PLANT BREEDING REVIEWS

Volume 32

Raspberry Breeding and Genetics

edited by

Jules Janick

Purdue University

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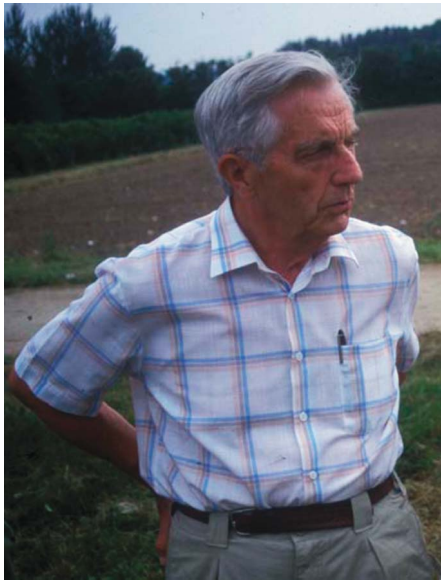
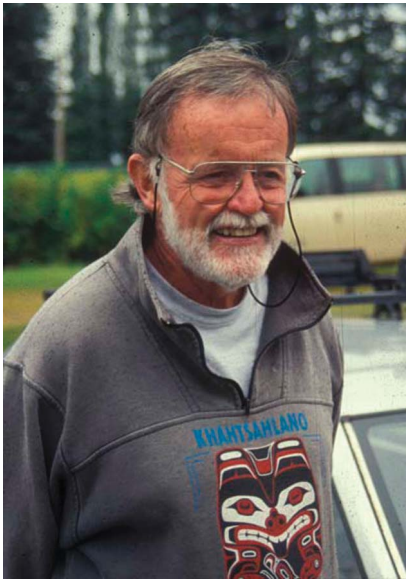


Derek Jennings



Hugh A. Daubeny

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Dedication: Derek Jennings and Hugh A. Daubeny Berry Breeders Extraordinaire

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Plant Breeding Reviews, *Volume 32* Edited by Jules Janick

This volume of *Plant Breeding Reviews* is dedicated to two extraordinary breeders who, with a combination of enthusiasm and expertise, have done much to change the raspberry industry. Both led the way in widening the genetic base of *Rubus* breeding programs and have encouraged international exchange of plant material and information. Their outstanding cultivar releases have foreshadowed the recent successes of the industry and are highly valued by raspberry breeding and growing programs throughout the world. Their collaborations have inspired the next generation of breeders and researchers to share information for international mutual benefit.

I. DEREK JENNINGS

A. Early Years

Derek Jennings was born in 1929 and grew up in Cardiff, Wales. His association with the principality continued when he obtained his first degree from the University College of Wales in Aberystwyth, in 1950.

After graduating, Derek went abroad for his first job. He was appointed as plant breeder to the East African Agriculture and Forestry Research Organization, in which capacity he was posted to Tanganyika (now Tanzania). There he worked in the breeding of maize (*Zea mays*), groundnuts (*Arachis hypogaea*), and *Sorghum*, and in 1952 he was given responsibility for the cassava (*Manihot esculentum*) program. The program started in 1937, and aimed to transfer resistances to two viruses from several tree species into cassava, which has an important role as a staple food crop in eastern Africa. The work was pioneering at the time, and Derek was responsible for introducing the resistant selections, by this time third backcrosses, to native farmers. At this stage, the resistance failed in some parts, and Derek soon found the cause to be host-virus interactions. He also discovered the breeding combinations that restored the resistance. During this early period in his career, Derek traveled throughout Tanzania lecturing in Swahili. He is regarded as an authority on cassava to this day.

Unfortunately, changes in administrative affairs led to the discontinuation of the cassava breeding program in 1956, and Derek returned to the United Kingdom the following year. However, before doing so, Derek distributed the elite cassava germplasm he had generated in the breeding program to many African countries to ensure that others could benefit. This generosity of spirit led to Derek being invited, in 1975, to work for 6 months at the International Institute of Tropical Agriculture in Nigeria, using the germplasm he had distributed 20 years previously. In 2002 he contributed an invited chapter on cassava breeding for a Commonwealth Agricultural Bureaux International (CABI) reference book.

B. Early Career

Derek's moved back to the United Kingdom in 1957 to take up the post of raspberry breeder at the Scottish Horticultural Research Institute, later to become the Scottish Crop Research Institute (SCRI), in Dundee, Scotland. The institute opened in 1953, and the pomology department was under the leadership of Conway Wood when Derek joined. The department's work was aimed at addressing the decline in raspberry yields caused largely by viral infections in the Tayside area of Scotland. Conway Wood had previously bred raspberries as assistant to Norman Grubb at East Malling before moving to SHRI, and there were four assistants in the group, including Malcolm Anderson, who later became the blackcurrant breeder at SCRI.

C. Scientific Collaborations

Derek formed several key relationships within SCRI. Some of the most significant scientific ones were with the pathologists Brian Williamson and Teifion Jones, with whom he investigated some important interactions between *Rubus* germplasm and pathogenic fungi and viruses respectively. The development of cane resistance to *Botrytis cinerea* and identification of new sources of resistance for breeding was two results of these collaborations, together with progress in breeding for resistance to cane blight (*Leptosphaeria coniothyrium*) and spur blight (*Didymella applanata*) through the use of mycelial inoculation techniques developed at SCRI. Additionally, genetic control of resistance to raspberry yellow rust (*Phragmidium rubi-idaei*) depended on whether resistance was immune (major gene) or resistant with a slow-rusting response (minor genes), and the interaction of diseases such as yellow rust and cane spot (*Elsinoe veneta*) was investigated. Derek and collaborators also investigated the apparent association of gene *H*, controlling cane pubescence, with increased resistance to cane *Botrytis* and spur blight but increased susceptibility to cane spot, mildew, and yellow rust. Derek and his coworkers believed that the pubescent canes mature at a different rate from the smooth ones, thereby separating the susceptibilities and resistances to the various pathogens. The gene *H* region of the raspberry genome continues to be analyzed at the molecular level by Julie Graham's group at SCRI.

With Teifion Jones and entomologists at SCRI, Derek both identified and then introgressed several key aphid resistance genes into the SCRI raspberry breeding germplasm. Raspberry breeding was given great importance at SCRI at this time. The subsequent reduction in viral infections in U.K. raspberry plantations was a major boost to the industry; sadly, resistance-breaking strains within the U.K. aphid population have now largely overcome the existing resistance genes, and so the search has begun again for robust sources of resistance at both SCRI and East Malling Research.

Derek also worked extensively with fruit agronomists at SCRI, notably the late Murray Cormack. In this collaboration, they achieved significant progress in the development of cultivars amenable to mechanical harvesting. They also developed information about the dormancy cycle of raspberry that is still used today for fruit production outside the main cropping season. Derek was involved with Harry Lawson in work to determine the best means for cane vigor control. This work was the key to the acceptance of 'Glen Clova' as the first of

the new raspberry cultivars from SCRI that ultimately transformed the industry in Scotland.

Derek traveled widely in the course of his work at SCRI, particularly to visit collaborators in North America. On one occasion during the cold war, Derek traveled with Peter Waister, also of SCRI, on a private trip to the Soviet Union at their invitation—neither he or his family had any advance knowledge of his itinerary or destination, and the men's flight to Siberia incurred the displeasure of the U.K. Foreign Office.

Derek carried out original research in raspberry breeding and registered at the nearby University of St. Andrews. In 1964 he was awarded a Ph.D. for his thesis entitled ''Breeding and Genetical Analysis of Red Raspberry (*Rubus idaeus*),'' supervised by Conway Wood. His relationship with St. Andrews continued with his appointment first as honorary lecturer and later as honorary senior lecturer in the Department of Botany.

D. Career Successes

1. Raspberry. Derek's work at SCRI covered various aspects of *Rubus* improvement, but the development of new cultivars for the U.K. industry was his main objective and ultimate achievement. Taking on the breeding of raspberry from David Bird, Derek released his first cultivar, 'Glen Clova', in 1969, combining high yields with good processing quality, suiting the Scottish industry at the time. 'Glen Clova' rapidly became the standard cultivar grown in Scotland, and was also successful for early production in the rest of the United Kingdom. Its position as a standard cultivar for the United Kingdom continued to 2000, when the withdrawal of Dinoseb for primocane management led to its replacement by cultivars with less vigorous primocane growth.

The next cultivar release from Derek's program was 'Glen Isla', which had fruit firmness derived from the black raspberry *Rubus occidentalis* via an East Malling selection. Although not commercially successful in its own right, 'Glen Isla' was widely used both by Derek and other breeders as a source of fruit firmness. The next real commercial successes were 'Glen Prosen' and 'Glen Moy', released in 1982. These two cultivars represented real progress in terms of fruit quality, for both the fresh and processing markets. They were also the first spine-free cultivars in the United Kingdom. As a result, they quickly became the new benchmark for high-quality fruit and are still grown today, albeit on a greatly reduced scale. 'Glen Moy' was of particular interest, due to

its early ripening character, while 'Glen Prosen' produced firm fruit with good machine-harvesting ability. The latter cultivar was used widely in breeding and consequently has had a high impact beyond the SCRI program.

In his breeding work, a recurring theme is Derek's great willingness to share germplasm. This led to some important long-term collaborations with other breeders, notably Hugh Daubeny in Canada ('Glen Prosen' was used as parental material in the development of 'Tulameen'), Harvey Hall in New Zealand (SCRI breeding material has featured in the background of many cultivar releases from the Institute of Horticulture and Food of New Zealand Ltd., HortResearch), and the late Graeme McGregor in Australia. In 1985 Derek accepted an invitation to work for 6 months in Victoria, Australia, to study problems relating to raspberry production in a climate warmer than Scotland. During this time he made a major contribution to the breeding program there, particularly in gaining an understanding of the disorder known as blind bud, which is related to the plants' dormancy cycle in the Australian climate.

In 1985 Derek released the cultivars 'Glen Lyon' and 'Glen Garry' from the SCRI program. Although neither was as successful as his previous releases within the United Kingdom, 'Glen Lyon' has become the major cultivar in Spain. This is due largely to its ability to withstand markedly different climatic conditions, together with its firm fruit inherited from 'Glen Prosen' and other sources, which makes it ideal for shipping back to other markets, notably the United Kingdom during the period from January to April every year. 'Glen Lyon' was originally selected for moderate vigor due to the withdrawal of vigor control chemicals in the United Kingdom, and its success in Spain was not foreseen at the time of release. At this time, Derek's interaction with Hugh Daubeny in North America was continuing to give benefits to both parties, and 'Glen Lyon' has one of Hugh's cultivars, 'Haida', as a grandparent.

During his time at SCRI, Derek oversaw the growth of the fruit breeding group at SCRI, and by the time of his retirement in 1989, he was head of the Soft Fruit Genetics Department. In 1994 a group of four cultivars were released from the raspberry breeding program: 'Glen Magna', 'Glen Ample', 'Glen Rosa', and 'Glen Shee'. Clearly Derek had a pivotal role in their development. Of this group, the most successful cultivar has been 'Glen Ample', which in recent years has become the leading cultivar in the United Kingdom and one of only two-main season cultivars, along with 'Tulameen', that is accepted by U.K. multiple retailers at the present time. The release of 'Glen Ample'

coincided with a major change in emphasis for raspberry production in Scotland: The largely processing market was generally supplanted by production of high-quality fruit for fresh consumption. The 'Glen Ample' cultivar is strongly preferred for its flavor and agronomic traits.

After retiring from SCRI, Derek moved to southeastern England, where he formed a partnership with Simon Brice, a leading grower there, through the company Medway Fruits. This gave Derek the opportunity to continue his fruit breeding activities across a broader spectrum of fruits. He concentrated on primocane-fruiting raspberries, instead of the summer-fruiting types previously developed, trailing-type blackberries rather than European types, and strawberries. While each of the *Rubus* cultivars from SCRI are readily identifiable by the 'Glen' prefix, Derek's new position enabled him to acknowledge the support of his wife Joan and other female members of his family. In 1994, his first release, the raspberry 'Joan Squire', challenged the U.K. industry standard for primocane types, 'Autumn Bliss'. Further releases followed, such as 'Terri-Louise' in 1996, 'Joan J' in 1999, and 'Joan Irene' and 'Marcela', both in 2004. Of these, 'Joan J' has a significant following in the home garden market, while 'Terri-Louise' was for a time marketed as a premium cultivar by one of the main U.K. supermarket chains, due to its very large fruit size. Some of these more recent releases have proved to be popular outside of the United Kingdom; for example, 'Joan Irene' is grown commercially in Chile at the present time, and 'Marcela' is grown in both Chile and Mexico.

2. Blackberry. In 1988 Derek released the spine-free blackberry 'Loch Ness', which has had considerable commercial success worldwide and is still grown extensively in Europe. The semi-erect habit makes 'Loch Ness' relatively easy to manage, and the shelf life was also an improvement on existing types at the time of release. After leaving SCRI, Derek concentrated on trailing blackberries of the North American type, and from Medway Fruits he released 'Adrienne' in 1995 and 'Helen' in the following year. The latter proved the most successful, giving high yields of early fruit.

3. Hybrid Berries and Other *Rubus* Fruits. Derek's interest in the various sections of *Rubus* led him to experiment with hybrid berry production, and from a tetraploid raspberry crossed with 'Aurora' blackberry he selected the 'Tayberry', released from SCRI in 1979. With its aromatic qualities and unique flavor, 'Tayberry' was a big commercial success in both the United Kingdom and North America, particularly with home garden and self-pick growers. Even now, almost 30 years

after its release, it remains a readily identifiable SCRI product for the general public in the United Kingdom. From a cross between 'Tayberry' and a sister seedling, 'Tummelberry' was released in 1983 but never reached the popularity of 'Tayberry'. An improved spine-free 'Tayberry' was discovered by Derek in 1996 in a Buckinghamshire allotment, and this was released under the name 'Buckingham Tayberry'. The spineless purple raspberry, 'Glen Coe', a diploid from a cross between 'Glen Prosen' and a spineless black raspberry, was released in 1988 and attracted interest from the processing market due to its intense color. Derek developed the spineless black raspberry by introgressing spinelessness from the old raspberry cultivar 'Burnetholm' into black raspberry types through crossing, backcrossing, selfing, and sib crossing. Further progress has been made in developing spineless black raspberry types from this germplasm by HortResearch, which released the black raspberry 'Hortberry1' under the trademark name 'Ebony'.

4. Strawberry After leaving SCRI, Derek also brought his expertise to the breeding of strawberry for Medway Fruits, and a number of cultivars were released. 'Christine' was released in 2000, and crops earlier than the U.K. standard, 'Elsanta'; it also has fruit quality acceptable to the supermarkets. As a result, almost 500,000 plants were sold in the United Kingdom in 2007.

E. Cultivar Releases

1. Raspberry

'Glen Clova' 1969. The origin of this cultivar is complex. It was derived from 'Burnetholm', 'Lloyd George', 'Malling Exploit', 'Malling Jewel', 'Newburgh', and 'Preussen'. The cross was performed in 1960; it was selected in 1963 and tested as M9. It has an early and extended season. It produces medium-size conical fruit, of medium-light red color. It is dusty, with moderate firmness and vigorous spreading canes. It is productive and susceptible to leaf spot virus. When grown commercially 'Glen Clova' was very good for jam and canning but less popular for frozen or fresh, perhaps due to its slightly acid flavor.

'Glen Isla' 1974. The origin of this cultivar is complex. It was derived from 'Burnetholm', 'Cumberland' black raspberry, 'Lloyd George', 'Malling Jewel', 'Malling Landmark', and 'Norfolk Giant'. The cross was performed in 1960; it was selected in 1963 and tested as M14. It is a late season cultivar, with round-conical orange-red fruit with regular,

small, firm, and cohesive drupelets. It is moderately acid when fresh, but jam is good although slightly acid when grown in Scotland. Fruit acidity was markedly reduced in New Zealand and the Pacific Northwest of the United States and Canada. Cane growth was vigorous and plentiful but they spread into the alleyways early in the season.

'Glen Esk'. This cultivar was never formally released but trialed widely around the world. Its origin is complex. It was derived from 'Burnetholm', 'Cumberland' black raspberry, 'Lloyd George', 'Malling Exploit', 'Malling Jewel', and the gene L_1 mutant of 'Malling Jewel'. It was selected in 1969, evaluated in Scotland as M31 and internationally as 'Glen Esk'. It fruits in late midseason, with a very large long conical fruit with pale orange-red color, with large drupelets and seed and weak flavor. The appearance 'Glen Esk' fruit in a punnet was outstanding, but it was not suitable for processing. Canes elongated early, very erect, very vigorous, tall, thick at the base, and grew in adequate numbers.

'Glen Moy' 1981. The origin of this cultivar is complex. It was derived from 'Burnetholm', 'Cumberland' black raspberry, 'Glen Clova', 'Devon', 'Lloyd George', 'Malling Exploit', 'Malling Jewel', 'Malling Landmark', 'Newburgh', and 'Norfolk Giant'. The cross was made in 1972; it was selected in 1976 and tested as SCRI 7210/204. It is an early-season cultivar, with good-quality fruit, vigorous canes, spine free, erect, productive, moderately hardy. It contains A_1 resistance to *Amphorophora idaei* and is susceptible to midge blight, leaf spot virus, *Phytophthora* root rot, and *Rubus* bushy dwarf virus (RBDV). 'Glen Moy' has been widely used parent for earliness and for contribution to earliness in the development of primocane-fruiting cultivars.

'Glen Prosen' 1981. The origin of this cultivar is complex. It is derived from 'Burnetholm', 'Cumberland' black raspberry, 'Devon', 'Lloyd George', 'Malling Jewel', 'Malling Landmark', 'Newburgh', 'Norfolk Giant', and 'Preussen'. The cross was made in 1968; it was selected in 1976 and tested as SCRI 6820/54. It is a late-season, large round berry with very large chunky drupelets, spineless, with upright canes, moderate vigor, and is hardy for Scotland. It contains A_1 resistance to *Amphorophora idaei* and is susceptible *Phytophthora* root rot and RBDV. 'Glen Prosen' has gained most significance as the parent of the very successful fresh-market cultivar 'Tulameen'.

'Glen Yarra' 1995. This cultivar is a sister seedling of 'Glen Prosen'. The cross was made in 1968; it was selected in 1976 and tested as SCRI

6820/64. The cultivar was introduced by G. R. McGregor, of the Institute for Horticultural Development, Melbourne, Australia. It is a midseason, medium-large firm fruit of medium-red color. It is dusty, vigorous, with upright spineless canes, relatively few new primocanes, and relatively low chilling requirement. It is susceptible to *Phytophthora* root rot. 'Glen Yarra' performed well in trials in other parts of the world but was inferior to 'Glen Prosen' in most places so it was not released beyond Australia.

'Glen Garry' 1990. 'Malling Delight' × SCRI 7331/1 (SCRI 703/36 × 'Glen Prosen'), SCRI 703/36, is of complex origin, derived from 'Burnetholm', 'Cumberland' black raspberry, 'Devon', 'Lloyd George', 'Malling Jewel', 'Malling Landmark', 'Norfolk Giant', and 'Pyne's Royal'. SCRI 7331/1 contained gene L_1 from a mutant 'Malling Jewel' selection used in breeding at SCRI. The cross was made in 1975, and it was tested as 7518E6. The cultivar is early to midseason, spineless, very large fruit size due to the presence of the unstable gene L_1. Plants not containing gene L_1 could be identified in the vegetative stage by smaller stipules and less serrated leaves. The fruit is long-conic, firm, slightly pale in color, has excellent flavor, and is suited to niche fresh market and home garden use. Plants are high yielding with moderate vigor but with long, strong fruiting laterals. 'Glen Garry' carries gene A_1 conferring resistance to two strains of the large raspberry aphid but is susceptible to RBDV.

'Glen Lyon' 1991. SCRI 7331/1 × SCRI 7256–1 (SCRI 6820/35 [sib of 'Glen Prosen'] × 'Haida') is from a cross made in 1975, tested as SCRI 7515C5. It is early to midseason, spineless, with bright, glossy medium red color, medium-size fruit, firm, easily removed from the receptacle. It has low sugar content and high acidity in Scotland but good sugar/acid balance when produced in southern Spain and Portugal. It has good shelf life, limited use for processing but now is grown in significant plantings in southern Spain and Portugal. The plant establishes rapidly and produces medium to high yields. It has easily managed upright growth and moderate vigor and A_1 aphid resistance. It is resistant to spur blight and leaf spot virus but susceptible to RBDV.

'Glen Ample' 1994. The origin of this cultivar is complex. It is a derivative of 'Glen Prosen', 'Meeker', 'Rumiloba', 'Carnival', 'Malling Jewel', 'Burnetholm', 'Malling Landmark', 'Malling Exploit', 'Lloyd George', and 'Pyne's Royal'. The cross was made in 1978, and it was tested as 7815B8. It is a midseason cultivar, with spineless canes, is high

yielding, and is particularly well adapted to fresh-market production in southern Britain. It has medium to large fruit, bright red, round-conic shape, is firm, and tends to break at collar in wet and cool conditions. It is easily removed from the receptacle and can be machine harvested. Canes are upright and vigorous with long, upright laterals. The cultivar has A_1 aphid resistance. This cultivar was released from SCRI with Ronnie McNicol.

'Glen Magna' 1994. 'Meeker' × SC RI 7719B11. The origin of this cultivar is complex. It is derived from 'Rumiloba', 'Glen Isla', 'Malling Jewel', 'Malling Exploit', 'Burnetholm', 'Devon' and 'Malling Landmark', 'Cumberland' black raspberry, 'Lloyd George', 'Norfolk Giant', and 'Pyne's Royal'. The cross was made in 1980; it was tested as 8032A3. The cultivar is late season, very high yielding, with very large fruit, deep red color, long conic shape, and excellent uniform appearance. It is machine-harvestable in some environments. It has excellent flavor with similarities to 'Glen Moy' and 'Meeker'. It is suitable for the fresh market and processing, especially freezing. It has upright, vigorous canes with few spines. The cultivar has A_1 aphid resistance and is resistant to RBDV. This cultivar was released from SCRI with Ronnie McNicol.

'Glen Rosa' 1994. This cultivar is a sib of 'Glen Ample'. The cross was made in 1978; it was tested as SCRI 7815A12. It is a midseason, spineless cultivar, with fairly good flavor for processing. It is less suited for the fresh market. It has moderate vigor and production, is moderately upright, and it is adapted for machine harvest. It contains gene *H*, giving resistance to spur blight and cane *Botrytis*, and gene A_{10}, giving resistance to four strains of the large European aphid. It is resistant to RBDV. This cultivar was released from SCRI with Ronnie McNicol.

'Glen Shee' 1994. The origin of this cultivar is complex. It is derived from 'Rumiloba', 'Burnetholm', 'Glen Clova', 'Carnival', 'Cumberland' black raspberry, 'Devon', 'Lloyd George', 'Malling Exploit', 'Malling Jewel', 'Malling Landmark', 'Newburgh', 'Norfolk Giant', and 'Pyne's Royal'. The cross was made in 1980; it was tested as SCRI 8044C9. It is a midseason cultivar with moderate yield and is spineless. Fruit are slightly pale, firm, fleshy, slightly weak skin, prone to wind rub, have a moderate flavor, and are not adapted to machine harvest. Canes are vigorous and relatively upright. It contains A_1 aphid resistance and is susceptible to RBDV. This cultivar was released from SCRI with Ronnie McNicol.

'Joan Squire' 1995. SCRI 8216B6 × EMR primocane selection. Fruit ripens 2 weeks later than 'Autumn Bliss', 2 weeks before 'Heritage'. This cultivar has good shelf life, excellent flavor, attractive red color with some gloss, no tendency to get a purple-blue tinge. It yields firm, cohesive fruit with skin strength nearly as good as 'Heritage'. It is more productive than 'Autumn Bliss' or 'Heritage'. It has numerous spineless canes and a spreading growth habit that needs support as the fruit ripens.

'Terri-Louise' 1996. 'Glen Moy' × 'Autumn Bliss'. Primocane fruit begins to ripen in August in southern England and will crop until mid-December under plastic tunnels. A very early spring crop is produced on overwintered canes. Fruit are very large; they have an attractive red color that darkens when overripe. The flesh texture is very firm, skin strength is weak, and flavor is excellent. It is susceptible to RBDV.

'Joan J' 1999. 'Terri-Louise' × 'Joan Squire'. This cultivar produces high yields of large fruit, mean 5 g, ripening in early August. Fruit has fleshy texture and is quite dark, with good flavor. The cultivar has spine-free canes and an erect vigorous growth habit. The combination of weak fruit skin and tendency to darken requires picking daily rather than on alternate days. It is mainly of interest to home garden and self-pick growers.

'Joan Irene' 2004. 'Joan J' × (selection of complex origin which also has 'Dinkum' in its background). 'Joan Irene' produces medium-late primocane fruit that ripen in southern England in August through to November. Fruit is a bright, midred that darkens if not picked regularly. Fruit skin strength is good, as is the shelf life, and large fruit size is maintained late into the fruiting season. Plants are very vigorous with spine-free stout canes.

'Marcela' 2004. 'Autumn Bliss' × 'Joan Squire'. This is a primocane-fruiting cultivar with an early harvest season, up to 2 weeks earlier than 'Autumn Bliss' in some environments. Fruit are very firm, lighter red than 'Autumn Bliss', and have a strong gloss. Medium force is required for fruit removal, and shelf life and transportation ability are excellent. Growth is strong and is nearly upright.

2. Blackberry

'Loch Ness' 1988. This cultivar has a complex parentage, from tetraploid North American cultivars and SCRI breeding lines. It crops over a long period, ripening around 50% of its yield in August under

U.K. conditions. It has vigorous growth with spine-free semi-erect shoots. The fruiting laterals usually are about 30 cm long, strong but flexible and with white flowers. The cultivar produces high yields of large, glossy black blunt-conical fruit that are firm and with pleasantly sharp flavor. It has excellent storage capability.

'Adrienne' 1995. 'Silvan' × unnamed selection. This cultivar is selected for spine-free habit and high yield potential. Cropping season is earlier than 'Loch Ness' and other European blackberries, from early July onward, with firm, long fruits of around 6 g. Growth is vigorous, with a trailing habit.

'Helen' 1996. 'Silvan' × unnamed selection. This cultivar is early ripening, often the first of the U.K. season. Canes are spine-free, with moderate vigor and trailing habit. Fruits are similar in size to 'Adrienne', but skin strength is not as good.

3. Hybrid Berry

'Tayberry' 1979. This cultivar is from the tetraploid SCRI raspberry breeding line 626/67 × 'Aurora' blackberry. It has vigorous shoots produced in moderate to high numbers, spreading in young plants but becoming semi-erect later. It has long laterals, up to 30 cm, bearing very large conical purple berries with high drupelet number. Fruit is firm, slightly glossy, and highly flavored with aromatic quality. Plug remains with fruit when it is picked. It is early ripening, comparable to a midseason red raspberry.

'Buckingham Tayberry' 1997. This cultivar is a chimeral spineless sport of 'Tayberry', where the cell initial for the L1 layer of the growing apex mutated to produce spinelessness. Vegetative propagation produces more spineless plants, but the spinelessness cannot be used for breeding purposes as it is not in the cells that give rise to flowers or fruit.

'Tummelberry' 1983. This cultivar is from 'Tayberry' × SCRI 69102/18; the latter is a selection from the same family as 'Tayberry'. It has vigorous shoots produced in moderate to high numbers, spreading to slightly more erect than 'Tayberry'. It has long laterals, medium-large fruit, and red-purple color. The flavor is slightly acid without aromatic characteristics of 'Tayberry'. Its ripening season is later than 'Tayberry', with slightly greater hardiness. It is susceptible to raspberry leaf and bud mite (*Phyllocoptes gracilis*).

4. Purple Raspberry

'Glencoe' 1989. This cultivar is SCRI 7751C4 (spineless inbred derivative of 'Munger' black raspberry and spineless red raspberries from SCRI) × 'Glen Prosen'). It is a midseason, spine- less purple raspberry, with midsize round-conic fruit. It is dull, purple, very firm, with intense flavor, and is easy to pick with good shelf life. It is selected for specialized processing, fresh market, and home garden uses. Its canes are semi-erect, deep purple, and coated with a conspicuous waxy bloom. Yield is moderate to high. The fruiting laterals are medium length and stiff. It is resistant to *Verticillium* wilt and not adapted to cold spring weather.

5. Strawberry

'Claire Maree'. This cultivar is from Cross made in 1995 between unnamed selections, one from Italian and one from U.K. germplasm. The cultivar is notable for its large size, bright color, and excellent flavor but has insufficient shelf life for supermarket sales and was therefore marketed for amateurs. It is now unavailable.

'Christine'. This cultivar is from a cross made in 1994 between parents of complex origin involving U.K. and Italian germplasm. It crops 7 to 10 days earlier than 'Elsanta', the standard U.K. cultivar, and is widely grown for early production. It is vigorous with a tall leaf canopy, and the fruit is well displayed around the plant. It has high skin strength, which gives it a longer shelf-life than 'Elsanta'. The color is a bright orange and the flavor is good. 'Christine' is highly resistant to powdery mildew and *Verticillium* wilt but susceptible to *Phytophthora* root rot. Like most early cultivars, its yield is slightly less than that of 'Elsanta'.

'Nicola'. This cultivar is from a cross made in 1996 between 'Symphony' and a parent selected from Italian germplasm. It is a midseason cultivar, cropping 4 days before 'Elsanta'. It is notable for its long shelf life and is superior to 'Elsanta' for size and good light, bright color. Yields are also above 'Elsanta'. One of its main values is its high resistance to *Phytophthora* root rot. It is prone to powdery mildew when grown under plastic but not in the open field.

'Chelsea Pensioner'. This cultivar is from a cross made in 1998 between unnamed selections, one from U.K. and one from Italian germplasm. It ripens 6 days after 'Elsanta', giving a peak of production late in the season, similar in time to 'Florence', the standard late variety in the United

Kingdom. The fruits are notable for their very high flavor, deep red color, and slightly prominent achenes. These qualities are not suitable for supermarket sales, so the variety is being marketed for amateurs. Yields have been good, and no serious disease problems have been reported.

F. Current Activities

Medway Fruits ceased to operate in 2002, after Simon Brice's retirement, with a final release of the autumn-fruiting raspberry 'Brice' in 2007. However, unknot surprisingly, Derek continued to be in high demand as a breeder, and currently he is working for Redeva Ltd., a subsidiary of the Summer Fruits Company.

G. Awards and Honors

During his career, Derek has been the recipient of several highly prestigious awards, both in the United Kingdom and abroad. In 1979 he was awarded the Scottish Horticultural Medal by the Royal Caledonian Horticultural Society, in appreciation of outstanding services to Scottish horticulture. Internationally, in 1997 Derek was awarded the Wilder Medal by the American Pomological Society for ''excellence in *Rubus* breeding,'' and in 2000 he received the ''Horticologo de Honra: Associacao Portugesa de Horticultura,'' in Portugal, in recognition of his work as consultant to the Department of Horticulture in that country. In 2001 Derek received the award for Lifetime Achievement at the U.K. Grower of the Year Awards.

Derek is a widely published scientist, with almost 100 papers and numerous book chapters. In 1988 Academic Press published his book, *Raspberries and Blackberries: Their Breeding*, *Diseases and Growth*, and this volume has become a standard text across a very wide readership, from researchers to home gardeners—a true testament to Derek's ability to communicate his subject and expertise.

Derek has passed his boundless enthusiasm for his work and wide knowledge on to numerous young emerging fruit breeders, several of whom spent happy and productive sabbatical periods at SCRI. He remains one of the most respected figures in fruit breeding and is still active—his latest selection, as yet unnamed, was awarded joint first prize at the 2007 National Fruit Show. Looking back over the 50 years of Derek's career in fruit breeding and research, his work provides a benchmark for the successful application of scientific advances into the reality of commercial cultivars, many of which will be grown for some time to come.

II. SELECTED PUBLICATIONS OF DEREK JENNINGS

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