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## Pinned Game Birds in Dieldrin Treated Fields

By M. E. STEMPEL

*Abstract.* Granular dieldrin was applied by air to control Japanese beetles. Fourteen pheasants and 12 quail in four pens were exposed to the application. Nearby were wild quail, songbirds and starlings, but no pheasants. Later, remains of some wild birds were seen or reported. Nine quail and one starling "posted" at Ames had lesions similar to those in birds affected by toxemia. One quail that died before the operation and two pheasants that were examined did not show these lesions.

Knowledge of possible effects of insecticides is vital to game management as it is to land management, and in March, 1958, there was an opportunity to investigate the possibility that some birds can be affected by field application of dieldrin. In Fort Madison, Iowa, and vicinity there was an infestation of Japanese beetles (*Popillia japonica*). These are classified as destructive to many ornamental plants and important farm crops. The Iowa Department of Agriculture and the United States Department of Agriculture set up the project to control beetles by application of two pounds of dieldrin in 18 pounds of clay per acre. The granular dieldrin-clay mixture was to be applied from an airplane.

Springer (1956) believed effects of pesticides are not great if the chemicals are used properly. DeWitt (1956) described effects of sprayed poisons under test conditions: sprays including dieldrin, were cumulative in effect on quail that failed to survive measured doses. These compounds also affected hatchability of eggs and viability of chicks. Genelly and Rudd (1956), in a controlled test, found that dieldrin was fatal to most pheasants subjected to tests. Birds examined had a high concentration of insecticide in fat or showed damage to liver cells, or both. Ward (1956) published tables showing oral toxicity to laboratory rats of 20 insecticides and 11 rodenticides, and other data. Dahelen and Haugen (1954) described condition of quail killed by insecticides, including dieldrin, under controlled conditions.

### MATERIALS AND EQUIPMENT

Two portable wire mesh pens 4 feet x 6 feet x 2½ feet and two of larger dimension were made and delivered to Fort Madison by Game Section personnel who also supplied feeders for 12 quail (*Colinus virginianus*) and 14 pheasants (*Phasianus colchicus torquatus*). Pens and feeders were of such construction that spray material of any kind would fall freely into them. Sufficient feed for

the birds was likewise provided. A numbered metal band was placed on one leg of each penned bird.

#### METHOD

Pens and birds were delivered to the prison yard at Fort Madison. There they were cared for by trustees. As is usual when live subjects are used, the original plan was to protect half of the birds from the dieldrin, but because of constant harassment by dogs or other predators, and consequent danger of loss of several birds, it was the biologist's decision that all birds should be exposed to the dieldrin treatment. A pen containing two quail and a pen of two quail and seven pheasants were placed west of town in loose, sandy soil in a harvested corn field south of Highway 61. A second similar setup was on another site in more compact sandy soil in an alfalfa field north of Highway 61, just west of the city near Oakland Cemetery. The units remained in the fields during the operation, and through several weather changes, including rain and dewfall. Feed was put on the ground as well as in containers. Water pans were open.

After pens were put out in selected areas the units were inspected at intervals by the local conservation officer and by the biologist. The second set of pens was observed frequently by the landowner.

Typical portions of the surrounding country were checked to get information on wildlife present. No wild quail were seen. However, their roosts were found, and farmers reported they recently had observed quail coveys. Also an estimate was made of the number of other common birds using fields and fencerows.

#### SEQUENCE OF EVENTS

February 24. At a meeting in the Conservation Commission office in Des Moines a tentative treatment date was set for March 10.

March 6. Birds to be used were delivered to Fort Madison. Check of wild birds.

March 9. Check on field layout.

March 12. Check of fields and final check of plans.

March 22. Birds placed in pens in fields selected.

March 27. Application of dieldrin completed.

April 3. Surviving birds picked up and taken to holding pens at Ottumwa.

April 5. Recheck of wild birds in sample plots.

#### RESULTS

Birds were frequently troubled by dogs. This is a common problem where small holding pens are used. Confined birds drank from pans provided. **During and after the application of dieldrin, they**

ate food placed on the ground where visual inspection revealed that the material fell at about the same rate as in surrounding areas.

#### Effects on Pheasants

Pheasants appeared to suffer loss of weight before removal to Ottumwa, and scalps were damaged because of frequent disturbances by predators.

After dieldrin was applied to the fields, all the pheasants were alive and active. At Ottumwa they were confined in wire mesh topped pens 25 feet x 100 feet; egg production by the hens was slower than by privately owned birds in an adjoining enclosure. All birds received the same type of feed.

To test fertility, clutches of 14 eggs were set under each of four bantam hens. By July 6, six chicks hatched from a setting of eggs produced by exposed hens. Five hatched from eggs laid by other stock. One hatching was deserted, and birds from the fourth brood were not counted as they were moved when the biologist was absent. No abnormalities were noted in the newly hatched young.

One cock pheasant and one hen were killed and examined at the Iowa Veterinary Diagnostic Laboratory in Ames and the report stated in part, "No gross pathological changes". One hen was killed in September, and a local veterinarian posted the fowl and found no indication of damage that could be attributed to the dieldrin. The general condition of the pheasant was good.

#### Effects on Quail

One cock and one hen quail were placed in each of the smaller pens. A pair was in each of the larger pens with six hen pheasants and a cock. This prevented customary fighting between male quail.

Before dieldrin was applied to the fields, one quail died following an attack by a predator that reached through the pen fence. Nine more died in pens at Fort Madison, or during removal to Ottumwa.

Concerning the quail, a letter from the Iowa Diagnostic Laboratory at Ames, dated April 14, 1958, gives the following information: ". . . ten quail brought April 9 showed the presence of lesions similar to those seen in birds and animals affected with a toxemia. One quail identified as having been affected before time of spraying did not show these toxic lesions . . ."

Further reference in this letter was to a starling found dead, and which had the same toxic lesions as the quail.

No wild quail were seen, although roosting places were found before the operation. There was so much traffic and other noises that calling birds could not be heard.

### General Observations

On March 6 several thousands of starlings (*Sturnus vulgaris vulgaris*) were observed near the west border of the area to be treated. The following wild birds (other than starlings) were observed at three sites.

Site 1: In a brushy fence row near the north pen site; 2 male cardinals (*Richmondia cardinalis*), 1 downy woodpecker (*Dendrocopus pubescens*), 6 redwings (*Agelaius phoeniceus*), 10 juncos (*Junco hyemalis*), 25 to 50 English sparrows (*Passer domesticus domesticus*).

Site 2: Near the first site, orchard border; 4 field sparrows (*Spizella pusilla pusilla*), 2 juncos, 1 female cardinal.

Site 3: Outside treated area. Hedge, and brushy, 0.3 mile long fence row, near Izaak Walton League grounds west of Fort Madison; 20 field sparrows, 20 juncos, 10 cardinals.

After the operation on April 5, the same areas were checked again. There were no large flocks of starlings. The following observations were made:

Site 1: 10 juncos, 5 robins (*Turdus migratorius*), 2 killdeer (*Chordeiles vociferus vociferus*), redwings.

Site 2: 1 starling, 1 meadowlark (*Sturnella magna*), 1 robin, 5 field sparrows.

Site 3: Outside treated area. 10 sparrows, 5 starlings, 2 juncos, 40 purple grackles (*Quiscalus quiscula*).

Squirrels (*Sciurus niger*) and rabbits (*Sylvilagus floridanus*) were seen in the area. No dead were seen or reported. Live meadowlarks and doves (*Zenaidura macroura*) were seen in the treated portions outside the areas where birds were counted. A few residents reported they saw unidentified dead birds in the city or in farm yards.

### DISCUSSION

Holding pens used in the treated area were suitable for proper exposure to the treatment, but larger pens would have given better protection from predators. Nervousness in pheasants because of frequent moving and disturbance by predators may have contributed to a low rate of egg laying.

Though there was evidence that predators visited the pens, the amount of this disturbance was unknown. However, one landowner, on whose farm two pens were placed, said that he often watched the area and it was his opinion that animals seldom appeared. On the other site disturbances appeared to be more frequent. In the corn-

field, in soft and sandy soils, dogs made many trails in the pen vicinity.

Large flocks of starlings disappeared from the treated fields about the time of the operation. Some of this was probably due to seasonal migration.

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