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## STARLINGS IN CALIFORNIA

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In 1959 Dr. Walter E. Howard, in an article printed in the Bulletin of the California Department of Agriculture, stated: "Even though the starling may be unwanted in California, it is now here and there is little chance of extirpating it". This statement is as true today as it was five years ago.

At present we have in California a resident population that is increasing each year and will most probably continue to increase. Nesting starlings have been found from Imperial and San Diego Counties in the south to Modoc County in the north.

To-date damage has been confined primarily to grapes and figs in the summer months and to cattle feedlots, hog farms and other concentrated feed sources during the winter months.

Most of the winter communal roosts in California have been in cattail and tule areas, well away from urban situations. Because of this we have experienced very little nuisance problem, such as plagues the cities of the eastern portion of the United States.

It can be expected that the damage to agriculture in California will increase as both our resident and migrant populations grow and expand.

To combat this potential population increase a cooperative program has been initiated by the California Department of Agriculture, the University of California, and the Bureau of Sport Fisheries and Wildlife of the United States Department of the Interior. The agricultural commissioner's offices of the counties of the state are contributing manpower to this program.

It is the function of the Department of Agriculture in this program to conduct field testing of control methods, to supervise the statewide banding program and to supply starlings to the University for research.

The starling program in California logically separates itself into two distinct parts. The first is the resident breeding population and the birds fledged during the spring and summer months; damage at this time is primarily to grapes and soft fruits. The second is the migrant population that begins to arrive in November and remains until March; damage at this time is primarily caused by millions of starlings congregated at feedlots and other concentrated sources of feed.

To combat juvenile starlings during the spring and summer months we have explored the use of frightening devices, biosonics and traps. During the summer of 1963 starlings were successfully repelled from vineyards and fig orchards with shell crackers, compressed air horns, carbide exploders and the amplified starling distress call. However, as the resident population increases causing heavier food pressures, the birds may be forced to overcome their fear. Trials with improved traps indicate that a more portable trap utilizing a funnel-type entrance may be more efficient than traps now in use.

No apparent weakness has been found in the life cycle of the juvenile birds that enables us to use toxic baits as a means of control and most of the roosts located at this time of the year were in areas that prohibited the use of toxic materials as sprays.

To combat starlings at concentrated sources of feed during the winter months we have explored the use of toxic baits, frightening devices and bio-sonics.

The use of frightening devices and the starling distress call have so far proven ineffective at these locations.

Starlings were successfully deterred from roosting in a holly grove in Santa Cruz County during the winter of 1962-63 with the starling distress call.

Trials utilizing TEPP (tetraethyl pyrophosphate) have been conducted and show that this material has some promise.

In our first attempts to use this material, raisins and cubed apples were treated with a TEPP solution and applied in strips down the high centers of alleys in the feedlot. The toxic bait in this trial was exposed in the early morning before the birds arrived at the feedlot. Four hundred pounds of bait were placed out and it was estimated that the 8,000 birds were killed.

Since our first trial we have found that if molasses is added to the bait acceptance is improved. A trial conducted in Madera County with raisins treated in this manner achieved an estimated kill of 13,000 starlings with 250 pounds of treated raisins.

We have also conducted trials to improve our baits and our baiting techniques. In a trial in Solano County bait consisting of 50 per cent rolled milo, 30 per cent rolled barley and 20 per cent raisins was used. Three hundred forty pounds of this bait was stripped down the alleys of a feedlot.

After treatment one third of the pens adjacent to the treated alleys were walked and nine transects were made at different locations in the feedlot. The total kill was estimated at between 20,000 and 25,000 birds.

TEPP has a very high mammalian toxicity. Proper precautions were taken while preparing and distributing the baits and respirators and protective clothing were worn.

A sample of toxic baits was taken from a treated feedlot 33 hours after exposure and fed to starlings at the Ecology Laboratory in Davis. The results are tabulated below:

<u>BIRD</u>	<u>BAIT</u>	<u>COMPONENTS GIVEN EACH BIRD</u>	<u>TIME OF DEATH</u>
1 Starling	Raisins	4	Within 12 hrs.
1 Starling	Raisins	6	Within 12 hrs.
1 Starling	Raisins	12	Within 12 hrs.
1 Starling	Cubed Apples ( $\frac{1}{2} \times \frac{1}{2}$ )	3	41 minutes
1 Starling	Cubed Apples ( $\frac{1}{2} \times \frac{1}{2}$ )	6	8 minutes
1 Starling	Cubed Apples ( $\frac{1}{2} \times \frac{1}{2}$ )	10	4 minutes

There is also some indication that treated baits may retain toxicity as long as 10 days under certain conditions. The expected rapid detoxification through hydrolysis apparently does not occur.

As of January 1, 1964, 27,103 starlings have been banded in California. Of this total approximately 6,000 were juvenile birds known to be offspring of the resident population.

In general it can be said that starlings from California will migrate as far north as Edmonton, Alberta, Canada. To-date only one of our banded birds has been picked up east of the 105th meridian.

The western mountain ranges are no barrier to the birds and there appears to be considerable movement of starlings throughout California during the winter months.

Banded starlings found during a toxic bait trial conducted in a feedlot at Collinsville, Solano County on January 16, 1964 had been banded at the following locations on the following dates:

<u>Banding location</u>	<u>Date banded</u>
Solano County	December 1962
Sacramento County	December 1962
Yolo County	January 1963
Stanislaus County	November 1962
Stanislaus County	November 1962
Stanislaus County	December 1963

Banded starlings found during a toxic bait trial conducted at the same feedlot on February 19, 1964 were found to have been banded at entirely different locations as follows:

<u>Banding location</u>	<u>Date banded</u>
Colusa County	December 1963
Colusa County	January 1964
San Joaquin County	January 1964
San Joaquin County	January 1964
Stanislaus County	November 1963

Five birds found on February 19th had been banded out of state and we do not have information on these.

It is emphasized that these were trials only and not control procedures. The next step will be to attempt to develop control procedures utilizing the knowledge gained from these trials. The development of effective local controls will be a long term project dependent upon the results of research made available for field use.