

[54] MACADAMIA NAMED "HIDDEN VALLEY A16"

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[57] ABSTRACT

A new variety of macadamia hybrid *integrifolia* × *tetraphylla* has been identified that is particularly characterized by the following combination of characteristics: a low density canopy, a very short flowering period, an elliptical leaf with smooth, lightly undulated and rolled margins, medium pale racemes setting an average of 4.4 nuts per raceme and a nut which is smooth, oval and thin shelled.

3 Drawing Sheets

1

The present invention is directed to a new and distinct variety of Macadamia tree believed to be a cross of *Macadamia integrifolia* × *tetraphylla* which was identified in a cultivated area.

Among the distinct characteristics of this tree is a combination of: a low density canopy, a very short flowering period, an elliptical leaf which has a smooth, lightly undulated and rolled margin, medium pale racemes, a set of an average of 4.4 nuts per raceme and a nut which is smooth, oval and thin shelled.

Asexual reproduction of the new variety has been accomplished by grafting scion stock taken from the original seedling plant onto both seedling and mature rootstock of various other Macadamia varieties. The variety has maintained character regardless of rootstock, and has exhibited the following characteristics and distinctions true to form through succeeding propagations.

DESCRIPTION OF DRAWINGS

FIG. 1 shows a typical tree specimen of the new variety, named "Hidden Valley A16".

FIG. 2 shows typical nut clusters of the new variety.

FIG. 3 shows a comparison of the leaves of the new variety with the known variety 'HAES 246'.

FIG. 4 shows a comparison of the kernel and nut of the new variety with the kernel and nut of the known variety 'HAES 246'.

FIG. 5 shows an enlarged view of the kernel and nut of the new variety.

The variety results from a seedling derived from the open pollination of a female parent of the variety Renown, itself a hybrid of *M. integrifolia* × *M. tetraphylla*. The seedling may have arisen from self-pollination or from cross-pollination with the nearest possible pollination parents being of the varieties Own Choice, Keauhou, Kakea and N.R.G. The male parent is believed unlikely to have been self and based on an examination of the morphological character of the plant it is believed that the most likely pollen parent is an *integrifolia* variety such as Kakea or Keauhou. The cultivar has been successfully and successively grafted onto a variety of rootstock yielding trees of consistent character and having good yield characteristics while maintaining

2

current kernel quality and beneficial growth characteristics. The cultivar was discovered and propagated at Hidden Valley Plantations, Beerwah, Queensland, Australia.

The following is a detailed description of the new variety, with color terminology determined in accordance with the Royal Horticultural Society (R.H.S.) Colour Chart number. The characteristics and morphology listed below represent mean measurements from a minimum of one hundred specimens from trees grown in Beerwah, Queensland, Australia.

Tree: The tree is erect in habit (slightly more than Kau), moderately branching with a low density canopy (less than Keauhou or Own Choice). The leaves are arranged predominantly three leaves per node unlike Renown which has predominantly four leaves per node and Hidden Valley A4 which has an even ratio between three- and four-leaf nodes. The grafted material is vigorous in growth (more than Keauhou but less than Hidden Valley A4). The shoots are of medium thickness (thinner than Hidden Valley A4) with an average of 44 mm between nodes, with sparse pubescence and weak anthocyanin coloration (R.H.S. 153A) on the new flush. The tree exhibits an average length juvenile phase (slightly shorter than Keauhou or Kau but longer than Hidden Valley A4).

Leaves: The leaves are elliptical, 2.65 times longer than broad, broader than Own Choice or Keauhou with an obtuse angle rounded tip similar to Kau. The leaf margins are smooth with 0.01 spines per cm and are less undulated than Keauhou. The leaf margins are rolled similar to Own Choice. The young leaves are pale green (R.H.S. 137B), while mature leaves are dark green (R.H.S. 137A), dull surfaced similar to Nutty Glen with distinctly lighter margins (R.H.S. 15D).

Mean leaf length.—126.59 mm with standard deviation (s.d.) of 15.29.

Mean leaf width.—48.24 mm with s.d. of 5.46.

Mean petiole length.—6.8 mm with s.d. of 1.48.

Flower: The racemes are white, medium in length (shorter than Renown) and sparse on the tree compared to Keauhou. The tree has a shorter and lighter flowering period than Keauhou, which starts earlier and finishes later. The flowering observed is mid-sea-

son and the length of flowering time is shorter than for any other known variety. The reduced length of flowering time is believed to contribute to an observed light post-anthesis nut drop.

Fruit: The husk is relatively thin (thinner than Renown and similar to Keauhou) with a small hilum end point (about the same as Kau) and an unshouldered pedicel also similar to Kau. Husk dehiscence is partly on the tree (although less so than Nutty Glen or Renown) but is mainly on the ground. There is an average of 4.4 nuts per raceme. There is no pre-germination on the tree observed (as in Nutty Glen) and a very low incidence of fruit remaining on the tree or double-embryo fruit as compared with Own Choice.

*Mean fruit length.*—40.7 mm with s.d. 2.47 (with pedicel and hilum).

*Mean fruit width.*—30.95 mm with s.d. 1.76.

Nut: The nuts are oval, 1.04 times longer than wider, less oval and more even than Renown but less round than Keauhou. The shell is light brown (R.H.S. 164A) with a smooth surface (smoother than Nutty Glen or Renown, but more coarse than Kau) and a moderate sheen (less than Nutty Glen but more than Keauhou). The shell is thinner at the micropyle end (thinner than Keauhou or Kau, but slightly thicker than Nutty Glen). The suture is darker than the shell (R.H.S. 165A), while the micropyle is barely visible. There is no twin mark evident. There is moderate pale flecking (R.H.S. 164C), more than Keauhou but less than Renown or Nutty Glen.

*Mean nut diameter.*—24.97 (Range 19–28 mm) with s.d. 1.27.

*Mean nut weight.*—6.5 gm.

Kernel: The kernel is ovoid, creamy white with very little upper/lower color difference and a mean weight of 2.9 gm. The kernel averages about 45% of the weight of the nut at 1.5% moisture content. 99% of the kernels have an oil accumulation above 72%.

Yield: Recorded nut yields to date have been estimated in trials to be the highest of all tested varieties based on the yield of the original tree. The estimate is based on recording yield per tree divided by tree silhouette area. The original tree's yield estimate is boosted by its relatively small size for its age. The nut yield has grown proportionately faster than the tree. Other trees of the variety are too young, as yet, to assist whether this growth characteristic is characteristic of the variety or simply of the original tree.

The following Table 1 compares many of the features of Hidden Valley A16 (HV A16) with the other varieties Keauhou, Kau, Own Choice, Nutty Glen, and Renown.

Tree			
Character	HV A16	Keauhou	Kau
Growth habit	erect	spreading	erect
Canopy density	low	medium	high
Lower branch attitude	rising	level	strongly rising
Vigour, grafts	strong	medium	med-weak
Shoot thickness	med-thin	medium	med-thin
Anthocyanin colouration	weak RHS	absent	absent

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Tree			
Juvenile phase	152A-B short	medium	long
Character	Own Choice	Nutty Glen	Renown
Growth habit	spread- ing	semi- erect	semi- erect
Canopy density	high	low	medium
Lower branch attitude	droop- ing	rising	droop- ing
Vigour, grafts	strong		strong
Shoot thickness	thin	med- thin	medium
Anthocyanin colouration	weak		medium weak
Juvenile phase	med- short		

LEAF			
Character No. per axis	HV A16 3	Keauhou 3	Kau 3
Shape	Ellipti- cal	Obovate	Obovate
Tip	obtuse rounded	obtuse rounded	obtuse pointed
Length/ breadth	2.64	3.25	3.42
length(mm)	126.59	138.82	125.09
Petiole length(mm)	6.78	10.43	9.24
Marg:Spines /cm	0.12	0.12	0.17
Mid portion Undulation	medium	med-strong	med-weak
Rolling	medium	med-weak	med-weak
Mature colour	dark green	dark green	dark green
RHS Chart No.	137A	139A	139A
Immature colour	green	green	green
RHS Chart No.	137B	137A-B	141A
Margin colour	paler	paler	similar
Leaf sheen	low	med-high	med-high
Vein colour	153A	152D	152C

Character No. per axis	Own Choice 3	Nutty Glen 4	Renown 4
Shape	Narrow Elliptical	Narrow Obovate	Broad Lanceolate
Tip	obtuse rounded	acute either	acute pointed
Length/ breadth	2.81	4.53	3.91
length(mm)	128.16	153.40	169.93
Petiole length(mm)	8.65	4.77	7.33
Marg:Spines /cm	0.09	0.90	0.78
Mid portion Undulation	medium	weak	weak
Rolling	med strong	weak	med-weak
Mature colour	dark green	dark green	dark green
RHS Chart No.	139A		137A
Immature colour	green	green	green
RHS Chart No.	137B		143A
Margin	paler	paler	paler

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LEAF			
colour			
Leaf sheen	low	medium	low-med
Vein colour	152D		153D

FLOWERING AND FRUIT			
Character	HV A16	Keauhou	Kau
Flowering time	med-late	medium	v-early
Duration	very short	medium	long
Nuts/raceme	4.4	1.5(est)	2.5(est)
Raceme density on tree	very light	dense	medium
Raceme length	medium	short	short-med
Husk color	137A	137A	137B
Husk thickness	3 mm	3 mm	2.7 mm
% nut diameter	12%	11.7%	10.6%
Hilum endpoint	medium-small	medium	small
Pedicel shoulder	absent	absent	
Dehiscence (1-5)	off-tree 1	off-tree 1	off-tree 1
Splitting (1-5)	off-tree 4	off-tree 5	off-tree 5

Character	Own Choice	Nutty Glen	Renown
Flowering time	early	late	med-late
Duration			
Nuts/raceme	2.0(est)		1.5(est)
Raceme density on tree	dense		med-dense
Raceme length	medium	long	long
Husk color	137A		138A
Husk thickness	3.2 mm	4.3 mm	4.4 mm
% nut diameter	12.1%	15.4%	16.4%
Hilum endpoint	med-small	small	large
Pedicel shoulder	absent	absent	weak
Dehiscence (1-5)	both 2		on-tree 3
Splitting	off-tree 4	on-tree 1	on-tree

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FLOWERING AND FRUIT	
(1-5)	2

NUTS			
Character	HV A16	Keauhou	Kau
Nut Shape	oval	round	round
length/breadth	1.04	0.98	0.99
Nut diameter(mm)	24.97	25.55	25.00
Range(mm)	19-28	21-30	22-28
Std deviation(mm)	1.27	1.46	1.37
Kernel weight(mm)	2.9-3.5	2.3-2.7	2.2-2.5
% of Nut	44-47	34-38	32-34
Shell texture	smooth	mild-rough	smooth
Shell sheen	medium	dull	dull
Shell flecking	mod-slight	slight	moderate
Micropyle	v-slight	obvious	v-slight
Shell colour (dried)	164A	165B	165B
Suture colour	darker	same	lighter

Character	Own Choice	Nutty Glen	Renown
Nut Shape	round	round	oval
length/breadth	1.04	0.99	1.12
Nut diameter(mm)	25.96	28.04	26.85
Range(mm)	21-30	23-34	23-30
Std deviation(mm)	1.57	2.02	1.45
Kernel weight(mm)	2.5-2.7	4.0	3.2-3.6
% of Nut	33-36	46-47	39-41
Shell texture	smooth	rough	rough
Shell sheen	dull	med-shiny	shiny
Shell flecking	mod-heavy	mod-slight	mod-heavy
Micropyle	v-slight	v-slight	v-slight
Shell colour (dried)	165A-B	165A-B	165B
Suture colour	same	same	lighter

We claim:

1. A new and distinct hybrid *Macadamia integrifolia* × *tetraphylla* named Hidden Valley A16 substantially as shown and described.

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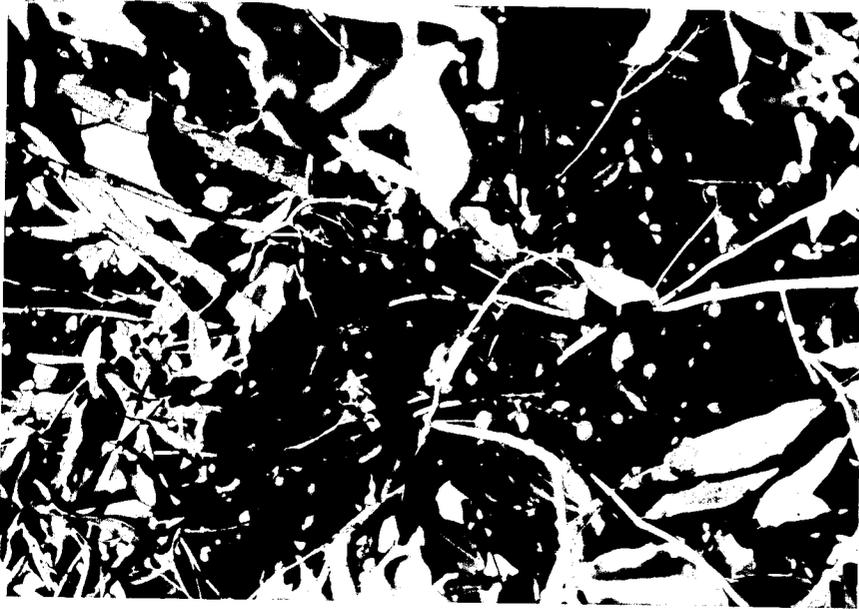


FIGURE 2



FIGURE 1

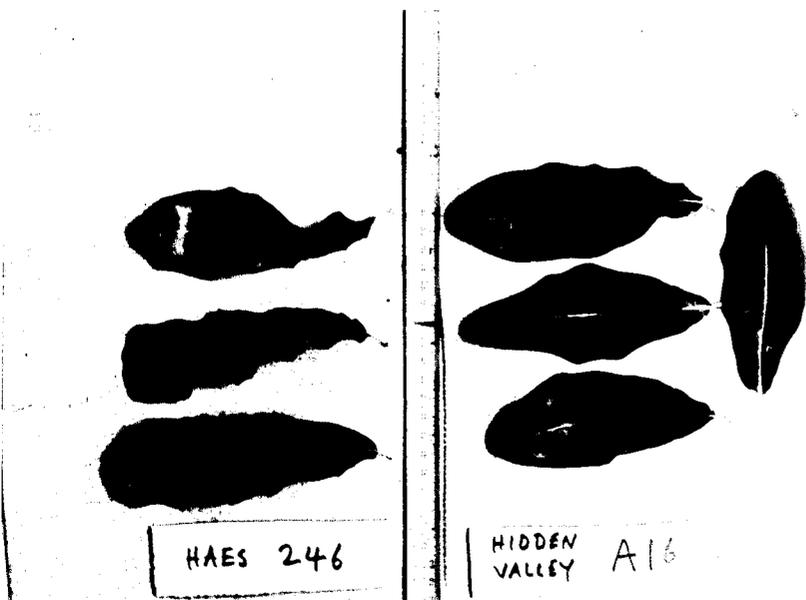


FIGURE 3

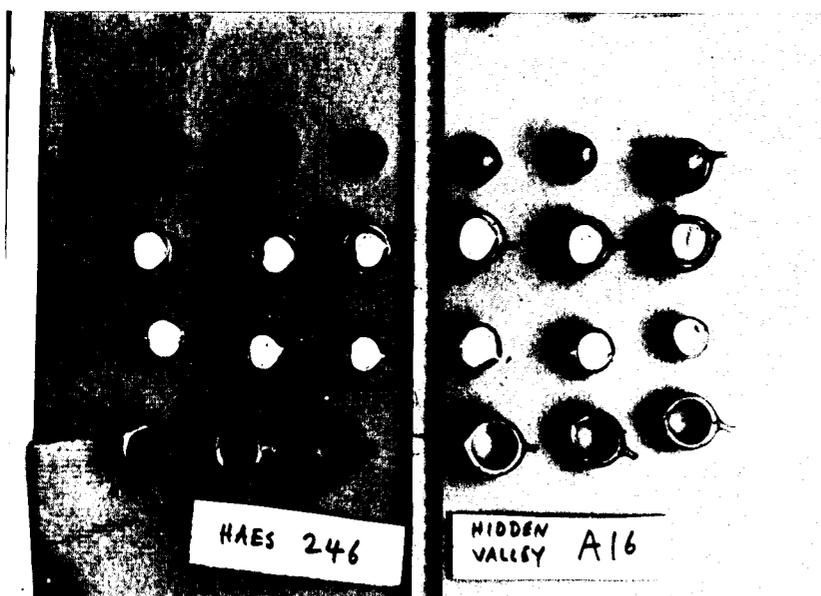


FIGURE 4

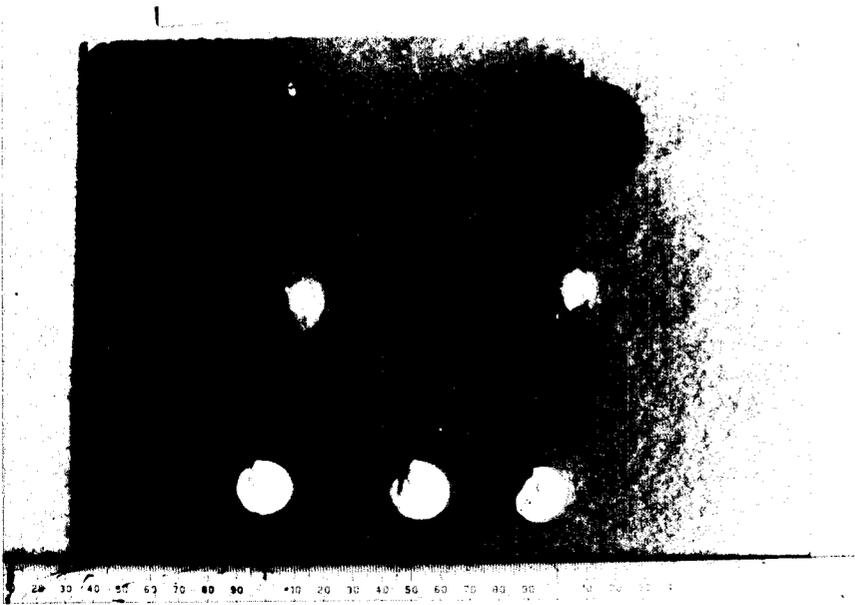


FIGURE 5