



COMPANION ANIMALS

Trap Injuries to Pets

A questionnaire circulated by the Tompkins County (NY) Society for the Prevention of Cruelty to Animals to a total of ten veterinarians and veterinary clinics revealed that 66 dogs and 93 cats received examination and treatment for trap injuries between July 1, 1979 and January 1, 1980. Thirty-two animals required life-saving limb amputation, while another eight had to be euthanized due to the severity of the injury.

The SPCA of Tompkins County, concerned by the high number of companion animal trap injuries yielded by the short-term survey, urged pet owners and trappers to find a cooperative solution to the problem by observing local leash and trapping laws. (*Tompkins County SPCA Tailbearer*, March, 1980, p. 3). Leash laws and the prohibition of trapping on private lands without the permission of the owner are in part designed to prevent these occurrences. However, rising fur prices have attracted more trappers and thus increased the possibility of careless placement of traps and failure to check the traps every 24 hours as required by law. On the other hand, pet owners who allow their dogs and cats (the latter are not covered by leash laws) to roam freely,

often believing that such 'freedom' is vital to the animals' health and well-being, may in fact be creating the chance for a pet to wander into a trap and incur a serious injury.

U.S. Dog and Cat Ownership Estimates

An updated estimate of dog and cat ownership in the United States has been published by National Family Opinion (NFO), a consumer panel research service headquartered in Toledo, Ohio. In September, 1979, National Family Opinion published a booklet, *NFO Consumer Family Sample 1979-1980*, based on demographic profiles made in 1978 of 100,000 families which are represented in a controlled survey panel balanced in accordance with household characteristics reported by the U.S. Bureau of the Census.

The report indicates that 51% of U.S. families owned a dog during 1978, while 30.6% of all families owned a cat. These statistics reflect a 1.5% average annual increase in dog ownership since a 1976 NFO survey was conducted for the Upjohn Company. Data on cats was not included in that survey; however, a 1975 study conducted by National Analysts for the Pet Food Institute can be used as a basis for comparison. The two surveys indicate an average annual increase of 2.86% in the number of families owning cats.

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LABORATORY ANIMALS

Effects of Caging in Animal Studies

A review article by L.L. Lewis in *Lab Animal* (9:53-58, 1980) provides a useful update of literature citations concerning the microenvironment (as opposed to the more often explored

room-level macroenvironment) of laboratory animals. Factors such as cage dimensions, air exchange and humidity, and related secondary diseases, notably mycoplasma, can be significant experimental variables if not controlled, and also jeopardize the animal's welfare. The review cites many references on the design of rodent cages and the build-up of potentially harmful metabolites, particularly ammonia. The point is also made that heat dissipation rates in dogs are greater in animals kept in isolation in an environmentally-controlled chamber, which may be a stress-response to social isolation.

As the reviewer states, there is an "...infinite number of environmental factors which can alter the homeostatic state of the animal. Such variables compound and confuse experimental results." The review contains only a few references on the influence of noise, lighting and social structure, indicating that more research is needed in these areas, especially in the realm of laboratory animal ethology.

Export Embargo

According to an Indonesian newspaper, the Indonesian government has temporarily suspended all trade in primates beginning 3 February 1980. Certain species were already protected, but this suspension includes the crab-eating macaque (*Macaca fascicularis*) which has taken the place of the rhesus macaque as the leading exported monkey for laboratory research. Other species involved in the suspension include the pigtail macaque and the silver-leaf monkey.

This embargo reduces still further the number of habitat countries which export large numbers of primates mainly for biomedical research. India and Bangladesh introduced embargoes in the last few years, followed by Malaysia. After the Indian ban, the number of monkeys

exported from Malaysia increased rapidly, and concern over this increased demand was partly responsible for the Malaysian action. After Malaysia introduced its embargo, dealers turned to Indonesia.

FARM ANIMALS

Farm Animal Welfare Concerns Recognized

The major national U.S. agricultural weekly, *Feedstuffs* (P.O. Box 67, Minneapolis, MN 55440), published several articles on farm animal welfare in the March 24, 1980 edition.

The articles emphasized that producers must begin to take the concept of farm animal welfare seriously and examine current practices in relation to welfare questions. The recommendations of the Brambell Committee in the U.K. and the subsequent welfare codes that have been established under the British Ministry of Agriculture, Fisheries and Food are noted, and the European Convention on the Protection of Animals Kept for Farming Purposes duly recognized.

These articles represent the first major effort in the United States by an official agricultural-industrial publication to bring matters of farm animal welfare to the attention of livestock and poultry producers.

Malignant Hyperthermia and PSE Meat

A condition known as malignant hyperthermia may provide a key to understanding why certain breeds of pig are more apt to produce pale, soft, exudative meat (PSE meat) upon slaughter. Both malignant hyperthermia, which occurs in humans as well as in swine, and pre-slaughter stress, which seems to be the precipitating factor in the production of PSE meat, involve rapid manufacture of lactic acid caused by intense anaerobic muscle activity. In malignant hyperthermia, the stepped-up muscle me-

tabolism is coupled with large increases in body temperature. In pigs with a high susceptibility to stress, glycogen breakdown continues even after slaughter, and lactic acid, which in the living animal would be removed to the liver via the bloodstream, swiftly accumulates in the muscles. This combination of acidity and still warm tissue produces aesthetically displeasing and commercially unsuitable meat.

As selection for lean breeds of pigs has improved, the incidence of PSE meat and the concomitant economic losses to the pork industry have increased. Although the connection between stress and PSE meat is well-established, researchers have not completely understood why lean pigs succumb to stress more readily than other breeds. However, a recent report by Monica Winstanley of the Meat Research Institute in England (*New Scientist* 84:594-596, 1979) posits that pigs which are highly susceptible to stress (and subsequently produce PSE meat) are also prone to malignant hyperthermia, and that the two conditions share a common origin.

An environmental trigger such as stress or the anesthetic Halothane, plus a genetic predisposition are necessary to induce malignant hyperthermia. The condition is self-perpetuating; unlike the processes of normal anaerobic metabolism which cease when the muscle stimulus is removed, the deranged muscle metabolism associated with malignant hyperthermia cannot "switch off." Scientists at the Meat Research Institute suspect that the abnormality has to do with faulty calcium ion feedback between cell mitochondria and muscle cytoplasm which prevents muscles from relaxing after the stimulus has been removed. Stress causes oxygen deficiency, which in turn stimulates the anaerobic metabolic processes of glycogen breakdown and lactic acid production, the same process which can go awry and result in malignant hyperthermia.

There may also be another damaging feedback mechanism in stressed pigs relating to adrenalin output. Stress increases adrenalin production, which stimulates muscle activity. The lactic acid byproduct of this activity also stimulates production of adrenalin, and the cycle begins anew.

Porcine malignant hyperthermia is presently treated with Dantrolene, a muscle relaxant. In the case of PSE meat, however, the emphasis must be on prevention rather than on treatment. The destructive effects of stress can range from poor post-slaughter meat quality in pigs to 100% mortality rates in wild animals that succumb to capture myopathy, characterized by severe acidemia often leading to heart failure, after a brief, extremely intense chase (A.M. Harthoorn, *The Chemical Capture of Animals*, Bailiere Tindal, London, U.K., 1976, p. 103).

Dr. Winstanley suggests concentrating on stress-resistant breeds, or alternatively, directing efforts toward following established guidelines to minimize stress in animals that are genetically predisposed to failure in coping with stress.

Porcine Aggression: Measurement and Effects of Crowding and Fasting

Studies were conducted to determine the effects of restricted space allowance, fasting and straw bedding on porcine agonistic behavior in growing-finishing pigs (Kelly, K.W., McGlone, J.J. and Gaskins, C.T., *J Anim Sci* 50:336, 1980). Fasting increased agonistic behavior while straw bedding did not reduce biting among growing pigs fed *ad libitum*, but tended to reduce agonistic behavior among fasted pigs. It was concluded that adding straw bedding when pigs are mixed does not reduce aggressive behavior when they are fed *ad libitum*.

WILD ANIMALS

Missing Lynx

Results of a study of demographic changes in the Alberta, Canada lynx population during the winters of 1971-72 through 1975-76 show that continuous trapping can threaten local survival of the species (*J Wildl Manage* 43(4):827-849, 1979).

The primary food source of lynx in these regions is the snowshoe hare. Thus, a decline in the hare population corresponds to a decline in the lynx population, a natural cyclical occurrence. The demographic study was geared toward understanding the impact of human intervention through trapping on an already reduced lynx population during a period of snowshoe hare scarcity.

Researchers collected 1,108 lynx carcasses from trappers in Alberta and from this sample examined the diet, physical condition, reproductive performance, sex, age and mortality of the regional lynx population. Analysis of the food recovered from remains in the gastrointestinal tract of the dead lynx as well as a visual appraisal of the amount of renal and subcutaneous fat on the carcasses revealed that although lynx turned to alternative sources of prey during hare scarcity, they suffered an overall reduction in daily food consumption of 37%. This nutritional lack in turn affected reproductive performance: counts of corpora lutea and placental scars indicated decreases in ovulation and pregnancy rates, and litter sizes. Age analysis of trapping samples (determined by developmental features of the dentition) showed a decline in the kitten population from 66% during the years of hare abundance to 3% during the years of hare scarcity.

The study concludes that the immediate cause of lynx population reduction is postpartum mortality of kittens due primarily to inadequate nutrition. However, increasing fur prices (\$38 per pelt in 1971-72 to \$216

in 1975-76) have heightened trapping activity during this naturally occurring cyclic decline, causing further decreases in lynx numbers. Indeed, starving lynx may be even more susceptible to death by trapping because of more frequent food searches and a consequently greater chance of encountering baited sets.

Since mortality due to natural factors and trapping mortality have an additive effect, the authors of the study recommend cessation of trapping for 3-4 years after the second year of peak kills in order to lessen the severity of the inevitable reduction in the lynx population due to snowshoe hare scarcity. If this practice or some refinement thereof is not adopted, "...intensive trapping could result in local extirpation of lynx during years when recruitment [influx of viable new members into a population] is absent" (p. 827).

Note: The lynx faced a similar fate in France not long ago, but the species is now being reintroduced into the forested mountains of that country. The predatory habits of the lynx include a preference for weak or sick members of abundant species. French officials hope that the lynx will prey on fox cubs, which are often infected with rabies virus, and thus contribute to a reduction in the incidence of the disease (*Uniterra* 4:7, 1979).

Endangered Reptiles

The U. S. Fish and Wildlife Service added five reptile species to its List of Endangered and Threatened Wildlife and Plants: the San Esteban Island chuckwalla of Mexico, the Fiji Island banded iguana, the Fiji Island crested iguana, and two species of Round Island boas. Commercial exploitation and habitat destruction have contributed to their endangerment. These reptiles do enjoy degrees of protection in their native countries, but the "endangered status" will tighten U.S. importation restrictions and allow U.S. funds to aid conservation programs in the species' countries of origin.