

# Economic Analysis of Pest Control in Viticulture

The following summarizes findings from a study by the USDA's National Wildlife Research Center on the economic value of controlling bird and rodent pests in wine grape industries. The analysis, based upon a survey of 84 wine grape growers, quantifies the net financial benefits derived from pest control practices.

The core conclusion is that the benefits of pest control, measured in crop savings and avoided property damage, overwhelmingly outweigh the costs. For wine grape growers, controlling bird damage yields a net benefit of **\$956 to \$1,117 per acre**, or 8% to 16% of average revenue. These findings demonstrate that pest control is critical to the profitability and viability of this agricultural sector. The study posits that without these control measures, many growers could face difficult operational issues which could lead to reduced production, higher consumer prices, and significant negative impacts on the economy.

Texas viticulture faces persistent challenges and damages from bird and rodent pests, including fruit consumption, damage to vines and trees, and equipment damage. While previous research has estimated existing damage levels, this analysis was designed to fill a critical gap by calculating the **net benefits of pest control**. The primary objective was to estimate the net financial benefits, (the value of crop savings and avoided property damage minus control costs) of managing bird and rodent pests in wine grape production. This information serves to justify the continued use of control methods from both a grower perspective and a social perspective for policymakers regulating pest control.

To gather the necessary data, a web-based survey was distributed to growers and the study successfully obtained responses from 84 wine grape growers. The survey focused on seven key questions for a typical year:

1. Total harvested acreage.
2. Methods used for bird and rodent control.
3. Total spending on bird and rodent control.
4. Current percentage of production lost to birds and rodents.
5. Current monetary value of property damage from birds and rodents.
6. Estimated percentage of production loss if controls were prohibited.
7. Estimated monetary value of property damage if controls were prohibited.

The net benefit of control was calculated using the following formula, with all terms expressed on a per-acre basis: (Value of Crop Saved + Reduction in Property Damage) - Cost of Control

To account for variations in survey responses, the study calculated both a "low estimate" and a "high estimate" for all derived data. The low estimate assumed that respondents who reported acreage but not costs spent nothing on control. The high estimate excluded these incomplete surveys from the sample.

The survey revealed distinct patterns in pest control strategies and expenditures.

- Bird control is prevalent.

- Nearly 50% of growers use **netting and/or visual scare devices** for birds.
- For rodents, common methods include rodenticides, trapping, and shooting, with **promotion of predators** used much more frequently.

#### Current Control Costs per Acre:

| Crop              | Pest    | Low Estimate | High Estimate |
|-------------------|---------|--------------|---------------|
| <b>Wine Grape</b> | Birds   | \$390.99     | \$420.03      |
|                   | Rodents | \$210.70     | \$270.75      |

The benefits of control are derived from two primary sources: increased crop yield (crop savings) and reductions in property damage. The study compared current damage levels (with control) to the potential damage that growers estimate would occur if control measures were prohibited.

#### Current vs. Potential Damage (Without Control):

| Crop              | Pest    | Damage Type     | Current Level          | Level Without Control     |
|-------------------|---------|-----------------|------------------------|---------------------------|
| <b>Wine Grape</b> | Birds   | Yield Loss      | 6.0% - 6.6%            | 26.6% - 39.6%             |
|                   |         | Property Damage | \$4.20 - \$4.90 / acre | \$78.70 - \$161.00 / acre |
|                   | Rodents | Yield Loss      | 3.9% - 4.6%            | 13.7% - 23.0%             |
|                   |         | Property Damage | \$9.10 - \$9.90 / acre | \$26.40 - \$58.40 / acre  |

The study highlights that without control, yield losses from birds and rodents in wine grape production would increase by a dramatic **30.4 to 51.4 percentage points**. To translate yield savings into monetary value, the analysis used average yield and price data:

**Wine Grape:** 7.3 tons per acre at \$1,650 per ton.

#### Value of Crop Savings per Acre:

| Crop | Pest | Low Estimate | High Estimate |
|------|------|--------------|---------------|
|------|------|--------------|---------------|

|                   |         |         |         |
|-------------------|---------|---------|---------|
| <b>Wine Grape</b> | Birds   | \$3,613 | \$6,142 |
|                   | Rodents | \$428   | \$811   |

The analysis conclusively shows that the financial benefits derived from controlling bird and rodent pests significantly outweigh the expenditures on control methods. These net benefits have a substantial impact on the profitability and overall viability of growing grapes for wine. When viewed as a percentage of typical revenue per acre, the importance of pest control becomes even more apparent:

#### **Wine Grape Production:**

- Bird Control: **23% to 38%** of average revenue per acre.
- Rodent Control: 9% to 20% of average revenue per acre.

The study concludes that these large net benefits have significant market-level implications. If growers were unable to control these pests, many likely would be forced to stop production, while others would produce less. This estimated reduction in supply would ripple through the economy, causing higher consumer prices and a shift toward less-desirable alternatives, production in other states, or increased international imports.