2005

# Alien Birds in North America – Challenges for Wildlife Managers

Michael Avery
*USDA, APHIS, Wildlife Services, National Wildlife Research Center, Gainesville, FL, USA*

Eric Tillman
*USDA, APHIS, Wildlife Services, National Wildlife Research Center, Gainesville, FL, USA*

# ALIEN BIRDS IN NORTH AMERICA – CHALLENGES FOR WILDLIFE MANAGERS

MICHAEL L. AVERY, USDA, APHIS, Wildlife Services, National Wildlife Research Center, Gainesville, FL, USA
ERIC A. TILLMAN, USDA, APHIS, Wildlife Services, National Wildlife Research Center, Gainesville, FL, USA

***Abstract:*** In Executive Order 13112 "Invasive Species", an alien species is defined as one "that is not native" to a particular ecosystem. In North America today, there are nearly 100 alien bird species with self-sustaining populations. These include numerous game birds (primarily gallinaceous birds) and escaped pet birds (primarily psittacine species). Others, such as house sparrows (*Passer domesticus)*, European starlings (*Sturnus vulgaris)*, and mute swan (*Cygnus olor)*, were originally introduced for aesthetic reasons or to control agricultural insect pests. The establishment of alien bird populations through purposeful or accidental introductions has resulted in numerous problems including crop damage, transmission of disease, adverse impacts to native species, and aircraft safety concerns. The estimated cost associated with alien bird species in North America approaches $2 billion annually. Although many alien bird species apparently cause minimal or no harm, others are considered persistent and destructive pest species. The challenge for wildlife managers often is one of public opinion and education rather than identifying effective management and control strategies. For many bird damage situations, techniques currently exist for addressing the specific problem, and ongoing research is providing new tools. Many times, however, the will of the public overrides the scientific and economic need to manage aggressively to reduce detrimental alien bird populations. Specific examples of this dilemma for wildlife managers are provided by case studies featuring monk parakeets (*Myiopsitta monachus)*, and mute swan.

***Key words:*** alien species, introduction, invasive species, native species

Proceedings of the 11th Wildlife Damage Management Conference. (D.L. Nolte, K.A. Fagerstone, Eds). 2005

## INTRODUCTION

By some estimates, as many as 97 non-native bird species have self-sustaining populations in the United States (Temple 1992). Many of these species are now fixtures in the avifauna of the country. The ring-necked pheasant (*Phasianus colchicus)* and gray partridge (*Perdix perdix)* are widely hunted species. The European starling (*Sturnus vulgaris)*, rock pigeon (*Columba livia)*, and house sparrow (*Passer domesticus)* regularly occur in large numbers in urban and agricultural locales throughout the country. Other species such as the monk parakeet (*Myiopsitta monachus)* in Florida, the red-crowned parrot (*Amazona viridigenalis)* in California, and the Eurasian tree sparrow (*Passer montanus)* in Missouri are common locally but currently are geographically restricted.

Application of consistent nomenclature clarifies a non-native species' origin and impact; we will apply definitions from Executive Order 13112 "Invasive Species" published in February 1999. An "alien species" is a species not native to the

ecosystem under consideration. An "invasive species" is an alien species whose introduction is *likely to cause harm* (emphasis added), either economically, environmentally, or to human health. An "introduction" is the placement of a species into an ecosystem as a result of human activity. A "native species" is one that occurs in a particular ecosystem not as a result of an introduction.

Thus, while all species mentioned in the first paragraph are alien species, they might not all be invasive species. It is not clear what harm species such as the gray partridge or the red-crowned parrot are doing. Further, species that have exhibited range expansions in recent time unaided by human intervention are deemed native. These include the cattle egret (*Bubulcus ibis)*, originally an Old World species that reached South America from Africa and then spread northward (Telfair 1994). Breeding was recorded in Florida in 1953 (Kale and Maehr 1990) and cattle egrets are now widely distributed throughout the US. The shiny cowbird (*Molothrus bonariensis)* arrived unaided to the Florida Keys in 1985 from the Caribbean, is now considered to be a permanent resident in south Florida, and continues to spread north and west (Lowther and Post 1999).

Management of alien species should focus on those considered invasive, that is those whose presence is causing, or likely will cause, harm. The major invasive bird species that are of management concern in the continental United States are the house sparrow, rock pigeon, and European starling. These species are so entrenched in their adopted home that it seems unthinkable to be without them. Their success is attributable to their opportunistic nature and ability to exploit human-altered environments for food, roost sites, and nesting. They exhibit basically a parasitic lifestyle in that they exist on anthropogenic resources and provide little if any benefit in return. In commensal associations, members of one species assist the foraging of another, but incur no significant costs and receive no benefits. These species, however, generate substantial costs in a number of areas and highlight the threats from introduction of alien species.

**Impacts to Native Species**

Numerous examples exist of the negative impact invasive species have on native birds. European starlings compete aggressively for nesting cavities, often to the detriment of native birds (Kerpez and Smith 1990). Similarly, house sparrows will supplant and even kill native species attempting to use nest boxes (Gowaty 1984, Radunzel et al. 1997). Mute swan adversely affect habitat for native waterfowl species and even displace colonial nesting waterbirds (Conover and Kania 1994, Maryland Department of Natural Resources 2003). In Hawaii, alien birds have facilitated the spread of mosquito-borne diseases that have decimated native bird populations (Warner 1968).

**Agricultural Damage**

The European starling is known for its propensity to damage fruit crops, sprouted seeds, and livestock feedlots (Dolbeer et al. 1978, Somers and Morris 2002). Ring-necked pheasant damage to sprouting corn can be locally severe (Besser and Knittle 1976).

**Nuisance Roosts and Structural Damage**

Starlings are major components of winter blackbird roosts which are noisy, smelly and generally not aesthetically pleasing (Dolbeer et al. 1978, Mott 1980). Urban house sparrows, starlings and rock pigeons constantly foul structures and property with droppings. Monk parakeets offer unique challenges through their habit

of constructing large nests of sticks on electric utility facilities (Avery et al. 2002, Tillman et al. 2004). Wet nest material causes short circuits which in turn damage facilities and create economic losses for the companies and their customers.

**Human Health and Safety**

Histoplasmosis is a serious respiratory ailment caused by fungal spores produced in excrement under large starling-blackbird roosts (D'Alessio et al. 1965, Stickley and Weeks 1985). This, however, is just one of over 60 transmissible diseases known to occur in starlings, house sparrows and rock pigeons (Weber 1979). Fecal contamination from these 3 species is a major concern in food production and storage facilities (Baur and Jackson 1982). Since 1990, European starlings and rock pigeons have been involved in approximately 2000 aircraft strike incidents that resulted in losses of approximately $4.5 million (Cleary et al. 2003).

Pimentel et al. (2000) estimated that costs associated with invasive bird species, principally pigeons and starlings, approach $2 billion annually. Unfortunately, the origin of this cost estimate is not very well documented. Most of it is based on a cost of $9/bird derived from a report on pigeon control operations in Basel, Switzerland (Haag-Wackernagel 1995). Regardless of the exact monetary figure, it is obvious that pigeons, starlings, house sparrows and other alien bird species are responsible for substantial costs due to a variety of impacts. Although the European starling and the house sparrow are among the most common and most widespread breeding birds in the US, each species has experienced a general population decline since the 1960's (Figure 1). The decline in house sparrow populations in the US mirrors a similar trend in the UK which has yet to be satisfactorily explained (Duncan 1996, Summers-Smith 2003).

Wildlife professionals, facility managers, and private citizens have numerous tools and techniques with which to combat the impacts of house sparrows, starlings and pigeons (Hyngstrom et al. 1994). The list of visual, acoustic and chemical methods will not be reviewed again here. Instead we want to highlight 2 case studies of alien bird species that represent different challenges for wildlife managers.

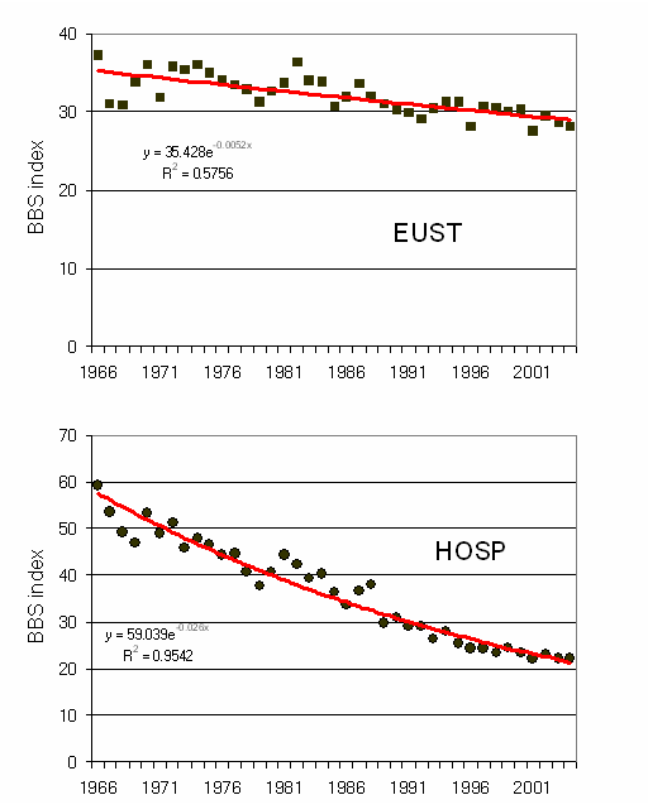


**Figure 1. Population trends of European starling (EUST) and the house sparrow (HOSP) throughout the USA as determined by the Breeding Bird Survey, 1966-2004. Data are from Sauer et al. 2005.**

## CASE STUDIES

**Mute Swan**

This large, attractive Eurasian species was released by private individuals

in New York prior to 1900, but there is no record of when the initial introduction actually occurred (Long 1981). The species now occurs from Massachusetts south to Virginia, as well as in Michigan, Oregon and several other states. The population trend for this species in the US, as judged by the Breeding Bird Survey, has been steadily upward (Figure 2; Sauer et al. 2005). The recent trend in Maryland has been even more dramatic (Figure 2). In Maryland, 5 birds escaped in 1962, and the population now approaches 4,000 (Maryland Department of Natural Resources 2003).

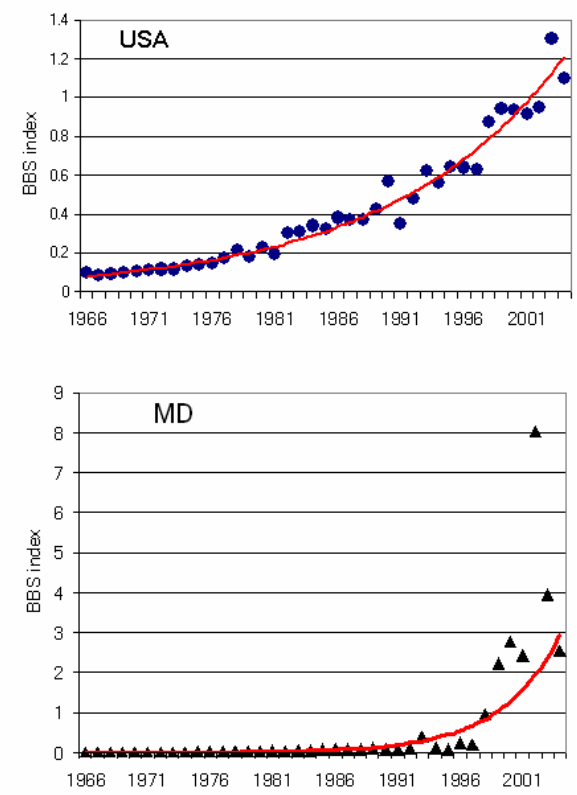


**Figure 2. Population trends of the mute swan throughout the USA and in Maryland as determined by the Breeding Bird Survey, 1966-2004. Data are from Sauer et al. 2005.**

Despite their aesthetic appeal, mute swans pose a series of concerns (Maryland Department of Natural Resources 2003). They sometimes threaten or directly attack people who get too close to their nest or young. Aggressive behavior exhibited by these large birds can pose a safety risk, especially to small children. Mute swans consume enormous quantities of submerged aquatic vegetation. It is estimated that 4,000 mute swan could annually consume about 12% of the submerged aquatic vegetation biomass in the Chesapeake Bay. Submerged aquatic vegetation is critical to the health and well being of a myriad of Bay organisms. Grazing of this resource by mute swans reduces the capacity of the remaining submerged aquatic vegetation beds to support wintering waterfowl and other fish and wildlife populations. Mute swans occupy and defend relatively large territories of wetland habitat during nesting, brood rearing and foraging, and thus compete with native birds for habitat. They displace native waterfowl from breeding and staging habitats and have been reported to attack, injure, or kill other wetland birds. Mute swans can reach 1 m under water to graze vegetation, and they are present year-round unlike native tundra swans (*Cygnus columbianus)* which overwinter in the Chesapeake Bay. Thus, the mute swans' impact on native submerged vegetation is extensive, both temporally and spatially. In the early 1990's, 600-1,000 mute swans established a loafing area on oyster shell bars and beaches used as nesting sites by black skimmers (*Rynchops niger)* and least terns (*Sterna antillarum)*. This resulted in abandonment of the site by these threatened waterbird species. The destabilizing effects of mute swan on Chesapeake Bay plant and animal communities place it in the category of a "strongly interacting nonindigenous species" and signals the need for prompt and effective management actions (Heiman 2005, Soulé et al. 2005). In 2003, the Maryland DNR initiated a program of mute swan population control that included egg addling and culling adults. This management program barely got underway

before it was halted through a legal challenge that resulted in a Federal court ruling that declared the mute swan protected under the Migratory Bird Treaty Act (MBTA). This ruling, in turn, lead to the passage of the Migratory Bird Treaty Reform Act (MBTRA) of 2004. As a consequence of the new legislation, the US Fish and Wildlife Service published new guidelines that specifically removed the mute swan and dozens of other alien bird species from Federal protection under the MBTA. In the wake of these new developments, the Maryland DNR planned to resume a large-scale egg addling program in April 2005. The mute swan management program is again on hold, however, because the Humane Society of the United States and others recently challenged the MBTRA in Federal court.

**Monk Parakeet**

This South American species has a reputation for causing substantial crop damage in its native range (Mott 1973). Thus, in the early 1970's when free-flying parakeet populations started showing up in greater and greater numbers, US wildlife and agriculture officials became alarmed at the potential crop damage that could occur here. In response to that concern, a parakeet eradication effort was initiated in 1973 under the direction of the US Fish and Wildlife Service (Neidermyer and Hickey 1977). The 3-year effort resulted in 163 parakeets being killed, mostly by shooting. Since then, the nationwide population has grown exponentially (van Bael and Pruett-Jones 1996).

Although monk parakeets do cause some local crop damage (Tillman et al. 2001), in the US, no widespread agricultural impacts have yet emerged. Instead, the parakeets have become problems for the electric utility industry because of their habit of constructing large nests of sticks and branches on utility poles, transmission line support towers, and electric substations (Avery et al. 2002). Wet nest material then causes short circuits and power outages. Research to alleviate this problem is ongoing. To date, trapping birds at their nest followed by removal of the nest is the most effective technique for coping with localized problem nests on a short-term basis (Tillman et al. 2004). Application of a hand-held red laser is an effective scare tactic to dislodge parakeets temporarily from their nest sites. Despite repeated use of the laser, however, the birds do not stay away (Avery et al. 2002).

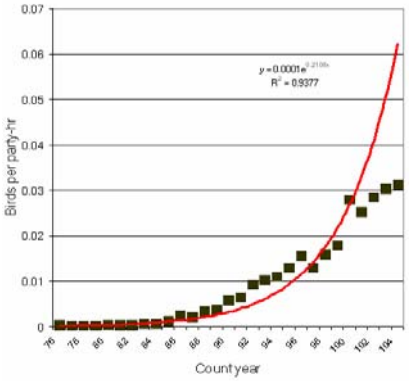


**Figure 3. Population trend of the monk parakeet throughout the USA as determined by data from the Christmas Bird Count, 1975-2003. Values for the graph were obtained online at: *http://www.audubon.org /bird/cbc/hr/index.html***

Ultimately some form of population reduction will probably have to be implemented to slow the expansion of the species because parakeet populations show no sign of leveling off (Figure 3) (van Bael and Pruett-Jones 1996). Factors that limit many bird populations such as predation, food, and availability of nest sites are not operative because of the parakeet's ability to exploit the abundance of resources provided by humans. This suggests that current problems will only get worse without intervention. Lethal control is unpopular,

however, as many people enjoy the sight of these birds at their backyard feeders or in community parks (Spreyer 1994). An alternative that might prove feasible is the application of a chemosterilant that would reduce reproductive output but not kill the birds (Avery et al. 2005).

## MANAGEMENT IMPLICATIONS

For the most part, current methods are adequate to address problems attributed to invasive bird species. The major issue is that wildlife managers are often not free to apply the most effective techniques to solve problems caused by invasive species. The constraint is particularly prominent in situations that involve lethal control measures. Public attitudes which often become manifested in actual or implied legal challenges or lawsuits can seriously delay or even prevent implementation of the most appropriate management actions. Concerted public education efforts can sometimes overcome attitudes against management of wildlife populations, and such efforts are certainly desirable when lethal control measures are contemplated. Effective education presupposes that adequate scientific data exist upon which to base a sound management program. If such data are not available then attempts to justify a proposed plan that involves population reduction will likely fail. It will be important to have reliable information on the status of the population targeted for reduction as well as thorough documentation of the adverse impacts the birds are having.

A contrary view is offered by Simberloff (2003) who argues for swift and decisive action to eradicate invasives before they become major problems. This "quick and dirty" strategy is necessary because during the time that biologists and wildlife managers amass data on the population and the effects it is having, the animals multiply or disperse and the problems become harder to address successfully. While this approach might be possible when incipient invasive populations are small and isolated, it has limited utility for control of established invasive populations. In addition, Simberloff does not consider the role that public opinion would play in implementation of his strategy. A "quick and dirty" response, unless conducted surreptitiously, is likely to attract attention. If the proper groundwork for the operation has not been laid, subsequent public reaction will likely be negative which will complicate more comprehensive management efforts. More stringent laws and beefed-up enforcement of existing regulations are necessary to preventing establishment of new invasive bird populations.

For managing existing invasive bird populations, increased public appreciation of the need for effective control measures is necessary. This can best be achieved through science-based public awareness and education programs (Temple 1992).

## LITERATURE CITED


AVERY, M.L., E.C. GREINER, J.R. LINDSAY, J.R. NEWMAN, AND S. PRUETT-JONES. 2002. Monk parakeet management at electric utility facilities in south Florida. Proceedings of the Vertebrate Pest Conference 20:140-145.

_____, J.R. LINDSAY, J.R. NEWMAN, S. PRUETT-JONES, AND E.A. TILLMAN. 2005. Reducing monk parakeet impacts to electric utility facilities in south Florida. Advances in Vertebrate Pest Management. In press.

BAUR, F.J., AND W.B. JACKSON, editors. 1982. Bird control in food plants. American Association of Cereal Chemists. St. Paul, MN, USA.

BESSER, J.F., AND C.E. KNITTLE. 1976. Mesurol 50 percent HBT for protecting sprouting corn from pheasants in Iowa and South Dakota. Proceedings of the Bird Control Seminar 7:225-227.

CLEARY, E.C., R.A. DOLBEER, AND S.E. WRIGHT. 2003. Wildlife strikes to civil aircraft in the United States 1990-2002. Federal Aviation Administration National Wildlife Strike Database Serial Report 9.

CONOVER, M.R., AND G.S. KANIA. 1994. Impact of interspecific aggression and herbivory by mute swans on native waterfowl and aquatic vegetation in New England. Auk 111:744-748.

D'ALESSIO, D.J., R.H. HEEREN, S.L. HENDRICKS, P. OGILVIE, AND M.L. FURCOLOW. 1965. A starling roost as the source of urban epidemic histoplasmosis in an area of low incidence. American Review of Respiratory Disease 92:725-731.

DOLBEER, R.A., P.P. WORONECKI, A.R. STICKLEY, JR., AND S.B. WHITE. 1978. Agricultural impact of a winter population of blackbirds and starlings. Wilson Bulletin 90:31-44.

DUNCAN, R.A. 1996. House sparrow (*Passer domesticus*) trends in coastal northwest Florida-Alabama based on Christmas bird count data. Alabama Birdlife 42:1-2.

GOWATY, P.A. 1984. House sparrows kill eastern bluebirds. Journal of Field Ornithology. 55:378-380.

HAAG-WACKERNAGEL, D. 1995. Regulation of the street pigeon in Basel. Wildlife Society Bulletin 23:256-260.

HEIMAN, K. 2005. Strongly interacting nonindigenous species. BioScience 55:548.

HYGNSTROM, S.E., R.M. TIMM, AND G.E. LARSON, editors. 1994. Prevention and control of wildlife damage. University of Nebraska, Lincoln, NE, USA.

KALE, H.W. II, AND D.S. MAEHR. 1990. Florida's birds, a handbook and reference. Pineapple Press, Sarasota, FL, USA.

KERPEZ, T.A., AND N.S. SMITH. 1990. Competition between European starlings and native woodpeckers for nest cavities in saguaros. Auk 107:367-375.

LONG, J.L. 1981. Introduced birds of the world. Universe Books. New York, NY, USA.

LOWTHER, P., AND W. POST. 1999. Shiny cowbird (*Molothrus bonariensis*). The birds of North America, No. 399. The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C., USA.

Maryland Department of Natural Resources. 2003. Mute swans in Maryland: A statewide management plan. Wildlife and Heritage Service. On-line access at: *www.dnr.state.md.us/wildlife/msfinaltoc.html*

MOTT, D 1973. Monk parakeet damage to crops in Uruguay and its control. Proceedings of the Bird Control Seminar 6:79-81.

_____. 1980. Dispersing blackbirds and starlings from objectionable roost sites. Proceedings of the Vertebrate Pest Conference 9:38-42.

NEIDERMYER, W.J., AND J.J. HICKEY. 1977. The monk parakeet in the United States, 1970-1975. American Birds 31:273-278.

PIMENTEL, D., L. LACH, R. ZUNIGA, AND D. MORRISON. 2000. Environmental and economic costs of nonindigenous species in the United States. BioScience 50:53-65.

RADUNZEL, L.A., D.M. MUSCHITZ, V.M. BAULDRY, AND P. ARCESE. 1997. A long-term study of the breeding success of eastern bluebirds by year and cavity type. Journal of Field Ornithology 68:7-18.

SAUER, J.R., J.E. HINES, AND J. FALLON. 2005. The North American breeding bird survey, results and analysis 1966 - 2004. Version 2005.2. USGS Patuxent Wildlife Research Center, Laurel, MD, USA.

SIMBERLOFF, D. 2003. How much information on population biology is needed to manage introduced species? Conservation Biology 17:83-92.

SOMERS, C.M. AND R.D. MORRIS. 2002. Birds and wine grapes: Foraging activity causes small-scale damage patterns in single vineyards. Journal of Applied Ecology 39:511-523.

SOULÉ, M.E., J.A. ESTES, B. MILLER, AND D.L. HONNOLD. 2005. Strongly interacting species: Conservation policy, management, and ethics. BioScience 55:168-176.

SPREYER, M. 1994. Mayor Washington's birds: The legendary monk parakeets of Chicago's Hyde Park. Birder's World 8:40-43.

STICKLEY, A.R. JR., AND R.J. WEEKS. 1985. Histoplasmosis and its impact on blackbird/starling roost management. Proceedings of the Eastern Wildlife Damage Control Conference 2:163-171.

SUMMERS-SMITH, J.D. 2003. The decline of the house sparrow: A review. British Birds 96:439-446.

TELFAIR, R.C. II. 1994. Cattle egret (*Bubulcus ibis*). The birds of North America, No. 113. The Academy of Natural Sciences, Philedelphia, PA, and The American Ornithologists' Union, Washington, D.C., USA.

TEMPLE, S.A. 1992. Exotic birds: A growing problem with no easy solution. Auk 109:395-397.

TILLMAN, E.A., A.C. GENCHI J.R. LINDSAY, J.R. NEWMAN, AND M. L. AVERY. 2004. Evaluation of trapping to reduce monk parakeet populations at electric utility facilities. Proceedings of the Vertebrate Pest Conference 21:126-129.

_____, A. VAN DOORN, AND M.L. AVERY. 2001. Bird damage to tropical fruit in south Florida. Proceedings of the Eastern Wildlife Damage Management Conference 9:47-59.

VAN BAEL, S., AND S. PRUETT-JONES. 1996. Exponential population growth of monk parakeet in the United States. Wilson Bulletin 108:584-588.

WARNER, R.E. 1968. The role of introduced diseases in the extinction of the endemic Hawaiian avifauna. Condor 70:101-120.

WEBER, W.J. 1979. Health hazards from pigeons, starlings and English sparrows. Thomson Publications. Fresno, CA, USA.