USING TAME HAND-REARED BIRDS IN FIELD STUDIES

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The purpose of this paper is to review and discuss the use of tame hand-reared birds in field studies. We have limited our review to field studies in which undomesticated species of birds have been: 1) hatched and reared, or at least reared, in captivity, 2) tamed, imprinted, or trained by humans, 3) released and studied in a natural environment, and 4) retrieved in a manner made possible by previous imprinting or training. Thus, we have excluded many studies in which either wild-caught or captive-reared birds have been held and studied in semi-natural enclosures. Although few studies meeting our criteria have been carried out, recent experiences with raptors, corvids, and game birds indicate this approach has great potential as an aid to research. Here, we present a short introduction to the subject, review selected examples of the technique, and discuss some advantages and disadvantages of using tame hand-reared birds in field investigations.

Most domesticated animals are propagated in captivity and kept in some degree of confinement. But some--hunting dogs, for example--are trained to venture into natural environments, perform some task while free-ranging, and then return. A select group of undomesticated animals have also been trained by man, though he has traditionally not

propagated them in captivity. Animals such as elephants, falcons, and cormorants have been trapped in the wild, coerced into some association with their keeper, and then trained to perform some useful task. The bonds which develop between man and his trained animals have been the subjects of many classical studies, including those of Darwin (1868), Hediger (1965), Lorenz (1970), and Hess (1973). These scientists have described the behavioral mechanisms which enable us to tame and train virtually any animal.

The use of tame animals in field studies represents a relatively new line of scientific investigation. Trained domestic animals have been used in laboratory investigations for many years, as have wild animals brought into confinement. But the use of free-ranging tame wildlife has opened many possibilities for investigating phenomena that are difficult to study with either caged or wild animals (Healy and Goetz 1974, Lorenz 1970). These studies have addressed problems in ethology, physiology, and ecology as well as other more applied disciplines.

ETHOLOGICAL STUDIES USING TAME BIRDS

Ethologists were among the first scientists to study tame free-ranging birds in natural settings. Konrad Lorenz pioneered behavioral studies of "free-flying" birds, and he made major contributions to the study of avian social behavior and social interactions among conspecifics and "companions" (Lorenz 1970). His years of observing imprinted, free-ranging Graylag Geese (Anser

anser), for example, contributed greatly to our understanding of waterfowl behavior (Lorenz 1954, 1978).

Biologists have also used tame birds to describe foraging behavior. Kenward (1978) described the outcomes of attacks by a trained Goshawk (Accipiter gentilis) on Woodpigeons (Columba palumbus). The use of the trained Goshawk allowed him to observe at close range many more attacks than he could have otherwise. Croze (1970) studied the foraging behavior of tame Carrion Crows (Corvus corone), with particular emphasis on the mechanisms of their food-searching behavior. Tame crows allowed him to observe foraging behavior at closer range than would have otherwise been possible. Cade (1967) was able to study the predatory behavior of tame free-ranging Northern Shrikes (Lanius excubitor) by training them with slightly modified falconry techniques. Tame birds have also been used in studies of migration. Bartlett and Bartlett (1973) integrated imprinted Snow Geese (Anser caerulescens) into flocks of wild birds to study several aspects of their migratory behavior.

PHYSIOLOGICAL STUDIES USING TAME BIRDS

Physiologists have had difficulty measuring the metabolic rates of birds in flight. The use of the doubly-labeled water technique has, however, allowed researchers to measure metabolic rates in birds that are recaptured after short periods of free flight. Tame birds have been invaluable in these experiments (LeFabvre 1964, Pearson 1964). Studies of the neurobiology and behavior of homing have been dominated by the use of tame Rock Doves (Columba liva), which are

comfortable being handled and return reliably after each release (Schmidt-Koenig 1983).

ECOLOGICAL STUDIES USING TAME BIRDS

Many recent field studies involving tame birds have addressed ecological questions. Ecologists have found trained or imprinted birds particularly useful in studies of predator-prey relationships and habitat associations. Eutermoser (1961) used trained Peregrine Falcons (Falco peregrinus), Gyrfalcons (Falco rusticolus), and Lanner Falcons (Falco biarmicus) to show that these predators selected prey which were less fit than individuals in a shot sample. Kenward (1978) used a trained Goshawk to determine the factors which affected hunting success and prey selection when Goshawks attacked Woodpigeons. Temple (1987) used a trained Red-tailed Hawk (Buteo jamaicensis) to show that substandard individuals are only captured disproportionately if the prey species is normally difficult to capture.

Other researchers have used tame birds to study food habits and food availability. Pehrsson (1979, 1984) used imprinted Mallards (Anas platyrhynchos) to determine the suitability of the food supply in different types of lakes. Several authors have used imprinted Wild Turkey (Meleagris gallopavo) chicks to determine the availability and use of food in different habitats (Hurst and Stringer 1975, Martin and McGinnes 1975, Anderson and Samuel 1980, Healy 1985,). Kimmel (1982) and Kimmel and Samuel (1984) used imprinted Ruffed Grouse (Bonasa umbellus) to determine the diets of grouse chicks in different

at distances greater than the trapper could detected them unaided (Michell 1900). Temple flew a trained Merlin (Falco columbarius) over dense forest stands to lure out wild pairs of Merlins that were hard to detect except when they were defending their territory against an intruder.

Tame birds have also been used in the field as decoys or lures to attract wild birds. Tame "call birds" have been used by waterfowl hunters for hundreds of years (Bruette 1929). Pakistani crane hunters train tame Common Cranes (Grus grus) to call on command and lure in migrating wild cranes (S. Landfried, pers. comm.). Lorenz (1970) lured his flock of tame Jackdaws (Corvus monedula) back into their quarters by retaining several members of the flock in the cage. Trained Great Horned Owls (Bubo virginianus) have been used to lure Northern Harriers (Hamerstrom 1963) and Swainson's Hawks (Buteo swainsoni) (Bechard 1983) into nets.

Tame birds can also be used to scare other species away. De la Fuente (1970) and other falconers have flown trained falcons at airports to scare other birds away from runways, where they posed a hazard to aircraft.

ADVANTAGES TO USING TAME BIRDS

The most obvious advantages of using tame birds in field studies are: 1) they do not become disturbed when handled or studied at close range, 2) they can be placed in preselected natural situations for observation, and 3) their movement and activity can be controlled to some extent, if necessary.

Rare birds and elusive birds present difficulties for field researchers. A researcher's time and effort are often so consumed pursuing chance observations that resulting sample sizes are small or inadequate. We found imprinted Himalayan Snowcocks to be essential for studying foraging ecology because wild snowcocks seldom allowed us to approach close enough for observation; even at great distances, the sight of a person made the birds nervous. Bartlett and Bartlett (1973) found it much easier to closely observe the migration of imprinted Snow Geese than wild birds. Broods of precocial birds (such as waterfowl and game birds) are secretive and the brood-rearing period lasts only a short time; the use of imprinted broods has aided several researchers studying the behavior and ecology of broods (e.g., Hurst and Stringer 1975, Healy 1985, Hunter et al. 1985). It is also difficult to observe predators in the act of making a kill, so the use of tame predators has allowed researchers to greatly increase the frequency with which they observe the act of predation (e.g., Eutermoser 1963, Kenward 1978, Temple 1987).

A key feature of using tame birds is the researcher's ability to manipulate the subjects. Rather that waiting for a wild subject to appear in a particular environment or following wild birds until they enter such an environment, a researcher can release tame birds in the specific environment of interest to him. Hunter et al. (1986), for example, released imprinted Black Duck ducklings in ponds that varied with respect to acidity and productivity. We observed foraging behavior of imprinted snowcocks that were released on plots showing 16

different combinations of vegetative characteristics. Kenward (1978) observed differences in the hunting behavior of a tame Goshawk in vegetable fields, grassland, and stubble habitats, and Healy (1985) observed foraging behavior of tame turkey chicks in 6 habitat types. Wallace and Temple's use of a tame Andean Condor for testing radio-telemetry attachments and the Nelsons' work with Golden Eagles landing on power lines illustrate the researcher's ability to conduct a field experiment many times in succession, making specific adjustments each time.

Of particular interest in physiological and behavioral studies is the reduced stress tame birds exhibit when being handled or observed closely. Wild birds behave abnormally and many of their physiological parameters are severely altered when they fear the researcher. The physiological condition of a bird is also an important factor influencing its behavior. Since tame hand-reared birds are generally fed good diets, they are typically maintained in good condition. As a result their behavior may be more uniform than wild birds that have been exposed to unknown stresses.

An advantage to working closely with tame hand-reared birds that often goes unmentioned in the technical literature is the greater appreciation and overall understanding a researcher gains of his subject. Many field biologist have difficulty gaining such an intimate understanding from short, distant, glimpses of wild birds in the field. Though untamed birds kept in captivity can provide some

insights, tame hand-reared birds in natural settings are clearly superior subjects.

There are also economic advantages to using tame hand-reared birds. Since one can be confident that a tame, well-cared-for bird is less likely to escape or perish, the researcher can invest more on each individual. One feels more comfortable, for example, fitting expensive experimental devices to birds that will almost certainly return than to wild individuals that may never be recovered. But, this benefit also suggests a possible disadvantage to using hand-reared birds: the money and time one typically invests in a few tame individuals makes them invaluable, and their continued fitness often becomes critical for completion of the study.

DISADVANTAGES TO USING TAME BIRDS

Taming, imprinting, and training hand-reared birds involve great investments of time. To successfully imprint galliform or anseriform birds to human beings, the researcher must handle hatchlings regularly during the first day after hatching (Hess 1973). Training young raptors to tolerate human beings as hunting partners and to return on command takes many weeks (Glasier 1978). After imprinting or training, birds must then be handled on a regular basis to maintain good performance.

Probably the greatest problem involved in using tame, hand-reared birds is the difficulty of knowing how closely these birds actually resemble their wild counterparts. This problem is particularly severe when the bird has been deprived of critical learning opportunities

that are typical of wild individuals. Many authors have failed to provide evidence that their tame birds behaved as wild birds would with respect to the phenomenon they were studying (e.g., Healy and Goetz 1974, Healy et al. 1975, Hurst and Stringer 1975, Martin and McGinnes 1975, Anderson and Samuel 1980, Healy 1985). In a few cases though, researchers have provided good evidence of the normality of the tame subjects. Temple (1987), for example, showed that his trained hawk captured wild prey at rates and in proportions that were statistically similar to wild birds.

There are almost certainly both learned and genetically encoded components to most behaviors in birds (Krebs and Davies 1978). Lacking natural parents as role models, or normal experiences to reinforce behaviors, the learned component of a hand-reared bird's behavior is bound to be flawed to some degree. Sparrowe (1972) has noted hand-reared American Kestrels (Falco sparverius) "became highly conditioned to [a] test system, and attacked in situations where wild-trapped birds [did] not attack," presumably because their artificial environment had provided no disagreeable foraging experiences.

There are, nonetheless, usually appropriate means of demonstrating that tame hand-reared birds are responding within the range of variation shown by normal wild individuals. It is essential that researchers present at least a small sample of comparative data from wild birds against which the performance of tame birds can be

judged. Without such evidence, readers should be skeptical of conclusions that are based solely on observations of tame birds.

CONCLUSIONS

In conclusion, we feel tame hand-reared birds can and should be used to approach many more problems in field biology. Those birds which have proven manageable in captivity are all likely candidates, particularly those which are known to be easily trained (e.g., Falconiformes, Psittaciformes, and certain Passeriformes) and the more easily imprinted precocial forms (e.g., Anseriformes and Galliformes). The technique greatly enhances data collection with rare and elusive species, and greatly reduces the technological difficulties encountered in physiological studies of free-ranging birds. To insure that conclusions are not severely biased, however, findings from tame hand-reared birds should always be accompanied by comparable data from wild birds to show that tame birds have responded in a normal fashion.

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