

UC Agriculture & Natural Resources

Proceedings of the Vertebrate Pest Conference

Title

Sterilants for managing the populations of red-winged blackbirds (*Agelaius phoeniceus*)

Permalink

<https://escholarship.org/uc/item/999891k8>

Journal

Proceedings of the Vertebrate Pest Conference, 15(15)

ISSN

0507-6773

Authors

Cyr, Andre
Lacombe, Diane

Publication Date

1992

STERILANTS FOR MANAGING THE POPULATIONS OF RED-WINGED BLACKBIRDS (*Agelaius phoeniceus*)

ANDRÉ CYR, Dept. of Biology, University of Sherbrooke, Sherbrooke, Québec, Canada, J1K 2R1

DIANE LACOMBE, Raptor Research Center, McDonald College of McGill University, 21111 Lakeshore, Ste-Anne-de-Bellevue, Québec, Canada, H9X 1C0

ABSTRACT: Male Red-winged blackbirds (*Agelaius phoeniceus*) being gregarious, and causing heavy damage to corn crops in the northeast, including southern Québec and Ontario, sterilization has been studied as a means to manage their populations. With chemosterilants (thiotepa and Ornitrol®) tested, year to year variations in reproductive success occurs. The spermatogenesis is disrupted, but the overall effect is not specific. Biosterilisation with 10.0 µg doses of GnRH-analogue hormones is more specific, and the spermatogenesis is disrupted for at least a month, but several spaced injections were required. No field trials have been done yet.

Proc. 15th Vertebrate Pest Conf. (J. E. Borrecco & R. E. Marsh, Editors) Published at University of Calif., Davis. 1992

The following is an extended summary of our main findings on sterilization as a means to manage the population of Red-winged blackbirds, a species known to cause large damage to crops, mainly corn, in the St. Lawrence Valley in Québec. The problem was more severe in the seventies and early eighties when the populations of the Redwings were known to increase, and were reaching peaks in southern Québec and Ontario and in the Ohio region, south of the Great Lakes (Dolbeer and Stehn 1979). More recently, the populations seem to be declining in Québec (Cyr and Larivée 1992).

Studies from Knippling (1959) and Wofford and Elder (1976) prompted us to further study the efficiency of sterilants on Redwings. Thiotepa was used in the beginning. Although some results showed promise (Potvin et al. 1982 a, b), reducing the nesting success of birds treated in the laboratory or in the field with the drug, thiotepa was not homologated then, nor was it considered safe, showing some carcinogenic effects. Furthermore, techniques to apply the sterilization in the laboratory (force feeding) or under field conditions (by gavage) were not deemed appropriate for large scale applications, especially because some applications required several daily treatments for appropriate sterilization to occur.

Studies were then undertaken with Ornitrol which had been shown promising in some pest birds (Fringer and Granett 1970, Sturtevant and Wentworth 1970). Ornitrol has been administered during 10 days, every day, during the growth phase of the testes, because Benjamin (1972) had shown no effect when administered after the testes were fully grown. Variation occurred between experiments, and the treatments did not inhibit the growth of the testes on a regular basis (Lacombe et al. 1984). It was felt that the precise timing of the treatment in relation to the growth phase of the testes was important to improve the efficiency. With daily ingestions of cracked corn coated with Ornitrol in the field, between year variations were found to hinder the efficiency of the treatment (Cyr and Lacombe 1983, Lacombe et al. 1986), even though a significant reduction in hatching success (49%) was achieved in one year.

Behavioral responses of birds were analyzed to evaluate the response of the birds under treatment in locating appropriate baiting sites without disturbances. The general behavior of the birds was not unduly affected by the sterilant treat-

ments, either with thiotepa or Ornitrol (De Traversay 1983, Cyr et al. 1983, Cyr and Lacombe 1988), nor their courtship displays (Y. Cuerrier, pers. comm.). Some structural parameters further affect the choice of baiting sites by the birds, and thus might affect the maximum number of birds to visit any site for appropriate baiting or treatment (Daoust 1986, and Daoust et al. 1986).

In order to understand in more detail the effect of any treatment with a sterilant, we evaluated its effect on the spermatogenesis of Red-winged blackbirds. Some structures of the testes were not affected following an Ornitrol treatment, but the thickness of the epithelium of the seminiferous tubules was significantly reduced, as well as the number of spermatocytes and round spermatids, the last stages in the formation of the spermatozooids. Also, the spermatogenesis was strongly disrupted in the treated groups (Lacombe et al. 1987), even if the treatment was administered on birds for which the testes growth was stimulated artificially in the laboratory. Further experiments with testes growth stimulated naturally with the natural spring photoperiod led to similar results in regard to disruption of the spermatogenesis, and to the significant reduction of the number of spermatocytes and round spermatids (Gauthier 1986).

Because of problems associated with the chemosterilant Ornitrol, namely the lack of specificity of the cholesterol disturbance in the birds, more specificity was sought after. Biosterilization was studied to evaluate its effects on the spermatogenesis and the hormonal disturbance in Redwings, especially because hormones are the important means through which testes growth are regulated in the body. The main part of this last multifaceted study was undertaken by Diane Lacombe (Lacombe 1989). Treatments were applied with a potent GnRH-analogue that affects the LH hormonal production in the pituitary (Lacombe et al. 1991b). The impairment of the LH production was dose-related, the maximal plasma LH levels being obtained with 10.0 µg after the first injection, but a pituitary desensitization was evidenced by the reduced plasma LH levels following the 14th injection in all groups (Lacombe et al. 1991a). The doses required to produce this response were found to be twice as high as those required in mammals, but are still low and considered safe, as far as human hazards are concerned (Lacombe et al. 1990a). Even if daily treatment were studied at first to determine the effi-

cient doses required to produce desirable effects, and disruption of the spermatogenesis, treatments every 4th or 7th days are still very efficient at doses of 10.0 µg (LaCombe et al. 1990b). Biosterilization produces a much better specificity in disturbing the spermatogenesis. A significant larger number of redwings showed signs of disturbed spermatogenesis, but the effect was dose related. Under a treatment of 14 injections at 10.0 µg the spermatogenesis of the bird has not completely returned to normal after 28 days, low levels of degeneration of the seminiferous tubules still being observed (Lacombe et al. 1991b). We have not studied bird's reproductive success under such conditions and cannot tell whether or not the birds had regained completely their fertility potential. Reproduction in the field was not tested either. Means to apply and study biosterilization in the field are still needed, but criticisms by Bomford and O'Brien (1992) are to be considered before developing such.

LITERATURE CITED

- BENJAMIN, C.L. 1972. The physiological and histological effects of 20, 25-diazacholesterol dihydrochloride (SC-12937) on the reproduction of the male Red-winged Blackbird (*Agelaius phoeniceus*). Ph.D. Thesis, Ohio State University, Columbus.
- BOMFORD, M. and P. O'BRIEN. 1992. A role for fertility control wildlife management in Australia? Vertebrate Pest Conference, Newport Beach, California, March 1992 (in press).
- CYR, A. and D. LACOMBE. 1983. The importance of timing the application of chemosterilization in Redwinged Blackbirds. Proc. Bird Control Semin. 9:271-274.
- CYR, A. et D. LACOMBE. 1988. La stérilisation est-elle une avenue fertile en vue du contrôle des populations d'oiseaux nuisibles? Proc. XIX Congressus Internationalis Ornithologicus 19: 484-492.
- CYR, A. and J. LARIVÉE. 1992. Trends in bird populations in Québec comparing data from ÉPOQ (Studies of Bird Populations in Québec) and BBS (Breeding Bird Survey). In: C.J. Ralph, S. Droege, and J. Sauer, eds. Workshop on monitoring bird population trends by point counts. U.S. Fish Wildl. Serv. (in press).
- CYR, A., C. LEROUX, and J.M. BERGERON. 1983. Adjusting bird control applications with their optimal behaviors in Red-winged Blackbird. Proc. Bird Control Sem. 9: 115-124.
- DAOUST, G. 1986. Paramètres favorisant le choix d'un site d'alimentation printanier par le Carouge à épaulettes (*Agelaius phoeniceus*): Évaluation de l'utilisation de la télédétection. Mémoire de M.Sc., Université de Sherbrooke, Sherbrooke.
- DAOUST, G., A. CYR, and F. BONN. 1986. Predicting food site preferences of Red-winged Blackbirds (*Agelaius phoeniceus*) using simulated SPOT data. 19th Int. Symp Remote Sensing Env., Ann Arbor, Michig. Oct. 1985.
- DE TRAVERSAY, J. 1983. L'effet des chimiostérilisants thiotépa et Ornitrol sur le comportement social du Carouge à épaulettes. Mémoire de M. Sc., Université de Sherbrooke, Sherbrooke.
- DOLBEER, R.A. and R.A. STEHN. 1979. Population trends of blackbirds and starlings in North America, 1966-76. U.S. Dept. Int., Fish Wildl. Serv., Spe. Sci. Rep. Wildl. 214: 1-99.
- FRINGER, R.C. and P. GRANETT. 1970. The effect of Ornitrol on wild populations of Redwinged Blackbirds and grackles. Proc. Bird Control Sem. 5:163-176.
- GAUTHIER, M. 1986. Effets du chimiostérilisant Ornitrol® chez le Carouge à épaulettes (*Agelaius phoeniceus*) mâle traité en période de grégarité printalière. Mémoire de M.Sc., Université de Sherbrooke, Sherbrooke.
- KNIPPLING, E.F. 1959. Sterile male method for population control. Science (Washington, DC.) 130: 902-904.
- LACOMBE, D. 1989. Étude de la stérilisation hormonale chez le Carouge à épaulettes (*Agelaius phoeniceus*) traité de façon chronique à l'aide d'un analogue agoniste de la LHRH. Thèse de doctorat en sciences (Ph.D.), Université de Sherbrooke, Sherbrooke.
- LACOMBE, D., A. CYR, and J.M. BERGERON. 1984. Effets du chimiostérilisant Ornitrol sur le développement testiculaire du Carouge à épaulettes traité en captivité. J. Can Zool. 62: 1960-1964.
- LACOMBE, D., A. CYR, and J.M. BERGERON. 1986. The effects of the chemosterilant Ornitrol on Red-winged Blackbirds treated in their natural environment. J. Appl. Ecol. 23: 773-779.
- LACOMBE, D., A. CYR, and P. MATTON. 1990a. Spermatogenesis in photostimulated Red-winged Blackbirds (*Agelaius phoeniceus*) chronically treated with a potent GnRH analogue. J. Can. Zool. 68: 2518-2523.
- LACOMBE, D., A. CYR, and P. MATTON. 1991a. Plasma LH and androgen levels in the Red-winged Blackbirds (*Agelaius phoeniceus*) treated with a potent GnRH analogue. Comp. Biochem. Physiol. 99A: 603-607.
- LACOMBE, D., A. CYR, and P. MATTON et al. 1991b. Pituitary LH content and plasma LH levels following daily GnRH analogue treatment in male Red-winged Blackbirds (*Agelaius phoeniceus*). Comp. Biochem. Physiol. (in press.).
- LACOMBE, D., P. MATTON, and A. CYR. 1987. The effect of Ornitrol® on spermatogenesis of developing testes in Red-winged Blackbird. J. Wildl. Manage. 51: 596-601.
- LACOMBE, D., P. MATTON, and A. CYR. 1990b. The effect of intermittent GnRH analogue treatments on hormonal levels and spermatogenesis in photostimulated Red-winged Blackbirds (*Agelaius phoeniceus*). J. Exp. Zool. 243: 303-310.
- POTVIN, N., J.M. BERGERON, M. NORMAN, and A. CYR. 1982a. Evaluating the sterile male method on Red-winged Blackbirds: clinical evaluation of thiotépa as a sterilant. Can. J. Zool. 60: 460-465.
- POTVIN, N., J.M. BERGERON, M. NORMAN, and A. CYR. 1982b. Evaluating the sterile male method on Red-winged Blackbirds: effects of the chemosterilant thiotépa on the reproduction of clinically treated birds in field conditions. Can. J. Zool. 60: 2337-2343.
- STURTEVANT, J. and B.C. WENTWORTH. 1970. Effect on acceptability and fecundity to pigeon of coating SC-12937 bait with Zein or Ethocel. J. Wildl. Manage. 34: 776-782.
- WOFFORD, J.E., and W.H. ELDER. 1967. Field trials of the chemosterilant SC-12937 in feral pigeon control. J. Wildl. Manage. 31: 507-515.