

Research priorities for greenhouse production in Alberta



The Alberta Crop Industry Development Fund (ACIDF) is preparing to fund a significant amount of agronomic research in 2014-15. In recent months, we've been asking producers, researchers, agronomists and others which areas they consider the highest priority for that work.

In this discussion paper, four greenhouse industry stakeholders advocate research on issues such as water use efficiency, crop diversification and Integrated Pest Management.

You could argue that no one has done more to advance the fortunes of Alberta's greenhouse industry over the past four decades than Mohyuddin Mirza.

From 1977 until his retirement from Alberta Agriculture and Rural Development in 2008, Mirza researched and developed new approaches that have contributed greatly to the growth of the industry. He's now a consultant who serves as Director of Education and Research with the Alberta Greenhouse Growers Association.

Mirza believes that, despite the industry's progress in recent decades, much work lies ahead if Alberta is to reach its potential in greenhouse production. He maintains that research dollars, academic talent and extension communications should be directed to these priority areas.

Water use efficiency. "Some growers depend on municipal water supplies, others on dugouts, but for growers, pressure is building on the water resource," says Mirza. "Water use efficiency should be the number-one priority for the greenhouse industry."

Nutrient management. He notes that current nutrient use guidelines for the greenhouse industry were developed in the 1980s. These need to be updated, especially as more growers pursue winter production. "In winter, for example, under artificial lights, plants need more iron," says Mirza, "but we don't know what level is suitable." Leaching of nutrients is another major concern.

Integrated Pest Management. With the global nature of today's greenhouse plant supply, new insects and diseases are emerging. Mirza recommends that new and integrated control methods for these threats be explored.

More attention for bedding plants. Many people associate greenhouse agriculture with vegetable production. Mirza points out that bedding plant production is now larger than vegetables in Alberta in economic terms. Urban (or container) gardening presents a strong opportunity; the industry should develop and deliver information that helps these gardeners succeed. "We grow 500 different types of bedding plants here," he says, "and they all have different needs. We need to develop good protocols in the context of urban gardening."

Crop diversification within vegetables and bedding plants. Why import okra from California when we can grow it here? Indeed, Mirza sees greenhouse crop diversification as a pressing need for Alberta. An entire category of ethnic vegetables – such as bitter melon and Chinese squash – has Alberta customers who are waiting to buy. Medicinal plants, including medical marijuana, could also be in the crop rotation of the future as Mirza sees it.

Greater focus on production technology. Mirza sees better management of the growing environment – with the help of new technology such as electronic sensors – unlocking significant production gains in the future. Nutrients could be tested on-site for greater immediacy. The emerging field of aquaponics -- raising greenhouse plants *and* fish in the same water-based growing medium – also merits study.

"Looking into the next decade," says Mirza, "we should look at adoption of LED lights for greenhouse crop production, solar energy harvesting and storing technologies through algae ponds and generation of electricity from greenhouses."

Still, no matter how great the gains that science can make, Mohyuddin Mirza's 37 years of experience tell him that sharing new knowledge with greenhouse growers is also essential.

"Research," he says, "must go hand in hand with technology transfer."

Smarter technology can accelerate growth

Greenhouse vegetable production runs on seed, water, light and heat. As Paul Doef sees it, though, technology is what makes the whole system work.

"We've been doing this a long time, and we feel strongly that our business is driven by technology," says Doef, whose family operates an 11-acre greenhouse operation near Lacombe. "That's really our number-one thing. We've often been a bit ahead of the curve, and we're always looking for ways to make production easier and better."

Most of this operation's production is in cucumbers, peppers and tomatoes. While many greenhouse producers have considered year-round production, Doef has been growing yearround for five years now. Alberta's cold winters don't make this easy, but the province's abundant winter sunlight at least gives growers like Doef a fighting chance.

Between October and May each year, Doef grows cucumbers with the help of artificial light. It works, but you should see his electricity bill. That's why Doef would like to see more research on how to effectively – and *cost*-effectively -- light and heat a greenhouse through the winter months. Gaining a better understanding of the relative merits of High-Pressure Sodium (HPS) and Light-Emitting Diodes (LED) lighting systems in different greenhouse situations would help a great deal.

As Doef sees it, plenty of next-generation greenhouse research has already been done in places like Holland. Rather than reinvent these particular wheels, he'd sooner see Alberta's greenhouse industry adapt existing knowledge to local conditions. For example, could crops such as lettuce be grown on floating ponds? Would other jurisdictions' best IPM practices have value here? Could co-generation ensure a consistent energy supply while lowering costs?

Whatever combination of new and adapted knowledge works best, Doef believes that pushing the envelope on greenhouse technology can be a winning strategy for Alberta.

"Anyone can grow lettuce in the summer," he says. "But, if you can grow fresh *kale* in the *winter*, it will be like gold at a farmers' market. We're competing against huge growers in Ontario and B.C., so we need to be on the cutting edge of technology."

Wanted: better guidelines for crop timing

When is the right time to sell your flowers and bedding plants? For a greenhouse producer, this is critically important information. According to Debbie Foisy, however, this seemingly basic information is often hard to come by.

Foisy, owner of Deb's Greenhouse & U-Pick west of Edmonton and President of the Alberta Greenhouse Growers Association, argues that developing crop-timing schedules should be a research priority. This would allow growers to maximize production and market opportunities by timing the sale of product to its optimum condition. Absent this information, she explains, it's a bit like someone who grows Christmas trees, but doesn't have a calendar and cuts them all in January.

"As bedding plant growers we produce hundreds of varieties, so crop scheduling and timing is key," Foisy says. "The industry would benefit from accurate research in varieties that have more recently been introduced."

As she sees it, the province's greenhouse industry has excellent research facilities. She'd like to see more greenhouse research carried out at both the North and South Crop Development Centres, so that findings are directly relevant to growers in each region.

“The light intensity is way different between the north and south,” says Foisy, “and that affects the growth of plants, big-time.”

Greenhouse growers spend a good deal of their time managing harmful insect pests while trying to safeguard beneficial insects. IPM provides a framework for growers to do this. Foisy advocates greater research focus on greenhouse IPM, along with a strong outreach program so that new knowledge can be adopted by growers more quickly.

“IPM and the use of biologicals is huge right now,” she says. “Lots of growers are looking for information and workshops on IPM.”

New crops, year-round production

The members of Red Hat Co-op, based in Redcliff, Alta., just west of Medicine Hat, have been growing greenhouse vegetables for the better part of 50 years.

Today, the co-op has 45 members and a total of 100 acres of production under glass and poly. The bulk of the group’s revenue comes from supplying tomatoes, cucumbers and bell peppers to regional and national retailers under the Red Hat brand.

According to General Manager Lyle Aleman, his members want to add new crops, diversify production and move closer to year-round production. New research attention on all these areas is therefore needed.

“The idea of year-round production is always risky due to the high capital investment,” says Aleman. “We have been growing cucumbers year-round for several years now, but found it more challenging with tomato and pepper crops. With our climate, there’s the question of how profitable it really is, and what the risk to growers would be. Research could give growers the confidence that year-round production could work.”

Many consumers are interested in buying organically grown produce. When they do, unfortunately, most will be buying imported product. Aleman believes that Alberta greenhouse producers would benefit from better availability of technical information on how to move some or all of their production to organic. What are the steps? How does accreditation work?

When you consider *all* the crops that can be grown in a greenhouse, Alberta’s heavy weighting in tomatoes, cucumbers and bell peppers could be limiting the industry’s potential.

At the same time, commercial producers are reluctant to be early adopters of crops that could ultimately prove disappointing – and expensive.

Aleman advocates more research that will allow producers to diversify their crop mix, while managing the associated risk.

“The obvious one is strawberries,” he says. “We’re growing some now, but it’s proven to be a challenge to find the best varieties for our climate, in order to have consistent production throughout the year. We also see potential in crops like hot peppers, okra, basil, arugula and micro-herbs.”

Alberta faces tough competition from the large, highly diverse greenhouse sectors of Ontario and B.C., not to mention warmer production areas such as California and Mexico. Still, with research focused on the most important issues identified by growers and others, these observers are confident that the Alberta greenhouse industry can diversify, grow and thrive in the years to come.