

BY STEVE WERBLOW

# NEW DATES WITH DESTINY

*How farmers can roll with the changes.*

The future is always uncertain, but fruit growers are facing shifting bloom dates and row crop growers are recalculating season length. Evidence suggests much of North America will continue to see stormy springs alternating with droughty summers. As average temperatures rise across much of the continent, pest habitats shift while pollination and ripening patterns change.

For farmers and the researchers who serve them, it is important to plan for the opportunities and threats that lie ahead for tomorrow's crops.

Warren Kruger, head of North American Seeds Development for Syngenta, sums up the future as “shifting seasons, altered temperatures, and unpredictable precipitation.

“Tomorrow's crops will need to be resilient superheroes,” he notes. “We're talking plants that can thrive in harsh conditions, fend off pests, use resources efficiently, and pack a nutritional punch—all while treading lightly on our planet.”

**Time shift.** Researchers worldwide are recording similar challenges. Since he started

working at Switzerland's Landwirtschaftliches Zentrum St. Gallen (LZSG) in 1980, Richard Hollenstein has seen the bloom date for apples creep 3 weeks earlier. Meanwhile, springtime frost dates have not changed significantly, so blossoms are at increased risk of frost damage.

Hollenstein established an orchard to compare currently popular varieties with an assortment of other strains to observe pollination, fruit set, and ripening. He is working closely with retailers—after all, why grow fruit nobody wants to buy? Swiss growers may some-



**Opposite.** Shifts in blooming dates can upset alignment with pollinators or frost-free dates. **Above.** Tyler Klick is changing vineyard management strategies to make better use of water and shade in Sonoma County, California.





**Below.** Richard Hollenstein of LZSG in Switzerland is studying apple varieties that will thrive in future conditions. Simone Aberer is doing the same in LZSG's vineyard. Saran Khumto, manager of East West Seed's R&D farm in Thailand, looks for new varieties that can handle drought, heat, and pests. **Opposite.** LZSG's vineyard tests innovative frost protection. Summer heat can change apple ripening. Met stations log weather. Cover crops shade soil.



day replace today's Gala apples with Natura or Freya from the Netherlands, Bonita from the Czech Republic, or some numbered variety still in the works.

Simone Aberer works in LZSG's vineyard, home to 400 varieties. Some are historic. Others are of current interest.

"Some varieties will sooner or later be gone from our region, but other varieties like Merlot or Cabernet Sauvignon will benefit from warmer conditions," she says. "It's nice to have such a high diversity of grapevines to see how differently they react."

In California's Sonoma Valley, Tyler Klick of Redwood Empire Vineyard Management is continually learning to adapt management tactics in a range of vineyards producing grapes that go into wines ranging from \$15 to \$100 per bottle.

"What we really have to prepare ourselves for is fluctuations," says Klick, who went through the University of California's Climate Steward program. "We're seeing an adjustment in how we're managing our canopies to protect the fruit from afternoon sun—how much leaf pulling we're doing, or how we design our row orientation in new vineyards so

the fruit is shaded by its canopy at 3:00 or 4:00 in the afternoon.

"It's also in how we irrigate to help promote resilience to heat," he adds. "It's almost like training an athlete. So what we like to do is larger, infrequent irrigation instead of shorter, frequent applications."

**Infrastructure.** French prime minister Georges Clemenceau famously said that generals always prepare to fight the last war. Stephen Shaw of the SUNY College of Environmental Science and Forestry in Syracuse, New York, is gearing up instead to fight the next war against watershed degradation.

Today's warmer atmosphere holds more moisture and rainfall patterns are becoming more stormy and erratic, so erosion and off-site flow of nutrients will likely change, he says.

"A lot of BMPs [best management practices] are still designed for the historical data of the last 30 years—sometimes the last 60 years," Shaw notes. "It's not that often that you see people adjusting for what the most likely storms are going to be in the next 25 or 50 years."

Those adjustments are complex, he says—and important.

George Smith, director of Michigan State University's AgBioResearch program, led the launch last year of a nationwide, 10-year research roadmap for AgInnovation, a coalition of state agricultural experiment station directors.

The roadmap proposes a 1% commitment of the federal research budget every year for a decade—\$1.9 billion annually—to fund research into water resilience, climate solutions, and sustainable food systems.

The group is also advocating for farm bill funding to cover deferred maintenance and upgrades to research facilities.

Century-old glasshouses aren't up to the demands of today's research, he notes. That's a job for modern tools like growth chambers, sensor-driven temperature and irrigation systems, and computers that can handle the massive data sets generated by remote sensing and machine learning.

"I think we see incredible challenges and the ability to make a difference," Smith says. "I am a strong believer in the power of the human intellect and the ability of research to provide solutions to challenges facing agriculture." ❀