Hop Sector Research and Service Priorities, 2014-2015

In 2014 there were approximately 32 commercial hop farms in Ontario with over 20 hectares (50 acres) of production. Based on industry estimates, 60% of the provincial hop acreage is represented by the Ontario Hop Growers Association (OHGA). Approximately 62% of total provincial acreage is produced using conventional practices while 25% is non-conventional and 13% is certified organic. Summarised below are the immediate and ongoing research and service needs identified by the sector during two workshops held in November and December of 2014.

RESEARCH PRIORITIES

Immediate

A: Plant Genetic Resources
1. Establish an Ontario clean plant program for virus and disease-free stock of commercial hop cultivars. Inclusion of Ontario naturalised varieties should be considered. Program should be maintained by public and/or academic institution, not private industry.

B: Pest Management
1. Increase availability of diagnostic services in Ontario for hop virus and systemic downy mildew. Inclusion of a clean plant propagator database is also required.
2. Field research on cultural pest management practices specific to downy mildew and its impacts on yield.
3. Registration and field evaluation of pest control products specific to leafhopper management.
4. Identification and management practices for hop virus.
5. Evaluate mechanical and cultural weed control options with specific interest in cover crop options for hop yards.
6. Evaluate management techniques of insects and/or debris on cones during harvest and post-harvest activities (e.g. ladybugs).

Pest issues in order of importance:
Diseases: Downy mildew (Pseudoperonospora humuli), virus (various), cone diseases (Alternaria spp.; Botrytis spp.; others).
Insects: Leafhoppers (Empoasca fabae), Japanese beetles (Popillia japonica), caterpillars (Hypena humuli; Polygonia interrogationis; various cutworms, armyworms, etc.), earwigs (Forficula spp.), Two-Spotted Spider Mite (Tetranychus urticae)
Weeds: Grassy weeds, Wild carrot/Queen Anne’s-Lace (Daucus carota L.)

C: Production efficiencies
1. Evaluate crowning practices used in Europe and USA for optimal timing, depth, and equipment most suitable to the job (scratching vs. discing) and their impact on pest management and yield.
2. Identify peak analytical properties (e.g. alpha/beta/oil levels) by cultivar under Ontario growing conditions in relation to soil types, growing zones and agronomic factors (e.g. irrigation, fertility) and their corresponding impact on hop yield.
3. Nutrient management and Ontario specific fertilizer recommendations for hops.
4. Field evaluation of fertility products for production systems (i.e. organic and conventional) and product form (e.g. foliar, granular) to better understand optimal application timing to maximize hop yield and quality.
5. Engineering of small scale harvest equipment for 5-10 acre sized operations.
6. Evaluate water use efficiency of hilled (raised beds) vs. non-hilled planting systems.
On-going
A: Plant Genetic Resources
1. Establish an Ontario clean plant program for virus and disease-free stock of commercial hop cultivars. Inclusion of Ontario naturalised varieties should be considered. Program should be maintained by public and/or academic institution, not private industry.
2. Develop an Ontario based breeding program focusing on Canadian variety development (proprietary varieties for marketing purposes and pest resistance specific to Ontario conditions) and increase access to germplasm for Ontario growers (e.g. proprietary varieties from other jurisdictions including dwarf cultivars, high alpha, etc.).

B: Pest Management
1. Increase availability of diagnostic services in Ontario for hop virus and systemic downy mildew. Inclusion of a clean plant propagator database is also required.
2. Field research on cultural pest management practices specific to downy mildew and its impacts on yield.
3. Field evaluation of pest control products specific to downy mildew and leafhoppers including timing and rotation of products specific to Ontario growing conditions.
4. Research and development of biological controls for downy mildew and other hop diseases.
5. Field research on integrated pest management (IPM) practices for both conventional and organic systems specific to Ontario growing conditions.

C: Production Efficiencies
1. Evaluate crowning practices used in Europe and USA for optimal timing, depth, and equipment most suitable to the job (scratching vs. discing) and their impact on pest management and yield.
2. Develop and evaluate efficient harvesting practices to address the lack of affordable, reliable, and capable labour for crop management (particularly harvest).
3. Investigate management techniques related to late spring frost damage to optimise yield (e.g. re-training new shoots, prune current bine, leave current bine).
4. Ongoing cultivar evaluations under Ontario growing conditions (yield, cone quality, analytical properties of cones, resistance to disease, ease of harvesting, etc.).

SERVICE PRIORITIES

Immediate
Plant Genetic Resources/Pest Management
2. Increase availability of hop virus testing in Ontario and include a database of propagators with clean plants.

Marketing
1. Increase accessibility to local markets and communication between government agencies for selling beer made with locally grown hops and other locally grown ingredients (i.e. address restrictions on shelf space in the LCBO, while considering sales at local farmers’ markets, and other retail outlets). Considerations include percent (%) content of ingredients, supply volumes required for LCBO. Possibly partner with Grape Growers of Ontario, Culinary Tourism Association, etc. on discussions.

Food Safety
1. Provide timely information on the Safe Food for Canadians Act (SFCA) (Food Safety Modernization Act in USA) - New legislation regarding on-farm processing/packaging.
Laboratory Services/Quality Control
1. Work with laboratory facilities to increase access to affordable analytical testing for Ontario hops (spectrophotometry vs. HPLC) including Alpha Acids (Humulone, Ad-humulone, Co-humulone), Beta Acids (Lupulone, Ad-lupulone, Co-lupulone), and Hop Storage Index (HIS).
   Top 4 essential oils:
   • Humulene; Caryophyllene; Farnesene; Myrcene
   Other essential oils of interest, not so well understood:
   • Linalool; Geraniol

2. Hop quality standard/benchmarking/grading developed through the OHGA or a hop working group (goal to educate new and existing growers). Standard or benchmark could provide different marketing options for pricing based on cultivars, moisture content, packaging, hop colour, etc.

Production efficiencies
1. Hop agronomic and pest management ‘APP’, pocket guide, or database (e.g. photos, ID, Q&A, record keeping, could include timing and/or rotations for: pruning, stringing, fertility, pest control products, nutrient deficiency symptoms, harvesting, drying/post-harvest)
2. Low-cost hop specific sprayer designs

Post-harvest
1. Summarise management techniques of insects and/or debris on cones during harvest and post-harvest activities (e.g. ladybugs).
2. Summarise research completed on post-harvest handling and its effects on hop cone chemistry (optimal drying temperatures, durations, and standard packaging for small and large scale options, etc.).
3. Summarise oast designs/options for small scale hop production (~5-10 acre operations).

Education
1. Identify speaker funding for education days and workshops (e.g. AMI speaker funding).
2. Develop linkages with other beverage sectors in Ontario to learn from their experiences (e.g. Grape Growers of Ontario).

On-going
Marketing and Business Development
1. Increase accessibility to local markets and communication between government agencies for selling beer made with locally grown hops and other locally grown ingredients (i.e. address restrictions on shelf space in the LCBO, while considering sales at local farmers’ markets, and other retail outlets). Considerations include percent (%) content of ingredients, supply volumes required for LCBO. Possibly partner with Grape Growers of Ontario, Culinary Tourism Association, etc. on discussions.
2. Continue discussions with Agricorp on developing Crop Production Insurance programs for Ontario hop growers.
3. Produce an annual provincial hop acreage report to better understand changing supply and availability of Ontario hops by cultivar.
4. Work with brewing industry and government to develop a beer quality assurance program which brands beer based on regionally grown ingredients including local hops (similar to VQA system).
5. Create cost of production and forecasting templates/worksheets specific to Ontario hop production.
6. Create a database of templates and resources to assist with developing forward contracts.
Production efficiencies/Post-harvest
1. Create database (update OMAFRA page) of equipment suppliers. Specific needs noted in 2014/2015: post-harvest equipment suppliers (i.e. freezer storage, mobile units, rental units), vacuum sealers and mylar bag suppliers.

Pest Management
1. Document and create a database of insects, diseases and weeds specific to Ontario hop production.
2. Training of qualified scouts specific to Ontario hop pest management.
3. Summarise information pertaining to the use of sheep and other livestock for weed management in hops.
4. Develop educational materials on the importance of sourcing disease/virus free stock.
5. Develop in-field workshops/IPM workshops and videos.

Funding Opportunities
1. Increase access to information and availability of funding opportunities at the farm level for implementation and development of specialty crops in Ontario (e.g. LFF, GF2, and cost-share opportunities through OMAFRA/OSCIA workshops).

Education
1. Identify speaker funding for education days and workshops (e.g. AMI speaker funding).