October 1973

MADAM SAGA - AN APPROACH TO AN ANIMAL DAMAGE PROBLEM

William D. Fitzwater
Environmental Protection Agency

MADAM SAGA - AN APPROACH TO AN ANIMAL DAMAGE PROBLEM

William D. Fitzwater
Senior Biologist, Operations Division
Environmental Protection Agency
Washington, D.C. 20460

While human tinkering with the zoogeographical distribution of lower animals sometimes pays dividends, more often it opens up Pandora's box. Such is the case of the Weaver Finch family. This group of birds is characterized by its colonial habits, granivorous appetite which often counters man's best interests, and elaborate nest structures. The House Sparrow (*passer domesticus)* is a notable exception of the latter trait as its nests look like a Picasso interpretation of an Afro wig.

Weaver Finches originated in Africa. Here they are found in their most numerous forms. The *Quelea quelea* in flocks of several million compete seriously with human food supplies. They are the prime avian pests on that continent. Despite this background, some Weaver Finches have been intentionally transplanted to other parts of the world including the Caribbean Islands by thoughtless humans (Bond, 1971; Wetmore and Swales, 1931).

The House Sparrow is found on Grand Bahama, Cuba and Jamaica; the Hooded Weaver Finch (*spermestes cucullatus)* and the Orange-cheeked Weaver Finch (*Estrilda melpoda)* are confined to Puerto Rico; and the Village Weaver (*Textor* [ploceus]cucullatus): is found only on the island of Hispaniola. This paper considers the problem of the latter species.

The Village Weaver has more aliases than an FBI wanted list. Besides "black and yellow weaver", it is known as "Madam Saga, sigua haitiana and chichiguao" on the Dominican Republic side of the island and "Madame Sara(h), tisserin and gendarme" on the Haitian side.

Madam Saga is a pretty, oriole-like bird. The male has a bright yellow body with dark olive-colored wings. His head is capped with a somber black hood. The red iris of the eye and the strong black bill give him a somewhat sinister appearance. Females and juveniles are lemon yellow and lack the black hood.

The original home of this bird was West Africa (Bannerman, 1949) from which it was apparently brought over in the 18th century with slaves from that area. Wetmore and Swales (1931) report the species was first seen in an aviary of a plantation owner in 1783. When or how they were released is not known, but in 1917 a free-living colony was first reported in Trou Caiman, Haiti. Within the last decade they have experienced a population explosion that has brought them to the attention of rice growers who found their crops being destroyed by these birds.

The new "environmental awakening" is forcing the economic zoologist to document loss patterns of any species of supposedly economic status. Methodology with the possible exception of the work by the U.S. Fish and Wildlife Service on blackbird corn-depredation in the Dakotas (De Grazio, *et al.,* 1969) is not available to accurately measure the economic impact, particularly of highly mobile animals like birds, over any great area.

Talks with growers indicated they felt damage varied from negligable amounts in the northeastern corner of the Dominican Republic into which the bird is just moving to total destruction of some small farms in the Artibonite Valley where the bird has been established for two decades or more. The Haitian government felt that losses through the activities of these birds amounted to 35% of the rice crop. Growers in the Dominican Republic were not as certain of their losses but felt they might amount to 20% in the areas in which Madam Saga had become firmly established.

We collected some birds from a roost in the center of a cluster of huts that adjoined a rice paddy in Juma (DR). Of the 18 stomachs examined, these held from 1 to 29 kernels of rice (one bird also had 42 kernels in its gullet) or an average of 14 kernels per bird. Rice was the only food found in the stomachs except in the case of the individual containing only one kernel. Here there were also 3 small dark seeds of some unknown plant. Thus it appeared the birds were concentrating on the rice where available (the roost was within 100 meters of the paddy periphery). So while a more statistically satisfactory answer was not obtained, the indications are that the birds are a serious problem to rice growers.

They also attack other crops. Several growers reported a 50% loss of millet and corn to birds. One small field on the ISA experimental agricultural grounds at Santiage (DR) was sampled. This lay within one kilometer of a Madam Saga roost of possibly a thousand birds. All the ears were picked off individual plants selected on a random number sample. Damage done by the birds was mostly on the tassel end as in the case of blackbird damage in this country. While 55% of the ears collected in the sample were damaged it was estimated the actual loss by consumption was only 3.9%. These results merely emphasize the need for more realistic determination of losses to vertebrate pests.

Following the determination of the economic impact is the need for a thorough knowledge of the habits of the pest species. Hopefully this knowledge will provide selective and effective approaches to reduce the problem. Unfortunately, I found that outside of taxonomic studies by Wetmore and Swales (1931) and Wetmore and Lincoln (1933), there was very little known about the life history of these birds on Hispaniola. Drs. N.E. and E.C. Collias (1970) have done considerable behavioral studies on this particular species in its native Africa, but I was not aware of these reports at the time I was in Hispaniola. Therefore, I found myself in the unenviable position of having to start from "scratch" as well as having observations confined to a 3-month portion of the yearly life cycle.

The following, therefore, is a tenative resume of some aspects of the life history of Madam Saga that I felt might aid in solving the damage problem.

Movements. It would seem that the main thrust of the birds were from the first reported sighting near Port-Au-Prince (Haiti). From here they moved eastward along the fertile Artibonite Valley of Haiti across the border into the Dominican Republic. It is also possible that they crossed over along the north shore as there were well established colonies around Monte Cristi (DR) that could not have moved north over the mountains. The fact that they are not reported in Cuba even though it is only fifty miles away would indicate that they are not adventuresome flyers.

The daily range is probably as restricted as it is for House Sparrows. I was told that this was about 2-4 kilometers for Madam Saga but they would go 6-7 kilometers from the roost to the first rice fields.

My timing on the island coincided with the start of the peak breeding season (assuming this is in the rainy season as reported by Chapin (1954) for the species in Africa). The natives stated the birds left the rice fields at the end of the harvest and moved to other sections of the country but I have no personal observations on migratory movements.

I encountered one large roost of about 5,000 birds on an American hospital grounds in Deschapelles, Haiti. The birds roosted for the night in two Haitian oaks and one mango. The composition of the flock appeared to be mostly females with probably immatures of both sexes. The obvious males in the group kept to separate portions of the roost. As this observation was made on May 14th, I felt it might be an indication of flocking behavior during non-breeding periods. Like the large blackbirds roosts in this country, they moved out of the roost in small feeding flocks. The movement which started at 0505 hours was completed by 0518 hours.

Reproductive habits. In their native Africa, these birds generally breed during the rainy season though in some localities such as tropical rain forest clearings near the equator, breeding may continue throughout the year. The males determine the location of the breeding colony as they initiate nest building.

A nest is started by weaving and knotting long vegetable fibers into a tight ring in a small fork or among fine branches. This is knotted together so tightly it is difficult to tear apart with the hands. The male builds the brood chamber as he clings to this ring, pushing and pulling the plant fibers into shape to form a completely domed compartment. He then turns around and builds a vestibule on the other side with the entrance facing downward. This tight structure forms a well insulated, weatherproof nest well adapted to raising a brood successfully. I saw one male finish a nest in 3 days whereas it took another up to a week, but Collias and Collias (1970) state the male can finish a nest in one day though he may constantly continue to add to it. I can vouch for the fact they are most industrious when beset with the home-building fever.

After the nest is completed, the male sits in his territory and waits for a receptive female. He usually advertises by hanging from the opening of his nest and flapping his wings. Collias and Collias (*ibid)* found the male polygamous. While I cannot confirm this, the multiple nest ownership I observed would tend to support this conclusion. I observed one male working alternatively on three nests within a short space of one another.

When a female accepts a nest, she does the interior decorating by adding a soft lining of grass panicles and other vegetation in the brood chamber. An average of two eggs are laid though this ranges from 1 to 3. I do not know the number of broods raised by a single female during the course of a year, but Collias and Collias (*ibid)* suggest this is at least two. In the one roost I examined completely, I found a lack of synchronization in reproduction. The birds in the 7 clutches collected ranged from freshly laid eggs to completely fledged individuals.

Feeding habits. Insects make up the main portion of the fledgling diet, but grains are probably the year-round staple. They attack when the rice reaches the milk stage and continue on for about 45 days until the crop is harvested.

I had the opportunity to watch several small flocks in action. These would drop into a field at no particular location. They would light on a stem and pinch off one or more kernels as the flock "hedgehopped" through the field.

They are reported to be a problem on peaches and possibly other fruits. Their nest building needs cause them th strip palm threes (their favorite material) to the point of defoliation. They will also damage hemp and sugar cane for the same purpose but probably without the same disastrous effects.

With only this sketchy background, I was obliged to make an evaluation of potential control measures applicable to these two countries.

Biological control. Synchronization of planting and harvesting so that the crops would be available to the birds for a shorter period of time and the loss spread over a wider area offers some promise. It was pointed out by Singl Golteus (Government Supervisor of Rice Plantings in the Artibonite Valley) that only 2 - 3% of the rice was owned by the government, 7 - 8% by share croppers and 90% by individual growers. In as much as 64 hectares might have as many as 210 individual owners involved the practicality of getting any standardization of agricultural manipulation.

Another approach would be the development of bird-resistant strains of grain. I was told that Algerian millet was reportedly bird resistant. A Phillippine strain of rice (IR5) has a low and bushy form that is somewhat bird resistant. Undoubtedly some relief could be expected from the development of bird-resistant plants but these usually have some undesirable side effects, such as, reduced production per acre, increased difficulty in harvesting and/or processing, etc.

Another biological approach would be the encouragement of natural enemies. In their native Africa, snakes and carnivores are apparently the most important predators (Collias and Collias, 1970). Snakes are not numerous in Hispaniola and there are no native carnivores. Past experience strongly discourages any suggestion of transplanting predators for their potential control value.

Man is probably the most important predator. In a protein deficient community, these birds offer an easily procured though somewhat small meal. The proficiency of local hunters with air guns showed that a sizable reduction could be made of a given population for the pot. But probably the most important reduction force was the circulation of a rumor that Madam Saga had aphrodisiac powers. This kept the bounty hunters busy supplying the market.

Chemosterilants, providing there is only one or at most two breeding seasons, could prove effective as preliminary baiting trials showed it might be possible to bait the birds on a roost.

Acoustucal repellants. Madam Saga has a repertoire of calls, including alarm notes, that could probably be used to disrupt either breeding or feeding patterns. However, the sophisticated equipment needed for wide scale use is not practical for either country.

The most widely used control measure at present is the use of "bird-watchers." Men or boys are hired for about 50¢ a day to walk the fields beating on tin cans, shoutinq or cracking long hemp whips to make the birds move. This is not very effective, but it could be improved by closer observation of feeding periods during which the birds are most active and concentrating the man power during these periods. Systematic coverage of the fields would probably help but not as much as some extension of the scares used by the bird-watchers. Visual noise makers such as whistling arrows equipped with streamers could be shot into flocks from a distance and retrieved to be used again and again.

Automatic acoustical devices, e.g., acetylene exploders, air horns, rope firecrackers, exploding shotgun shells, etc. would certainly aid the bird-watchers but the cost of these expendable controls would make them prohibitive for Hispaniola.

visual repellants. White plastic fertilizer sacks were seen strung over several fields in an effort to repell the birds. It is doubtful if visual scares by themselves will effectively deter birds from depredation. However, these and other brightly moving objects, such as windmills, balloons and other "scarecrows," can be used to supplement other control approaches providing they are shifted frequently within a given field.

chemical repellants. The use of area frightening repellents, such as Avitrol and methiocarb which are being used on various crops within this country in blackbird control (Goodhue and Baumgartner, 1965; Stickley and Guarino, 1972) would undoubtedly be effective against Madam Saga. However, the cost of these materials would again be prohibitive under Hispaniolan circumstances.

Mechanical repellents. Screening large areas with inexpensive fiber or plastic netting is considered prohibitive in this country and would not be practical for Hispaniola.

Trapping. The natives trap and sell Madam Saga as cage birds or for the pot. The methods are primitive -- bird limes (made of the latex from the narrow-leafed bread fruit), ash-sifter drop traps and spring polesnares. I caught quite a few in mist nets particularly when sections were hung up in a nest tree. Trapping is a slow, expensive reduction method and rarely can achieve practical relief.

Roost destruction. Next to the bird-watchers, the destruction of nests was the most common approach. Bounties of about ?? apiece are paid for nests. My studies showed the effectiveness of this approach was most questionable. The birds build several nests and can replace them within a short space of time. In the one tree roost I dismantled there were 91 nests for a population of less than 50 birds. Of these 29 were completed but only 7 had broods indicating an 8 percent occupancy of nests in this particular roost. Further, the lack of a reasonable synchronization of production within a given colony and the physical difficulties of getting into typical roost trees (tall palms, thorny mesquite and finer branches of the large trees) add to the problem. A more practical approach would be to spray individual nests with a contact poison, such as, fenthion or endrin, in order to kill either the building male or the brooding female or both. Another possible approach would be the

placement of toxicant-treated building materials, such as green palm fronds, within easy range of nest-building males. At the same time their normal sources of nesting materials should be removed insofar as practical.

Fumigation. The large flock of non-breeding birds noted in Haiti, offers a possibility for widescale flock reduction by means of gas. The roost trees are evergreen so that the foliage will hold a lethal concentration. Temperatures are well within the effective range. Thus fumigating the roost trees at night with a lighter-than-air chemical such as cyanide would seem very practical. Large numbers could be eliminated in one location with the minimum of expense.

Toxicants. Due to the colony traits and conspicious nesting habits of the birds, it was not difficult to learn of roost concentrations in any given area from the local residents. While spraying the trees with a contact poison might be considered dangerous, it could be done under controlled situations and drastically reduce the Island's Madam Saga populations in local areas.

Another cheaper and less environmentally hazardous approach would be the use of poisoned bait in selected bait stations. Some V-shaped troughs, such as used in linnet control in California (Koehler, 1963) were placed in the branches of one tree roost. While it took several days for the birds to acclimate themselves to feeding in the troughts, they did eventually empty them. Confining the bait to designated roosts and alerting the humans in the area, could reduce the numbers in a given area without undue hazard.

Literature Cited

Bannerman, D.A. 1949. The birds of tropical West Africa with special reference to those of Gambia, Sierra Leone, the Gold Coast and Nigeria. Oliver and Boyd. London, vol. 7, pp. 87-94.

Bond, J. 1960. Birds of the West Indies. Collins. London. 256 pp.

Chapin, J.P. 1954. The birds of the Belgian Congo. Part IV. Bull. Amer. Mus. Nat. Hist. 75B.

Collias, N.E. and E.C. Collias. 1970. The Behaviour of the West African Village Weaverbird. Ibis. 112:457-480.

De Grazio, J.W., J.F. Besser, J.L. Guarino, C.M. Loveless, and J.L. Oldemeyer. 1969. A method for appraising blackbird damage to corn. J. Wildl. Manage. 33(4):988-994.

Goodhue, L.D., and F.M. Baumgartner. 1965. Applications of new bird control chemicals. J. Wildl. Manage. 29(4):830-837.

Koehler, J.W. 1963. How to control some off beat birds: Linnets, Horned Larks, Crowned Sparrows, and Woodpeckers. Pest Control. 31(9):35-36.

Stickley, A.R., Jr. and J.L. Guarino. 1972. A repellent for protecting corn seed from blackbirds and crows. J. Wildl. Manage. 36(1):150-152.

Wetmore, A. and F.C. Lincoln. 1933. Additional notes on the birds of Haiti and the Dominican Republic. Proc. U.S. Nat. Mus. No. 2966. 82(25):1-68.

Wetmore, A. and B.H. Swales. 1931. The birds of Haiti and the Dominican Republic. Smithsonian Institute U.S. Nat. Mus. Bull. 155. 483pp.