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## AN OVERVIEW OF DEPREDATING BIRD DAMAGE CONTROL IN CALIFORNIA

Dell O. Clark

*California Department of Food and Agriculture*

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## AN OVERVIEW OF DEPREDATING BIRD DAMAGE CONTROL IN CALIFORNIA

Dell O. Clark  
California Department of Food and Agriculture  
Sacramento, California

To many people, California is synonymous with Disneyland, freeways, Los Angeles smog, Yosemite, the California missions, or for you bird aficionados, the California Condor. But do you think about California when you eat strawberry shortcake? You should - California leads the nation in strawberry production. How about artichokes? California produces over 98% of the artichokes raised in the United States. Dates? California produces over 99% of the dates in the United States.

Yes, California is all of these, and it is much more. California may well be the most diverse state in the United States. Within its 100.2 million acres, California has the lowest place in the U.S. in Death Valley and one of the highest mountains with Mt. Whitney. Because California is such a diverse state and has a wide variety of micro-climates, it supports a uniquely diverse agriculture. Agriculture uses only about 36 million acres of its total 100.2 million acres, and most of the cash return from crops is produced on 8.6 million acres that are irrigated. California produces about 250 crops and livestock commodities (excluding nursery crops) and provides the U.S. with about 25% of its table foods. California leads the nation in the production of 46 commercial crops and livestock commodities; its farmers and ranchers marketed \$8.6 billion of crop and livestock products in 1975, and the state's harvested farm production in 1975 set a new record at 51.1 million tons.

### HISTORY OF BIRD PROBLEMS

Records such as this are not achieved without some risk. Crops growing in California have always had competition from many types of vertebrate pests. The wide variety of crops grown in California and the varied climates and situations in which they are grown has resulted in many different species of birds damaging crops. Birds have competed with man for his crops since the dawn of agriculture.

McAtee (1932) cited examples of bird damage that occurred in a wide variety of crops in California during the early 1900s. During the 1920s, many requests for information and relief from damage caused by a wide variety of birds, culminated in the assignment, in May 1929, of two biologists, S. E. Piper and Johnson Neff, of the former U.S. Biological Survey, to initiate field studies in California. In cooperation with the California Department of Food and Agriculture and County Agricultural Commissioners, the study was to determine the problems and devise control procedures relative to bird depredations. *Piper and Neff found such damage as Horned Larks pulling sprouting crops, House Finches disbudding deciduous fruit trees and devouring mature fruit. Blackbirds were a problem in the rice crop. Early controls were varied and, for the most part, lacked effectiveness. Flagging of fields was common to deter Horned Larks. Windmill devices were tried to frighten birds. Shooting to kill birds was common; scarecrows were used.*

The six-year study brought forth the basis of most of the depredating bird control techniques still in use in California. At the end of the study, these two biologists compiled a book called "Procedure and Methods in Controlling Birds Injurious to Crops in California." This was and still is the "Bible" for bird damage control techniques used in California. The thorough investigations conducted by these biologists resulted in techniques that have remained valid in California for over 40 years.

### STATE AND COUNTY DEPARTMENTS OF AGRICULTURE

In 53 of the 58 counties in California there exists a county agricultural commissioner along with his staff of certified agricultural inspectors and biologists. It is their duty to administer regulatory duties as prescribed by the Food and Agriculture Code. Vertebrate pest control functions, including depredating bird damage control, are among the commissioners' responsibilities as deemed by their local boards of supervisors. The State Department of Food and Agriculture has biologist counterparts that provide training, supervision, and coordination to county personnel. This county-state set-up, serving the agricultural community, is unique within the United States.

## LAWS AND REGULATIONS

Specified migratory bird species may be taken under the supervision of the county agricultural commissioner without a Federal depredation permit when such birds are causing losses to agricultural crops in California (Code of Federal Regulations Title 50, Part 21, Sec. 21.44). It is by virtue of these regulations that much of the bird damage control is carried on in California. California is the only state to have this exemption. This exemption came into being as a result of extreme losses, a framework of state and county personnel to provide supervision and field work, and the bird damage studies by the U.S. Biological Survey. Bird Control activities are also governed by sections of the California Fish and Game Code (Sec. 3005, 3513, 3800, 3801 and 3801.5).

The Government Code (Sec. 25842) allows a County Board of Supervisors to authorize vertebrate pest control activities in their county. The California Food and Agriculture Code (Sec. 401, 403, 482, 5101 and 6024) allows the county agricultural commissioner to engage in pest control activities.

The 1974-75 annual report of the Unit of Control and Eradication, Vertebrate Pest Control, indicates that 33 county agricultural commissioners in California conducted bird damage control. They used in excess of 29,000 pounds of treated bait to help keep bird caused losses to a tolerable level. In this endeavor over 12,500 man hours were expended by county personnel in bird damage control activities.

It is of interest to note that in the past few years, a few private pest control operators have begun conducting bird damage control activities in California on a commercial basis. All work is closely monitored by the local county agricultural commissioner.

## DEPREDATING BIRD DAMAGE

Piper and Neff, in 1935, wrote in regards to bird damage in California, "the principal offending species of more than half a century ago, particularly the Linnet and Horned Lark, are today as abundant as ever and still the chief offenders." This could have been written yesterday and would be just as true. The main exception is that the Starling, (*sturnus vulgaris*), is now on the scene and is certainly responsible for considerable agricultural losses.

The California Department of Food and Agriculture has estimated that birds cause an annual loss to California agriculture of \$12.75 million (CDFA, 1974). Crase (1976) reported that bird damage to grapes in the United States was at least \$4.4 million in 1972, and the loss in California alone was probably over \$3.7 million.

## CURRENT BIRD PROBLEMS AND CONTROL

Crop damage by depredating birds in California places a responsibility upon the California Department of Food and Agriculture and the county agricultural commissioners. Along with the regulatory duties charged to these agencies goes the responsibility of providing reasonable means for relief from damage caused by depredating species with the least harm to non-offending species. The primary obligations of these official agencies engaged in the control of injurious birds are conservation, crop protection, and preservation of public welfare.

Currently, bird control depredations are caused by 13 species or groups of birds (i.e., Blackbirds, Goldfinches, Woodpeckers). Since life history information is readily available, this overview will be limited to the damage caused by each species and the current control techniques commonly used in California.

### House Finches (Linnets)

House Finches (*carpodacus mexicanus*) are one of the most injurious bird species to California agriculture. House Finches are designated as a migratory non-game bird by federal regulations and are thus protected. However, they may be taken in California under the supervision of the agricultural commissioner or under a depredation permit from the Fish and Wildlife Service.

House Finches cause a wide variety of agricultural losses. One of the most outstanding is disbudding deciduous fruit trees and almonds. House Finches detach the bracts of fruit buds and devour the bud. At blossom time they knock off flower petals and eat the embryonic fruits. House Finches feed on practically all deciduous fruits, berries, small grains, and vegetable and flower seeds. Included among the crops damaged are ripening fruits of apricot, cherry, peach, pear, nectarine, plum, prune, avocado, grape, apple, fig, strawberry, blackberry, raspberry, etc.; buds of almonds, pears, peaches, plums, nectarines; and seeds of milo, sunflower, lettuce, broccoli, miscellaneous vegetables and flowers, and tomato plantlets.

Control. Certain sanitation practices around ranches, such as cleaning up brush piles, will help reduce nesting and resting areas for House Finches. Frightening devices, such as Av-Alarm, Zon guns, etc., in general have little practical value as methods of crop protection against House Finches. Control in California centers around two activities - trapping and the use of strychnine-treated rape and canary grass seed.

Modified Australian crow traps and cotton trailers converted to traps have been very effective in trapping large numbers of House Finches. Traps are covered with  $\frac{1}{2}$ " x  $\frac{1}{2}$ " - mesh hardware cloth or aviary wire. Canary grass seed, rape seed, a wild-bird mixture of seeds, or chick scratch (cracked corn, milo and other grains) make an excellent bait and food source for decoy and captured birds. Adequate food and water supply is absolutely essential to maintain decoys. Minor changes in location can greatly influence trapping success.

Baiting. Through the extensive field investigations of Piper and Neff, it was found that the best bait for House Finch control was a mixture of Dwarf Essex rape seed and canary grass seed. Strychnine is usually applied in a thin coat to the rape and canary grass seed with a corn syrup-base sticker. As the House Finches hull the seeds, the strychnine coating flakes off into the bird's mouth. Exposure of prebait and treated bait is done in V-shaped troughs. V-shaped troughs are usually made of 1" x 3" or 1" x 4" x 8-10" redwood or pine. They are glued and nailed for stability and durability, and bait therefore is not lost through cracks due to faulty construction. Troughs are placed in crotches of trees or on stakes or standards.

Baiting involves alternating between exposing prebait and treated bait. Good acceptance of prebait must occur before the exposure of toxic bait. After prebaiting for 3-10 days, and obtaining good acceptance, treated bait is substituted in the troughs. Treated bait is removed after two days exposure. Troughs are refilled with clean bait. This is left in the troughs for about four days or until good acceptance is obtained. The prebait is again removed and poison bait exposed for two days. This process is repeated until the birds are brought under control. With the close supervision provided by the agricultural commissioner, the use of this technique has proven to be a very efficient and selective method of reducing local populations of House Finches and thereby reducing agricultural losses.

#### Starlings

Starlings, in California can generally be divided into two groups - the larger winter migratory flocks that come from out of state and resident birds. The migratory flocks generally arrive about October 15 and usually are too late to cause damage to late maturing grapes. A few early migrant flocks, however, cause some localized losses to grapes. A serious concern of the winter migratory flocks is their tendency to congregate in cattle feedlots. Here they consume cattle ration. They also spoil cattle feed by their droppings and spread dysentery to the cattle. The large numbers of birds that share communal roosts are often of concern but are generally of a nuisance factor rather than actually causing losses. At this time of the year certain benefits are derived from Starlings eating a large number of insects.

Resident Starlings breed and raise their young in California. The fledglings that join into larger and larger flocks during the summer can inflict heavy damage to all types of soft fruits. Among the crops damaged are grapes, figs, peaches, cherries, apricots, olives, strawberries, nectarines, plums, apples, persimmons, and grains in newly-seeded fields. Dairies and poultry ranches also suffer Starling depredations.

Control. Intensive Investigations were carried on in California in the early 1960s. Techniques were developed to reduce Starling damage. Many of these techniques are still being used. Today the primary method of damage control revolves around trapping, exposing toxic bait in conjunction with traps, and sound devices.

There are no state or federal regulations restricting the taking of Starlings in California. Modified Australian crow (MAC) traps were the first traps used effectively. Improvements have been many. One was the enlargement of the entire trap size. Trailers used to transport cotton have been modified into Starling traps. The larger size of the trap proved very effective in catching large numbers of birds and gave bird damage control operations additional versatility by their mobility. In some cases MAC traps are simply placed on trailers to give the mobility needed.

Successful trapping takes constant care, attention, and persistence. One must keep decoy birds alive and well inside the trap. They therefore must be fed and watered regularly. Also trapped birds must be removed and disposed of, usually through fumigation. With larger traps this becomes increasingly difficult.

Starlicide-treated baits are used for Starling damage control. This bait is often exposed on trays attached to or in conjunction with traps. In cattle feed lots, treated bait can be exposed by "stripping" down the feed alleys, being placed in V-shaped troughs at selected locations or in troughs attached to the outside of feed bunkers, or being broadcast thinly in alleyways and pens.

Baits have included rolled milo, rolled barley, rolled corn, cull raisins, and fresh grapes. Usually the grain in the cattle ration being fed will be the preferred bait. Of utmost importance before exposing bait is observations and bait acceptance trials to see what Starlings will feed on, and where. This point cannot be stressed too much. One can have the best toxicant in the world, but if it isn't ingested by the birds, the program fails. Acoustical devices have been quite effective in dispersing Starlings from localized areas. Recorded distress calls, Zon guns, Av-Alarms, shell crackers, bird bombs, all have their place in effecting a Starling control program. Most often no one technique is totally effective, and a combination of two or more techniques are needed to alleviate Starling depredations. Complete exclusion through netting is employed very little because of the expense and labor involved.

#### Blackbirds

Blackbird control often runs hand in glove with Starling control, especially where mixed flocks occur in cattle feedlots. Federal regulations allow blackbirds (Red-winged, Trf-colored, Brewer's, Yellow-headed, and Cowbirds) to be taken without a permit when they are causing or are about to cause agricultural damage. In addition to the feed lot situation discussed with Starlings, blackbirds damage sunflowers, chili peppers, small grains, rice, corn, lettuce, cabbage, and other crops.

In many of these situations, control may be erratic. Relatively good *control* has been achieved with various frightening devices such as Av-Alarm, Zon guns, shotguns, and .22 rifles. Limited success has been obtained by trapping using MAC traps, both the 6' x 6' x 8' size and the converted cotton trailer traps. When acceptance of pre-bait is good, strychnine-treated baits have been effective in reducing blackbird damage, both as a population reduction technique and as a frightening agent. When a few birds begin to demonstrate the symptoms of strychnine poisoning, often a fright reaction spreads throughout the flock; and in some cases this will cause the birds to abandon an area. Starlicide-treated baits have also been successfully used locally. Avitrol baits have been very effective in dispersing flocks of blackbirds in certain situations.

#### Horned Larks

Horned Larks (*Eremphila alpestris*) have caused serious crop depredations in California since the early 1900s and undoubtedly have caused depredations ever since man has planted crops in California. Horned Larks are fond of open spaces and will frequently begin their feeding damage in the center of a field. Losses occur primarily on newly planted seeds and seedlings of beets, lettuce, alfalfa, broccoli, carrots, sugarbeets, beans, peas, spinach, melons, tomatoes, onions, peppers, and flowers. Blossoms of beans and peas are sometimes eaten, and lettuce and peppers are occasionally pecked.

Horned Larks are designated as a migratory non-game bird in the Code of Federal Regulations and can be controlled in California only under the supervision of the county agricultural commissioner or under a depredation permit from the United States Fish and Wildlife Service. Frightening devices have limited and temporary results in dispersing Horned Larks. Flagging can offer protection against Horned Lark depredations, but labor costs may be prohibitive; and the flagging may interfere with farming practices.

Most damage control is attempted with the use of strychnine-treated baits. Horned Larks have a tendency to follow along any trail or depression, such as a furrow or seeder track. This lends itself to the use of seeders for poisoning in some situations. Prebait is exposed sparingly on the smooth surface of a seedbed or a depression between bedded crops. After prebait is well accepted and close observations show no non-target species to be taking the bait, strychnine-treated bait is exposed in the same tracks or depressions where prebait was accepted. The amount of bait should average 8 to 10 pounds per mile of trail. Approximately every eighth seedbed should be treated where damage is evident. Recent testing in California indicates that Horned Lark baiting might be done in ground level troughs.

#### House Sparrows

The House Sparrow (*Passer domesticus*) is defined as a non-game bird by the California Fish and Game Code and they may be taken and possessed by any person at any time. There are no federal restrictions against taking House Sparrows.

House Sparrows are known to damage grain, especially sorghum, near ranch buildings; grain in poultry rations, storage sheds and livestock feedlots; some disbudding of fruit trees occurs, and sprouting vegetables and flower crops are taken. House Sparrows are capable of transmitting a number of avian diseases.

Frightening devices have not been very effective against House Sparrows. Methods used to reduce House Sparrow damage include exclusion by screening with 3/4" or less mesh, trapping and the use of Avitrol.

Baits treated with strychnine have been effective in reducing flocks of House Sparrows where good acceptance of prebait has been obtained. Flat bait trays or V-shaped troughs are used to hold the bait. After prebait is being accepted well, the poison bait is placed sparingly in trays or troughs that are located in trees, shrubs, on fence posts or on standards in areas frequented by House Sparrows. The prebait-baiting process is repeated if necessary.

#### Crowned Sparrows

The damage caused by White-Crowned Sparrows (*zonotrichia leucophrys*) and Golden-Crowned Sparrows (*z. atricapilla*) is due mostly to overwintering birds that feed on young seedlings of a variety of crops. Crops damaged include lettuce, deciduous fruits, melons, grain, almonds, alfalfa, sugarbeets, and miscellaneous garden and vegetable crops. Disbudding of deciduous trees may occur, but it is generally minor. Blossoms of carnations and chrysanthemums grown for the cut flower market have been damaged. As with other specified migratory non-game birds, Crowned Sparrows may be taken in California under a depredation permit from the U.S. Fish and Wildlife Service or under the general supervision of the county agricultural commissioner.

In contrast to Horned Larks that prefer wide open spaces, Crowned Sparrows do not feed far away from a safe retreat. Damage usually occurs along the edge of brush piles, weedy borders along fields and fence rows. The elimination of these habitats is the first step in controlling losses to Crowned Sparrows.

Crowned Sparrows are usually quite easily trapped by using a lily-pod trap or clover-leaf trap. MAC traps have also been used. Milo or finely cracked corn (chick scratch) has been an effective bait for trapping.

Chick scratch treated with strychnine is the toxic bait most often used. Both pre-bait and treated baits are usually exposed in low troughs (4" wide with 2" sides), 3-4 feet off the ground rather than in flat trays. After good acceptance of the prebait is achieved, toxic bait is exposed thinly. Toxic bait should not be left out for more than two days. Alternate prebaitings and baitings can be continued throughout the damage period. Good acceptance of prebait must always be obtained before toxic bait is exposed.

#### Goldfinches

American and Lesser Goldfinches, (*Spinus tristis*) and (*s. psaltria*), are the Goldfinches of concern in California. Considerable loss occurs when Goldfinches remove mature seeds in commercial flower and vegetable seed plantings or invade early maturing strawberry plantings and remove the seed (achene) from the berries. The strawberries begin to decay where each seed is removed.

Even though Goldfinches can be taken legally under the supervision of the county agricultural commissioner or under a depredation permit from the U.S. Fish and Wildlife Service, no truly effective method of baiting Goldfinches has been developed. Only very limited success has been achieved with the various frightening devices available. The use of protective screens, netting, etc. is at present the only effective method known for crop protection.

#### Crows, Jays, Magpies

Crows (*Corvus brachyrhynchos*), Scrub Jays (*Aphelocoma coerulescens*), and Magpies (*Pica pica* and *P. nuttalli*) all cause similar damage. Host of their damage is to nut crops - almonds, walnuts, and pistachios. Various fruits and grains are also subject to depredation

Crows and Magpies can be taken without a permit from the U.S. Fish and Wildlife Service when they are found committing or about to commit agricultural depredations. Jays can be taken only under a depredation permit from the U.S. Fish and Wildlife Service. Control of these bird species centers around the use of frightening devices, shooting, and trapping.

#### Ravens

Ravens (*Corvus corax*) are responsible for losses to poultry eggs, young poultry, young or sickly livestock, and sprouting corn and grain. Ravens may be taken only under a depredation permit from the U.S. Fish and Wildlife Service. Under such a permit, Ravens have successfully been taken using Australian crow traps with 6" x 12" entrance holes on the entrance board. Eggs and turkey carcasses were effective baits. Proper trap placement and the use of decoy birds are important in trapping success.

#### Woodpeckers and Common Flickers

Acorn Woodpeckers (*Melanerpes formicivorus*), Lewis' Woodpeckers (*Asyndesmus lewis*), and Common Flickers (*colaptes auratus*) occasionally damage almonds and apples; but for the most part, losses occur with damage to wooden buildings, water tanks, telephone poles, and wooden fence posts. Federal regulations allow the taking of these birds under the supervision of the county agricultural commissioner or under a permit from the U.S. Fish and Wildlife Service.

Frightening devices and repellents offer some relief but only for a short time. Most repellents stain the surface to which they are applied, so discretion must be used in applying them. Usually only a few birds are involved in depredations, and shooting or trapping may be the only control method practical. Trapping may be done with a wooden base rat trap. The trap is secured to the building or tree where the bird is working, with the trigger of the trap pointing down, and is baited with suet or nut meats.

#### Pigeons

Domestic or Feral Pigeons (*columba livia*) are responsible for losses on small grains and vegetables with possible contamination of foodstuff and dissemination of diseases to domestic stock. Feral Pigeons are not protected by an federal or state statute.

Limited success has been obtained by nest removal and with use of frightening devices and repellents. Where local ordinances permit, shooting can reduce a small flock rather rapidly. Pigeon control is accomplished mainly by trapping. A low profile trap (9" high) using a "bob" type entrance has been very successful when baited with whole kernel corn or commercial pigeon mix. Avitrol is often used by commercial pest control operators to rid an area of Pigeons.

#### Monk Parakeets and Red-Whiskered Bulbuls

Two bird eradication programs are in operation in California as a cooperative effort between county agricultural commissioners and the State Department of Food and Agriculture. Both Honk Parakeets (*Myiopsitta monachus*) and Red-Whiskered Bulbuls (*Pycnonotus jocosus*) are prohibited species in California.

Red-Whiskered Bulbuls were first detected in the "wild" in 1968 in Los Angeles County, and since that time 75 have been taken. In the eradication program in California recorded calls of the Bulbuls have been used with a high degree of success in luring the birds to within shooting range or to elicit a call so they could be located. Currently, a stuffed bird mounted on a tall pole, with speakers playing the birds' call, has been quite successful in luring Bulbuls to within shooting range. Shooting has been with shotguns, pellet rifles, and sling shot.

A few Bulbuls seem to appear each year. Their source is not really known, but we are confident that our efforts will keep this prohibited bird from becoming established in California.

Monk Parakeets have been found in nest building activities in California. However, the rearing of young has not been confirmed. Monk Parakeets are very noisy, and their call is quite annoying. It is felt that this factor has led to the taking of these birds by private individuals. We have knowledge of 41 having been taken in California. No feral monks are known to now occur in California.

### SUMMARY

Selective and effective depredating bird damage control has been conducted in California for over 40 years, by the California Department of Food and Agriculture and the county agricultural commissioners. Untold losses have been prevented.

As long as official agencies in California are involved in depredating bird damage control, their primary obligations will continue to be conservation, crop protection and preservation of public welfare and their efforts will be directed towards these ends.

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## DISCUSSION

- Williams: Do you have any places where you control Mockingbirds?
- Clark: Mockingbirds are protected and if control was to become necessary, they could be taken under a depredation permit only. We have captured quite a number of them incidental to trapping Starlings, but they have been released. We do not have any control program on Mockingbirds.