

Exhibit A

US00PP20551P3

(12) **United States Plant Patent**
Lane(10) **Patent No.:** **US PP20,551 P3**(45) **Date of Patent:** **Dec. 15, 2009**(54) **CHERRY TREE NAMED '13S2009'**(50) Latin Name: *Prunus avium*
Varietal Denomination: **13S2009**(75) Inventor: **W. David Lane**, Summerland (CA)(73) Assignee: **Her Majesty the Queen in right of Canada, as represented by the Minister of Agriculture and Agri-Food Canada**, Summerland (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 763 days.

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Related U.S. Application Data

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(51) **Int. Cl.**
A01H 5/00 (2006.01)(52) **U.S. Cl.** **Plt./181**(58) **Field of Classification Search** Plt./181
See application file for complete search history.(56) **References Cited****PUBLICATIONS**

UPOV hit '13S2009', UPOV—rom Plant Variety Database, Mar. 2003.*

Manual of Patent Examining Procedure (MPEP) pp. 700/234 to 700/243. USPTO Aug. 2006.*

* cited by examiner

Primary Examiner—Annette H Para(74) *Attorney, Agent, or Firm*—Penny J. Aguirre(57) **ABSTRACT**

A new and distinct variety of cherry tree named '13S2009' with the following characteristics. '13S2009' has large flattened-heart shaped fruit, with shiny, dark red skin and red to dark red flesh. The fruit has a non-prominent suture and a flat to slightly hollow apex. The fruit matures very late in the harvest season, about 27 days after 'Van' and 'Bing' and 8 days after 'Sweetheart'. The flesh of the fruit is very firm, and has a moderately sweet taste. The fruit are tolerant to rain splitting. The stone of '13S20-09' is intermediate in lateral view, large in size, and has strongly developed keel. The tree is upright to spreading, self-compatible, moderately vigorous and has produced good, crops annually since fruiting commenced.

3 Drawing Sheets**1**Botanical classification: *Prunus avium*.
Variety denomination: '13S2009'.**BACKGROUND OF THE INVENTION**

This invention relates to cherry trees and particularly to a seedling cherry tree from an open pollination selected by Dr. W. David Lane of the Pacific Agri-Food Research Centre Summerland cherry breeding program located at Summerland, British Columbia, Canada. '13S2009' is a fruiting sweet cherry tree and has a market use as a dessert quality cherry.

The Agriculture and Agri-Food Canada research facility at Summerland was established in 1914. Originally called the Dominion Experimental Farm at Summerland, the name was changed to the Summerland Research Station in 1959, the Summerland Research Centre in 1994 and to the Pacific Agri-Food Research Centre (PARC) Summerland in 1996. The tree fruit breeding program was established in 1924 to provide new varieties for the tree fruit industry of British Columbia, Canada, and the world. The breeding program at Summerland has produced several tree fruit varieties including 'Spartan' (unpatented), 'Silken' (U.S. Plant Pat. No. 10,740), and 'Creston' (U.S. Plant Pat. No. 10,739) apples and 'Van' (unpatented), 'Lapins' (unpatented), and 'Sweetheart' (unpatented) sweet cherries. The tree fruit breeders typically produce several thousand seedlings each year.

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advantage of niche markets; 2) to improve environmental adaptation to major fruit growing areas, for consistent production of high quality fruit; 3) to reduce the cost of production. The varieties are evaluated for the following traits to insure that the objectives are met. Primary traits include: early onset of bearing, self-compatibility, extended ripening season, fruit size, fruit firmness, and resistance to rain-induced cracking. Secondary traits include: disease resistance, winter hardiness, resistance to spring frosts, and compact tree growth habit.

Upon fruiting, the seedlings are evaluated for fruit and tree quality. Time of bloom, harvest indices, disease susceptibility and growth habit are evaluated in the field. Promising seedlings are re-propagated by budding or grafting onto rootstocks, and planted out as second test selections in variety evaluation plots. The reproductions are evaluated for varietal stability, disease susceptibility, and fruit and tree quality. The new varieties are compared to reference varieties to establish uniqueness.

The present invention relates to a new and distinct variety of cherry tree which was named '13S2009' in 2000. The original seedling was produced in 1982 and is the offspring of the seed parent 'Sweetheart' and an unknown pollen parent. The variety was planted out as a seedling in 1984 and given the Breeders Reference Number '13S-20-09' in 1991 and named "13S2009" in 2000.

History of the Invention

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original cross happened in 1982 and was discovered by Dr. W. David Lane the same year. Seeds from the variety 'Sweetheart' were gathered at fruit maturity, isolated from seeds from other crosses. The seeds were subjected to the required moist chilling treatment (stratification) to enable the seeds to break dormancy in the fall of 1983. After the required stratification the seeds were germinated in a greenhouse. The resulting seedlings were transplanted into pots and grown in a greenhouse in the spring of 1984. The seedlings were taken from the greenhouse in May 1984 and planted in the seedling orchards at the PARC Summerland. A particular seedling was planted at tree position 9 in row 20 in a field designated 13 South. The seedling subsequently fruited and observations determined the fruit had unique qualities of possible commercial potential. The seedling was given the Breeders Reference Number 13S-20-09 in 1991. Four trees were created by T-budding vegetative buds of 13S-20-09 onto *P. avium* ('Mazzard' (unpatented)) rootstock in August of 1990. 'Mazzard' is the cherry rootstock of choice of most growers and nurseries in British Columbia. The stock creates full-sized trees but induces earlier fruiting with most cultivars. The resulting trees were grown in a nursery, then dug up in the fall of 1991 and stored in cold storage over winter. In the spring of 1992 the trees were removed from cold storage and planted in a field designated 4C. The resulting trees were stable in their horticultural traits and no off-types or variants occurred during the re-propagation of the instant plant. To determine fertility of the variety, blossoms of 13S-20-09 ('13S2009') were hand pollinated with pollen collected from other blossoms of '13S2009' and/or other known self-compatible varieties. The blossoms were covered with bags to inhibit pollination by bees, fruit developed normally and it can be assumed with confidence that '13S2009' is self-compatible and pollination from other sources is not required. The hand pollination and resulting determination that the variety was self-compatible also determines that the variety carries the S4' (S4 prime) allele. Polymerase chain reaction (PCR) research has determined the variety also carries the S3 allele so the compatibility group, while self-compatible, is also S3S4'.

Controlled grower trials, under test agreements, have been established in British Columbia, selected sites in the United States, and in Europe.

Stability and Propagation

In 1991, under the direction of Lane, T-budding of vegetative buds from the original plant of 13S-20-09 on Mazzard rootstock created new trees. The asexual propagation took place in Summerland, British Columbia, Canada. The resulting trees were stable and no variations occurred. Subsequent propagations have produced trees that are also stable, true-to-type and identical to the original tree in all the horticultural traits.

Distinguishing Characteristics

Under growing conditions at the Pacific Agri-Food Research Centre (PARC) Summerland located at Summerland in the Okanagan Valley of British Columbia, Canada, the variety '13S2009' consistently has the following characteristics that distinguish it from other cherry varieties. The variety is self-compatible and the fruit matures, on average, significantly later than any other commercial cherry variety. This is the variety's most distinguishing characteristic. This

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son maturity can help growers avoid the oversupply of cherries on the market that can happen during the peak cherry harvest season. The oversupply drives the price of cherries down, and in turn reduces the financial return to the grower. '13S2009' produces fruit of very high quality, being large with very firm flesh and having moderately glossy, red to dark red skin. The color and glossiness of the skin are very attractive when packed in a box and the firm flesh appeals to consumers and buyers. The advantage to the grower of producing '13S2009' is the lateness of fruit maturity, the visual appeal of the fruit, tolerance to rain-induced cracking, and the self-compatibility of the tree. Self-compatibility eliminates the need for pollinizer varieties and reliance on insect pollination for fruit set. Self-compatible varieties tend to produce heavier crops than self-incompatible varieties, especially during years with poor pollination weather. Poor pollination can be the result of cold, wet and/or windy conditions during the blossom period. These types of conditions restrict the movement of insects, most notably bees, and can result in low fruit set and non-profitable crops.

The fruit of '13S2009' is flattened heart-shaped and is borne on long, moderately thick stems. The fruit at maturity has red to dark red colored skin with moderate glossiness, red flesh, and a sweet taste. The fruits are very large, have very firm flesh and are resistant to rain-induced cracking. The fruit has a low prominence of suture. The stone of '13S2009' is large in absolute size, although medium in size relative to the size of the fruit. The stone is symmetrical and the shape is intermediate in the lateral view, round elliptic in the basal view and elliptic in the frontal view. The keel is strongly developed.

The leaves of '13S2009' have weak to medium glossiness on the upper side, are broad elongate in shape and have moderately shallow, dentate serrations on the leaf margins. The leaves are oriented obliquely upwards to horizontal in relation to the shoot and have cuspidate to acuminate tips and circular shaped bases. The petioles are medium in length, have anthocyanin coloration, and average more than 2, purple/red, round shaped nectaries at the base.

'13S2009' flowers about the middle of the blossom season, similar to 'Bing'. The flowers are self-compatible. The flowers are white, large in size, single in type, and appear in clusters. The pedicels are long and moderately thick. The petals are medium in size, broad elliptic to round in shape and free to touching.

The tree of '13S2009' is of moderate vigor and hardy to Zone 6A. The tree habit is upright to spreading. The tree is precocious, and very productive, and has produced good crops annually since first fruiting. The one-year-old dormant shoots show weak anthocyanin coloration and are of medium diameter at the middle of the shoot. On the average the internodes are medium in length and average a few to a medium number of small lenticels. The buds on the one-year-old dormant shoots are large in size, conical in shape and are moderately held out in relation to the shoot. The bud support is medium in diameter.

Parent Plants

'13S2009' a seedling resulting from an open pollination of the flower of the seed parent 'Sweetheart' by an unknown pollen parent.

'Sweetheart' is a result of a controlled cross of the seed parent 'Van' and the pollen parent 'Newstar' (unpatented)

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ues to produce good crops annually. 'Sweetheart' became commercially available in the spring of 1994.

Seed parent:

Name.—'Sweetheart'.

Species.—*avium* L.

Market class.—Sweet dessert.

Parentage.—'Van' × 'Newstar'.

Pollen parent:

Name.—Unknown.

Genus.—*Prunus*.

Species.—*avium* L.

Market class.—Unknown.

SUMMARY OF THE INVENTION

The new and distinct variety of *Prunus avium* L. fruiting cherry tree, '13S2009', resulted from open pollination of a 'Sweetheart' blossom that happened in 1982 at the Pacific Agri-Food Research Centre in Summerland, British Columbia, Canada. The seed was stratified by conventional methods and germinated in a greenhouse, and the resulting seedling tree was established in a seedling block in 1984. The seedling tree was selected for further propagation and evaluation on the basis of fruit and tree quality and the very late timing of fruit maturity, by Dr. W David Lane and given the Breeder's Reference Number '13S-20-09' in 1991. The variety has been established in a second selection block at the Pacific Agri-Food Research Centre Summerland. Evaluations began upon fruiting.

The variety has been propagated, by budding onto rootstocks under the direction of Dr. W. David Lane. The resulting trees have proved to be stable with no variations occurring. The variety demonstrates significant differences from its parents and other fruiting cherry varieties in that the fruit of '13S2009' matures very late in the cherry harvest season, is large and very firm. The skin of '13S2009' is red to dark red in color and of moderate glossiness with a few light colored highlights (dots). The flesh is dark red. The fruit is sweet (19.7% soluble solids) with a balance of sweet/sour 1.60% SSC/mg NaOH). The fruit has low susceptibility to rain-induced cracking (20% natural rain splits). The stone is symmetrical and the shape is intermediate in the lateral view, round elliptic in the basal view and elliptic in the frontal view. The keel of the stone is strongly developed.

The tree habit is upright/spreading, and moderately vigorous. The variety was first propagated in 1991 by budding on Mazzard F12/1 rootstock was established in a second selection field at the Pacific Agri-Food Research Centre at Summerland, British Columbia, Canada in 1993. The fruit of '13S2009' matures 26 to 28 days after 'Van' and 7 to 9 days after 'Sweetheart'. '13S2009' fruit is flattened heart shaped, has a slightly flattened to very slightly hollow apex, and a non-prominent suture.

Trials and Evaluations

The Pacific Agri-Food Research Centre Summerland, located at latitude 49.6 degrees north and longitude 119.6 degrees west, and about 100 feet above Okanagan Lake at an elevation of approximately 1100 feet above sea level. The Plant Hardiness Zone is 6A. The average annual precipitation is about 28 cm (11 inches). The soil types range from sandy loam to clay. All orchards in this area require irrigation and fertilization.

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was compared to the reference varieties 'Van', 'Sumleta' (U.S. Plant Pat. No. 11,378), 'Lapins', 'Skeena' (U.S. Plant Pat. No. 11,392), and 'Sweetheart' of approximately the same age and planted in the same area. ('Van' was used as comparator to establish harvest timing only). Controlled grower trials, under test agreements, have been established in British Columbia, selected sites in the United States and Europe.

'13S2009' was evaluated for fruit size, fruit firmness, maturity date, fruit taste (soluble solids and titratable acids), natural rain splits, tree growth habit, fruit shape, productivity, precocity and disease resistance from 1989 until the present.

Under growing conditions at the Pacific Agri-Food Research Centre (PARC) Summerland located at Summerland in the Okanagan Valley of British Columbia, Canada, the variety '13S2009' consistently has the following characteristics. '13S2009' matures on average 26 to 28 days after 'Van' and 7 to 9 days after 'Sweetheart'. 'Van' fruit mature on average about the 8th to 10th of July in Summerland. Gibberellic acid was not applied to the crop. Gibberellic acid can delay the maturity of the fruit by up to five days.

Days After Van	Variety Name					
Year	Van	Sumleta	Lapins	Skeena	Sweetheart	13S2009
1982	0				8	
1983	0		9		7	
1984	0		4	11	11	
1985	0	-3	12		10	
1987	0	16	16	16	35	
1988	0	3	1			
1989	0	0	12		14	
1990	0	7	4	7	15	29
1991	0	13	23	9	23	22
1992	0	10	14	14		
1994	0	-4	14	0		
1995	0	7	8	21	21	30
1996	0	11	6	6	36	26
1997	0	8	8	8	32	32
1998	0			9		29
1999	0	14	13	14	13	23
2000	0	16	7	13	16	27
Average		98	151	128	241	218
days past Van		8	10	11	19	27

'Van' is harvested about the 8th to 10th of July at Summerland

The variety has an average fruit weight of 11.4 g, similar to 'Lapins' (11.7 g) and 'Skeena' (11.5 g), significantly larger than 'Sweetheart' (10.1 g), and significantly smaller 'Sumleta' (13.1 g). 'Lapins', 'Sumleta' and 'Skeena' are considered to have large fruit, 'Sweetheart' is considered to have moderately large fruit.

Average fruit weight	Variety Name					
	Year	Sumleta	Lapins	Skeena	Sweetheart	13S2009
1991	12.9	12.4	12.6	11.0	12.2	
1993	13.4	12.1	11.3	9.9	11.8	
1995	13.7	11.9	12.1	10.0	11.3	
1996	12.6	9.8	10.8	10.4	11.4	

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Average fruit weight	Variety Name				
Year	Sumleta	Lapins	Skeena	Sweetheart	13S2009
1999	12.8	12.2	11.5	11.0	11.2
2000	14.4	12.0	12.5	10.1	10.8
Total	91.9	81.6	80.6	70.4	80.0
Average over 7 years	13.1	11.7	11.5	10.1	11.4

The flesh is significantly firmer than 'Lapins', slightly firmer than 'Sumleta', and as firm as 'Sweetheart' and 'Skeena'. Over 5 years, '13S2009', 'Skeena', and 'Sweetheart' had a mean rating of 81 in firmness as measured by Shores Durometer, whereas 'Sumleta' averages 79 and 'Lapins' 76. 'Sweetheart' is considered to be a very firm variety by commercial growers. Gibberellic acid was not applied to any of these test samples. In commercial plantings, gibberellic acid is used to improve the firmness and delay the maturity of cherry fruit.

Flesh Firmness	Variety name				
Year	Sumleta	Lapins	Skeena	Sweetheart	13S2009
1995	79	78	82	83	85
1996	85	83	85	79	80
1997	80	76	77	84	83
1999	76	72	80	79	76
2000	75	72	81	79	80
Total	395	381	405	404	404
5 year Average	79	76	81	81	81

The fruit of '13S2009' on average has a high soluble solids concentration (SSC) similar to 'Sumleta', 'Skeena', and 'Sweetheart' and significantly higher than 'Lapins'. '13S2009' has a moderate amount of titratable acid (TA), similar to 'Skeena' and 'Sweetheart', significantly more than 'Lapins' and significantly less than 'Sumleta'. The balance between SSC and TA in '13S2009' gives the fruit a sweet taste. The SSC/TA balance does reflect the sensory perception of sweetness in the fruit. For example 'Sumleta' has a lower ratio than the others, reflecting a more acidic taste. This is consistent with human perception of the taste even though 'Sumleta' has higher soluble solids than most other dark or red cherries.

	Variety Name				
Year	Sumleta	Lapins	Skeena	Sweetheart	13S2009
Soluble Solids					
1995	22.7	20.9	17.8	20.7	21.3
1996	17.9	17.9	17.3	19.1	19.6
1997	20.2	21.9	16.6	19.4	18.9
1999	21	21	19.6	21.9	20.3
2000	19.3	17.6	15.5	18.9	18.5
Total	101.1	99.3	86.8	100	98.6

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	Variety Name				
Year	Sumleta	Lapins	Skeena	Sweetheart	13S2009
Titratable Acidity					
1995	14.17	13.52	8.39	12.73	12.06
1996	15.93	13.94	12.25	12.13	11.41
1997	12.41	12.58	8.34	10.77	9.72
1999	16.4	14.8	11.3	15.4	14.5
2000	15.75	14.15	10.95	13.1	14.25
Total	74.66	68.99	51.23	64.13	61.94
Average SSC/TA Balance	14.932	13.798	10.246	12.826	12.388
1995	1.60	1.55	2.12	1.63	1.77
1996	1.12	1.28	1.41	1.57	1.72
1997	1.63	1.74	1.99	1.80	1.94
1999	1.28	1.42	1.73	1.42	1.40
2000	1.23	1.24	1.42	1.44	1.30
Total	1.35	1.44	1.69	1.56	1.59
SSC/Total TA					

'13S2009' has a significantly lower tendency to crack due to rain than most other varieties. 'Lapins' is considered to be highly tolerant of rain-induced cracking. Rain-induced cracking is difficult to reproduce annually, as it is dependent on the weather during the latter part of the fruit maturation period. 'Sweetheart' for example is very susceptible to rain-induced cracking, but over a 7 year period it appears to have about the same resistance as 'Lapins'. However from observation and grower comments it has been established that '13S2009', 'Lapins', and 'Skeena' are much less prone to rain-induced cracking than are 'Sweetheart' and 'Sumleta'. This could be a reflection of the area where the cherries are grown. The Okanagan Valley of British Columbia receives a total yearly average of about 28 cm (11 inches) of precipitation, with June typically receiving the most rain during the summer months. As the late season cherries do not mature until late July or after, they are past the heavy rain periods and are subject only to short storm periods after turning from straw color to red. Cherries split more after turning red. The same observations and comments indicate '13S2009' is more tolerant to cracking than 'Lapins' and 'Skeen'.

% Rain induced Cracking	Variety Name				
Year	Sumleta	Lapins	Skeena	Sweetheart	13S2009
1991	35	21	23	20	15
1993	55	44	18	30	9
1995	34	7	25	26	14
1996	33	26	28	49	27
1997	61	38	32	48	32
1999	23	25	22	7	26
2000	51	22	15	24	16
Average % R.I.C.	291	183	163	204	139
Total Average	42	26	23	29	20

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