Spec Trellising Bird and Insect Netting Report

Executive Summary

This report examines the challenges vineyard operators face from bird and insect damage while showcasing how Spec Trellising's specialized netting solutions effectively mitigate these threats. Based on current research and industry practices, this document outlines the comparative impact of different pests and provides evidence-based recommendations for implementing Spec Trellising's range of protective netting systems to maximize grape yields and quality.

The Vineyard Pest Challenge: Birds vs. Insects

2025 Pest Pressure Forecast: Increasing Threats

Recent climate research and agricultural forecasts indicate that 2025 is expected to bring heightened pest pressure to vineyards across North America. Climate change is accelerating several trends that directly impact both bird and insect damage to grape crops:

- **Expanding Pest Ranges**: Warming temperatures are allowing both insect pests and problematic bird species to expand their geographical ranges northward as demonstrated by research showing that climate change over the past 50 years has increased the overwintering range of agricultural insect pests by approximately 2.4 million km² worldwide.
- **Increased Insect Metabolism**: Rising temperatures are accelerating insect reproductive and metabolic rates, leading to larger pest populations and more voracious feeding. Models predict that when average global surface temperatures increase by 2°C, the median increase in yield losses owing to pest pressure is expected to be 31% for staple crops, with similar impacts projected for vineyards.
- **Bird Behavior Changes**: Climate shifts are altering bird migration patterns and feeding behaviors. Research indicates that climate-induced shifts in woody plant distributions significantly impact bird diversity and behavior, potentially concentrating bird populations in productive agricultural areas like vineyards.
- **Extreme Weather Events**: Canadian vineyards are already reporting lower crop yields due to more extreme and unpredictable weather events, with similar trends expected to impact U.S. growing regions in 2025.

These converging factors make protective measures like Spec Trellising's netting solutions more critical than ever for the 2025 growing season and beyond.

Bird Damage: A Critical Threat

Birds represent one of the most significant threats to grape production, with damage expected to intensify in 2025 due to climate-driven changes in bird populations and behaviors. Without adequate protection, crop losses from bird damage can be devastating:

- Red grape varieties can experience up to 95% crop loss by late October
- White grape varieties typically suffer approximately 60% loss when unprotected
- Michigan has the highest percentage of crop loss among grape-producing states due to bird damage (Somers & Morris, 2002)
- In California, over 67% of vineyard acres already experience some degree of bird damage, with estimates ranging from 5.4% to 16.1% of crops damaged (Kross, 2015)

Climate scientists and agricultural researchers are forecasting increased bird pressure on vineyards for 2025, as warming temperatures alter migratory patterns and feeding behaviors. A recent study found that climate-driven range shifts significantly affect bird diversity and behavior, potentially concentrating bird populations in agricultural areas like vineyards (Kissling et al., 2010).

According to research conducted by Michigan State University, Cornell University, Washington State University, and other institutions through a USDA-funded Specialty Crop Research Initiative, bird damage represents a significant economic problem for fruit growers across the country (Lindell et al., 2019). The damage begins around veraison when berries begin to accumulate sugar and color and continues until harvest, even in late fall/winter when grapes are harvested for ice-wine production. This timing makes bird protection particularly critical as grapes approach their highest value stage.

Birds primarily cause direct damage to fruit, but the secondary effects can be equally damaging. In addition to direct loss of fruit, bird-damaged fruit becomes more susceptible to various fruit rots that can cause off-flavors and other defects in wine. This compounds the economic impact beyond simple yield reduction.

Different bird species create different patterns of damage:

- Starlings, blackbirds, and grackles tend to travel in large flocks and take whole berries
- Sparrows, finches, and robins typically peck at fruit to taste sugar content and consume seeds
- On the West Coast, starlings and blackbirds cause most damage
- On the East Coast, cedar waxwings and robins tend to be the primary culprits

A study published in the Journal of Applied Ecology found three overall trends in vineyard bird damage: (1) damage was greatest on the edges of vineyards and decreased with distance towards the center; (2) damage increased as the season progressed; and (3) there were distinct spatial patterns in damage that remained constant over time (Somers & Morris, 2002). This research underscores the importance of targeting protection strategies to vineyard layout and pest patterns.

Insect Damage: Diverse and Persistent with Increasing Pressure for 2025

While less immediately catastrophic than bird damage, insect pests create persistent challenges throughout the growing season that are projected to intensify in 2025. According to research from Michigan State University's Department of Entomology, insect pests can cause significant economic damage to vineyards through multiple pathways (Isaacs, 2019).

Climate change is driving concerning trends in insect pest activity that vineyard operators should prepare for in 2025:

- Warming temperatures are accelerating insect reproductive and metabolic rates, with studies predicting that a 2°C temperature increase could lead to 31% greater crop losses due to increased pest feeding (Deutsch et al., 2018)
- Climate change is expanding the overwintering range of agricultural pests, allowing many species to establish permanent populations in regions where they previously couldn't survive year-round
- The American grapevine leafhopper (Scaphoideus titanus), which vectors the devastating Flavescence dorée disease, is expanding its range northward as average temperatures increase during growing seasons

Common insect pests affecting vineyards include grape berry moths, grape leafhoppers, Japanese beetles, rose chafers, various types of mites, mealybugs, and cutworms. Vineyard protection strategies must adapt to these increasing threats.

The impact of insect damage is multifaceted:

- Direct fruit damage making grapes unusable for winemaking
- Leaf damage affecting photosynthesis and overall vine health
- Root and trunk damage from below-ground pests threatening vine survival
- Disease transmission, as many insects vector viruses and pathogens

Michigan State University researchers have identified that grapevines are highly susceptible to plant viruses, with some vines hosting multiple viruses simultaneously (Miles et al., 2025). These viruses, often spread by insect vectors, can significantly affect vineyard productivity. The economic impact of Michigan's grape and wine industry is estimated to be more than $6.3 billion annually, highlighting the importance of protecting these valuable crops from insect damage.

Malformed leaves, small leaves, less vine growth, and reduced berry size are common after pest damage. You might notice fewer grape bunches or leaves that are speckled and yellow after a pest infestation.

Economic Impact of Pest Damage

The economic consequences of bird and insect damage to vineyards are substantial. A comprehensive web-based survey of fruit growers conducted by Cornell University's Human Dimensions Research Unit and administered across California, Michigan, New York, Oregon, and Washington revealed a total of close to $200 million in self-reported losses due to bird damage alone (Curtis et al., 2013).

According to research by the USDA's National Wildlife Research Center, the annual damage caused by birds in the United States exceeds $4.7 billion across all agricultural sectors (Shwiff et al., 2017). For vineyards specifically, this damage represents a significant portion of potential profits.

Comparative Threat Assessment

Both birds and insects pose significant threats to vineyard production, but they differ in important ways:

Birds:

- Cause catastrophic, acute damage in a very short time frame
- Damage is concentrated during the ripening period
- Primarily affect the fruit directly
- Can destroy an entire harvest in days

Insects:

- Cause chronic, ongoing damage throughout the growing season
- Affect all parts of the vine (fruit, leaves, stems, roots)
- Act as vectors for diseases
- Require complex integrated management approaches

Research by Cornell University and Michigan State University indicates that while various management techniques exist for both bird and insect pests, physical exclusion through netting remains among the most effective protection strategies (Henrichs & Curtis, 2013).

Spec Trellising's Netting Solutions

Spec Trellising offers a comprehensive range of specialized netting products designed to address the unique challenges of vineyard pest management. From birds to insects, their solutions provide effective protection while maintaining optimal growing conditions.

Product Line Overview

Spec Trellising offers several distinct product lines to address different vineyard protection needs:

Side Netting Systems

TightLoch® Permanent Style Side Netting

- 50 GSM weight for maximum durability
- 3mm x 5mm triangular mesh design
- Provides maximum protection against both birds and insects

- Allows sufficient airflow and sunlight for healthy vine development
- Reinforced edges with eyelets every 3" on top and bottom
- Suitable for deer protection
- 10-year pro-rata UV warranty against product failure
- Typically lasts up to 13 years
- Can be safely stored on upper catch wires or a lower wire during winter/spring

CrystaLoch Permanent Style Side Netting

- 40 GSM weight for excellent durability
- 2mm x 7mm rectangular mesh
- Maximum protection against birds while allowing sufficient airflow and sunlight
- Reinforced edges with eyelets for secure attachment
- Made from 100% virgin HDPE cylindrical monofilament
- 100% lockstitched for additional strength
- 10-year pro-rata UV warranty against product failure
- Typically lasts up to 13 years
- Can be safely stored on upper catch wires during off-season

Non-Permanent Style Side Netting

- Designed for more flexible seasonal use
- Offers a more economical option for vineyards with changing needs
- Provides effective bird protection during critical periods
- Easier to deploy and remove compared to permanent systems

Drape-Over Netting Systems

Classic Canopy Single-Row Drape-Over Netting

- Extremely durable knitted construction
- Available in a choice of widths and colors
- 10-year pro-rated UV warranty
- Mesh sizes designed to allow sufficient air-flow and light
- Small mesh options available to exclude wasps
- Ideal for all levels of bird protection and trellis types
- Physical barrier proven more effective than other deterrents such as balloons, reflective tape, kites, squawkers and cannons

Multi-Row Drape-Over Netting

- Standard widths ranging from 33' to 66'
- Superior protection against bird damage compared to single-row nets
- Fewer clusters accessible through the nets
- Allows workers to access vineyard rows while beneath the nets
- Can be placed directly on top of groups of rows or joined together

- Standard weights of 30GSM with heavier weights available as special order
- Optional contrasting colored lines at 1/4 and 3/4 widths for proper placement
- Optional pre-inserted plastic coated mono-wire available for quick tie-down
- All bales come complete with heavy duty storage bags

Specialized Solutions

IceVine Permanent Grapevine Netting

- Purpose-built for both ice wine and conventional wine grape protection
- Extra heavy mesh design with load-bearing reinforced edges
- Center reinforcement to handle substantial weight of frozen clusters
- Crafted from knitted virgin HDPE round monofilament
- High puncture resistance and lock-stitched for additional tear strength
- UV stabilized with 10-season pro-rata warranty
- Effective against birds, deer, and other wildlife
- Also provides hail and wind protection
- Reduces risk from large insects and Multicolored Asian Lady Beetles (MALB)
- Designed to stay up year-round, even during harvest
- Allows vines to grow through the center without requiring tucking

Insect Protection: The Fine Mesh Advantage

The IceVine and TightLoch® products feature finer mesh designs specifically engineered to provide protection against both birds and insects:

- **IceVine's** fine mesh structure creates an effective barrier against large insects and Multicolored Asian Lady Beetles (MALB) while still allowing beneficial pollinators access to the vines
- **TightLoch's** 3mm x 5mm triangular mesh is specifically designed to block insects while maintaining critical airflow

The advantage of these dual-purpose netting systems is that they address multiple threats with a single solution, simplifying vineyard management and providing comprehensive protection. This approach aligns with research from Michigan State University showing that integrated pest management (IPM) strategies are most effective when addressing multiple pest threats simultaneously (Isaacs, 2019).

Implementation Guide for Vineyard Protection

Selecting the Right Netting System

When choosing between Spec Trellising's various netting options, consider:

1. **Pest Pressure Assessment:**
    - Identify the primary bird species in your region (starlings, robins, etc.)

    - Evaluate insect pressure and determine if finer mesh is needed
    - Consider wildlife threats such as deer that may require stronger systems
2. **Vineyard Configuration:**
    - Row spacing and trellis system will influence optimal netting choice
    - Consider equipment access needs when choosing between side and drape-over systems
    - Evaluate seasonal vs. permanent protection needs
3. **Wine Production Goals:**
    - Ice wine producers should specifically consider IceVine systems
    - Organic producers may prefer comprehensive protection without chemicals
    - Consider light and airflow needs based on grape varieties

Research from Cornell University's grape research programs indicates that netting selection should be tailored to specific vineyard configurations and pest pressures for maximum effectiveness (Somers & Morris, 2002).

Installation Methods for Maximum Effectiveness

Spec Trellising supports multiple installation methods depending on the chosen netting system:

Side Netting Installation

- Install on both sides of the vine row to create a protective tunnel
- Attach to top wire and secure to lower wire or ground level
- Ensure proper tension to prevent sagging without stressing attachment points
- For permanent systems (TightLoch®, CrystaLoch), follow specific attachment guidelines for season-to-season durability

Single-Row Drape-Over Installation

- Position netting over the top of vine rows, using center markers for alignment
- Ensure complete coverage of the fruiting zone
- Secure at ground level to prevent bird entry from below
- Can be applied and removed seasonally with proper equipment

Multi-Row Drape-Over Installation

- Cover multiple rows simultaneously for efficient protection
- Can be joined to form a single roof over entire vineyard blocks
- Provides worker access beneath the nets for vineyard operations
- Utilize contrasting colored lines for proper placement

Timing of Deployment

For maximum effectiveness, timing is critical when deploying vineyard netting. Studies from Cornell University and Michigan State University have demonstrated that installation just before veraison provides optimal protection against bird damage (Lindell et al., 2019).

- Install bird netting just before veraison (when grapes begin to change color)
- For insect netting, earlier deployment may be necessary depending on specific pests
- Monitor pest activity and be prepared to deploy protection at first signs of activity

Maintenance and Storage

To maximize the lifespan of your Spec Trellising netting investment:

- Inspect regularly for damage and repair promptly
- Clean before storage to remove debris that could damage fibers
- Store in a cool, dry place protected from UV exposure when not in use
- For permanent side netting systems (TightLoch®, CrystaLoch), store on upper catch wires during the off-season

Economic Analysis: ROI of Netting Solutions

Cost vs. Benefit Analysis

The investment in quality netting solutions from Spec Trellising delivers substantial returns through:

1. **Prevented Crop Loss:**
    - Protection against potential 60-95% crop loss from birds
    - Prevention of quality degradation from bird-damaged fruit
    - Reduced susceptibility to secondary rot and disease issues
2. **Long-Term Durability:**
    - 10-year pro-rata warranty against UV degradation
    - Premium materials can extend useful life up to 13 years with proper care
    - Multi-season protection reduces per-harvest protection costs
3. **Labor Savings:**
    - Permanent systems like TightLoch® and IceVine eliminate annual installation/removal
    - Properly installed netting eliminates need for constant bird deterrent efforts
    - Less crop damage means more efficient harvesting

Research by Cornell University found that the total benefits of managing bird damage across fruit crops was estimated at up to $834 million, yet most known techniques for damage management were either slightly or not at all effective—with the exception of netting, which proved to be the most reliable method (Curtis et al., 2013).

Cost Recovery Timeline

Spec Trellising's premium netting solutions typically pay for themselves quickly:

- TightLoch® permanent side netting pays for itself in just one year through crop protection
- The 10+ year lifespan of properly maintained netting systems provides exceptional return on investment
- Reduced labor costs for permanent systems create additional savings year after year

Economic analysis conducted by Michigan State University researchers indicates that investments in physical exclusion methods like netting typically provide positive returns on investment within 1-3 growing seasons, depending on crop value and pest pressure levels (Lindell et al., 2019).

Best Practices from Industry Leaders

Vineyard operators who have implemented Spec Trellising's netting solutions successfully follow these best practices:

1. **Comprehensive Protection Strategy:**
    - Utilize side netting for maximum protection against both birds and insects
    - Consider multi-row drape netting for larger operations
    - Use specialized IceVine netting for ice wine production
2. **Proper Installation and Maintenance:**
    - Follow Spec Trellising's installation guidelines precisely
    - Conduct regular inspections during growing season
    - Properly store netting during off-season periods
3. **Integration with Overall Pest Management:**
    - Use netting as the cornerstone of physical protection
    - Complement with appropriate cultural practices
    - Monitor and document effectiveness to refine approach

Conclusion

Bird and insect damage represent significant threats to vineyard productivity and grape quality. While birds can cause catastrophic acute damage during the ripening period, insects pose a persistent threat throughout the growing season. Spec Trellising's specialized netting solutions provide effective, economical protection against both threat categories.

The company's comprehensive product line addresses virtually every vineyard protection scenario, from side netting systems like TightLoch® and CrystaLoch to drape-over options for single and multiple rows. Specialized solutions like IceVine deliver targeted protection for unique applications such as ice wine production.

By implementing the appropriate Spec Trellising netting solution with proper installation techniques, vineyard operators can dramatically reduce crop losses, improve fruit quality, and

enhance the sustainability of their operations. The return on investment from quality netting solutions is substantial, with potential protection against up to 95% crop loss in high-risk situations and product lifespans extending to 13 years with proper maintenance.

Contact Spec Trellising today to discuss your specific vineyard protection needs and discover how their bird and insect netting solutions can help safeguard your harvest and maximize your production quality.

About Spec Trellising

Spec Trellising is a leading provider of high-quality vineyard protection solutions, offering a comprehensive range of bird netting, deer fencing, and insect netting products. As your #1 source for vineyard supplies and the top supplier for winery equipment, Spec Trellising helps vineyard operators protect their valuable crops from wildlife damage while maintaining optimal growing conditions.

For more information about Spec Trellising's vineyard protection solutions, visit spectrellising.com or call 1-800-237-4594.

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