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Update: Growing *Rubus* crops in containers and substrate

In 2020, we wrote an e-GRO Edibles Alert on growing Rubus species (blackberry and raspberry) in containers and soilless substrates called “Is container-grown blackberry ready for prime time?”

At the time, the concept of growing these crops using soilless culture was relatively new to North America with only a few early adopters. Fast-forward three years, and this has become a major topic within the *Rubus* community, with significant growth. This past week was also the North American Raspberry and Blackberry Association’s (NARBA) 2023 Annual Conference, where industry leaders discussed the status and future of substrate-grown raspberry and blackberry.



Figure 1. Raspberry grown as long-canecrops in soilless substrate in a high tunnel.

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This e-GRO Alert provides an update on substrate-grown blackberry and raspberry and highlights from the 2023 NARBA conference.

Basic methods of production

There are multiple methods for growing blackberry and raspberry in substrate, however we will discuss two of the more common strategies. The first strategy is to produce a “primocane-fruiting” or annual crop.

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Vegetatively propagated plugs are transplanted into containers in spring, first year growth develops into long canes (i.e. primocanes) during summer, and fruit is harvested from the primocanes in fall. Only certain varieties of raspberry and blackberry have been bred to be primocane-fruiting, as *Rubus* species typically develop fruit on second year canes (i.e. floricanes) after a dormancy period. Primocane-fruiting genetics for substrate cultivation are more advanced for raspberry than blackberry, and we tend to see more annual cropping of raspberry in substrate.

The second strategy is to produce a floricanes-fruiting crop. Primocanes are grown in containers, similar to the first strategy, but go dormant in the fall instead of developing fruit. After accumulating some of the outdoor chilling requirement, dormant plants are cold stored until needed for spring production. Plants are then transplanted into larger containers, and the now second-year canes or floricanes develop flowers and fruits. Both raspberry and blackberry crops are produced using this strategy. Plants are grown either outdoors or under tunnels during primocane development, but are grown under high tunnels and sometimes in greenhouses during flower and fruit development.

The term “long-cane” is used to refer to the second production strategy but is sometimes used to describe the first strategy. For the remainder of this article, the term long-cane will be used to encompass the production of raspberries and blackberries using both strategies.



Figure 2. Production of blackberry long-canes in an outdoor nursery in the United Kingdom.



Figure 3. Production of blackberry long-canes in a nursery under plastic cover, in a double row V-trellis system.



Figure 4. Blackberry long-canes being forced for flower and fruit production in a greenhouse in the United Kingdom.



Figure 5. Dormant raspberry long-canes just breaking bud and being forced for fruit production in a high tunnel in Canada.



Figure 6. Dormant blackberry long-canes being forced for fruit production in a high tunnel in Mexico.

Highlights from the 2023 NARBA conference

Long-cane production has reached global status and continues to expand. The global origin of long-cane production is Northern Europe, primarily the United Kingdom, Belgium, and The Netherlands. Long-cane production has since spread to other European countries including Spain, Portugal, France, and Germany, and more recently to countries in Africa, Southeast Asia, North and South America, and Australia.

A few years ago, there seemed little evidence of long-cane production in the United States. Now, a drive through California exposes significant investments in acreage towards substrate-grown raspberry and blackberry. Some growers along the East Coast, for example in North Carolina and Georgia, have also started producing or experimenting with long-canes. Progressive growers in Canada have been producing long-cane raspberry successfully for local markets for years and are now trialing blackberry. Mexico remains a huge supplier of blackberries/raspberries to the United States and has also been increasing the amount of substrate production.

Breeders have tuned into long-canes. Private sector breeders including Driscoll's (United States), Hortifrut (Chile), NIAB East Malling (United Kingdom), and Niwa Breeding (Poland) provided updates which included efforts in breeding targeted towards substrate long-cane production. Driscoll's announced that over one-third of their global test plot efforts were dedicated to long-cane production systems, and Hortifrut listed long-cane production as part of their global strategy for sustainability.

Researchers are presenting new data on long-cane production. I presented on scheduling strategies for long-cane blackberry and a costing and profitability model study for long-cane raspberry. Research and extension specialists Lisa Rayburn and Dr. Gina Fernandez from North Carolina State University presented on pine bark as an alternative to coconut coir for long-cane raspberry production, and Josh Hayes from TriEst Ag presented on transitioning from soil to substrate production with key ideas on infrastructure and fertigation.

It is becoming easier to find the specialized plant material, supplies, and information needed for long-canes. An increasing number of vendors now cater to long-cane customers. Nourse Farms (noursefarms.com) in Massachusetts specializes in growing raspberry and blackberry long-canes, which can be purchased dormant and shipped to your location. Fibre Dust (fibredust.com) is producing coir-based substrate blends specialized for berry and long-cane production. Plantlogic (getplantlogic.com) is producing a range of different container options for these systems. Hort Americas (hortamericas.com), a long-time distributor for greenhouse hydroponics and controlled-environment agriculture, now offers a range of supplies for long-canes. TriEst Ag (triestag.com) is now providing fertilizer, irrigation, and other technical solutions to growers in this area. This is by no means a comprehensive list of suppliers for the raspberry/blackberry long-cane industry, but rather some of those in attendance at the 2023 NARBA conference.

Long-cane production offers plenty of potential benefits, but there are also risks. The potential benefits of transitioning from soil to substrate long-cane production that resonate the most with growers include higher yields per acre, improved berry quality and consistency over time, and greater harvest labor efficiency. The higher yields and berry quality come with higher planting densities, improved fertilizer and irrigation management, reduction of soil-borne pathogens, and protected cultivation (i.e. tunnels, greenhouses). The high planting density and unique trellising of long-canes reportedly allows workers to more easily pick fruit, cutting down on labor. Some of the major risks include variability in quality of purchased long-cane material, higher production costs, and lack of technical knowledge or support for long-cane production systems.

Conclusions

Long-cane and substrate production is a small but expanding sector of the raspberry/blackberry industry. With global prospects for breeders and growers, we will likely see continued growth in the years to come.



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