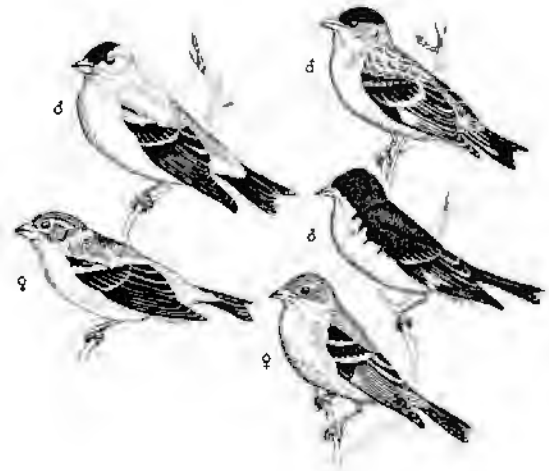
*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Goldfinches

**American Goldfinch, *Carduelis tristis***

**Lesser Goldfinch, *Carduelis psaltria***

**Family: Fringillidae**



Introduction: Goldfinches are a familiar and abundant small colorful bird. They can be found in weedy fields and visiting feeders. They have a particular liking for thistles, eating the seeds and using the down to line their nest.

Identification: Goldfinches are small birds with a small, pointed, conical, pink bill. They have a bright yellow to dull brown body; their wings are dark with large white wing-bars. The tail is short and notched. During the breeding and summer seasons the male is bright yellow with a black cap whereas female is drab olive, both sexes are similar and drab in winter. Their call is a long series of twittering and warbling notes. Further information including audio is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

**Legal Status**: Goldfinches are classed as migratory nongame birds in the U.S. Code of Federal Regulations. They may be controlled under permit from the U. S. Fish and Wildlife Service.

**Damage**: Commercial flower and vegetable seeds, strawberries, and disbudding of almonds and apricots.

**Range**: Both species breed and winter in California and other western states. There is no regular migration, though there are occasional movements.

American Goldfinch

Lesser Goldfinch

**Habitat**: Farms, weeds, fields, gardens, wooded streamsides, groves, parks, and orchards.

Biology: These goldfinches are largely permanent residents in California; nesting is in May and June. The American goldfinch is gregarious but not a colonial nester. However, numerous pairs may occupy a suitable area. Nests of both species are usually built one to forty feet off the ground in trees, bushes, or tangles of vegetation. Four to six eggs are laid by both the American goldfinch and the lesser goldfinch. Incubation period is not known exactly, but is thought to be 12 to 14 days. Age at first flight is 10 to 16 days for the American and thought to be about 14 days for the lesser.

Goldfinches are seed eaters although some insects are taken in the spring and during nesting. Weed seeds, especially seeds of composites are preferred foods. Damage to flower seeds is occasional but may be severe as the birds fly in flocks of up to several hundred in winter.

### Damage Prevention and Control Methods

Exclusion: Protective plastic netting, preferably ½ inch mesh has provided excellent protection in some crop situations.

Habitat Modification, Fumigants, Repellents, Toxic Bait, and Trapping: None of these provide adequate or appropriate methods of control.

Frightening Devices: Gas cannons and other noise making devices have produced limited results in repelling goldfinches from crops.

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## *BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

### Gulls

**Herring, *Larus argentatus***
**Ring-billed, *L. delawarensis***
**Western, *L. occidentalis***
**California, *L. californicus***
**Glaucous-winged, *L. glaucescens***
**Family: Laridae**

Introduction: The term gull refers to members of a group of 25 North American bird species that belong to the family *Laridae*. Gulls are small to large seabirds, many of which also live inland for at least part of the year; some are found strictly in marine environments. Most are grey, black and white when fully mature, but extensively marked with various shades of brown during from one to four years of immaturity. They have long, slim wings and can fly exceptionally well, but also strong legs, which give them reasonably good mobility on the ground. They swim buoyantly and often resort to water to roost at night.

Identification: Adult gulls are white with varying patterns of gray and black over their back, wings, and head. The young are often gray or brown and take several years to develop adult plumage. Both sexes are similar in appearance. They all possess excellent flying and swimming skills, some can dive underwater. Further information including audio is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

Legal Status: Gulls are classed as migratory species and may only be taken with a permit issued by the U.S. Fish and Wildlife Service.

In California, the California gull holds the protective status "California Species of Special Concern" due to declining numbers at their historic California breeding colony at Mono Lake. However, in an ironic twist, this species has colonized the southern portion of San Francisco Bay, an area it did not historically nest, and has undergone exponential population growth. These California gulls now inhabit large, remote salt-production ponds and levees.

Damage: Gulls cause damage to agricultural crops and threaten human safety at airports through air strikes with aircraft. Their abundant distribution throughout the country mean gulls are involved in more aircraft collisions than any other bird, see FAA Wildlife Strike database. Gulls can pollute domestic water reservoirs by fecal contamination, transmit Salmonella bacteria to sheep and cattle, and become a public nuisance in and around refuse dumps, outdoor restaurants, and public buildings.

Gulls occasionally cause a nuisance when they nest on rooftops and seek food from people outdoors. Gulls are predators of several seabirds during the breeding season.

Range: Nearly worldwide, favoring coasts. Of 43 species known globally, 17 species of gulls occur in the Western United States. The above listed are the most commonly encountered that infringe upon human activity in California.

With the exception of the more resident Western gull, most species typically migrate along the coast, southward for the winter, and returning northward to breed and reside in small or large colonies.

Herring Gull

Ring-billed Gull

Western Gull

California Gull

Glaucous-winged Gull

Habitat: Gulls are common along our marine coasts, but some are found many miles inland from water. Gulls spend much time on shore, and most of their feeding is done on water. Omnivorous feeding habits and gregariousness may relate to their recent intrusion into waterfronts, cities, refuse dumps, fields, and farmland.

Biology: Gulls (25 species known to U.S.) are medium to large, typically gray and white seabirds, with long, pointed wings, a strong, hooked bill and a square tail. The feet, bill and wing-tip colors are the most reliable characters for identifying adults. Gulls depend on their narrow wings mostly for gliding, using air updrafts from ocean waves, buildings, ships and cliffs. They swim well, because of their webbed feet, yet can walk with agility on land. Flocks will follow the tractor disk to pick up unearthed grubs and mice, or gather in fields to eat grasshoppers and other insects aroused by flood irrigation.

Though primarily fish-eaters, gulls eat almost anything, and are known to scavenge decaying sea animals along the cost as well as harvest fresh food from the sea. Gulls also eat young, other gulls' eggs, rabbits, ground squirrels, rats, earthworms, cherries, insects, wheat, and steak bones. Special glands in their heads enable them to drink salt water as well as fresh.

## Damage Prevention and Control Methods

Exclusion: Exclusion of gulls from attractive areas i.e. garbage dumps, sewage discharge areas, and restaurant areas is significant as it may reduce gull numbers near airports.

Excluding gulls from temporary or limited resting areas such as window ledges, roof tops, etc is best achieved as with other birds (see Pigeons) using porcupine wires.

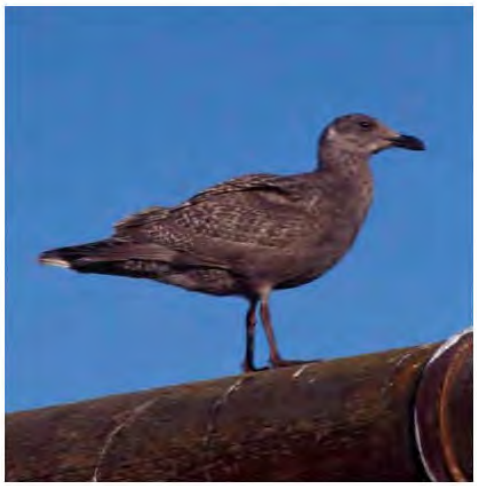
Large area exclusion, such as water reservoirs, crops, and landfills, is best achieved with wire or plastic netting, or by suspending parallel steel wire or nylon monofilament over the area. Spacing should be 40 feet to 15 feet.

Similar gull exclusion is used in fish rearing ponds. Other devices including floating plastic balls are commercially available to keep gulls from using water areas.

Habitat Modification: Discouraging gull use of areas essentially means reducing or eliminating food, water, nesting, and resting sites. This is not easy to do given gulls adaptability to a wide variety of foods. Human food wastes, fruit, vegetable crops, insects, earthworms, other invertebrates, and vertebrates are all potential foods.

Manipulating grass and vegetative cover around airports, park areas, can be successful in discouraging gulls. However, the key is to identify the pest. For example, gulls are deterred by increasing cover, while many other airport bird pests are deterred by reducing cover.

Frightening: Frightening devices can be effective when used against gulls e.g. shotgun shells, shell crackers, gas-powered exploders, and broadcasting distress or alarm calls. Carter (2002) reports success with radio controlled aircraft at Dover Air Force Base as a hazing technique.



To be successful, all scaring devices should be used with experience, continuity and care in use. Most distress and alarm calls are species specific. Limit use to avoid over familiarization.

Frightening devices are usually a temporary measure and will not cure repeated presence by gulls. Dead effigies or decoys may assist in this issue.

Fumigants: Not an effective method and none are registered.

Repellents: Not an effective method and none are registered.

Shooting: Shooting gulls is only effective in highly selective situations and is not recommended for management control of large populations. Shooting has been used to eliminate gulls habitually flying over airport runways, and to remove offending gulls preying on the nestlings of protected species. Federal and State permits are required.

Toxic Bait: The toxicant DRC-1339 is a Restricted Use Pesticide that is registered in the U.S. and is registered in California for control of nesting herring gulls, great black backed gulls, and ring billed gulls. It is an acute toxicant and its use is in limited situations where there are high gull populations. DRC-1339 is slow acting. Death is caused by poisoning. A depredation permit from USFWS is required to use this material.

Trapping: Live trapping is possible using rocket or cannon netting over baited sites, using box

traps over nests and eggs, spotlighting at night and capturing with hand nets. Live trapped and relocated gulls are likely to return to their place of capture.

Other: Removal of nests, eggs, and young needs to be done on a continual basis. It is time and labor intensive. Permitting is required.

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*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Horned Lark

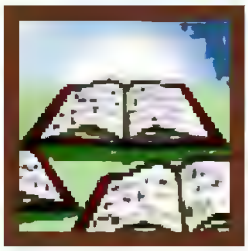
***Eremophila alpestris***

**Family: Alaudidae**

Introduction: The horned lark (shore lark) walks or runs instead of hopping and moves in an erratic pattern when feeding, when on its breeding territory, and when in flocks during winter. It feeds on seeds and ground insects. The only true lark native to the U.S.; the horned lark is faithful to its birthplace, where it returns after every migration. Fifteen distinct subspecies have been described in the West.

Identification: Horned larks are ground dwelling birds slightly larger than a house sparrow. They are brown, with a yellowish face, black breast, black whiskers, and two small black horns. They have a high pitched and sustained call. Further information is available at:

Cornell Lab of Ornithology



Legal Status: Horned larks are classed as migratory nongame birds in the U.S. Code of Federal Regulations. They may be controlled under the general supervision of the county agricultural commissioner or under a depredation permit from the U.S. Fish and Wildlife Service.

Damage: Seedlings of beets, lettuce, alfalfa, broccoli, carrots, sugar beets, beans, peas, spinach, melons, tomatoes, onions, peppers, and flowers. Blossoms of beans and peas are sometimes eaten, and lettuce and peppers are occasionally pecked.

Damage by horned larks usually begins as the first plants break through the surface of the soil. The horned lark nips off parts of the tender plantlets, or in the case of small seedlings such as lettuce, it may pull up the entire plant. If the seedlings are not destroyed in the early stage of growth, the secondary leaflets and adventitious buds are rapidly consumed as they appear. In areas dry-farmed, where the plant is slow-growing, the damage may extend over a long period and cause excessive loss. In irrigated fields, where the plants grow rapidly, the damage is usually of short duration. When the seedlings reach a height of 3 to 4 inches, damage is normally curtailed.

The first evidence of damage by horned larks is usually the denuding of the plants from a small area in the center of the field. As the damage continues the bare spot may spread rapidly until a narrow fringe of undamaged plants may remain along the borders of the field.

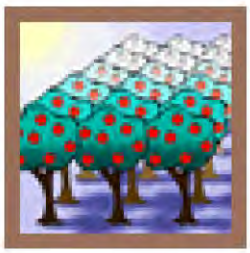
Range: Horned larks may be found as migrants or residents in any part of California from sea level to mountaintop. They breed from northern Alaska to southern Mexico and retreat from northerly latitudes and higher elevations in autumn, wintering from southern Canada southward. There are at least eight geographical races of the species in California.

## Horned Lark

Habitat: Grasslands, meadows, prairies, stony deserts, and tundra are preferred habitat. Open fields of cultivated or irrigated crops in California are invaded after the natural vegetation dries up in summer.

Biology: In its northern ranges and at higher elevations, the horned lark follows the retreat of winter closely. In California, most horned larks start nesting in March in dry treeless locations in the rolling foothills. A shallow cup of fine grasses is constructed in a hollow in the ground. Three to five eggs, commonly four, are laid. The incubation period is 11 to 14 days and age at first flight is 10 to 12 days. Two broods are commonly raised each year.

The horned lark is markedly terrestrial, perching on the lowest strand of a wire fence, on a rock or clod of dirt but never in a tree. Flocks of various size feed along roads and in fields and stubble. Insects and other small invertebrates are important food in spring, but in other seasons, vegetable matter such as weed seeds, grain, and seedlings form the bulk of their diet. The food of the horned lark consists largely of seeds. Analysis of the food items contained in 259 horned lark stomachs, collected in California, showed the bird's annual food to consist of about 91 percent vegetable, and 9 percent animal matter. Seeds of weeds and wild grasses averaged 51 percent of the total food.



## Damage Prevention and Control Methods

Exclusion and Habitat Modification: No methods are effective.

Frightening devices: Acoustical sounds are the most common control tools currently used in California to frighten horned larks from damaged field crops. For sound to be effective it should be used immediately when numerous horned larks are observed congregating over a recently seeded crop. The most widely used devices for minimizing depredations has been automatic propane exploders. The units should be moved daily to prevent horned larks from becoming habituated to the sound. Exploders are most effective when they are supplemented with other methods such as shotgun blasts, shell crackers, bird bombs®, or bird whistlers®. Often, frightening will just move birds around in the field.

Raptor-mimicking kites suspended from helium-filled balloons or tethered to stationary posts have been used to scare horned larks from small areas. Their effectiveness is enhanced when used in conjunction with propane exploders or exploding shells.

The stake and flag method of frightening horned larks from various crops were developed in California during the 1930's. It consisted of driving stakes in the soil over the crop bed rows and then attaching strips of cloth or paper to the tops. The wind movement of the cloth or paper would scare the horned larks from the seed bed. This control method is still being used today with reflective tape replacing the paper or cloth strips.

Fumigants: Not an effective method. None are registered.

Repellents: Capsicum-containing granular repellents are federally registered for use against

horned larks and several other birds. Use is limited to certain fruit, vegetable, and grain crops. Read the product label for specific information.

Cummings et al (2006) reports inconclusive results using Flight Control®, an anthraquinone repellent foliar spray. This product is not registered for use in California at this time.

Toxic Bait: There are no specific toxicants registered for control of horned larks.

Shooting and Trapping: Shooting may scare or reduce the number of birds but is labor intensive and costly. Shooting may be done under the supervision of the agricultural commissioner or under a depredation permit from the U.S. Fish and Wildlife Service.

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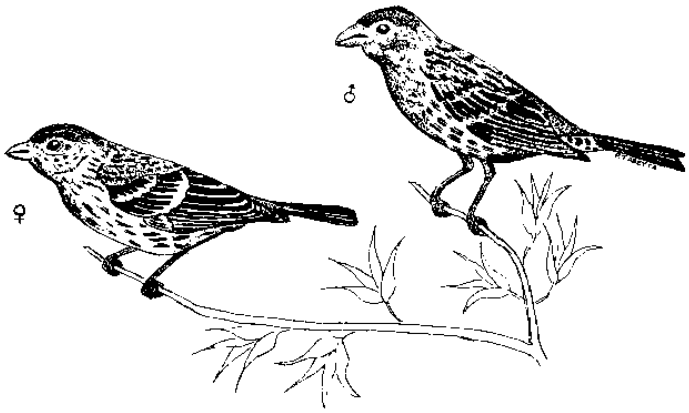
*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## House Finch (Linnet)

***Carpodacus mexicanus***

**Family: Fringillidae**




Introduction: House finches, also known as linnets, are a bright red and brown-striped bird who frequent cities and suburbs. Their call is similar to the house sparrow. They are primarily seed and fruit eaters.

Identification: About the same size as sparrows. Males are brownish with a bright red breast, forehead, rump, and stripe over the eye. They also have narrow dark stripes on their flanks and belly. Females are very sparrow like with a plain head and eye stripe. Their call is a warbling song. Further information is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

**Legal Status**: The house finch is classed as a migratory nongame bird in the U.S. Code of Federal Regulations. It may be controlled under the general supervision of the county agricultural commissioner or under a depredation permit from the U.S. Fish and Wildlife Service.

**Damage**: House finches feed on practically all deciduous fruits, berries, grains, and vegetable and flower seeds. Included are ripening fruits: apricot, cherry, peach, pear, nectarine, plum, prune, avocado, grape, apple, fig, strawberry, blackberry, raspberry, etc; buds of almonds, apricot, pear, peach, plum, prune, nectarine; and seeds of milo, sunflower, lettuce, broccoli, miscellaneous vegetables and flowers, and tomato plantlets. They also detach the bracts of fruit buds and devour the bud. At blossom time, they knock off flower petals and eat the embryonic fruits. There are three types of damage to ripening fruits:

1. Early season damage by nesting adults.
2. Mid and late season damage by young and adult birds resident in the locality.
3. Winter damage to late ripening fruit by flocks of birds gathering in their winter habitat.

Disbudding of fruit trees can occur in October or November but becomes most noiceable in January. A relatively small resident flock of house finches can completely disbud a considerable acreage because of the long period of activity. This damage is done by three types of flocks:

1. Resident local birds.
2. Birds in their winter habitat.
3. Migratory flocks moving from one range to another.

Definite localization of house finch activity was the rule in both summer and winter depredations studied by Piper and Neff (1937), though there were some exceptions.

Range: House finches are abundant residents throughout California, western United States, and Mexico, wherever food and water are available. They are most numerous on the valley floors and in the foothills. Though classified along with other finches as migratory nongame birds under Federal law, authorities agree that the California house finch is relatively non-migratory. In late summer they wander into the higher mountains and have been collected as high at 9,800 feet. They are relatively resident birds and most of those in the valley districts may spend their lives within a few miles of the place where they were hatched.

House Finch

Habitat: Open woods, scrub-growth areas, deserts, ranches, farmlands, suburbs, and towns. Human development has created extensive favorable habitat i.e. hedgerows, field edges, and crop fields.

Biology: House finches nest in a great variety of places, and there are few areas where they cannot find suitable nesting sites. Nesting begins in March in the southern portion of the state and extends to July in colder areas. House finches have adapted well to man's presence and the female will build a nest in almost any sheltered spot including ledges in buildings. Almost any soft material is used, including fine twigs and grasses. Four to five eggs are laid and they hatch in 12 to 16 days. Age at first flight is 11 to 19 days. Two broods are commonly raised, often in the same nest.

During the nesting period, adults are widely scattered. As summer progresses, groups of young birds and a few adults band together to feed in the general area where they were reared. These bands grow larger as additional broods of young and their parents flock to them. By mid-August, most of the young are out of the nest and have joined the neighborhood band.

The only movement is that of broods of young as they join the flocks and a minor drift of a flock as it follows a succession of fruits or maturing seed about the general area it inhabits.

## Damage Prevention and Control Methods

Exclusion: Protective plastic netting ½ inch mesh has provided excellent protection in covering crops like blueberries, bush berries, and strawberries.

Habitat Modification: Elimination of cover: Remove large brush piles, stacks of irrigation pipe, and piles of boxes to eliminate nesting and resting areas for house finches.

Frightening Devices: Frightening devices in general have little practical value as methods of crop protection against house finches. Cases have been reported where good results have been obtained using gas cannons mounted above the crop and moved frequently. Some grape growers have reported limited success in repelling house finches with silver reflective tape cut in small strips and tied to outside vine branches. Homeowners have reported similar results in protecting fruit trees when strips of tape are tied to branch ends. The entire tree needs to be covered to gain maximum protection.

Fumigants: None are registered.

Shooting: Shooting can reduce the number of birds present but is costly and a rather futile method of complete crop protection.

Toxic Bait: None are registered.

Trapping: Modified Australian crow traps and cotton trailers converted into traps have been effective in trapping large numbers of house finches. The wire covering of traps used for house finches must be of a small mesh such as ½" x ½" mesh hardware cloth or aviary wire. Canary grass seed, a wild bird mixture of seeds, or chick scratch (cracked corn, milo, and other grains), makes an excellent bait and food source for decoy and captured birds.

Trap location is one of the most important factors in achieving good results. Before placement, observations should be made to determine flyways, resting, perching, and feeding areas. Traps have been most effective when placed in locations where the birds enter an area or near a resting or perching location. Traps should be placed in open areas where they can easily be seen and are readily found by the birds. If the trap does not begin catching birds within 1 week it should be moved to a new location.

Trapped house finches serve as decoys to other birds. Decoy birds are usually essential in attracting other house finches. Use one to fifteen live decoys depending on trap size. Provide food water and shade at all times to keep decoys alive and make the trap more attractive.

All traps should be serviced on a regular basis to insure the timely release of non target species and to maintain adequate food, water, shade, and roosts for the trapped birds.

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*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## House Sparrow (English Sparrow)

***Passer domesticus***

**Family: Ploceidae**

Introduction: The House Sparrow occurs naturally in most of Europe and much of Asia. Noisy and gregarious, it has followed humans all over the world and has either been intentionally or accidentally introduced. It is now the most widely distributed wild bird on the planet. Ironically, they were introduced independently in the U.S. as a means of pest control. Today the House sparrow is abundant in urban and agricultural habitats.

Identification: The house sparrow is a small, stocky songbird. It has short legs, and a thick bill. The male has a black throat and white cheeks. Size is 6 inches. The male has a reddish back and black bib, female is brown. Call is a distinctive series of slightly metallic "cheep, chirrup." Further information including audio is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

**Legal Status**: The California Fish and Game Code defines house sparrows as a nongame bird that may be taken and possessed by any person at any time (CFGC § 3801). There are no federal restrictions on taking house sparrows.

**Damage**: Grain, especially sorghums, near ranch buildings; grain in poultry rations, storage sheds, and livestock feedlots; sprouting vegetables and flower crops and newly seeded lawns, disbudding of fruit trees and ornamentals, and occasional pecking of ripening fruit. The house sparrow harbors the chicken louse and the bird louse. House sparrows are capable of transmitting fowl cholera, turkey blackhead, Newcastle disease, avian tuberculosis, Eastern equine encephalitis, pullorum, canary pox, anthrax, and numerous helminth, fungal, and protozoan parasites. The noise and filth associated with their nests are nuisances in urban areas. Further disease information is listed in the Wildlife Chapter or at www.cdc.gov.

**Range**: Established throughout California and the nation, the house sparrow is common though less numerous than it was before the automobile replaced the horse. This species is non-migratory.

House Sparrow

**Habitat**: Cities, towns, agricultural areas.

**Biology**: Nest building begins as early as February with both sexes participating in the activity. Nests are constructed of grass, straw, and debris and may be located almost anywhere. Three to seven eggs are laid, commonly five, and two or three broods are raised each year. The same nest has been occupied by up to four different females in a season, leading to higher estimates of the number of broods raised than is probably the

case. The incubation period is 11 to 12 days and the age at first flight is about 15 days. Soon after the young leave the nest, they gather in small flocks. As the summer advances, the juveniles are joined by adults until the flock may number several hundred.

The house sparrow is primarily a grain eater. An adult bird eats about six grams of dry grain a day. Bread crumbs and other human debris substitute for grain in cities. Some weed seeds and insects are eaten, but animal food accounted for less than five percent of the annual diet (Kalmbach 1940). The young are fed most of the animal matter. Succulent vegetable matter including fruit, young plants, and blossoms of beans and peas are also taken.

## Damage Prevention and Control Methods

Exclusion: Carefully screening around poultry houses, lawns, etc., with ¾ inch or smaller mesh will keep them out.

Protect from roosting on walls by stringing plastic bird netting over vines. Alternatively, remove the shrubbery. Place netting over all openings where sparrow exclusion is desired e.g. ventilators, vents, air conditioners, building signs, eaves, overhangs, and ornamental designs.

House sparrows may be discouraged from bird feeders by installing vertical monofilament lines at 2 foot intervals around the feeders. Studies have reported that many other species of bird are not affected by this approach. House sparrows cannot access openings narrower than 1 ⅛ inches.

Habitat Modification: Destruction of roosts and nests is one method. Total removal of vegetation, such as shrubs and trees is an effective but extreme measure. In rural areas, removal of hedgerows adjacent to crop fields can assist in attractiveness to house sparrows. Remove dead fronds from palm trees.

Frightening Devices: The sparrow's range of hearing is reported between 675-11,500 Hz meaning ultrasonic devices are ineffective. Fireworks, blank shot, shell crackers, and other noise making devices, if permitted by local regulations and persistently carried out, will eventually dislodge birds from an evening tree roost. These devices are usually ineffective where they are also nesting.

Flags, foil strips, and dangling paper are relatively useless as the birds readily adapt to them.

Fumigants: None are registered.

Repellents: Sticky repellents applied to ledges, rafters, beams, etc. may help keep sparrows away. However, the ability of sparrows to cling to small projections makes this an expensive, laborious, and messy process.

Shooting: Shooting will reduce the number of birds present but is costly and rather futile as a method of crop protection.

Trapping: This is probably the most widely used method. A wide variety of traps have been used for local control of house sparrows. Traps that are designed to catch only a few birds at a time include the double funnel trap, nest trap and the commercially available elevator trap. Modified Australian crow traps and cotton trailers converted to traps have caught larger numbers of birds. Aviary wire of ½" x ½" mesh hardware cloth should be used for the wire covering of these traps. Chick scratch, fine cracked corn, milo, wheat, bread crumbs, or their combinations make good baiting material and food sources for decoy and captured birds.

Toxicants:

Avitrol® - 0.50%

Some success has been achieved with Avitrol®. Treated bait Avitrol® is a commercially prepared grain bait for use by public agencies and licensed pest control operators qualified in bird control. Use according to label directions. A permit from the county agricultural commissioner is needed for its use.

Directions for Use

General Procedure: Before exposing treated baits, thorough observations should be made to determine the number of house sparrows present, their feeding habits, their preferred locations, their daily behavior patterns, and the presence of nontarget species. Observations should continue throughout the day. Desirable locations for bait exposure should be selected during these observations. If adequate precautions are taken in selecting baiting sites no other species should be harmed.

When the daily activity pattern of the birds has been established and baiting locations selected, clean bait should be used to determine the preferred bait. Prebaiting should continue for several days or until there is good bait acceptance. Toxic bait should not be exposed until good acceptance of clean bait occurs.

Bait should be applied only under the supervision of the agricultural commissioner. Allow only responsible adults to place bait.

Placement of Bait Trays: Flat bait trays or "V" shaped troughs can be placed on rafters in garages, sheds, barns, hangers on standards, etc., where house sparrows frequent to feed or perch, and where there is no danger to man or other animals. Construct trays and troughs soundly to prevent bait spillage.

Prebaiting: Prebaiting with clean, untreated bait is essential for good control. Prebait and treated bait should be of the same grain bait. If trays and troughs are well located and birds are numerous, acceptance of bait should be well established within one week. If at the end of 10 days some birds fail to show acceptance of bait, the trap should be moved to a new location. Expose prebait sparingly but replenish as needed to keep birds feeding.

Exposing Poison Bait: When prebait is accepted freely in all or nearly all trays or troughs, they should be emptied and poison bait substituted. Spread poison bait sparingly and evenly. Place

bait in troughs during early morning. Do not allow bait to become wet. After two days, remove poison bait, replace with clean bait for one week or until good acceptance is obtained. The process of prebaiting and exposing treated bait is then continued until the birds are under control or the damage period is over.

Summary of Instructions: After prebaiting, place poison bait sparingly in trays or troughs that are located in trees, shrubs, on fence posts, or on standards in areas frequented by sparrows. Remove after two days. Refill with clean bait for one week or until good acceptance is obtained; remove prebait and again expose poison bait for two days. Repeat process until birds are brought under control.

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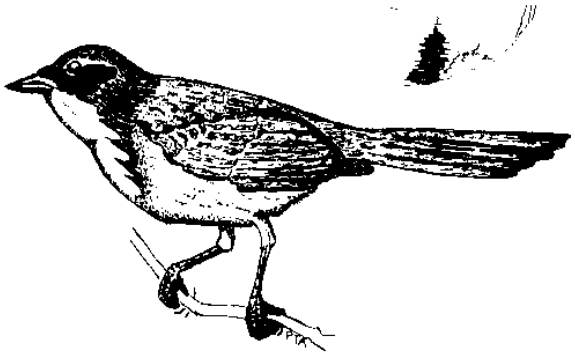
## *BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

### Jay (Scrub or California Jay)

***Aphelocoma coerulescens***

**Family: Corvidae**



Introduction: The California Western scrub jay (blue jay) is one of the most colorful members of the crow (Corvid) family. Blue Jays are famous for their ability to learn quickly and often are featured in textbook descriptions about finding food. Blue Jays will imitate the calls of hawks, especially the Red-shouldered Hawk. It has been suggested that these calls provide information to other jays that a hawk is around, or that they are used to deceive other species into believing a hawk is present. Blue Jays were probably one of the first North American birds that became well-known in Europe.

Identification: The California Western scrub jay is larger than an American Robin, but smaller than a crow. Both sexes are similar with their upper parts being various shades of blue to bluish gray with bold black and white markings on the face and tail, off-white belly, and black beak, legs, and eyes. They have a black eyeline and breast band.

Further information is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

Legal Status: Jays are classed as migratory nongame birds in the U.S. Code of Federal Regulations. They may be controlled only under a , from the U.S. Fish and Wildlife Service.

Damage: Almonds, walnuts, pecans, pistachios, apples, pears, grapes, cherries, plums, prunes, figs, berries, peas, corn, and grain.

They also take insects, small mammals, reptiles, and eggs of young game and song birds. They have a distinct preference for fruits.

Range: Resident throughout California except the higher mountains and the desert regions. There is no migration, although downward movement from the higher portions of the range occurs in winter. Poor acorn crops in some areas may cause jays to move to more fruitful adjacent areas in the same year.

Island Scrub Jay

Western Scrub Jay

Habitat: Urban areas, foothills, oaks, oak chaparral, brush, riparian woodlands, pinons (pine nuts), and junipers.

Biology: The scrub jay's nest is usually well hidden in brush or shrubbery within 6 feet of the ground. Egg laying occurs from early March through early June with the peak being in April. Usually four to six eggs are laid with as few as two or as many as seven. The incubation period is 14 to 16 days and the young are able to leave the nest after another 18 days.

Scrub jays do not flock to the degree noted in crows or blackbirds. Jays usually feed individually, but where the population is dense they may form almost continuous lines when moving to and from the food source.

Beal's food study of the California (or scrub) jay in 1910 showed a diet of 73 percent vegetable and 27 percent animal matter. The animal matter varied greatly and included insects, spiders, snails, bird eggs, and small vertebrates including nestlings. The vegetable food was about one-third fruits and berries, and two-thirds acorns, nuts, and grain.

Nuts and acorns are stored or hidden for later use, though it is debatable whether jays remember the hiding place.

### Damage Prevention and Control Methods

Exclusion: Place bird netting over fruit and nut trees, vines, and gardens to exclude jays from the immediate area.

Frightening devices: Frightening devices are relatively ineffective in protecting crops from scrub jays. Almond and pistachio growers commonly use gas cannons and shooting to frighten or disperse jays.

Fumigants: None are registered.

Repellents: None are registered.

Toxic Bait: None are registered.

Trapping: Trapping can be done if a USFWS permit is obtained. The permit will specify what trapping methods and procedures can be used. Little success has been obtained in trapping jays with modified Australian crow traps. A limited number of jays can be taken by using conventional rat traps baited with a shelled or unshelled almond or the meat of half of an English walnut. An unshelled almond is probably less likely to attract other birds than are the exposed almond or nut meats. Acceptance of nut baits is not as good when there is an abundant supply of ripe fruit or nuts around.

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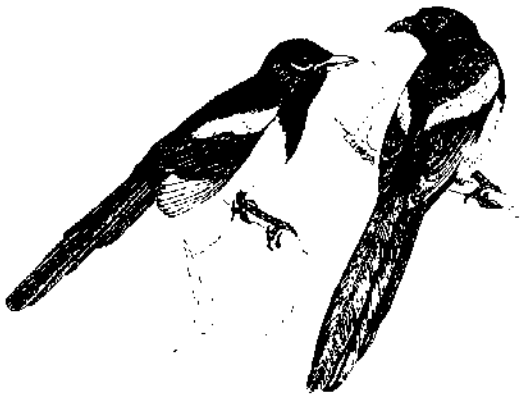
*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Magpies

**Black-billed Magpie, *Pica pica***

**Yellow-billed Magpie, *Pica nuttalli***

**Family: Corvidae**



Introduction: A common and very conspicuous bird of western North America. Magpies are known as scavengers, predators and pest-destroyers. Their behavior makes them appear challenging, almost arrogant. With their noisy chattering, black-and-white plumage and long tail the magpie is very distinctive and thus easy to identify. Seen close-up its black plumage has a colorful hue with a purplish-blue iridescent sheen to the wing feathers, and a green gloss to the tail. Non-breeding birds will gather together in flocks.

Identification: Black-billed magpies are medium-sized, with very bold patterning. Adults are largely black, with contrasting white stripes, a white belly, iridescent metallic blue-green wings and tail, and large white markings on primaries which form a white patch on the wings when wing is extended. The tail is long, narrows to tip. Black beak and dark legs. Size 16 - 19 inches. Small body but long tail makes bird appear fairly large.

The yellow-billed magpie is nearly identical, except it has a yellow bill, yellow skin around the eye, and is slightly larger. It lives only in a small area in California. Further information is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

**Legal Status**: Magpies are classed as migratory nongame birds in the U.S. Code of Federal Regulations. A federal permit is not required to control magpies when they are found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

Remember to always consult with state and local authorities before taking magpies.

**Damage**: Almonds, walnuts, olives, melons, grapes, peaches, figs, poultry eggs, milo, corn, barley, wheat, potatoes, and enlargement of open cuts and wounds of livestock.

**Range**: Black-billed magpies are found east of the Sierra summit and as far west as Shasta Valley in northeastern California. Yellow-billed magpies occupy the Central Valley and adjacent foothills, and the valleys in the Coast Range from San Francisco Bay to Santa Barbara County. Both species are permanent residents except for occasional local movement within the range.

Black-billed Magpie

Yellow-billed Magpie

**Habitat**: Open forests of foothills, riparian woodlands, oak groves, agricultural lands, parks, and urban areas.

Biology: Black-billed magpies build a large nest on the ground near a stream or in a bush or low tree, often nesting in a scattered colony. The yellow-billed magpie builds a smaller nest resembling a large clump of mistletoe, sometimes in loose colonies like the black-bill, but nests are closer together and almost always far out on a limb of a tree, rarely in bushes or low trees. Four to eight eggs are laid, usually five to seven. The incubation period for the black-billed magpie is 16 to 18 days and the young are able to fly in another 22 to 27 days. This information is not known for the yellow-billed magpie but is presumed to be similar.

The black-billed magpie eats more than 80 percent animal matter, and prefers insects, etc., to fruit or grain; eggs and nestlings of other birds are taken occasionally. The yellow-billed magpie's diet is about 70 percent animal matter, including large insects, carrion, and bird eggs. Most of the damage to poultry and to wild birds occurs during the nesting season. The 30 percent which is vegetable food includes nuts and fruits as well as acorns and other natural foods.

The yellow-bill has been charged with attacking fresh shearing cuts on sheep, and branding wounds on sheep and cattle. Yellow-bills are gregarious. After the breeding season, they gather at night to roost in flocks of 50 or more.

## Damage Prevention and Control Methods

Exclusion: Exclusion is generally not feasible to protect crops from magpies, unless the crops are of high value or the area to be protected is relatively small. Plastic or nylon mesh type netting can be used to cover crops. However, this can be time consuming, labor intensive, and can become uneconomical. Netting is useful in small areas or for individual tree protection.

Where economically viable exclusion is useful to protect magpies from accessing poultry nests and young; lambs (eye pecking); or where livestock have open wounds or disease and need temporary protection.

Habitat Modification: Magpies can become problematic during their own breeding season, and may increase predation on poultry. Nest removal can assist. However, only remove empty nests to ensure legal compliance.

Clearing low brush to reduce nesting areas and thinning or removing roost trees is also effective.

Frightening: Frightening devices may help reduce magpie problems. An integrated management program (IPM) approach is most successful involving a combination of

human presence, scarecrows, pyrotechnics (fireworks), and propane cannons. Cost considerations for each of these methods need to be assessed. Success can vary greatly depending on specific locations, food availability, and how the technique is used.

Frightening devices such as scarecrows, effigies, eye balloons, hawk kites, and Mylar tape have been used to haze magpies. Most of these are effective short term only. Frequent movement aids in these devices effectiveness.

Repellents: No effective chemical repellents are available for magpies.

Shooting: Shooting will reduce the number of birds, but is costly. Effective reduction of populations may be prevented by the wary nature of magpies.

Toxic Bait: None are registered.

Trapping: A circular funnel design trap has been successful in trapping magpies in Canada. The best place to set the trap is where magpies congregate or near their flyways. Prebait for several days with meat scraps, small dead animals, etc. Place the trap in close proximity to prebait allowing birds to become accustomed to the trap. Allow a one or two day period of successful prebaiting before placing the trap over bait. Stake down the trap. Position bait in front of the inner end of the tunnel, well away from the trap's outer wall.

If after several days, no results are obtained, the trap should be moved and the above procedures repeated. Best results can be obtained if the trap has a "weathered" or old appearance, as magpies are suspicious of shiny material.

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*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Red-breasted Sapsuckers

***Sphyrapicus varius***

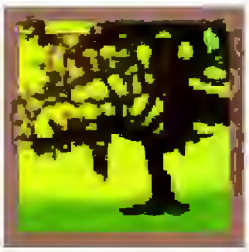
**Family: Picidae**

Introduction: The red-breasted sapsucker was historically shot as an orchard pest but is now protected. It is an inhabitant of coniferous forests of the northern Pacific Coast, usually found at middle or lower elevations.

Identification: Generally about 8 to 9 inches, the red-breasted sapsucker is a medium-sized woodpecker. It has a red head and breast with white stripe running up side. There is a black spot in front of its eyes and white line from nostril onto its face. Its back is black with a variable amount of white or yellow spots. Belly is yellowish, wings are black with some white spotting. The tail is barred black and white in the middle and outermost feathers, black on sides. Its bill is black and rump is white. Further information is available at:

Cornell Lab of Ornithology

**Legal Status**: Sapsuckers are listed as migratory nongame birds in the U.S. Code of Federal Regulations. They may be controlled only under permit from the U.S. Fish and Wildlife Service. No permit is required to scare or herd sapsuckers.



**Damage**: Sapsuckers are specialized woodpeckers that excavate numerous rows of square shaped holes around the circumference of the bole and larger limbs of many species of trees and shrubs, including evergreens. Sap flows into these pits and the sapsuckers lick it up with their brush-tipped tongues and eat insects attracted to the exudation. Individual trees attacked year after year suffer from lowered vitality and are exposed to injury by insects and disease. Occasionally, a tree is completely girdled and dies. Damage most often occurs on ornamental yard trees, but in wintering areas and during migration, sapsuckers sometimes congregate in orchards and vineyards, and cause significant damage.

**Range**: Summer range includes breeding from southern Alaska to central California, eastward to eastern British Columbia and eastern California. During the winter the red-breasted sapsucker is found from southern British Columbia through California to Baja Mexico.

Red-breasted Sapsucker

**Habitat**: Red-breasted sapsuckers breed primarily in coniferous forests, but also use deciduous and riparian habitat, as well as orchards and power line cuts. They winter in a variety of forested habitats.

**Biology**: The red-breasted sapsucker forages for insects by gleaning, probing, prying, tapping, and catching them on the fly. It drills a series of shallow holes in bark of trees, and licks up sap. It also feeds on fruit and insects. It nests in the cavities of dead trees or dead branches. No nest material is added to the cavity. Eggs are white and clutch size is four to

seven eggs.

### Damage Prevention and Control Methods

Exclusion: Good protection from sapsuckers are barriers of hardware cloth, plastic or burlap, loosely wrapped and secured around the injured areas of trees to discourage further damage.

Repellents: Sticky or tacky bird repellents smeared on tree limbs or trunks may discourage pecking.

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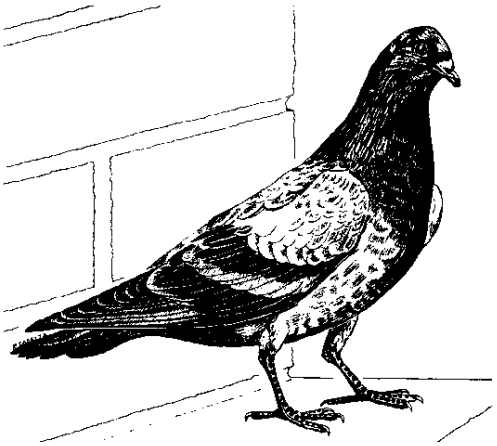
http://www.birds.cornell.edu

*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Rock Doves (Domestic pigeons - also known as feral pigeons)

*Columba livia*

**Family: Columbidae**



Introduction: Pigeons and doves share many common features, including small, rounded heads, small slim bills with a small fleshy patch at the base, rounded bodies with dense, soft feathers, tapered wings and short, scaly legs, and cooing or crooning calls. In fact, there is no strict division. The rock dove has long been domesticated and 'escaped' to live wild as the familiar town pigeon. There are many species all over the world. The rock dove was first introduced into North America in the 1600's.

Identification: The rock dove is a large pigeon. Their color varies, but the truly wild birds are gray. They have a white rump, rounded tail, usually with a dark tip. Their pale gray wings have two back bars. The sexes look alike although the male is slightly larger with more iridescence on the neck. Size: 11-14 inches. Distinctive sound is a continuous "Coo, recto-coo." Further information is available at:

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The Royal Society for the Protection of Birds

Legal Status: Feral pigeons are not protected by federal or state statute. However, the taking of Antwerp or homing pigeons (banded individuals) is a misdemeanor. There may be local municipal restrictions on the methods used to take feral pigeons.

Damage: In rural areas, pigeons can cause serious losses by their depredations on small grains and vegetables, contamination of foodstuffs, and potential dissemination of disease to domestic stock.

Domestic pigeons carry pigeon ornithosis (psittacossis), Newcastle Disease, aspergillosis, pseudotuberculosis, pigeon coccidiosis, toxoplasmosis, encephalitis, and *Salmonella typhimurium*. Except for the latter three, these diseases rarely infect humans, although the effects may be serious if diagnosis is delayed. Salmonella is found in about 2 percent of pigeon feces and is statistically the most frequent cause of salmonella food poisoning in man. Pigeon-transmitted encephalitis has killed dairy calves in Los Angeles County.

Histoplasmosis and cryptococosis are systematic fungus diseases in humans which can be contracted from dusty pigeon manure. Pigeon ectoparasites such as bugs, fleas, ticks, and mites may bite humans, possibly transmitting disease. Welts and skin infection may also result from mite bites. Ectoparasites frequently invade homes from pigeon nests in or on the building.

Pigeon droppings deface and accelerate deterioration of buildings and automobiles and may land on unwary pedestrians. Pigeons' feces are a common contaminant of grain destined for use as human food. Pigeon nests may clog drain pipes, interfere with awnings and render fire escapes hazardous. The nests harbor numerous ectoparasites.

Further information on wildlife diseases can be found in the Wildlife Diseases chapter of this book, and at the Center for Disease Control and Protection.

Range: Widely distributed in California cities and surrounding countryside. In winter, the feral pigeon is less frequently encountered in

open country.

Rock Dove

Habitat: Cities and farms.

Biology: Building ledges, barn rafters, and similar man-made shelters are usual nesting sites. The pair constructs a rather messy nest in which the female lays one or two eggs. The male cares for and guards the female and nest. The incubation period is 17 to 19 days. The young are fed predigested food until weaned and just before leaving the nest at 35 to 37 days. More eggs are laid before the first young are weaned. Breeding occurs in all seasons and several broods are raised each year. The average life span is five to seven years and some live over fifteen years. Pigeons are generally monogamous although, when a mate dies, the survivor will select a new mate.

An adult pigeon will eat about a pound of food per week, consisting of seeds and other grains augmented with some amounts of fruit, green feed, insects, and sufficient grit for digestion.

## Damage Prevention and Control Methods

Exclusion: A permanent solution to excluding pigeons from spaces or openings is the installation of plastic netting or galvanized wire mesh.

Permanent exclusion of pigeons from window sill, ledges, eaves, and roof peaks is the traditional method of control using 'porcupine wires,' spikes or similar commercially available materials. The sharp, pointed wires inflict temporary discomfort and cause birds to avoid landing on these surfaces. Recent studies (Haag-Wackernagel 2007) suggest that these methods are not 100 percent fool proof in excluding feral pigeons, which are capable of sitting on ledges smaller than 2 inches and at steep angles, greater 45 degrees.

Habitat Modification - Nest Removal: Removing nests and destroying the young help depress populations; however, inaccessibility makes the cost-benefit ratio unattractive.

Frightening Devices: Pigeons have a strong territorial sense and are less responsive to noises than are most other birds. No practical alarm or distress calls have been found. Raptor forms such as stuffed owls are ineffective for repelling pigeons. Flags, dangling paper, foil or Mylar® strips, etc., will sometimes work temporarily.

Fumigants: No known fumigants registered and not a recommended method for controlling feral pigeons.

Repellents: As a pigeon's sense of smell is rudimentary, odor repellents like naphthalene are not effective except in confined locations. Tactile repellents, made of sticky materials, are available commercially. They are usually applied to ledges, sills, or rafters where birds roost. They repel pigeons by entangling their feet and sometimes their feathers causing alarm, flight and a distress signal to the flock. It is advisable to seal porous surfaces or apply tape to assure adhesion. Note that these sticky materials may stain treated surfaces, such as building exteriors.

Shooting: Where local ordinances permit (always check local laws), pigeons may be shot. Normally .22 shot or shotguns are necessary, but compressed air guns or .22 dust shot may be effective at close range. Shooting can be an effective technique to remove the few pigeons that may be left around farm or grain elevators following a lethal control program with toxicants.

Trapping: Colonies of pigeons tend to use regular feeding and roosting areas and can sometimes be controlled by intensive trapping at these locations. Large, walk-in traps have been reported to be more effective than smaller ones. However, a low profile trap design has produced consistently good results in trapping pigeons in Southern California. Smaller traps are less expensive to construct and easier to transport. Suggested baits include whole or coarse-cracked corn, wheat, milo, oat groats, millet, popcorn, sunflower and natural seeds, peas, non-wilted greens, bread or peanuts. Water should be available in the trap at all times.

Traps with the "bob" type entrances (light rods that swing inward to allow the bird entrance) are the most common. Other trap designs include funnel traps, double entrance funnel trap, lily-pad traps, and clover-leaf trap.

Heavy prebaiting in and around traps with the doors left open may be necessary to get pigeons to visit the trap readily. Live decoys should be placed in the trap to help attract other pigeons. White or light colored birds make better lures than drab, blue-gray ones. If possible, leave the same individuals in the trap.

### Toxicants

#### Avitrol - 0.5%

A fright-producing chemical commercially prepared on grain bait for use by public agencies and

licensed pest control operators qualified in bird control. Use according to label directions. A permit from the county agricultural commissioner is needed for its use.

### DRC-1339

DRC-1339 is a Restricted Use Pesticide registered for the control of pigeons. It is strictly controlled and can only be used by USDA-APHIS personnel under direct supervision.

The toxicity of DRC-1339 to birds varies considerably. Starlings, red-winged blackbirds, crows, and pigeons are most susceptible, while house sparrows and hawks can be resistant. Generally, mammals are not sensitive to the toxic effects of DRC-1339.

DRC-1339 is a slow acting poison. It takes from several hours to three days for death to occur. The excreta and carcasses of poisoned pigeons are nontoxic to predators or scavengers.

### Directions for Use

General Procedure: Before exposing treated baits, thorough observations should be made to determine the number of pigeons present, their feeding habits, their preferred locations, their daily behavior patterns, and the presence of nontarget species. Observations should continue throughout the day. During these observations desirable locations for bait exposure should be selected. If adequate precautions are taken in selecting bait sites no other species should be harmed. When the daily pattern of the birds has been established and baiting locations selected, clean bait should be used to determine the preferred bait. Prebaiting should continue for several days or until there is good bait acceptance. Toxic baits should not be exposed until good acceptance of clean bait occurs.

Bait should be applied only under the supervision of the agricultural commissioner. Allow only responsible adults to place bait.

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*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Starling

***Sturnus vulgaris***

**Family: Sturnidae**

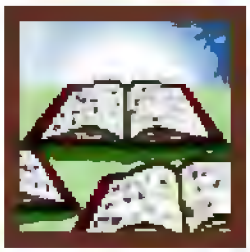
Introduction: The European Starling is an invasive species. In 1890, 100 birds were released in New York's Central Park, the North American population is now estimated at more than 200 million.

Bird control in agriculture is an age old problem. Starlings are no exception to this problem (Seamans et al 2002). Starlings damage row crops, nuts, fruit, grapes, seedling sugar beets, tomatoes, and lettuce (Gorenzel and Salmon 2000).

Identification: Smaller than blackbirds, with a short tail and pointed head and triangular wings, starlings look black at a distance but when seen closer they are very glossy with a sheen of purples and greens. Their flight is fast and direct and they walk and run confidently on the ground. Noisy and gregarious, starlings spend a lot of the year in flocks. Further information is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds



**Legal Status**: The California Fish and Game Code defines starlings as a nongame bird that may be taken and possessed by any person at any time. There are no federal restrictions on taking starlings.

**Damage**: Damage can be seen in grapes, figs, peaches, cherries, apricots, olives, strawberries, nectarines, plums, prunes, apples, persimmons; grain in newly seeded fields; and in cattle feedlots, dairies, and poultry ranches.

**Range**: Resident throughout lowland California. These residents are joined by large flocks of migrants from the northern states in autumn and winter.

Starling

**Habitat**: Farms, ranches, open country, open groves, fields, cities, and more open forest and scrub.

Biology: About mid-September, migrants from as far north as British Columbia begin arriving in California. They merge with residents into large flocks which are found in and around animal feedlots, scattered over pasture and rangeland, or in vineyards feeding on insects and mummified grapes left after harvest. By mid-March these birds have either paired off to nest or have migrated from California.

The nest is built in any tree cavity, hole in a building, or deserted woodpecker hole of suitable size. Nests used in successive seasons become foul-smelling. Two to eight eggs are laid, usually four to six. The incubation period is 11 to 13 days; both sexes assist in this activity. Age at first flight is 19 to 22 days.

As fledglings come off the nest they gather in small family groups of up to ten birds, including one or two adults. These small groups eventually merge together until large flocks are formed. Merging continues until all of the birds in a local area are in one large flock. These flocks are scattered throughout the state in summer and are responsible for depredations to soft fruits and other summer crops. Population build ups in cattle feedlots begin by mid-October. Starlings share a communal roost at night and, during the winter, as many as 5 million birds have been observed in one cattail and tule roost. The starling's diet is almost 60 percent animal matter; mainly insects and other small invertebrates. Vegetable matter is largely berries and other fruit with some seeds and grain. Losses from starlings in feedlots result from fecal-transmitted dysentery in the cattle as well as the value of rations consumed.

## Damage Prevention and Control Methods

Exclusion: Exclusion from nesting sites is possible. Close all openings larger than 1 inch to exclude starlings from buildings and other structures and provide a permanent solution. In farm-like settings heavy plastic or rubber strips hung in open doorways of buildings have been successful in excluding starlings while still allowing people and machinery to pass through doorways. Hang 10 inch wide strips no more than 2 inches apart.

In California, plastic netting has proven itself as an option to protect vineyards, orchards, or fruit crops (Taber 1998). Weigh the cost of netting against the destruction of crop. Efficient mounting can be achieved using tractor-mounted rollers to facilitate installation and removal of netting draped directly over vines. Taber (1998) reports success where Canadian vine growers

mount netting strips vertically to cover the fruit bearing portion of the vine only.

### Habitat Modification

**Airports**: Starling flocks near airports are a known hazard. Researchers report that airside vegetation should be kept between 5 to 10 inches to reduce starling or similar bird activity (Barras et al 2000).

**Livestock**: Starlings are attracted to the food and water on offer at livestock operations, particularly during the winter months. Limit the availability of food and water wherever possible for effective long term starling control. For example, the following practices, individually or together can reduce both ration loss and disease transmission:

1. Maintain a clean policy. Clean feed spills.
2. Store all grains and feed in bird proof containers (sealed).
3. If possible, use bird proof livestock feeders. Flip tops, magnetic, or automatic release type.
4. Alternatively, feed in covered areas where possible.
5. Use feed larger than the starling can digest. For example, cubes or blocks larger than ½ inch.
6. Starlings prefer to feed morning to midday. Stagger feed schedules where possible. Consider feeding at night.
7. Starlings are attracted to water. Control water levels in livestock water troughs so starlings cannot access easily. Drain unnecessary water pools.

**Frightening Devices**: Propane cannons or exploders, alarm and distress calls, shell crackers, bird bombs®, and bird whistlers® are used in dispersing starlings from crops. These devices should be used as soon as the birds appear; delays will make bird removal more difficult. A combination of two or more different sounds is often needed to move the birds out of the crop.

The cannons or biosonic units should be mounted on stands or telescoping tripod towers above the crop. The units should rotate so the sound is projected over a wide area. Field observations will determine the location where the units should be placed, the number of units to use and how often they should be moved.

**Fumigants**: Fumigation is not practical for starling control, and no fumigants are registered for this purpose.

**Repellents**: For the most part, repellents are of no value in agricultural situations: Washburn et al (2006) evaluated propane exploders at airports; Seamans et al. (2006) the Chromaflair crow buster; and Beason (2004) acoustic devices. Askham (1996) demonstrated that disaccharide (sugar) intolerances did not work as a control method.

Sticky repellents, mechanical barriers, etc., may be effective when starlings are roosting on buildings or structures.

Trapping: Modified Australian crow traps (Gadd 1996) and converted cotton trailers have been effective for capturing large numbers of starlings in California. A cotton trailer may be converted to a large mobile trap by constructing an entrance on top and plugging all escape holes. In some instances the slot entrance has proven more effective, while at other times the wire entrance was more successful. The location of the trap is important. Observations should be made to determine starling flyways, resting or perching areas and feeding areas before the traps are placed in operation. These traps have been most effective when placed in the open near, but not necessarily under, perching or feeding areas.

When a trap is first installed, the bottom should be checked to see that an uneven ground surface does not leave holes that birds can escape through. It may be necessary to use a chicken wire bottom to prevent the entry of predators or ground squirrels. Starlings can escape through holes dug by squirrels. Trap baits that have been used successfully include cull peaches, other soft fruits, raisins, and poultry pellets. Bait placed on the ground inside the trap in large amounts with a little on the top near the entrances is most effective. Bait materials that the birds feed on in the area should be used for best results.

The use of live decoy starlings is usually essential in attracting birds to the trap. Five live decoys are sufficient for the modified crow trap and up to fifteen for converted cotton trailer. Food, water and shade must be supplied at all times. Starlings will die rapidly without water in warm weather. The traps must be kept clean and dead birds removed.

Trapped birds can be removed through a small exit hole which has been cut into the upper corner of the rear of the trap and covered with a closeable door. A small holding cage can be placed over the hole and the starlings herded into this cage. Euthanize with $CO_2$ for a bottle. The birds should be disposed of by burying or in plastic bags in the trash.

Shooting: Shooting is costly and rather futile as a method of crop protection because of the typically large number of starlings causing depredations.

Bait: Bait materials have included poultry pellets, raisins, cherries, fresh grapes, dried apples, rolled milo, barley, and corn, and mealworms.

### Toxicants

Avitrol - 0.5% Mixed Grains

A fright producing chemical prepared on grain bait for use by public agencies and licensed pest control operators qualified in bird control. Use according to label directions.

### Directions for Use

General Procedure: Before exposing treated baits, thorough observations should be made to determine the number of starlings present, their feeding habits, preferred locations, daily behavior patterns, and the presence of nontarget species. Observations should continue throughout the

day. During these observations, desirable locations for bait exposure should be selected. If adequate precautions are taken in selecting baiting sites no other species should be harmed.

When the daily activity pattern of the birds has been established and baiting locations selected, clean bait should be used to determine the preferred bait. Prebaiting should continue for several days or until there is good bait acceptance. Toxic bait should not be exposed until good acceptance of clean bait occurs. Bait should be applied only under the supervision of the agricultural commissioner. Allow only responsible adults to place bait.

Starling Control at Animal Feedlots: When the daily activity pattern of the birds has been established and baiting location selected, clean bait should be exposed to determine the bait preference. Rolled milo, barley, and corn, raisins, and fresh grapes have been found to be best accepted baits. Usually the grain in the cattle ration will be the preferred bait, although at times raisins or fresh grapes have been well accepted.

When the preferred bait has been determined, treated bait should be exposed at the selected feeding locations.

Several methods of bait application may be used. The material may be "stripped" down feed alleys, placed in V-troughs at selected locations, placed in troughs attached to the outside of feed bunkers, or broadcast thinly in alleyways and pens if weather permits.

Observations must be continued throughout the program. Poor acceptance may be due to a change in bait preference.

Baiting should be continual until control is achieved. This may be for a considerable period of time or for a few days, depending upon the number of birds present and the rate of movement of new starling populations into the feedlot.

Baits will lose their toxicity in rainy weather. This loss can be reduced by treating the bait with a lard or tallow coating.

In some instances, the use of modified Australian crow traps or cotton trailers converted to starling traps can provide control at small feedlots. Bait trays may be attached to the traps.

Control of Starlings in Orchards and Vineyards: Control of starlings in orchards and vineyards can be accomplished using traps and bait stations. Expose treated bait at bait stations with caged live starlings. Damage can also be reduced through the use of frightening devices and recorded distress calls.

Trapping can be used to reduce starling populations. The most effective traps are modified Australian crow traps or cotton trailers converted into larger traps. Traps and bait stations are most effective when utilized in organized control programs supervised by persons experienced in starling control procedures. Using them early in the season when juvenile birds are first observed can reduce local populations and less damage will occur when fruits ripen.

The first fledged starlings of the year leave the nest in April and soon gather into small family groups of up to ten birds, which include one or two adults. At this time, the adults teach the

fledglings how to feed themselves. As the summer progresses these small family groups band together and form larger flocks. This continues until all young starlings in a local area gather into one large flock.

Trapping or the use of toxic bait in areas where these flocks are building up can effectively prevent heavy crop damage. Placement of the traps and bait stations is of prime importance and should be supervised by personnel experienced in starling control. The exposure of toxic baits should be under the supervision of the county agricultural commissioner.

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*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Waterfowl (Ducks, Geese)

Introduction: Waterfowl (ducks and geese) cause problems by depredation to crops. Health and safety problems can occur where the birds are present in large numbers around reservoirs, ponds, lakes, and at airfields and airports. Management can be achieved through a number of different methods discussed below. Woodruff et al (2004) describes how consultative approaches using community involvement can be effective where public awareness challenges exist, see also Gray (2004) who discusses cooperative community mitigation efforts at Seymour Air Force Base, North Carolina. For current information on waterfowl hazard management issues and aircraft see FAA Wildlife Strike database.

Identification: Migratory waterfowl damage crops in most of the northern and central U.S. During springtime they may graze and trample crops, such as cereal grains, soybean, and sunflowers. In autumn grains may be damaged through feeding, trampling, and fouling. Geese may damage crops such as wheat, corn, and soybean. Migrating waterfowl also may damage rice and lettuce.

In urban areas most goose problems are generally the result of Canada geese. Smith (2004) illustrates this and describes many of the issues associated with capture and roundup in Reno, Nevada. The issue is exacerbated by people welcoming geese on ponds. However, if left undisturbed they can readily turn from pet to pest, fouling ponds and damaging surrounding landscaping. Injuries to humans can result from defense of nests or young by geese or swans. Further information is available at:

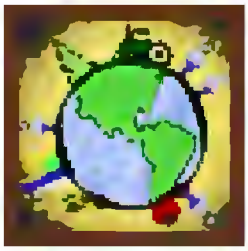
Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

Legal Status: Ducks and geese are classified as migratory game birds in the U.S. Code of Federal Regulations. A depredation permit is required from the U.S. Fish and Wildlife Service before any person may take, possess or transport migratory game birds. Hunting is allowed in California provided the necessary license requirements and regulations are adhered to. The U.S. Fish and Wildlife Service permit is administered concurrently with the states' hunting license requirements. No federal permit is required to scare or herd depredating waterfowl, except threatened or endangered waterfowl (i.e. Aleutian Canada goose).

Damage: During the fall, winter, and early spring, large flocks of waterfowl migrate into California where they may damage small grains and alfalfa. Damage is normally due to the grazing of alfalfa or sprouting grain. In the fall, large flocks of birds land in un-harvested rice, damaging the crop by trampling and consumption.

Aircraft collisions with birds (bird strikes) are a serious economic and safety problem. Researchers estimated wildlife strikes (97.5 percent involving birds) cost the civil aviation industry in the USA over $400 million/year, 1990-2000. Current and further information is available at the Federal Aviation Administrations wildlife mitigation homepage.



Range

Canada Goose

Ring-Necked Duck

Ruddy Duck

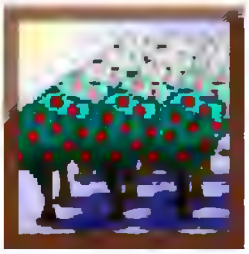
Habitat: As their name infers, waterfowl can be found near water. They may also travel large distance to specific, favorite feeding areas, including agricultural lands. Many species are very adaptable to both rural and urban environments, such as mallards and Canada geese.

Biology: Waterfowl are generally monogamous and solitary nesters (Nebraska 1994). Their size and nesting territory is determined by individual aggressiveness of paired birds. Geese and swan pairings are generally permanent until a partner dies. Ducks seek a new mate each year.

Species mortality in the first year can be as high as 70 percent but reduces in following years to 35 percent. Life spans may vary from 10 to 20 years

for captive ducks and 20 to 30 years for captive geese and swans.

Ducks lay one egg each day and geese one every other day until clutch is complete. Incubation can range from 23 to 28 days (giant Canada geese, mallards). Nest sites are abandoned within 1 to two days after hatching.



## Damage Prevention and Control Methods

Exclusion: Waterfowl exclusion is generally used at reservoirs, lakes, ponds, and fish rearing facilities. Where exclusion is desired in gardens and yard areas similar principles apply. Constructing overhead grids over reservoirs, ponds, and lakes is best achieved using either monofilament line or stainless steel spring wire. The line should be supported between fence posts approximately 5 feet high at 20 foot intervals (geese) and 10 foot intervals (ducks). Install at a height that allows people and equipment to move below with ease. Try to avoid lines crossing where possible, or tie if necessary, to prevent breakage through rubbing together. Independently attach lines to posts for ease of replacement. Avoid one continuous line so as to not have to entirely rebuild if one lines breaks.

Polypropylene UV protected netting 1 to 1 ½inches) can be used for total exclusion (e.g. contaminated oil basins). The key here is support cables as high winds can threaten the structure.

In gardens, stringing wires, aluminum foil, or Mylar tape can be effective.

Caution should be used with all types of exclusion as birds may become entangled in wire or netting and die. This may expose the owner to prosecution under the Migratory Bird Treaty Act. Martin et al (1998) reported success using Bird Balls® in containment basins to deter geese. These are small, light plastic (polyethylene) type balls which cover the entire surface and may be particularly useful in hazardous municipal or industrial liquid storage areas.

Habitat Modification: Generally discourage waterfowl from using pond areas by making the

surroundings unattractive will work. Reduce the ability to nest by mowing to pond edges, manage aquatic vegetation to eliminate nesting places by cutting back or using appropriate herbicides. Prohibit waterfowl feeding where possible e.g. municipal ponds. Construct or modify ponds so that there are vertical edges or surfaces that are difficult to walk on. Canada geese in particular do not like to nest where they cannot walk out of the water.

For specific information on vegetation recommendations contact your local County Cooperative Extension office at http://www.ucanr.org

Frightening Devices: Devices such as shell crackers, bird bombs®, bird whistlers®, biosonics, and propane exploders are successful in frightening waterfowl from crops. Use of these devices should begin as soon as birds make an appearance; delays will make bird removal more difficult. No one technique is usually effective. A combination of two or more devices is often needed to alleviate the damage. These units must be mounted on stands or poles above the crop so the sound is dispersed over a wide area. Seamans et al. (2004) reports dead goose effigies are not effective but suggests may be effective at start of an integrated pest management IPM program. Proper location of sound devices is important and a number of units may be needed to provide sound over the entire area to be protected. Observations to determine their effectiveness should be made and individual units moved to new locations if necessary.

Fumigants: Not an appropriate method. None registered for use.

Repellents: Generally repellents are not effective as standalone methods for waterfowl management and should be used as part of an integrated pest management program. However, Devers et al (1998) reports success using the repellent anthraquione dispensed as Flight Control® to control Canada geese on turf.

Shooting as a repellent or lethal method of control can be appropriate where safe and legal. Where direct threats to human health and safety exist i.e. geese at airports, permits may be available from the U.S. Fish and Wildlife Service to kill migratory birds. Glahn (2000) evaluated pyrotechnics and shooting and states that shooting was more successful for dispersing double crested cormorants from night roosts.

Radio controlled models have been used for bird dispersal. Carter (2002) states that in a study at Dover Air Force Base radio controlled aircraft were effective in dispersing gulls and radio controlled boats worked for dispersing geese.

Toxic Bait: There are no toxicants currently registered for control of waterfowl.

Trapping: Trapping for relocation is appropriate. Lethal trapping is illegal in most situations. Smith (2004) reports on the use of Alpha-Chloralose as a bird immobilizing agent when

relocating Canada geese. The advantages are easier to control geese. However, public relations challenges may arise when immobilizing geese in urban areas as people do not like to see the birds handled. Hall et al (2002) states that relocation of Canada geese was effective when pursued as a method long term.

Other: The growth of waterfowl populations can be effectively slowed by destroying nests and eggs. Ensure that the appropriate federal permit is secured before embarking on such a course of action (50 CFR § 21.41a). This method is especially effective for Canada geese.

In recent years avian contraception tools have become popular. Research shows this method may be time consuming and is most likely not effective as a standalone tool (Yoder et al 2006, VerCauterren et al. 2002). However, when used as an IPM tool (i.e. together with other methods to maintain population reduction), the need for population culling may be reduced.

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*BIOLOGY, LEGAL STATUS, CONTROL MATERIALS AND DIRECTIONS FOR USE*

## Woodpeckers and Common Flicker

**Acorn Woodpecker - *Melanerpes formicivorus***

**Lewis' Woodpecker - *Melanerpes lewis***

**Common Flicker - *Colaptes auratus***

**Family: Picidae**

Introduction: Woodpeckers are found worldwide and include about 180 species. Woodpeckers gained their English name because of the habit of some species of tapping and pecking noisily on tree trunks with their beaks. This is both a means of communication to signal possession of territory to their rivals and a method of locating and accessing insect larvae found under the bark or in long winding tunnels in the tree. Flickers (*Colaptes auratus*) are a medium-sized member of the woodpecker family. They are native to most of North America, one of the few woodpecker species that migrates, and the only woodpecker species that commonly feeds on the ground.

Identification: Seventeen species exist in California, including sapsuckers and flickers. From 5 ¾ to 15 inches long. All have strong, sharply pointed bill for chipping and digging in tree trunks and branches for insects. They use the tail as a prop. Some woodpeckers have zygodactyl feet, meaning they have two toes pointing forward, and two backward. These feet are adapted for clinging to a vertical surface, and can be used for grasping or perching. Several species have only three toes. Males and females look

slightly different. The male typically has a red patch either on the back of the head or on the face. The flicker is a jay-sized woodpecker with brown back and white rump, usually salmon red under the wings but occasionally yellow. Further information including audio is available at:

Cornell Lab of Ornithology

The Royal Society for the Protection of Birds

Legal Status: Acorn woodpeckers, Lewis' woodpeckers and common flickers are classed as migratory nongame birds in the U.S. Code of Federal Regulations. They may be controlled under a depredation permit from the U.S. Fish and Wildlife Service.

Damage: Almonds, apples; inflicts structural damage to wooden buildings, drilling into sidings and shingles or under eaves looking for food or to excavate a nest chamber. Also damages fences, poles, and other wooden structures. Characteristic drumming on buildings may create annoying noise.

Range: Most woodpeckers are permanent residents in California. Lewis' woodpecker is an exception; it breeds from central British Columbia south to south-central California and winters from northern Oregon to northern Mexico. The acorn woodpecker is found throughout the state where habitat is suitable and the flicker is found in all areas except desert regions.

Acorn Woodpecker

Lewis' Woodpecker

Northern Flicker

Habitat: The acorn woodpecker is found in oak woods, groves, mixed forest, oak-pine canyons, and foothills. The flicker is found in more open woods, riparian forests, farms, suburbs, and canyons. Lewis' woodpecker generally breeds in open country with large dead trees or in burned forests where high stumps remain; it winters in a variety of forested areas.

Biology: Lewis' woodpecker usually builds its nest in a dead, fire-scorched tree stump. Five to nine eggs are laid, usually six or seven, and incubation takes about 14 days. Age at first flight is unknown. Acorns comprise about one-third of their diet; wild berries and other fruits and nuts account for the remaining vegetable food. Insects are frequently taken on the wing as well as from trees and on the ground. Lewis' woodpecker is gregarious and flocks of 50 or more migrants are not uncommon. Lewis' is a noticeably silent woodpecker except during mating season. Its straight, crow-like flight differs from the undulating pattern of most other woodpeckers.

The acorn woodpecker, as its name suggests, subsists largely on acorns during fall and winter. Acorns and almonds are stored in holes drilled in trees, fence posts or telephone poles. Besides nuts and acorns, this woodpecker eats berries and other fruits, as well as ants, beetles, other insects, and tree sap.

Both sexes aid in excavating a nest, preferably in an oak tree. Four to six eggs are laid usually four or five and incubation lasts about 14 days. Age at first flight is unknown. The acorn woodpecker is sociable and often gathers in small colonies, sometimes with more than one pair nesting in the same tree or even in the same hole.

Flickers excavate a nest in a soft-wood tree, post, or building. Five to ten eggs are laid, with incubation lasting 11 to 12 days. Age at first flight is 25 to 28 days.

Unlike other woodpeckers, flickers feed to a great extent on the ground where fallen seeds, insects, and wild berries are found. Forty-five percent of the food taken during the year consists of ants; as many as 5,000 being found in one bird. The tongue can be extended 2 ½ inches beyond the bill and it is covered with a sticky substance, enabling efficient use when it is inserted into nests of ants and other ground breeding insects. Twenty-eight percent of the diet consists of insects other than ants, and the remaining 30 to 40 percent is wild fruits and seeds. Flickers sometimes annoy homeowner by making nest holes under the eaves or drumming on the roof in the early morning hours.

## Damage Prevention and Control Methods

Frightening Devices: Woodpeckers and flickers are quite persistent and frightening devices usually have little practical value against these birds. However, dangling foil strips 2 to 3 inches wide and 3 feet long hung under eaves or fascia board of a building have been reported to have

discouraged woodpeckers for a short period of time.

Repellents: Sticky or tacky bird repellents have been reported effective against woodpeckers and flickers where they are causing damage to buildings. Some of these sticky repellents will discolor painted, stained or natural wood siding. They also may run in warm weather, leaving unsightly streaks.

Netting: Netting is an effective method of excluding woodpeckers and flickers from damaging wood siding beneath the building eaves. The netting should be attached leaving at least five inches of space between the netting and damaged building. The netting can be attached to overhanging eaves and angled back to the siding below the damaged area and tautly secured. If installed properly, the netting is barely visible from a distance and will offer a long-term solution to the damage problem.

Metal Barriers: Metal sheathing or hardware cloth placed over areas damaged by woodpeckers and flickers offer permanent mechanical protection from continued damage. The material should be installed when damage first appears.

Shooting: Not recommended. Could only be used under a depredation permit

Trapping: Trapping by means of a wooden base rat trap can be effective if allowed under the depredation permit. Secure the trap to the building where the bird is working, with the trigger of the trap pointing down; bait it with suet or nut meats.

Toxic Bait: None registered for woodpecker control.

# REFERENCES AND ADDITIONAL READING

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