cool, Category 2 = swollen and warm, Category 3 = core lesions were noted, Category 4 = deep tissue infection and Category 5 = evidence of osteomyelitis. All missing toe nails, joint swellings or lesions were drawn on individual foot diagrams as part of the animal record. All hock and carpal joints were palpated for bone incongruities or inflammation (i.e., swollen or hot).

Animals were housed in a 4' x 5'x 4' stainless steel cage with Daisy Mat® astroturf-type flooring. They were fed a diet of mixed grains, Purina Flamingo Breeder® food in a slurry of water once a day and offered several hundred meal worms twice a daily. Individually, the birds varied significantly in their health status.

## Reference Blood Values

Normal range for an avian packed cell volume (PCV) is between 35% and 55% depending on the species (Campbell 1994). As a part of the larger American Coot post-release study, healthy control birds were wild-caught and blood samples analyzed. These coots had an average white blood cell count (WBC) of 8,600 with a range between 1,100-26,000 (n=40). Their packed cell volumes averaged 47% with a range of 38-54% (n=47) and their total proteins averaged 5.6 g/dl (n=37) with a range of 4.1-7.4 g/dl (Newman and Zinkl 1966).

## American Coot G-3

Bird G-3 was admitted on April 21, 1995 weighing 455 g with a sharp keel, chronically anemic (PCV 14% and TS 2.8 g/dl), minor carpal lesions due to cage trauma, and swollen, soft and fluctuant feet with cracked pads, both rated as a Category 4. The initial hemogram, taken after hospitalization indicated a WBC count of 6,000-8,000 with a heterophil:lymphocyte ratio of 6.0. Our previous experience with Sora and Virginia Rails led us to expect an approximately equal heterophil:lymphocyte ratio in a healthy bird (White and Wolfe 1997).

Because the feet were infected, Enrofloxacin (Baytril®) therapy was initiated at 10 mg/Kg twice daily. An aggressive cleaning and flushing regimen was inaugurated which initially required a stab incision on the dorsal side central pad of the left foot to remove exudate. The feet were inspected, flushed thoroughly with dilute chlorhexidine (Nolvasan®) solution and then flushed again with reconstituted IV penicillin (K-Pen®) (1 million units/4 dosages) before re-wrapping with gauze sponges and Vetwrap®. This was repeated daily for all the birds while their feet lesions were resolving.

On May 11, a severe *Haemoproteus* protozoal infection was reported on a blood smear in G3 submitted to the IDEX laboratory in West Sacramento. This finding was consistent with a regenerative anemia as evidenced by reported marked polychromasia. Prior to administering anti-parasite drug therapy, 18 cc of 0.9% NaCl was given subcutaneously (SQ) in the paralumbar region

and the bird was placed in an incubator. At this time the bird was depressed, had lost weight (435 g), PCV was 20%, TS was 2.8 g/dl, and temperature was 100.7°F. The final hemogram, taken on 5/5/95 reported a PCV of 21%, TS of 3.8 g/dl, a white blood cell count of 6,000 and a heterophil:lymphocyte ratio of 3.36.

Approximately two hours after giving SQ fluids, the bird was found dead in its cage. Gross necropsy observations indicated that the bird may have had compromised respiratory function due to infiltration by subcutaneous fluids through a small opening into the body cavity from the paralumbar fossa. While the paralumbar site is commonly used by the authors for subcutaneous fluid therapy in various avian species, the inguinal or axillary areas may be preferable when working with rail species. While the outcome for the bird was not positive, it is worth noting that the feet lesions had improved to the point where only a few scabs remained that were nearly ready to fall off, a finding supported by the normal WBC estimate of 6,000 on 5/5/95. Because of the improved feet and continued low WBC estimate, antibiotics had been discontinued on 5/6/95. The weight at death was 455 g.

## American Coot G-58

Bird G58 presented emaciated weighing in at 395 g. The bird had moderately severe foot lesions (both Category 3), and was bright, alert and responsive (BAR). There were no hock or carpal lesions. It had a PCV of 32% and TS of 5.2 g/dl. An avian white blood cell estimate revealed a count between 19,000-21,000 and a heterophil:lymphocyte ratio of 6.07.

Baytril® therapy was started the next day at 10 mg/Kg BID. The foot lesions were opened and once a day were thoroughly flushed and re-wrapped. A complete blood cell count (CBC) was performed on 5/5/95 which revealed a white blood cell count of 11,300 and normal heterophil:lymphocyte ratio of 1.09. The foot lesions had been completely resolved, thus on May 6, 1995 Baytril® therapy was stopped. The bird was held several additional weeks to see if the infection would return following the discontinuance of antibiotics but the feet continued to look good (i.e., not swollen or hot). A final blood sample taken on 5/22/97 revealed a PCV of 39%, TS of 5.2 g/dl, a WBC count of 17,100 and a heterophil:lymphocyte ratio of .722. The bird was released on June 3, 1995 weighing 385 g.

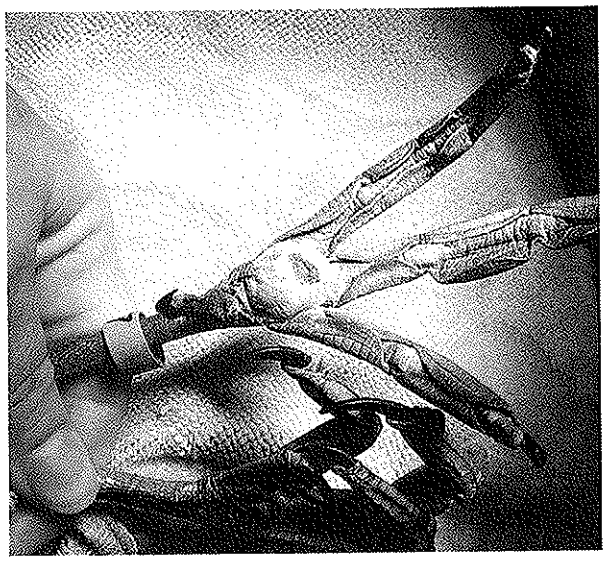
## American Coot G-17

Bird G17 presented BAR with a sharp keel and a weight of 530 g. It had a PCV of 39%, a TS of 5.0 g/dl, a WBC estimate of 15,000-17,000 and a heterophil:lymphocyte ratio of 1.85. This bird had central pad and digital lesions on the left foot with slight swelling but no discharge and was classified as Category 4. There were no carpal or hock lesions.

The feet were opened and treated as previously described. Baytril® therapy was started and feet were cleaned and re-wrapped once daily. Blood work was performed on 5/5/95 and 5/12/95 to evaluate therapy. The WBC count had fallen to 7,300, the PCV to 32%, TS was 3.2 g/dl and the heterophil:lymphocyte ratio was .82. On May 12, the WBC estimate had risen to 11,000-13,000 along with the PCV which now stood at 38%. Because of the improved blood values and improved condition of the birds feet, on May 15, 1995 drug therapy was discontinued. The bird was observed without further treatment until June 3, 1995 when it was released with G58 weighing 465 g. The last PCV was 41 %, TS of 4.2 g/dl, and a heterophil:lymphocyte ratio of 1.77 taken on May 19. The WBC count was 11,100, taken on the day of release.

## American Coot G-11

Bird G11 was admitted weighing 435 g, moderately fleshed, with tarsometatarsal lesions on both feet (Category 4) that appeared infected. The bird had a slight anemia (PCV=31%) that worsened gradually. Other values taken at intake included a TS of 4.2 g/dl, WBC estimate of 14,000-16,000 and a heterophil:lymphocyte ratio of 3.54.



*American Coot foot with a 'core' lesion.*

The bird had no hock or carpal lesions. A culture on the caseated pus from the right foot taken on 4/21/95 revealed an hemolytic, coag positive *Staphylococcus* organism, sensitive to both penicillin and enrofloxacin. Baytril® therapy had already been initiated on April 21, 1995 at 10 mg/Kg BID and was continued. The hemogram indicated that the bird might have a mild regenerative anemia as evidenced by a slight polychromasia but no blood parasites were noted. The white blood cell counts taken on 5/5/95 and 5/12/95 remained moderately elevated (ranging between 17,300-19,000 respectively) and the right foot lesions did not resolve well. In the face of continued infection, chronic anemia (of disease) is a common sequela.

Based on the lack of response to persistent systemic and local antibiotic therapy, the lack of improvement of the chronic anemia (on May 19 th PCV=27%, TS=3.2 g/dl), and physical examination of the feet, it was thought that this animal was probably suffering from a non-resolvable bone infection (Category 5). Consequently, the bird was euthanized on June 3, 1995 weighing 485 g.

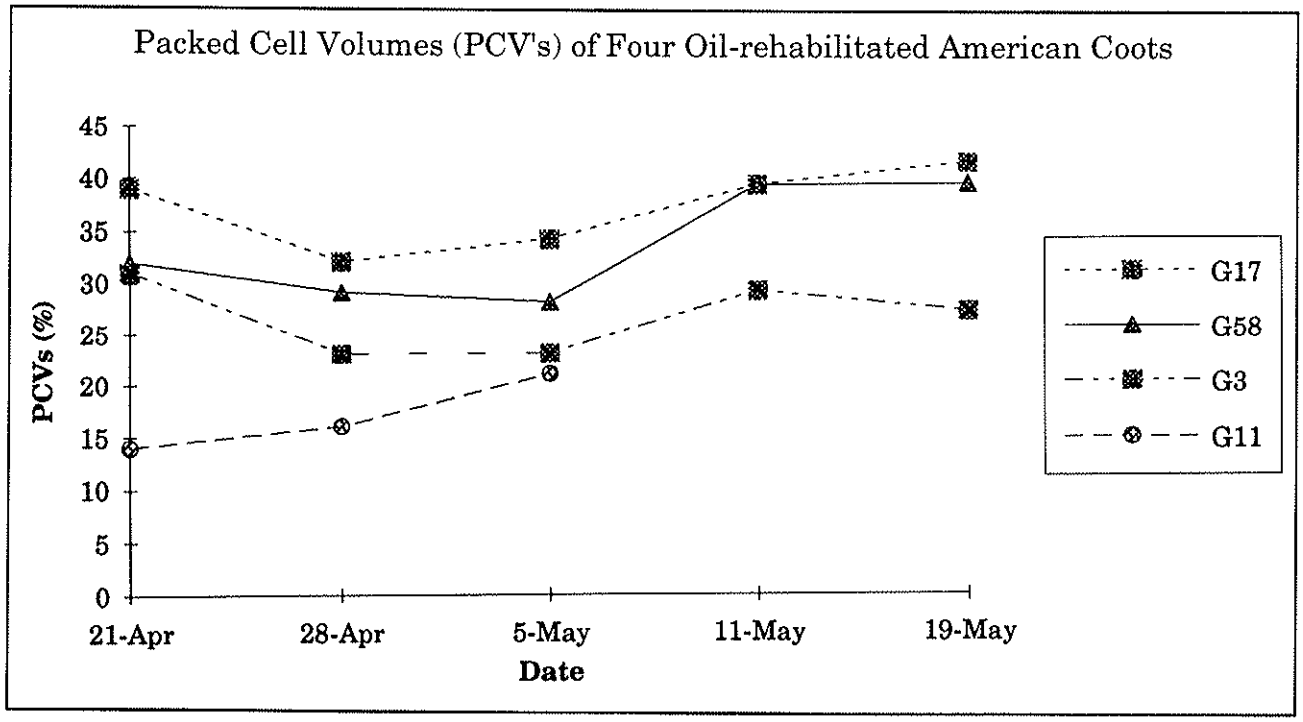
## Conclusions

In summary, this experience has taught or reinforced several principles in wildlife rehabilitation. Knowledge of a species habitat, ecology, and behavior are critically important when designing the most appropriate housing for its rehabilitation. Housing, even on a short-term basis, should be designed to prevent nosocomial (e.g., captively induced) injuries. Since oil spills usually have funds available for the care of oil-affected birds, building temporary pens with natural substrata should be considered.

It is important for rehabilitators and trustee agencies to plan for and design post-release studies in advance of oil spill events. During an event, all aspects of the study should be carefully evaluated and the necessary equipment received in advance of the earliest probable release date, especially when captive care problems are likely to result from any additional delays. A part of this process should include a careful evaluation of existing or proposed care methods with reference to the length of time that a bird can be safely held in captivity.

The question of what health parameters are indicative of the best time for release has also become the subject of study. Areas of concern have included organ insult or injury and immune function. Specific indicators of immune dysfunction or injury in oiled birds cited by previous investigators include reduced number of immune cells in lymphoid organs, reduced proportion of lymphocytes, reduced resistance to lethal disease, and severe lesions in the bursa of Fabricicus (Holmes et al. 1979, Leighton 1984, Rock et al. 1984, Leighton 1986, Leighton 1990).

It has been suggested that, in addition to hemograms, complete serum chemistry profiles should be performed to better evaluate the metabolic condition of the animal. This may yield a better overall view of liver, kidney, and immune capabilities (i.e., globulin and albumin:globulin ratio) in oil-contaminated birds prior to release



(Newman 1996). Unfortunately, no funds were made available to do additional tests on these four birds.

A number of health parameters are commonly evaluated when considering release of oil-rehabilitated birds. These include: weight, behavior, waterproofing, salt gland function, and general health parameters including PCV and white blood cell counts (White 1992, Frink 1994). Low packed cell volumes are often seen early in the course of recovery due to the oxidative effects of some oils (White 1990, Leighton 1990). Late in the course of recovery if there is a chronic infection anemia may be present. Health care providers should also evaluate the heterophil:lymphocyte ratio as well as absolute lymphocyte numbers when available in recovering birds. Normal white blood cell counts and heterophil:lymphocyte ratios may be a positive indicator of immune function. When funds allow, serum chemistries such as the globulin and albumin:globulin ratios or serum electrophoresis are also useful to evaluate the immune system.

Additionally, owing to our gross necropsy findings on American Coot G-3, we feel that inguinal and/or axillary regions may be the safest areas for SQ fluid administration in this species until further reports dispute this.

It is worth noting that when placed in a "natural setting," only four of the birds from the original study group did not recover sufficiently to be released without further treatment.

Coots can be a problem bird to monitor for adequate food intake. While specific nutritional parameters were not measured, the diet fed to the coots appeared to provide adequate nutrition as there were no substantial weight losses (i.e., 0%, -12.3%, +10.3%, -2.5%) over six weeks although more long-term data is necessary before this can be conclusively decided.

Wildlife rehabilitation is a learning experience and this oil spill was as much an opportunity as it was a challenge. Through the application of such learning experiences, it is hoped that better rehabilitation techniques can be developed for the care of both oil-contaminated and regular rehabilitation cases.

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***Acknowledgments:***

*Many thanks to Marti Wolfe for her work on the graphics in this article, to Scott Newman, Jay Holcomb and Flo Tseng for reviewing and commenting on the text, and to Louise Shimmel for editing of the draft manuscript.*

J. Wildlife Rehab. 20(2):14
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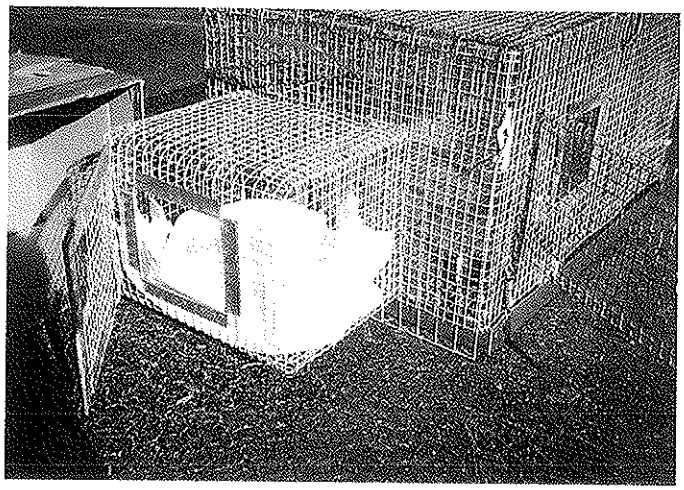
## *Simple Things That Make A Difference*

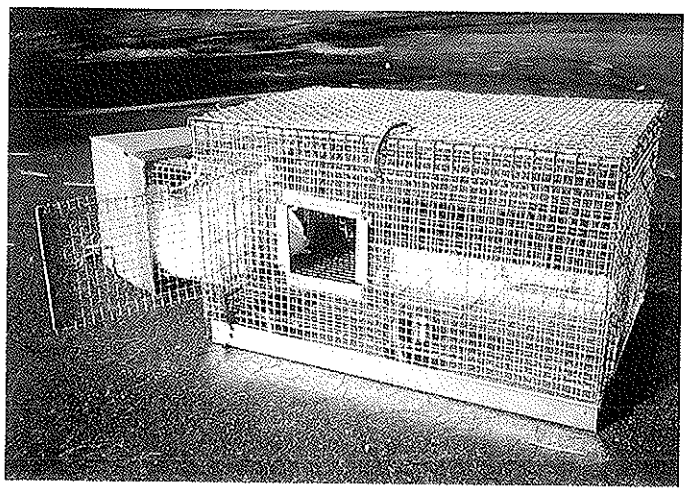
# Adult Squirrel Caging

**Raine Carson**
**Highlands Wildlife Rehabilitation Center, Inc.**
**9 Adams Street**
**Milford, New Hampshire 03055**

Adult squirrels in captivity can present a variety of problems and this cage works well in solving at least a few of them. It offers an easy method of confining the squirrel to clean out the cage and because of its small size it makes it easier to catch the adult if treatment is required. It is intended for short term use only. I purchased a rabbit cage about 2' x 2' in size. These cages have slightly raised floors and fit into a removable metal pan. The roof forms a hinged lid to the cage. The manner of securely latching the lid is modified by using two latches made of springs and 'S' hooks which the squirrel cannot undo from inside. The wire forming the cage floor is such that feces and urine will fall through but, the holes are small enough so that the animals feet will not. Close to one side of the cage wall, cut two holes in the floor to hold a metal bowl for water and another for dry food stuffs. The holes must be made to fit the bowls snuggly. In the lower corner of one side another hole is cut in the cage wall. Using 1/2" hardware cloth and cage clips a box is made and attached permanently with cage clips, to the cage wall. This box forms a nest box for the squirrel and should be about 1' long, x 8" wide x 1' high. In the outside wall of this box another hole is cut large enough for the hand to pass through. A door is constructed from hardward cloth using cage clips as hinges and a spring and 'S' hook as a latch. A cardboard box of suitable size then fits over the nest box to provide privacy for the squirrel and is large enough to contain a heating pad should it be needed. Bedding in the nest box consists of a thick layer of paper towels on its floor and then several crumpled paper towels lie loosely on top. We also put crumpled paper towels in the cage itself so that the squirrel can add to the nest material in the box as desired.

After years of struggling with adult squirrels in a regular small cage during their time of needed confinement, we find this cage set up extremely convenient. The adult invariably goes into the nest box at cage cleaning time and remains there. We do all cage cleaning through the small door in the main cage wall. The metal pan under the cage, as stated above, is easily detached and washed under hot water without giving the squirrel a chance to escape. If it is necessary to catch the squirrel for treatment it can either be done by gently pulling the squirrel out by the door in the nest box or gently encouraging the animal into the main cage and catching it through the small door in the wall. Once the squirrel is secured, the cage top can be opened for removing the squirrel. This cage is simple to construct and is invaluable!





# *In Memoriam*

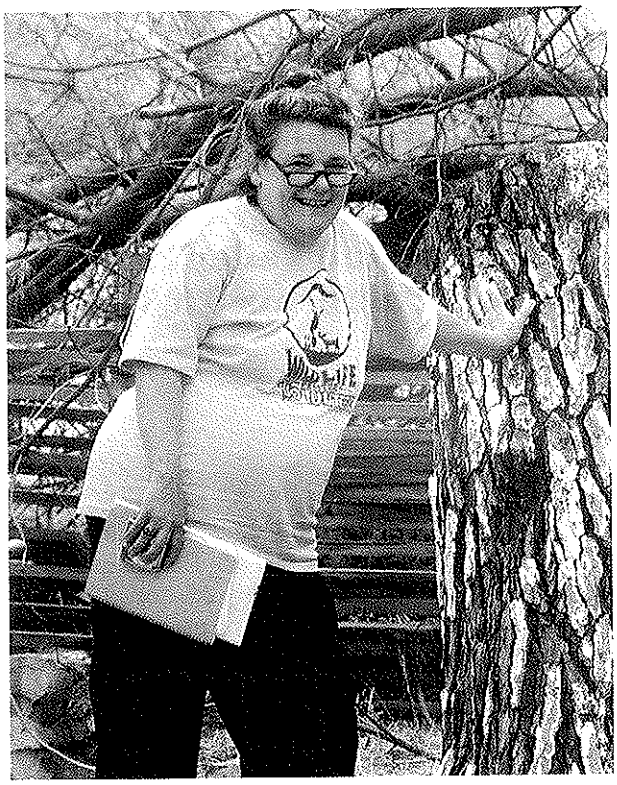
My Mother, Nan Pipestem, founder of the San Benito County S.P.C.A. Wildlife Rehabilitation Center passed away peacefully at home Feb 26, 1997. Mother's life began on May 26, 1937 in Amarillo, Texas. She was the first of 2 daughters born to Dorothy Kinmonth Hosmer and Vansant Hosmer. Mother, along with her sister Susan, were brought up in Oklahoma City where she graduated from Classen High School in 1955. My Mother and Father, Bill Pipestem along with Janice, Dawn, and myself moved to San Benito Co. from Denver, Co. in 1962. My mother and father shared a love for nature and wildlife and felt Hollister would be a good place to bring up their growing family. Mother helped found,the Hollister Art League in 1963. She got her M.F.A. degree from Jepson Art Institute in Los Angeles and soon became very accomplished in the art world and received many awards for her work.

My father had built a beautiful songbird aviary the backyard for my mother to raise domestic birds in her spare time. I'm sure mom never realized what direction this would take her, with us kids always finding something whether it be domestic or wild we knew good 'ole Mom could make it all better.

Before long even the neighborhood kids were bringing little animals in need of help. Mother continued for several years teaching art and during all this she and my father would have two more children, Nina and Brian. She learned to play the guitar and even did some melodrama acting in San Juan Bautista. She played Grannie, of course, had a garden shop and went on to write a cookbook with her good friend Judy Ohr. Mother looked forward to the time she spent running the art dept. at our local county fair. It would be here that mother would find a new path. She always made sure to see all the exhibits and displays and ran across a booth run by two local women, Olive Place and Susan Ober who wanted to start a local S.P.C.A. Knowing from past experience she agreed that it was time and innocently signed up to volunteer to help wildlife. From that time on she kept true to her promise and has succesfully released back to the wild hundreds of animals that otherwise would have perished due to mankind.

I feel honored and privileged to have had her as my teacher. My life came through hers and now I walk the same path. I only hope that I can accomplish half of what she has. She taught me the love of art, nature, giving, and healing. My mother was a shining example of what one person can do in this short lifetime we are give n on Earth.

# *Nan Pipestem 1937-1997*



I promise not to ever take for granted the things she taught me or misuse the knowledge we share as rehabilitators. The kind of love she gave has a chain reaction and will continue!

Meredith Pipestem, Director
Nan Pipestem Wildlife Rehabilitation Center

***Jobline***

**Job:** Wildlife AHT/RVT

**Job Site:** The SPCA of Monterey County

**Salary Range:** $8.55-$11.54/hr + benefits.

**Requirements:** Current CA RVT license.

**Description:** The humane society is seeking a full-time person to work with staff and colunteers to assure the proper care of all Wildlife Center animals. License is required; experience with wildlife a plus. Weekends and holiday work required. Send resume and references to the SPCA of Monterey County, P.O. Box 3058, Monterey, CA 93942.

**Deadline:** Open until filled.

# *Book Review*

## *Because They Matter...*

**Cindy Traisi**
**Fund for Animals Wildlife Rehabilitation Center**
**18740 Highland Valley Road**
**Ramona, California 92065**
**1997**
**214 pages**
**$8.00 list price**

Cindy Traisi is resident manager of a wildlife rehabilitation center in California and author of the book, *Because They Matter...* This is a book written in celebration of animals. Traisi candidly shares stories of "courage, fear, joy, sadness, the worth of precious freedom, and the kindness of death." It is also a book written *for* animals because, as the author says, "From you I have learned humanity."

The attractive cover of *Because They Matter*, drawn by Dorothy Mushet, predominately features a raven. Many stories in the book focus on ravens in rehabilitation. Traisi loves ravens, not because they are cute and cuddly, she admits, but because they are not. Ravens play, catch and bury things. That's it in a nutshell. Eggward, for example, was a raven who was fed only scrambled eggs by an elderly lady. In addition to being imprinted, Eggward was malnourished. Eggward thrived with Traisi's variety of nutritious food. She came to know his healthy pink mouth very well, because it was always open.

Larry King once said that the best interview has three elements: first, the person knows the subject, second, the person has a passion for their subject; and third, there is a touch of anger. This book has those three elements, plus a fourth, humor. Traisi generously shares her knowledge and experience with wildlife rehabilitation, referring openly to mistakes made in the process.

Wildlife is presented with a respect for their natural history, their inherent wildness, and the demands placed on them by an unnatural life in captivity. She makes the effort to portray how beneficial many types of wildlife may be to a neighborhood, although it is often difficult to convince a homeowner of this. Anger and pain are evident in stories involving accidental and intentional cruelty.

A charming aspect of this book is her gentle sense of humor which flows through stories. "The nice part about being sprayed by a skunk" Traisi writes, "is that after a while, you don't smell yourself anymore, so you figure no one else can either. I always get to be first in line at our local market if I have to go shopping following a skunk mission. As a matter of fact, I usually get to be the only person in that line. The poor checkers who have known us for years and know what we do just smile and give me really fast service."

Traisi has accomplished what we, as wildlife rehabilitators hope to achieve, a joy for—wildlife, not because they entertain us or amuse us, but because of our inherent oneness with wildlife. She writes of a coyote called Longshot, "The coyote, with his music, joy for life and his will to survive, could teach us all a wonderful lesson, if we as humans could stop the killing and sit back to listen and learn. Thoughts of old Longshot still pass through my mind, and I often think how fine it would have been if someone who didn't love coyotes had been able to sit with Longshot for those three days. Maybe that someone would have learned about coyote spirit and would have been a better human being because of it." *Because They Matter. . .*

-Hope Douglas-



*Continued from page 2*

I was really impressed with the caliber of wildlife care professionals that work with wildlife in Central America. Because of the illegal pet trade, many governments recognize the need for private and/ or government funded sites to house confiscated wildlife and whereever possible, to return those animals to their native habitat. Obviously, parrots are the mainstay of this trade, but many reptiles, including large iguanas, are also confiscated.

I was delighted to meet a government paid staff member, José Alberto Álvarez, from Cuba who proudly showed me magazine coverage of a government project to save thousands of individual baby flamingos complete with a nursery. I met two Ph.D. students, Sigi Weisel and Sabine Weber of Germany who came to Costa Rica about three years ago to study Margays, and at last count had 58 juveniles to rehabilitate! They showed videos of how they provided opportunities for their animals to learn normal behaviors and stay wild. They were and are struggling to keep their research program going and care for the animals, so they really did not need a hurricane to blow down their facility. I had never heard of a fungus growing in a computer, but hurricanes in the tropics can really mess up a CPU! They were lamenting the loss of their only laptop and I told them I would pass the word here for a used CPU that could be donated to their worthy cause. If anyone has one, let me know and I will see they get it.

I was pleased to cross paths with Luis Ramos, a veterinarian who worked on his masters degree at UCD when I was a student and came to see me at the Wildlife Health Center several years ago. He wanted to be a wildlife veterinarian in San Salvador and wondered what advice I could offer. I didn't tell him then, but I thought, "fat chance" in a country so poor. Well, Luis followed his heart and his dream and there he was, the wildlife veterinarian representing his country at the workshop. I met Juana Roda, an experienced rehabilitator from Bogata, Columbia and was impressed at the variety of animals that are rehabilitated there. We went to visit a private zoo and rehabilitation facility, ZOO AVE where several species of native primates, raptors, songbirds and reptiles were being rehabilitated. I asked about the monkey rehabilitation program and was told they took in injured or displaced animals and worked them into a cohesive, breeding troup which they would then repatriate as a group. This is a much different process than rearing and releasing this year's crop of baby squirrels or raccoons.

Karin Hoad, a wildlife rehabilitator from Project Wildlife in San Diego, CA now lives in Costa Rica and operates the Center for Earth Concerns, an education center in Heredia, Costa Rica where the conference was held. The center is situated on the top of a beautiful misty mountainside in a privately owned wildlife refuge where parrots fly free. It has two dormitory units where the non-local participants stayed. She did a tremendous job in providing support and logistics for the meeting. Between her and her assistant, three meals a day for about 45 people were cooked every day for six days! Karen, who is a vegan, provided us with a tropical vegan diet. After about 3 days, about a dozen or so of us disappeared down the hill to a local restaurant for some carne!

The workshop provided participants with progress reports on the status of wildlife rehabilitation or confiscation in all of the represented countries. The representatives from HSUS (i.e., Dr. Patrice Klein, Richard Farinato and John Grandy) and Ed Clark and Dr. Ned Gentz of the Wildlife Center of Virginia gave presentations on an array of topics from facilities development to euthanasia. My presentation was on release considerations for rehabilitated wildlife. On one day, functioning work groups tackled various topics and wrote reports. The group I participated in developed a draft protocol for the capture, transport and rehabilitation of wildlife from a veterinary point of view. Each group presented its findings to the entire workshop for further comment. One of the final topics to be considered at the workshop was whether a neotropical wildlife rehabilitation association should be developed. After a lively debate, it was decided that at this time, the best use for everyone's time was to take care of the animals and continue to develop their programs. (Does this sound familiar?) However, such an association is a likely project for future efforts and the need for it was recognized. I was impressed with the pragmatic mind-set the participants had. They were focused on the tasks they had in front of them and were very realistic about apportioning their time and efforts. Carlos Drew, the conference coordinator, will also produce a Spanish language proceedings due out early in 1998.

I left Costa Rica feeling like I had made many new friends and learned much about their approach to the rehabilitation of many unique animals including dolphins which are now being rehabilitated in that part of the world. As the internet becomes more accessible, it is my hope that we can have more interaction with rehabilitators from around the world. We can learn from each other and together we are a stronger force for the animals.

-jan white-

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## *Conference Corner - IWRC'S 25TH ANNIVERSARY*

### *From Science to Reality—A Bridge to the 21st Century!*

### *October 2-5 1997, Concord, California*

### *Conference Highlights*

***Wednesday, October 1, 1997***

- *Basic IAB Skills Seminar*
- *Avian Necropsy Advanced Seminar*

***Thursday, October 2, 1997***

- *IWRC Board of Directors Meeting*
- *Basic IAB Continues*
- *Mammal Necropsy & Volunteer Mngmnt.*
- *Field Trips*
- *Registration Opens*
- *Exhibits Open*
- *Evening "Get Acquainted" Icebreaker*

***Friday, October 3, 1997***

- *General Sessions Begin*
- *Exhibits*
- *Hospitality Suite Opens*
- *IWRC Annual Membership Meeting*
- *Poster Sessions*
- *Evening Roundtable Sessions*

***Saturday, October 4, 1997***

- *General Sessions Continue*
- *Exhibits*
- *Hospitality Suite*
- *Workshops*
- *Veterinary Sessions Begin*
- *Awards Banquet*
- *Silent Auction/Raffle Drawing*
- *Evening Entertainment*

***Sunday, October 5, 1997***

- *General Sessions Continue*
- *Veterinary Topics Continue*
- *Hospitality Suite*
- *Farewell Address & Closing*

***Monday, October 6, 1997***

- *Post Conference Birding Field Trip*