AN EVALUATION OF FLOATING ROPES FOR REDUCING CORMORANT DAMAGE AT CATFISH PONDS

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ABSTRACT: A floating rope system consisting of lengths of 9.5 mm (3/8 in) yellow polyethylene rope and foam floats was evaluated for reducing double-crested cormorant (Phalacrocorax auritus) depredation on farm raised channel catfish (Ictalurus punctatus)in Mississippi. The ropes were placed at 15-17 m intervals across 2 ponds (4.6 and 6.0 ha) perpendicular to the prevailing winds. Helium-filled balloons were used in an attempt to enhance the effect of the ropes. Cormorant numbers entering both test ponds were recorded during pretreatment, treatment, and posttreatment periods. The floating ropes were effective in reducing cormorant numbers on ponds (by at least 95%) during the 3 to 8-week treatment periods and may be more practical to use on large (>2 ha) ponds than overhead wire grid systems.

Key words: barriers, catfish, control methods, double-crested cormorants, Phalacrocorax auritus, predation.

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Aquaculture farming has grown tremendously in the last 20 years in the southern states, especially catfish production in the Delta region of Mississippi. With this growth has come a corresponding increase in predation by fish-eating birds on aquaculture stocks. Double-crested cormorants (Phalacrocorax auritus) are responsible for a large portion of this damage (Stickley and Andrews 1989, Glahn and Brugger In Press). Catfish producers have employed frightening techniques, including using gas exploders, shooting with live ammunition and pyrotechnics, and human effigies with varying degrees of success in protecting their crop (Stickley and Andrews 1989, Littauer 1990). Several overhead wire systems have also been suggested for excluding cormorants from aquaculture facilities (Barlow and Bock 1984, Moerbeek et al. 1987, May and Bodenchuk 1992). These systems, however, are not totally effective and may pose engineering problems in spanning long distances as found in Mississippi catfish ponds (i.e., ponds 5-10 ha in size). Furthermore, the posts supporting an overhead system would likely interfere with normal fish raising practices. Therefore, a simpler system of parallel floating ropes within catfish ponds was tested to determine its utility for preventing cormorant predation; the premise being that the ropes established perpendicular to the prevailing wind may inhibit cormorants from landing or taking off from the pond.

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METHODS AND MATERIALS

Study Area

The evaluation of floating ropes was conducted at a catfish raising facility located in Humphreys County, Mississippi. This facility comprised 101 ha, and consisted of 21 adjacent catfish ponds ranging in size from 2.4 to 10.1 ha, averaging 4.8 ha. Ponds contained market-size catfish as well as catfish fingerlings. Several of the ponds also contained gizzard shad (Dorosoma cepedianum). The site was situated alongside a swampy bayou (Snake Creek) containing a number of large bald cypress (Taxodium distichum). Cormorants consistently day-roosted in these large trees and from their perches had a commanding view of all ponds at this facility. Because of its location near the day roost, this facility has had a perennial problem with cormorant predation. A pairof adjacent ponds (Ponds 17 and 19) on the east end of the facility was selected for the rope evaluation based on an assessment of bird foraging activity. Cormorants apparently preferred feeding in these ponds because, in addition to catfish, they contained populations of shad (Stickley et al. 1992). Because of cormorant feeding pressure, the facility employed an individual to drive the levees to scare cormorants (by shooting when necessary). This person was usually on the facility between 0800 and 1700 hours daily, but the frequency with which he drove by the test ponds varied with bird pressure. This activity did not appear to have any long term effect on cormorant activity at the test ponds or the overall facility.

Bird Observations

Using binoculars or a spotting scope, numbers of cormorants entering each test pond were recorded during pretreatment (January 22-February 4), treatment (February 6-April 6), and posttreatment (April 8-9) periods. Observation periods usually lasted for at least 120 minutes and were normally made 3 days a week between 0800-1200 hours from a vehicle parked on a levee 300 m north of the test ponds. Birds entering both test ponds were recorded during the same time period.

The efficacy of the treatment was assessed by comparing differences in numbers of cormorants entering ponds/minute/day between pretreatment and treatment periods. A Mann-Whitney U test (Hollander and Wolfe 1973) (significance level $P \leq 0.05$) was used to test for differences.

Floating Rope Deployment

On February 6, 1992, the floating rope system was first set up on the pond having the highest pretreatment cormorant activity (Pond 17). The rope system consisted of lengths of 9.5 mm (3/8 in) yellow polyethylene rope, red foam floats (12 x 7 cm), and metal tent stakes (38 x 2 cm). The floats were threaded on the rope and spaced 6.1 m apart. The rope was then placed in the water and pulled across the pond using a small boat with outboard motor. Each end of the rope was staked to the pond bank. The ropes were placed at 17 m intervals across the pond in an east-west orientation. A total of 14 ropes (2500 m) was used to cover this 4.6 ha pond (Fig. 1).

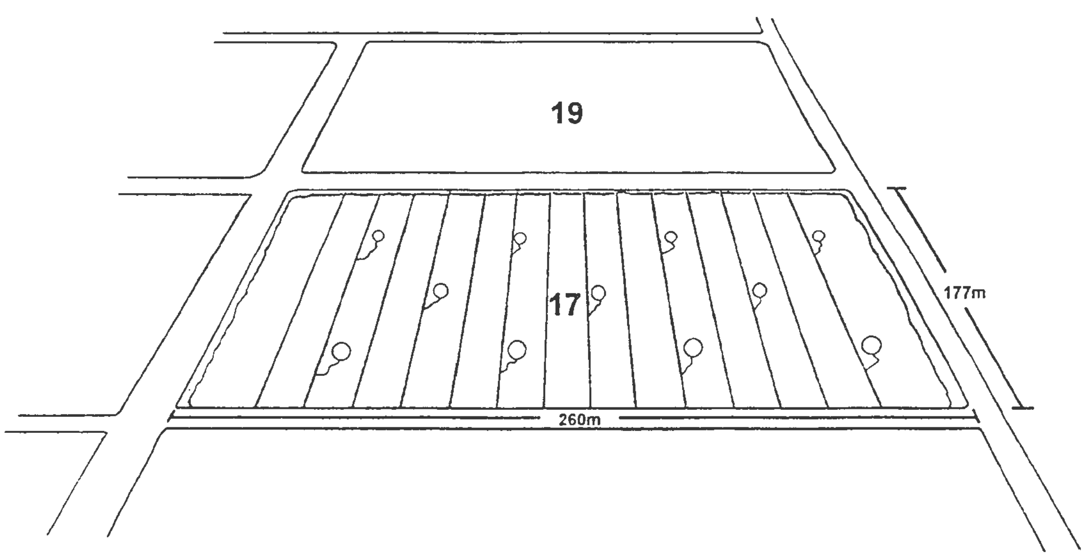

Fig.1. Placement of the floating rope system on Pond 17 and location of helium balloons, Humphreys Co., MS, 1992.

The second pond (Pond 19) served as a untreated control for Pond 17 until March 11 when floating ropes were also placed on this 6.0 ha pond. The ropes were deployed as before except that they were placed at 15 m intervals. A total of 14 ropes (3232 m) was used on this pond.

On March 23, 11 helium-filled Mylar balloons (86 cm diameter) on 7.5 m strings were set out on Pond 17 in an attempt to enhance the effect of the ropes. Either 1 or 2 balloons were attached to every other rope in a staggered pattern that covered most of the pond (Fig. 1). Over the next week, 8 balloons had to be replaced because of breakage or loss of helium. Because of continued problems in maintaining the balloons, only 1 remained on the pond on April 1 and none on April 2. The ropes on both ponds were removed on April 7.

RESULTS AND DISCUSSION

There were differences in the numbers of cormorants entering Pond 17 before and after the ropes were deployed (U = 117, 159; n = 6, 17; P = 0.001). During pretreatment, 2,369 cormorants entered this pond during 1,019 observation minutes (2.2 birds/minute/day). For 5 weeks after the ropes were in place, only 161 cormorants entered during 2,418 minutes (0.08 birds/minute/day) (Fig. 2). There was no difference (U = 73.5, 202.5; n = 6, 17; P = 0.9442) in the number of cormorants (0.69 and 0.80 birds/minute/day) entering the adjacent untreated Pond 19 during these same periods (Fig. 3).

Cormorant numbers entering Pond 19 also differed after the ropes were established (U = 321.5, 56.5; n = 17, 10; P = < 0.001). During the control

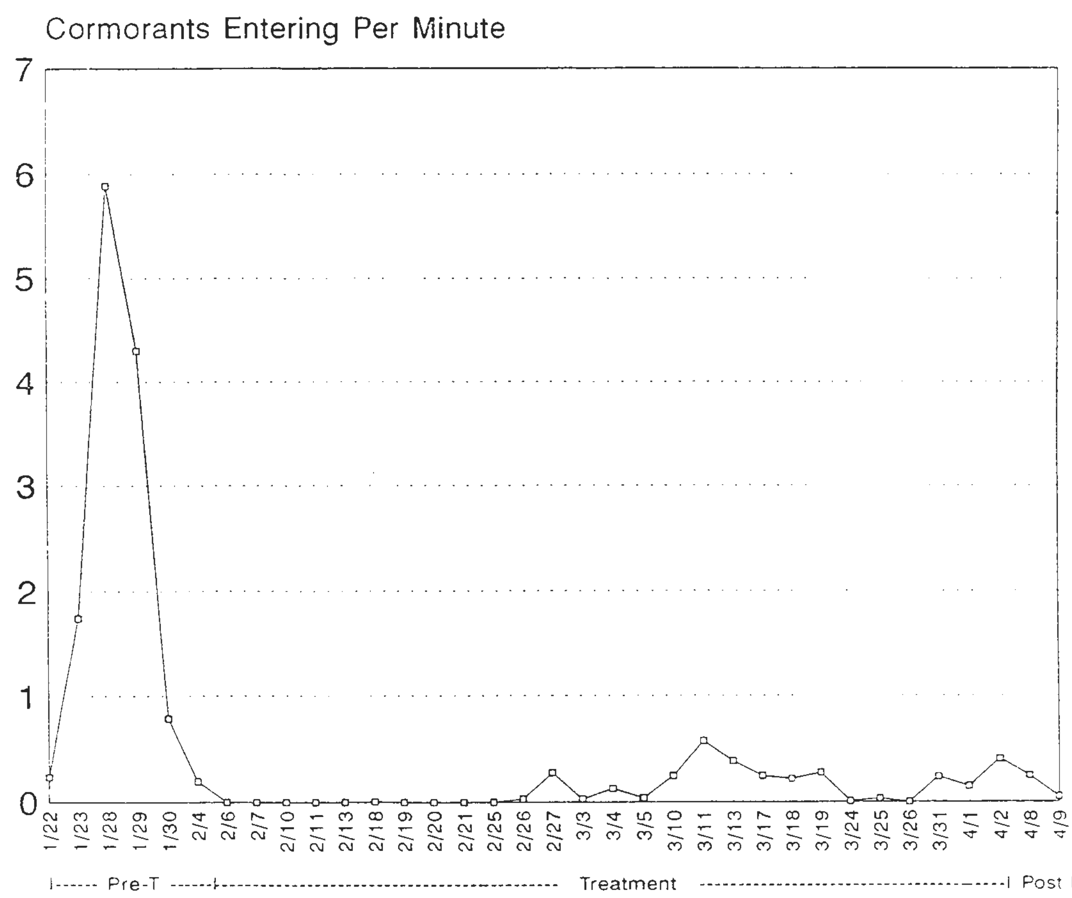

Fig. 2. Average number of cormorants per minute landing in Pond 17 during pretreatment, treatment, and posttreatment observation periods, Humphreys Co., MS, 1992.

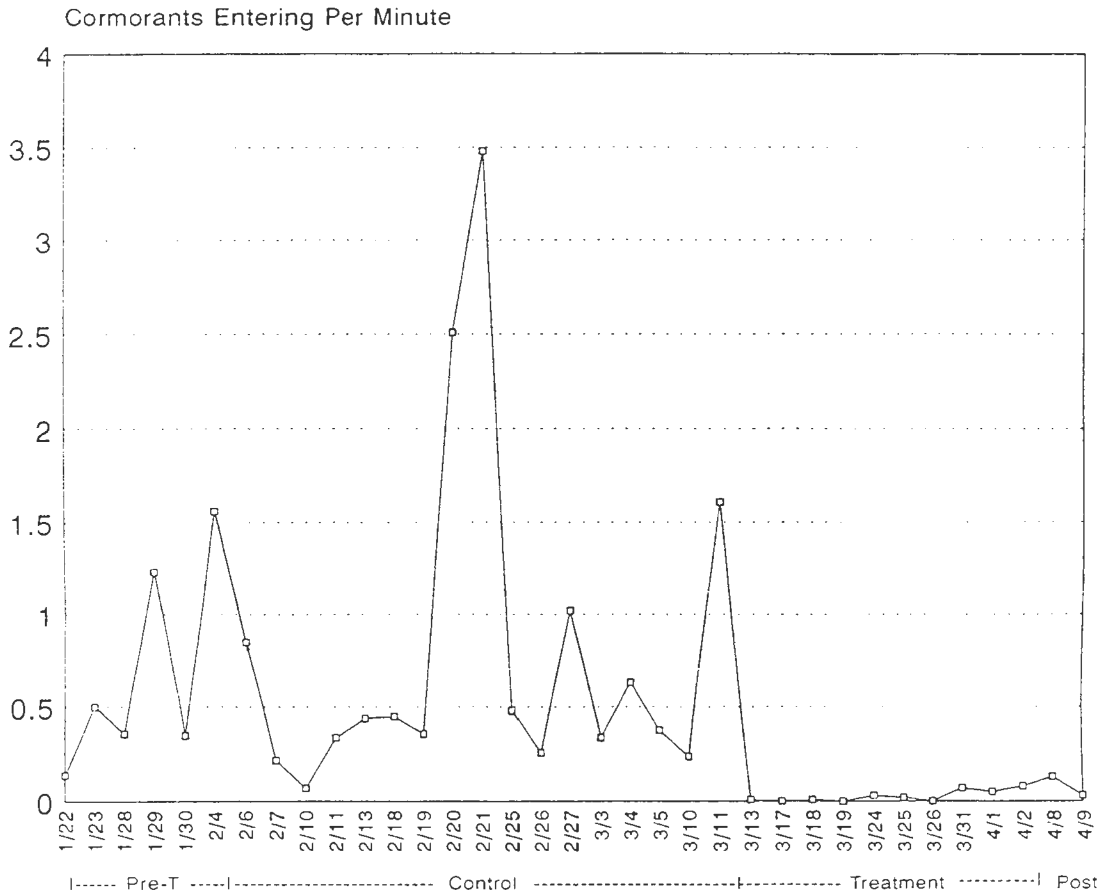

Fig. 3. Average number of cormorants per minute landing in Pond 19 during pretreatment, control (no treatment), treatment, and posttreatment observation periods, Humphreys Co., MS, 1992.

(untreated) phase, 1,741 cormorants entered during 2,418 observation minutes (0.80 birds/minute/day); whereas, during the 3-week treatment period only 30 cormorants entered during 1,140 observation minutes (0.03 birds/minute/day) (Fig. 3).

The addition of the 11 balloons to Pond 17 appeared helpful in frightening the cormorants that did acclimate to the ropes. During the week after they were set out, only 0.02 cormorants/minute/day were recorded as entering this pond, whereas, 0.29 cormorants/minute/day had entered the previous week. Cormorants on this pond increased to 0.27 birds/minute/day the last few days of the test when 3 or fewer balloons remained.

No great increase in cormorant activity was noted on the 2 days after the ropes were removed from the ponds (Figs. 2 and 3). This was probably because of the northward migration of cormorants out of the test area at this time.

In general, cormorants seemed to have a much more difficult time landing on a treated pond than they did in taking flight from the pond. The few cormorants that did land appeared to forage and take flight from the pond unhindered.

A total of 20 and 25 person/hours (3 people) was required to set up the ropes on Pond 17 and 19, respectively. It took 12 person/hours (2 people) to remove the rope system from both ponds.

Costs for components of the floating rope system ranged from $448.00 for Pond 17 (4.6 ha) to $576.00 Pond 19 (6.0 ha). This included costs for the rope

($0.14/m), floats ($0.28 ea), and tent stakes ($0.49 ea). Based on calculated average feeding rates of double-crested cormorants on catfish in the Delta region of Mississippi (Stickley et al. 1992), the cost for materials for a floating rope system for a single pond would be exceeded in less than 6 days by an average of 30.5 cormorants feeding all day at an average consumption rate of 5 catfish/cormorant hour. Thus, by using this system savings could be substantial over the course of the 5 month damage season.

MANAGEMENT IMPLICATIONS

The floating rope system effectively reduced cormorant activity on ponds during the time frame of this test. However, as observed in this experiment, some cormorants adapted to the ropes after a period of weeks and a reinforcement strategy would most likely be needed to bolster their effectiveness. Helium balloons would be useful for this purpose, however, a more durable balloon than was used in this test would be needed.

Problems associated with overhead wire grid systems (spanning large distances, interference of posts/stanchions) are eliminated by use of this system. Current harvesting techniques, however, would probably necessitate unfastening the ropes from at least 1 side of the of the pond levee to permit passage of the tractor pulled seine.

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