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(54) **FEMALE PISTACHIO TREE NAMED 'GOLDEN HILLS'**

(50) Latin Name: ***Pistacia vera***
Varietal Denomination: **Golden Hills**

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See application file for complete search history.

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(57) **ABSTRACT**

A new and distinct variety of Pistachio tree denominated 'Golden Hills' is described. This selection's most significant advantage over the industry standard is the higher early yield and a greater percentage of this yield is composed of edible split nuts. This variety also has less of a chilling requirement for dormancy resulting in more uniform spring foliation, flowering, pollination and nut maturity at harvest.

12 Drawing Sheets

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Botanical/commercial classification (*Pistacia vera*)/ new Pistachio variety.

Variety denomination: 'Golden Hills'.

BACKGROUND OF THE INVENTION

The present invention relates to a new and distinct variety of Pistachio tree *Pistacia vera* which has been denominated varietally as 'Golden Hills', and more particularly to such a pistachio tree which has a harvest date of two to thirteen days earlier than the industry standard pistachio tree variety 'Kerman'.

'Golden Hills' produces a greater yield and higher percentage of split, edible nuts than 'Kerman' while maintaining a similar low percentage of loose shells and kernels. The

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earlier harvest date will permit growers to extend their harvest period and reduce competition for scarce harvesting resources and may reduce disease in the northern production areas of California by permitting an earlier harvest before fall rains. The cultivar requires less chilling than 'Kerman', which improves uniformity of foliation, bloom, nut set, nut fill, and uniformity of nut maturity at harvest in years with insufficient chilling for 'Kerman'. Based on all of our evaluations, this cultivar appears to be an exceptional producer and has the potential to increase grower profits by up to 40%, while being better adapted to low chill years, more uniform harvest period, and having fewer Navel Orangeworm problems.

SUMMARY OF THE INVENTION

'Golden Hills' differs from 'Kerman' as follows: a) This cultivar produced 46% higher yield than 'Kerman' the primary cultivar grown on a commercial basis in California (<95% of the crop) and 43% greater yield in 2004; b) Nut size is on average slightly larger than 'Kerman' and weight is similar; c) Flowering and harvest are 2 to 4 weeks eariler than 'Kerman'. This earlier harvest date is important as it permits growers to more efficiently use their equipment and labor by spreading the harvest period across 6 weeks, rather than the current 3 week harvest period. Fruit ripening is also more uniform than was observed for 'Kerman'; d) Earlier harvest resulted in significantly less Navel Orangeworm damage (0.0% vs. 9.3%). This is an important characteristic since nut damage on the tree is associated with aflatoxin contamination; e) 'Golden Hills' had more but smaller scaffold branches than 'Kerman', producing a smaller more bushy tree after 3–4 years of training; and f) 'Golden Hills' buds were about 1 mm longer than 'Kerman' buds.

'Golden Hills' has been asexually reproduced in Kern County, Calif. and Madera County Calif. The cultivar was propagated from buds, inserted into both 'PG-1' and 'UCB-1' rootstocks (budded onto). The cultivar is present at field locations in Kern Co. and Madera Co. (test plots). In addition 2 trees have been budded on 'UCB-1' rootstocks in pots at Davis for planting into the field this spring. 'Golden Hills' is grafted onto 'UCB-1' rootstock in the field at the Wolfskill experimental farm near Winters at row 6, tree 16 A and B.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**. Flowers and leaves from grafted 'Golden Hills' trees at the Bakersfield test plot in 2003.

FIG. **2**. 'Golden Hills' flowers—Mar. 31, 2004. Several days ahead of 'Kerman'. Some flowers have set.

FIG. **3**. 'Kerman' flowers—Mar. 31, 2004, mid-bloom. Note that leafing is more advanced than for 'Golden Hills' even though flowering is later.

FIG. **4**. Comparison of 'Golden Hills' and 'Kerman' leaves and flowers—Mar. 31, 2004.

FIG. **5**. Fruit clusters on 'Golden Hills' tree at Bakersfield plot, 2003.

FIG. **6**. 'Golden Hills' trees at Bakersfield test plot, 2003.

FIG. **7**. Roasted seed harvested from 'Golden Hills' grafted trees in the Bakersfield plot, 2003.

FIG. **8**. 'Golden Hills' and 'Kerman' roasted nuts.

FIG. **9**. Year by variety mean values for total yield (CCP assessed weight).

FIG. **10**. Year by variety mean values for yield of split nuts.

FIG. **11**. Year by variety mean values for yield of % split nuts—untransformed data.

FIG. **12**. Year by variety mean values for grower paid yield.

FIG. **13**. 5 trees each of 'Kerman' and 'Golden Hills', showing the difference in scaffold branch development. This results in a smaller, shrubbier tree for 'Golden Hills'.

FIG. **14**. Lenticel pictures from each of 5 trees for 'Kerman' and 'Golden Hills'. The areas shown are 25 sq. cm., 5 cm on each side.

DETAILED BOTANICAL DESCRIPTION

The following description describes the key characteristics of a new female pistachio cultivar named 'Golden Hills' as well as reference to the standard pistachio cultivar 'Kerman' in California.

The Royal Horticultural Society color chart from 1986 is used in the identification of color. Also, common color terms are to be accorded their ordinary dictionary significance.

The cross: The cross that produced 'Golden Hills' was originally made in 1990, and the original seedling was planted at a research plot in 1991 near Bakersfield, Calif. The cross was made between a *Pistacia vera* female '2-35', located in Kern County and propagated from wood supplied to Joseph Maranto from a plot in UC Davis in 1985, and a *Pistacia vera* male 'ES#2' originally from Chico, CA. 'ES#2' is no longer available. This seedling, from this cross, was designated as B22-31. Buds from this seedling tree were budded to rootstocks planted in August 1997 in an advanced selection trial near Lost Hills, Calif. Each cultivar is represented by 2 replicates of 10 trees grafted to 'UCB-1' and 10 trees grafted to 'PG-1' per replicate. They first flowered in 2001. Performance data was obtained in 2002, 2003, and 2004. Nursery rootstock trees were budded with this selection in 1997 and were used to plant a second advanced selection trial in Madera County north of Fresno, Calif. in September 1999. Each plant selection is represented by two replicates of 5 trees grafted to 'UCB-1' and 5 trees grafted to 'PG-1' per replicate. This selection flowered and fruited in 2003. The cultivar is stable and no significant differences in morphological or phonological characteristics were observed when propagated on rootstocks.

Tree vigor: The tree is of average size for a pistachio, based on observation of 7 year old trees. Grafted trees are about 3 m tall at 7 years with a spread equal to the height. Trunk diameters are 10 to 15 cm.

Tree structure: 'Golden Hills' has tree structure and branching habit typical for *Pistacia vera* L. Branch angles are broad, ranging from 80 to 90 degrees for both scaffold and lateral branches. Distribution of scaffold and lateral branches are a function of pruning and training activities which are practiced intensively during the first three years of growth (FIGS. **2** and **6**).

'Golden Hills' had more but smaller scaffold branches than 'Kerman', producing a smaller more bushy tree after 3–4 years of training. The effect is clearly shown in FIG. **13**, where photos of 5 trees each of 'Golden Hills' and 'Kerman' are presented. This is a significant character, since it may help explain the excellent yield characteristics of 'Golden Hills'. The shrubbier tree has more fruit bearing wood and also probably puts fewer resources into wood development and more resources into fruit development. This type of tree may also require less extensive pruning in later years, resulting in cost savings to the grower.

Bark: 'Golden Hills' bark color was identical to the bark color of 'Kerman', specifically RHS 202D (grey).

Trunk Lenticels: Close up photo evaluation of trunk lenticels was undertaken. There were visible differences between the lenticel patterns for 'Kerman' and 'Golden Hills', shown in FIG. **14**. The area shown is 5 cm×5 cm. 'Kerman' lenticels appear to be distinctly shorter and are more widely spaced on the bark, both horizontally and vertically. The overall impression is that there is more open bark visible. 'Golden Hills' appears to have lenticels that are wide (in the horizontal dimension), and in many cases merge

to create horizontal rows. The color of the 'Golden Hills' lenticels was RHS 172C (grey orange) as compared to 'Kerman', for which the color of the lenticels was RHS 172D. The width of the lenticels of 'Golden Hills' ranged from 1.2 to 2.2 mm, with most being about 2 mm in width. The width of the lenticels of 'Kerman' ranged from 1 to about 2 mm, an average of 1.8 to 2.0 mm. The height of the lenticels from both 'Golden Hills' and 'Kerman' was 1 mm.

Flower Buds: Bud size analysis for 'Golden Hills' and 'Kerman' was limited to bud length, since this was the only character that seemed to be different between the varieties. The buds were much thinner than for the males, making width measurements problematic. 10 buds per tree were measured for each of 5 trees. Within tree differences were not found to be highly significant, so data for each cultivar was bulked (eg. 50 buds per cv) and analyzed using a completely random design. As can be seen from the data analysis, bud length differences were highly significant. 'Golden Hills' buds were about 1 mm longer than 'Kerman' buds. (Tables 1 and 2). The color of the emerging inflorescence for both 'Golden Hills' and 'Kerman' was yellow-green (RHS 145C).

TABLE 1

ANOVA TABLE for bud l (mm)

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Culitvar	2	25.473	12.736	25.503	<.0001	51.007	1.000
Residual	147	73.411	.499				

Means TABLE for bud l (mm)
Effect: Cultivar

	Count	Mean	Std. Dev.	Std. Err
Golden Hills	50	8.340	.626	.089
Kerman	50	7.476	.643	.091
Lost Hills	50	8.360	.832	.118

TABLE 2

	Mean Diff.	Crit. Diff.	P-Value
Fisher's PLSD for bud l (mm) Effect: Cultivar Significance Level: 5%			
Golden Hills, Kerman	.864	.279	<.0001 S
Golden Hills, Lost Hills	−.020	.279	.8877
Kerman, Lost Hills	−.884	.279	<.0001 S
Scheffe for bud l (mm) Effect: Cultivar Significance Level: 5%			
Golden Hills, Kerman	.864	.350	<.0001 S
Golden Hills, Lost Hills	−.020	.350	.9900
Kerman, Lost Hills	−.884	.350	<.0001 S

Inflorescences: Female inflorescences are born laterally alternately on branches, rarely as terminal buds. They are located on one year old wood. The flower buds form a branched compound inflorescence of the panicle form. Individual flowers are about 1 mm in size. All flowers are female. The panicles are 5 to 8 cm long with considerable variation in size. The panicles become more extended as flowering progresses. Flowers become receptive from the base to the tip of the panicle, and the total period of receptivity may span a 3 week period, depending on weather conditions during individual seasons. Flowers are pale green (RHS 143C) as are the supporting structures of the panicles (FIGS. **1**, **2** and **4**). Comparisons with 'Kerman' are provided in FIGS. **3** and **4**.

Flowering Date:

Data from seedling test plot in Kern County, Calif.:

1996: For 'Golden Hills'—Apr. 15, 1996

1997: For 'Golden Hills'—first flowering Apr. 15, 1997 to Apr. 21, 1997, peak flowering Apr. 22, 1997 to Apr. 28, 1997, last flowering Apr. 29, 1997 to May 5, 1997; for 'Kerman'—first flowering Apr. 22, 1997 to Apr. 28, 1997, peak flowering Apr. 29, 1997 to May 5, 1997, last flowering—May 6, 1997 to May 13, 1997

1998: For 'Golden Hills'—first flowering Apr. 12, 1998 to Apr. 19, 1998, peak flowering Apr. 20, 1998 to Apr. 27, 1998, last flowering Apr. 20, 1998 to Apr. 27, 1998; for 'Kerman'—first flowering Apr. 20, 1998 to Apr. 27, 1998, peak flowering Apr. 28, 1998 to May 5, 1998, last flowering May 6, 1998 to May 13, 1998.

1999: For 'Golden Hills'—first flowering Mar. 27, 1999 to Mar. 30, 1999, peak flowering Apr. 1, 1999 to Apr. 4, 1999, last flowering Apr. 5, 1999 to Apr. 9, 1999.

2000: For 'Golden Hills'—first flowering Apr. 8, 2000 to Apr. 13, 2000.

Data from grafted test plot in Kern County: Trees were grafted on either 'UCB1' or 'Pioneer Gold-1' rootstocks. Visits to the two experimental sites were made at intervals of three to four days through the bloom period. In 2004 (8^{th} year since grafting), a bloom-rating of 1 through 6 was used with 1=dormant; 2=early bloom, 3=mid bloom, 4=full bloom and 5=late bloom. Bloom evaluation is subjective; the number of individual flowers in bloom within an inflorescence varies, as does the degree of flowering at different locations along a branch. Full bloom was an estimate of when the maximum number of receptive stigmas were present on the tree. On Mar. 25, 2004 'Golden Hills' was at full or mid bloom (3.0), 'Kerman' was just beginning to break buds (1.5).

Leaves: The leaves are single parapinnate compound leaves with an average number of leaflets of 3 or 5. The apex of the leaflet blades is obtuse to cuspidate, and the leaflet base is rounded. Leaflet margins are entire to slightly crenate. Leaflets are oval to ovate. Terminal leaflet appears mucronate in some situations. Leaflets are typically 3–5 cm wide and 4 to 7 cm long. The compound leaf is typically 10 to 15 cm long. There is considerable variation in leaf and leaflet size depending on the time of the season, position in the tree, and year. The width of a compound leaf ranges from 8 to 14 cm. The length of the compound leaf ranges from 10 to 15 cm. Margins of leaf blades are entire. Leaf surfaces are glabrous, smooth and waxy. The color of the upper and lower surfaces of the leaves range from light green at first emergence (RHS 136A to RHS 139B) to dark green at maturity (RHS 136A to RHS 136A). The upper surfaces of the leaves of 'Kerman' range from RHS 136A to RHS 139A at emergence to maturity. (FIGS. **1**, **2**, and **4**). The leaf vein and petiole of 'Golden Hills' are a light yellowish green in color (RHS149D). The petiole is 4 to 7 cm in length and the texture is smooth, with no wings.

Leafing date: In general 'Golden Hills' flowers before leaves start to push, while flowering and leafing are more synchronous with 'Kerman'.

1997: for 'Golden Hills'—first leafing Apr. 22, 1997 to Apr. 29, 1997; for 'Kerman' Apr. 22, 1997 to Apr. 29, 1997.

1998: for 'Golden Hills'—first leafing Apr. 20, 1998 to Apr. 27, 1998; for 'Kerman' Apr. 20, 1998 to Apr. 27, 1998

1999: for 'Golden Hills'—first leafing Apr. 1, 1999 to Apr. 4, 1999

2000: for 'Golden Hills'—first leafing Apr. 8, 2000 to Apr. 13, 2000

Nut description: Nuts are arranged in panicle clusters (FIG. **5**). They are considered drupes. Most flowers abort so that 10 to 20 nuts per cluster remain. The color of the pellicle for both 'Golden Hills' and 'Kerman' is grey-orange (RHS 177D). The pellicle is approximately 0.1 mm in thickness. Husk color gradually changes from a light green in late June to a creamy white, tinged red, color (RHS 52D (pink) to RHS 11D) prior to harvest (FIG. **5**). The surface texture of the hull is smooth and dull, with roughness aproximately equivalent to 1000 grit sandpaper. The hull thickness ranges between 1 and 1.5 mm. Husks (exo-mesocarp) initially adhere tightly to the shell (endocarp) but become detached but intact at harvest. Past harvest the husks split, exposing the shell. Shells split midseason, usually 4 to 6 weeks prior to harvest. Some shells do not split, producing a nut with low economic value. This is an important commercial character. Blank nuts are formed when the embryo aborts but the shell and husk continue to develop. Blank nuts are commercially undesirable and do not contribute to yield. 'Golden Hills' produces a processed nut that is very similar to 'Kerman' in size and color. Nuts are oval, longer than wide with a somewhat truncate base and slightly cuspidate to rounded tip (FIG. **7**). The shell suture is deep, extending from the tip almost to the base and is symmetrical. 'Kerman' nuts are slightly shorter than 'Golden Hills' nuts (Table 3) and are less symmetrical (FIG. **8**). Shell sutures are less symmetrical and a significant percentage of in-shell nuts have a flattened shape with longer shell sutures on one side, not typical for 'Golden Hills'. The color of the 'Golden Hills' kernel is green (RHS 145C), as is the kernel of 'Kerman' (RHS 145 A). The average kernel size is 1.99 cm in length, 1.03 cm in width, and 1.06 cm in depth. The form of the kernel is generally egg shaped or ovate, narrowing toward the micropylar end. The surface texture of the kernel is smooth, with surface wrinkles oriented in a linear manner from the stem end to the micropylar end. The average weight of the kernel is 0.7 grams. The flavor of the kernel is typical of pistachios, similar to 'Kerman', and is slightly sweet and nutty.

TABLE 3

Average individual nut length and width[1] of nuts for 'Golden Hills' and 'Kerman' 'PG-1' rootstock from a test plot in northwestern Kern County from 2002 through 2004 (7th and 8th leaf).

	nut length, mm		nut width, mm	
Cultivar	2003	2004	2003	2004
'Golden Hills'	20.2	18.2	11.9	12.8
'Kerman'	17.8	17.0	12.2	12.3

[1]In 2003 the values in the table were based on one 50 nut sample from each variety. In 2004 the values in the table were based on one 50 nut sample from each of the two replicates of each variety.

Split nut percentages (at Kern Co. location unless otherwise noted):

2002: 'Golden Hills'=96%; 'Kerman'=85%

2003: 'Golden Hills'=73% 'Kerman'=60%

2004: 'Golden Hills'=93%; 'Kerman'=90%

2004 at Madera plot: 'Golden Hills'=65%; 'Kerman'=59%

Blank nut percentages (at Kern Co. location unless otherwise noted):

Cumulative 2002–2004: 'Golden Hills'=3.4%; 'Kerman'=24.2%

Harvest date: 'Golden Hills' matures 2 to 4 weeks earlier than 'Kerman' (Table 4). This is a valuable commercial character as it permits growers to better the manage the harvest which otherwise occurs over a short time period. Delayed harvest can also result in high levels of insect (Navel Orangeworm) damage and associated aflatoxin contamination.

TABLE 4

Harvest dates for 'Golden Hills' and 'Kerman' on 'PG1' rootstock from a test plot in northwestern Kern County from 2002 through 2004 (6th through 8th leaf).

Cultivar	2002[1,2]	2003[1]	2004
'Golden Hills'	September 4	September 3	August 16
'Kerman'	September 4	September 19	September 21

[1]Oil applied in February of 2002 and 2003 to promote earlier bloom in the surrounding orchard (and also in the test plot).
[2]In 2002, 'Golden Hills' was harvested 2+ days past maturity due to scheduling difficulties.

Insect damage: Cumulative insect damage on nuts was 0.0% for 'Golden Hills' and 9.3% for 'Kerman' from 2002 through 2004.

TABLE 19

Additional harvest timing, yield and nut quality information (2002 and 2003) for 'Golden Hills' compared to 'Kerman' on 'PG-1' rootstock. Data from Kern County Plot from different sampling than shown below.

	2002		2003	
Characteristic	'Kerman'	'Golden Hills'	'Kerman'	'Golden Hills'
nut yield (CPC weight (5% moisture), lbs/tree	12.8	13.5	8.0	15.7
split edible in-shell, lbs/tree	10.0	12.4	4.7	11.0
edible in-shell split percentage	78	92	52	70
loose shell and kernel percentage	1	1	0	1
closed shell percentage	20	6	46	30
blank nuts (no kernel) percentage	7	3	6	4
individual nut weight (grams)	1.44	1.44	1.25	1.31
approximate date ready for harvest	9/4/02	9/2/02	9/16/03	9/3/03

Yield: 'Golden Hills' had significantly greater total yield and grower paid yield (after non-split nuts and insect damaged nuts are accounted for) than did 'Kerman'. Cumulative yields for 'Golden Hills' from 2002 through 2004 were about 40% to 45% greater than for 'Kerman'. (FIGS. **9**–**12**).

Total yield in lbs/acre:

2002: 'Golden Hills'=1762; 'Kerman'=1593

2003: 'Golden Hills'=2048; 'Kerman'=1081

2004: 'Golden Hills'=4276; 'Kerman'=3032

Yield of split nuts in lbs/acre:

2002: 'Golden Hills'=1677; 'Kerman'=1355

2003: 'Golden Hills'=1484; 'Kerman'=641

2004: 'Golden Hills'=3969; 'Kerman'=p2725

Grower paid yield in lbs/acre:

2002: 'Golden Hills'=1720; 'Kerman'=1474

2003: 'Golden Hills'=1767; 'Kerman'=861

2004: 'Golden Hills'=4123; 'Kerman'=2876

Values for total yield, inshell yield, and grower paid yield are presented in Table 5.

TABLE 5

Cumulative nut yields[1] for 'Golden Hills' and 'Kerman' on 'PG-1' rootstock from a test plot in northwestern Kern County from 2002 through 2004 (6th through 8th leaf).

Cultivar	CPC assessed weight, lbs./acre	Edible split inshell nuts, lbs./acre	Grower-paid yield[2], lbs./acre
'Golden Hills'	8087	7130	7609
'Kerman'	5707	4721	5211

[1]Yields based on two replications of 10 trees each. Trees were on 'PG-1' rootstock.

[2]Grower-paid yield is the weight of harvested nuts for which the grower is paid. This yield is basically the CPC assessed weight minus the weight of the shells from closed shell and shelling stock.

Evaluation data from the Madera County Test plot is presented in Table 6. This data is relatively preliminary, representing only the first harvestable yield. As was true at the Kern County location, split nut percentages were higher for 'Golden Hills', blank nut percentages were lower for 'Golden Hills', and nut weights were similar to 'Kerman'. Tables 7–18 provide more data on the yield of 'Golden Hills' as compared to both 'Kerman' (unpatented) and 'Lost Hills' (U.S. patent application Ser. No. 11/086,616).

TABLE 6

Nut characteristics for three advanced selections and 'Kerman' on 'PG-1' and 'UCB1' rootstock in a test plot located in southern Madera County, 2004

Variety	split nut %	adhering hull, %	black nuts, %	loose shell and kernel, %	average nut weight[1], grams
'Kerman'	59.4	10.6	13.8	3.7	1.29
'Golden Hills'	65.4	10.7	9.0	5.9	1.29

[1]Based on 50 nut samples.

TABLE 7

ANOVA for total yield (CCP assessed weight). Years, varieties, and interactions were significant.

	DF	Sum of Squares	Mean Square
year	2	11657142.111	5828571.056
variety	2	1888152.111	944076.056
year * variety	4	1710508.889	427627.222
Residual	9	1020624.500	113402.722

	F-Value	P-Value	Lambda	Power
year	51.397	<.0001	102.794	1.000
variety	8.325	.0090	16.650	.880
year * variety	3.771	.0455	15.083	.668

TABLE 8

Total yield means table (lbs/acre CCP assessed weight) for varieties × years.

	Count	Mean	Std. Dev.	Std. Err.
2002, Kerman	2	1593.500	88.388	62.500
2002, Lost Hills	2	1707.500	67.175	47.500
2002, Golden Hills	2	1762.500	540.937	382.500
2003, Kerman	2	1081.500	55.861	39.500
2003, Lost Hills	2	2185.000	537.401	380.000
2003, Golden Hills	2	2048.500	386.787	273.500
2004, Kerman	2	3032.000	52.326	37.000
2004, Golden Hills	2	2998.000	345.068	244.000
2004, Golden Hills	2	4276.000	390.323	276.000

TABLE 9

Mean differences for yield (CCP assessed weight), protected LSDs, and Scheffe tests (5% significance) for varieties. 'Golden Hills' had significantly higher yield than 'Kerman' at the 1% significance level. 'Lost Hills' had higher yields than 'Kerman', but only at the 7.3% level and lower yield than 'Golden Hills', also at the 7% level. S denotes significant difference at 5%.

	Mean Diff.	Crit. Diff.	P-Value	
	LSD			
Golden Hills, Kerman	793.333	439.819	.0028	S
Golden Hills, Lost Hills	398.833	439.819	.0705	
Kerman, Lost Hills	−394.500	439.819	.0730	
	Scheffe			
Golden Hills, Kerman	793.333	567.273	.0090	S
Golden Hills, Lost Hills	398.833	567.273	.1780	
Kerman, Lost Hills	−394.500	567.273	.1836	

TABLE 10

ANOVA for split nut yields. Years, varieties, and interactions were significant.

	DF	Sum of Squares	Mean Square
year	2	11502633.333	5751316.667
variety	2	1966566.333	983283.167
year * variety	4	2154286.333	538571.583
Residual	9	866340.500	96260.056

	F-Value	P-Value	Lambda	Power
year	59.748	<.0001	119.495	1.000
variety	10.215	.0048	20.430	.938
year * variety	5.595	.0153	22.380	.848

TABLE 11

Split nut yields means table (lbs/acre) for varieties × years.

	Count	Mean	Std. Dev.	Std. Err.
2002, Kerman	2	1355.000	171.120	121.000
2002, Lost Hills	2	1474.000	65.054	46.000
2002, Golden Hills	2	1677.500	478.711	338.500
2003, Kerman	2	641.000	106.066	75.000
2003, Lost Hills	2	2016.500	504.167	356.500
2003, Golden Hills	2	1484.000	216.375	153.000
2004, Kerman	2	2725.500	.707	.500
2004, Golden Hills	2	2707.500	327.390	231.500
2004, Golden Hills	2	3968.500	429.214	303.500

TABLE 12

Mean differences, protected LSDs, and Scheffe tests (5% significance) for varieties (split nut yields). Both 'Lost Hills' and 'Golden Hills' had significantly higher yields of split nuts than 'Kerman' at the 1% significance level. S denotes significant difference at 5%.

	Mean Diff.	Crit. Diff.	P-Value	
	LSD			
Golden Hills, Kerman	802.833	405.215	.0015	S
Golden Hills, Lost Hills	310.667	405.215	.1169	
Kerman, Lost Hills	−492.167	405.215	.0226	S
	Scheffe			
Golden Hills, Kerman	802.833	522.641	.0051	S
Golden Hills, Lost Hills	310.667	522.641	.2732	
Kerman, Lost Hills	−492.167	522.641	.0645	

TABLE 13

ANOVA for % split nuts (transformed data). Years, varieties, and interactions were significant.

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
year	2	11.297	5.649	23.416	.0003	46.832	1.000
variety	2	5.627	2.813	11.663	.0032	23.325	.964
year * variety	4	11.524	2.881	11.943	.0012	47.771	.995
Residual	9	2.171	.241				

TABLE 14

Mean % split nuts (lbs/acre) for varieties × years - untransformed data.

	Count	Mean	Std. Dev.	Std. Err.
2002, Kerman	2	84.866	6.031	4.265
2002, Lost Hills	2	86.317	.414	.293
2002, Golden Hills	2	95.507	2.152	1.521
2003, Kerman	2	59.602	12.886	9.112
2003, Lost Hills	2	92.241	.387	.274
2003, Golden Hills	2	72.743	3.172	2.243
2004, Kerman	2	89.904	1.528	1.081
2004, Lost Hills	2	90.280	.529	.374
2004, Lost Hills	2	92.737	1.573	1.112

2004, Golden Hills

TABLE 15

Mean differences, protected LSDs, and Scheffe tests (5% significance) for varieties (% split nuts - transformed data). Both 'Lost Hills' and 'Golden Hills' had significantly higher yields of split nuts than 'Kerman' at the 1+% significance level. 'Lost Hills' and 'Golden Hills' were not significantly different with respect to split nut percentages. S denotes significant difference at 5%.

	Mean Diff.	Crit. Diff.	P-Value	
	LSDs			
Golden Hills, Kerman	.051	.041	.0187	S
Golden Hills, Lost Hills	−.016	.041	.4090	
Kerman, Lost Hills	−.067	.041	.0047	S
	Scheffe			
Golden Hills, Kerman	.051	.052	.0542	
Golden Hills, Lost Hills	−.016	.052	.6976	
Kerman, Lost Hills	−.067	.052	.0149	S

TABLE 16

ANOVA for grower paid yield. Years, varieties, and interactions were significant.

	DF	Sum of Squares	Mean Square
year	2	11536201.444	5768100.722
variety	2	1925492.111	962746.056
year * variety	4	1888457.889	472114.472
Residual	9	924545.000	102727.222

	F-Value	P-Value	Lambda	Power
year	56.150	<.0001	112.299	1.000
variety	9.372	.0063	18.744	.916
year * variety	4.596	.0269	18.383	.763

TABLE 17

Grower paid yield means table (lbs/acre) for varieties × years.

	Count	Mean	Std. Dev.	Std. Err.
2002, Kerman	2	1474.000	130.108	92.000
2002, Lost Hills	2	1591.000	66.468	47.000
2002, Golden Hills	2	1720.500	509.824	360.500
2003, Kerman	2	861.500	24.749	17.500
2003, Lost Hills	2	2099.500	519.723	367.500
2003, Golden Hills	2	1766.500	301.395	213.500
2004, Kerman	2	2875.500	21.920	15.500
2004, Lost Hills	2	2853.000	336.583	238.000
2004, Golden Hills	2	4122.500	409.415	289.500

TABLE 18

Mean differences, protected LSDs, and Scheffe tests (5% significance) for varieties (grower paid yield). Both 'Lost Hills' and 'Golden Hills' had significantly higher grower paid yield of split nuts than 'Kerman' at the 5% significance level. 'Golden Hills' had higher grower paid yield than 'Lost Hills' at the 9% significance level. S denotes significant difference at 5%.

	Mean Diff.	Crit. Diff.	P-Value	
	LSDs			
Golden Hills, Kerman	799.500	418.605	.0019	S
Golden Hills, Lost Hills	355.333	418.605	.0870	
Kerman, Lost Hills	−444.167	418.605	.0399	S
	Scheffe			
Golden Hills, Kerman	799.500	539.912	.0064	S
Golden Hills, Lost Hills	355.333	539.912	.2133	
Kerman, Lost Hills	−444.167	539.912	.1079	

Chilling Requirement: This variety has less of a chilling requirement for dormancy as compared to 'Kerman' resulting in more uniform spring foliation, flowering, pollination and maturity at harvest.

Disease resistance and susceptibility: Earlier harvest resulted in significantly less navel orangeworm damage (0.0% vs. 9.3%). This is an important characteristic since nut damage on the tree is associated with aflatoxin contamination.

Usage: The nuts are primarily sold as a dry "in shell" product for direct consumption at the retail level. They may be sold either "salted" or "unsalted". They are marketed either in packages or are sold in bulk. Small quantities may be used in confections or ice cream. The shipping quality of the nut is excellent, and is similar to Kerman when the husk is removed and the nut is dried. The nut may be stored dry

(<6% moisture) at room temperature for up to one year, before exhibiting off-type or stale flavor.

'Golden Hills' is a female tree with a harvest date 2 to 4 weeks earlier than 'Kerman', which is the industry standard. 'Golden Hills' produces a greater yield and higher percentage of split, edible nuts than 'Kerman' while maintaining a similar low percentage of loose shells and kernels. The earlier harvest date will permit growers to extend their harvest period and reduce competition for scarce harvesting resources and may reduce disease in the northern production areas of the state by permitting an earlier harvest before fall rains. The cultivar requires less chilling than 'Kerman', which improves uniformity of foliation, bloom, nut set, nut fill, and uniformity of nut maturity at harvest in years with insufficient chilling for 'Kerman'. Based on all of our evaluations, this cultivar appears to be an exceptional producer and has the potential to increase grower profits by up to 40%, while being better adapted to low chill years, more uniform harvest period, and having fewer Navel Orangeworm problems.

What we claim is:

1. A new and distinct variety of pistachio tree substantially as shown and described herein.

* * * * *

FIGURE 1

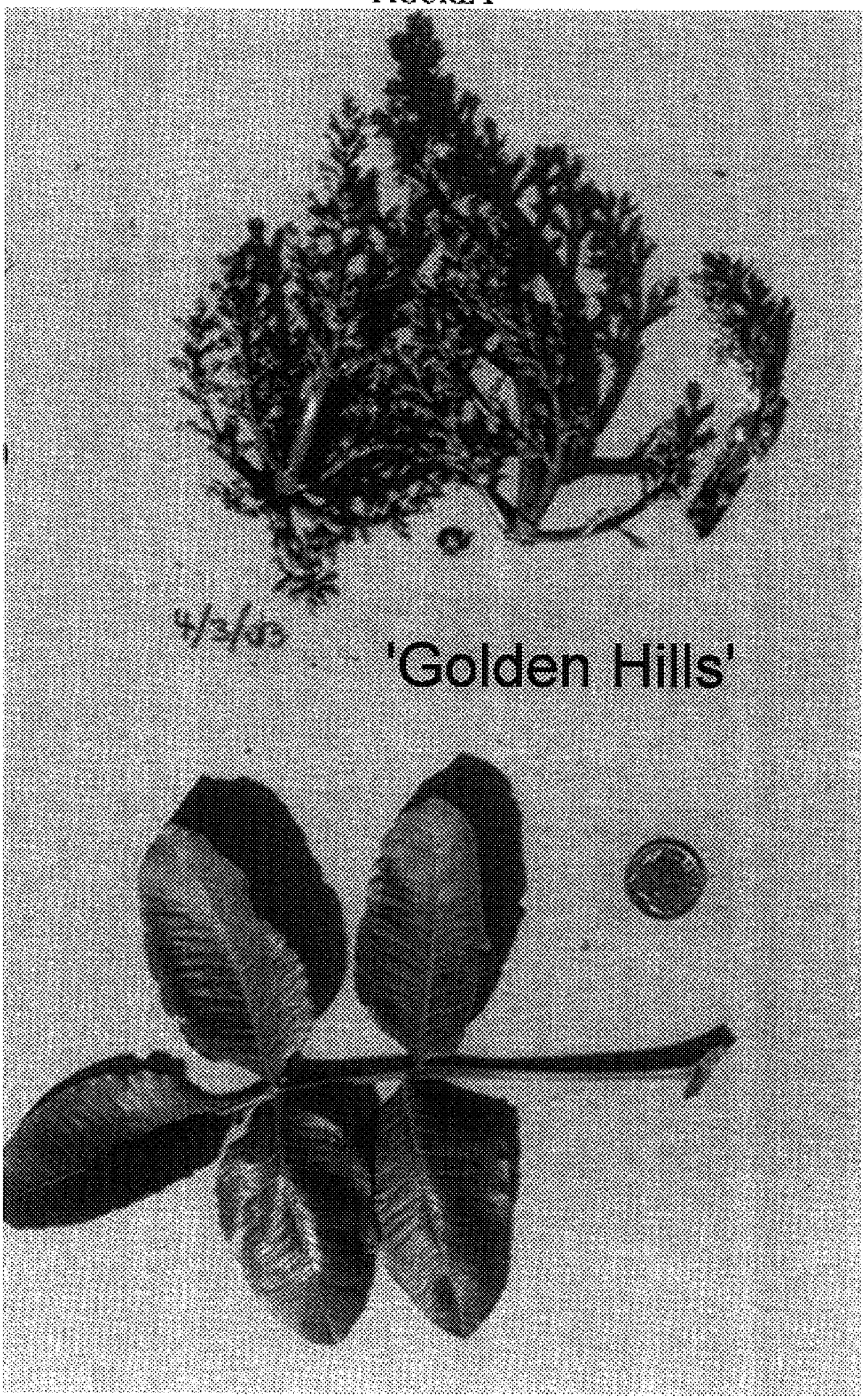

FIGURE 2

FIGURE 3

FIGURE 4

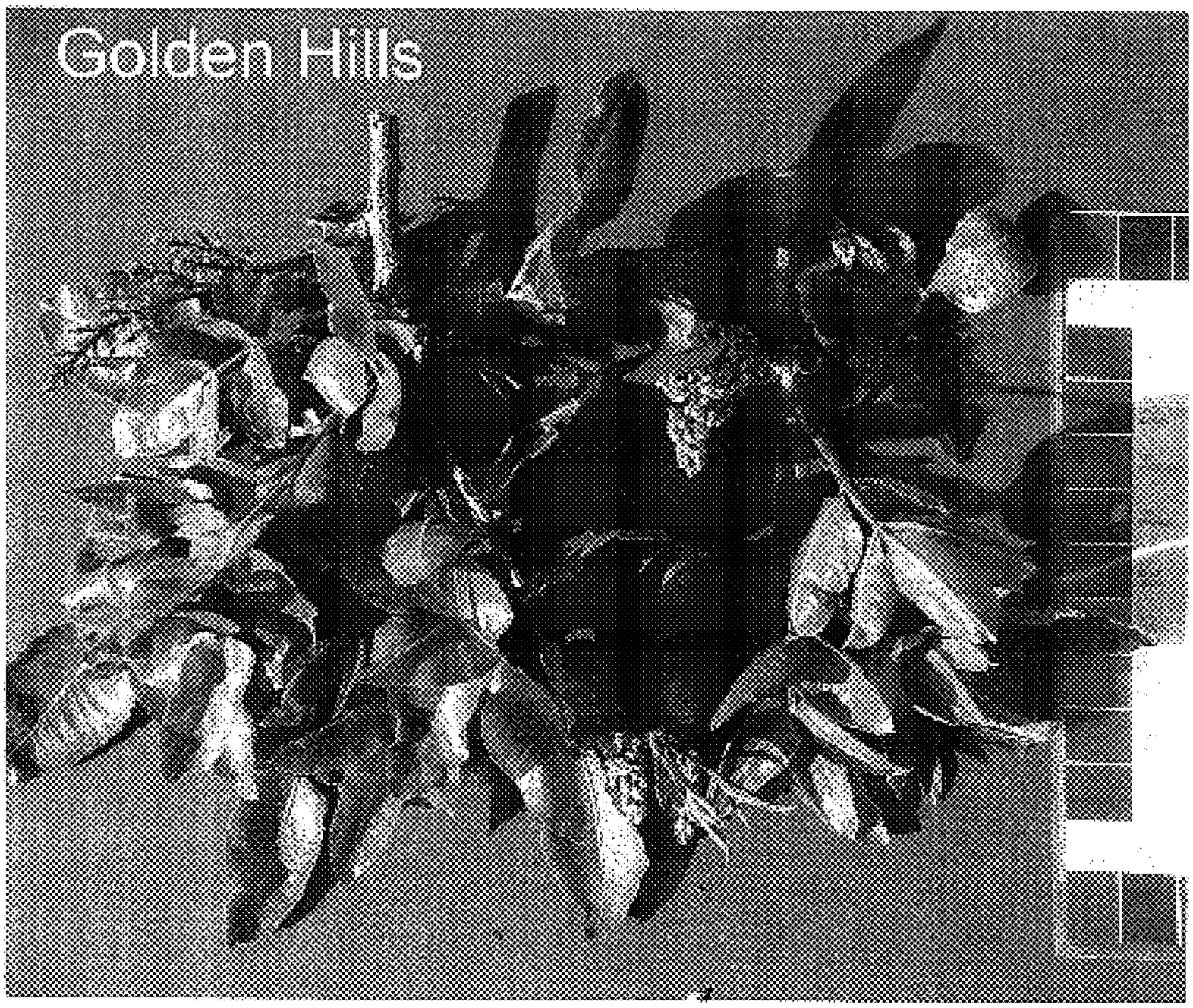

FIGURE 5

FIGURE 6

FIGURE 7

FIGURE 8

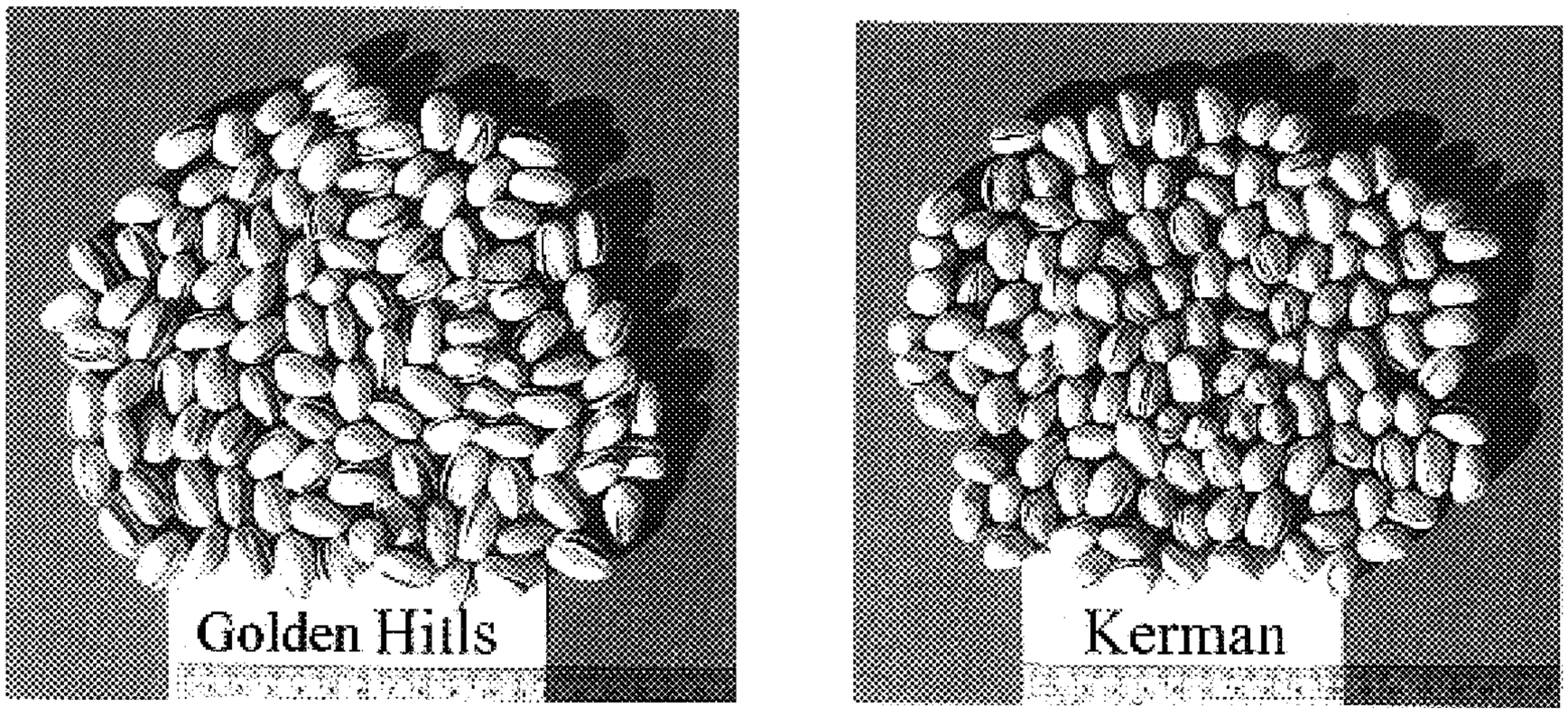

FIGURE 9

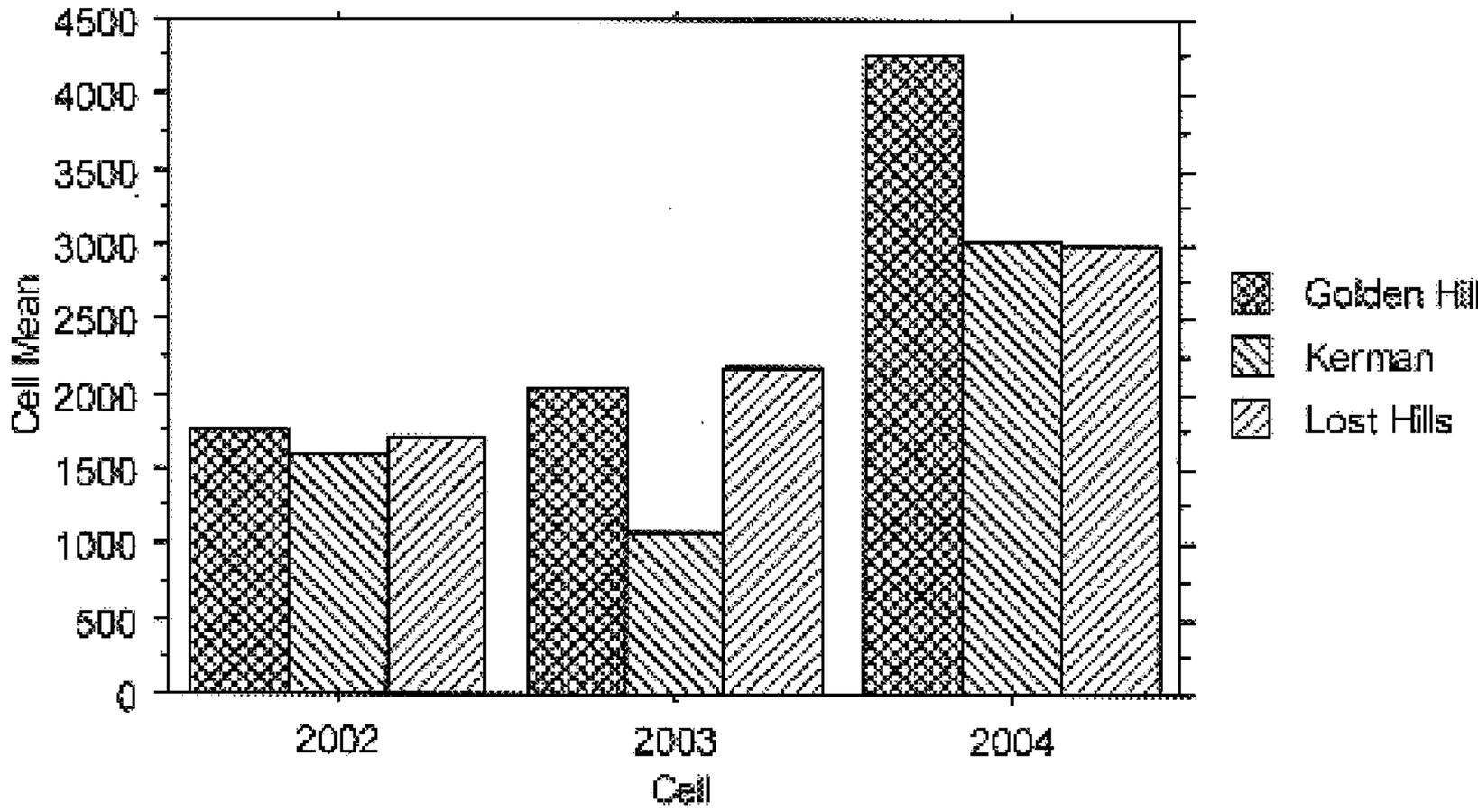

FIGURE 10

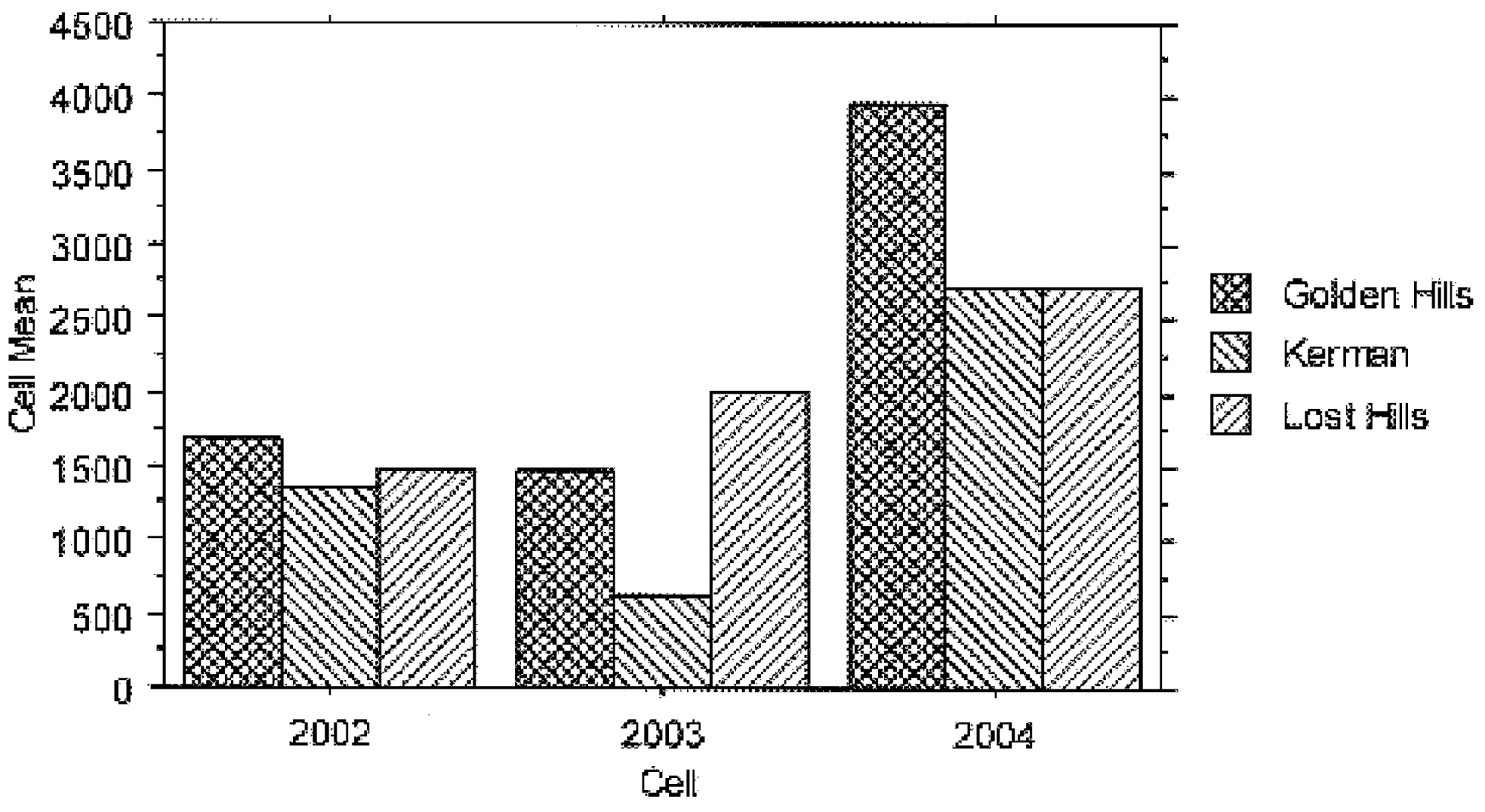

FIGURE 11

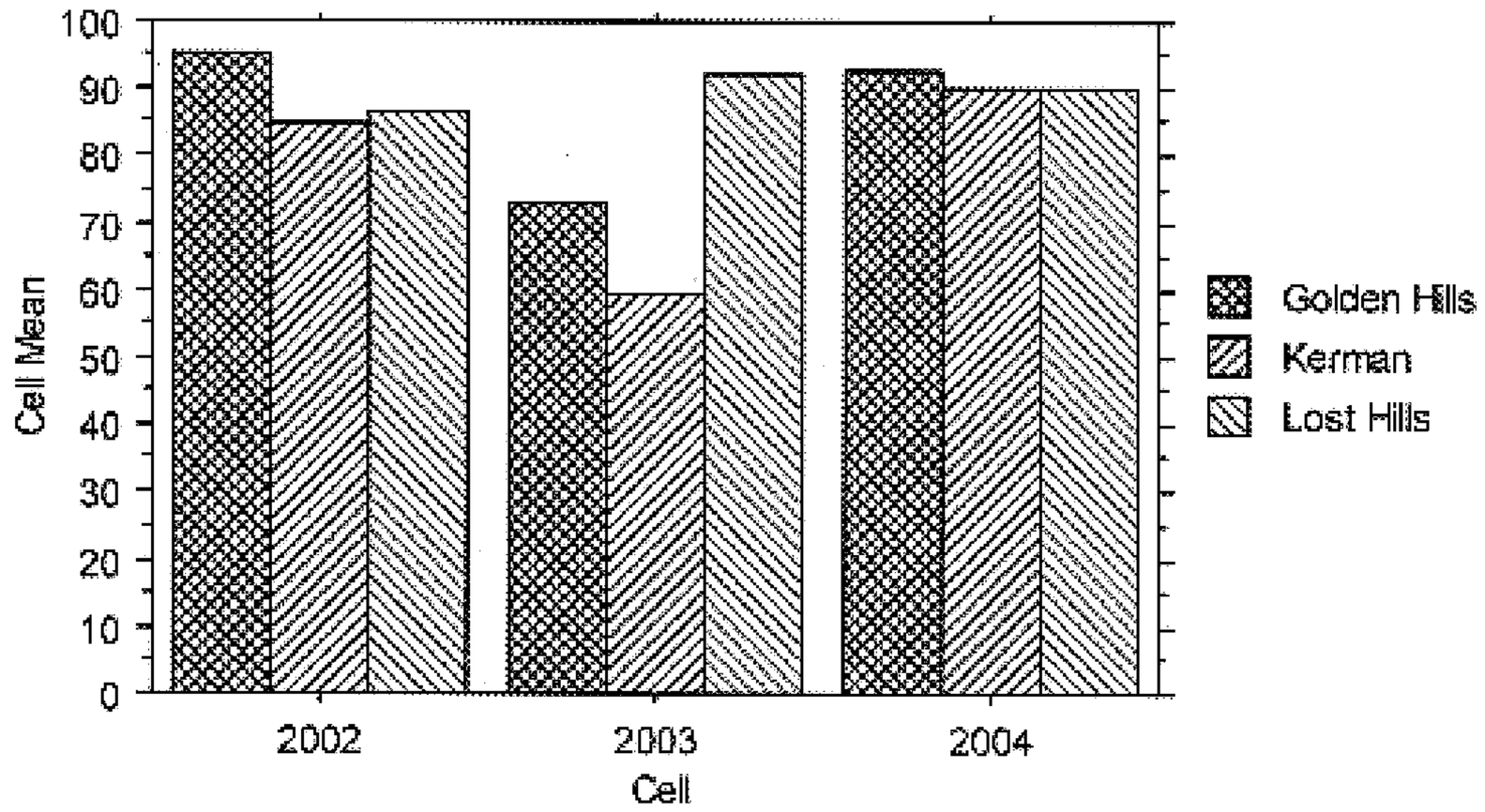

FIGURE 12

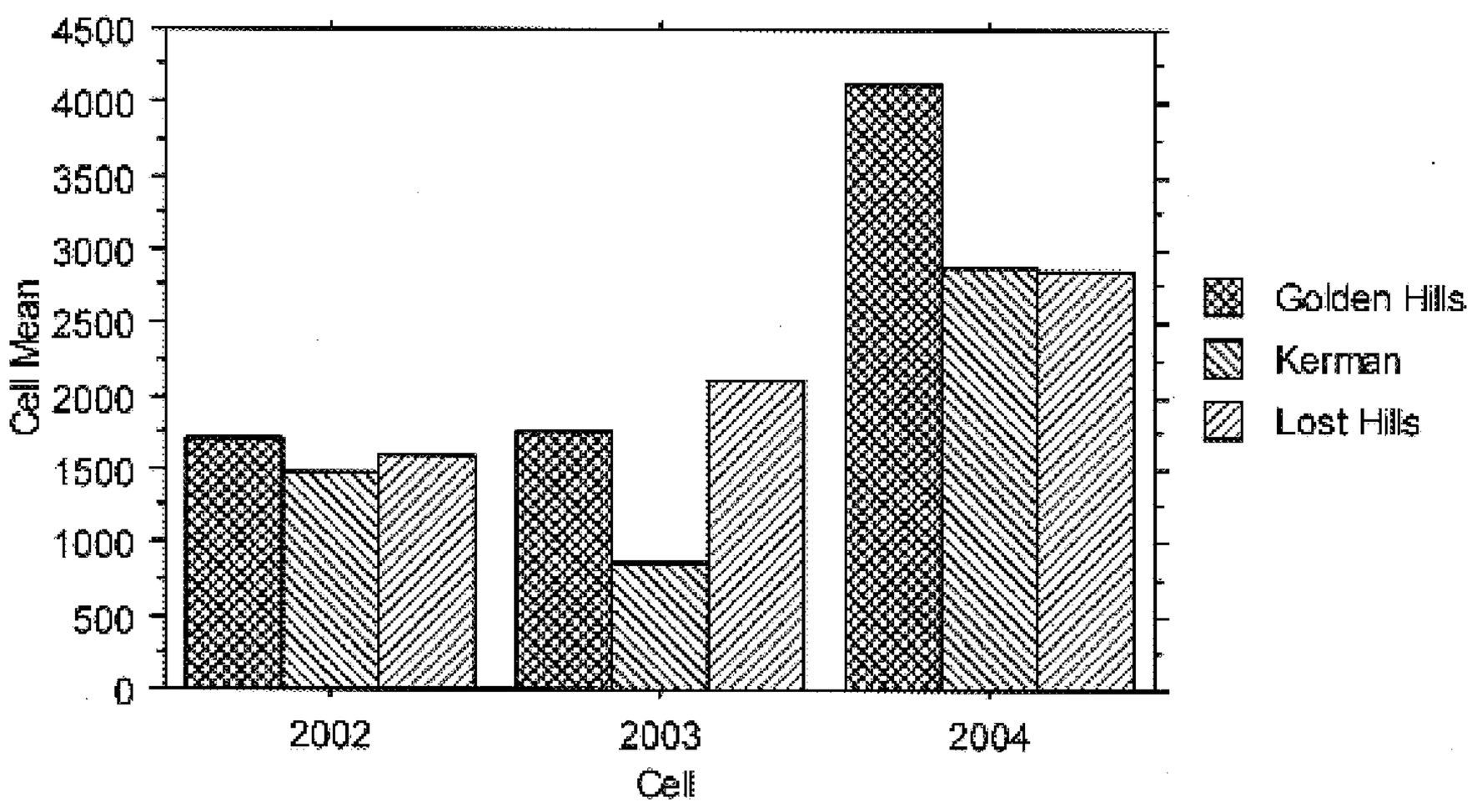

FIGURE 13

'Kerman'

'Golden Hills'
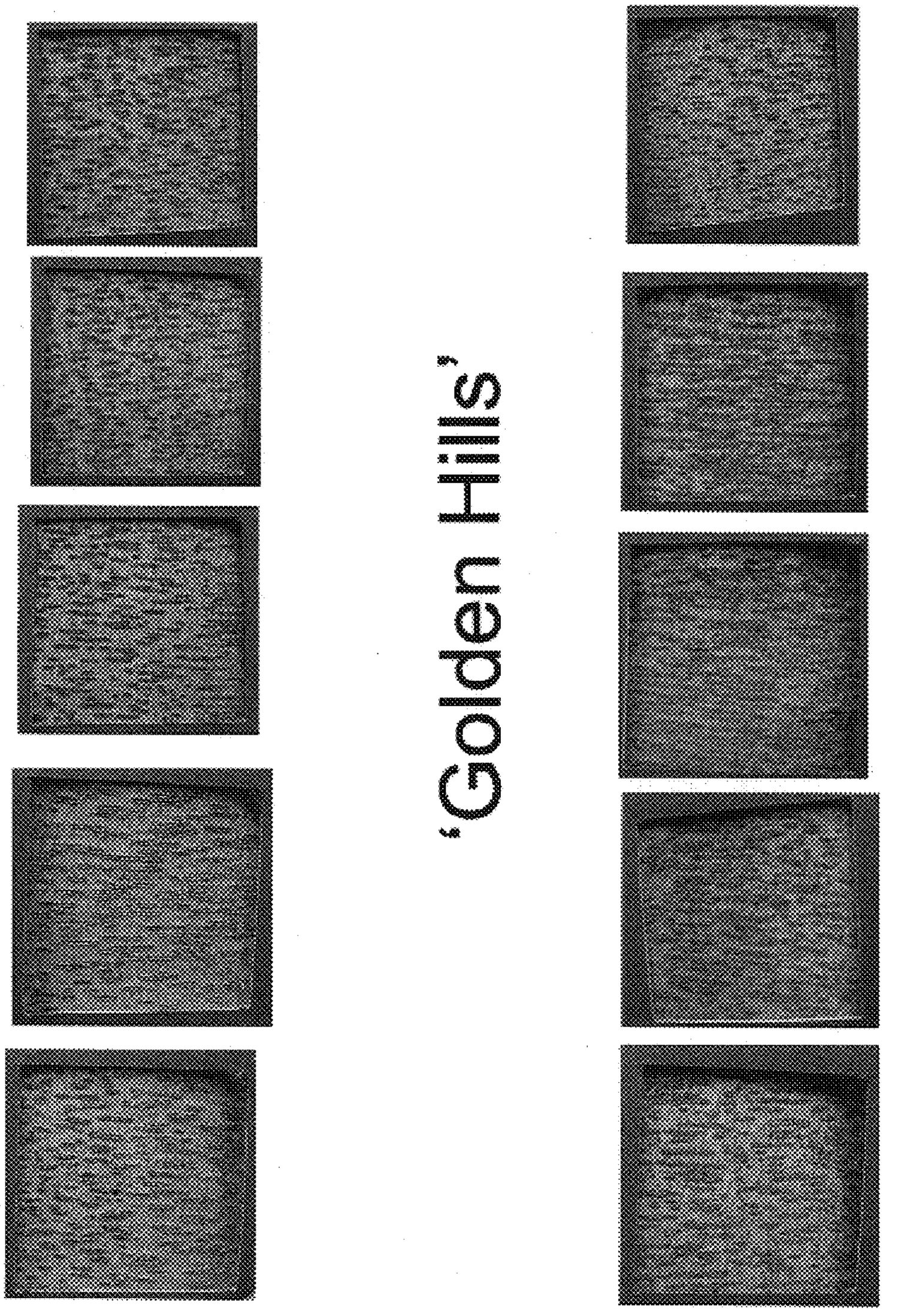
FIGURE 14