Keys to Successful Organic Raspberry Production

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Learning objectives

• What are the economics of raspberry production?
• Is organic production of raspberries feasible?
• How do raspberries grow?
• Keys to successful production
Raspberries

- 281 bearing acres
- 169 tonnes
- $1.053 million farm gate value
- fresh fruit use
- hedgerow production system
- tunnel production of primocane fruiting types
- some biennial production

Statistics Canada 2011
## Economics (per acre basis) of berry crops

<table>
<thead>
<tr>
<th>Crop</th>
<th>Establishment cost</th>
<th>Operating cost</th>
<th>Crop revenue</th>
<th>Break-even yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberries</td>
<td>$3,500</td>
<td>$6,500</td>
<td>$10,500 (6,000 qts)</td>
<td>3,715 qts</td>
</tr>
<tr>
<td>Raspberries</td>
<td>$5,000</td>
<td>$4,000</td>
<td>$10,500 (3,500 pts)</td>
<td>1,333 pts</td>
</tr>
<tr>
<td>Highbush blueberry</td>
<td>$15,000</td>
<td>$8,000</td>
<td>$20,000 (8,000 pts)</td>
<td>3,200 pts</td>
</tr>
<tr>
<td>Lowbush blueberry</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$770 (1 tonne)</td>
<td>1.3 tonnes</td>
</tr>
<tr>
<td>Grapes</td>
<td>$15,000</td>
<td>$4,000</td>
<td>$4,500 (3 tonnes @ 20 Brix)</td>
<td>2.7 tonnes</td>
</tr>
<tr>
<td>Cranberries</td>
<td>$40,000</td>
<td>$5,000</td>
<td>$10,500 (150 bbls)</td>
<td>71 bbls</td>
</tr>
</tbody>
</table>

Personal information, J.Lewis 2009
Toughest to grow organically – why?

• Mid to late season crop – hard to avoid pests
• Broad pest profile – serious root, cane, and fruit diseases; insect suckers and borers aplenty; weeds
• Aiming for a ten year crop – not going to do long-term nutrient management with a pre-plant cover crop
Raspberry biology – Floricane ‘summer fruiting’ types

![Diagram showing primocane and floricane growth with axillary buds and fruiting laterals, indicating the need for manual pruning.](image-url)
Raspberry biology – Primocane ‘fall fruiting’ types

- Can produce on 2nd year floricanes as well but generally not so as to enable mechanical pruning
- Top heavy – needs a strong but removable trellis
Key to success # 1: Must have a good site!

- Good sun exposure
- Gently sloping for air drainage
- Windbreaks
- Cannot plant on land that once had potatoes – Verticillium wilt will get you!
Key to success # 2: Must have a good soil

- Drainage, drainage, drainage – if you don’t have it or can’t make it don’t grow raspberries or you will get ‘Phytophthora’ root rot
- Deep sandy-loam soil with O.M. above 3% ideal
- In less than ideal soils, consider tile drainage and/or planting on hills
- No sawdust please!
Raised beds
Soil preparation

• Don’t rush or you will regret it!
• Soil preparation should begin at least one year prior to planting to build up soil organic matter and minimize perennial weed problems;
• Consider pre-plant ‘green manure’ cover crop
• **Soil test** to allow pH, P, K, and boron adjustment prior to planting. Ideal pH is between 5.5 and 6.5
Key to success #3: Choose resistant cultivars

• Look for disease resistant varieties that are locally adapted,

• Diseases of concern include: Phytophthora root rot, crown/cane gall, fire blight, fruit rot, cane diseases, late yellow rust

• Buy certified stock to minimize virus problems
Phytophthora root rot
Cultivars

- **Boyne** – very winter hardy, early but smallish, darker, soft fruit; resistant to late yellow rust and tolerant of Phytophthora root rot and crown gall; suitable for U-pick and processing.

- **Nova** – winter hardy, mid-season variety with medium sized, firm berries with good flavor and shelf-life. Resistant to late yellow rust and fire-blight but susceptible to cane botrytis and cane gall.
Primingocane ‘fall’ fruiting cultivars

• **Autumn Britten** – early ripening with large, firm, good flavored fruit; less vigorous;

• **Himbo Top** – mid-season with very large, firm, bright light red, easy-to-pick, flavourful berries; high-yielding; Phytophthora root rot resistance; vigorous so watch fertility

• If you want to make the most of fall bearers you need an island or tunnels!
Key to Success # 4: Must have a Pest Management Plan

- Weed control plan
- Diseases
- Insects
Weed control

- Weed control toughest in planting year – not so difficult when fully established;
- Consider planting on plastic mulch and stripping away after first year;
- Vinegar for small weeds, possibly flame weeding;
- Manual weeding in the planting year and in the spring of production years.
Disease control

• Site and cultivar selection help but they aren’t cure-alls!
• Use good **cultural practices** that improve air circulation and shorten drying times:
  – Spring floricane thinning and post-harvest floricane removal if cane diseases present
  – Summer ‘primocane’ thinning
  – Maintain narrow rows.
  – Use divided canopy trellis systems
  – Avoid excessive nitrogen fertilization
  – Use trickle irrigation
  – Weed control
Botrytis

Cane Botrytis

Botrytis fruit rot
Organically allowable pesticides for disease control

- **Cane diseases** – *Lime Sulphur* – apply at ¼ inch green tip – “single most important spray”! Make sure it is allowable by your certifier!
- **Botrytis fruit rot** – *Serenade ASO* for suppression of botrytis grey mould – focus sprays during bloom and up to preharvest;
- **Fire blight** – *Bloomtime Biological FD* for suppression of fire blight – focus sprays during bloom
Insect and mite management

- Root weevils – insect pathogenic nematodes (eg. *Heterorhabditis bacteriophora* ‘Larvanem’ from Koppert) applied through trickle in late summer

- Two spotted spider mites – predatory mites (eg. *Phytoseiulus persimilis* – ‘Spidex’ from Koppert)

- Leaf rollers, spanworms – Entrust 80W, B.t products (Dipel, etc)
Insect and mite management (con’d)

• Tarnished plant bug – trap crops?
• Raspberry sawfly?
• Raspberry fruitworm?
• Raspberry crown borer?
• Raspberry cane borer?
• Leafhopper – Surround WP but minor pest
And then there’s Spotted Wing Drosophila!

• New species of fruit fly that attacks full ripe berries and loves raspberries;
• Population levels start increasing in early August – raspberry season!
• One organic control – Pyganic Crop Protection EC 1.4 Emergency use for 2012 only!
• Make sure any controls you apply are allowable by your certifier!
• Read the labels carefully for application details and warnings!
Key to success #5: Must have a nutrient management plan

- What are the key nutrients raspberries need?
  - Nitrogen (N) macronutrient
  - Phosphorous (P) macronutrient
  - Potassium (K) macronutrient
  - Calcium (Ca) secondary nutrient
  - Magnesium (Mg) secondary nutrient
  - Boron (B) micronutrient
  - Iron (Fe), Zinc (Zn), Copper (Cu), Manganese (Mn)
  - Sulfur (S) secondary nutrient?
- Must use organically allowable nutrient sources – check with your certifier to make sure
What does the soil test report say?

- Crop to be Grown
- pH
- Organic matter
- Macronutrients
- Micronutrients
- Lime recommendation
- N,P,K recommendation
Pre-plant nutrient amendments (from your soil test)

- Limestone and/or gypsum for pH, Ca, and Mg adjustments (also sulfur)
- Mineral phosphates or bone meal for P adjustment
- Sulphate of potash magnesia (Sul-Po-Mag/K-Mag), non-synthetic potassium sulphate (0-0-50), or kelp meal for K adjustment
- Borax or Solubor for boron adjustment
- Verify with your certifier!
Nitrogen management

• Mature summer fruiting raspberries require 40-80 lbs N/acre/season depending on cultivar and soil type
• Mature fall-bearing raspberries require 70-100
• Consider a pre-plant compost application to meet planting year N needs:
  – Use a compost that has a C/N ratio below 15 for short-term nutrient availability
• Use spring ‘bud break’ surface applications of compost – C/N ratio below 15
• Perhaps fish fertilizer through trickle system?
• Compost tea through trickle system?
• Molasses?
• Food safety issues
• Verify inputs (eg. Compost source) with certifier!
Key to Success #6: Utilize an effective trellis system

- Trellis system:
  - T-trellis, V-trellis, I-trellis
  - Divided canopy best for disease control
Key to success #7: Utilize trickle irrigation

• Best for disease control
• Option for pest control delivery and nutrient management
• Essential for optimum yields – raspberries require 1-1.5 inches of water/acre/week
• Don’t overdo it or you will have root rot!
Key to success #8: Use timely pruning practices

- Fruiting canes are removed immediately after harvest to reduce disease and insect pressure.
- In early spring, while still dormant, remaining canes are thinned to 10-15 canes per meter of row, depending on cane height and caliper.
- Row widths should be maintained at 18 inches – use your whipper snippers regularly!
- Summer prune late primocanes prior to harvest.
High-tunnels

- High cost but better for biological control of pests and essential for optimum yields of fall fruiting types
- Economics unproven at this date
Key to success #9: Have a post-harvest handling and marketing plan

• Don’t plant until you know you have a market!
• Raspberries have the shortest shelf-life of all the berries:
  – If shipping to a store you need forced-air cooling
  – Harvest a hair under-ripe – not over-ripe!
  – Harvest regularly – every two days to avoid over-ripe fruit
  – Cool to 1 °C asap and no later than 12 hrs from harvest
  – Hold at 0 °C and 90% humidity until shipping
PRECOOLING TYPICAL PERFORMANCE

TEMPERATURE, °C

TIME, MIN

NO COOLING
FORCED AIR
HYDRO
VACUUM
Questions or feedback?