The berry best: research helping cranberry growers thrive

Expert agricultural scientist Dr Hilary Sandler introduces her novel collaborative efforts with growers to improve cranberry production in Massachusetts, USA, and address problems that adversely affect yield and fruit quality.

Can you introduce the history of the University of Massachusetts Amherst’s Cranberry Station?

The Station traces its beginnings to the 1905 summer meeting of the Cape Cod Cranberry Growers Association where Professor H T Fernald spoke to a crowd of cranberry growers. Following this meeting, the growers urged further study of the crop, and then PhD student Henry Franklin was chosen for the job. In 1910, the state legislature made US $12,600 available to purchase land, including a cranberry bog, and to construct a building. Dr Henry Franklin became the Station’s first Director.

What are the chief objectives of your research?

We have a range of objectives, from understanding the factors that influence the dynamics of crop and weed ecology within the cranberry production system to developing and implementing nonchemical pest management strategies. We also promote adoption of integrated pest management through scientific and extension publications and outreach activities.

An important aspect of your work involves capitalising on application technologies. Can you provide an example and explain the importance of this work?

In collaboration with the Cranberry Growers Service in Wareham, Massachusetts, we built a cantilevered, walk-behind liquid sprayer (15-foot spray reach) during the summer of 2014. The idea was based on a retrofitted sprayer I had seen at a cranberry meeting in Quebec, Canada. We think application technologies such as this...

Bounty from the bog

Researchers at the University of Massachusetts Amherst Cranberry Station are working closely with cranberry growers to improve pest management in the bogs where cranberries are grown.

THE CRANBERRY is an interesting plant that has been important to humans for many centuries and in many locations around the world. In England, it was long called the fenberry, in Canada the mossberry and the Native American peoples referred to it in Algonquian as sassamanash. The colonists of New England, in the 17th Century, called the fruits of the plant bearberries, in reference to their role in the urine diet, and their current name comes from the resemblance of the plant’s flower to the crane.

Regardless of what name they go by, cranberries do not grow like other plants. Most fruit-bearing shrubs are cultivated in fields or orchards, but cranberries grow best in bogs – specially maintained areas of land characterised by peaty, acidic soils, containing sand and gravel, with a high water table. Although many people may be unaware that Wisconsin and Massachusetts have these geological characteristics, these two states jointly account for more than three-quarters of the US’s overall production.

The plant itself is a trailing vine that grows along the ground, surviving well in its wetland environment. The vines will colonise the ground and form a continuous vegetative mat, resembling a lawn more than a typical agricultural field. A thin layer of sand is added by the grower every few years to encourage the parts of the plant that produce fruit and to suppress pests. Despite its long and successful history in Massachusetts, the cranberry is constantly defending itself against a long list of persistent and deadly foes.

PERENNIAL PLANTS AS WEEDS

Dr Hilary Sandler leads a dedicated integrated weed management team at the University of Massachusetts Amherst Cranberry Station, a unique facility with more than 100 years of history working towards a unique mission: to sustain and grow the cranberry-producing industry in the state. “Today, just as when the Station was first established, the facility works closely with growers in the field to achieve lasting impacts,” she notes.

Growing cranberries in a wetland environment makes them competitive with many other annual and perennial plants – but not all.

Sandler’s group, therefore, is particularly concerned with the management of plant pests in the cranberry bog, from poverty grass to poison ivy. Poverty grasses flourish in nutrient-poor soil and have a life cycle that makes them hard to spot at first; they grow slowly but then burst onto the scene in mid-summer and quickly disperse copious seeds. ‘One cultural option is to mow the grasses, but even with this strategy, the cut stems are usually left on the ground and we have observed that cut stems have closed seed heads that will still open and release seeds,’ Sandler explains.

As such, Sandler and her team have conducted numerous investigations into controlling the growth of poverty grass both pre- and postemergence, leading to the inception of a programme with a mixture of non-chemical and chemical tactics to prevent its growth.

INTEGRATING STRATEGIES

As part of their recent work on poverty grass, Sandler and her colleagues developed an integrated pest management (IPM) programme – a rating system whereby growers can compare the efficacy of different control options at different points in the growing season. ‘With this information, growers can implement a multipronged approach to managing poverty grasses,’ Sandler comments. With respect to controlling poison ivy, a serious problem in cranberry bogs, the team has found that repeated applications of a concentrated herbicide solution are effective, especially for...
will be adopted as niche solutions: good for some growers in certain situations.

What have been your fondest moments during your research and career?

The best parts of my job are the people I work with and the growers I serve. There is no specific moment that comes to mind, but to be out on a grower’s farm and see them successfully implement the results of our research gives me the greatest satisfaction.

Most recently, I edited and published a weed identification guide for cranberries (translated from French), and this has been well-received and welcomed by the grower community. This is a good memory (though still in progress).

How do you foresee cranberry culture evolving in North America?

I believe that new high-yielding hybrid cultivars from breeding programmes at Rutgers University, University of Wisconsin-Madison, and a private Wisconsin grower will continue to be planted across the growing region. The biggest challenge for the near future will be marketing all the fruit that is being produced. Cranberry growers are very good at their job and produce abundant, high-quality fruit, but we need to find new markets and innovative uses for this healthy berry.

From a pest management perspective, our challenges lie in developing use patterns for pesticides that will produce fruit that meets export market requirements.

denser weed populations. This approach can be implemented by current techniques or by using a newly developed prototype sprayer; the researchers envision new technologies like this could reduce the effort required to apply herbicides.

But Sandler and her collaborators are leaving no stone unturned. In one innovative study, they looked at the efficacy of flame cultivation as an herbicide-free approach to weed management. Using a handheld propane torch, they found, was a good way to reduce the impact of troublesome dewberry plants – a relative of the strawberry that is problematic for cranberry growers.

Another prominent contribution has been their investigation into the plant parasite dodder, the germination and emergence patterns of which are now better understood. Based on this information, growers can more accurately time their flame and herbicide treatments to eradicate the pest. “In its 100-year history, the Cranberry Station and its scientific staff have seen many changes in cranberry growing

as a result of its research efforts,” Sandler reflects. “I hope to continue to contribute to the innovative work conducted at the Station, which puts growers at the centre of its activities and translates its research results into workable, practical and functional horticultural and pest management options that can be adopted by cranberry growers not only in Massachusetts, but throughout the US and Canada.”