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ABSTRACT

The December 1983 freeze inflicted tremendous damage to the South Texas citrus groves and reduced tree numbers by approximately fifty percent. Additionally, it is believed that Great-tailed grackle (Quiscalus mexicanus) populations have increased over the past few years. With decreased citrus acreage and increased grackle numbers, the severe negative effects are economically significant to the Texas citrus industry.

Grackle damage to grapefruit and oranges differs in type and economic importance. The first is "cosmetic" in nature, small pecks or scratches on the fruit skin, and downgrades the fruit, reducing its value. The second is actual crop loss due to consumption of fruit pulp.

Several techniques were used to disperse birds from citrus groves including propane exploders and pyrotechniques. In addition, attempts were made at population reduction through the use of live traps, shooting, treated baits, mist nets, and a floodlight trap.

Some work has been reported on various agricultural problems with grackles; however, literature on grackle predation to citrus is limited. Our work identifies a unique problem to citrus, and future research is needed for long term potential solutions.

INTRODUCTION

The Lower Rio Grande Valley (LRGV) boasts some of the finest citrus in the nation. Citrus in Hidalgo, Willacy, and Cameron Counties total over 12,150 ha (30,000 acres) and consists primarily of grapefruit and oranges. There are several varieties of early-, mid-, and late-season fruit maturing throughout an 8-month harvest period beginning in mid-September and ending in May or June (Powell 1979).

There are many vertebrate pests that cause problems in citrus within the U.S. One problem that appears limited to the LRGV is the damage caused by the Great-tailed grackle. The Great-tailed grackle is a resident of South Texas with populations present year-round. Other grackle species such as the Boat-tailed (Q. major) and the Common (Q. quiscula) are rarely found in the LRGV.

"Great-tailed grackles have a very long keel-shaped tail and their eyes have a bright, golden yellow iris. Males are iridescent with a purple head, back, and underparts. The females have brown upperparts and underparts, and cinnamon buff on breasts to grayish brown on belly" (Natl. Geo. Soc. 1983:424). Great-tails are often confused with Boat-tailed grackles in areas where both are present; however they are considered taxonomically separate (Selander and Giller 1961). Boat-tails are distinguished in the field by being smaller in size, have dull yellow eyes, and their crown is rounded. Great-tails, however, have bright yellow eyes and a flattened crown.

There are no estimates of grackle populations in the LRGV, however, Audubon Society bird counts have noted an upward trend in birds observed during winter counts. Also, it is an accepted hypothesis by biologists and bird watchers in

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the valley that the grackle population trend has been increasing over the past 5 years.

Great-tailed grackles are common in the Southwestern U.S. (Oberholser 1974), in open flatlands scattered with trees, and in marshes and wetlands (Natl. Geo. Soc. 1983). In the LRGV, grackles are found in every habitat type present from the river areas to the gulf coast beach to the chaparral rangelands. During the nesting season, grackles preferred to nest and roost in huisache (Acacia farnesciana), mesquite (Prosopis glandulosa), or ebony (Pithecellobium flexicaule) thickets. However, after breeding season, grackles began roosting in sugar cane fields.

Grackles consume or destroy most every farm crop planted including citrus, tomatoes, watermelons, cabbage, lettuce, grain, corn, peaches, figs, and cantaloupe. In addition to the farmers problems, grackles are a disease and nuisance problem. Another economic factor they influence is the predation on dove squabs, especially white-winged dove. White-winged dove hunting is an important industry in the LRGV typically bringing in $20 million annually (U.S. Fish and Wildl. Ser. 1985, unpubl. data). Texas Parks and Wildlife Dept. biologists have conducted numerous research studies, not only to determine the effects of grackle predation, but also on control methods to reduce white-winged dove losses to grackles (Waggerman 1975). No doubt nesting success can be increased by removing grackle influences (Blankenship 1966), but a universal, wide-spread, economical, and legal control method has not yet been devised.

Citrus damage caused by the Great-tailed grackles has become an increasing concern to Valley citrus growers since the freeze of 1983. Because Texas citrus is located in such a small area, the freeze was disasterous to the industry. After the freeze, the total number of citrus trees decreased from 8,072,640 to 3,769,400 resulting in a loss of about 53% (Texas Crop and Livest. Rep. Serv. 1985). Damage to citrus caused by the Great-tailed grackle has appeared to have increased since the freeze. Two reasons are often postulated to explain the increase in damage. One being, as mentioned earlier, that there has been a rise in the total grackle population. Another reason is that the reduced amount of citrus makes the stress of any loss to the crop owner seem significant.

There are two types of damage; cosmetic and internal. Cosmetic damage occurs when small peck marks or scratches are made by grackles on the skin of the fruit. When the damage is severe enough, the fruit must be sold as juice and the price per ton is reduced by 40%. Cosmetic damage sometimes results in the complete loss of fruit when peck or scratch marks break the rind and the fruit falls off the tree. More often, the marks heal and the fruit continues to grow to maturity. We began seeing damage as early as June when the fruit was about golf-ball size. The second type is internal damage which is actual crop loss due to punctures in the rind for the consumption of pulp. This damage occurs later in the season when the fruit ripens.

METHODS

To alleviate grackle damage, dispersal and population reduction techniques were performed. Several forms were conducted with varying success.

Propane exploders and pyrotechniques

Scareaway and Zon propane exploders (stationary and rotary) were placed as available in groves at a density of about 1 per 4.05-8.1 ha (10-20 acres). To increase effectiveness and alleviate bird conditioning, exploders were moved weekly within an orchard. It was

noticed that as the number of acres needing protection increased, the number of cannons necessary to protect them decreased due to what we called "hot spots". Hot spots were areas within a grove that received the most damage. These areas were usually next to water, trees or brush, or fields of corn or sorghum. Placement of the exploders adjacent to these "hot spots" allowed protection of larger groves with fewer exploders.

Because grackles are somewhat cautious, propane exploders and pyrotechniques were effective especially when used in conjunction with one another. If an orchard was heavily infested with grackles, it was necessary to move the birds completely with a significant number of bird bombs before placing propane exploders.

Efficacy of the propane exploders and pyrotechniques to protect citrus from grackle depredation was dependent upon placement of the exploders, rotation within an orchard, and the reinforcment with pyrotechniques and live ammunition.

Australian Crow Traps

Australian Crow traps were built and placed at various locations throughout the LRGV. Whole and cracked corn, sorghum, fruit, dog food, and virtually anything produced in the valley was used for bait. Live grackles were used as often as available as decoys to attract other grackles to the traps. Modifications were eventually made by adding side entrances along the base of the traps to accomodate grackles at their staging areas. Because of the availability of food sources year round in the LRGV, baiting grackles into live traps proved difficult. Some success was noticed during rainy periods when normal food supplies were scarce. After these short periods, insect populations would become active and available in large numbers reducing the attractiveness of our baits.

With success depending upon many variables, such as weather, availability of particular food crops, insect populations, proper placement of the traps, and live decoys, Australian Crow traps were basically ineffective for trapping Great-tailed grackles.

Chemical control

Strychnine grain was used as a means of attempting population reduction. Grain was dispensed into baiting stations and monitored while it was available. Any grain remaining was properly disposed.

Staging sites were areas where grackles congregated and were relatively easy to locate. These areas were then used as morning and evening chemical control sites. Also, the perimeter area of citrus groves that were infested with grackles were used for treatment during the day.

Areas to be treated were first pre-baited with untreated grain 3 consecutive times and monitored to determine acceptability by target birds. Non-target species were repelled before consuming any grain. Baiting stations consisted of wooden planks 25.4 mm x 203.2 mm x 3.05 m (1"x8"x10') with a 19.05 mm (3/4") high border. Four stations were set out in close proximity to each other.

Relatively few grackles (< 50) accepted the pre-bait or treated bait material on any 1 occasion. Possibly the baiting stations, material, or process had a negative influence, but more likely it was the food preference of grackles and the variety of food sources available throughout the year. A problem with baiting staging sites was that the birds were constantly changing their staging locations. We were unable to achieve satisfactory results using strychnine grain because of these 2 problems. Chemical control in the

staging areas does have potential, especially since flocks often consist of grackles exclusively, and in large numbers.

The chemical PA-14 is a surfactant that has been used in other parts of the U.S., but was not used in the LRGV on roosting grackles because it was not believed to get cold enough in South Texas for birds to die of exposure.

Mist Netting

Mist netting grackles was performed in sugar cane fields where large numbers of grackles and other blackbirds roost at night. Four mist nets (61mm mesh) were placed side-by-side directly against the cane. Hand-held radios were used to communicate when to fire pyrotechniques along the far sides of the roosts. Birds dispersed in all directions using this method and only small portions flew in the direction of the nets and those that did, hit the net at the same time and bounced out. Walking through the sugar cane was more effective in moving roosts in one direction but the cane proved to be difficult to maneuver through. The birds were moved slowly so only a few would become entangled in the net. The bird flushers would stop until all birds were removed from the mist net and then, by use of the walkie-talkie, would receive the cue to continue walking and scaring up birds. The numbers of birds caught compared to the roost size did not make the mist nets an effective means to reduce a population. They were, however, an effective means to obtain birds for decoys and behavioral studies when necessary.

Floodlight Trap

One other device used specifically for the capture and reduction of bird numbers was a floodlight trap (Mitchell 1963 and 1964). The floodlight trap consists mainly of a large net, a holding chamber, and floodlights. The net is 44.45 mm (1 3/4") mesh and is a trapezoidal shape forming a funnel. This netting is raised by two 11.9 m (39') octahedron towers. The rear of the net empties into a canvas catch cage that is 2.1 m (7') tall, 3.0 m (10') wide, and 6.1 m (20') long. Five 1,000 watt floodlights were placed at the back of the catch cage, and were powered by a 6.5 kilowatt generator. Birds were flushed from their roosts by walking through the sugar cane (much like that done for the mist nets) and were attracted toward the net entrance by the floodlights. After the birds funneled down to the catch cage, gassing was accomplished by using two flexible rubber hoses that extended from the exhaust pipes of a vehicle into sleeves of the canvas catch cage that were designed for that purpose.

Success of floodlight trapping is not dependent alone on trap structure. Weather conditions, nature of the roost, coordination of drives, and density of roosting bird populations are some of the factors that affect success (Mitchell 1963:5).

Several factors limited the success of the floodlight trap in south Texas. Locating a place around a roost perimeter that would facilitate the floodlight trap limited the number of areas that we could work. When setting up the floodlight trap, birds tended to move away from the operation site. Because of the abundance of roost sites and average sugar cane plot size (approx. 20 ac.), herding the grackles back toward the floodlight was unsuccessful.

Sugar cane is grown in dense rows which the lights could not penetrate. We elevated them to shine over the top of the cane by attaching the lights to the towers. Although the success of the floodlight trap in sugar cane has been less than expected, there are other areas where birds congregate throughout the year (e.g. nesting season) that hopefully will

eliminate some of these limiting factors.

Research

In an attempt to better understand grackles and their attraction to citrus, the Caesar Kleberg Wildlife Research Institute (CKWRI), located at Texas A&I University in Kingsville, TX, set up 5 research projects. Project 1: characterize grackle damage in citrus groves. Project 2: population characteristics and movement patterns of grackles. Project 3: determine the effects of depredation control methods on grackle populations and grackle productivity in groves. Project 4: evalaute behavioral characteristics of grackles. Project 5: develop new control techniques.

Research was initiated on 1 December 1986 and data is continuing to be collected and analyzed by the CKWRI. Animal Damage Control (ADC) personnel were indirectly involved with facets of the research, additionally, we provided direct input on subprojects 3 and 4. ADC provided Scareaway brand propane exploders, Marshal-Hyde shellcrackers, and the personnel to operate and maintain this equipment on a daily basis. We also provided assistance in setting up monofilament line and reflective tape within groves to measure their effectiveness as a grackle repellant. Results of all 5 research projects are forthcoming from the CKWRI.

DISCUSSION

To solve this unique problem with the Great-tailed grackle in South Texas citrus, research for a long-term solution is necessary. Traditional bird dispersal techniques are vital and necessary but only temporary. However, even if populations were reduced, damage will probably persist, requiring a continued maintenance program. Population reduction itself is no easy answer either because a sound method will require substantiation and should be environmentally practical.

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