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**Shaw et al.**

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(54) **STRAWBERRY PLANT NAMED 'GRENADA'**

(50) Latin Name: ***Fragaria×ananassa* Duch.**
Varietal Denomination: **Grenada**

(71) Applicant: **The Regents of the University of California**, Oakland, CA (US)

(72) Inventors: **Douglas V. Shaw**, Davis, CA (US); **Kirk D. Larson**, Santa Ana, CA (US)

(73) Assignee: **The Regents of the University of California**, Oakland, CA (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 67 days.

(21) Appl. No.: **13/999,314**

(22) Filed: **Feb. 10, 2014**

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(51) **Int. Cl.**
***A01H 5/08*** (2006.01)

(52) **U.S. Cl.**
USPC ..... **Plt./208**

(58) **Field of Classification Search**
USPC ..... Plt./208, 209
CPC ..... A01H 5/0893; A01H 5/08
See application file for complete search history.

(56) **References Cited**

PUBLICATIONS

http://www.darensberries.com/our-berries/; 2013; 1 page.*

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*Primary Examiner* — Kent L Bell
(74) *Attorney, Agent, or Firm* — Kilpatrick Townsend & Stockton LLP

(57) **ABSTRACT**

'Grenada' is a short-day (June bearing) cultivar similar to 'Camarosa' (U.S. Plant Pat. No. 8,708), but with greater productivity, higher quality fruit, and earlier production; it is similar to 'Ventana' (U.S. Plant Pat. No. 13,469) and 'Benicia' (U.S. Plant Pat. No. 22,542), but with somewhat earlier production, a larger plant, larger fruit size, and higher quality fruit.

**3 Drawing Sheets**



Genus and species: The strawberry cultivar of this invention is botanically identified as *Fragaria×ananassa* Duch.

Variety denomination: The variety denomination is 'Grenada'.

## BACKGROUND OF THE INVENTION

This invention relates to a new and distinctive short-day type cultivar designated as 'Grenada', which resulted from a cross performed in 2008 between two unreleased germplasm accessions Cal 4.41-6 and Cal 5.109-2. Accession Cal 4.41-6 was chosen as a parent due to its very high seasonal productivity, high quality fruit, and moderate plant vigor. Accession Cal 5.109-2 was chosen as a parent due to its very high early productivity and its large and flavorful fruit.

'Grenada' was first fruited near Winters, Calif. in 2009, where it was selected, originally designated Cal 8.55-2, and propagated asexually by runners. Following selection and during testing the plant of this selection was designated 'C232'. With the decision that this plant was to be released, this plant was given the name 'Grenada' for purposes of introduction into commerce and for international registration and recognition. Asexual propagules from this original source have been tested in Watsonville Calif. and near Irvine, Calif., and to a limited extent in grower fields starting in 2010.

## BRIEF SUMMARY OF THE INVENTION

'Grenada' is a short-day (June bearing) cultivar similar to 'Camarosa' (U.S. Plant Pat. No. 8,708), but with greater productivity, higher quality fruit, and earlier production; it is similar to 'Ventana' (U.S. Plant Pat. No. 13,469) and 'Benicia' (U.S. Plant Pat. No. 22,542), but with somewhat earlier production, a larger plant, larger fruit size, and higher quality fruit.



## BRIEF DESCRIPTION OF THE DRAWINGS

The Figures depict various characteristics of the 'Grenada' cultivar.

FIG. **1** shows the general flowering and fruiting characteristics of the plant in a field planting.

FIG. **2** shows a typical leaf at mid-season.

FIG. **3** shows representative mid-season fruit.

## DETAILED DESCRIPTION OF THE INVENTION

'Grenada' is typical of short-day strawberry cultivars and produces fruit over an extended period when treated appropriately in arid, subtropical climates. The production pattern for 'Grenada' is similar to that for 'Camarosa' (U.S. Plant Pat. No. 8,708), although it is substantially earlier to initiate fruiting with most cultural treatments. 'Grenada' initiates fruiting slightly earlier than 'Ventana' (U.S. Plant Pat. No. 13,469) and 'Benicia' (U.S. Plant Pat. No. 22,542) when established in very early fall. Fruit for Grenada is darker, firmer, more consistent in size, and more uniformly conical than fruit from unreleased parent variety Cal 4.41-6. Fruit from Grenada is lighter, firmer, more evenly colored, and more uniformly conical than fruit from unreleased parent variety Cal 5.109-2. Grenada produces fruit somewhat earlier than either parent. 'Grenada' will be of special interest for winter plantings, where 'Camarosa', 'Ventana', and 'Benicia' have been suc-

cessful, and in summer plantings where 'Chandler' (U.S. Plant Pat. No. 5,262) and 'Camino Real' (U.S. Plant Pat. No. 13,079) have been successful.

Plants and foliage: Fruiting plants of 'Grenada' are slightly taller, more erect, and more open than all of the comparison cultivars in most production environments. Comparative statistics for foliar characters near midseason are given for 'Grenada' and three comparison cultivars in Table 1. Individual leaflets for 'Grenada' are shorter than those of 'Camarosa' and 'Ventana', and are more elongated than for 'Benicia'. The leaflet base is obtuse and the leaflet margin is serrate to crenate. Leaves (including petioles) for 'Grenada' are longer than for all comparison cultivars. Petioles for 'Grenada' are also generally longer than those of 'Ventana', 'Benicia' and 'Camarosa'. The adaxial (upper) and abaxial (lower) surfaces of leaves for 'Grenada' are darker than for 'Camarosa' and 'Ventana', similar in color to 'Benicia' leaves at midseason. Leaves of 'Grenada' have similar concavity to 'Camarosa', and are less concave than those for 'Ventana'. Serrations at midseason are less pointed than for 'Ventana', similar in shape and number to 'Benicia'and 'Camarosa'. The stipule length is somewhat shorter for 'Grenada' than for the comparison cultivars.

TABLE 1

Foliar and plant characteristics for 'Grenada', 'Camarosa', 'Ventana', and 'Benicia'.

| | Cultivar | | | |
|---|---|---|---|---|
| Foliar Character | 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
| Plant height (mm) | | | | |
| mean | 227 | 277 | 245 | 286 |
| range | 190-320 | 250-300 | 220-260 | 260-300 |
| Plant spread (mm) | | | | |
| mean | 368 | 425 | 414 | 435 |
| range | 300-465 | 375-525 | 360-500 | 380-505 |
| Mid-tier leaflet Length (mm) | | | | |
| mean | 85 | 89 | 80 | 82 |
| range | 70-95 | 80-110 | 70-90 | 70-90 |
| Width (mm) | | | | |
| mean | 79 | 77 | 80 | 76 |
| range | 65-90 | 70-90 | 75-80 | 65-85 |
| Mid-tier leaf Length (mm) | | | | |
| mean | 230 | 231 | 264 | 330 |
| range | 200-290 | 180-260 | 220-310 | 310-340 |
| Width (mm) | | | | |
| mean | 143 | 153 | 161 | 139 |
| range | 120-170 | 140-160 | 150-180 | 80-170 |
| Leaf components Petiole length (mm) | | | | |
| mean | 110 | 113 | 136 | 210 |
| range | 90-150 | 80-120 | 110-160 | 200-220 |

TABLE 1-continued

Foliar and plant characteristics for 'Grenada', 'Camarosa', 'Ventana', and 'Benicia'.

| | Cultivar | | | |
|---|---|---|---|---|
| Foliar Character | 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
| Petiole diameter (mm) | | | | |
| mean | 3.6 | 5.3 | 4.9 | 4.9 |
| range | 3-4 | 4-7 | 4-6 | 4-6 |
| Petiolule length (mm) | | | | |
| mean | 5.1 | 6.9 | 5.3 | 6.7 |
| range | 4-6 | 6-8 | 4-6 | 5-8 |
| # leaflets/leaf | 3 | 3 | 3, rarely 4 or 5 | 3 |
| Leaf convexity | most flat to slight concave | flat to very concave | flat to concave | flat to concave |
| Serrations | | | | |
| number/leaf | 20.8 | 20.6 | 20.5 | 21.1 |
| range | 19-23 | 18-25 | 18-23 | 19-23 |
| shape | semi-pointed | semi-pointed | round to semi-pointed | semi-pointed |
| Leaf pubescence | light-moderate | moderate-heavy | moderate-light | moderate |
| Petiole pubescence | | | | |
| density | heavy | moderate-heavy | heavy | heavy |
| direction | perpendicular | perpendicular to acropetal | perpendicular | perpendicular |
| Petiole color (Munsell) | 2.5 GY 8/9 | 7.5 GY 9/4 | 7.5 GY 8/10 | 5 GY 8/8 |
| Stipule length (mm) | | | | |
| mean | 27.2 | 24.0 | 31.1 | 22.5 |
| range | 20-34 | 20-30 | 25-40 | 19-30 |
| Stipule color (Munsell) | | | | |
| core | 2.5 Y 6/8 | 2.5 GY 8/9 | 2.5 NT 9/4 | 5 GY 7/10 |
| margins | 7.5 Y 6/7 | 5 GY 8/8 | 5 GY 8/8 | 5 GY 6/8 |
| Stolon base diameter (mm) | 11.7 | 15.2 | 16.5 | 11.8 |
| Stolons per nursery mother plant | 22.7 | 18.8 | 22.9 | 28.7 |
| Venation | | | | |
| pattern | pinnate | pinnate | pinnate | pinnate |
| color (Munsell) | 7.5 GY 8/7 | 7.5 GY 9/4 | 7.5 GY 8/7 | 7.5 GY 8/7 |

Disease and pest reaction: 'Grenada' is moderately resistant to powdery mildew (*Sphaerotheca macularis*), but is moderately susceptible to Anthracnose crown rot (*Colletotrichum acutatum*), and to Verticillium wilt (*Verticillium dahliae*); it is moderately resistant to Phytophthora crown rot (*Phytophthora cactorum*) and common leaf spot (*Ramularia tulasnei*) (Table 2). When treated properly, it has tolerance to two-spotted spider mites (*Tetranychus urticae*) equal to that for the comparison cultivars. 'Grenada' is tolerant to strawberry viruses encountered in California.

TABLE 2

Disease resistance scores for 'Grenada' and three comparison cultivars; all scores were obtained in evaluations conducted in 2012-2013.

| Genotype | *Phytophthora* Resistance Score (5 = best) | *Verticillium* Resistance Score (5 = best) | *Colletotrichum* Resistance Score (5 = best) |
|---|---|---|---|
| 'Camarosa' | 3.6 | 2.8 | 2.3 |
| 'Ventana' | 2.1 | 2.9 | 3.0 |
| 'Benicia' | 3.5 | 1.6 | 2.5 |
| 'Grenada' | 3.9 | 3.3 | 1.9 |

Flowering, fruiting, fruit, and production characteristics: 'Grenada' is similar to other California short-day strawberry cultivars (e. g. 'Ventana', 'Camarosa', and 'Benicia') in that it will flower over an extended period and into spring or summer, given appropriate local temperature and horticultural conditions. With most planting treatments 'Grenada' produces fruit slightly earlier than 'Ventana' and 'Benicia' and substantially earlier than 'Camarosa'. Comparative statistics for flower and fruit characters near mid-season are given for the four cultivars in Table 4. The primary flowers for 'Grenada' are similar in size to 'Camarosa' but smaller than 'Ventana' and 'Benicia' with a calyx that is distinctly larger than the corolla on primary fruit. The calyx for 'Grenada' varies in position but frequently has a slight indent early in the season and is even with the fruit later in the season; each primary flower has 5-7 petals, similar to the comparison cultivars on average. The fruit shape for 'Grenada' is consistent throughout the season, and is typically medium to short and somewhat rounded conic. It is easily distinguished by fruit shape from 'Camarosa' (shortened and flattened conic), or 'Ventana' (medium symmetrical conic), and 'Benicia' (often flattened). Fruit size for 'Grenada' is larger than for the comparison cultivars. External fruit color for 'Grenada' is similar to that for 'Camarosa', lighter than for 'Benicia', and darker than for 'Ventana'; internal color for 'Grenada' is somewhat darker than for 'Ventana' (Table 3). Achenes vary from yellow to dark red, and are even with the fruit surface or slightly indented.

TABLE 3

Foliar and fruit color characteristics for 'Grenada' and three comparison cultivars.

| | Cultivar | | | |
|---|---|---|---|---|
| Color Character | 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
| Leaf color (CIELAB) Adaxial | | | | |
| L* | | | | |
| mean | 38.3 | 39.2 | 35.0 | 36.7 |
| range | 37.3-39.8 | 36.0-41.1 | 33.3-36.4 | 35.3-38.3 |
| a* | | | | |
| mean | −12.2 | −14.3 | −11.7 | −9.0 |
| range | −9.5--15.5 | −12.9--16.7 | −10.3--13.5 | −5.5--13.8 |
| b* | | | | |
| mean | 16.9 | 20.6 | 16.9 | 13.7 |
| range | 13.3-19.9 | 17.3-24.8 | 13.1-21.7 | 11.5-18.9 |
| Munsell | 5 GY 5/5 | 2.5 GY 6/8 | 5 GY 5/6 | 5 GY 4/3 |
| Abaxial | | | | |

TABLE 3-continued

Foliar and fruit color characteristics for 'Grenada' and three comparison cultivars.

| | Cultivar | | | |
|---|---|---|---|---|
| Color Character | 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
| L* | | | | |
| mean | 52.5 | 53.2 | 48.5 | 51.1 |
| range | 51.3-54.6 | 51.8-54.6 | 41.7-52.3 | 50.2-52.8 |
| a* | | | | |
| mean | −13.1 | −14.2 | −13.5 | −12.3 |
| range | −11.4--14.9 | −13.9--14.7 | −11.9--16.8 | −9.5--13.5 |
| b* | | | | |
| mean | 20.5 | 21.7 | 20.0 | 19.2 |
| range | 18.9-22.4 | 20.3-23.3 | 17.9-21.9 | 18.1-20.0 |
| Munsell | 7.5 GY 8/7 | 10 GY 8/7 | 7.5 GY 5/7 | 7.5 GY 8/7 |
| Fruit color (CIELAB) External | | | | |
| L* | | | | |
| mean | 38.6 | 38.1 | 36.0 | 36.4 |
| range | 34.7-42.7 | 37.6-39.0 | 34.2-37.5 | 34.5-38.4 |
| a* | | | | |
| mean | 34.4 | 33.4 | 31.2 | 33.3 |
| range | 33.6-36.2 | 29.4-38.7 | 26.6-36.3 | 31.8-35.3 |
| b* | | | | |
| mean | 22.5 | 19.2 | 14.2 | 16.0 |
| range | 18.8-29.3 | 17.8-21.1 | 10.6-17.3 | 15.1-17.6 |
| Munsell | 7.5 R 4/11 | 5 R 4/12 | 2.5 R 4/0 | 5 R 3/7 |
| Internal | | | | |
| L* | | | | |
| mean | 50.2 | 48.6 | 44.0 | 47.1 |
| range | 46.6-53.3 | 46.2-52.3 | 40.8-47.0 | 40.3-55.8 |
| a* | | | | |
| mean | 30.8 | 28.9 | 30.9 | 27.8 |
| range | 25.6-35.4 | 23.5-33.0 | 27.8-33.6 | 19/1-31/6 |
| b* | | | | |
| mean | 30.1 | 31.3 | 27.5 | 27.9 |
| range | 28.0-32.0 | 30.6-32.5 | 24.6-28.8 | 24.7-32.0 |
| Munsell | 7.5 R 5/13 | 7.5 R 6/13 | 5 R4/2 | 5 R 5/13 |
| Achene color | 2.5 Y 7/10 | 10 Y 8/11 | 5 R3/7 | 10 YR 7/10 |
| Munsell | | | | |

TABLE 4

Flower and fruit characters for 'Grenada' and three comparison cultivars.

| | Cultivar | | | |
|---|---|---|---|---|
| Character | 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
| Petal number | | | | |
| mean | 5.8 | 6.2 | 6.1 | 6.2 |
| range | 5-7 | 5-7 | 5-7 | 5-7 |
| Petal shape | | | | |
| apex | truncate to slightly obtuse | truncate to slightly obtuse | truncate to slightly obtuse | truncate to slightly obtuse |
| base | attenuate | attenuate | attenuate | attenuate |
| margin | entire | entire | entire | |
| Petal length (mm) | | | | |
| mean | 11.5 | 13.3 | 11.7 | 12.5 |
| range | 10-13 | 11-15 | 8-13 | 11-14 |

TABLE 4-continued

Flower and fruit characters for 'Grenada' and three comparison cultivars.

| Character | Cultivar 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
|---|---|---|---|---|
| Petal width (mm) | | | | |
| mean | 12.0 | 14.6 | 14.4 | 14.6 |
| range | 10-14 | 13-16 | 8-13 | 12-16 |
| Flower position (relative to foliage) | most even some exposed | even to exposed | even to exposed | even to exposed |
| Calyx diam. (mm) | | | | |
| mean | 40.4 | 47.0 | 50.8 | 36.2 |
| range | 33-47 | 40-50 | 47-53 | 31-41 |
| Corolla diam. (mm) | | | | |
| mean | 26.1 | 39.0 | 39.6 | 77.0 |
| range | 23-31 | 35-45 | 39-41 | 24-30 |
| Sepal length (mm) | | | | |
| mean | 14.3 | 16.6 | 16.4 | 13.8 |
| range | 12-18 | 14-19 | 13-20 | 10-15 |
| Sepal width (mm) | | | | |
| mean | 8.3 | 8.4 | 8.4 | 7.7 |
| range | 7-10 | 7-10 | 7-10 | 7-9 |
| Sepal color (Munsell) | 5 GY 7/10 | 5 GY 5/5 | 10 GY 8/7 | 5 GY 5/6 |
| Pedicel length (mm) | | | | |
| mean | 155 | 115 | 183 | 198 |
| range | 130-180 | 90-140 | 150-210 | 170-220 |
| Pedicel diameter (mm) | | | | |
| mean | 2.7 | 3.5 | 3.7 | 3.8 |
| range | 2-4 | 3-4 | 3-5 | 3-5 |
| Pedicel color | 7.5 GY 8/7 | 5 GY 8/9 | 2.5 GY 8/9 | 5 GY 7/10 |
| Fruit shape | | | | |
| Fruit length (mm) | | | | |
| mean | 46.0 | 48.4 | 46.5 | 51.8 |
| range | 40-48 | 47-52 | 41-52 | 48-56 |
| Fruit width (mm) | | | | |
| mean | 37.4 | 42.6 | 42.4 | 467 |
| range | 33-46 | 40-46 | 36-46 | 42-52 |
| Length/ width | | | | |
| ratio | 1.26 | 1.17 | 1.08 | 1.12 |
| range | 1.0-1.4 | 1.1-1.2 | 1.0-1.2 | 1.1-1.2 |
| subjective | Obovate-flat | Medium conic | Medium conic | Rounded short conic |
| Primary/ secondary fruit comparison | | | | |
| size (subjective) | 50-70% | 55-75% | 55-65% | 60-80% |
| shape | similar shape, more conic | similar shape | similar shape | similar shape |

TABLE 4-continued

Flower and fruit characters for 'Grenada' and three comparison cultivars.

| Character | Cultivar 'Camarosa' | 'Ventana' | 'Benicia' | 'Grenada' |
|---|---|---|---|---|
| Extent/size of hollow core | small-absent | small | small-absent | small-absent |
| Calyx | | | | |
| position | indented-neck | indent-reflexed | even-indented | Indented |
| size relative to fruit | equal or less than fruit diameter | equal or less than fruit diameter | equal or greater than fruit diameter | equal or less than fruit diameter |
| Seed position | indented-extruded | mostly even | even-indented | indented |
| Adherence of Calyx to Fruit | weak | intermediate | weak | reflexed |

Flower and plant measurements obtained on April, 2012, fruit measurements May 10-20, 2012.

'Grenada' has been tested under a variety of cultural regimes, and optimal performance is obtained when nursery treatments and nutritional programs similar to those for 'Camarosa', 'Ventana', and 'Benicia' are used. In general, plants of 'Grenada' are lower in vigor than the comparison cultivars with very early season planting, but have greater vigor if later planting delays the onset of fruiting. 'Grenada' retains excellent fruit quality in summer planting systems.

When treated with appropriate planting regimes, 'Grenada' has substantially larger sized fruit than 'Camarosa' or 'Ventana', and produces individual-plant yields greater than any of the comparison cultivars (Table 5). Commercial appearance ratings have also been substantially better than those for all of the comparison cultivars, especially in comparison with 'Camarosa'. Fruit for 'Grenada' is similar in firmness to fruit from 'Camarosa', more firm than the other comparison cultivars. Subjectively, 'Grenada' has excellent flavor. The fruit will be exceptional for both fresh market and processing, and will be useful for home garden purposes.

TABLE 5

'Grenada' and three comparison cultivars near Watsonville, CA in 2010-12.

| Item | Yield (g/plant) | Appearance Score (5 = best) | Fruit Size (g/fruit) | Firmness |
|---|---|---|---|---|
| 'Camarosa' | 1,815 | 2.8 | 27.1 | 11.6 |
| 'Ventana' | 2,080 | 3.3 | 30.1 | 10.2 |
| 'Benicia' | 1,649 | 3.4 | 33.1 | 11.1 |
| 'Grenada' | 2,511 | 3.7 | 33.1 | 11.9 |

All plants for these trials were harvested from a commercial nursery near Macdoel, CA on October 15-16, and transplanted after 6-7 days supplemental storage. Fruit harvest was initiated in early April and continued through the last week of August. (52" 2-row beds, 17,300 plants/acre).

What is claimed is:

**1**. A new and distinct cultivar of strawberry plant having the characteristics substantially as described and illustrated herein.

* * * * *


FIG. 1

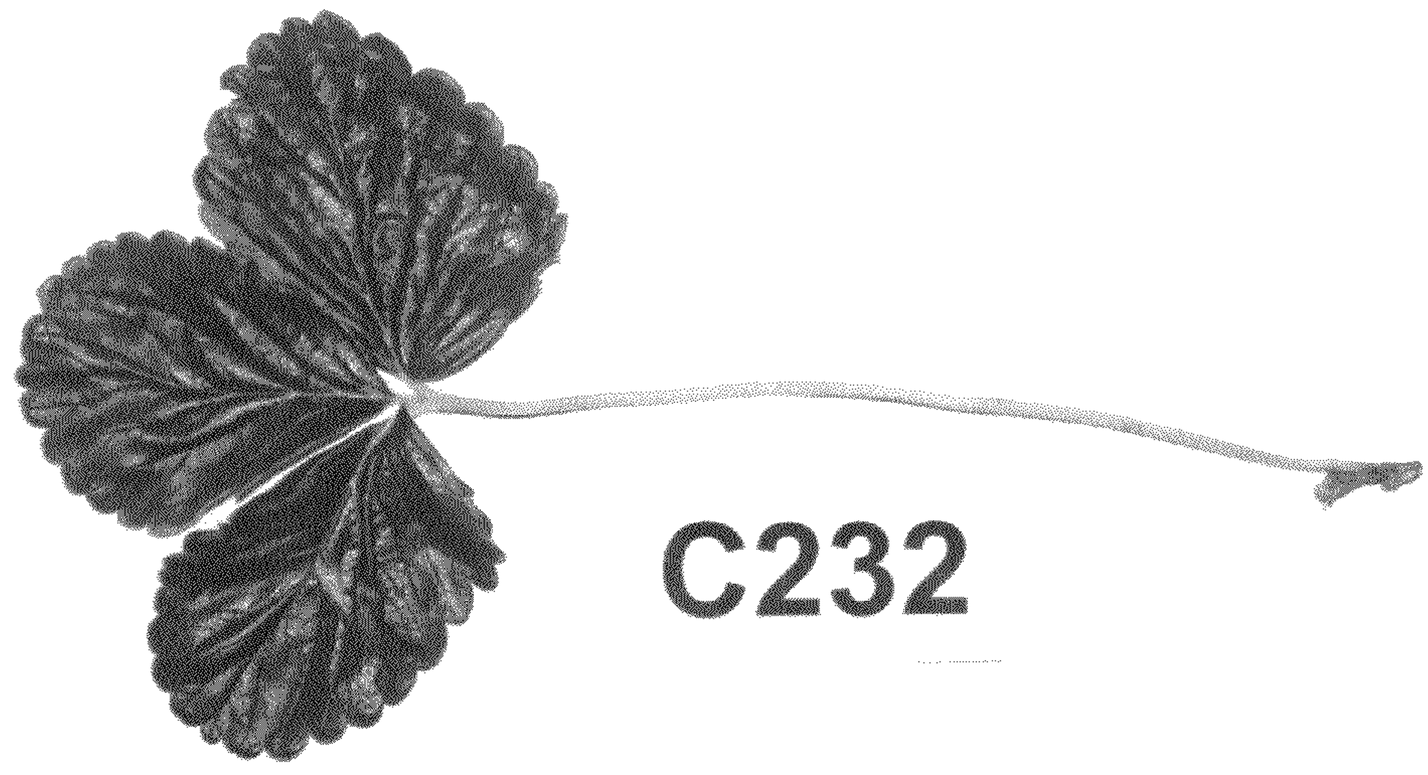


FIG. 2


C232
0 1cm 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

FIG. 3