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THE IMPORTANCE OF TIMING THE APPLICATION OF CHEMOSTERILIZATION IN RED-WINGED BLACKBIRD

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ABSTRACT

To evaluate the importance of the timing of an application of a chemosterilant, we measured the effect of Ornitrol on testis size and maturation of sperm cells at different time periods during testis growth and in two different breeding seasons. Indoor experiments showed that Ornitrol did not affect testes nor sperm cells when applied at the onset of testes growth, but did have an effect when applied the 4th week afterwards. Field experiments showed much variation in Ornitrol treatment efficiency between years. Timing of application in relation to testes growth is believed to be of major importance in using chemosterilization as a management tool for red-winged blackbird population control.

INTRODUCTION

Chemosterilization has been proposed as a potentially useful management tool to control red-winged blackbird populations (Dyer & Ward, 1977; Stehn & Dolbeer, 1980; Weatherhead & Bider, 1980). Reducing fertility is considered to be more suitable than increasing the extinction rate of local populations (Stehn & Dolbeer, 1980; Stenseth, 1981). In an effort to evaluate the best strategy for optimal pest control, we investigated the importance of timing the application of the chemosterilant.

Benjamin (1972) reports no effect of Ornitrol on fully grown testes. Since the chemosterilant would be administered through food offered to spring flocks of blackbirds, and since their testes at that time are not fully grown, we predict that a treatment with Ornitrol will be more efficient if given at this time. We also wanted to know the extent to which yearly variations occur in treatment efficiency, since this would increase the importance of proper timing for the application of the sterilization method as a control measure.

METHODS

Birds were caught with mist nets or α -chloralose and were kept in outdoor aviaries in spring and indoor aviaries in winter. They were fed cracked corn *ad libitum*. The first experiment dealt with birds held in natural spring photoperiod and having involuted testes. A first group of these birds was treated cracked corn containing 0.1% (w/w) of Ornitrol for 10 days and a second one two weeks later. Sperm counts followed the methodology given by Aman and Almquist (1961) using an hemacytometer.

The second experiment, involving fall birds kept indoors, dealt with testis size of birds treated at 0 and 4 weeks from the onset of testis growth, which was initiated by photostimulation (from LD 8:16 to 18:6). Left testis size was measured *in vivo* every two weeks on laparotomized birds (Risser, 1971) until week 8 of photo stimulation. The same procedure was applied on controls.

The third experiment involved 39 territorial red-winged blackbirds to which Ornitrol-treated food was offered on feeders for one month. Each bird's productivity was evaluated from the nesting success expressed in number of eggs laid and number of hatchlings.

RESULTS AND DISCUSSION

Sperm counts and testis size did not differ significantly between controls and treated birds with involuted testes, but 10 days after the onset of testis growth the difference showed up. Testis size of birds treated two weeks after the beginning of testis growth differed significantly from controls at the end of the treatment ($t = 3.308, P < 0.05$) as well as 10 days later ($t = -4.164, P < 0.05$) (Lacombe et al. 1984a).

In another experiment, we compared the effect of a treatment at the onset of testis growth to its effect during testis growth, 4 weeks later. Although the experimental birds (treated and control) were laparotomized, only the treated group showed a significant weight loss two weeks after the beginning of the treatment (Figure 1). Before the treatment, testis size was only slightly smaller in treated birds than in controls. During their growth, testes remained always smaller in treated than in controls, although the difference was not significant (Figure 2). This difference was more evident for adults than for subadults and increased from week 0 to week 4.

This last result is important, because subadults do not usually breed in their first season. Since the territorial birds are more often adults, it is meaningful to realize that a treatment affects them more than subadults.

On week 6, after photostimulation, testis size of control and treated birds reached a peak. The testis size at this stage was significantly bigger than at the onset of photostimulation. The difference between treated and control did show up between the treatment at the onset (week 0) and the one during testis growth (week 4) but was not significant. On week 8, testis size decreased so as to cancel differences between control and treated birds.

The efficiency of the treatment in the field varied, as predicted, from one year to the next. The number of eggs laid was comparable for treated and control birds; the hatching success was significantly different only in 1981, when a mean of 2.03 fewer eggs hatched per nest in treated birds as compared to 0.33 in 1982 (Lacombe et al., 1984b).

Comparing aviary experiments with those in the field, it seems obvious that the timing of an Ornitrol treatment is a possible limiting factor to an efficient sterilization program. Since the treatment has no effect when applied on fully grown testes, as shown by Benjamin (1972), and since testis growth curves vary slightly between years and last only two to three weeks, this might explain why 1981 and 1982 treatments on territorial males gave such different results.

Testis size seems a good criterion to decide the proper timing for the Ornitrol treatment, being easily measured on yearly samples of birds and being related to fertility. Since blackbirds gather in spring flocks at least 4 weeks before the proper time for an Ornitrol application, it is thus important to evaluate, on yearly and local bases, the critical period which would yield the maximum number of birds to be treated. For such an operation, it would seem necessary that the growers take part actively in any sterilization program by helping the biologist or the pest manager to detect the birds' presence and prepare the proper feeding station with the baiting corn.

The bird samples on which testes size would be measured could easily be caught by funnel traps. With such a collaboration between the scientists, the growers, and the birds, one could reasonably expect results if the timing is appropriate and the feeding sites are chosen optimally to attract more birds.

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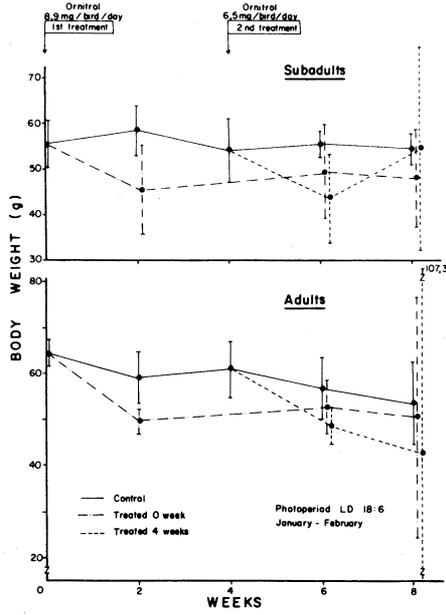


FIGURE 1. Body weight changes at two-week intervals after an Ornitrol treatment in subadult and adult male red-winged blackbirds.

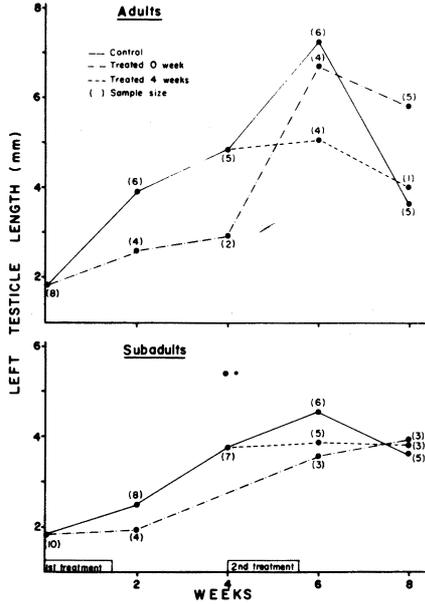


FIGURE 2. Left testis length of adult and subadult red-winged blackbirds treated at 0 or 4 weeks from photostimulation. At week 4, the value obtained for subadults is for only one bird, so that the point was not related to the corresponding curve of treated birds.