

Macadamia information kit

Reprint – information current in 1998



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This publication has been reprinted as a digital book without any changes to the content published in 1998. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

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- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
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- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

This publication was last revised in 1998. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.

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Macadamia Variety Identifier

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your growing guide
to better farming
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Macadamia Variety Identifier

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Introduction

A common problem for new macadamia growers is the correct identification of the varieties in their orchard. This is important as each variety has different characteristics that may influence the way in which it is managed. For example, the management of nutrition, pest and disease monitoring, pollination and harvest operations may all be different for some varieties. Correct identification of varieties also helps in marketing.

The *Macadamia Variety Identifier* is the first comprehensive guide to identifying the varieties likely to be planted in existing Australian orchards. It covers 24 varieties including all of the major commercial varieties originating from both Australia and Hawaii. The benchmark for inclusion of a variety is:

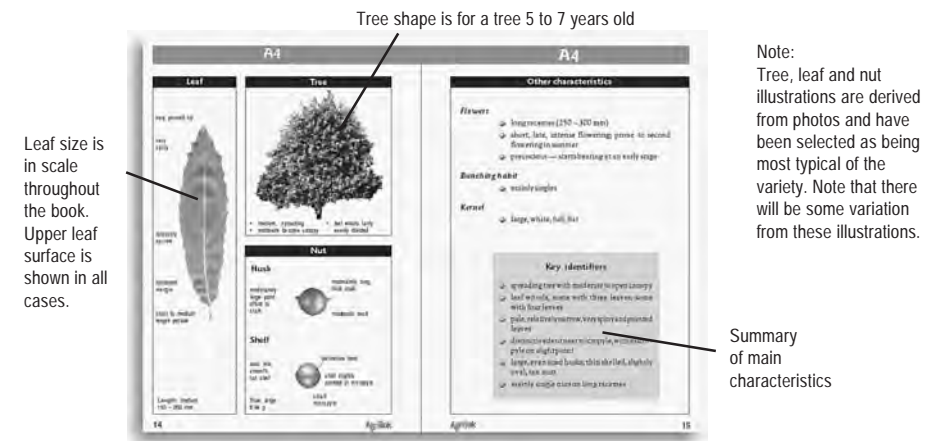
- either *Macadamia integrifolia* or *Macadamia integrifolia* hybrid origin;
- in commercial use;
- commercially propagated in quantities to make it likely that blocks of trees exist.

Minor varieties propagated in small numbers and those of *Macadamia tetraphylla* origin are not included.

Layout

The identifier consists of three sections:

- The **main identification characteristics** used and where the varieties broadly fit.
- A simple **key to varieties** based on leaf spines, leaf size and leaf shape. As leaves are always available, this allows a quick narrowing of the options at any time.
- Detailed **individual variety profiles**. The information on each variety is presented in a two-page format with the main identification characteristics on the left-hand page. Where appropriate, this enables the pages to be flicked over quickly to locate matching characteristics.



Meaning of terms used

Petiole – leaf stalk

Willowing of branches – branches tend to be thin and hang down

Hilum – attachment of nut to husk

Micropyle – white spot at the end of the nut opposite to the hilum where water enters to initiate germination

Raceme – flower stalk

Turkey's neck – distinct break between main body of tree and the top

Sticktight nuts – dry mature nut-in-husk stay attached to the tree and do not fall naturally (as distinct from late fall green nuts)

Pre-germination – germination on the tree before nuts fall

Precocious – starts bearing at an early age

Undulating leaf margins – wavy leaf margins

Basal discolouring – colouring of kernel due to absorption of colour from shell

Leaf whorl – two or more leaves attached at the one node

Information on selecting varieties

Note that this book is a variety identifier – not a guide to selecting varieties for the orchard. Information on this subject can be found in the *Key issues* section of the *Agrilink Macadamia Information Kit*.

Precautions in using this guide

- Illustrations of trees, leaves and nuts have been selected as being most typical of the variety. Illustrations are also based on trees grown in south Queensland and northern New South Wales. *Note that there will be some variation from these illustrations for other districts and under different management systems.*
- Leaves used in the illustrations are mature leaves from the outside of the leaf canopy exposed to full sun.
- The guide is not suitable for identifying trees less than about three years of age.
- As with all identification, accuracy depends on experience.

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The authors wish to sincerely thank Loraine Chapman for image scanning, artwork, page layouts and desktop publishing, and Glenis Ayling for editing the text.

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Information for the book was derived principally from data collected from the regional variety trials conducted by DPI, NSW Agriculture and the Australian Macadamia Society. Photographs used to develop the diagrams were kindly supplied by Eric Gallagher.

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based on leaf spines, leaf size and leaf shape	12
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Individual variety profiles

A4	14
A16	16
A38	18
A203	20
A268	22
H2	24
NG8	26
246	28
333	30
344	32
508	34
660	36
741	38
781	40
783	42
791	44
800	46
814	48
816	50
842	52
849	54
Daddow	56
Own Choice	58
Own Venture	60

Tree shape

Spreading



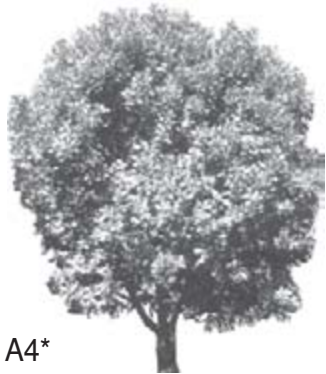
A4*	508*
A203	783
A268	800
246	849
333*	

Upright



A16*	814*
A38	816
344	842
791	Own Venture

Round



A4*	508*
A16*	
H2	781
NG8	Daddow
333*	Own Choice

Upright with turkey's neck



660
741
814*

Tree density & size

Dense



A16	781
H2	783
246	800
333	816
344	849
508	Own Choice
660	

Open



A4	NG8
A38	791
A203	814
A268	

**Open when young;
dense when older**

741	Daddow
842	Own Venture

Small

A16
NG8
791
814

Medium

A4	660
A38	783
A203	842
A268	849
Own Venture	

Large




H2	741
246	781
333	800
344	816
508	
Daddow	
Own Choice	

* Shape of these varieties varies with environment, age and tree management.




Note: Tree density and size vary with environment and tree management.

Leaf length




Leaf width; tip shape

Short < 150 mm	Medium 150–200 mm	Long > 200 mm
		
A16 H2 344 508 781 Own Choice	A4 660 A38 741 A203 783 246 791 333 800 Daddow 816 Own Venture	A268 NG8 814 842 849

Note: Leaf length varies with environment and tree age.

Narrow < 40 mm wide	Medium 40–50 mm	Wide > 50 mm wide
		
A4 A38 A203 NG8 344 508 660 741	783 791 800 816 Own Choice Own Venture	A16 A268 H2 246 333 781 814 842 849 Daddow


Note: Leaf width varies with environment and tree age.


Rounded tip	Slightly pointed	Pointed tip
		
H2 783 246 816 508 842 781 849 Daddow Own Choice	A16 344 A203 660 A268 800 333 814 Own Venture	A4 A38 NG8 741 791

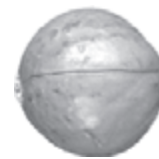
Leaf spines & husk shape

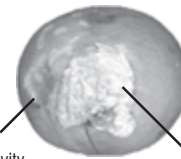
Distinctive shell features

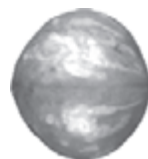
No spines	One spine on tip	Basal spines
H2	A38	344 660 741
Few spines	Moderate spines	Many spines
A16 791 A203 814 508 816 781 783 Own Choice	NG8 842 246 849 333 800 Daddow Own Venture	A4 A268


Point offset to stalk		
		
A4 333 783 A38 508 800 A268 660 814 H2 741 816 NG8 781 842 246 849 Own Choice Own Venture		

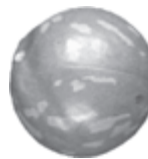
Point in line with stalk		
		
A16 A203 344 791 Daddow		


Distinct suture line	
	
A16 A38 344 660 741	783 791 816 Daddow

Adhering husk	
	
H2 791	

Prominent bulge	
	
A4 A16	














Pronounced flecks or stripes	
	
A4 A16 A203 A268 Daddow Own Choice Own Venture	NG8 246 344 660 741 783 849

Distinct groove	
	
781 800 Own Venture	814 842












Pointed hilum	
	
A16 Daddow	

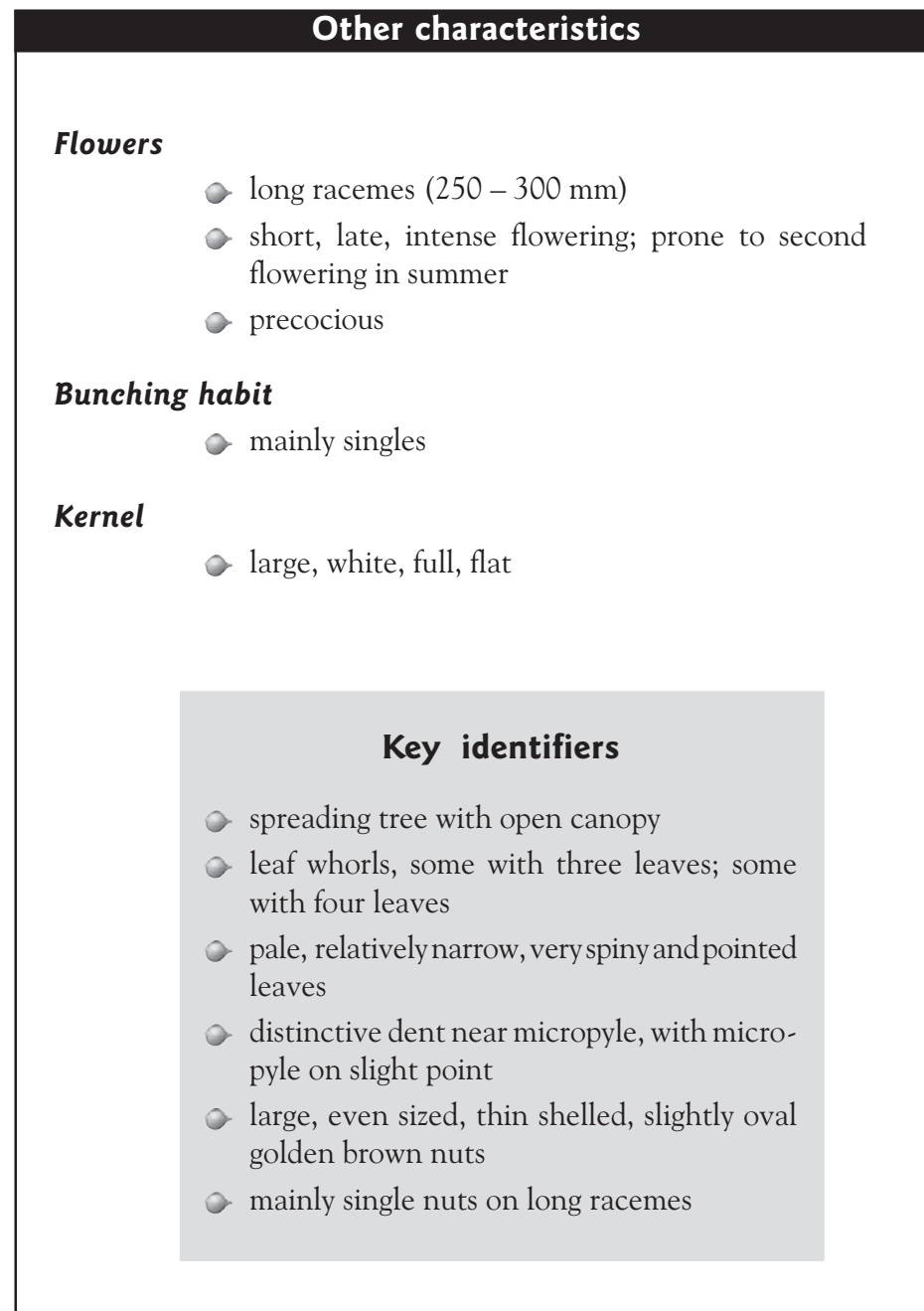
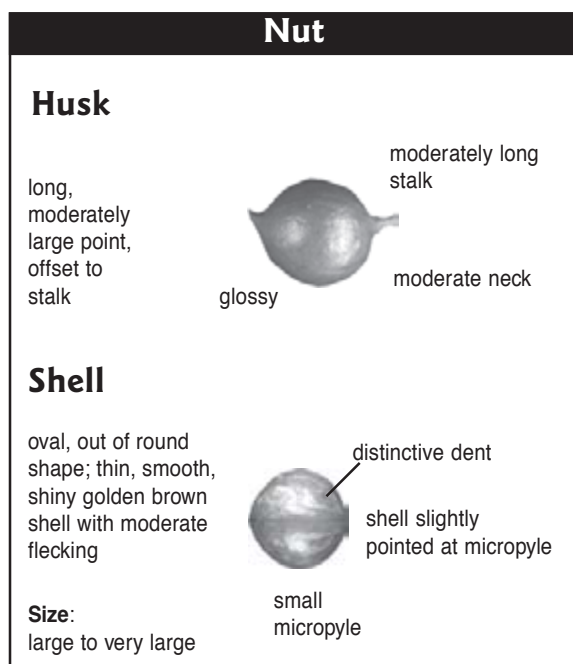
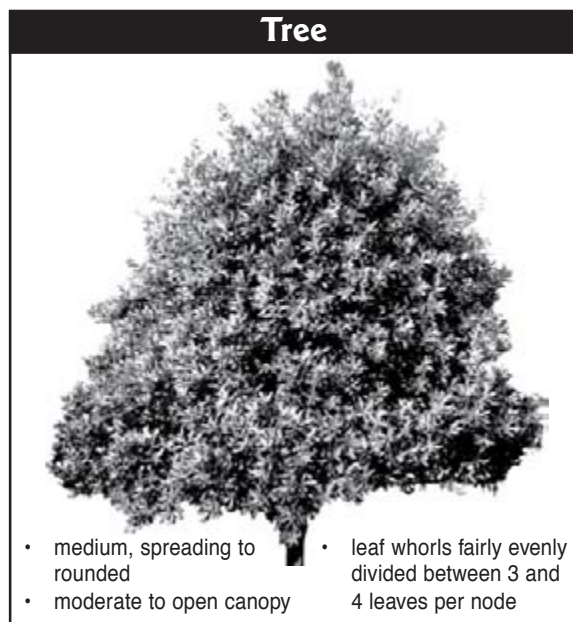
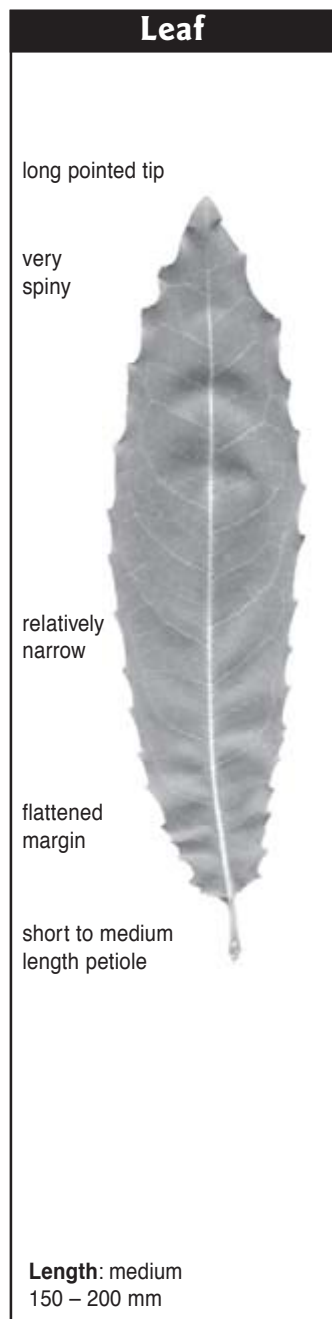
Key to varieties based on leaf

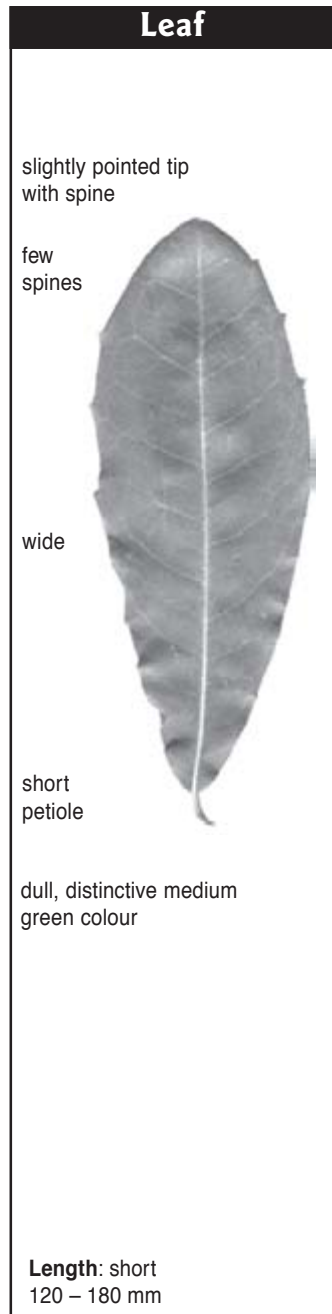
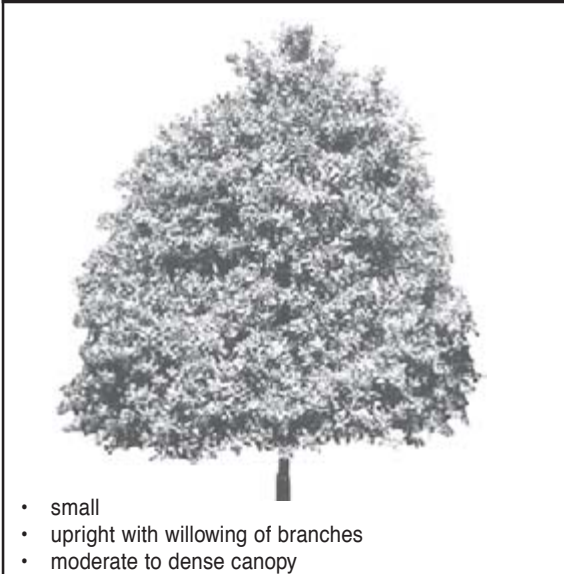
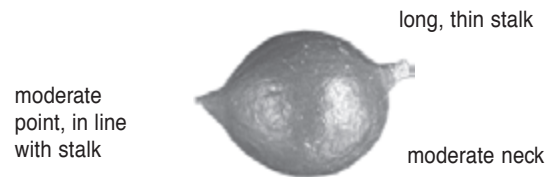
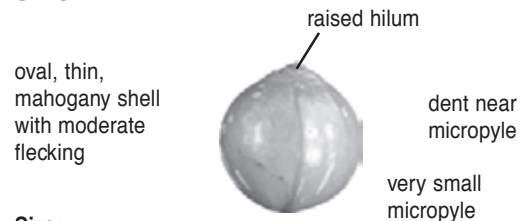
spines, leaf size and leaf shape

No spines	One spine on top	Basal only spines		Few spines		
		Short	Medium	Short	Wide	Medium
						
H2 page 24	A38 page 18	344 page 32	660 page 36	508 page 34	781 page 40	783 page 42
						
			741 page 38	Own Choice page 58	A16 page 16	816 page 50
						
						A203 page 20
						
						791 page 44

Note: This is a simplified key only — refer to the individual variety profiles for full details on each variety.

Few spines	Many spines				Very spiny	
	Long	Narrow	Wide	Narrow	Wide	Medium
						
814 page 48	800 page 46	246 page 28	Own Venture page 60	842 page 52	A4 page 14	A268 page 22
						
		Daddow page 56	NG8 page 26	849 page 54		
						
		333 page 30				



**Tree****Nut****Husk****Shell**

Size:
variable from small to large

Other characteristics**Flowers**

- long racemes (200 – 250 mm)
- condensed, late flowering

Bunching habit

- tends to open bunching

Kernel

- full, white

Key identifiers

- small, moderate to dense upright tree with willowing of branches
- dull green, short and wide leaves with few spines and short petiole
- thin shelled, oval mahogany nuts with a dent near a very small micropyle
- very late nut drop
- small percentage of 4 leaf whorls
- prone to sticktight

Leaf

one spine on pointed apical tip



narrow

slightly undulating margin

medium to long petiole

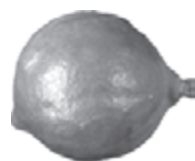
Length: short – medium
140 – 160 mm

Tree

- medium
- very open canopy
- very upright with willowing of branches in later years

Nut**Husk**

moderate point, offset to stalk

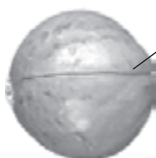


medium thick stalk

large neck

Shell

round, light brown, glossy shell with slight flecking



suture line

very small micropyle

Size:
uniform medium to large

Other characteristics**Flowers**

- very long racemes (more than 300 mm) with cream flowers
- short, mid-season flowering

Bunching habit

- tends to very long, large bunches towards the bottom centre of the tree

Kernel

- slightly flattened, cream
- high percentage of whole kernels

Key identifiers

- very long racemes
- shortish narrow leaves with only one spine on apical tip
- tends to very long, large bunches towards bottom centre of tree
- very upright tree with very open canopy
- medium to large, uniform, round nuts
- tends to long willowy branches in later years

Leaf


slightly pointed tip

longish, dull with few spines

narrow


margin rolls down toward tip

long petiole



Length: medium – long
150 – 230 mm

Tree



- medium
- slightly upright with slight willowing of branches
- moderate to open canopy

Nut


Husk

rough surface

moderately long, thick stalk

large point, in line with stalk

large neck

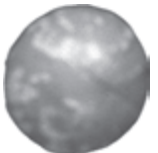


Shell

glossy, slightly rough surface with flecking

slight dent near micropyle

very small micropyle



Size:
medium to large

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- intense, short, mid-season flowering

Bunching habit

- old trees tending to singles with no large bunches


Kernel

- full, white

Key identifiers

- slightly pointed, longish, narrow, dull, medium green leaves with few spines and long petiole
- slight dent near very small micropyle
- medium to large, uneven sized nut
- intense, short late flowering
- rough surface on husk and nut
- slightly upright tree with slight willowing of branches

Leaf



pointed tip

many spines


wide and long

undulations in margin towards tip

short petiole

Length: long
200 – 250 mm

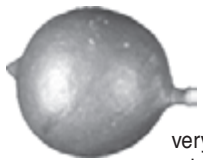
Tree



- medium to large
- spreading habit
- moderate to open canopy

Nut

Husk




thin, medium length stalk

small point, offset to stalk

very slightly raised neck

Shell



even sized pebbly to rough shell with moderate flecking

very small micropyle

Size:
very large

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- short, condensed mid-season flowering

Bunching habit

- tendency to single nuts


Kernel

- full, creamy white

Key identifiers

- long leaf with many spines and short petiole
- medium to large spreading tree with moderate to open canopy
- leaves much larger than A4
- small point on husk with thin stalk
- very large, even sized nut with small micropyle and slightly rough surface

Leaf



rounded tip

no spines


short, wide

flat margin with rolled down tip

short to medium petiole

Length: short < 150 mm


Tree



- large, upright
- dense canopy

Nut

Husk

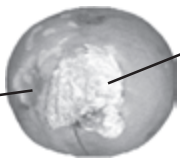


flattened, with very small point, offset to stalk

no neck

short thick stalk

Shell



distinct lobed shape

slightly flat, aborted embryo mark (dimple)

large hilum with piece of adhering husk

medium to large micropyle

Size: small

Other characteristics

Flowers

- medium racemes (150 – 200 mm) with some branching possible
- late, short flowering

Bunching habit

- prone to tight bunches
- prone to sticktight nuts and pre-germination

Kernel

- flat with moderate ridge
- many whole kernels

Key identifiers

- small, slightly flattened nuts with distinctive lobe, dimple, medium to large micropyle and large hilum with piece of adhering husk
- short, wide leaf with rounded end, no spines, flat margin with rolled down tip
- medium to long racemes with some branching
- shell with thick base
- prone to sticktight nuts
- large, dense, upright tree

Leaf

pointed tip

many spines (particularly near base)

long, narrow leaf

slight undulations on margin

short petiole



Length: long
200 – 250 mm

Tree



- very small, round
- open canopy
- moderately precocious — starts bearing early

Nut

Husk

dark green

short, thin stalk

medium to large point, offset to stalk

very small neck



Shell

bright brown shell with moderate flecking

raised at micropyle end

small micropyle



Size:
medium to large

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- intense, late flowering

Bunching habit

- some open bunches, mainly singles
- nuts hang down on long racemes

Kernel

- medium to large
- very few whole kernels — mostly halves

Key identifiers

- very small, open, round tree
- very dark green, long, narrow leaves
- nuts prominent; hang singly on long racemes
- bright brown nuts with moderate flecking
- tend to dehusk on the ground
- precocious — starts bearing early; high yield per canopy area
- very few whole kernels — mostly halves
- dehusks on the ground

Leaf

rounded tip

moderate
spines

wide

regular,
very
undulating
marginmedium to long
petiole**Length:** medium
150 – 200 mm**Tree**

- large, spreading
- moderately dense canopy

Nut**Husk**small point,
offset to
stalk

short, thick stalk

large neck

Shellslightly rough
surface with
moderate
fleckingslightly
flattened

large micropyle

Size:
large**Other characteristics****Flowers**

- short – medium racemes (less than 100 – 200 mm)
- extended, heavy flowering
- precocious — starts bearing early

Bunching habit

- few bunches of nuts
- mainly singles — increasing tendency as trees age

Kernel

- slightly flat with a prominent ridge
- tendency to basal discolouring

Key identifiers

- large tree with spreading growth habit
- regular, very even undulating margin on dark green wide leaf
- short racemes and extended flowering
- short, thick stalk
- medium to large nut with large micropyle

Leaf

pointed tip

many
spinesmedium
to long,
very
wide
leaflarge
undula-
tions in
marginmedium to long
petiole

very dark green

Length: medium – long
150 – 200 mm**Tree**

- medium
- round to spreading
- moderately dense canopy

Nut**Husk**large point,
offset to
stalk

very tough husk

very short, thick
stalk

large neck

Shellslightly rough
surface with
minimal
fleckingslightly flattened
with thick shell**Size:**
mediumsmall to
medium
micropyle**Other characteristics****Flowers**

- long racemes (200 – 250 mm)
- mid to late flowering of moderate intensity

Bunching habit

- mainly singles

Kernel

- slightly flat

Key identifiers

- medium to long, very wide, spiny, very dark green shiny leaves with undulating margins
- round tree
- tough, pale green husk
- very short, thick stalk
- small point on husk
- thick shell

Leaf

pointed tip with spine

few spines, mainly near base

short, narrow

slightly undulating margin

medium length petiole



Length: short
<150 mm

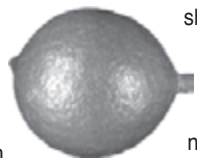
Tree

- large, upright, conical
- dense canopy
- moderately precocious

Nut**Husk**

small point, in line with stalk

glossy, smooth



short, thick stalk

no neck

Shell

round, dull shell with moderate flecking



small micropyle

Size:
medium to large

Other characteristics**Flowers**

- medium length racemes (150 – 200 mm)
- mid to late, light flowering
- precocious — starts bearing early

Bunching habit

- tends to tight bunches, particularly with light flowering

Kernel

- flat, ridged, dull cream

Key identifiers

- large, upright, conical, dense tree
- short, narrow, dark green leaves with few spines
- light flowering
- small point on husk in line with stalk
- no neck on husk, short thick stalk
- compact and very dense tree when young

Leaf

rounded tip

few
spines

short,
narrow

many short
undulations
on margin

medium to long
petiole



Length: short
<150 mm

Tree

- large, spreading
- moderate to dense canopy

Nut**Husk**

small
point,
offset to
stalk

glossy



short, moderately
thick stalk

moderate neck

Shell

round



small micropyle
(can be open)

Size:
medium

Other characteristics**Flowers**

- medium racemes (150 – 200 mm)
- late, long flowering

Bunching habit

- tending to singles
- can have sticktight nuts

Kernel

- full, white

Key identifiers

- very large, spreading tree
- short leaves with rounded tip, few spines and many small undulations
- small, round nuts
- small point on husk
- susceptible to yellowing and leaf scald under heat stress

Leaf

slightly pointed tip

slightly undulating margin

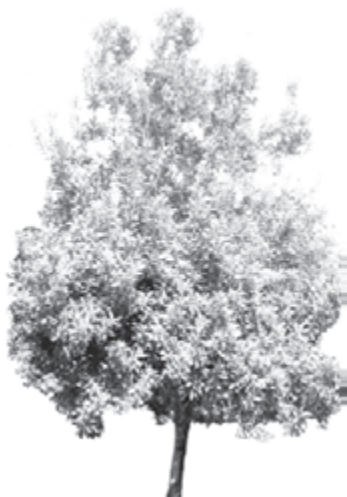
narrow

few spines, mainly near base

long petiole



Length: medium
150 – 200 mm

Tree

- medium to large
- upright
- moderate to dense canopy
- turkey's neck

Nut**Husk**

large point offset to stalk



moderately long, wide stalk

moderate neck

Shell

pronounced flecking



small micropyle

Size:
small, variable

Other characteristics**Flowers**

- medium to long racemes (150 – 200 mm)
- concentrated flowering
- variable timing

Bunching habit

- variable with no large bunches

Kernel

- small, full, with slight ridge

Key identifiers

- very dark green, narrow, slightly pointed leaves with spines mainly near the base
- long petiole
- small nuts, variable in size
- upright tree with turkey's neck
- very early nut drop; tends to germinate in wet conditions

Note: It is very difficult to distinguish between 660 and 741

Leaf

pointed tip

slightly
undulating
marginrelatively
narrow,
particularly
towards
basedistinctive,
spurred,
basal
spines

long petiole

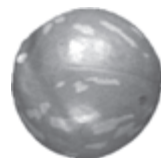
**Length:** medium
150 – 200 mm**Tree**

- large, upright
- moderate to open canopy
- turkey's neck

Nut**Husk**large
point,
offset to
stalkmedium to long
thick stalk

moderate neck

prominent point when nuts still growing

Shellround, smooth
shell with slight
flecking

small micropyle

Size:
medium**Other characteristics****Flowers**

- medium racemes (150 – 200 mm)
- prone to light flowering
- late, concentrated flowering

Bunching habit

- numerous open bunches

Kernel

- full, slightly dull, cream

Key identifiers

- distinctive spurred basal spines on leaves (more than 344 or 660)
- large, upright tree; moderate to open canopy with turkey's neck, particularly when young
- late, concentrated light flowering
- numerous open bunches
- large point on husk, offset to stalk

Note: It is very difficult to distinguish between 660 and 741

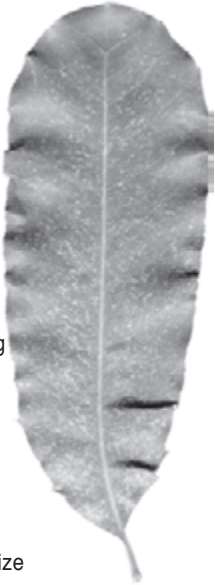
Leaf

rounded tip with no point

some large spines

wide

slightly undulating margin



variable size petiole

yellowing of summer flush under heat stress

Length: short
<150 mm

Tree

- very large, moderately upright
- moderately dense canopy

Nut**Husk**

round, smooth

thick, medium length stalk

very small point offset to stalk



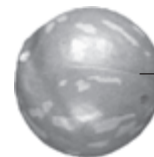
small neck

Shell

large, round, slightly flecked

flat at hilum

distinct groove (not suture)



Size:
large

medium micropyle

Other characteristics**Flowers**

- short – medium racemes (100 – 200 mm)
- light, late flowering

Bunching habit

- mainly singles, doubles, triples

Kernel

- medium to large

Key identifiers

- very large, moderately upright tree; moderately dense canopy
- short, wide, slightly undulating leaves with some spines and some yellowing on summer flush (caused by heat intolerance)
- large kernel but low yield to canopy area
- long, late nut drop; prone to sticktight nuts
- large nuts, but can be variable

Leaf

rounded tip

slightly
undulating
marginmedium
widthfew spines
mainly at
basemedium
petiole

Length: medium
150 – 200 mm

Tree

- medium to large, spreading

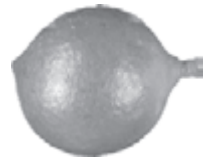
- moderately dense canopy

Nut**Husk**

round, dull, dark surface

very small point offset to stalk

prominent ridge at dehiscing point

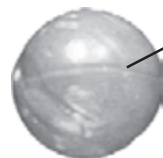


thick, medium length stalk

raised neck

Shell

round, even nut; moderately flecked, some whiteish



distinct suture line

medium micropyle

Size:
medium

Other characteristics**Flowers**

- medium racemes (150 – 200 mm)
- extended flowering; more intense late in season

Bunching habit

- many clusters

Kernel

- medium
- high percentage of whole kernels

Key identifiers

- medium to large, moderately dense, spreading tree
- relatively narrow leaves with rounded tip, small undulations and a few spines at base
- small point to husk; thick stalk with raised neck
- prominent ridge on husk at dehiscing point
- moderate flecking; some nuts are whitish
- distinct suture line on nut

Leaf

pronounced tip

few spines

medium width, slightly cupped

slightly undulating margin

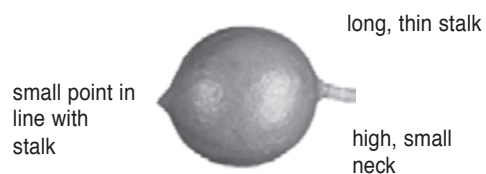
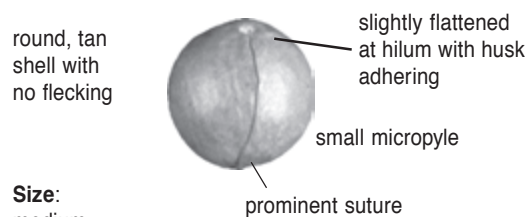
medium sized petiole



Length: medium – long
150 – 200 mm

Tree

- small, upright
- irregular shape; appears straggly
- very precocious – starts bearing early

Nut**Husk****Shell**

Size:
medium

Other characteristics**Flowers**

- long racemes (200 – 250 mm)
- extended flowering throughout most of the year

Bunching habit

- loose bunches with many doubles and triples

Kernel

- flattish and oblong
- prominent ridge

Key identifiers

- small, upright, irregular, straggly tree
- longish, narrow leaves with pronounced tip and slightly undulating margins
- slightly cupped leaves with short petiole
- extended flowering through most of the year
- small point on husk in line with stalk
- round tan coloured nut, slightly flattened at hilum with no flecking
- leaves not evenly spaced on the whorl

Leaf

slightly pointed tip

many large spines

medium width

regular undulating margin

medium length petiole

paler than 246

Length: medium
150 – 200 mm



Tree

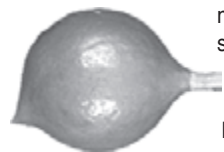


- large, very spreading
- very dense canopy
- wide lateral limb structure when compared to 246
- prone to twisted branches (caused by copper deficiency)

Nut

Husk

medium point offset to stalk



medium thick stalk

large neck

Shell

slightly rough surface



distinct groove (not suture)

medium micropyle

Size:
large

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- long flowering

Bunching habit

- singles to triples

Kernel

- round, white

Key identifiers

- large, very spreading, dense tree; highly prone to wind damage
- regular undulating margin and many large spines on leaves
- leaves narrower and paler than 246
- slightly rough nut surface with moderately large micropyle
- prone to twisted branches
- round, white kernels

Leaf

slightly pointed tip, variable

few spines at stem end and tip

wide

uneven, slightly undulating margin, prone to rolling downwards

medium length petiole

older leaves tend to yellow

Length: long
200 – >250 mm



Tree



- small, upright
- open canopy
- precocious — starts bearing early

Nut

Husk

very small point offset to stalk

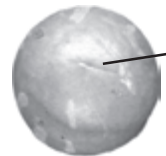


short, thick stalk

no neck

Shell

round with slight flecking



medium hilum

transverse groove (not from micropyle to hilum)

medium micropyle

Size:
small

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- short, light, late flowering

Bunching habit

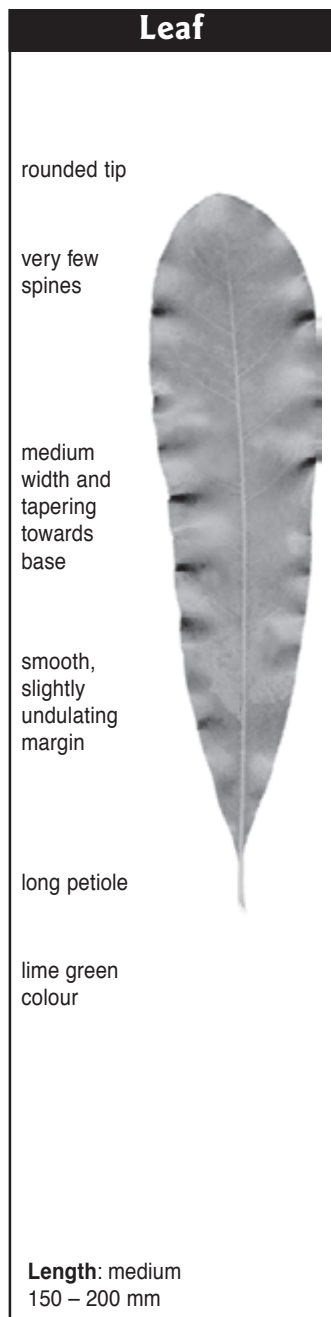
- many small bunches

Kernel

- small, round

Key identifiers

- small, upright, open, precocious tree
- long, wide, dull mid-green leaves with uneven undulating margin
- small, round, even-sized nuts
- many small bunches of nuts



Tree



- medium to large
- moderately upright
- moderately dense canopy

Nut

Husk

medium point offset to stalk, slightly rough surface; pale lime green



average length, thick stalk

large, raised neck

Shell

round with little flecking



distinct suture

small to medium micropyle

Size:
medium to large

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- light, late flowering

Bunching habit

- mostly singles and doubles

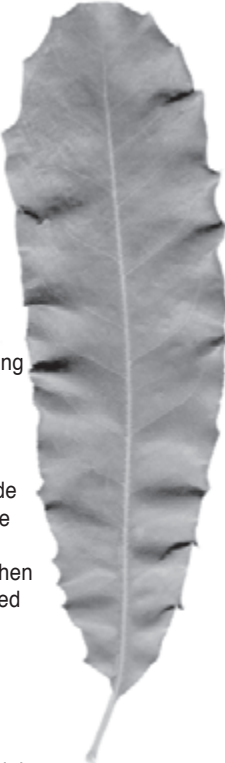
Kernel

- large, round with high kernel recovery
- good percentage of whole kernels

Key identifiers

- medium to large, moderately upright tree with moderately dense canopy
- pale lime green leaves with smooth margin or only a few spines and long petiole
- light, late flowering with early nut drop
- large, lime green nut in husk, with raised neck and thick stalk
- pale nut with prominent suture

Leaf



rounded tip

many spines

small, regular undulating margin


very wide but more uniform width when compared to 849

long petiole

lighter leaf colour when compared to 849

Length: long
200 – 250 mm

Tree



- medium to large
- moderately upright
- open canopy when young; more dense with age

Nut

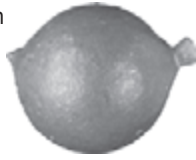
Husk

very even, round, smooth

very small point offset to stalk

very short stalk

small neck




Shell

slightly flat, oval, light brown shell with slight flecking

distinct groove

small to medium micropyle



Size:
small

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- intense flowering over long period

Bunching habit

- mainly two or three nuts, with small clusters
- nuts tend to be concentrated towards the centre of the tree

Kernel

- small to medium, round

Key identifiers

- medium to large, moderately upright tree
- long, very wide leaves with many spines and small regular undulations on the margin
- very even, round, small, smooth nut in husk with very small point offset to a very short stalk and small neck
- intense, flowering over long period
- lighter leaf colour than 849

Leaf

wide rounded tip

many
spines

wide
club-
shaped,
tapering
towards
base

veins
raised
on upper
leaf
surface

very undulating
margin with
undulations
wider near tip

medium petiole

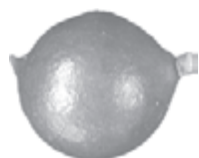
Length: long
200 – 250 mm

**Tree**

- medium to large
- spreading
- moderately dense to dense canopy

Nut**Husk**

very small
point offset
to stalk



smooth

medium, thick
stalk

slightly raised
neck

Shell

slight to
moderate
flecking



round but flattened
at hilum

medium micropyle

Size:
medium to large

Other characteristics**Flowers**

- medium racemes (180 – 220 mm)
- light, late flowering over short period

Bunching habit

- mainly two or three nuts, tending to small bunches as tree gets older

Kernel

- dull, cream, similar to 246
- slightly flat
- good percentage of whole kernels

Key identifiers

- medium to large, spreading tree
- long, wide, dark green leaves, wider at the tip with many spines and very undulating margins
- light flowering over short period
- round nut with flattened area at hilum and slight to moderate flecking
- late maturing nuts tend to pre-germinate
- veins raised on upper leaf surface

Leaf

rounded tip

moderate spines, particularly at base

wide

undulating margin; some rolling at tip



medium length petiole

old leaves dull and dark green; young leaves light green

prone to mottling in older leaves

Length: medium
150 – 200 mm

Tree



- medium to large
- moderately upright
- very dense

Nut

Husk

dull, dark green; slightly rough

small point in line with stalk



medium stalk

very well defined, raised neck

Shell

tea coloured, round, heavily striped



large hilum

very distinct suture

very small micropyle

Size:
medium

Other characteristics

Flowers

- short racemes (100 – 150 mm)
- moderately intense, mid to late flowering

Bunching habit

- many bunches with three to four nuts


Kernel

- round with moderate ridge

Key identifiers

- medium to large, upright to slightly spreading, very dense tree
- wide, undulating, moderately spiny leaves with some rolling and mottling on older leaves
- very prominent hilum and suture on nuts, which looked cracked
- short racemes with moderately intense mid to late flowering
- extended late nut drop
- mature leaves dull and dark green; young leaves light green in colour

Leaf



rounded tip

few spines


medium width

slightly rolling undulating margin

medium length petiole

Length: short – medium
140 – 160 mm


Tree



- large, round
- very dense canopy

Nut

Husk




very large point offset to stalk

very dark green

short, thick stalk

moderate neck

Shell



slightly oval, golden brown shell with moderate flecking

slight dent from hilum to micropyle

small to medium micropyle

Size:
large

Other characteristics

Flowers

- short racemes (100 – 150 mm)
- extended out of season flowering

Bunching habit

- tending to single nuts
- prone to sticktight nuts and pre-germination


Kernel

- full, white

Key identifiers

- large, round, very dense tree
- pale to medium green leaves with few spines and slightly rolling, undulating margin
- very extended flowering and nut drop pattern
- prone to sticktight nuts and pre-germination
- slightly oval, tan nuts with slight dent from hilum to micropyle
- low dense tree skirt

Leaf



slightly pointed tip

many spines

medium width


small, regular undulating margin

medium to long petiole

dull light green colour

Length: long
200 – 250 mm

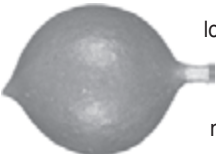
Tree



- medium to large
- moderately upright
- open canopy when young; more dense with age

Nut

Husk




long thin stalk

large point offset to stalk

medium neck

dull, spotted

Shell



heavy flecking

small micropyle

Size:
large

Other characteristics

Flowers

- long racemes (200 – 250 mm)
- short, late flowering

Bunching habit

- singles and doubles
- tendency to sticktight

Kernel

- large, flat, slightly oblong, variable in shape

Key identifiers

- long relatively narrow, spiny leaves
- heavy flecking on shells
- large nut
- very dense tree when mature
- late nut drop with a tendency to sticktight
- light green leaf colour

Notes