Annotated Bibliography on the Ecology and Management of Invasive Species House Sparrow (*Passer domesticus*)

Prepared by Carrina Maslovat, Victoria BC
For the Garry Oak Ecosystems Recovery Team
and the Nature Conservancy of Canada
Funding supplied by the Habitat Stewardship Program of the Government of Canada

January, 2003

Ace Bird Proofing Division, Ace doors Nergeco Partner. 2002. Problems caused by urban birds. Website: www.birdproofing.co.nz/birds.htm Accessed: November 19, 2002.

Ace Bird Proofing Division is a business that provides structural birdproofing of commercial sites in New Zealand. The website provides an extensive list of diseases carried by bird pests including *Campylobacter* spp, *Eschericia coli* 0157, *Listeria* spp, *Salmonella* spp, *Vibrio cholerae, Cryptococcus neoformans* and *Histoplasma capsulatum.* However, it is not clear which of these diseases are carried by house sparrows. Scaring devices are not an effective control method for house sparrows. Preventing entry to buildings and nest sites is the best option but it is difficult because sparrows are small and agile. Netting with a mesh of 19 mm is recommended for sealing openings in buildings but netting that can trap native birds should not be used in Garry oak ecosystems. Avicides such as Alphachloralose may be effective for removing individual sparrows but they require special licenses in New Zealand and are not available in Canada.

ADAS Pest Consultancy Services. 2001. ADAS pest manual: a reference manual for the management of pests. Website: www.adas.co.uk/env/environment/PestMgt/BIRDS2.pdf Accessed: November 23, 2002.

This manual was prepared as a collaboration between ADAS Pest Consultancy Services and the British Pest Control Association to guide technicians dealing with invasive species. The manual is designed to be used with pest control training courses. Species description, habitat and biology of house sparrows is as detailed by other references. House sparrows impact food premises (by spoiling foodstuffs, spreading diseases), gardens (by pecking produce and bulbs and by eating buds) and livestock areas (by

spreading disease). Bird proofing after removal of individual birds is the best control option. One way wire cone traps are effective if baited with the food house sparrows are accustomed to eating. Pre-baiting is not necessary to trap house sparrows. Traps should be checked at least twice a day and the birds should be humanely euthanised. The recommended euthanasia technique is cervical dislocation accomplished by holding the bird against the edge of a table and pressing with the thumb. Stupefying baits such as alphachloralose are used to remove house sparrows from urban buildings. These baits are not available in Canada.

Agriculture Western Australia. 2000. Farmnote No. 117/99: Sparrows. More information from the website: www.agric.wa.gov.au. Accessed: November 23, 2002.

This fact sheet is designed to be used by the general public to identify house and tree sparrows, understand their basic life history and develop an awareness of the impacts of these species. The species description and distribution information is the same as detailed in other references. House sparrows are closely associated with human habitation and they are found in a range of open and semi-open habitat. They usually congregate in large flocks. House sparrows nest in holes in buildings, tree cavities, haystacks or woodpiles. House sparrows eat fruit and cereal crops and damage stored feed and grain with their droppings. House sparrows cause damage to buildings by blocking downspouts and gutters. House sparrows also compete with native birds for food and nesting sites.

Altwegg, R., T. H. Ringsby and B. E. Saether. 2000. Phenotypic correlates and consequences of dispersal in a metapopulation of house sparrows *Passer domesticus.* Journal of Animal Ecology 69 (5): 762-770.

Authors' abstract: 1. We examine causes and consequences of natal dispersal within a metapopulation of house sparrows *Passer domesticus* in an archipelago in Northern Norway where a large proportion of the individuals is colour-ringed. 2. Less than 10% of the fledglings dispersed, i.e. left their natal island. 3. Dispersal was female biased and almost exclusively performed by juveniles. 4. The probability of natal dispersal was not related either to the body condition or the body mass of the juvenile. Similarly, neither clutch size nor hatching date explained a significant proportion of the variance in the probability of dispersal. 5. The probability of male natal dispersal was related to the rank of the fledgling in the size- hierarchy within the brood. Low ranking individuals that hatched early in the season were more likely to disperse. 6. In both sexes, the survival of dispersers at the island of establishment was higher than among the residents on that island. Similarly, dispersers survived better than adults that remained on their island of birth. 7. These results suggest that dispersal may be an adaptive strategy to avoid poor conditions in the natal area.

Anderson, T. R. 1995. Removal indeterminancy and the proximate determination of clutch size in the house sparrow. Condor 97 (1): 197-207.

Author's abstract: To test whether or not the House Sparrow (*Passer domesticus*) is a determinate or indeterminate layer, 16 experimental nest sites were used following a

removal protocol suggested by Haywood (*pers. comm.).* In six of the 16 experimental nests the females laid in an indeterminate manner, laying 8-18 eggs at daily intervals, or with breaks of one or two days. Analysis of the egg contents showed that fresh mass and dry masses of yolk, albumen and shell tended to increase with position in the laying sequence, with fresh mass, dry albumen mass and total dry mass of eggs 2-6 being significantly less than those of the supernumerary eggs, eggs 7+. Female condition was unaffected by the laying of supernormalsized clutches. The implications of these results for the proximate determination of clutch size in the House Sparrow were discussed, including a proposed mechanism for clutch size determination in the species.

Beauchesne, S. M., P. Chytyk, and J. M. Cooper. 2002. Western bluebird stewardship account for the Garry oak ecosystems of southwestern British Columbia. Garry Oak Ecosystems Recovery Team, Victoria, BC.

This report synthesises current peer reviewed literature and expert interviews to delineate the current status of western bluebirds and to identify options to counteract their decline. Western bluebirds have been extirpated from the Gulf Islands and southeastern Vancouver Island: there are no records of the birds on Vancouver Island since 1997. The range of their extirpation overlaps with a large portion of the range of Garry oak ecosystems in Canada. Bluebirds nest in secondary cavities and breed in a range of habitat from open woodlands and forests to agricultural areas. Habitat loss is the biggest threat facing this species. Competition for nest sites with native and introduced species including house sparrows may also have contributed to the decline of western bluebirds. Because of the large numbers of house sparrow competitors, control of this invasive species is recommended as an important component of western bluebird recovery.

Berube, C. 2002. *Personal communication.* Ministry of Water, Land and Air Protection, Nanaimo, BC.

Permits will not be granted for the chemical control of house sparrows except where they pose a serious health hazard. The hazard must be certified by the Workers' Compensation Board or the Health Board and all other suitable control methods must be tried first. Stupefying baits such as Alphachloralose are not available in Canada.

Best, L. B. and T. R. Stafford. 2002. Influence of daily grit consumption rate and diet on gizzard grit counts. Journal of Wildlife Management 66 (2): 381-391

Authors' abstract: We evaluated the relationship between the number of grit particles in gizzards and the grit consumption rate. House sparrows (*Passer domesticus*) were given, via oral gavage, doses of 9, 18, 36, 72, 144, 288, or 576 particles/day, and northern bobwhites (*Colinus virginianus*) were given 9, 18, 36, 72, 144, or 288 particles/day. Test birds were fed either a hard food (wild bird seed mix) or soft food (canned dog food) diet and were given equal numbers of grit particles from 3 different size classes (house sparrows: 0.2-0.4, 0.6-0:8, and 1.2-1.4 mm; northern bobwhites: 0.6-0.8, 1.4-1.7, and 2.4-2.8 mm). For both species, the number of grit particles in gizzards increased as dose increased, but the percentage that the gizzard grit count constituted of the daily grit dose

decreased at higher doses. The fact that the birds eliminated large amounts of grit at the higher dose levels but retained most of the grit at lower levels suggests that birds need a certain target amount of grit in their gizzards. As daily grit dose increased, house sparrows on a hard diet had more small and medium-size grit in their gizzards than did house sparrows on a soft diet; the amount of large grit was similar between diets. As the daily grit dose increased, northern bobwhites had more small and medium-size grit in their gizzards than large grit. The high grit counts for some northern bobwhites may have resulted from incomplete flushing of the gizzard grit before dosing began. Our study improved upon previous efforts to evaluate the relationship between gizzard grit counts and grit consumption rates and provides information useful in assessing the potential for avian exposure to granular pesticides.

Bhattacharyya, S. 1998. Faunal diversity of nesting arthropods in eight districts of West Bengal, India. Proceedings of the Zoological Society (Calcutta) 51: 155-163.

Author's abstract: Arthropod fauna within the nests of eight species of birds namely, *Streptopelia chinensis* (Scopili), *Acridotheres tristis* (Linnaeus), *Sturnus contra* Linnaeus, *Corvus splendens* Vieillot, *Pycnonotus cafer* (Linnaeus), *Prinia socialis* Sykes, *Ploceus philippinus* (Linnaeus) and *Passer domesticus* (Linnaeus) are enlisted. Extraction of fauna from 1536 birds nests collected from 8 districts of West Bengal showed the presence of 20112 insects, 2035 spiders, 788 pseudoscorpions, 3440 immature arthropods, 66 ticks and 30561 mites. Interacting factors were responsible for this population build-up of different kinds of arthropods.

Birkhead, T. R., J. P. Veiga and F. Fletcher. 1995. Sperm competition and unhatched eggs in the house sparrow. Journal of Avian Biology 26 (4): 343-345.

Authors' abstract: There is considerable debate over the benefits that female birds obtain from engaging in extra-pair copulations (Westneat et al. 1990, Birkhead and Moller 1992). Two main classes of benefit have been identified: direct benefits, which includes fertility insurance (e.g. Sheldon 1994), and indirect or genetic benefits (see Birkhead and Moller 1992, Moller 1994). In the House Sparrow *Passer domesticus*, Wetton and Parkin (1991) found that the occurrence of unhatched eggs was associated with extra-pair paternity in the same clutch and suggested that this might occur because females guard against low fertility of their mate by engaging in a relatively small number of extra-pair copulations. Both Birkhead and Moller (1992: 15) and Lifjeld (1994) offered alternative explanations for Wetton and Parkin's (1991) result. Lifjeld (1994) suggested that unhatched eggs may have been the consequence of social interactions. That is, female House Sparrows paired to poor quality males would be more likely to seek extra-pair copulations, and because extra-pair copulations in this species are often forced and occur during 'communal displays' (Moller 1987), these females would be subject to an unusual amount of harassment. As a consequence, not only would these females lay a greater proportion of infertile eggs, they would also produce some eggs fathered by extra-pair males.

Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, A.

C. Stewart, and M. C. E. McNall. 2001. The birds of British Columbia, Volume 4: Passerines (Wood-Warblers through Old World Sparrows). UBC Press, Vancouver, BC.

This is the most comprehensive reference available for our region and it is based on a comprehensive review of peer reviewed literature and provincial observations. The detailed range map includes breeding and nonbreeding chronology for the province. House sparrows are listed as common to very common in the Georgia Depression and they occur in most agricultural and human modified landscapes in the province. House sparrows are not generally found in closed canopy forests. They occur and probably breed throughout the Canadian range of Garry oak ecosystems. House sparrows probably arrived in the province sometime between 1895 and 1898. House sparrows are nonmigratory and tend to breed close to human settlements. They will nest in nest boxes, cavities, buildings and other human-made structures. Nest boxes for native birds can be made less attractive to house sparrows by restricting the size of the entrance hole and removing perches. In British Columbia, they have been observed building nests in or on the nests of the following species: cliff swallows, American robins, bank swallows, European starlings, house wrens, downy woodpeckers and bald eagles. House sparrows have usurped the nests of violet-green swallows, tree swallows, cliff swallows, American robins, chestnut-backed chickadees and house finches. House sparrows arrive before migratory birds and are known to actively remove nesting birds and destroy the eggs and young. Nests are built from grasses, feathers and a variety of found objects. House sparrows can nest in colonies and begin nesting as early as February in the Georgia Depression. House sparrows can have up to 3 broods per year in the Georgia Depression and clutch sizes range from 1-7 with an average of 4-5 eggs. Incubation of eggs ranges from 10-14 days and the young fledge as early as 10 days old. Nest success rate on the coast is 53%. Nest failure is largely due to egg predators including European starling, crested myna, American kestrel, Steller's jay, red squirrel and striped skunk. In the Georgia Depression, adult house sparrows are preyed upon by Cooper's hawks and barn owls.

Chastel, O. and M. Kersten. 2002. Brood size and body condition in the House Sparrow *Passer domesticus*: The influence of brooding behaviour. Ibis 144 (2): 284-292.

Authors' abstract: In many bird species, females undergo a marked decline in body condition during the first days of the nestling period. This decline may be because brooding young chicks reduces the time available for foraging. Alternatively, it might be viewed as an adaptive way to reduce flight costs when the food demand of the brood is highest. To test these hypotheses we modified the brooding commitment of House Sparrows *Passer domesticus* by manipulating brood size to see if changes in time spent brooding affects adult body condition. During the nestling period, females provided on average three times as much brooding as males. Reduced broods received 14% more brooding than large broods and time spent brooding declined with brood size and chick age according to an exponential decay function. Male body condition was unaffected by brood size and remained stable throughout the reproductive period. Body condition of females with enlarged broods decreased gradually during the nestling period, whereas that of females tending reduced broods dropped abruptly and significantly upon hatching.

This resulted in females with reduced broods having lower body condition during the first half of the nestling period than those with enlarged broods. The sharp drop in body condition of females with reduced broods coincided with the period that brooding was most intensive. Indeed, female body condition at the end of the nestling period was negatively correlated with the proportion of time they spent brooding during the first half of the nestling period. Thus, the probable lower homeothermic capacities of reduced broods implies a higher brooding commitment for female House Sparrows that, in turn, may reduce their opportunity to forage and consequently also their body condition.

Chilvers, B. L., P. E. Cowan, D. C. Waddington, P. J. Kelly and T. J. Brown. 1998. The prevalence of infection of *Giardia* spp. and *Cryptosporidium* spp. in wild animals on farmland, southeastern North Island, New Zealand. International Journal of Environmental Health Research 8 (1): 59-64.

Authors' abstract: *Giardia* spp. cysts were detected in the faeces of 23.6% of 76 possums (*Trichosurus vulpecula*), 42.1% of 19 ship rats (*Rattus rattus*), 30.5% of 46 house mice (*Mus musculus*), 33.3% of 6 hedgehogs (*Erinaceus europaeus*), 33.3% of 3 ferrets (*Mustela furo*), 20% of 5 rabbits (*Oryctolagus cuniculus*), 35% of 20 blackbirds (*Turdus merula*), 50% of 14 thrushes (*Turdus philomelos*), 15.4% of 104 sparrows (*Passer domesticus*), 60% of 10 chaffinches (*Fringilla coelebs*), and 14.3% of 14 hedge sparrows (*Prunella modularis*) trapped on two farms in the Dannevirke area, southeastern North Island, New Zealand. *Cryptosporidium* cysts were detected in 12.8% of 39 possums, 37.5% of 8 ship rats, 11.8% of 17 house mice, 8.2% of 61 house sparrows, 21.4% of 14 thrushes and 1 of 2 starlings (*Sturnus vulgaris*) from the same area. Although one of the two farms had a history of human *Giardia* infection, no significant differences were found between the prevalence of *Giardia* in wild animals on the farms. There was a significantly lower prevalence of *Cryptosporidium* than *Giardia* in the wild animals tested. The role of wild animals in maintaining and spreading *Giardia* and *Cryptosporidium* in New Zealand is discussed.

Cizek, A., I. Literak, K. Hejlicek, F. Treml and J. Smola. 1994. *Salmonella* contamination of the environment and its incidence in wild birds. Journal of Veterinary Medicine Series B 41 (5): 320-327.

Authors' abstract: In 1984-1991, the incidence of salmonellas was studied in wild birds from various sites in the Czech Republic. On an agricultural farm with salmonellosis in calves, salmonellae were isolated from eight birds (seven *Passer domesticus*, one *Serinus serinus*) of 31 birds examined. On various agricultural farms with no salmonellosis in farm animals, salmonellae were found in two birds (*Columba livia* f. *domestica*) of 2186 birds examined. Of 35 birds caught at a municipal waste-dump site, salmonellae were isolated from one specimen (*Larus canus*). No salmonellae were found in birds living in reed growths and in various military training areas (557 and 116 birds examined, respectively). In black-headed gulls (*Larus ridibundus*) from various areas with bodies of water, salmonellae were found in 4.2% of 189 adults and 19.2% of 740 non-flying young examined. *S. typhimurium* was the most common serotype isolated from gulls. Phage type 101 represented 32% of 48 phage-typed strains. This study shows a relationship

between the contamination of the environment with salmonellae and their incidence in wild birds.

Copley, D., D. Fraser and C. J. Finlay. 1999. Purple Martins, *Progne subis*: A British Columbian success story. Canadian Field-Naturalist 113 (2): 226-229.

Authors' abstract: The limited historical data appear to indicate that in the late 1800s and early 1900s, Purple Martin populations were limited to southern Vancouver Island from north of Campbell River south to, and including, Victoria as well as the western Fraser valley on the mainland. With the arrival of the House Sparrow, *Passer domesticus*, martin numbers appeared to suffer a decline. By the late 1940s there were only a few scattered colonies that persisted. Habitat loss (dead snag and piling removal) began to play a major role, and this, combined with an increase in the European Starling, *Sturnus vulgaris*, population, resulted in a further population decline. By 1983, known martin nests in British Columbia were fewer than six. In 1985, concerned individuals began installing nest boxes. Just over a decade later the Purple Martin population in British Columbia has grown to 146 pairs recorded in 1998.

Cordero, P. J. and J. C. Senar. 1994 (1995). Persistent tree sparrows *Passer montanus* can counteract house sparrow *P. domesticus* competitive pressure. Bird Behaviour 10 (1-4): 7-13.

Authors' abstract: Strategies by subordinate species to ameliorate the effect of interspecific competition with a sympatric dominant opponent have been rarely reported. Nestbox removal experiments, aimed to increase the rate of interspecific encounters between House and Tree Sparrows around nests, showed House Sparrows to be dominant over Tree Sparrows, to be more aggressive toward them than expected by chance, and to occupy most nest sites. However, and in spite of the agonistic pressure of dominant House Sparrows, some individual Tree Sparrows persisted around the occupied nests, delaying egg laying until House Sparrows had abandoned the nestboxes, and some even coexisted using small entrance nest sites. Therefore, although Tree Sparrow breeding potential was reduced, persistence and breeding plasticity had allowed them to counteract, to some degree, House Sparrow competitive pressure.

Cordero, P. J., S. C. Griffith, J. M. Aparicio and D. T. Parkin. 2000. Sexual dimorphism in house sparrow eggs. Behavioral Ecology and Sociobiology 48 (5): 353-357.

Authors' abstract: Recent evidence has revealed an apparently high degree of control by female birds over the physiological aspects of their reproduction and offspring sex allocation, consistent with adaptive hypotheses of sex allocation and differential investment in their offspring. In the house sparrow, we investigated possible mechanisms that may be used by females to enhance the fitness returns from a reproductive effort. Using molecular techniques, we demonstrate that house sparrow eggs containing male embryos are significantly larger than those containing female embryos. We also found that male embryos were laid randomly with respect to laying order. We speculate that this

sexual dimorphism of eggs is adaptive, because male house sparrows show greater variance in condition-dependent reproductive success than females. More important, the result provides further evidence of the ability of females to detect or control ovulation of either male or female ova and to differentially invest in one sex over the other.

Cordero, P. J., J. H. Wetton and D. T. Parkin. 1999. Within-clutch patterns of egg viability and paternity in the House Sparrow. Journal of Avian Biology 30 (1): 103-107.

Authors' abstract: One of the potential benefits of extra-pair copulation is an enhanced likelihood of successful fertilization if the pair male is unable to produce sufficient viable sperm to ensure the fertility of an entire clutch. Low male fertility can be a transient phenomenon associated with higher rates of sperm usage than production, leading to a progressive depletion of sperm reserves. Evidence of a correlation between hatching success and the occurrence of extra-pair fertilizations has been reported in House Sparrows. In this study we have used single-locus minisatellite and microsatellite profiling to investigate the distribution of extra-pair fertilizations within House Sparrow broods to determine whether there are changes in the level of hatching failure or extra-pair paternity during the course of producing a clutch. Embryonic material was collected at mid-incubation to minimize loss of data through pre-sampling mortality and to ensure that laying order was known. A significant clustering of both infertile eggs and extra-pair young was noted in the earliest eggs in a clutch. Possible causes of this phenomenon are discussed.

Day, T. D. 1995. Bird species composition and abundance in relation to native plants in urban gardens, Hamilton, New Zealand. Notornis 42 (3): 175-186.

Author's abstract: During a census in gardens in Hamilton, 71.8% of the 4428 birds observed belonged to introduced species. A total of 15 species were observed. Bird species richness was positively correlated with native plant biomass and, more strongly, with total plant biomass. More birds were present in gardens with more native plants. Among the most common species, the abundance of the House Sparrow (*Passer domesticus*) decreased with increasing percentage of native plants, the Silvereye (*Zosterops lateralis*) increased, while Blackbirds (*Turdus merula*) and Starlings (*Sturnus vulgaris*) showed no significant change. This was typical for all other introduced bird species. Most other birds, including the Fantail (*Rhipidura fuliginosa*) and the Grey Warbler (*Gerygone igata*), were most abundant in gardens with higher native plant biomass. Notable was the absence of the Tui (*Prosthemadera novaeseelandiae*) from all censused areas in Hamilton at the time of observation. No significant variation between morning and evening samples was noted.

Degraaf, R. M., T. J. Maier and T. K. Fuller. 1999. Predation of small eggs in artificial nests: Effects of nest position, edge, and potential predator abundance in extensive forest. Wilson Bulletin 111 (2): 236-242.

Authors' abstract: After photographic observations in the field and laboratory tests indicated that small rodents might be significant predators on small eggs, we conducted a

field study in central Massachusetts to compare predation of House Sparrow (*Passer domesticus*) eggs in artificial nests near to (5-15 m) and far from (100-120 m) forest edges and between ground and shrub nests. As in earlier studies in managed northeastern forest landscapes that used larger quail eggs, predation rates on small eggs in nests at the forest edge did not differ ($P > 0.05$) from those in the forest interior for either ground nests (edge = 0.80 vs interior = 0.90) or shrub nests (edge = 0.38 vs interior = 0.28) after 12 days of exposure. However, predation rates on eggs in ground nests were significantly higher ($P < 0.001$) than in shrub nests at both the edge and interior. There were no significant ($P > 0.05$) differences in the frequency of capture of the 6 most common small mammal species between forest edge and interior. Logistic regression analyses indicated a highly significant ($P < 0.001$) nest placement effect but very little location or small mammal effect. Predation of small eggs by small-mouthed ground predators such as white-footed mice (*Peromyscus leucopus*) has not been documented as a major factor in egg predation studies, but use of appropriately-sized eggs and quantification of predator species presence and abundance seems essential to future studies.

Dinsmore, J. J. 2001. Invasive birds in Iowa: Status, problems, and threats. Journal of the Iowa Academy of Science 108 (4): 212-220.

Author's abstract: A total of 18 invasive bird species has been introduced into or have expanded their range to include Iowa. These include ten non-North American species, one North American species that has been displaced and now is established in Iowa, and seven native species that have been released to re-established Iowa populations. Twelve of those are regularly occurring species in Iowa, and they comprise 3.0% (12 of 404) of the species known from Iowa and 5% (10 of 199) of Iowa's nesting avifauna. These percentages are similar to those found in neighboring states. Several more species are likely to become established in the near future. Two invasive species, European Starling (*Sturnus vulgaris*) and House Sparrow (*Passer domesticus*), are among the most numerous species found in Iowa and have negative effects on other species. Most of the older invasive bird species seem to have little effect on other bird species. Two species, Mute Swan (*Cygnus olor*) and Eurasian Collated-Dove (*Streptopelia decaocto*), are close to becoming established in Iowa. Both have the potential to be harmful to other bird species.

Dott, H. E. M. and A. W. Brown. 2000. A major decline in House Sparrows in central Edinburgh. Scottish Birds 21 (2): 61-68.

Authors' abstract: A recent British national decrease in House Sparrows is now recognised, though evidence comes mainly from non urban census plots in southern Britain. Counts presented here show that House Sparrows in the centre of Edinburgh have become about 10 times less numerous over a recent 15 year period, and have contracted in distribution, while other bird species in the same place have shown no such change. Possible causes are discussed but no specific reason for the decrease has been determined.

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook: a field

guide to the natural history of North American birds. Simon & Schuster Inc., New York, NY.

This field guide details life history and ecological information of house sparrows. House sparrows were introduced to North America between 1850 and 1867 and were the most common bird on the continent in the early 1900s. Although the birds are still abundant, the population has declined with increasing numbers of cars and fewer horses. Both the males and females build nests in cavities in buildings or in trees up to 40 feet high. House sparrows compete for nest sites in the fall and aggressively take over nests from native species, killing eggs and nestlings. Clutches average 4-6 eggs that range from white, greenish or bluish in colour. Females incubate the eggs for 10-13 days and the young are altricial. House sparrows eat insects, spiders, fruit, blossoms and grass and forb seeds.

Ericson, P. G. P., T. Tyrberg, A. S. Kjellberg, L. Jonsson and I. Ullen. 1997. The earliest record of house sparrows (*Passer domesticus*) in northern Europe. Journal of Archaeological Science 24 (2): 183-190.

Authors' abstract: Remains of the house sparrow (*Passer domesticus*) recovered from a late Bronze Age (1200-800 BC) settlement in central Sweden are described. The house sparrow is conspicuously rare in prehistoric Europe, and this record constitutes the earliest from the northern part. The find predates the introduction of domestic fowl (*Gallus gallus*) to Sweden, a species with which the house sparrow has been assumed to be spread simultaneously. Instead, it is here suggested that house sparrows most likely spread over Europe along with the horse *Equus caballus*.

Fernandez-Juricic, E., M. D. Jimenez and E. Lucas. 2002. Factors affecting intra- and inter-specific variations in the difference between alert distances and flight distances for birds in forested habitats Canadian Journal of Zoology 80 (7): 1212-1220.

Authors' abstract: Studies of escape from predators have usually focused on fleeing. We studied intra- and inter-specific variations in a previous level of decision-making during predator-prey encounters by determining the difference between the distance at which a predator is detected and the distance at which the prey flees from the predator (buffer distance). We measured buffer distances of four bird species (ground foragers) living in forested habitats (wooded recreational parks) to approaching humans. Buffer distances increased with group size and temperature, and this was probably related to dilution of the predation risk and a higher risk of heat stress, respectively. Buffer distances decreased with shrub and coniferous cover, probably because of increased visual obstruction, and increased with tree height, probably because of the increased security provided by taller trees. Grass cover increased buffer distances of wood pigeons (*Columba palumbus*) but decreased those of house sparrows (*Passer domesticus*) and magpies (*Pica pica*); this may be related to higher food availability, i.e., vegetation in grassy areas for wood pigeons and food left by humans in areas with bare ground for house sparrows and magpies. Buffer distances of blackbirds (*Turdus merula*) and house sparrows were greater in highly visited parks, which may be related to habituation. Finally, larger species showed greater buffer distances, landed farther away, used higher landing

substrates (trees), and flew higher, probably because they need to ensure a certain margin of security from predators. Alternatively, the increased buffer distances of large species may be related to the increasing energy expenditure of flight. The buffer distance appears to be a good indicator of tolerance toward predators and (or) risk taken by prey after detecting predators.

Fernandez-Juricic, E. 2001. Avian spatial segregation at edges and interiors of urban parks in Madrid, Spain. Biodiversity and Conservation 10 (8): 1303-1316.

Author's abstract: Few studies have investigated the effects of urban landscape composition on avian habitat selection at urban-park edges. I assessed how the number of species, density of guilds, and density of individual species varied between edge and interior habitats in six large wooded parks in Madrid (Spain), and analysed such patterns in relation to habitat structure, car traffic, and pedestrian traffic. Few differences in habitat structure were found; whereas car and pedestrian traffic were significantly higher at edges. Species foraging in trees and on the ground, and nesting in trees and in tree cavities had lower numbers and breeding densities at edges, probably as a result of the disturbance from traffic noise and pedestrians. Species highly habituated to human activities (House Sparrows *Passer domesticus* and Rock Doves *Columba livia*) displayed opposite patterns, with higher breeding densities at urban-park edges, probably due to their higher foraging opportunities (refuse, people leftovers, deliberate feeding) and nest site availability in adjacent buildings. Urbanisation sprawl may increase the prevalence of edge specialists and diminish the representation of species with specific habitat requirements.

Fernandez-Juricic, E., R. Sanz and A. Sallent. 2001. Frequency-dependent predation by birds at edges and interiors of woodland. Biological Journal of the Linnean Society 73 (1): 43-49.

Authors' abstract: Structural variations between edge and interior areas within forest fragments may bring about differences in food availability that may influence the selective behaviour of predators and prey population dynamics. The purpose of this paper was to assess patterns of artificial prey selection by wild birds (House Sparrow *Passer domesticus* and Rock Dove *Columba livia*) between edge and interior areas of woodland, taking into account differences in prey frequency (10% of one food type and 90% of the other) and density (30 baits/m-2 and 50 baits/m-2). Experiments were conducted at 24 plots in 3 forest fragments in the city of Madrid, Spain. Selectivity did not vary among parks or between densities. However, selectivity did vary with the frequency and location of baits, showing an anti-apostatic trend (baits were preferred at low rather than at high frequencies) that was more pronounced at interiors than at edges. Two possible factors that may account for stronger anti-apostatic selection at edges are the higher densities of predators and pedestrians found there. However, there are many other possible explanations, and no specific conclusion can be supported with the current data. The results of this study also\ point out that site heterogeneity should be taken into account in the experimental design of future studies on frequency- dependent food selection by wild birds, particularly in fragmented landscapes.

Gering, J. C. and R. B. Blair. 1999. Predation on artificial bird nests along an urban gradient: Predatory risk or relaxation in urban environments? Ecography 22 (5): 532-541.

Authors' abstract: Urbanization - the anthropogenic conversion of natural ecosystems into human-dominated ecosystems - has occurred on global scales. The human-dominated landscape presents particular challenges to researchers because the effects of urbanization on ecological processes are not well understood. We investigated the influence of urbanization on predation by conducting an artificial nest experiment along an urban gradient of six sites ranging from natural to urbanized ecosystems. Previous hypotheses suggest that predation pressures in urban environments will either 1) increase because of the high abundance of exotic species which act as predators or 2) decrease due to the lack of natural predators. To determine relative predation pressures among sites along the urban gradient, we monitored the fates of 16 artificial avian nests at each of the six sites for a total of 96 nests in each year (1996, 1997). We analyzed the dependency of nest fate (depredated or undisturbed) on intensity of urbanization (sites along the urban gradient), nest height (ground, above-ground), and year using loglinear models. The frequency of nest predation was strongly dependent on site along the urban gradient, indicating that urbanization intensity was an important determinant of nest fate. Predation pressure exhibited an overall decline from natural to urban sites in both years, suggesting that urban environments have low predation pressures relative to natural areas. The predatory relaxation in urban environments may partially explain the greater abundance of some species in urban environments, particularly urban exploiters such as European starlings *Sturnis vulgaris*, house sparrows *Passer domesticus*, and rock doves *Columba livia*.

Giesbrecht, D. S. and C. D. Ankney. 1998. Predation risk and foraging behaviour: An experimental study of birds at feeders. Canadian Field-Naturalist 112 (4): 668-675.

Authors' abstract: Influence of predation risk on the foraging behaviour of seven species of passerine birds was examined in London, Ontario (43degreeN, 81degreeW). Feeders containing black sunflower seeds were set up 1.7m, 2.7m, and 3.7m away from a dense row of cedar trees (*Thuja sp.).* The species and number of individuals at each feeder were recorded during 34 thirty-minute observation periods. Seed consumption during each observation period was also measured. Overall, there was a strong tendency for birds to feed close to cover. Variation in use of escape cover and foraging strategies, however, resulted in interspecific variation in feeding location. House Sparrows (*Passer domesticus*), White-crowned Sparrows (*Zonotrichia leucophrys*), Northern Cardinals (*Cardinalis cardinalis*), and Dark-eyed Juncos (*Junco hyemalis*) used feeders closer to cover more than those farther away. Conversely, House Finches (*Carpodacus mexicanus*) fed more frequently at feeders farther from cover. Black-capped Chickadees (*Poecile atricapillus*) and Red-breasted Nuthatches (*Sitta canadensis*) fed independently of feeder proximity to cover but these two species always carried food items to cover for consumption. When food became depleted in the feeders closest to cover, House Sparrows, House Finches, and Dark-eyed Juncos increased their use of the more distant

feeders. Our results suggest that proximity to cover has a significant effect on foraging decisions of some species of birds.

Gionfriddo, J. P. and L. B. Best. 1996. Grit color selection by house sparrows and northern bobwhites. Journal of Wildlife Management 60 (4): 836-842.

Authors' abstract: Granule color may be an important factor influencing avian exposure to granular pesticides when they are mistakenly picked up as grit, and is one of the most easily altered characteristics of pesticide granules. We studied colored grit use by house sparrows (*Passer domesticus*) and northern bobwhites (*Colinus virginianus*) by offering captive birds a grit mixture consisting of equal amounts of 8 colors (red, brown, yellow, green, blue, black, white, clear), either on a light-brown or a dark-brown soil background. After 7 days, gizzards of both species consistently contained more yellow and white particles and fewer black and blue particles than expected by chance (sparrows: P lt 0.025; bobwhites: P lt 0.001). Soil background color was not an important influence on grit color selection by either species. To examine the influence of food color on grit color selection, we repeated the experiments (on dark soil only), using birds maintained on food dyed to match 3 of the 8 grit colors (red, yellow, blue). Grit color use again was nonrandom (P lt 0.001). Overall, house sparrows preferred brown, yellow, and white grit, and northern bobwhites preferred yellow and green grit. Black again received little use by both species. Food color did not influence grit color selection by house sparrows, but was associated with small but statistically significant differences in the use of black and clear grit by northern bobwhites. Our results suggest that the colors black and blue should be tested further if the goal to design pesticide granules in colors unattractive to birds. On the other hand, if the goal is to deter avian consumption of pesticide-treated granules by applying a mixture of unattractively-colored, treated particles and attractively- colored, untreated ones, then yellow (and perhaps white and green) should receive further study as colors likely to attract birds.

Harkin, E. L., F. D. van Dongen, M. E. Herberstein and M. A. Elgar. 2000. The influence of visual obstructions on the vigilance and escape behaviour of house sparrows, *Passer domesticus*. Australian Journal of Zoology 48 (3): 259-263.

Authors' abstract: The scanning and flight behaviour of birds that forage in flocks may be influenced by several variables, including the size of the flock and the presence of visual obstructions. Visual obstructions can conceal both potential predators and flock mates from a foraging bird, and individuals may increase their scanning rate accordingly, although concealing flock mates may result in more variable scanning rates as they come in and out of vision. We examined these ideas experimentally by observing house sparrows foraging at a feeder with and without visual obstructions. Birds foraging in the presence of visual obstructions had generally higher and more variable scanning rates. When the birds were approached by a human observer, they took flight earlier in larger flocks, although their reaction was generally delayed when there were obstructions. These data indicate that visual obstructions increase the probability of predation because individuals are less likely to detect a predator and/or the alarm flight of other individuals.

Hartup, B. K., A. A. Dhondt, K. V. Sydenstricker, W. M. Hochachka and G. V. Kollias. 2001. Host range and dynamics of mycoplasmal conjunctivitis among birds in North America. Journal of Wildlife Diseases 37 (1): 72-81.

Authors' abstract: An epidemic of conjunctivitis among house finches (*Carpodacus mexicanus*) caused by *Mycoplasma gallisepticum* (MG) bacterial infections was first described in 1994. The disease exhibits high primary host specificity, but has been isolated from a limited number of secondary avian hosts at various times and locations. We used records from the House Finch Disease Survey, a continent-wide, volunteer monitoring project, to document the host range of conjunctivitis in birds at feeding stations and to investigate how disease in house finches might influence the spread of conjunctivitis to other hosts. Between 1994 and 1998, participants recorded 675 cases of conjunctivitis in 31 species other than house finches in eastern North America. Seventy five % of these cases were observed among three species: American goldfinches (*Carduelis tristis*), purple finches (*Carpodacus purpureus*) and house sparrows (*Passer domesticus*). The proportion of sites with diseased wintering populations of the three species increased over the 4 yr study and coincided with range expansion of conjunctivitis in house finches. Sites with diseased house finches present were significantly more likely to report conjunctivitis in each of the three species during the same month. These observations are most consistent with transmission of an infectious agent (presumably MG) from house finches to these secondary hosts via spillover of localized epidemics, rather than sustained interspecific transmission.

Hebert, P. N. 1999. Evidence of egg ejection in Mountain Bluebirds. Wilson Bulletin 111 (3): 440-442.

Author's abstract: When the last two eggs of Mountain Bluebird (*Sialia currucoides*) clutches were replaced with another bluebird egg and one House Sparrow (*Passer domesticus*) egg, 20% (3/15) of the sparrow eggs were removed within 24 hr. None of the surrogate bluebird eggs was removed. This is the first recorded instance of interspecific egg ejection in a bluebird species, and hole-nesters in general.

Horn, D. J. 1999. The species richness of birds visiting a yard is influenced by the feeders/seeds present. Journal of the Iowa Academy of Science 106 (2): 21-25.

Author's abstract: Although seed preferences of species that visit bird feeders have been well documented, we know little about feeder/seed combinations most appropriate for attracting highest species richness or increasing abundance of individual species. I studied how the species composition of birds visiting a feeding station was influenced by addition of feeders filled with mixed seed, thistle, and suet in a yard that previously contained only a feeder with sunflower seeds. Addition of a seed mixture consisting of hulled sunflower, hulled peanuts, hulled millet, and hulled "tree" nuts in an elevated platform feeder increased species richness and total number of birds visiting a feeding station. Presence or abundance of Red-bellied Woodpecker (*Melanerpes carolinus*), Blue Jay (*Cyanocitta cristata*), American Crow (*Corvus brachyrhynchos*), European Starling (*Sturnus vulgaris*), Northern Cardinal (*Cardinalis cardinalis*), and House Sparrow

(*Passer domesticus*) increased when the seed mixture was added. Presence of White-breasted Nuthatch (*Sitta carolinensis*) increased when thistle seed in an elevated feeder was present. Addition of a "Peanut Treat" suet cake in a single-cake capacity, wire-cage increased species richness, and presence or abundance of Red-bellied Woodpecker, Downy Woodpecker (*Picoides pubescens*), and Hairy Woodpecker (*P. villosus*) increased when "Peanut Treat" suet was added. Results indicate that the combination of feeders/seeds placed within a yard influences species composition. These results can be used to make more informed decisions on how to attract species of birds of greatest interest for viewing.

Hull, S. L. 1998. Alarm calls and predator discrimination in populations of the house sparrow *Passer domesticus* in Leeds. Naturalist 123 (1024): 19-24.

Author's abstract: Field data from a study conducted on an urban population of House Sparrows *Passer domesticus* in Leeds indicated that they produce specific alarm calls to warn foraging conspecifics of an imminent attack by a predator. A loud 'quer-quer-quer' alarm call was only produced in response to the presence of either a Common Kestrel *Falco tinnunculus* or a Eurasian Sparrowhawk *Accipiter nisus*, whereas ground predators (domestic cats, *Felis silvestris catus* and humans, *Homo sapiens*) resulted in the production of a quiet, 'chree' alarm call uttered on take-off. The role of the alarm calls produced by the Leeds House Sparrow population differs from that previously reported for the same calls. The House Sparrows demonstrated three different and- predator strategies in response to an alarm call. The freeze/crouch response was only performed by juveniles, whereas adults either exhibited a short flight into dense hedge or a longer flight high into a tree. In response to an attack by Common Kestrels, cats and humans, the adults used either a long or short flight response with equal frequency. On attack by Eurasian Sparrowhawks the House Sparrows demonstrated a significant preference for the short flight response into dense cover. The data presented shows that House Sparrows produce different alarm calls depending upon predator class and take an appropriate anti-predatory response to minimise predation risk.

Jobin, B., J. L. DesGranges and C. Boutin. 1998. Farmland habitat use by breeding birds in Southern Quebec. Canadian Field-Naturalist 112 (4): 611-618.

Authors' abstract: Recent changes in agriculture in eastern Canada has resulted in changes in farming techniques and loss of farmland habitats which can have adverse effects on birds. Our knowledge of farmland bird communities in southern Quebec is rather incomplete. Twenty-minute surveys were used to study farmland habitat use by 28 species of farmland birds in the St. Lawrence Lowlands of southern Quebec in June 1992. European Starling (*Sturnus vulgaris*) was the species detected in largest numbers followed by House Sparrow (*Passer domesticus*), Red-winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*) and Barn Swallow (*Hirundo rustica*). Vesper Sparrow (*Pooecetes gramineus*), Upland Sandpiper (*Bartramia longicauda*), American Kestrel (*Falco sparverius*) and Northern Oriole (*Icterus galbula*) were the least detected species. Pastures, old fields and hayfields supported the highest bird abundances whereas figures were lowest in cornfields. Species richness was highest

in old fields and pastures and lowest in urban areas and monocultures (corn, soybeans). Several species (House Sparrow, European Starling, Barn Swallow, Common Grackle, Tree Swallow (*Tachycineta bicolor*)) were mainly observed on and around houses and farm dwellings. Species abundance and richness would be higher on dairy farms than on farms with cash crops because of the reduced vegetation cover and intensive farming practices in cash crop fields.

Johnson, C. A., L. A. Giraldeau and J. W. A. Grant. 2001. The effect of handling time on interference among house sparrows foraging at different seed densities. Behaviour 138 (5): 597-614.

Authors' abstract: Interference models of the ideal free distribution (IFD) assume competition among foraging animals causes intake rates to decline with increasing competitor density and that the strength of the decline influences forager distributions among food patches. However, the resulting distributions of animals may depend on which components of foraging success contribute to interference. We examined the effect of group size (1-13 birds) on the prey encounter rates, handling times, and foraging rates of house sparrows, *Passer domesticus*, feeding at three seed densities in a suburban backyard. House sparrows did not experience interference during search. Interference arose primarily from foraging time lost handling seeds. Foraging rates decreased with increasing seed density as a consequence of increased handling times. Also, birds experiencing significant increases in handling time with group size suffered most from interference. Our results suggest that animals adjust handling time to avoid costly aggressive interactions, indicating that handling time may be an important component of interference in some foraging systems. Future studies estimating interference should try to identify which components of foraging contribute to interference, paying particular attention to handling times for species that monitor and avoid competitors.

Jones, D. N. and J. Wieneke. 2000. The suburban bird community of Townsville revisited: Changes over 16 years. Corella 24 (4): 53-60.

Authors' abstract: The suburban avifauna of Townsville, north Queensland had been studied during the wet and dry seasons of 1980-81. In 1996-97, the sites and methods used in the earlier study were repeated with the aim of assessing changes in the bird community of this tropical city. No significant differences in species richness or the numbers of individuals were found to have occurred in the 16 years between the two studies. There were, however, significant increases in the numbers of individuals detected for eight species (including Peaceful Dove *Geopelia striata* and Common Myna *Acridotheres tristis*) and significant decreases in numbers of two introduced species (House Sparrow *Passer domesticus* and Nutmeg Mannikin *Lonchura punctulata*).

Kristin, A. and J. Patocka. 1997. Birds as predators of Lepidoptera: Selected examples. Biologia 52 (2): 319-326.

Authors' abstract: The diet of 40 bird species (Passeriformes, Piciformes, Coraciiformes) was studied using mostly the neck ring method and dropping analysis in forests, forest

steppes and hedges of Slovakia and Bavaria in May-July 1978-1994. Overall 10 of the 40 bird species studied belonged to the guild of lepidopterophags (*Parus palustris, P. major, P. caeruleus, P. ater, Coccothraustes coccothraustes, Sitta europaea, Passer domesticus* and *P. montanus, Anthus trivialis* and *Emberiza citrinella*). From 7,919 samples 60,335 food items were examined. Twenty-eight lepidopterous families having approximately 200 species (including 46 noctuid species, 37 geometrids and 23 species of tortricids) were identified in 35 of 40 bird species studied. In general, glabrous larvae and larvae more than 5 mm long were preferred (99%:1%).

Kern, W. H. 2001. Fact Sheet SS-WEC-119: House or English Sparrow. Department of Wildlife Ecology & Conservation, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Website: edis.ifas.ufl.edu/BODY_UW119 Accessed: November 23, 2002.

The Institute of Food and Agricultural Sciences based at the University of Florida is a federal, state and local government supported program that focuses on research and public extension. Although the website is hosted by a university there are no references given for the information presented on house sparrows. The website provides background information on identification, distribution, habitat and life history of the house sparrow as detailed in other references. The listed impacts of house sparrows include aesthetic concerns with their nests and droppings, fire hazards from nests in lighted signs and contamination of food and livestock feed from droppings. House sparrows also act as vectors for bird mites, fleas, ticks, bed bugs, dermestid beetles, and a broad range of diseases including *Salmonella* food poisoning, tuberculosis; *Sarcosporidiosis, Toxoplasmosis, Coccidiosis, Chlamydiosis*, encephalitis, Newcastle disease, poultry fowl pox, swine gastroenteritis (hog cholera) and poultry parasitic nematodes. These diseases infect livestock but may also be transmitted to humans. Although not mentioned here, some of these diseases may also impact native bird species. The site provides extensive control measures, many of which are highly applicable in Garry oak ecosystems. The best control option is to exclude house sparrows by sealing all potential nest site openings, removing perches from bird houses built for native birds and pruning trees to create more open growth. Kern provides detailed drawings and descriptions of a wide range of trap designs that can be used depending on the number of birds and the situation. He suggests pre-baiting the trap is important although other authors have stated it is not necessary. Shooting house sparrows with a .22 or pellet rifle requires a thorough understanding of legal implications and firearm training. Chemical controls, tactile repellents, sound repellents, ultrasonic devices are rarely effective and are not recommended.

Lindell, C. 1996. Patterns of nest usurpation: When should species converge on nest niches? Condor 98 (3) 464-473.

Author's abstract: The acceptability of a nest to more than one species and the convergence of species on a nest niche is demonstrated through nest usurpation. I compiled examples of nest usurpation from the literature to examine patterns regarding the species and nest sites that tend to be usurped, those species likely to be usurpers, and the habitats in which usurpation occurs. Cavities and enclosed nests are more likely to be

usurped than cup nests. Species that excavate or build these types of nests, like the Picidae and the Furnariidae, are likely to be the hosts of usurpers. Particular groups are prone to usurping nests, including introduced species like the House Sparrow (*Passer domesticus*) and European Starling (*Sturnus vulgaris*). Cavity usurpations were more likely to be observed in temperate than tropical/subtropical zones, and about equally likely to be observed in closed and open habitats, while enclosed nest usurpations were observed more frequently in open than closed habitats, and more often in tropical/subtropical than temperate zones. Usurpation of all nest types is more likely to occur in tropical/subtropical zones than expected, based on the number of studies in the literature conducted in these zones. Usurpation of all nest types is less likely to occur in open, and more likely to occur in moderately open habitats than expected, based on the number of studies in the literature conducted in these habitats. Instances of cavity usurpation, recorded primarily in temperate zones, across a variety of habitats, do not contribute to these general patterns. Nest- site convergence through nest usurpation may be more likely to occur in moderately open tropical habitats because of: 1) the availability of enclosed nests, 2) the limited structural heterogeneity of the vegetation, which limits the possibility of nest-niche partitioning, and 3) the high diversity of potential nest competitors and predators. In such environments, interspecific nesting associations may be a more effective generalized nest defense strategy than using a nest site that is difficult to find.

Literak, I., K. Sedlak, Z. Juricova and I. Pavlasek. 1999. Experimental toxoplasmosis in house sparrows (*Passer domesticus*). Avian Pathology 28 (4): 363-368.

Authors' abstract: A total of 31 house sparrows (*Passer domesticus*) were divided into five groups of six to seven birds. Birds were infected per os with 1, 10, 102, 103 and 104 oocysts of *Toxoplasma gondii* of the K1 strain, respectively. When the general health, production of antibodies against *T. gondii* and isolation positivity of the sparrows were examined in weeks 3, 7 and 12 post-infection (p.i.), no clinical signs of toxoplasmosis were observed. Seroprevalences ascertained in weeks 3, 7, and 12 p.i. were 64% (18 positive/28 tested), 95% (21/22) and 70% (7/10) when tested by indirect immunofluorescence (titre gtoreq 20); 54% (15/28), 59% (13/22) and 70% (7/10) when tested by the latex agglutination test (titre gtoreq 20); and 59% (4/7), 0% (0/12) and 20% (2/10) when tested by the Sabin Feldman dye test (titre 4), respectively. *T. gondii* was re-isolated from 45% (13/29) infected sparrows. House sparrows were found to exhibit some resistance to the K1 strain of *T. gondii* after oocyst infection, and the results suggest that sparrows may not be a significant source of environmental infection.

Literak, I. J. Pinowski, M. Anger, Z. Juricova, H. Kyu-Hwang and J. Ramonowski. 1997. *Toxoplasma gondii* antibodies in house sparrows (*Passer domesticus*) and tree sparrows (*P. montanus*). Avian Pathology 26 (4): 823-827.

Authors' abstract: Synanthropic sparrows in Poland and the Czech Republic were tested for *Toxoplasma gondii* antibodies by an indirect fluorescent antibody test (titre gtoreq 10). *T. gondii* antibodies were demonstrated in 12.3% of 227 house sparrows (*Passer domesticus*) and 4.9% of 41 tree sparrows (*Passer montanus*).

Lowther, P. E and C. L Cink. 1992. House Sparrow (*Passer domesticus*). The Birds of North America, No. 12 (A. Poole, P. Stettenheim, and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, DC.

This paper cites numerous peer reviewed papers and provides an extensive review of North American research on house sparrows. General species description is the same as referenced elsewhere but adds that house sparrows have shorter legs and thicker bills than native sparrows. Distribution is global. House sparrows are generally found in association with human altered ecosystems including agricultural, urban and residential areas. Global house sparrow populations are declining and the authors speculate it is due to an increase in automobiles and a decrease in horse transportation coupled with changes in agricultural practices. House sparrows are nonmigratory. Diet includes livestock feed, cereals, commercial birdseeds, weed seeds and insects. House sparrows need to eat between 20-28kcal/day. House sparrows are territorial around their nests and have been recorded attacking 70 different bird species at nest sites. House sparrows begin "nest-site sitting displays" in the fall. House sparrows will nest in the former nests of barn swallows, cliff swallows, bank swallows, eastern phoebes and American robins. Nest sites, nest construction, egg size and colour, incubation, hatching, parental care and development of the young is as described in other references. Survival of the young to adulthood averages 20%. Sparrows have been known to live up to 13 years old. Adult house sparrows are preyed upon by a range of hawks and owls. Young and eggs are eaten by cats, dogs, raccoons and a snake that is not native to Garry oak ecosystems. House sparrows are host to a broad variety of diseases and parasites - other references provide examples of the infections and pests that are most transmissible to humans and other animals. The paper also summarizes results from extensive general biological studies that use house sparrows as a study subject. The details on systematics, energetics, vocalizations, locomotion, self-maintenance, displays and moulting are not directly relevant to Garry oak ecosystems and are not summarized here.

MacDonald, A. 2002. *Personal communication.* Birder, Victoria, BC.

MacDonald has observed house sparrows competing with native birds such as swallows and chickadees for nest sites. He has also observed house sparrows beginning to claim nest sites in the fall before migratory birds arrived. Native raptors feeding on house sparrows; maintaining habitat for hawks and owls, installing raptor perches and maintaining standing, dead trees, also known as wildlife trees, will encourage the presence of birds of prey and may help control sparrow populations.

Maier, T. J. and R. M. DeGraaf. 2000. Rhodamine-injected eggs to photographically identify small nest-predators. Journal of Field Ornithology 71 (4): 694-701.

Authors' abstract: Photographs that clearly disclose avian-nest predators are difficult to obtain, particularly when predators are small and exhibit subtle depredatory behavior. We exposed House Sparrow (*Passer domesticus*) eggs injected with Rhodamine B dye in

camera-monitored ground nests for 12-d periods at 76 sites within mixed-hardwood forest stands in central Massachusetts, June-July 1997. Dye-injected eggs enabled us to recognize with certainty when eggs were breached at the nest because their contents were fluorescent pink and readily detected photographically. Eleven potential predator species were identified disturbing nests, of which eight were confirmed as predators. Eastern chipmunks (*Tamias striatus*) were the most frequent predators detected, along with fisher (*Martes pennanti*), raccoon (*Procyon lotor*), Blue Jays (*Cyanocitta cristata*), Black-capped Chickadees (*Poecile atricapillus*), red squirrels (*Tamiasciurus hudsonicus*), an Eastern Towhee (*Pipilo erythrophthalmus),* and a white-footed mouse (*Peromyscus leucopus*). White-footed mice were the most commonly detected species disturbing nests, but were photographed only once actually destroying an egg. The visual cue provided by dye- injected House Sparrow eggs confirmed depredatory behavior by eastern chipmunks, Black-capped Chickadees, an Eastern Towhee, and a white-footed mouse.

Maier, T. J. and R. M. Degraaf. 2000. Predation on Japanese Quail vs. House Sparrow eggs in artificial nests: Small eggs reveal small predators. Condor 102 (2): 325-332.

Authors' abstract: Nest predation studies frequently use eggs such as Japanese Quail (*Coturnix japonica*) to identify potential predators of Neotropical migrants' eggs, but such eggs may be too large or thick-shelled to identify the full complement of potential predators. We compared predation events and predators of Japanese Quail and smaller House Sparrow (*Passer domesticus*) eggs in paired, camera-monitored ground nests within edges and interiors of 40 mixed-hardwood forest stands in central Massachusetts. House Sparrow eggs were depredated significantly more than Japanese Quail eggs at both forest edges and interiors. Eleven potential predator species disturbed nests, six of which were confirmed as predators. Our use of House Sparrow eggs revealed predation by eastern chipmunks (*Tamias striatus*) and Black-capped Chickadee (*Poecile atricapillus*), but not by white-footed mice (*Peromyscus leucopus*), the most abundant small mammal species in all 40 stands. Neither predator species composition (as detected by camera) nor the frequency of nest predation differed between forest edge and interior. We conclude that the egg type used in artificial nest studies affects both the predation rates and the predator species detected.

Mathew, K. L. and R. M. Naik. 1998. A comparative study of the breeding biology of the house sparrow in rural and urban habitats in tropics. Pavo 36 (1-2): 19-26.

Authors' abstract: The house sparrow, *Passer domesticus*, in urban habitats reached the first peak in breeding before that in rural habitats. The breeding in rural areas was regular and better synchronised, whereas it was staggered and interrupted in cities. The breeding terminated earlier in villages. Habitat did not affect clutch size, but the number of clutches laid in a nest box in the village was higher than that in the city. Repeat clutches were frequent in villages. The mean weight of eggs laid by sparrows in the city varied significantly in different months. Egg mortality was higher in rural habitat due to predator pressure. However, fledging success was higher in rural habitats. Consequently, breeding success and the numbers of nestling fledged per nest was the same in either habitat. The nestlings of villages outweighed their counterparts from cities in summer and monsoon. It

is concluded that the sparrows adopt different breeding strategies in changing habitats to maximize fecundity.

Mathew, K. L., R. M. Naik and M. I. Patel. 1996. Seasonal and age depended changes in the food of House Sparrow nestlings. Pavo 34 (1-2): 47-51.

Authors' abstract: The adult House Sparrow *Passer domesticus* selectively fed its younger nestlings with insect materials in summer as its availability was less in the habitat whereas in monsoon when the insects were plenty, the nestlings were reared predominantly on insect diet throughout the nestling period. Older nestlings of summer were offered mainly seeds. The amount of food offered to nestlings of all ages was more in monsoon than in summer. The increment of dry matter with increasing age of nestling was higher in summer due to the greater proportion of plant matter/seeds in the diet of older nestlings and, therefore, the chicks of this season received more food in dry weight towards the later part of the nestling period as compared to monsoon.

McLennan, J. A., N. P. E. Langham and R. E. R. Porter. 1995. Deterrent effect of eye-spot balls on birds. New Zealand Journal of Crop and Horticultural Science 23 (2): 139-144.

Authors' abstract: An "eye-spotted" beach ball and a commercially available deterrent eye-spot ball significantly reduced the number of house sparrows (*Passer domesticus*) visiting a bird table to feed. The commercial ball had a greater deterrent effect than the beach ball at all four distances tested (10, 20, 30, and 40 m). The deterrent effect of both balls decreased with distance from the table, and was negligible at c. 40 m. Deterrence was increased 10% by illuminating the eyes with a rotating halogen light and by reinforcing the visual stimulus with alarm calls of blackbirds (*Turdus merula*), house sparrows, and starlings (*Sturnus vulgaris*), but declined with continuous use, and disappeared altogether after 9 days. Eye-spot beach balls in a vineyard significantly reduced landings by song thrushes (*Turdus philomelos*) for 2 weeks, and landings by blackbirds, house sparrows, and starlings for 3 weeks. They failed, however, in the fourth week when the grapes were fully ripe and most in need of protection. Eye-spot balls are environmentally friendly, so could be especially useful bird scarers in organic vineyards and near residential areas.

Medeiros, F. M. 1998. Population dynamics of the house sparrow: An approach. Boletim do Museu Municipal do Funchal, Supplement 5 Part A: 219-224.

Author's abstract: The main objective of this work is to investigate movements of a population of the House Sparrow in the Azores archipelago (36degree 55' 43" to 39degree 43' 23" N, 24degree 46' 15" to 31degree 16' 24" W) throughout the year. As this species was introduced to the Azores from the Portuguese mainland in 1960 and as it causes damage to crops it is particularly timely to study aspects of its population dynamics. 1242 adults and 514 juveniles were collected in one site (Laranjeiras - Sao Miguel - Azores) during 24 months (May 1991 - April 1993). All the individuals were ringed with one metal ring and three colour rings and liberated on the site of capture. The

nets were set daily during the first year and three times a week during the second year and were distributed regularly in an area of 0.5 Km2 in 76 different positions. This and a larger area around it (2 km2) were checked with binoculars (10 X 50) for ringed birds on the same days of capture. The main results are: 1 - Home ranges of all individuals have a mean radius of 56 m (27.5 m to 135 m). Although adults move less than juveniles there were no statistical significant differences between their movements. So all the individuals show site tenacity; 2 - The number of recaptures obtained during this study (27.9%) is higher than the number of recaptures obtained by WILL (1970) during a similar study (4.75%). This may suggest a higher level of residence of the House Sparrow in the Azores islands. The relevance of this result to the pest status and control of the House Sparrow will be discussed.

Mock, D. W., P. L. Schwagmeyer and J. A. Gieg. 1999. A trap design for capturing individual birds at the nest. Journal of Field Ornithology 70 (2): 276-282.

Authors' abstract: We describe traps designed for the trapping of particular individual parent birds during the nestling phase of the breeding cycle. These traps have been used successfully with large cup-nesting birds (egrets) and small cavity-nesting birds (House Sparrows). The common features shared include a dropping wire door that prevents escape and an electronic radio-release triggering mechanism that allows the researcher to control the precise moment of capture from a considerable distance away. The radio technology is modified from commercially available units developed for remote-control toy craft. The sparrow trap includes a mechanical motion-amplifier, adapted from a standard rat-trap. Both traps have been successfully field tested many dozens of times and currently result in captures on approximately 90% of attempts.

Msimanga, A. and R. Slotow. 2000. The House Sparrow *Passer domesticus* (Passeriformes: Ploceidae) invasion of southern Africa: Dispersal rates and the Allee effect. Durban Museum Novitates 25: 5-11.

Authors' abstract: The House Sparrow *Passer domesticus* is one of the most successful invasive bird species in the world. It was introduced to southern Africa around 1900 and has since spread throughout the region. Its dispersal was characterized by an initial slow phase followed by a rapid increase in the rate of spread. Following 50 years of slow spread, the rate of dispersal accelerated to over 80 km/year. The initial slow rate can be attributed to an Allee effect, defined as a disproportionate reduction in reproduction below a threshold population density due to reduced probability of finding a mate. The rapid phase involved a combination of long-range jumps (leap-frogging dispersal) and diffusive movement over short distances. Dispersal was significantly faster along railway lines.

Mueller, H. C., N. S. Mueller, D. D. Berger, G. Allez, W. G. Robichaud and J. L. Kaspar. 2000. Age and sex differences in the size of prey of the Sharp- shinned Hawk. Journal of Field Ornithology 71 (3): 399-408.

Authors' abstract: We trapped Sharp-shinned Hawks (*Accipiter striatus*) during fall

migration, using House Sparrows (*Passer domesticus*), European Starlings (*Sturnus vulgaris*), and Ringed Turtle Doves (*Streptopelia risoria*) as lures. Adults and males initiated attacks on sparrows more frequently than juveniles and females. Adult females initiated attacks on starlings and doves more often than adult males, but there was no such difference between the sexes in juveniles. Females actually struck all three species of lure more frequently than males, and juvenile females struck lures more frequently than adult females. There was no age difference in the incidence of strikes by males. Larger (longer-winged) juvenile males and females attacked starlings more often than smaller juveniles, but there were no size differences in strikes on prey in any age and sex group of hawks, suggesting that sexual dimorphism in size is not a result of selection for differences in prey size. Females struck disproportionately larger lures than males, presumably because they are less efficient at capturing smaller prey. Juveniles attacked doves as frequently as starlings, and there was little age difference in the incidence of strikes, suggesting that inexperience in judging the size of prey is an inadequate explanation for the many attacks that fail to result in strikes.

Palmer, T. S. 1898. The danger of introducing noxious animals and birds. Reprinted from the 1898 yearbook of the Department of Agriculture. Website: www.americanartifacts.com/smma/per/spar.htm Accessed January 15, 2002.

At the time this paper was written, the house sparrow had been introduced to all of the continents and had already become a pest species in North America. Palmer provides detailed information about the repeated attempts to introduce house sparrows to North America and their dispersal from these points of origin. House sparrows had become established in Montreal, Canada by 1870.

Penn State Agricultural Sciences. 2001. Controlling wildlife damage in the home fruit garden, Chapter 3: Birds. Website: ssfruit.cas.psu.edu/default.htm Accessed: November 23, 2002.

This website is designed to help small scale fruit producers implement pest management solutions without pesticides. House sparrows damage fruit by pecking holes in it. Using a variety of control methods is most effective for preventing damage to fruit crops. Control methods include protecting the fruit with netting, mesh, cages or wire; these options are of limited use in Garry oak ecosystems. Also of limited use in Garry oak ecosystems is the application of methyl anthranilate (a human food and drug flavouring additive) to fruit to deter bird consumption. Frightening devices may be used in Garry oak ecosystems and are most useful when accompanied by loud sounds. However, birds quickly become accustomed to these devices and they need to be moved and changed regularly to be effective.

Pinowski, J., M. Barkowska, A. H. Kruszewicz and A. G. Kruszewicz. 1994. The causes of the mortality of eggs and nestlings of *Passer* spp. Journal of Biosciences 19 (4): 441-451.

Authors' abstract: In the world-wide literature the role of predators and food shortage are

considered as responsible for mortality of eggs and nestlings. In synantropic altricial hole-nestling birds such as sparrows *Passer domesticus* (L.) and *Passer montanus* (L.) the predation plays unimportant role and in spite of this, mortality of eggs and nestlings can exceeded 50%. The role of microorganisms, heavy metals, pesticides and food shortage were investigated as possible causes of embryo and nestling deaths. About 70% of eggs that not hatched were infested with such pathogens as *Escherichia coli, Staphylococcus epidermitis* and several, more rarely occurring others. Considerable percentage of nestlings died due to pathogenic impact of such factors as *Escherichia coli, Isospora lacazei, Candida* spp., heavy metals and pesticides. As one effect of such interaction, the level of sublethal doses of heavy metals and pesticides are much lower that reported in the literature.

Pogue, D. W. and W. A. Carter. 1995. Breeding biology of secondary cavity-nesting birds in Oklahoma. Southwestern Naturalist 40 (2): 167-173.

Authors' abstract: We examined reproductive success, nest failure, and timing of nest initiation for secondary cavity-nesting bird species in south-central Oklahoma. Habitats in study areas were old fields with patches of tallgrass prairie and fragments of oak woodland. By monitoring 150 nest boxes from 1989 to 1993, we studied a total of 334 nests, including those of Carolina chickadees (*Parus carolinensis*), tufted titmice (*P. bicolor*), Bewick's wrens (*Thryomanes bewickii*), eastern bluebirds (*Sialia sialis*), and house sparrows (*Passer domesticus*). Carolina chickadees and tufted titmice were single-brooded and nested early in the breeding season. The parids had the highest nesting success of the species studied. Nest initiations for eastern bluebirds extended from early March to late July, and eastern bluebirds were generally double-brooded and occasionally triple-brooded. Bewick's wrens and house sparrows had the lowest nesting success. Nest failures increased as the breeding season progressed primarily due to an increase in snake predation and nest abandonment. Except for bluebirds and house sparrows, interspecific competition for nest sites is unlikely given differences in habitat preferences and timings of nesting among the five species.

Radunzel, L., 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 (1): 7-18.

Authors' abstract: Annual variation in the breeding success of Eastern Bluebirds (*Sialia sialis*) nesting in five types of cavities was assessed over 27 yr near Green Bay, Wisconsin. We found slight but statistically significant variation in clutch size, the fraction of young hatched, banded, and surviving from hatching to banding, and the percentage of banded young that returned to the study population. Breeding success was significantly greater in Open Top than in Standard boxes for all measures except return rate. Success improved slightly over the course of the study in Standard boxes, probably because of gradual improvements in box design. Total nest failure was the main factor influencing nesting success, and House Wrens (*Troglodytes aedon*), House Sparrows (*Passer domesticus*), cats (*Felis domesticus*), and raccoons (*Procyon lotor*) were the major causes. Total nest failure was significantly lower in Open Top boxes than in

Standard boxes, probably because sparrows and wrens prefer cavities with closed tops. As a result, where these two box types are used together and sparrows and wrens are common, bluebirds are probably being produced at lower rates than could be obtained if only Open Top boxes were employed.

Ringsby, T. H., B.E. Saether and E. J. Solberg. 1998. Factors affecting juvenile survival in House Sparrow *Passer domesticus*. Journal of Avian Biology 29 (3): 241-247.

Authors' abstract: We studied how variation in different reproductive traits (hatching date, clutch number and clutch size) in addition to mass, size and condition of the fledgling influenced its probability of survival until recruitment in a House Sparrow population living on islands off the coast of northern Norway in 1993 and 1994. Twenty-three and 21% of the fledglings were recorded alive in the population the year after hatching, respectively. Most mortality occurred just after fledgling. In both years larger-sized fledglings survived better than smaller ones. Juvenile survival was independent of clutch size. Multiple logistic regression analyses showed that in both years juvenile survival increased with body size (expressed as tarsus length). In addition, in 1993 fledglings in high body condition survived better, whereas in 1994 hatching day explained a significant proportion of the variation in juvenile survival. However, this last year both body condition and size increased significantly with hatching date, suggesting that juvenile survival rate may have been dependent on body condition also in this year. These results demonstrate that losses of juveniles during the non-breeding season are strongly influenced by factors during the breeding season that affect the size and condition of the fledglings.

Robinson, R. A., J. D. Wilson and H. Q. P. Crick. 2001. The importance of arable habitat for farmland birds in grassland landscapes. Journal of Applied Ecology 38 (5): 1059-1069.

Authors' abstract: 1. Over the last 25 years, populations of seed-eating birds have declined severely over most of western Europe. Local extinctions have occurred in grassland-dominated areas in western Britain, which may be influenced by loss in habitat diversity and a decline in the amount of arable cultivation. 2. We used the large-scale British Breeding Bird Survey of 1998 to investigate the importance of arable habitat within grassland landscapes for 11 common seed-eating birds and four similar sized insectivores. Generalized linear models were used to model the number of birds recorded in agricultural habitat within survey squares as a function of the amount of arable habitat present. 3. Numbers of grey partridge *Perdix perdix*, skylark *Alauda arvensis*, tree sparrow *Passer montanus*, corn *Miliaria calandra* and reed buntings *Emberiza schoeniclus*, yellow-hammer *Emberiza citrinella* and whitethroat *Sylvia communis* increased with the amount of arable habitat present in a survey square; the numbers of house sparrow *Passer domesticus*, four finch species, dunnock *Prunella modularis*, robin *Erithacus rubecula* and blackcap *Sylvia atricapilla* did not. 4. The positive association between numbers of some species and arable habitat within 1-km squares was strongest where arable habitat was rare in the surrounding area, and weakest or even reversed when

arable habitat was common. These results demonstrate the scale-dependence of bird-habitat associations in agricultural landscapes, only demonstrable where data are available at fine grain over large geographical areas. 5. These results support the hypothesis that range contractions (i.e. local extinctions) of some granivorous species have occurred because of contraction in arable cultivation. The loss of arable habitat where it is scarce may be causing declines in some areas, even though intensification of arable management is thought to be the main cause of declines elsewhere. Agri-environment schemes may need to vary between regions, for example to encourage arable cultivation in pastoral areas.

Roof, J. 2000. *Passer domesticus*: House sparrow. Website maintained by the University of Michigan. Website: animaldiversity.ummz.umich.edu/accounts/passer/p._domesticus$narrative.html Accessed: November 19, 2002.

The website provides background information on the range, description and life history of the house sparrow. The website uses only one reference (Lowther and Cink, 1992) and does not refer to any peer reviewed papers. The native range of house sparrows is listed as Eurasia and North Africa. They have been introduced to South Africa, Australia, New Zealand, and North and South America. Species description is the same as detailed in other references. The diet of house sparrows includes insects, weed seed, commercial birdseed, livestock feed and cereal crops. House sparrows build nests from plants, feathers, string and paper in openings in buildings and in both deciduous and coniferous trees. Up to 4 clutches of 1-8 eggs can be laid in a season. Both sexes incubate the eggs for 10-14 days and both sexes feed the young. House sparrows are highly territorial around their nests but not their feeding areas. House sparrows prefer human modified habitat such as farms, residential and urban areas. They are generally not found in uninhabited areas. Adult house sparrows are preyed on by hawks and owls. The young are preyed on by cats, dogs, racoons and snakes.

Saether, B. E., T. H. Ringsby, O. Bakke and E. J. Solberg. 1999. Spatial and temporal variation in demography of a house sparrow metapopulation. Journal of Animal Ecology 68 (3): 628-637.

Authors' abstract: 1. In order to compare spatial and temporal variation in the demography of a metapopulation of house sparrows living on four islands off the coast of Northern Norway, we computed the asymptotic population growth rate (lambda) for three transitions between years, using a projection matrix model. 2. The mean growth rate of the metapopulation was positive (lambda = 1.05). 3. Large variation was found in space and time in the asymptotic growth rate. Even though the standard deviations of the estimates were large, lambda was significantly greater than 1 on one island in 2 out of 3 years. In contrast, lambda significantly less than 1 occurred on an island on five occasions. 4. Decomposition of the magnitude of the spatial and temporal components of lambda showed that one year (1995) had a particularly negative impact lambda. In contrast, one island had a great positive effect. 5. These differences in lambda were most closely related to variation in the juvenile survival rate and in the fecundity rate, which,

in turn, was closely related to variation both in space and time in the proportion of the eggs that produced a fledgling. 6. As expected from the large spatio-temporal variation in lambda, the sensitivities and the elasticities of lambda to variation in the different elements in the projection-matrix also differed both in space and time. When lambda was small, it was most influenced by variation in adult survival rate. In contrast, for large lambda, it was most sensitive to variation in the recruitment rate. 7. We suggest that conditions during the breeding season determine whether a population acts as a source or sink in this temperate small passerine metapopulation, and that the ratio of juveniles to adults can be used to characterize populations as sources or sinks. 8. These results demonstrate large variation in space and time in the demography of a small passerine metapopulation. These differences result from a combination of regional effects on the whole metapopulation, and factors that occur at one particular island in a single year.

Schwagmeyer, P. L., D. W. Mock and G. A. Parker. 2002. Biparental care in house sparrows: Negotiation or sealed bid? Behavioral Ecology 13 (5): 713-721.

Authors' abstract: We explored the responses of monogamous house sparrow parents to deviations in their mates' contributions to nestling provisioning. Following 1-2 days of baseline measurement of parental food delivery rates, we applied small lead fishing weights to the tail feathers of either male or female parents. Weighting had much greater immediate impact on male parental care than on female care, but the handicapping had little long-term effect on either male or female provisioning behavior. When parental performance of handicapped males was most impaired, their mates did not show significant increases in parental care as compensation, nor did females mated to handicapped males reduce their provisioning as their mates recovered from weighting. Similarly, males mated to handicapped females did not respond to their partners' recovery with declines in their own efforts; paradoxically, these males showed a sustained elevation of provisioning throughout the post-treatment interval, despite no significant reduction in provisioning by weighted females. The apparent insensitivity of both males and females to changes in their mates' parental behavior, and the ineffectiveness of current partner behavior at predicting an individual's provisioning effort, fail to conform to assumptions of biparental care models that require facultative responses to partner deviations in effort. Instead, the remarkable consistency of each individual's behavior supports the notion of "sealed bids" and suggests that variation in nestling provisioning is largely attributable to factors that are independent of the mate's current behavior, such as differences in individual quality.

Siriwardena, G. M., S. R. Baillie and J. D. Wilson. 1999. Temporal variation in the annual survival rates of six granivorous birds with contrasting population trends. Ibis 141 (4): 621-636.

Authors' abstract: To identify the environmental changes responsible for the declines in abundance shown by many granivorous bird species, the demographic mechanism through which the changes have acted must be determined. Ring-recovery data were used to estimate the annual survival rates (since 1962) of six seed-eating bird species with contrasting population trends to identify whether variations in survival could have been

the mechanism behind population change. The survival rates of Bullfinch *Pyrrhula pyrrhula*, Chaffinch *Fringilla coelebs*, Goldfinch *Carduelis carduelis*, Greenfinch *C. chloris*, Linnet *C. cannabina* and House Sparrow *Passer domesticus* were estimated using models allowing age- and time-specificity in survival (reporting rates could be assumed to be constant). Three tests of the importance of variations in survival in determining population trend were conducted: (1) simple population models with constant productivity showed whether temporal changes in survival were sufficient alone to explain observed trends in abundance, (2) survival models incorporating changes in abundance as a covariate identified whether annual survival rates were associated with population changes, and (3) mean survival rates found in objectively identified periods of increase, decline and stability in each species' population trend were compared. These analyses suggested that environmental change has led to the observed population trends for Goldfinch and House Sparrow largely through effects on survival. Weaker relationships between variations in survival and population trend were found for Bullfinch, Chaffinch and Linnet, but other factors such as breeding success are likely to have been at least as important for these species, and also for Greenfinch. Checking analyses incorporating density-dependence did not alter these conclusions.

Solberg, E. J., T. H. Ringsby, A. Altwegg and B. E. Saether. 2000. Fertile House Sparrow X Tree Sparrow (*Passer domesticus* X *Passer montanus*) hybrids? Journal fuer Ornithologie 141 (1) 102-104.

Authors' abstract: Viability and a seemingly successful breeding of a F1 House Sparrow X Tree Sparrow hybrid are reported from islands off the coast of northern Norway. From two consecutive clutches of House Sparrow X Tree Sparrow hybrids recorded in 1995, only one of 7 chicks survived the first year. The surviving individual was later, in 1997, found attending the nest with a female House Sparrow and feeding the young in two consecutive clutches. Neither of the F2 hybrids were observed after fledging. Despite the fact that House Sparrows indulge in frequent extra pair copulation, we find it unlikely that both clutches fed by the male hybrid could have been fathered by a House Sparrow male and therefore conclude that the F1 male hybrid was fertile. The hybridization may have been facilitated by the fragmented structure and small size (from 5 to 100 individuals) of the sub-populations found in our study area.

Tomialojc, L. 1998. Breeding bird densities in some urban versus non-urban habitats: The Dijon case. Acta Ornithologica 33 (3-4): 159-171.

Author's abstract: The composition of bird assemblages in the parks of Dijon, Burgundy - France, is Central-European in character and similar to that found in the nearest forests. This confirms that urban green areas harbour a set of birds gained from the surrounding habitats, except for some species originating from the waves of urbanized (synurbic) populations leaping from one human settlement to another (e.g. *Passer domesticus, Streptopelia decaocto, Serinus serinus*). Censuses repeated after years in a young park show that bird colonization of urban area proceeded even when no suitable habitat changes had occurred. In an old park of Dijon an extraordinary bird density has been found, 8-10 times exceeding that in the neighbouring forests or younger urban parks. The

density of Stock Doves *Columbia oenas* (c. 28 p/10 ha) is there among the highest in Europe. Such high urban densities cannot be explained by the habitat structure suitability alone nor by "species-area effect". They apparently result from the absence of main predators and coincidental availability of rural food resources within the reach of feeding flights, similarly as this was found in some Polish studies.

Vaclav, R. and H. Hoi. 2002. Importance of colony size and breeding synchrony on behaviour, reproductive success and paternity in house sparrows *Passer domesticus*. Folia Zoologica 51 (1): 35-48.

Authors' abstract: Several comparative studies have previously identified breeding density and synchrony as potential determinants of reproductive success and extra-pair mating. However, the mechanisms and interaction of these two factors are poorly known. Here, we examined the effects of breeding density and synchrony on the behaviour, reproductive success and paternity losses in house sparrows. In order to test the effects of colony size, we created nest sites with varying numbers of nest-boxes. Our results show that there is an interaction between breeding synchrony and density, namely that breeding synchrony decreased with colony size. Neither colony size nor breeding synchrony seemed to influence brood size at fledging, although birds in larger colonies laid larger clutches. Moreover mate guarding behaviour was not influenced substantially by these two factors. Only nest guarding was significantly related to colony size and breeding synchrony. Paternity losses were not significantly related to colony size but they appeared to decrease with increasing synchrony. This finding supports the idea that extra-pair fertilisations are under male rather than female control.

Wildlife Damage Control. 2002. Starlings. Website: www.wildlifedamagecontrol.com/starlings.htm Accessed: November 23, 2002.

Although the website focuses on starling control, there are useful precautions for preventing disease transmission when handling all birds and bird nests. Protective clothing can prevent infection by ectoparasites. These parasites can also be killed with pesticides. Disease transmission can be prevented by wearing HEPA filter masks.

Zalewski, A. 1994. Diet of urban and suburban tawny owls (*Strix aluco*) in the breeding season. Journal of Raptor Research 28 (4): 246-252.

Author's abstract: The diet of tawny owls (*Strix aluco*) was studied during the breeding seasons 1988-90 in an urban and a suburban area in Torun, Poland. Two amphibian, 18 bird, and 14 mammal species were recorded as prey in a sample of 312 pellets. From 600 prey items found in both sites, the house sparrow (*Passer domesticus*) was the most frequently taken bird prey and the common vole (*Microtus arvalis*) the most frequently taken mammal prey. Significantly more mammals than birds were taken at the suburban site than at the urban site (P lt 0.001). At the urban site, the proportion of birds (except for tits (*Parus* spp.) and house sparrows) increased over the course of the breeding season, while the proportion of *Apodemus* spp. decreased. Similarly, at the suburban site the proportion of all birds increased and the proportion of *Microtus* spp. decreased.

House sparrows at the urban site and Eurasian tree sparrows (*Passer montanus*) and tits at the suburban site were taken in higher proportion than their availability. An examination of dietary studies from elsewhere in Europe indicated that there was a positive correlation between mean prey size and increasing proportion of birds in tawny owl diets ($P = 0.003$).