Bird Depredations in Uruguayan Vineyards

Ethel N. Rodriguez
Bird Pests, Biological Laboratories Department, Agricultural Services General Directorate (DGSSAA), Uruguay Ministry of Livestock, Agriculture and Fisheries (MGAP), Montevideo, Uruguay
Guadalupe Tiscornia
DGSSAA - National Institution of Vitiviniculture (INAVI), Montevideo, Uruguay
Mark E. Tobin
USDA APHIS WS National Wildlife Research Center, Fort Collins, Colorado

ABSTRACT: Many species of birds in Uruguay frequent vineyards and damage grapes, both species that are considered crop pests and species that are protected by law because their conservation and protection are desirable. We surveyed 70 farmers in the Department of Canalones, the main grape growing region in Uruguay, to determine their perceptions about the nature and severity of bird depredations and the methods being employed to reduce such damage. Sixty-seven percent of respondents reported receiving damage from birds. Bird depredations were considered a serious problem by 58% of respondents, a moderate problem by 19% of respondents, and a minor problem by 19% of respondents. The species most often cited as causing damage were Picazuro pigeons, great kiscadees, and creamy-bellied thrushes. Respondents use a variety of methods to deter bird depredations including firearms, toxic baits, visual deterrents, and chemical repellents. We describe a research proposal to determine more precisely the magnitude of bird depredations in Uruguayan vineyards, to adapt and/or develop management tools, and to formulate and implement a pilot management plan for reducing bird depredations.

KEY WORDS: bird damage, bird damage control, birds, grapes, Uruguay, vineyards

Proc. 21st Vertebr. Pest Conf. (R. M. Timm and W. P. Gorenzel, Eds.)
Published at Univ. of Calif., Davis. 2004. Pp. 136-139.

INTRODUCTION

Uruguay, the smallest Spanish-speaking nation in South America, has a land area of 176,220 square kilometers, slightly smaller than North Dakota. This temperate country is bounded on the west by Argentina, on the north and northeast by Brazil, and on the southeast by the Atlantic Ocean. Uruguay is the only Latin American country lying wholly outside the tropics. It has moderate temperatures with an average of 16°C in the south and 19°C in the north. Rainfall is fairly evenly distributed throughout the year, with an annual average of 983 mm in the south and 1,313 mm in the north. Average wind speeds are 10 km/hr in the central zone and 25 km/hr in the coast region (Uruguay. Estudio Ambiental Nacional 1992).

Most of Uruguay is a gently rolling plain that represents a transition from the almost-featureless Argentine pampas to the hilly uplands of southern Brazil. Only 2 - 3% of Uruguay is forested. The natural grasslands for which Uruguay is famous lend themselves to livestock production, which is the predominant agricultural activity. Other agricultural products include grain crops such as rice, barley, sunflower, corn, and sorghum; and horticulture and fruits such as citrus, orchards, and grapes.

Grapes were first cultivated in Uruguay in the 1870s, mostly for local consumption. In 2002, Uruguay produced almost 94 million kg of table and wine grapes, 29% of which were white grapes and 71% were red grapes (INAVI 2002). Table grapes are grown mainly for internal consumption (www.turismo.gub.uy/infogeneral/inavi_s.html); almost 97% of wine production is for local consumption but exports are increasing yearly. Major markets include Brazil, Great Britain, France, Belgium, and the United States, among others (www.inavi.com.uy). Seventy percent of wine grapes are universal varieties such as Tannat, Cabernet Sauvignon, Cabernet Franc, Merlot, Sauvignon Blanc, and Chardonnay (www.turismo.gub.uy/infogeneral/inavi_s.html/). Wine vineyards are located mainly in the western and south-central parts of the country, where a mosaic-like landscape of cultivated grain seeds, orchards, horticulture, and vineyards are interspersed with natural riparian forest and eucalyptus plantations.

Uruguay is politically divided into 19 Departments, each of which is sub-divided into Police Sectionals (PS). Uruguayan Departments and PS are roughly analogous to states and counties in the United States. The major grape-producing Departments are Canelones, Montevideo, Colonia, and San Jose (Table 1).

Uruguayan vineyardists increasingly complain about bird depredations in their vineyards, although no studies have evaluated the magnitude of such depredations, the major species causing damage, or the efficacy of control measures. As a result of an agreement between the Uruguay National Institution of Vitiviniculture (INAVI) and the Agricultural Services General Directorate (DGSSAA), with assistance from the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services National Wildlife Research Center, we report the results of a survey of Uruguayan vineyard managers regarding bird depredations and describe an ongoing study to survey bird populations in and around Uruguayan vineyards and estimate damage in selected

Table 1. Number and hectares of grape vineyards and grape production (kg harvested) in the major grape-producing Departments of Uruguay.

Department	No. vineyards (%)	Hectares (%)	Kg (×1000) (%)
Canelones	1,742 (68)	5,966 (65)	60,661 (65)
Montevideo	405 (16)	1,200 (13)	16,457 (18)
Colonia	147 (6)	685 (8)	6,136 (7)
San José	116 (5)	554 (6)	5,834 (6)
Tacuarembo	35 (1)	42 (0.5)	272 (0.3)
Paysandú	3 (1)	181 (1)	2,138 (2)

vineyards. We also describe a pending proposal to adapt and/or develop management tools and formulate and implement a pilot management plan.

METHODS

Farmer Survey

We interviewed 70 farmers (4% of total farmers) selected at random in the Department of Canelones, the major grape-growing Department in Uruguay, to determine their perceptions about the nature and severity of bird depredations and the methods being employed to reduce such damage. We stratified our sample so that we interviewed one farmer for each PS that had ≤10 vineyards (being one vineyard defined as a production unit), three farmers for each PS that had >10 but ≤100 vineyards, and six farmers for each PS that had >100 vineyards.

RESULTS

The 70 farmers surveyed planted a total of 23 varieties of grapes. Fifty-five farmers (79%) cultivated only wine grapes, 4 (6%) cultivated only table grapes, and 11 (16%) cultivated both kinds. The average vineyard was 10.8 ha (s.e. = 14.8) in size. Table varieties included Cardinal, Italy, and Ribol. Muscat D'Hamburg, the most common variety reported in our survey, was cultivated by 74% of the farmers surveyed. Other common wine grape varieties included Tannat, Merlot, Cabernet Sauvignon, Cabernet Franc, Sauvignon Blanc, Ugni Blanc, and Chardonnay.

Sixty-seven respondents (96% of those surveyed) reported receiving damage from birds. Bird depredations were considered a serious problem (30 - 100% of grapes damaged) by 41 respondents (58%), a moderate problem (>10% and <30%) by 13 respondents (19%), and a minor problem (<10% of grapes damaged) by 13 respondents (19%). Three farmers (4%) reported receiving no damage from birds. Forty-four growers (63%) implicated Moscatel as the variety most often damaged. Ten growers (14%) implicated Cabernet Sauvignon grapes, and eight respondents (11%) implicated Merlot as receiving most damage.

Birds typically begin damaging ripening grapes in January (summer), when grapes are in the golden red stage and are just starting to change color (stage 35, according to the maturity scale of Eichorn and Lorenz 1977). Damage usually continues until harvest in late February and March. Sixty-four of the 70 respondents characterized damage caused by birds. Forty-eight percent said that birds take whole berries, 36% reported that birds peck grapes, and 16% reported that birds in their vineyards caused both types of damage. Respondents identified a number of species as responsible for damaging grapes (Table 2), including birds that are considered of conservation value as well as species considered as agricultural pests. The most frequently implicated species were the Picazuro pigeon (*Columba picazuro*), the great kiscadee (*Pitangus sulphuratus*), and creamy-bellied thrush (*Turdus amaurochalinus*).

Farmers were asked to estimate the severity of bird depredations in their vineyards. Fifty-nine percent thought that birds typically damage <10% of the grapes in their vineyards, about 30% of respondents claimed that birds damage about 10 - 30% of the grapes, and the rest claimed that bird damage exceeds 30%. Sixty-seven

Table 2. Species of birds and percentage of farmers who reported them as causing damage in their vineyards.

Species	% of growers reporting damage
Columba picazuro Picazuro pigeon	94
Pitangus sulphuratus Great kiscadee	27
Turdus amaurochalinus Creamy-bellied thrush	27
Passer domesticus House sparrow	16
Mimus saturninus Chalk-browed mockingbird	15
Turdus rufiventris Rufous-bellied thrush	12
Colaptes campestris Field flicker	9
Zenaida auriculata Eared dove	8
Columba livia Rock dove	5
Zonotrichia capensis Rufous-collared sparrow	5
Myiopsitta monachus Monk parakeet	3
Furnarius rufus Rufous hornero	2
Penelope obscura Dusky-legged guan	2
Tyrannus savana Fork-tailed flycatcher	2
Molothrus bonariensis Shiny cowbird	2

percent of farmers interviewed claimed that bird depredations have increased in the past few years, 32% believe that damage has remained about the same, and 1% said that damage has decreased.

Habitat, crop, and ecological variables associated with bird depredation are shown in Table 3. Farmers felt that vineyards adjacent to forests were most susceptible to bird depredations. Other important variables included vicinity to the coast, the presence of large flocks of birds, and the variety and type of grapes grown.

Table 3. Habitat, crop, and ecological variables reported by Uruguayan vineyardists as being associated with bird depredations.

Factor	% of growers reporting damage
Vineyard adjacent to a forest	81.0
Vineyard in the vicinity of the coast	18.0
Variety of grape	12.0
No alternative food around	9.0
Food source nearby	4.5
Vineyard in the vicinity of an abandoned field	4.5
Presence of wetlands	1.5
No other vineyard around	1.5

We asked farmers to compare bird damage to other damaging agents. Thirty-eight percent of respondents considered ants to be a more serious problem than bird depredations, 11% considered ants to be an equivalent problem, and 51% considered that ants were a less significant problem than birds. Many farmers mentioned that they don't consider ants as a problem because they have tools that allow them to control them year around. Eighty-three percent considered hail and freezing to be a more serious problem than bird depredations; 1% thought that hail and freezing were about equally damaging, and 16% thought that hail and freezing were a less significant problem. Eight percent of growers considered heat to be a more serious problem than bird depredations, and 92% claimed that it is a smaller problem. Five percent of respondents considered rain more of a problem than birds; 2% considered them equally damaging, and 93% considered rain a smaller problem .

Uruguayan vineyardists use a variety of methods to deter bird depredations (Table 4). A majority (57%) of managers reported using firearms, mainly to drive birds away from their vineyards. Forty-one percent of respondents reported using toxic baits. Carbofuran is the only avicide registered for use in Uruguay, exclusively as a grease formulation to kill parakeets on the nest. However, some vineyardists reported using other techniques. Twenty percent reported using visual deterrents such as flags and scarecrows. Nineteen percent of the respondents used chemical repellents such as methiocarb (Draza) or anthraquinone (Flight Control), this last one registered for use on several crops, including grapes. Fifteen percent report using acoustic repellents such as firework, propane cannons, or distress calls.

Overall, 17% of respondents considered their bird control efforts very effective, 46% considered them somewhat effective, and 37% considered them not very effective.

Table 4. Control methods used by Uruguayan farmers to reduce bird depredations.

Method	% of farmers who use
Firearms	57
Toxic baits	41
Visual repellents (flags and scarecrows)	20
Chemical repellents (methiocarb)	19
Acoustic repellents (fireworks, propane cannons and distress calls)	15

FUTURE RESEARCH NEEDS

The results of our survey indicate that farmers consider bird depredations to be a significant and growing problem in Uruguay, not only because of economic losses, but also because more environmentally compatible and efficient control methods are needed both to promote the export image of Uruguayan wine and to protect birds of conservation value.

In the early to mid-1990s, the senior author and various United Nations/Food and Agriculture Organization (FAO) consultants made a number of recommendations to develop strategies for managing bird pests in Uruguay (Fiedler 1990; Bullard 1991a,b; Jaeger 1991; Keith 1991; Otis 1992: Rodriquez 1994; Rodriguez and Avery 1996; Bruggers et al. 1998). These recommendations included obtaining bird pest damage assessment data from several crops and developing alternative approaches to toxicants, or at the least, more effective, environmentally sound chemicals and application methods. None of these evaluations and recommendations specifically included vineyards. Since there are no previous bird management studies in Uruguayan vineyards, we have applied for a Food & Agriculture Organization grant to evaluate the damage and its impact, and to study the management and control bird damage to grapes in Uruguay. The general goals of the proposal are 1) to diagnose the problem (i.e., determine the magnitude of depredations and the major depredating species; identify environmental variables associated with damage, and assess the effectiveness of currently-used control methods), 2) to adapt and/or develop management tools (conduct field and laboratory trials to adapt and/or develop management technologies), and 3) to formulate and implement a pilot management plan (including promoting the plan through multiple media to technicians and producers). If funded, the results of the proposed research would help Uruguayan farmers devise more effective, environmentally compatible means of reducing bird damage to grapes.

ACKNOWLEDGEMENTS

We thank Inés da Rosa for field and laboratory assistance, and INAVI and Biological Laboratories Department, Agricultural Services General Directorate of the Uruguay Ministry of Livestock, Agriculture and Fisheries for their support. M. Avery and R. Bruggers reviewed an earlier draft of this manuscript.

LITERATURE CITED

BRUGGERS, R. L., E. RODRIGUEZ, AND M. E. ZACCAGNINI. 1998. Planning for bird pest problem resolution: a case study. Int. Biodeterior. Biodegrad. 42:173-184.

BULLARD, R. W. 1991a. Bird pests in Argentina and Uruguay, repellent consultancy. Unpubl. report prepared for the United Nations Food and Agriculture Organization, July 31, 1991. U.S. Department of Agriculture, Denver Wildlife Research Center, Denver, CO. 22 pp. + 3 appendices.

BULLARD, R. W. 1991b. Bird pests in Argentina and Uruguay, repellent consultancy. Unpubl. report prepared for the United Nations Food and Agriculture Organization, December 5, 1991. U.S. Department of Agriculture, Denver Wildlife Research Center, Denver, CO. 16 pp.

EICHORN, K. W., AND D. H. LORENZ. 1977. Phänologishche Enwicklungsstadkien der Rebge. Nachrichtenbl. Dtsch. Pflanzenschutzdienstes (Braunschweing) 29:119-120.

FIEDLER, L. A. 1990. Bird pests in Argentina and Uruguay-Project Planning. Unpubl. report prepared for the United Nations Food and Agriculture Organization, May 25, 1990. U.S. Department of Agriculture, Denver Wildlife Research Center, Denver, CO. 18 pp. + 4 appendices.

INAVI. 2002. Depto de registro de viñedos: estadística de viñedos 2002. Datos a nivel Nacional.

JAEGER, M. M. 1991. Evaluation and recommendations on the use of lethal methods to control bird damage in Argentina and Uruguay. Unpubl. report prepared for the United Nations Food and Agriculture Organization, November 7, 1991. U.S. Department of Agriculture, Denver Wildlife Research Center, Denver, CO. 21 pp. + 2 appendices.

KEITH, J. O. 1991. Bird pests in Argentina and Uruguay, ecotoxicological evaluation of control programs. Unpubl. report prepared for the United Nations Food and Agriculture Organization, September 16, 1991. U.S. Department of Agriculture, Denver Wildlife Research Center, Denver, CO. 24 pp.

OTIS, D. L. 1992. Recommendations on the need and use of statistical surveys for evaluating the impacts of bird damage to crops in Uruguay and Argentina. Unpubl. report prepared for the United Nations Food and Agriculture Organization, January 27, 1992. U.S. Fish and Wildlife Service, South Carolina Cooperative Research Unit, Clemson Univ, Clemson, SC. 34 pp.

RODRIGUEZ, E. N. 1994. An integrated strategy to decrease eared dove damage in sunflowers. Ph.D. dissertation, Colorado State University, Fort Collins, CO. 92 pp.

RODRIGUEZ, E. N., AND M. L. AVERY. 1996. *Agelaius* blackbirds and rice in Uruguay and the southeastern United States. Proc. Vertebr. Pest Conf. 17:94-98.

URUGUAY. ESTUDIO AMBIENTAL NACIONAL. 1992. OPP – OEA – BID. 328 pp.