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USE OF STARLICIDE IN PIGEON CONTROL

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HISTORY AND BIOLOGY

Feral pigeons, problem birds common to most American cities and farms, are descendants of the Rock Dove (Columba livia) of North Africa and Europe. They were brought to America as domestic poultry by the first European settlers and have since escaped. They are not truly 'wild', as their existence depends upon man's activities. An adult pigeon will eat about a pound of food a week, consisting primarily of grain spilled around elevators, railroad yards and **feedlots** or fed by pigeon lovers.

In rural areas feral pigeons are generally not as great a problem as in towns and cities although at times they may cause losses to the farmer by crop depredation, contamination of feed, and dissemination of disease to domestic livestock. Feral pigeons' droppings deface and accelerate deterioration of buildings, corrode and clog rain gutters, and kill lawns and shrubs in urban areas.

Feathers and nesting materials clog air conditioners, mar window sills, interfere with awnings and create hazards on fire escapes. Pigeons may enter attics of buildings with the end result of the ceiling collapsing under the weight of droppings and nests. There are also a number of diseases associated with pigeons and their by-products which infect man, domestic pigeon flocks, and other animals.

There are numerous references on established control methods. Pigeon proofing (exclusion) is probably the most widely used method. There are several chemical repellents (naphthalene and sticky materials), and shooting has found limited use on small flocks where local ordinances permit. A 1% strychnine grain bait has been used, although problems have arisen when large flocks, after consuming lethal amounts of bait, are frightened into flight by a few going into convulsions at the feeding site. As the frightened birds became affected, they dropped from the sky into backyards, parks, streets and freeways. Avitrol is used as a repellent where affected birds give a distress alarm thus frightening the rest of the flock from a certain area. During the past several years **chemosterilants** have been successfully employed, however, they are more expensive than conventional baits. For the past two decades in California, anticoagulant toxicants have given excellent control of pigeons. Baits of 0.01% diphacinone and 0.025% pival both have registration in California. Some controversy has arisen over sick and bleeding birds. In the past, trapping has had limited use because it is very time consuming. In an attempt to find new and better methods of pigeon control, Starlicide was experimentally tested at two locations in southern California. With this data and additional use, a 24-C registration was obtained.

STARLICIDE TRIAL--MOBIL OIL REFINERY

The Mobil Oil Refinery in Torrance, (Los Angeles County, California) is located on 740 acres, of which about half is storage tanks, buildings, and sheds containing motors, pumps, distillation apparatus, pipes, and valves. The remaining 370 acres are pipe and storage, reservoirs, and agricultural fields, primarily small

grains. An estimated 1,500 to 2,000 pigeons fed in the fields, drank from leaking water and steam pipes, and roosted in the sheds and buildings. The roosting areas presented the greatest problems. Droppings accumulated on catwalks, pipes and valves, causing health and safety difficulties for workmen and loss of equipment from corrosion.

Prebaiting

Prebaiting was started on August 24, 1971. Clean, slightly rolled groats were placed on roofs of sheds around two abandoned, 20-story flash towers in 28 trays at four bait stations. After 20 days of prebaiting, an additional 11 bait stations, utilizing 50 trays, were established on buildings and tanks in the central and eastern sections of the refinery where heavy pigeon concentrations had been observed. Three trays were removed from the two southern stations at the flash towers due to lack of feeding activity. A total of 75 trays at 15 stations was used to expose 400 pounds of prebait.

Baiting

Two mixtures of Starlicide treated bait (rolled oat groats) were exposed over a 24-day period. The two parts to five parts Starlicide mixture bait was exposed for ten days but there were still many pigeons actively feeding, some not showing Starlicide symptoms. 17 pounds of undiluted 0.37% Starlicide bait were exposed for an additional 14 days. Good acceptance of the undiluted bait was obtained for the first four days but slowly dwindled to no acceptance on the 14th day. Observations were made daily by the industry cooperator and twice weekly by State and Los Angeles County personnel.

Results

Bait stations near water had the most pigeon activity. Two days after the toxic bait was exposed many pigeons showed typical Starlicide poisoning symptoms, although no dead birds were observed. The pigeon population declined rapidly during the first week of toxic bait exposure with 40 to 60% reduction noted around all bait stations. After four days of **toxicant** exposure, the bottom four floors of the north flash tower were inspected and 18 dead pigeons were found without searching behind pipes or inside openings. Only one dead pigeon was found on the first five floors of the south tower. (This tower had been previously treated June, 1971) 20 - 25 dead pigeons were collected on the ground around the towers. Most of the birds around all the stations exhibited typical Starlicide poisoning symptoms.

At the large floating roof storage tank in the eastern section of the refinery, 25 dead birds were observed on the roof. Oil was removed from the tank which lowered the roof about 50 feet, however, pigeons continued to feed on the exposed toxicant. An additional 25 to 30 dead pigeons were collected throughout the rest of the refinery and buried, bringing the total birds collected to 40 on the 4th day. Some pigeon feathers and other parts were found, therefore, the number of birds that had been eaten or dragged away by predators is not known. On the 5th day after the **toxicant** was exposed, 50 dead birds were observed at the 15 stations. Birds were removed and buried where the area was frequented by employees.

During the 24 days of toxic bait exposure about 150 dead pigeons were collected throughout the refinery because they died in areas frequented by employees. The other 90% died in nests and roosts on beams of sheds, pipes, and on floors behind pipes and boilers. In the dry heat of the summer the bodies mummified in several days and were not seen until wind blew them to the ground.

At one **location** about 50 live birds were observed during prebaiting. After the first week of toxic bait exposure only 17 were alive. The 17, although sick, continued to live and feed seven more days or until three days after the 0.37% bait was exposed. These birds were later found dead around the catwalks and pipes of a boiler plant across the street from the bait stations.

Known roosting sites were inspected two nights before the toxic bait was removed. A total of 12 birds was observed. Daytime inspections, 14 and 21 days after toxic bait was removed, resulted in sighting 34 and 1 pigeon(s) respectively, throughout the refinery, compared to the 1,500 to 2,000 sighted before the trial commenced. Eight months after the conclusion of the poisoning program, only eight birds were observed, five of which were at **Station I** where bait acceptance was poor.

Conclusions

Starlicide was an effective and selective pigeon control material in this field trial. No non-target species were found dead and 99% of the pigeon population was controlled. Few pigeons died where they were conspicuous to the public compared to the number killed. Only about 10% of the birds killed had to be collected.

STARLICIDE TRIAL--MARCH AIR FORCE BASE

Statement of Problem

Within residential and administrative areas of March Air Force Base, (Riverside County, California) approximately 250 pigeons were depositing fecal material in window wells, rain gutters, on roofs and the ground, causing property damage and health hazards. Over four inches of excrement had accumulated in several wells where windows opened directly into offices. Rain gutters were being pulled down by weight of the droppings. Most of the pigeons' night roosts were in palm trees growing along the streets, although they frequented buildings by day. Fecal material collecting around each tree made an unsightly nuisance and caused a health hazard to children and pets. The pigeons, in bands of 10 to 50, were generally dispersed over about 160 acres of buildings and trees.

Procedure

Bait stations were established using trays 18" x 36" x 2" or 12" x 36" x 2" on the roofs of 11 buildings at March Air Force Base. The trays were placed on the highest part or the area of the building most frequented by pigeons. Prebaiting commenced April 28, 1972, using approximately two pounds of clean, slightly rolled oat groats per tray. After five days of prebaiting, 3 stations were discontinued because of poor acceptance or use by non-target species. All remaining stations were rebaited. On May 10, 1972, 11 days after prebaiting started, a mixture of two parts 0.37% Starlicide treated oat groats to five parts non-toxic oat groats was placed in all bait trays. Toxic bait was exposed until June 4, 1972, (26 days). (See Appendix I for mixing instructions.)

Results

The following amounts of bait were used:

a.	<u>Prebait</u>	
	Clean oat groats	100 pounds
b.	<u>Toxic Bait</u>	
	0.37% Starlicide treated oat groats	32 pounds
	Diluent = clean oat groats	78 pounds
	TOTAL TOXIC BAIT	<u>110</u> pounds
	(2 parts 0.37% to five parts clean grain)	
c.	<u>Starlicide</u>	
	75% Technical grade	2.5 ounces

Over 200 pigeons, 85 to 95% of the total population, were killed by the **Starlicide** treatment. During the 26 days of toxic bait exposure, 165 pigeons were collected by March Air Force Base personnel. An estimated 20% of the birds were not collected because they died in inaccessible nests and roosts. An estimated additional 10% were consumed by predators. Dead pigeons were found at (a) feeding or bait stations, (b) watering areas, or (c) roosting and nesting sites.

Assuming that the number of birds collected at or near the seven bait stations is a representative sample of the number actually killed, 13% of the population was taken during the first 24 hours after toxic bait exposure. Fifty-seven percent and 84% died after five and 13 days respectively. A bait station with six trays had the greatest bait consumption, with more birds being collected at this station. Palm trees lined both sides of a street, plus one row is planted down the middle of the street. Two stations were located at this prime nesting and roosting area and more birds were found here in proportion to bait consumed than any other station. A leaking sprinkler head provided a 24-hour water supply at one station and probably accounted for the large number collected at this site. Three common crows, Corvus brachyrhynchos, were the only non-target species found dead. Several dead pigeons were found with their crops opened and cleaned out, apparently eaten by the crows. One crow was autopsied and oat groats were found. (Note: Starlicide is extremely toxic to crows (LD_{50} = 1.8 mg/kg).

Discussion

About 10 to 20% of the pigeons appeared to survive the initial exposure of Starlicide bait. However, after an additional 10 to 15 days of bait exposure, this 10 to 20% died. Three theories could explain the survival: (a) physiological resistance, (b) ability of some birds to detect the treated kernels, and (c) pecking order excludes some from obtaining a lethal dose. The first two, "a" and "b" are probably the most realistic reason for the survival.

At one residential location a band of 25 to 30 pigeons did not accept pre-bait or toxic bait even though a bait station was only $\frac{1}{4}$ mile from their nesting and roosting site. The natural feeding area of this band, as were the others located at March Air Force Base, was in the grain fields surrounding the base. This location was similar to the area around three stations where acceptance of bait and control was excellent. It was concluded bait must be exposed in the immediate area of nesting and roosting to obtain good acceptance and therefore good control.

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APPENDIX I

MIXING PROCEDURES FOR STARLICIDE TREATED PIGEON BAIT

MATERIALS:

75% Starlicide	1.3 ounce (40.4g)
Water (hot, but not boiling)	1 quart
Oat groats	17 pounds

MIXING PROCEDURES:

0.37% Starlicide Bait: Mix 1.3 oz. (40.4g) of 75% Starlicide in 1 quart of hot water until completely dissolved. Slowly pour this mixture over 17 pounds oat groats as it tumbles in a mechanical mixer. Spread the thoroughly mixed bait on the floor or place in drying box to dry.

Diluted Mix: The exposed bait is diluted with untreated oat groats at a ratio of 2 parts 0.37% treated bait to 5 parts untreated. Mix in a mechanical mixer 17 pounds of dry 0.37% Starlicide treated oat groats with 43 pounds of untreated grain.