



# Quirks of Breeding Black Raspberries

## Part 1 of 3



Centers for Disease Control and Prevention and  
National Cancer Institute  
*(click on image)*

Spoon yourself some health!  
Eating more colorful whole foods *really* matters!



Golden raspberry, *cultivar* ("cultivated variety") of red raspberry (*Rubus idaeus*)

*What is the black raspberry?*

- a raspberry species native to the northern United States and southern Canada
- a close cousin (*Rubus leucodermis* -- western North America; *Rubus occidentalis* -- eastern North America) to the more common red raspberry (*Rubus idaeus*)
- nearly all of the commercial crop is cultivated in Oregon and Washington State; wild black raspberry grows from southern British Columbia to upstate New York and North Carolina



Black raspberries (*Rubus leucodermis* L.) in different stages of ripening -- red berries are still maturing; black berries are ripe. Black raspberries contain dense amounts of **polyphenols** that (in lab experiments) inhibit cancer mechanisms

## *Why are we interested in the black raspberry?*

- among berries native to North America, it is second only to black chokeberry (*Aronia melanocarpa*) for density of polyphenols associated with antioxidant properties in test tube experiments
- it is popular for flavoring and coloring foods and beverages
- there is growing research evidence for black raspberry preparations having anti-cancer effects both in laboratory studies and in early-stage human clinical trials on patients with oral, throat or rectal cancer

Recent example of anti-cancer evidence:

[Press release for consumer public](#), *click!*

With such promising and favored properties as these, increasing the amount of acreage for

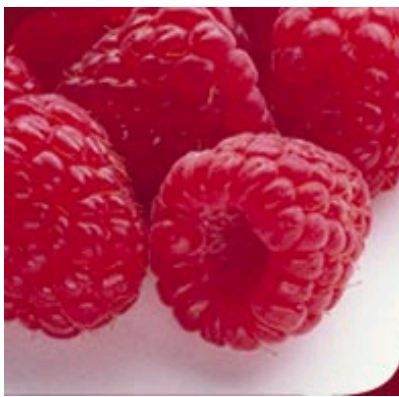
the commercial crop would seem an important investment.

*However, black raspberries are proving  
difficult to cultivate --  
even for the best berry scientists  
of the US Department of Agriculture.*

What are some of the issues for breeding and cultivating more black raspberries with stronger growing characteristics?

### *Challenges and quirks of breeding black raspberries*

1. among popular cultivars in the western US, there is *little genetic variation* -- an 81% similarity, possibly weakening the available stock, as evident by high disease rate and crop turnover
2. *fruit size* is perhaps the main favorable differentiated trait
3. the main black raspberry **anthocyanins** are called cyanidins and pelargonidins making up > 92% of total **polyphenols**
4. other desirable traits (hardiness, virus-bacteria-fungus resistance, specific nutrient contents) may be genetically improved through breeding but this has not yet been accomplished
5. fruit ripening in warm dry climates like the southern interior of Washington or eastern Oregon would likely yield smaller fruit but with higher sugar and anthocyanin content
6. viruses such as wilt and **canker** affect yield and longevity of plantings
7. due to weak genetic inter-breeding and susceptibility to diseases, the average life of a black raspberry vine even under close cultivated care is only 3-4 growing seasons -- this is discouraging for berry farmers to invest in this crop
8. in the United States, there may be only some 40 farms cultivating black raspberries
9. a current strategy to improve the genetic foundation for cultivated black raspberries is to cross a wild strain having strong disease resistance with a cultivar having ideal fruit size



Red raspberries (*Rubus idaeus*)

## Reading

- a [full research report by USDA berry scientists](#) -- complex genetic details and horticulture, *click*

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