



A tractor-mounted hedger at work in an orchard in Nova Scotia's Annapolis Valley. Keeping tree foliage tight to the trellis wire allows for more efficient tending and harvesting. (Perennia photos)

Too much of apple picking?

Mechanization is radically altering orchard management practices

by **Emily Leeson**

The Annapolis Valley is known for the orchards that have thrived for generations on its gentle slopes and rich soils. The iconic vistas of the region feature rows of thick-trunked apple trees – generously spaced, and bursting out at all angles with sturdy limbs ready to bear a fruit crop that is second only to blueberries in terms of its value to the provincial economy. But this vision may soon be a thing of the past, as growers adopt new management practices geared toward mechanization, which holds the promise of reduced labour requirements and increased productivity.

At the annual convention of the Nova Scotia Fruit Growers Association (NSFGA), held Jan. 23-24 in Greenwich, N.S., the theme was “Staying Ahead of the Game.” Karen Lewis, fruit tree specialist at Washington State University’s Center for Precision and Automated Agricultural Systems, was keynote speaker at the conference, and she made a strong case for the necessity of switching to mechanization if orchardists wish to remain competitive.

Lewis drew on a wealth of research about the development and integration of mechanized technologies for tree planting, pruning, hedging, and

harvesting. With her knowledge of what has worked (and what hasn’t) in the state of Washington – which accounts for well over half of U.S. apple production – she presented the options available to Nova Scotia growers as they make the transition.

UNIFORMITY

Nova Scotia has been in the apple business since at least the first census of the Annapolis Royal area in 1698, when 1,584 apple trees were recorded. The NSFGA was established in 1863 as a means for growers to share knowledge and to promote the industry internationally. The province’s apple

sector boomed until the 1930s, and although it has declined since then, it is still substantial, producing some 1.7 million bushels annually for the local fresh market, local processors, and exports to the U.S.

The next-generation orchard described by Lewis is oriented toward premium apples – such as Honeycrisp, which has become the leading variety in Nova Scotia. These new orchards are designed to produce high yields of high-quality fruit, with the consistency of size, flavour, and durability that consumers now expect. According to Lewis, the key to achieving these results is uniformity. “If you don’t have it, you better find it, because it’s going to cost you money,” she said. “Every bend in a tree, every dip in the top – they all cost you money.”

Fully embracing uniformity means implementing a growing system that bears little resemblance to the traditional orchard. With GPS-directed planting, producers are able to place their trees in perfect, high-density rows. Instead of relying solely on the strength of their trunk to support their weight, the trees are supported on trellises similar to those used in vineyards. The system of posts and wires allows the trees to withstand the weather, protecting graft unions from breakage. As these relatively thin trees grow, they are trained either vertically or at an angle – depending on the trellis system chosen – to provide maximum light exposure, and to allow for mechanized tending. Mechanical hedgers and pruners can move up and down the rows efficiently. Workers doing manual tending or harvesting no longer need to climb up and down ladders; they are raised to the right height on mobile platforms, allowing managers to direct more consistent attention to each tree, each row, and each acre.

“When you are planting the orchard, when you’re pruning it, when you’re training, you need to be making it ready for whatever mechanization you’re going to try to bring to it, because mechanization and growing



A mobile platform traversing the rows of trees, with workers and apple bin aboard – far less labour-intensive than climbing up and down ladders!

are married to one another,” said Blake Sarsfield, past president of the NSFGA, when he opened the panel discussion at the convention.

According to Lewis, the goal is to make the orchard ready not only for workers, but for specialized machines, robots, and “precision ag” – a system of collecting and analyzing data for individual trees or GPS locations, allowing for site-specific orchard management. “That is the future of the industry,” she said, explaining that growers are switching to “two-dimensional trees,” planted close together and pruned tight to the trellis wires.

“It’s much easier, much less complex, and really a huge improvement in moving our fruit quality forward.”

BETTER TRELLISES

Apple trellis systems have come a long way, Lewis said. Some early adopters in Washington built trellises that were under-engineered, and paid the price for those mistakes. Producers jumped aboard the trellising bandwagon with little or no

consideration for apple variety, and they added extensions with abandon. When major wind storms occurred, there were major collapses, resulting in million-dollar losses.

Nowadays, there’s a wealth of knowledge available to growers pondering which trellis system to choose. The well-informed producer will consider factors such as soil type, elevation, apple varieties, and local wind conditions.

Lewis pointed out that producers also need to adjust their expectations with respect to return on investment. In Washington, she said, the industry used to produce about 30 percent premium apple varieties, but premium varieties now account for 70 percent of the crop. “It’s about paying up front, and then getting the money back out at the end,” she said, noting that producers can now bring an orchard into productivity relatively quickly, hastening the payback period.

Another factor is the relatively low labour costs associated with trellis systems. The work is also less physically gruelling, and therefore

more manageable for an aging labour force. Lewis said she has measured the efforts of workers climbing up and down traditional ladders, and estimated that harvesting two hectares of orchard is the equivalent of hiking from base camp to the peak of Mount Everest. "It's better than a gym membership, if you have a 20-year-old workforce," she said. "But we don't have a 20-year-old workforce anymore."

PLATFORMS

Mechanical platforms, which raise workers up and down as they move along the rows at consistent speeds, now reduce the physical demands on individual workers, and allow for somewhat smaller crews. "At the end of the day, I'm not fatigued like I would be either climbing up and down the ladder all day, or if I was carrying around a 6- or 8-foot pneumatic pruner all day," said Andre Tougas, a Massachusetts grower who took part in the panel discussion. "It's just much more pleasant to be on the platform."

Sarsfield noted that the shift to mechanization generally makes management work more predictable. "You set the speed, and you can pretty much calculate how long you want to take to do an acre of orchard. It makes it more uniform because the workers all have the same amount of time to do a tree," he said. "It just makes for a more consistent job, at the end of the day. Maybe it doesn't make as pretty an orchard as those who want to go in and do artwork on each individual tree, but it does reduce your labour costs, for sure."

David Eisses, a grower from Centreville, N.S., who purchased an Italian-made Rinieri hedger a few years back, said he's been very pleased with it so far, though he acknowledged that maintaining the machine may eventually become an issue. "Right now, we have to get our parts from Italy – there's just no way around it," he said. "But the seller has been very accommodating."

Lewis remarked that this is the

moment to harness new orchard management tools and push for further research into precision ag – to attract scientists, engineers, and investment toward fruit tree crops. "If they don't come to us, they're going to go to leafy greens," she laughed. "I had a guy come to me the other day saying, 'I'm thinking about carrots.' Who thinks about carrots? Don't they just throw out the seed and they grow? We've got real problems!"

Real problems, but also real potential. As a visiting American, Lewis chose well with her final analogy, recounting Wayne Gretzky's famous remark about skating to where the puck is going rather than where it has been. "The same can be said for going forward and building our orchard systems of the future," she stated.

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