

# **UC Agriculture & Natural Resources**

## **Proceedings of the Vertebrate Pest Conference**

### **Title**

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### **Permalink**

<https://escholarship.org/uc/item/8wg6816q>

### **Journal**

Proceedings of the Vertebrate Pest Conference, 5(5)

### **ISSN**

0507-6773

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### **Publication Date**

1972

## SOME APPROACHES TO CONTROLLING DEPREDATIONS BY CROWS AND JAYS IN TULARE COUNTY

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### THE COMMON CROW (Corvus brachyrhynchos) AS A PEST BIRD

In 1966 Tulare County nut growers became keenly aware of an ever increasing problem to their industry--the common crow. Growers requested help in solving this problem. The Tulare County Agricultural Commissioner's Office undertook this program with the assistance of the U. S. Fish and Wildlife Service and California State Department of Agriculture. Growers in the county estimated losses to be anywhere from 6% to 18% of their nut crops. Monetary losses to almond growers have reached estimates of over \$85,000 during one season. Walnut growers have reported observing crows carrying off nuts day after day, amounting to hundreds of pounds during the season. In one instance, a 1.5 acre pistachio nut orchard located near a roost was raided by 40 crows and completely destroyed in 5 days.

Flock sizes observed at time of depredation range from 30 to 200 birds. The combined crow population in Tulare County is about 20,000.

Almond bearing acreage 963, non-bearing 2,615; walnut bearing acreage 16,064, non-bearing acreage 7,480; pistachio bearing acreage 139, non-bearing acreage 166.

### HARVESTING TECHNIQUES

Harvesting techniques in nut crops are all very similar. Mechanical harvesters are used to shake the nuts to the ground or in canvas catchers. Nuts on the ground are picked up by sweepers and carried to processing plants in bins and trailers.

### DAMAGE IN ALMOND ORCHARDS

Once crows have selected an orchard, they will fly into the trees to knock off thousands of pounds of the ripening nuts by deliberately pouncing from branch to branch. Occasionally they will use their feet to strip the almonds from the branches. The ground feeding crows will then work on the soft hull with their mandibles until they tear an opening large enough to remove the nut meat. In most orchards nuts not consumed on the ground by crows are lost during irrigation and smoothing of the soil in preparation for harvest in August. Labor costs for gathering the nuts by hand far exceeds their value.

### DAMAGE IN WALNUT ORCHARDS

Crow damage to walnuts occurs during September and October in Tulare County. Because crows cannot easily knock nuts out of the trees, the greatest losses occur after trees have been mechanically shaken, but before the nuts are picked up. Many times the nuts are exposed under the trees for several days, allowing flocks of crows enough time to carry them away. Small groups of the flock will feed and gather nuts in the orchard for a short time and then rotate their position with another small group waiting their turn in an adjacent field. Further observations have revealed that while enroute from the orchard to a loafing site, crows will often drop the nut on a hard surface and then swoop down to clean up the exposed meat before flying on. Nuts have been found as far as 3 to 4 miles from the nearest grove.

### OTHER ORCHARD DAMAGE

Growers with new plantings of orange and olive trees wrap the trunks with a special paper to prevent lower branch growth and to alleviate sunburn, rabbit damage and the need for pruning. This is a labor saving device. Crows will remove or tear these wrappers while searching for over-wintering insects, breaking the new growth off. This type of damage occurs in October after a rain when wrappers are easily removed.

Because larger pistachio nut orchards are located on the fringe of the present feeding range (southern part of county), damage has been minimal. On the other hand, orchards in the central part of the county are experiencing extensive damage. These orchards are located in areas where crows are now abundant. However, plantings of walnuts, almonds,

pistachio and olive orchards are increasing in the southern part of the county, creating an ideal crow habitat. A roost site located in this area would cause tremendous losses to the nut grower.

#### ROOSTING CHARACTERISTICS

For some reason certain plum and prune orchards are chosen as roost sites during the summer. In the evening, crows congregate by the thousands and literally cover the trees, breaking limbs and knocking fruit to the ground, causing hundreds of dollars worth of damage.

##### Summer and Fall

Summer and fall communal roosts are located in three areas in Tulare County. Growers nearest the roost sites suffer the most damage. At the break of dawn, crows leave their roost sites, fanning out to a radius as great as 15 miles. They are lazy travelers and occasionally swing down to forage and loaf in nut and fruit orchards. At times flocks leap-frog each other--one flock will stop and permit trailing flocks to pass them during their journey across country.

The distance and the weather determine how early they start for home at night. If it's overcast, windy or raining, the crows are anxious to get into cover early. In good weather it is not uncommon to see crows still coming into the congregating area an hour after sunset. They congregate in an open area before flying into the roost they plan to use for the night. Small flocks start arriving in this area about two hours before sundown, until all crows are in. Then about 20 or 30 crows will leave the congregating area to scout the roost site for danger before leading the final roost flight. Crows settle down quickly, once in the roost.

##### Winter

During November, birds from the northern part of the county leave their summer locations to establish a new roost near the crows in the Lindsay Area, located in the central portion of the county. Olive orchards are always used for winter roost sites. In December the combined populations form two roost locations--one containing the northern birds and the other the Lindsay birds. Sometime during January, the two flocks establish a common roost. This roosting habit continues until the nesting season begins in March. Because crows forage over longer distances during the winter, their return flight is more direct than in the summer.

#### CROW NESTING

By March, crows start to nest throughout the county, with the bulk of the nesting occurring in olive orchards. However, they occasionally nest in walnut orchards and oak trees in parks or along rivers. Some have been sighted in residential areas. Nests found in olive trees are from 18 to 25 feet from the ground, while nests in walnut and oak trees are from 40 to 60 feet above ground. There are 5 olive orchards in which the crows have chosen to colonize their nesting.

##### Nest Building

It seems to be characteristic of the crow to build its nest as high as possible. Walnut and oak trees are dormant in the winter and nests can easily be sited from the ground. In the evergreen olive trees, nests are built in the dense growth of leaves and stems. Fashioned out of twigs and lined with grape bark and grasses, the nests are well hidden from below by foliage. The diameter of 20 nests that were measured range from 10 to 15 inches with an average cup size of 8 x 4 inches.

##### Observations of Young

Egg laying occurs from early March through early May with the peak occurring in mid-April. During April some 628 nests were sited, but only 139 nests could be reached and observed during the season. Shortly after the nests are built, crows start laying from 1 to 5 mottled greenish eggs. The measurement of 35 eggs averaged 40 by 28 millimeters. Crows raise one brood of from 1 to 4 young, but seldom manage to raise more than three. In some nest locations crows live under semicomunal conditions with mutual interest in defending nest and young. In 1967, during our observations, it was alarming to find out

how alert crows are. Apparently all of the nests with eggs or young, when touched and disturbed, were abandoned except young 3 weeks or older. At 3 to 4 weeks, the young are moving out of the nest and balancing themselves on its rim and the surrounding branches. In 5 to 6 weeks, young can be seen in the nearby trees. By mid-June young crows are starting to fly with the adults to feed in the general area where they were fledged. Summer communal roosting starts in July.

#### CROW BANDING

In the nesting season of 1967-68-69 and 70, young crows 3 weeks or older, were banded with Bureau of Sport Fisheries and Wildlife bands.

#### METHODS OF CONTROLLING

The use of frightening devices (exploders, shooting) have so far proven ineffective in Tulare County. Trapping was also attempted in orchards with no results. Olive pruning usually begins in February if weather permits. Late rains may postpone pruning into March and April during the nesting season, thus destroying hundreds of eggs and young.

#### Chemical Control

Bait preference tests with untreated yellow corn, walnut and almond meats were conducted in crow congregating areas throughout the county. Tests showed that yellow corn was best accepted and most suitable for toxic baits. Starlicide® was explored experimentally as a lethal agent for reducing the crow population where damage was occurring.

Toxic bait may be diluted with clean untreated corn to reduce the hazard to non-target species. On March 12, 1968, the bait exposed was a mixture of 7 pounds of treated corn to 3 pounds of untreated corn. The corn bait was exposed on barren patches of alkali soil in a 160 acre pasture where prebaiting had indicated good acceptance by crows. Other areas where toxic baits have been successfully exposed, in cultivated fields, and alleys in grape vineyards.

After 8 hours, all non-treated bait had been picked up by crows, thus showing a definite preference. Forty-eight hours after initial exposure the toxic bait was 97% eaten. Transects of the roost indicated at least 200 crows succumbed to the toxic material. Subsequent trials have proven to be very successful. One-hundred thirty pounds of toxic bait have been exposed in 10 pound increments with an 87% average rate of acceptance. One thousand eight hundred and forty-two crows have been recovered from or near the roost areas. Sick and dying crows are often accompanied by several individuals which appear to be healthy or unaffected by the toxicant.

#### Conclusion

Starlicide® appears to be an acceptable crow toxicant and exposure of treated baits can be accomplished with little hazard to non-target species.

Congregating areas, generally within 2 miles of the roost, appear to be the best baiting sites. Quite frequently after a baiting program, crows change their roost locations. It would appear that the presence of dead or affected crows in the roost has a deterrent effect on comfortable roosting.

#### CROW FORMULA AND MIXING PROCEDURES

10 pounds of yellow corn  
42.6 grams of Starlicide® (75%)  
12 fluid oz. of tap water

Place corn in container and pour or spray Starlicide® solution over the corn and stir or mix until all of the solution has been absorbed. Spread out to dry for approximately 4-8 hours. When bait is dry, place it once again into container and apply a coating of

Editor's note: Starlicide® (3-chloro p-toluidine hydrochloride) as discussed in this paper was used on an experimental basis. Starlicide®, marketed by Ralston-Purina Company, is not presently registered for crow or scrub jay control.

Rhoplex AC-33 as masking agent. The Rhoplex solution is a mixture of 4 fluid ounces of water and 1 fluid ounce of Rhoplex AC-33.

#### DATA ON CROWS KILLED BY STARLICIDE®

<u>Weight</u>	<u>Average</u>
Male	398 gms.
Female	367.5 gms.
<u>Length, Beak to Tip of Tail</u>	
Male	16.5 to 19 inches
Female	17 to 18 inches
<u>Wing Span</u>	
Male	35 to 36 inches
Female	32 to 35 inches

#### THE SCRUB JAY (Aphelocoma coerulescens) AS A PEST BIRD

Although the scrub jay is bold and forward and considered as a non-flocking species, individuals and pairs will gather quickly in response to the ripening pistachio nuts in Tulare County.

Jays are very destructive to pistachio nuts and find no difficulty in removing the kernel after the shell starts to open. As soon as 10% of the nuts are open, jays begin their raids and continue as long as any of the crop remains. The nut is held against a branch with the foot and wedged with the bill until the kernel can be extracted. Most of the feeding is done while they are in the orchard. Jays appear to have a nervous instinct to bury or to hide as if they were harvesting one crop to plant another.

Pistachio bearing acreage 139 acres; non-bearing 166 acres. Pistachio plantings are set at 176 trees to the acre with a ratio of 1 male to 9 female trees.

Growers have reported finding the remains (shells) of nuts equal to 1.5 pounds of nuts (dry weight) under each tree causing losses amounting to \$150 an acre.

#### HARVESTING TECHNIQUES

Mechanical harvesters are used to shake the nuts to the canvas catcher and are carried by a conveyor belt into bins, loaded on trucks and hauled to a processing plant.

#### DAMAGE

A particular 10 acre orchard was selected for our observations to determine the number of nuts carried into the orange grove. During the morning hours and until mid-afternoon, there is a constant flow of jays into the nut orchard to feed and return with a nut to the orange grove.

#### Data from Field Notes of 1600 Man Hours

August 12, 1971 to September 17, 1971

#### Average Number of Visits by Jays to Orchard

<u>Time</u>	<u>Trips</u>
7:30 to 8:30	504
8:30 to 9:30	856
9:30 to 10:30	860
10:30 to 11:30	604
11:30 to 12:30	428
12:30 to 1:30	265
1:30 to 2:30	280
2:30 to 3:30	220
3:30 to 4:30	188
4:30 to 5:30	160
5:30 to 6:30	122
6:30 to 7:30	76

Total number of nuts taken out each day 4,563, equaling 17.4 pounds (dry weight).

#### METHODS OF CONTROLLING

Extensive shooting under proper supervision was performed at periods of high activity and has proven ineffective. Trapping by means of an ordinary wooden-based "snap-trap" (rat size) was used in the trees with little success.

In 1970, the Av-Alarm system was set up at the same location with a decline in activity the first 48 hours. After that, activity was back to normal. The Av-Alarm was relocated several times during the next 18 days with no effect as a deterrent. More research is needed with this system in jay control. Live traps were also used with some success.

#### Chemical Control

Controlled pilot bait preference tests with untreated walnut nut meats and pistachio nut meats were conducted using V-shaped troughs. Test showed that pistachio nut meat was the best accepted bait for treatment.

Jays usually filter into an orchard at the same location and use the same trees on each invasion. Light V-shaped troughs 3 x 3 inches and 6 feet long were placed in the branches of three dying orange trees. Untreated pistachio nut meat was exposed until good acceptance was obtained.

Pistachio nut meats then treated to contain 0.88% or 1.21% Starlicide® were not well accepted by the jays. Pistachio nut meats treated to contain 0.66% was, however, readily accepted and within 48 hours populations were starting to decline. After 7 days, the exposure of 4 pounds of toxic bait was 100% taken. The use of Starlicide® for the control of jays was conducted to obtain data on its effectiveness for that purpose.

#### DAMAGE

#### Data from Field Notes After Treatment

##### Average Number of Visits by Jays to Orchard

<u>Time</u>	<u>Visits</u>
7:30 to 9:30	64
9:30 to 11:30	120
11:30 to 1:30	24
1:30 to 3:30	10
3:30 to 6:00	6
6:30 to 7:30	0

Total number of nuts taken out each day 224, equaling 1/2 pound dry weight.

Pistachio nut meats treated to contain 0.66% were used at several other locations with good results.

#### Conclusion

Starlicide® appears to be an acceptable scrub jay toxicant and exposure of treated baits in V-shaped troughs can be accomplished with little hazard to non-target species.

#### SCRUB JAY FORMULA AND MIXING PROCEDURES

- 1 pound pistachio nut meat
- 4.0 grams of Starlicide® 75%
- 3 fluid ounces of Rhoplex AC-33 Solution

Dissolve all of the Starlicide® in Rhoplex solution. Pour or spray solution over the nut meat and stir or mix until bait starts to dry. Spread bait out to dry for approximately 2 hours. After completely dry apply a second coating of Rhoplex AC-33 (2.5 fluid ounces of water and 0.5 fluid ounces of Rhoplex AC-33) over the nut meats.

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