

Berry Bulletin

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The University of Idaho College of Agricultural and Life Sciences, Sandpoint Research & Extension Center

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Welcome to *Berry Bulletin*! This newsletter discusses commercial and home berry and grape production, processing, and marketing in Idaho and surrounding regions.

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want to be removed from our mailing list, please contact us. Contact information is at the end of this newsletter.

This issue is devoted to raspberries and blackberries. The University of Idaho is also active in research and extension activities relating to blueberries, huckleberries, bilberries, lingonberries, currants, gooseberries, jostaberries, saskatoons, strawberries, and blue honeysuckle. Future issues will address these crops.

Idaho's Raspberry and Blackberry Industry

Raspberries are popular home and market garden crops throughout Idaho. Their cold hardiness and adaptability to diverse soils and climates make them valuable for fruit production in the state. Unlike Washington and Oregon, however, Idaho does not have large, centralized raspberry or blackberry industries.

Washington produces around 33,600 tons of red raspberries each year on 9,500 acres. Oregon annually produces about 3,300 tons of red raspberries and 1,100 tons of black raspberries on 1,900 and 1,000 acres, respectively. Oregon is famous for high-quality blackberries, producing more than 23,000 tons annually on 6,200 acres. Most Oregon and Washington production is located in coastal areas west of the Cascade Mountains.

Mild coastal climates and large areas of level farmland and slightly to moderately acidic soils make the northern Pacific Coast an ideal location for large-scale berry production. Most Washington and Oregon berries are machine

harvested and are used for jams, jellies, drinks, and other value-added products. The Watsonville area of northern California is a leading producer of fresh market raspberries.

Raspberry production in Idaho is scattered throughout the state and is largely produced for home consumption or direct sale in local markets. Efforts to establish a large raspberry industry in northern Idaho during the late 1980s and early 1990s largely failed. From a production standpoint, many growers started with too little experience and too much acreage. Some crops literally rotted in the fields because local skilled labor pools were unavailable and many prospective harvesters were unwilling to pick raspberries at the wages available. Failure to identify an effective marketing strategy also contributed to the industry's failure to establish itself. Small acreage production targeting local markets and focusing on high berry quality for the fresh market have proven more successful.



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Idaho raspberry growers enjoy two large advantages over their coastal counterparts. The first is the climate. Many regions of the state typically experience warm summer days and cool nights. Under these conditions, raspberries build up large amounts of sugar, producing especially sweet, firm fruits. Second, raspberries quickly go from underripe to overripe. In order to ship the fruits to distant markets, raspberries are picked when they are mature, but not fully ripe. While they still develop good color during shipment

and display, the fruits do not develop as much flavor as they would if they were fully vine ripened. By focusing on local markets, Idaho growers are able to allow the berries to more fully ripen before harvest, providing their customers with excellent quality.

Blackberries are less cold hardy than raspberries and are generally best grown for commercial use in the warmest areas of the state around Boise, Lewiston, and Coeur d'Alene. Even then, it is wise to select the most cold hardy blackberry cultivars.

What Cultivars are Best for Your Site?

Gardeners and commercial fruit growers have a tremendous number of raspberry and blackberry cultivars to choose from. All have their advantages, but many are not well suited to Idaho. Even within the state, climate differs. Choosing cultivars adapted to

your location are critical for successful and enjoyable production.

To assist you in selecting raspberry and blackberry cultivars best suited to your region, the University of Idaho has both printed and on-line guides. Information on these resources is provided on page 7 of this newsletter.

Is a Commercial Bramble Farm for You?

As with most fruit crops, raspberries and blackberries require long-term commitments. Commercial plantings generally take three to four years to come into full production and produce for an additional 6 or 7 years before replacement is recommended. Raspberries are very labor-intensive and investments for trellises, irrigation systems, deer fences, and cooling facilities are high. Some blackberries can be grown without trellises, but establishment costs for the two crops are similar.

Selecting and properly preparing an excellent site and matching suitable cultivars to it are critical for success. Raspberries are susceptible to root rot and require a light, well-drained soil at least 18" deep. Blackberries are less susceptible to root rot and tolerate somewhat heavier soils. An optimum site has a slope of about 2 to 4% to provide for water drainage and drainage of cold air during the spring and fall. An optimum soil will have a pH

between 5.8 and 7.0 (pH 7.0 is neutral) and a low salt content. Production on alkaline soils (pH above 7.0) is possible, but can present some difficulties. Neither crop tolerates drought well and both are grown commercially with irrigation.

Raspberry cultivars vary widely in their cold hardiness. Black raspberries are hardy only to between -5 and -10°F. Purple raspberries are hybrids between red and black raspberries and are hardy to between -10 and -20°F. Because of the potential for freezing injury, commercial production of black and purple raspberries in most of Idaho is risky. Red raspberries are the hardiest of the caneberries, and many cultivars can survive temperatures of -20°F or colder.

Blackberry cultivars differ greatly in their cold hardiness. Trailing types, like 'Marion,' 'Logan,' 'Hull,' and 'Tayberry,' are injured or killed at temperatures between 0 and +5°F. Many erect blackberry cultivars are much

more cold hardy. 'Darrow' is the most cold hardy, followed by 'Illini Hardy.' These cultivars tolerate temperatures of -20 °F or slightly below. Thornless cultivars 'Chester' and 'Dirksen' are hardy to -15 to -20 °F and are good choices for warmer Idaho locations. Unlike raspberries, blackberries require warm temperatures and long growing seasons in order to ripen the fruit. Commercial blackberry farms are best located in USDA Plant Hardiness Zone 6 or, preferably, Zone 7 or warmer.

Raspberries bear fruit either during the summer (summer-bearers) or both in the fall and summer (fall-bearers). Summer-bearing raspberries produce a single crop of berries on one-year old canes during July and August. Fall-bearing (also known as primocane-bearing) cultivars produce crops of berries on current season canes during the late summer or early fall. If the bearing canes are left, they will produce a second, lighter crop the following summer. Most commercial growers harvest only the fall crop. Fall-bearing raspberries can be damaged by fall frosts and it is important to select cultivars that will ripen at your site before expected frosts.

Blackberries produce single crops of berries in the fall. 'Darrow' is the earliest ripening and most cold hardy blackberry, but flavor and other fruit qualities are poor. Many other blackberries tested in northern Idaho (Zone 5) grew well and produced abundantly, but fruits often failed to ripen before fall frosts.

Bramble fruits are among the most delicate and perishable of all crops. For fresh use the berries should be picked at least every other day during the harvest, handled as gently and as little as possible, cooled immediately after picking, and should reach consumers within 48 hours of picking. The berries can be picked by machine, but are then only suitable for processing.

Potential Costs and Returns

Establishing a commercial raspberry or blackberry enterprise is expensive. Before land, equipment, or plants are purchased, prospective growers should determine whether or not they have adequate resources not only to successfully establish and operate a their

operation, but also to survive a poor crop or marketing year. A producer should not expect a positive cash flow until at least the second growing season for fall-bearing raspberries and the third growing season for blackberries and summer-bearing raspberries. Advance budgeting is also necessary before expanding an existing operation.

Plan to spend at least \$8,000 to \$9,000 per acre, not including labor, for site preparation, plants, a trellis system, and an irrigation system. Also consider the cost of purchasing or renting the land. Refrigerated storage facilities may be required. An herbivore (deer and moose) fence is a necessity in many parts of Idaho for young plantings, especially raspberries. Even mature plants can be seriously damaged by herbivores. Contact the Idaho Department of Fish & Game for guidance on whether protection is recommended in your location. Labor expenses for brambles are high, especially for thorny raspberries and blackberries. For harvesting during the peak of the season, you will need eight to ten experienced pickers per acre. Pruning and trellising costs are less for fall-bearing raspberries than for summer-bearing cultivars.

Summer-bearing raspberries produce about 10 to 20% of a full crop during their second season, about 80% of a full crop in their third season, and should be into full production in their fourth season. Although yields of 10,000 pounds per acre or more are possible, most commercial red raspberry growers in the Pacific Northwest average 3,400 to 7,300 pounds per acre. Black raspberry yields are lower, averaging around 2,200 pounds per acre.

Fall-bearing raspberries yield less than summer-bearers, but reach full production earlier. Even when growers provide excellent care, up to 40% of harvested berries fail to meet the grading standards for fresh use due to poor color, shape, or size, and alternative markets for processing-grade berries should be established.

Oregon blackberry yields average about 7,000 pounds per acre, with Boysenberry and Loganberry crops yielding about 3,000 to 4,000 pounds per acre.

Blackberry yields in Idaho have not been documented, but will probably be lower.

High-quality, fresh red raspberries presently sell for \$1.30 or slightly more per pound on the wholesale market. Remember that harvest and shipping costs for fresh fruit are high. Because of reduced labor costs, U-pick berries sell for lower prices than grower-picked fruit, but production costs are also

lower. Wholesale, processing red raspberries sold for about \$0.70 to \$0.76 per pound in 2004-2005.

Fresh, wholesale blackberry prices averaged between \$1.00 and \$1.49 during 2004-2005. Wholesale processing blackberries sold for \$0.41 to \$1.00 per pound during the same period.

Research Updates

Evaluation of Select Raspberry Cultivars in Southern Idaho

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Cooperators include the Sawtooth Botanic Garden, Ketchum, Idaho, and Idaho Master Gardener volunteers. The project was supported by the Northwest Center for Small Fruits Research.

Summary

The growth, yield and berry quality of six raspberry cultivars ('Algonquin', 'K-81-6' 'Lauren', 'Nova', 'Qualicum', and 'Reveille') grown in southern Idaho were compared. Over the course of the study, highest yielding in 2001 was 'Nova' (7.65 T/A) and in 2002 'K-81-6' (10.4 T/A). In the second year of harvest (2002), all cultivars produced greater than the projected commercial production requirement of 3 T/A. Raspberry bloom occurred after the spring frosts. Berry size was largest in 'K-81-6' (3.3 g and 2.5 g in 2001 and 2002 respectively) and smallest in 'Algonquin' (1.8 g and 1.5 g in 2001 and 2002 respectively). Early fruiting cultivars were 'Nova' and 'Reveille'.

Introduction

Southern Idaho is experiencing increasing demand for local niche products. Small farmers and traditional agricultural producers seeking to diversify need reliable alternate crop information. No raspberry cultivar trials have been done in southern Idaho using newer cultivars.

The study site is representative of southern Idaho growing conditions with a short season of 90 to 100 frost-free days; cold winter nights with 0 to -30°F and days of 10 to 35°F; and warm, dry summer days of 75 to 90°F with cool nights of 40 to 60°F.

According to enterprise budgets developed by Oregon State University, raspberries, at \$0.64/lb, break even at 3 tons/acre with machine harvesting. The purpose of this study was to determine if southern Idaho production might be economically feasible using the cultivars in the trials.

Materials and methods

Plots were planted on 26 May 1999. Six raspberry cultivars were randomly located within three replications. All plants were obtained from Norse Farms (South Deerfield, MA) except for 'Qualicum' raspberry from Spooner Farms (Puyallup, WA), and 'Algonquin' raspberry from Indiana Berry and Plant Company (Huntingburg, IN). Rows were 15 feet long. Raspberry cultivars were 'Algonquin', 'K-81-6' 'Lauren', 'Nova', 'Qualicum', and 'Reveille'. Raspberries were spaced three feet apart in rows row (5 plants per replication) with rows four feet apart.

Plots were drip irrigated as needed beginning 26 May 1999. The study site is organically managed, and the plants were fertilized with fish fertilizer pellets (7-7-2, Bio-Fish All Purpose Fertilizer, Down to Earth Distributors, Eugene, OR 07401). Raspberries were fertilized in a split application at full leaf (late May to early June) and fruit set (late June

to early July) with 70 lb N/A (31.8 kg/A). Plots were kept weed free with bark mulch, hoeing, and shallow rototilling. Each year, two to four feet of snow covered the planting from early December through mid-April. No disease or insect control was needed during the four years of the study.

The canes were supported by a post and twine trellis and pruned and trained in early to mid May. Due to cold temperatures and a lack of honeybees during raspberry bloom, bumble bee colonies (one in 2002 and two in 2003) were placed in the raspberries in mid June for pollination (Biobest Canada, Ltd, Ontario, Canada).

In 1999, deer browsing was noted beginning in mid-August. This became more severe in September, when the tips of the new canes were eaten. On 29 September, the deer repellent Hinder® (Uniroyal Chemical) was applied to the plots. This, combined with a highway death of one deer, reduced further damage. During the winter, deer continued to feed on the tips of the raspberry canes above the snow. As the planting grew stronger and the floricanes were stouter, winter-feeding by deer became less of a problem. Beginning in August 2000, and continuing August through October annually, Garden Scarecrows (Contech Electronics, Inc., Saanichton, BC Canada) controlled deer damage. These motion-detecting sprinklers direct an impulse of water toward movement and were effective in

frightening away deer. In 2000, Hinder® was applied about every 14 days to the raspberry plants.

Results and discussion

‘Lauren’ raspberry was almost completely replanted on 9 June 1999 due to poor establishment of original plants. By late July all cultivars were growing well although ‘Lauren’ raspberry was a little less vigorous than the other cultivars (data not shown).

In 2000, primocane growth was strong and by the end of the season, the plants had filled the two-foot-wide beds. Fall primocane heights are shown in Table 1. Shoot and cane growth was strong in all years and shoots emerging beyond the two-foot-wide row required control through rototilling and digging.

Plant vigor was evaluated each spring (Table 1). All cultivars except ‘Lauren’ exhibited strong vigor each spring. Tips of the raspberry canes stuck out above the snow in the winter. Each spring, ‘Lauren’ plants were small and sparse and suffered cold damage to cane tips. ‘Algonquin’ established slowly, but grew stronger each year. All other cultivars grew quickly and were strong in the spring, with no winter tip damage. In 2002 lower cane laterals were dead on the portion of the canes that had been under the snow in ‘Qualicum’ and ‘Reveille’.

Table 1: Spring vigor and fall primocane height of raspberry cultivars planted May 1999.

Raspberry Cultivar	Average Spring Vigor*				Fall Primocane Height (cm)		
	15 May 2000	30 May 2001	31 May 2002	3 year average	30 Aug 2000	30 Aug 2001	4 Oct 2002
Algonquin	4.3	5.3	6.0	5.2	95	125	152
K-81-6	5.7	6.0	6.0	5.9	120	144	165
Lauren	3.0	3.7	4.7	3.8	126	135	175
Nova	5.0	6.7	6.0	5.9	119	144	163
Qualicum	6.0	5.0	5.7	5.6	135	154	155
Reveille	5.0	6.3	6.0	5.8	102	122	135

*Vigor scale 1-10; 1 = barely alive, 5 = weak, but acceptable growth, 10 = growing extremely well

Spring freezes occurred in May and June each year. In 2001, the first year of production, few flowers were open during

freezes on 13 June at 31°F and 14 June at 30°F and no damage occurred. In 2002, some flowers were open on 19 June with 32 °F, and

slight flower damage was observed. Raspberries bloom after most of the spring frosts experienced in southern Idaho, so fruiting performance is more reliable than earlier flowering small fruits.

No harvest was done in 2000 due to the loss of floricanes to deer feeding. In subsequent years, raspberry plants were harvested weekly from late July through early to mid September (26 July through 13 September 2001 and 23 July through 10 September 2002). In 2001, 'Nova' produced economically viable yields, as did all raspberry

cultivars in 2002 except for 'Lauren' (Table 2). Over the course of the study, 'Nova' (2001) and 'K-81-6' (2002) produced the greatest yields. In 2002, winterkill to lower laterals in 'Qualicum' and 'Reveille' in did not appear to affect yield greatly.

Berry weight was significantly greater in 'K-81-6' than all other cultivars, except for 'Qualicum' in 2001 (Table 2). Berry weights decreased by varying degrees in all cultivars as the season progressed in 2001, and berries produced during 2002 size were heaviest in mid-season (data not shown).

Table 2: Yield and average berry weight of raspberry cultivars planted May 1999.

Raspberry Cultivar	Yield (T/A)**		Average Berry Weight (g)**	
	2001	2002	2001	2002
Algonquin	2.2 bc	8.2 a	1.8 c	1.5 c
K-81-6	3.7 bc	10.4 a	3.3 a	2.5 a
Lauren	1.5 c	3.8 b	1.9 bc	2.1 b
Nova	7.7 a	7.5 ab	2.1 bc	1.7 b
Qualicum	3.0 bc	7.4 ab	2.3 ab	2.1 b
Reveille	5.6 ab	7.2 ab	2.0 bc	1.9 b

**Mean separation within columns by LSD, $P < 0.05$

'Nova' and 'Reveille' ripened earliest during 2001 (Table 3). In 2002 'Nova' and 'Reveille' again ripened early, 'Algonquin' was intermediate, and the other cultivars ripened late. Harvest intervals were similar in all cultivars for each year (Table 3).

Subjective fruit quality evaluations were made at each harvest in all years (data not shown). All cultivars were rated as having good

external color although 'Qualicum' tended to be dusty pink and 'Reveille' was dark and purplish (Figure 1). Flavor ratings were high in all cultivars, with flavor rated highest in 'Algonquin' (sweet) and 'K-81-6' (aromatic and sweet). 'Nova' and 'Reveille' were rated as tart or acidic. Fruit firmness rated highest in 'K-81-6', 'Qualicum', and lowest in 'Reveille'.

Table 3. Midpoint of harvest and harvest interval of raspberry cultivars planted May 1999.

Raspberry Cultivar	Midpoint of Harvest		Harvest Interval (5% to 95%)	
	2001	2002	2001	2002
Algonquin	August 14	August 8	August 2 – August 27	July 25 – August 24
K-81-6	August 15	August 15	August 2 – September 2	July 27 – August 27
Lauren	August 10	August 17	July 26 – August 24	July 24 – August 24
Nova	August 6	August 5	July 25 – August 22	July 23 – August 20
Qualicum	August 19	August 12	August 15 – September 3	July 28 – August 30
Reveille	August 3	July 31	July 24 – August 19	July 23– August 17

Over the course of this study, the highest-yielding cultivar was 'Nova', which established well and yielded most during the

first year of harvest. All other cultivars except 'Lauren' yielded as well as 'Nova' in the second year. 'K-81-6' had the largest berries.

All of the cultivars in these trials, except 'Lauren,' which lacks cold hardiness for the area, have commercial potential for southern Idaho. By the second year, all were yielding well above the break even yield of three tons per acre. Spring frosts were not a serious problem during these trials.

References

Turner, B. T. Cross, B. Strik and D. Kaufmann, 1993. Enterprise Budget, Red Raspberry, Willamette Valley Region. Oregon State University, EM 8539.

Resources for Northwest Berry Growers

Growing Raspberries and Blackberries in the Inland Northwest and Intermountain West – Bulletin 812.

Growing Blueberries in the Inland Northwest and Intermountain West – Bulletin 815.

Growing Strawberries in the Inland Northwest and Intermountain West – Bulletin 810.

Growing Western Huckleberries – Bulletin 821.

The booklets were written primarily for home gardeners, market gardeners and small acreage producers focusing on local markets. It covers planting site requirements, recommended cultivars, planting and trellis designs, fertilization, and harvesting. Organic and sustainable practices are included.

On-line copies are now available at <http://info.ag.uidaho.edu:591/catalog/default.htm>.

Printed copies are available on the same site or can be ordered from: Publications, University of Idaho P.O. Box 442240, Moscow, ID 83844-2240. Phone: 208/885-7982. Email: calspubs@uidaho.edu.

Commercial Red Raspberry Production – PNW 176 is undergoing a complete revision and should be available within the year from the University of Idaho, Oregon State University, and Washington State University. This guide is written for commercial growers.

Highbush Blueberry Production – PNW 215.

This guide, co-written by the University of Idaho, Oregon State University, and Washington State University, is intended for commercial berry growers. The guide covers site and cultivar selection, crop management, pests, diseases, and marketing. Order a copy from the University of Idaho (under ***crops***) at <http://info.ag.uidaho.edu/catalog/catalog.html> or from Oregon State University (***agriculture***) at <http://eesc.oregonstate.edu/>.

Northwest Berry and Grape Information

Network. This website is a cooperative effort between the University of Idaho, Oregon State University, Washington State University, and the U.S. Department of Agriculture. Production and marketing information are available for many berry and grape crops. <http://berrygrape.oregonstate.edu/>.

University of Idaho Sandpoint Research & Extension Center Website.

The SREC website provides current and past copies of Berry Bulletin, research updates, cultivar and crop recommendations, and help in evaluating your site for prospective crops. A weather page provides historical climatic profiles for Idaho's ten northern counties. www.ag.uidaho.edu/sandpoint.

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We hope that you will find *Berry Bulletin* useful. If you have any comments or topics you wish to see addressed, please contact us. We appreciate your participation.

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