



US00PP08663P

# United States Patent [19]

[11] Patent Number: Plant 8,663

Voth et al.

[45] Date of Patent: Mar. 29, 1994

[54] STRAWBERRY PLANT NAMED 'LAGUNA'

Primary Examiner—James R. Feyrer  
Attorney, Agent, or Firm—Townsend and Townsend  
Khourie and Crew

[75] Inventors: Victor Voth, Santa Ana; Douglas V. Shaw; Royce S. Bringhurst, both of Davis, all of Calif.

[73] Assignee: The Regents of the University of California, Oakland, Calif.

[57] ABSTRACT

[21] Appl. No.: 41,750

'Laguna' is a short-day (June-bearing) cultivar similar to 'Chandler' (U.S. Plant Pat. No. 5,262) with similar total productivity and somewhat later productivity, large and very symmetrically conic fruit, firmer fruit, and a larger and more vigorous plant.

[22] Filed: Apr. 1, 1993

[51] Int. Cl.<sup>5</sup> ..... A01H 5/00

[52] U.S. Cl. .... Plt./49

[58] Field of Search ..... Plt. 48, 49

2 Drawing Sheets

## 1

### DESCRIPTION

This invention relates to a new and distinctive short-day type cultivar designated as 'Laguna', which resulted from a cross performed in 1988 between the cultivar 'Irvine' (U.S. Plant Pat. No. 7,172) and advanced selection Cal 85.92-602.

'Laguna' was first fruited at the University of California South Coast Research and Extension Center, near Irvine, Calif., in 1989, where it was selected, originally designated Cal 88.66-616, and propagated asexually by runners. Asexual propagules from this original source have been tested at the South Coast Research and Extension Center, the Watsonville Strawberry Research Facility, and to a limited extent in grower fields starting in 1990.

FIG. 1 shows the general flowering and fruiting characteristics of the plant;

FIG. 2 shows a typical mature leaf during late spring; and

FIG. 3 shows representative midseason fruit.

'Laguna' is typical of short-day types and produces fruit over an extended period when treated appropriately in arid, subtropical climates. 'Laguna' differs from 'Irvine' in that 'Irvine' is a day-neutral type with essentially no photoperiodic flowering response and is very difficult to grow as compared to 'Laguna.' The production pattern for 'Laguna' is similar to that for 'Chandler' (U.S. Plant Pat. No. 5,262); it produces equivalent quantities of early-season fruit, and persists somewhat later in the season in cool mediterranean climates. 'Laguna' will be of special interest for winter plantings, where 'Chandler' has been successful, and for summer plantings where 'Pajaro' (U.S. Plant Pat. No. 4,538) has been successful. Because of its late season production, 'Laguna' is likely to be adapted to production objectives in central California, as well as in southern California.

Plants and foliage: Fruiting plants of 'Laguna' are larger, more erect, and more vigorous than plants of 'Chandler', and are generally larger and similar in form to 'Oso Grande' (U.S. Plant Pat. No. 6,578). 'Laguna' forms branch crowns in greater quantity than 'Chandler' with similar or greater branching than 'Oso Grande'. When propagated in the nursery, 'Laguna' has similar or greater runner production capacity compared with 'Chandler'. Comparative statistics for foliar characters, including leaf color, near mid-season are given for the three cultivars in Table 1 with visual compari-

## 2

sons of leaf color to the Munsell color scale (Nickerson Color Fan) given in Table 5. Leaf color is distinctly lighter on the underside for 'Laguna'; the differential is larger than for 'Chandler' and similar to that for 'Oso Grande'. Individual leaflets for 'Laguna' are larger but otherwise similar in shape to those of 'Chandler', and are more elongated than for 'Oso Grande'. Leaves (including petioles) are longer and much broader than for 'Chandler'. Petioles are thicker and more stiff than those of 'Chandler' and are similar to those of 'Oso Grande'. Paired stipules, borne in a median position on the petiole, appear as small, stalked, ovate to heart-shaped structures on some leaves for 'Laguna' and on most leaves for the comparison cultivars. Stipule size varies greatly both within and among individual plants for 'Laguna', and one or both stipules are frequently absent or may abscise as the leaf matures. Leaf and petiole pubescence characters for 'Laguna' are similar to those for 'Oso Grande', except that tomentum on leaves are substantially less dense. Also, leaves for 'Laguna' are similar in color to leaves of 'Chandler' and 'Oso Grande'. Visual comparisons of fruit color according to the Munsell color scale (Nickerson Color Fan) are given in Table 5. 'Laguna' has flat (occasionally concave) leaves, which are easily distinguished from 'Chandler', and which are similar in convexity to 'Oso Grande'.

Isozymes in leaf extracts: 'Laguna' has been classified for three isozyme systems using starch gel electrophoresis (Table 2): Phosphoglucosomerase (PGI), Leucine Aminopeptidase (LAP), and Phosphoglucomutase (PGM). It is distinguishable from all other short-day cultivars released to date except 'Oso Grande'. For electrophoretic procedures see: J. Amer. Soc. Hort. Sci. 106:684-687.

Disease and pest reaction: 'Laguna' is moderately resistant to common leaf spot (*Ramularia tulasnei*) and powdery mildew (*Sphaerotheca macularis*). When treated properly, it has equal or greater tolerance to two-spotted spidermites (*Tetranychus urticae*) than 'Chandler'. 'Laguna' is tolerant to strawberry viruses encountered in California.

TABLE 1

Foliar characteristics for 'Laguna', 'Chandler', and 'Oso Grande'.			
Foliar Character	Cultivar		
	'Laguna'	'Chandler'	'Oso Grande'
<u>Mid-tier leaflet</u>			
<u>Length (mm)</u>			
mean	95.4	82.4	77.2
range	82-115	78-94	75-80
<u>Width (mm)</u>			
mean	83.6	71.4	67.6
range	70-110	63-88	62-71
<u>Mid-tier leaf</u>			
<u>Length (mm)</u>			
mean	274.4	244.2	191.6
range	252-315	218-262	170-200
<u>Width (mm)</u>			
mean	161.4	148.0	137.2
range	140-185	132-158	130-149
<u>Leaf color (CIELAB)*</u>			
<u>L*</u>			
mean	30.8	31.4	31.9
range	29.2-32.3	27.1-33.3	29.9-33.0
<u>a*</u>			
mean	-7.1	-8.0	-5.3
range	-5.3--8.7	-5.2--8.2	-4.2--8.3
<u>b*</u>			
mean	15.6	16.0	15.5
range	13.1-20.4	12.9-21.4	12.5-20.6
# leaflets/leaf	3	3	3
Leaf convexity	flat/slight concave	concave	concave
<u>Serrations</u>			
number	moderate	many	moderate
shape	semi-round semi-pointed	semi-pointed	semi-round
Leaf pubescence	sparse	moderate/sparse	moderate/heavy
<u>Petiole pubescence</u>			
density	heavy	heavy	heavy
direction	perpendicular	acropetal	perpendicular

\*CIELAB is the abbreviation of the international color system known as "Commission Internationale De L'Eclairage" 1978. Recommendations on uniform color spaces — color difference equations, psychometric color terms, Supplement No. 2 to CIE Publication No. 15. PARIS.

TABLE 2

Isozyme phenotypes for 'Laguna', 'Chandler', and 'Oso Grande'.			
Locus	Cultivar		
	'Laguna'	'Chandler'	'Oso Grande'
PGI	A2	A1	A2
LAP	B3	B3	B3
PGM	C2	C1	C2

Flowering, fruit, and production characteristics: Comparative statistics for flower and fruit characters, including fruit color, near mid-season are given for 'Laguna', 'Chandler' and 'Oso Grande' in Table 3. The primary flowers for 'Laguna' are larger than those of 'Chandler' and 'Oso Grande'; the sepals for 'Laguna' are substantially larger than for the comparison cultivars. Each primary flower has 6-8 petals. The calyx for 'Laguna' is usually even with the shoulder of the fruit, but is occasionally slightly indented. The primary fruit shape for 'Laguna' is a very symmetrical and conic, with secondary fruit usually similar in shape. External fruit color for 'Laguna' is lighter and substantially more orange than fruit of 'Chandler' and 'Oso Grande'; internal color is lighter than for 'Chandler' and 'Oso Grande'. Achenes vary from yellow to light red, and are slightly indented; the fruit is glossy, but not as glossy as 'Chandler'.

'Laguna' has been tested under a variety of cultural regimes, and optimal performance is obtained when nursery treatments, pre-plant chilling regimes, plant densities, and nutritional programs similar to those that optimize performance for 'Chandler' are used. In general, 'Laguna' is more adapted to early-season planting with less supplemental chilling than 'Chandler'.

'Laguna' has similar average fruit size and yields to those of 'Chandler' and 'Oso Grande' (Table 4). 'Laguna' is similar to 'Chandler' and 'Oso Grande' in its production pattern, although it produces better quality fruit late in the production season than either comparison cultivar (with conventional winter planting). Commercial appearance ratings have been better than those for 'Chandler' or 'Oso Grande'. Fruit firmness for 'Laguna' is equal to or greater than that for 'Oso Grande', and the fruit is substantially firmer than fruit from 'Chandler'. Subjectively, 'Laguna' has very good flavor, somewhat less aromatic than 'Chandler', somewhat less sweet but with better acid balance than 'Oso Grande'. The fruit will be outstanding for both fresh market and processing, due to its firm flesh and will be useful for home garden purposes.

TABLE 3

Flower and fruit characters for 'Laguna', 'Chandler', and 'Oso Grande'.			
Character	Cultivar		
	'Laguna'	'Chandler'	'Oso Grande'
<u># petals</u>			
mean	6.4	6.6	5.0
range	6-8	6-8	5-5
Flower position (relative to foliage)	exposed	even/exposed	exposed
<u>Calyx diam. (mm)</u>			
mean	52.8	47.7	34.1
range	45-56	45-53	27-38
<u>Corolla diam. (mm)</u>			
mean	41.8	39.3	32.2
range	38-48	36-46	27-41
<u>Fruit shape</u>			
length/width ratio	1.10	1.33	1.06
subjective	conic	flat conic	blocky/conic
Calyx position	even/slight indent	even/slight neck	even/slight indent
Seed position	slight indent	even/slight indent	even
<u>Fruit color (CIELAB)</u>			
<u>external</u>			
L*	29.0	23.6	22.4
a*	38.2	38.5	31.2
b*	25.4	14.8	17.2
<u>internal</u>			
L*	54.3	46.2	54.1
a*	27.0	39.1	30.4
b*	21.3	29.4	22.7

TABLE 4

Performance for selection 'Laguna' compared with 'Oso Grande' and 'Chandler' at the South Coast Research and Extension Center in 1991. All plants were dug from the South Coast nursery on October 1 and planted October 2 (68"/4-row beds, 23,061 plants/A, 100 g/plant = 425 Crates/A).					
	Yield To 4/1 (g/plant)	Total Yield (g/plant)	Size (g/fruit)	Appearance Score	Firmness
'Laguna'	473	1,510	22.7	4.4	5.0
'Chandler'	463	1,738	23.3	3.9	4.0
'Oso Grande'	530	1,675	25.0	3.8	4.9

TABLE 5

Munsell color classification for leaf and fruit characters.				
Item	Munsell		Munsell	
	Leaf Color Classes		Fruit Color Classes	
	Upper (Adaxial)	Lower (Abaxial)	External	Internal
Chandler	5GY 4/3	5GY 5/6	5R 5/13	7R 5/13
	5GY 5/6		5R 4/12	

TABLE 5-continued

Item	Munsell color classification for leaf and fruit characters.			
	Munsell Leaf Color Classes		Munsell Fruit Color Classes	
	Upper (Adaxial)	Lower (Abaxial)	External	Internal
Oso	5GY 4/3	5GY 5/6	5R 5/13	7.5R 7/9
	5GY 3/2	7.5GY 6/8	7.5R 5/13	7.5R 6/12
Laguna	7.5GY 6/8	5G 6/8	7.5R 5/13	2.5R 9/3
	7.5GY 5/7	5G 5/8	7.5R 4/11	

We claim:

1. The new and distinct variety of strawberry plant illustrated and described and having the characteristics above enumerated.

\* \* \* \* \*

20

25

30

35

40

45

50

55

60

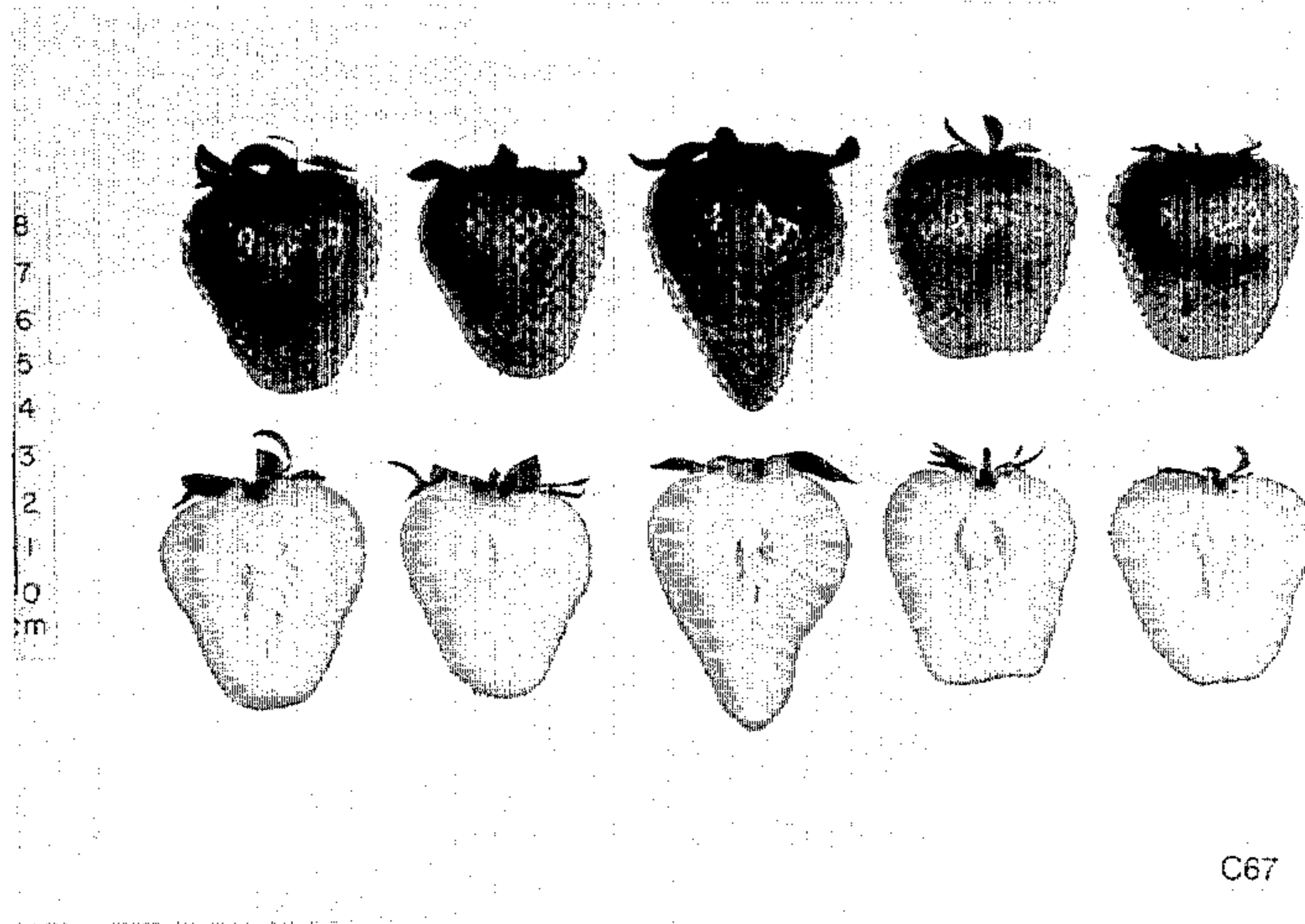
65



*FIG. 1.*



*FIG. 2.*



*FIG. 3.*