



Alnus

vegetative key to species in cultivation

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Alnus day Arboretum Groenendaal

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32 *Alnus* species in this key:

A. acuminata

- subsp. *acuminata*
- subsp. *arguta*
- subsp. *glabrata*

A. alnobetula

- subsp. *alnobetula*
- subsp. *crispa*
- subsp. *fruticosa*
- subsp. *sinuata*
- subsp. *suaveolens*

A. cordata

A. cremastogyne

A. fauriei

A. ferdinandi-coburgii

A. firma

A. formosana

A. glutinosa

- subsp. *barbata*
- subsp. *betuloides*
- subsp. *glutinosa*

A. henryi

A. hirsuta

- subsp. *hirsuta*
- subsp. *sibirica*

A. incana

- subsp. *incana*
- subsp. *rugosa*
- subsp. *tenuifolia*

A. inokumae

A. japonica

A. jorullensis

A. lanata

A. mandschurica

A. maritima

A. matsumurae

A. maximowiczii

A. aff. *maximowiczii* (Ulleungdo)

A. × *mayrii* (*A. hirsuta* × *A. japonica*)

A. nepalensis

A. nitida

A. orientalis

A. × *peculiaris* (*A. firma* × *A. pendula*)

A. pendula

A. × *pubescens* (*A. glutinosa* × *A. incana*)

A. rhombifolia

A. rubra

A. serrulata

A. serrulatoides

A. sieboldiana

A. × *spaethii* (*A. japonica* × *A. subcordata*)

A. subcordata

A. trabeculosa

To improve accuracy:



Use a 10× LENS.

Look at the entire plant.

Beware of hybridisation.

key to groups



5 groups

with the following

diagnostic characters:

GROUP A

Largest buds slender-pointed and (sub-)sessile
AND covered with glabrous scales of unequal size (10× LENS).



A. pendula

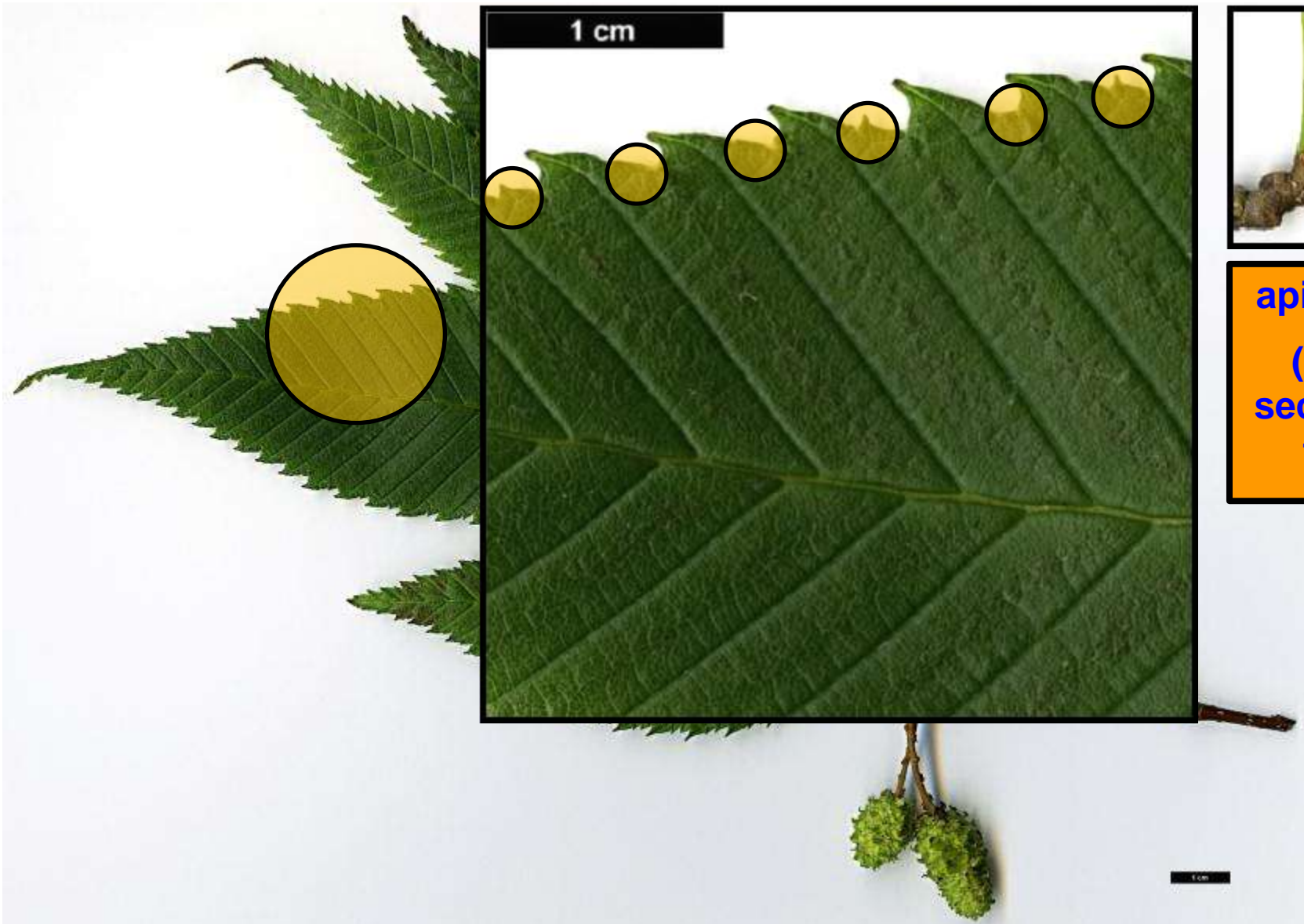
Group A



Japan (Hokkaido, Honshu), North Korea, South Korea

A. pendula

Group A



apical half
(0-)1-2
secondary
teeth

Japan (Hokkaido, Honshu), North Korea, South Korea

A. pendula

Group A

lamina narrowly ovate
secondary veins 18-26/side



apical half
(0-)1-2
secondary
teeth



Japan (Hokkaido, Honshu), North Korea, South Korea

A. firma

Group A



apical half
(0-)1-2
secondary
teeth

Japan (Hokkaido, Honshu), North Korea, South Korea

A. firma

Group A

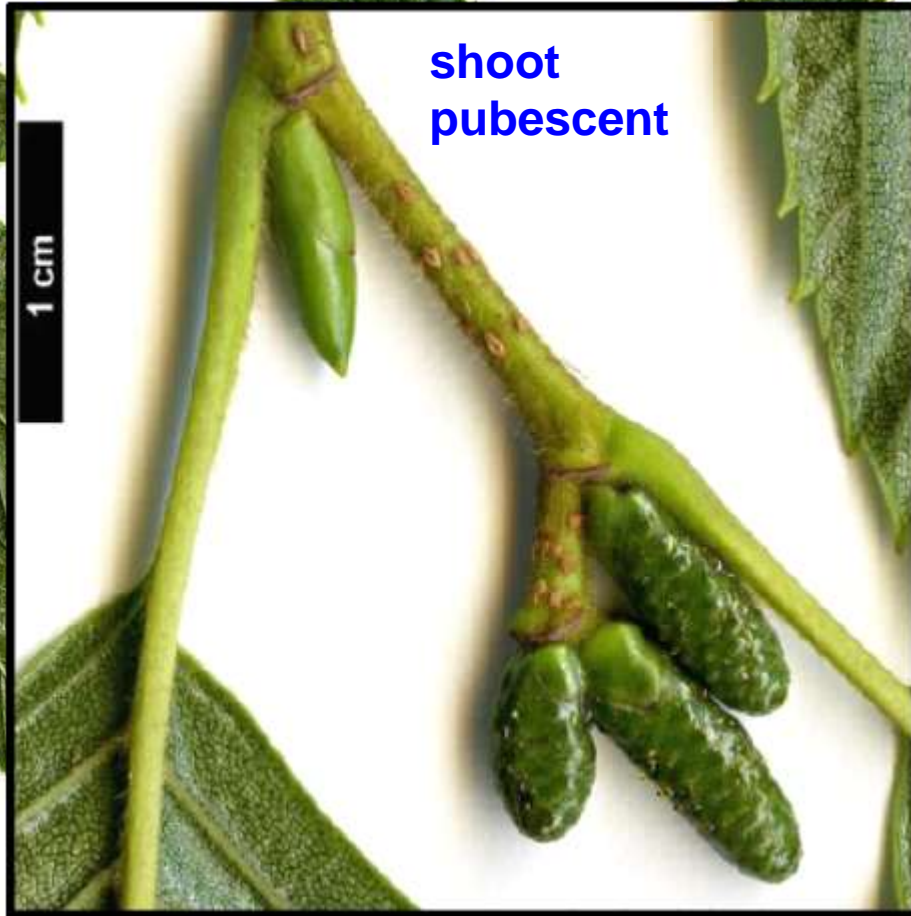
lamina ovate to broadly ovate
secondary veins 12-18/side



apical half
(0-)1-2
secondary
teeth

shoot
pubescent

1 cm



Japan

A. sieboldiana

Group A

lamina ovate to broadly ovate
secondary veins 12-18/side



apical half
(0-)1-2
secondary
teeth



Japan (Honshu, Shikoku), S Korea

A. sieboldiana

Group A

lamina ovate to broadly ovate
secondary veins 12-18/side

shoot
glabrous

apical half
(0-)1-2
secondary
teeth



Japan (Honshu, Shikoku), S Korea

A. aff. maximowiczii

Group A



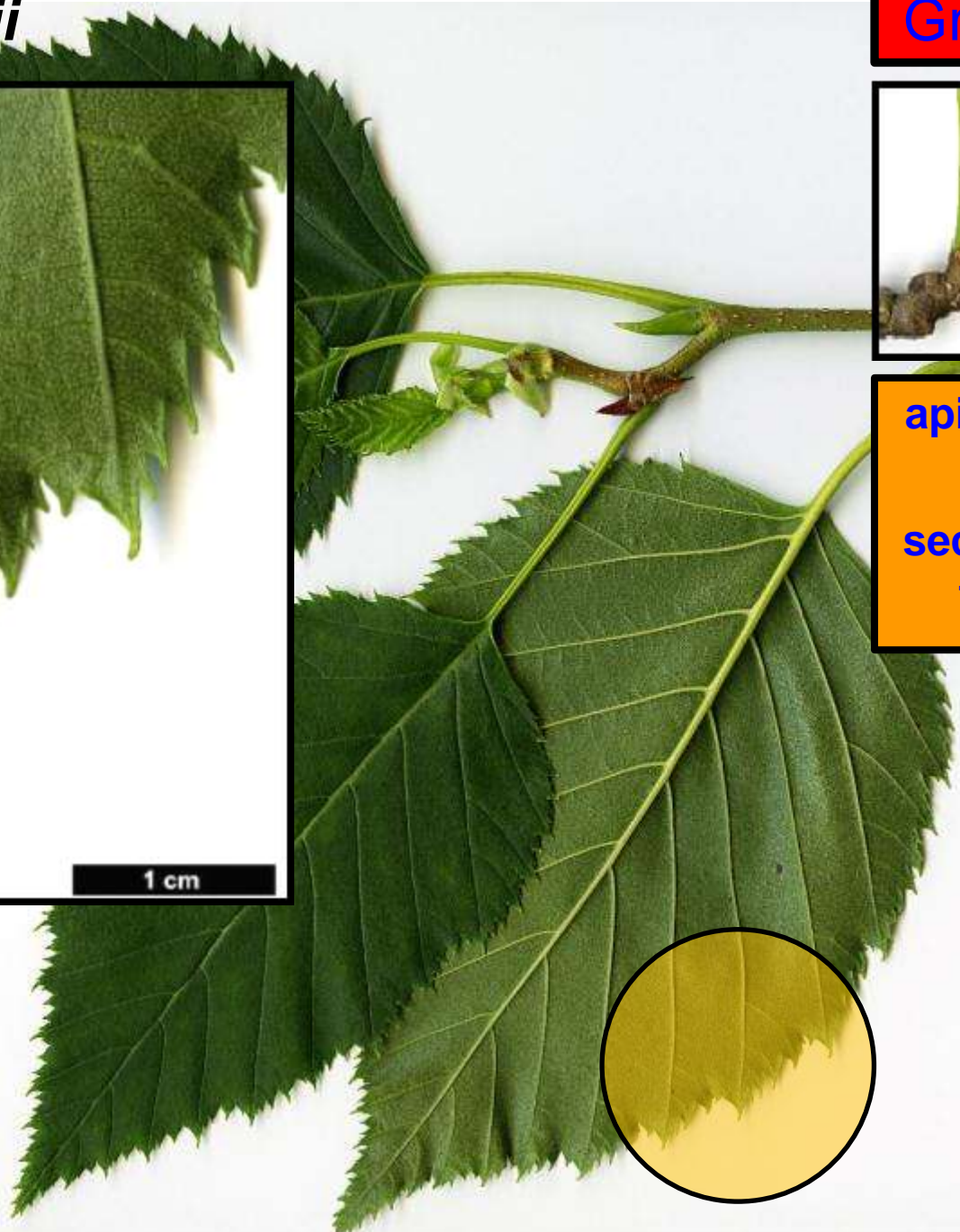
South Korea (Ulleungdo)

A. aff. maximowiczii

Group A



apical half
4-6
secondary
teeth



South Korea (Ulleungdo)

A. aff. maximowiczii

Group A

midvein length 10-17 cm AND
base cuneate-obliquely cordate



apical half
4-6
secondary
teeth



South Korea (Ulleungdo)

A. maximowiczii

Group A



apical half
4-6
secondary
teeth



Japan, Korea, Russian Far East (Sakhalin, Primorye, Khabarovsk, Kuril Islands)

A. maximowiczii

Group A

midvein length <12 cm AND
base predominantly cordate



apical half
4-6
secondary
teeth



Japan, Korea, Russian Far East (Sakhalin, Primorye, Khabarovsk, Kuril Islands)

A. alnobetula subsp. *crispa*

Group A

midvein length <12 cm AND
base cuneate/rounded/(sub)cordate



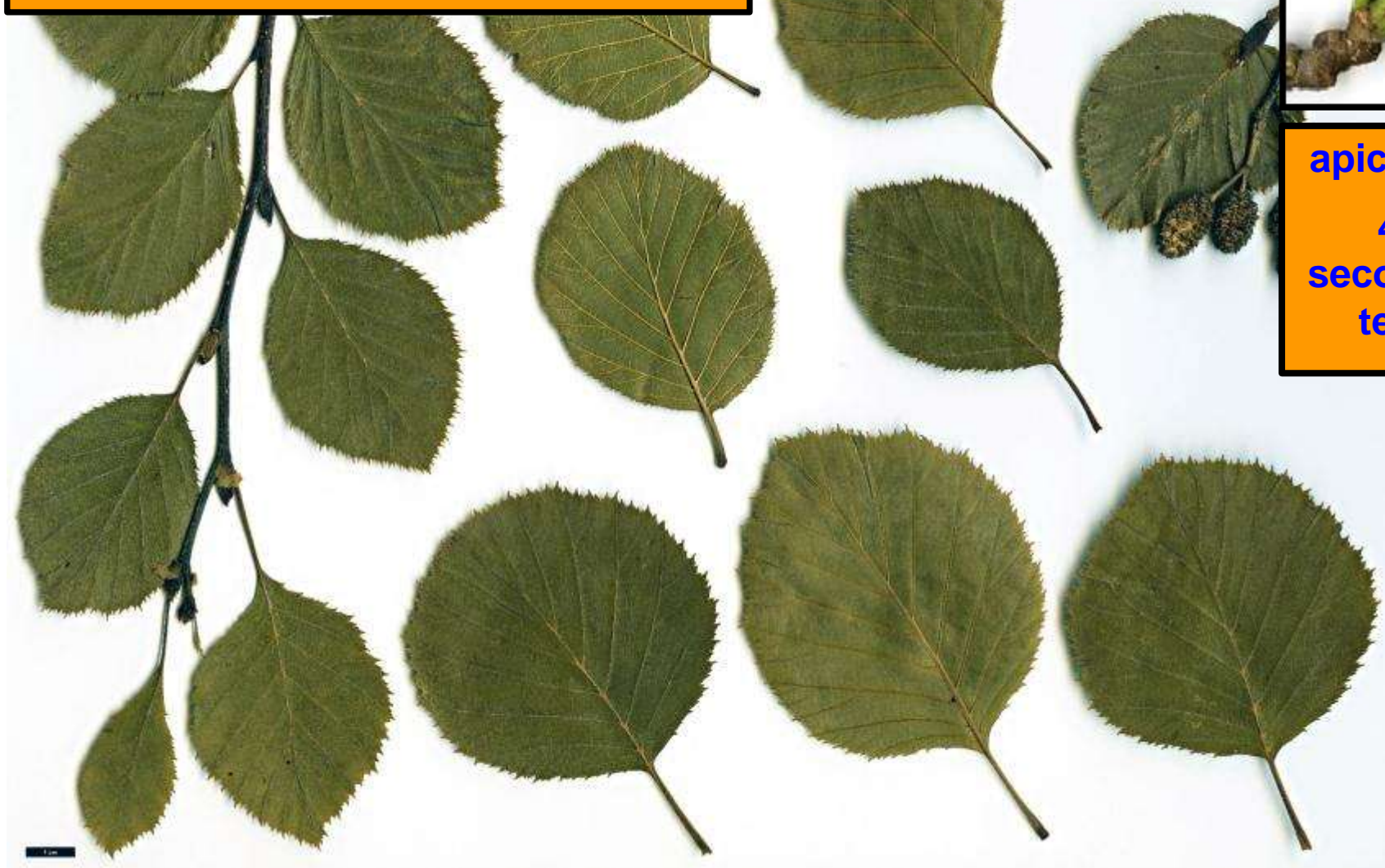
apical half
4-6
secondary
teeth

Subarctic America to North Carolina

A. alnobetula subsp. *suaveolens*

Group A

midvein length <12 cm AND
base cuneate/rounded/(sub)cordate



apical half
4-6
secondary
teeth

A. alnobetula subsp. *sinuata*

Group A

midvein length <12 cm AND
base cuneate/rounded/(sub)cordate



apical half
4-6
secondary
teeth



Russian Far East to N China, Japan, Alaska to California and Wyoming

A. alnobetula subsp. *fruticosa*

Group A

midvein length **<12 cm** AND
base **cuneate/rounded/(sub)cordate**



apical half
4-6
secondary
teeth



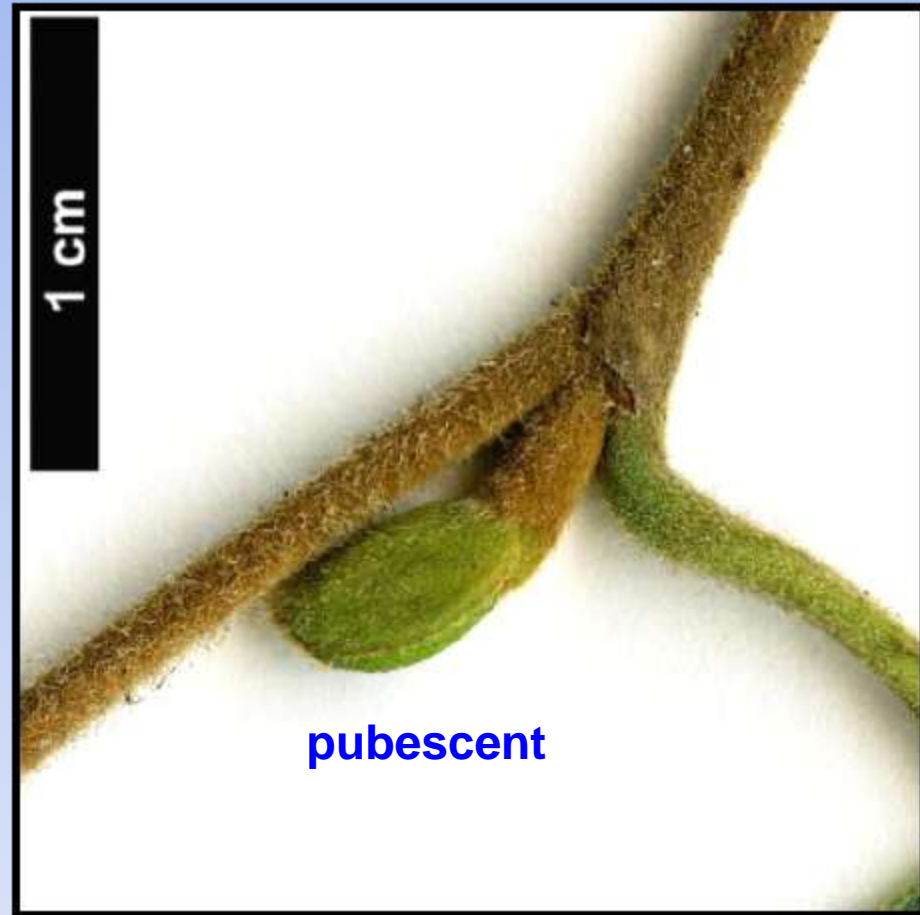
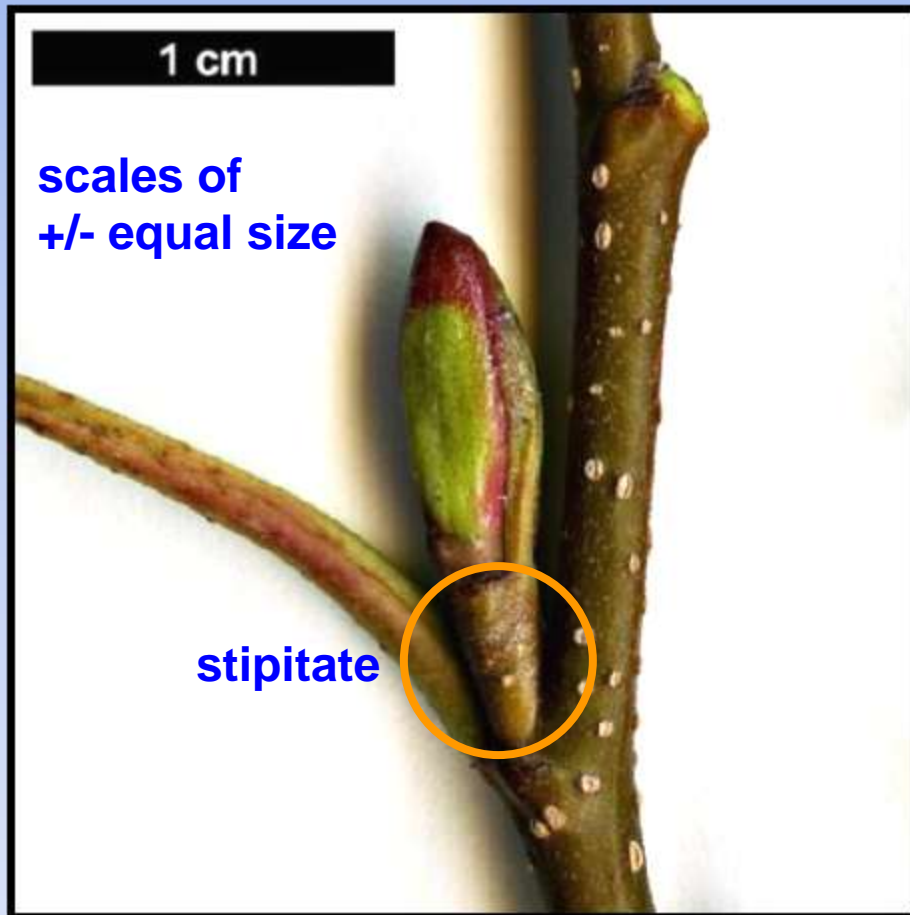
N Russia to Inner Mongolia, Alaska to California

GROUP A

Largest buds slender-pointed and (sub-)sessile
AND covered with glabrous scales of unequal size (10× LENS).

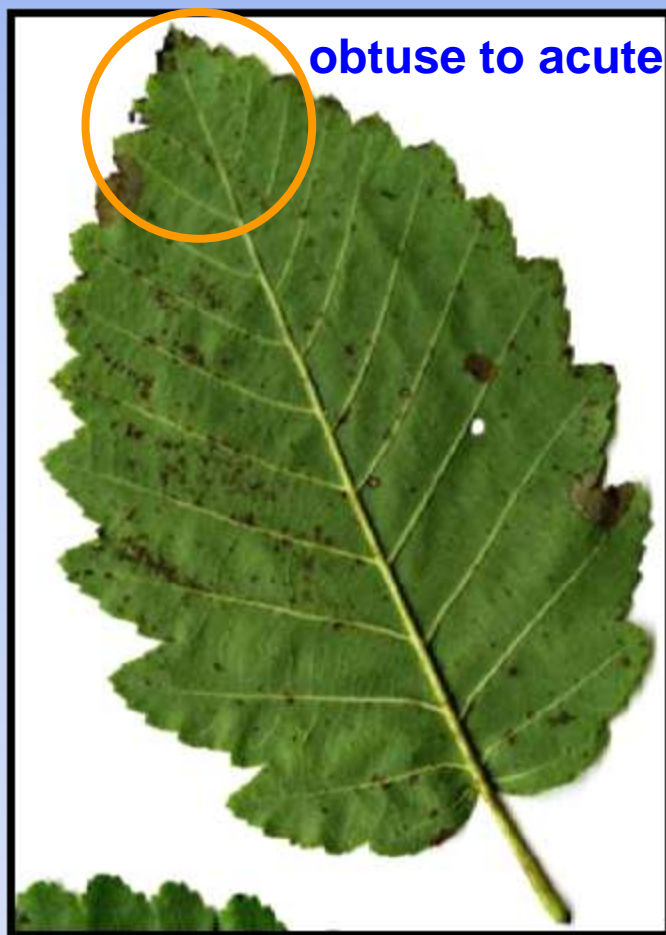


**Largest buds blunt to shortly pointed,
OR stipitate, OR pubescent, OR covered with scales of +/- equal size (10× LENS).**



GROUP B

Lamina secondary veins predominantly 10-15/side.
Lamina apex predominantly obtuse to acute or abruptly acute.



A. rhombifolia

Group B



10-15
veins/side

apex
obtuse to
(abruptly)
acute

W USA to Mexico

A. rhombifolia

Group B

vein pattern **craspedodromous**
margin **finely regularly dentate**



10-15
veins/side

apex
obtuse to
(abruptly)
acute

W USA to Mexico

A. rubra



Group B



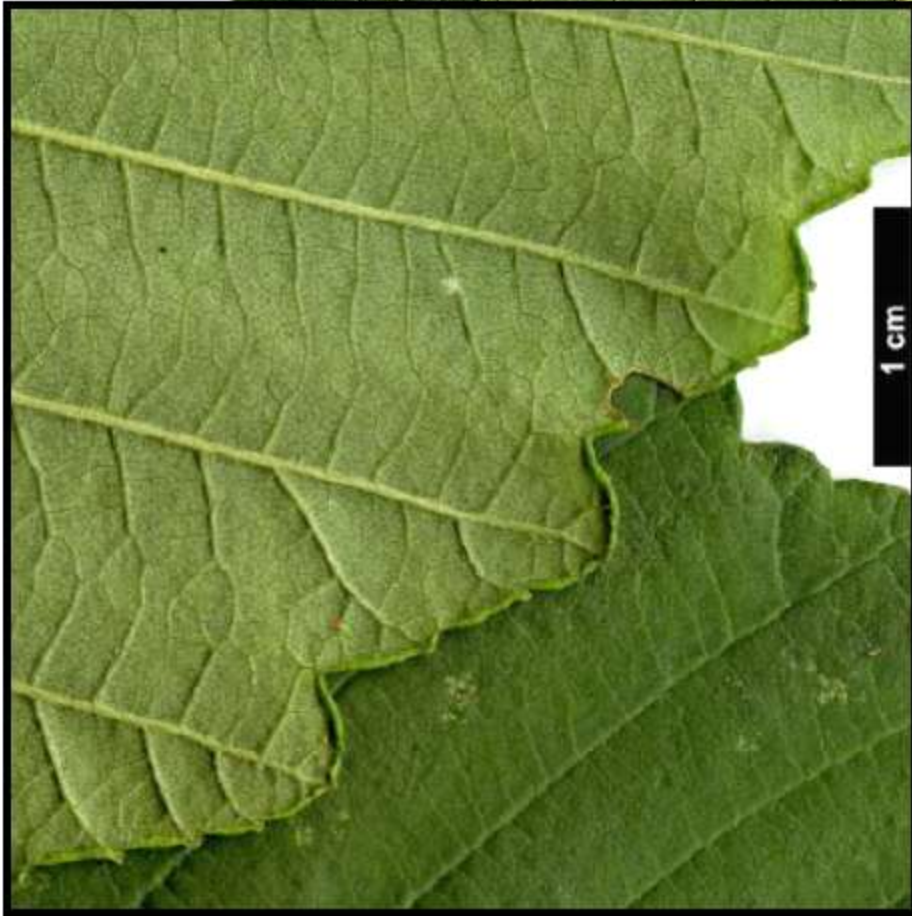
10-15
veins/side

apex
obtuse to
(abruptly)
acute

Alaska to California

A. rubra

vein pattern **craspedodromous**
margin **lobulate and revolute**



Group B



10-15
veins/side

apex
obtuse to
(abruptly)
acute

Alaska to California

A. incana subsp. *tenuifolia*

Group B



10-15
veins/side

apex
obtuse to
(abruptly)
acute



Alaska to New Mexico

A. incana subsp. *tenuifolia*

Group B

vein pattern **craspedodromous**
margin **lobulate and flat**



**10-15
veins/side**

**apex
obtuse to
(abruptly)
acute**

Alaska to New Mexico

A. cremastogyne

Group B



**10-15
veins/side**

**apex
obtuse to
(abruptly)
acute**



China (Sichuan, SE Gansu, N Guizhou, S Shaanxi, Zhejiang)

A. cremastogyne

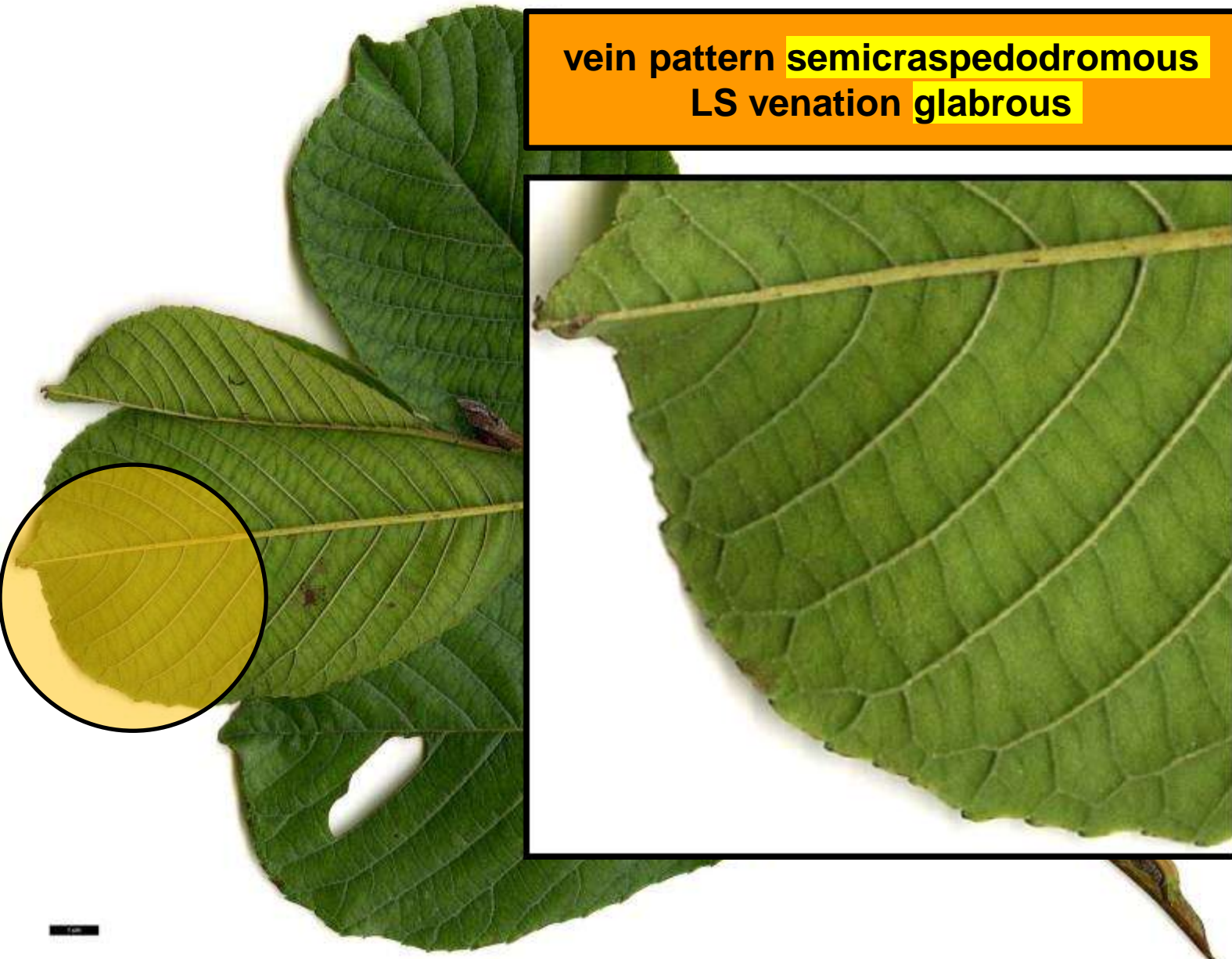
Group B

vein pattern **semicraspedodromous**
LS venation **glabrous**



10-15
veins/side

apex
obtuse to
(abruptly)
acute



China (Sichuan, SE Gansu, N Guizhou, S Shaanxi, Zhejiang)

A. ferdinandi-coburgii

Group B



10-15
veins/side

apex
obtuse to
(abruptly)
acute

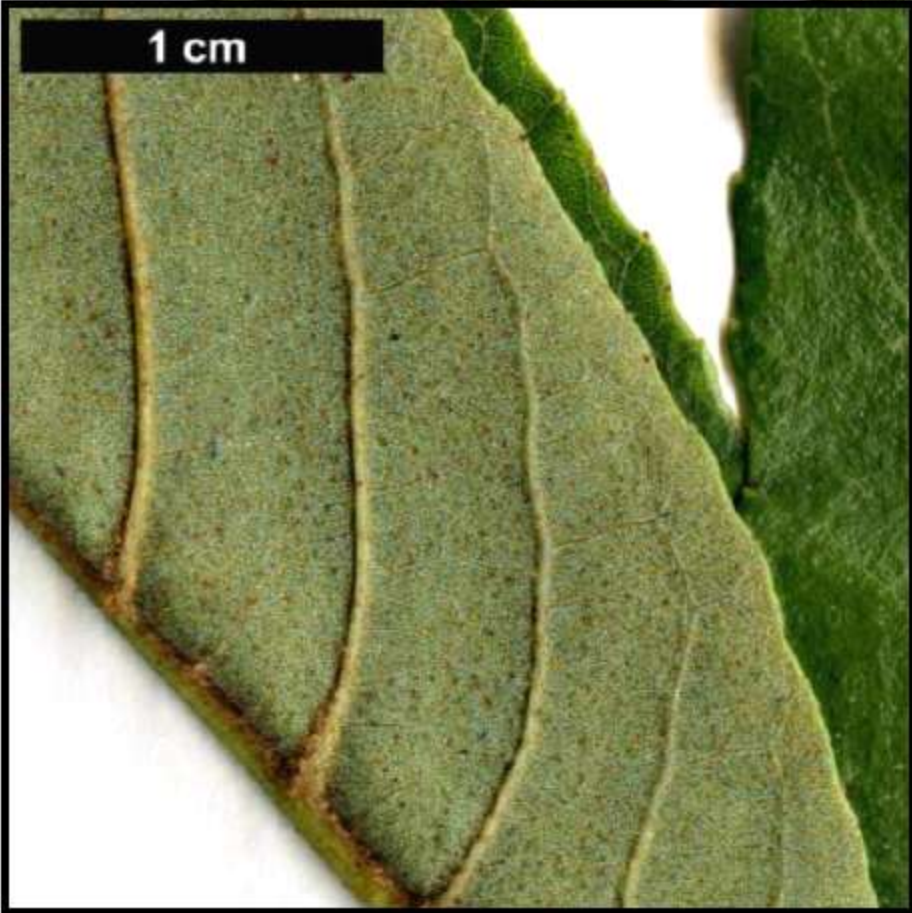
1 cm

China (Yunnan, Guizhou, SW Sichuan)

A. ferdinandi-coburgii

Group B

vein pattern **semicraspedodromous**
LS venation +/- rusty pubescent



10-15
veins/side

apex
obtuse to
(abruptly)
acute



China (Yunnan, Guizhou, SW Sichuan)

A. lanata

Group B



10-15
veins/side

apex
obtuse to
(abruptly)
acute



China (Sichuan)

A. lanata

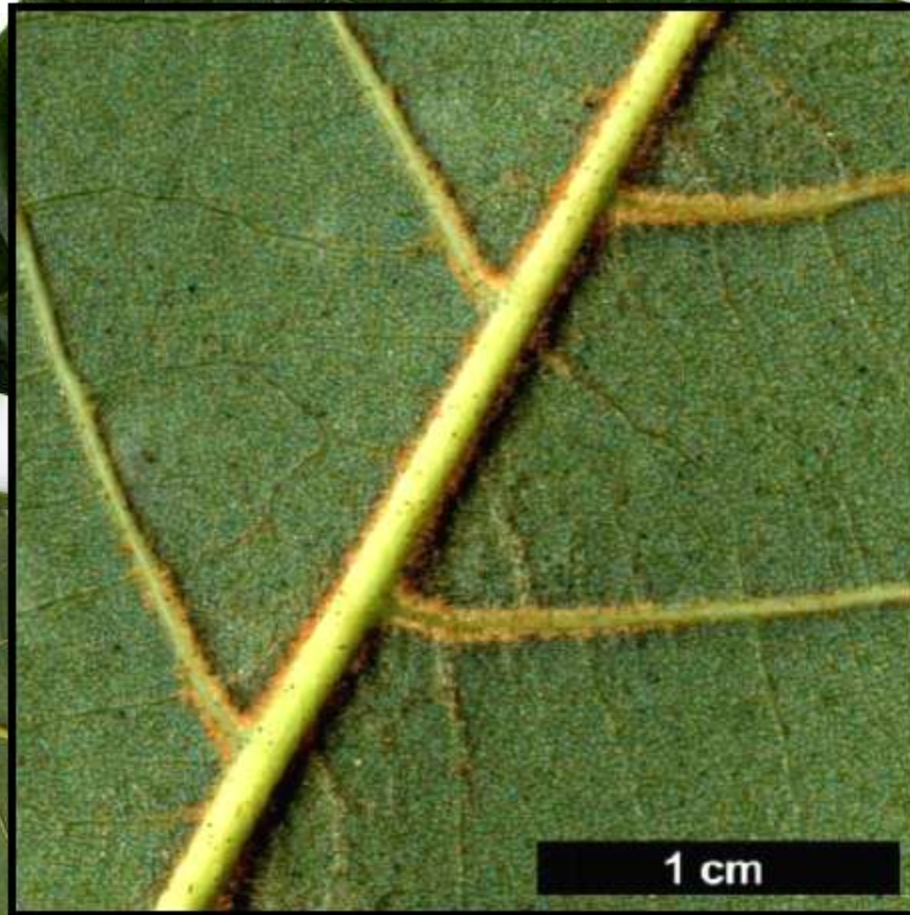
Group B

vein pattern **semicraspedodromous**
LS venation +/- **rusty pubescent**



10-15
veins/side

apex
obtuse to
(abruptly)
acute



1 cm

1 cm

China (Sichuan)

GROUP C

Lamina secondary veins predominantly 10-15/side.
Lamina apex predominantly acute to acuminate or caudate.



A. acuminata

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

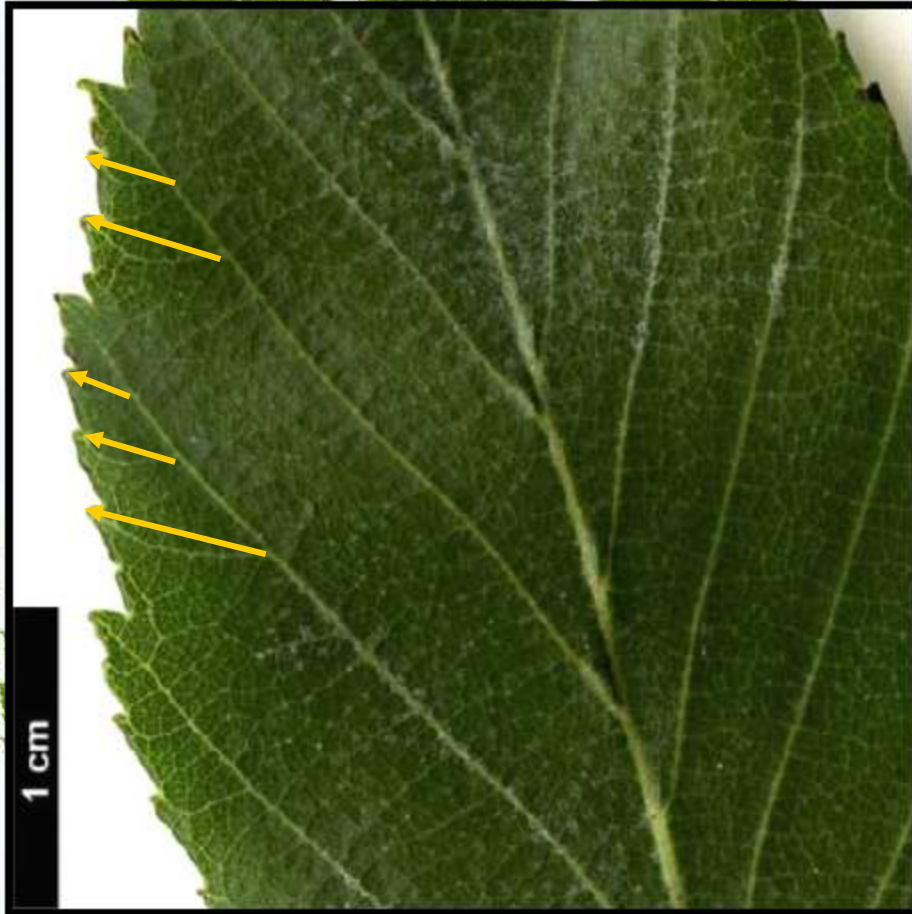
lamina
margin
lobulate

Mexico to N Argentina

A. acuminata

Group C

primary teeth usually
with proximal teeth only



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
lobulate

Mexico to N Argentina

A. incana

Group C

primary teeth dentate on both sides



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
lobulate

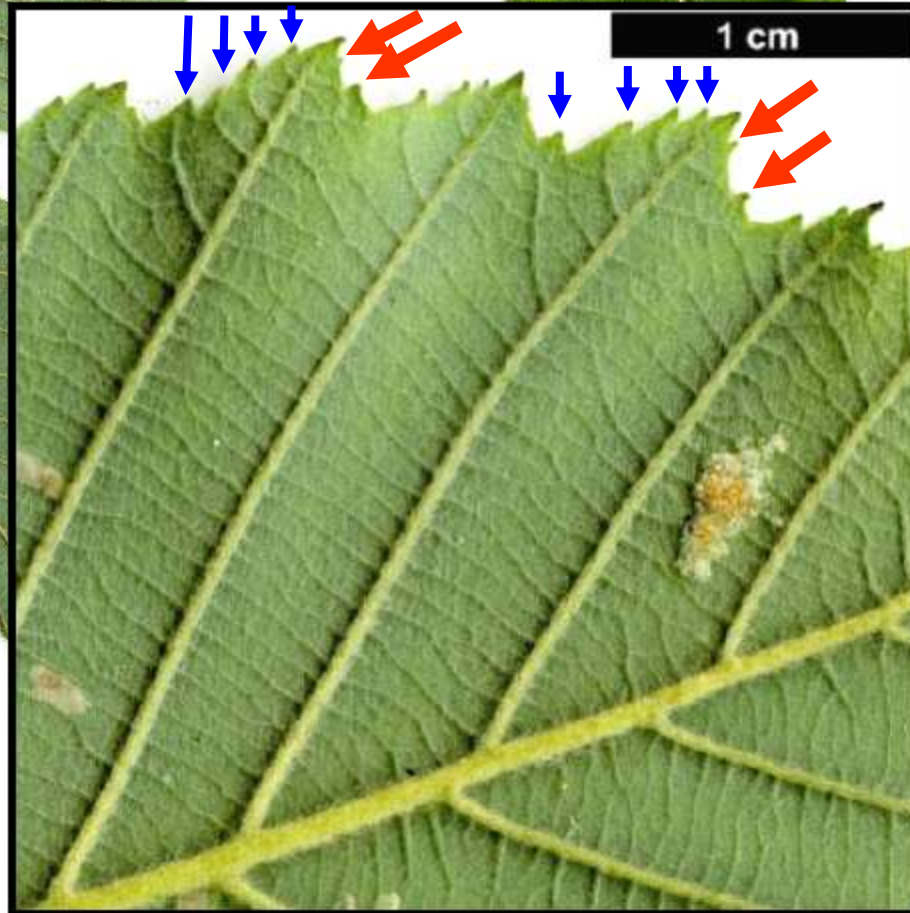


Europe to W Siberia and Turkey, N America

A. incana

Group C

primary teeth dentate on both sides



10-15
veins/side

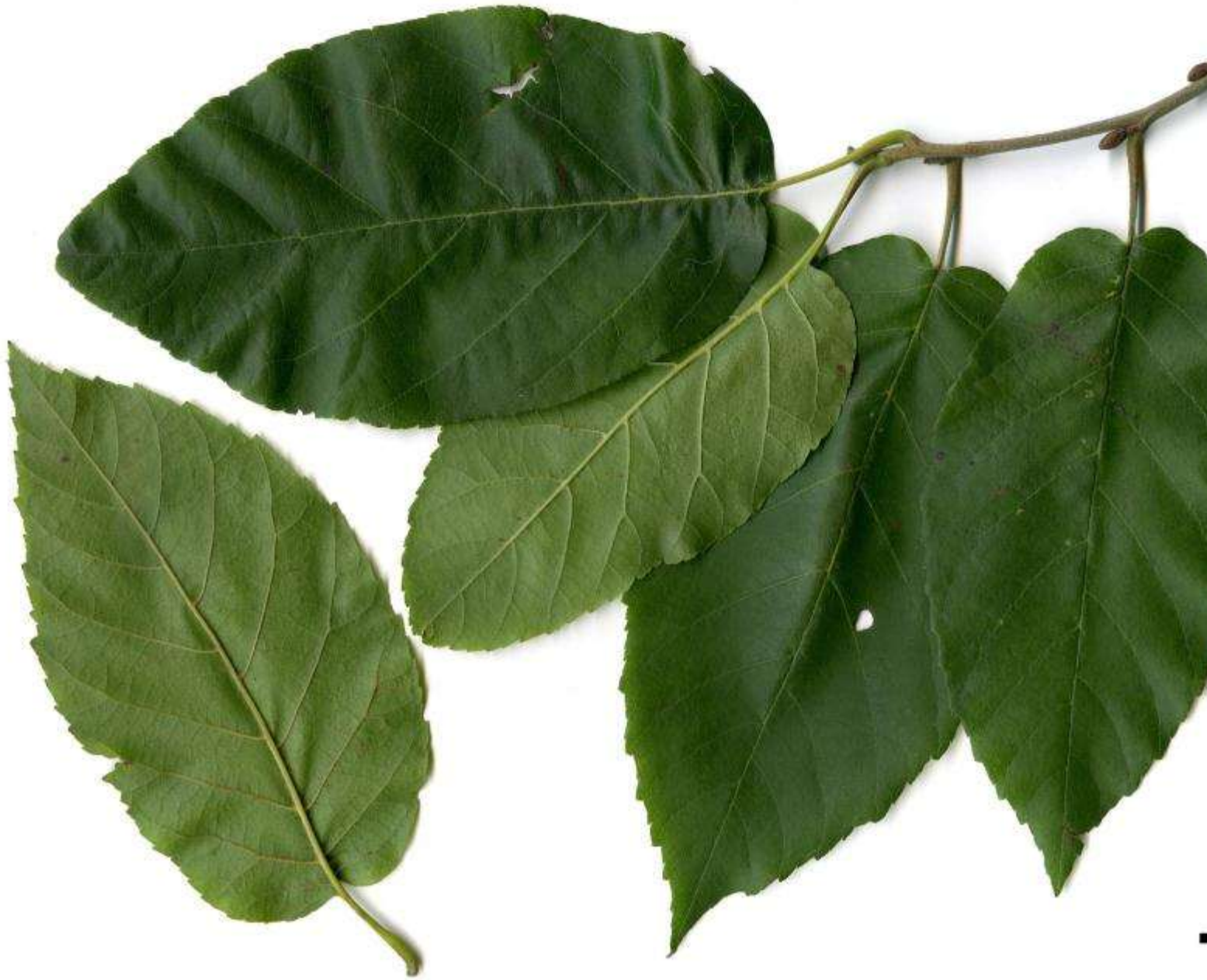
apex
acute to
acuminate
or caudate

lamina
margin
lobulate

Europe to W Siberia and Turkey, N America

A. subcordata

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

SE Transcaucasus to Iran

A. subcordata

Group C

**base cordate
(sometimes truncate to cordate)**



**10-15
veins/side**

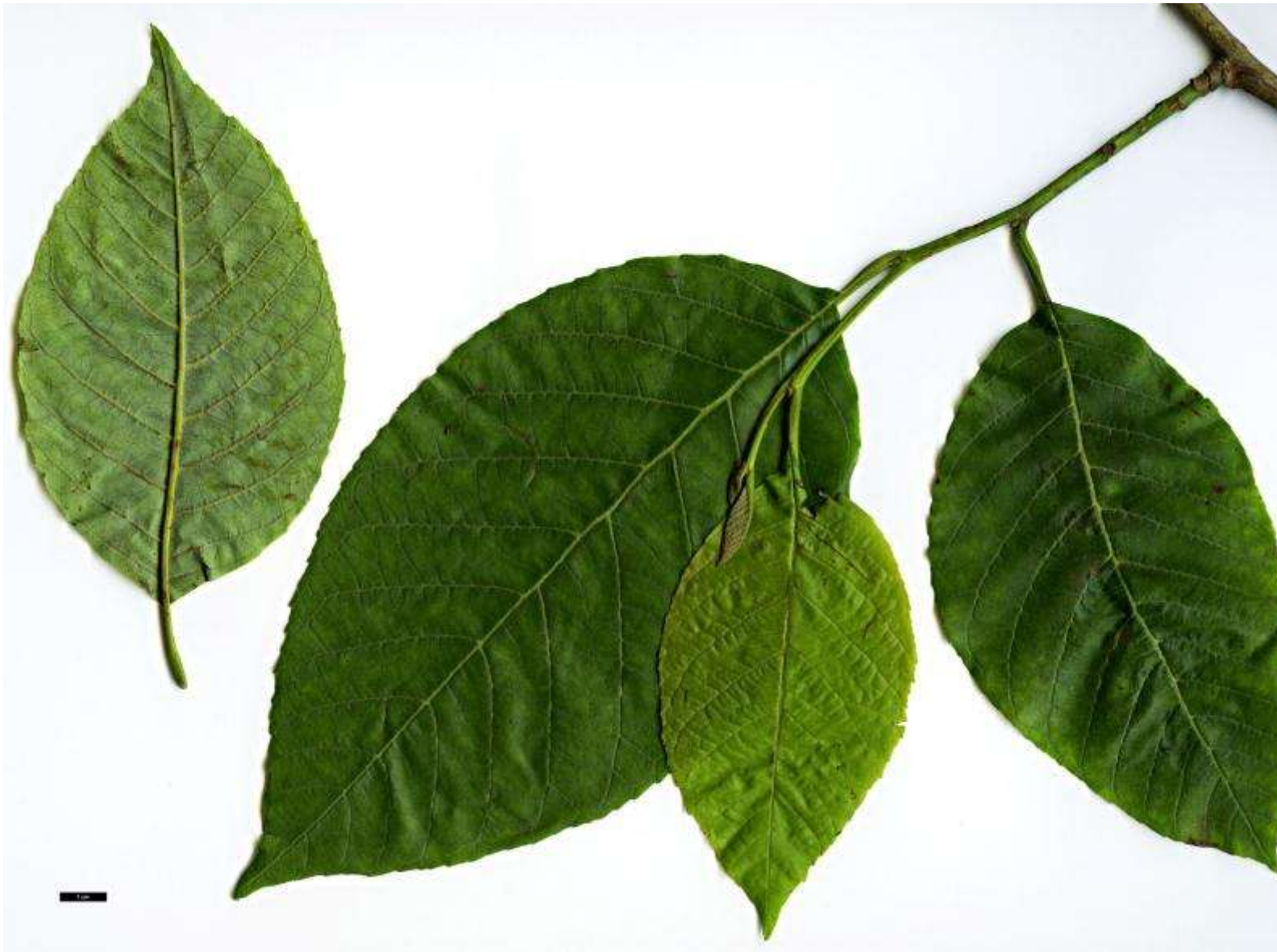
**apex
acute to
acuminate
or caudate**

**lamina
margin
not
lobulate**

SE Transcaucasus to Iran

A. nepalensis

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

Himalaya to SC China

A. nepalensis

Group C

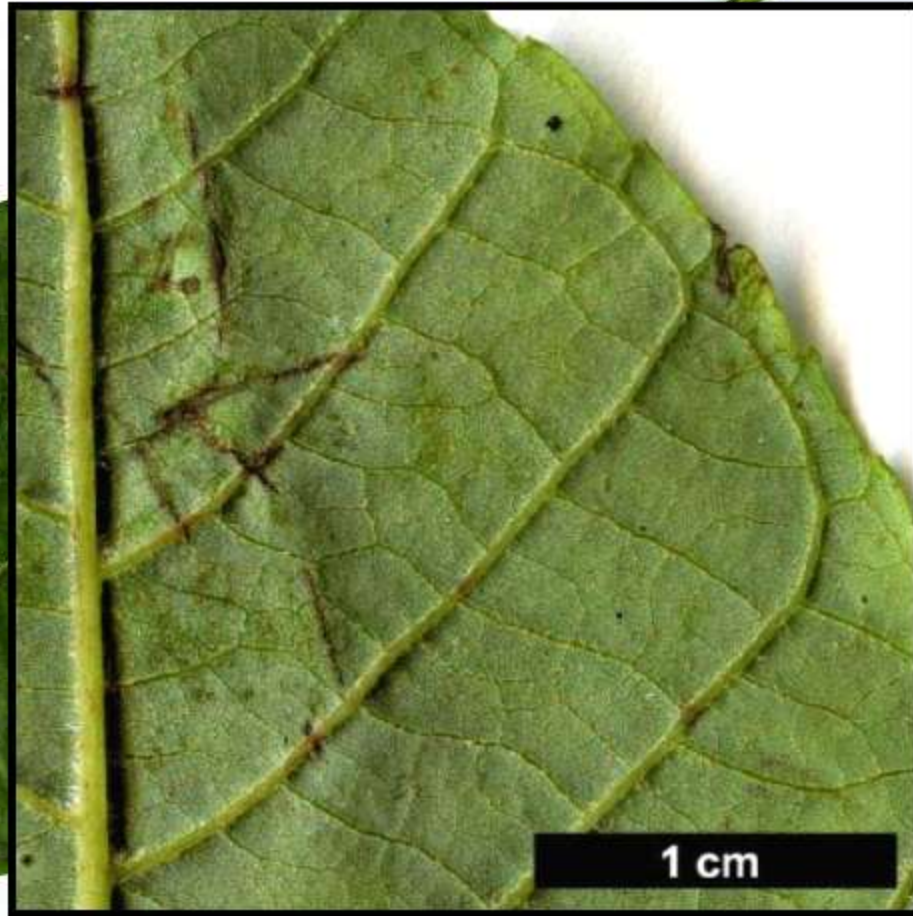
base cuneate to rounded, margin shallowly distantly serrate to entire



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate



Himalaya to SC China

A. nepalensis

Group C

base cuneate to rounded, margin shallowly distantly serrate to entire



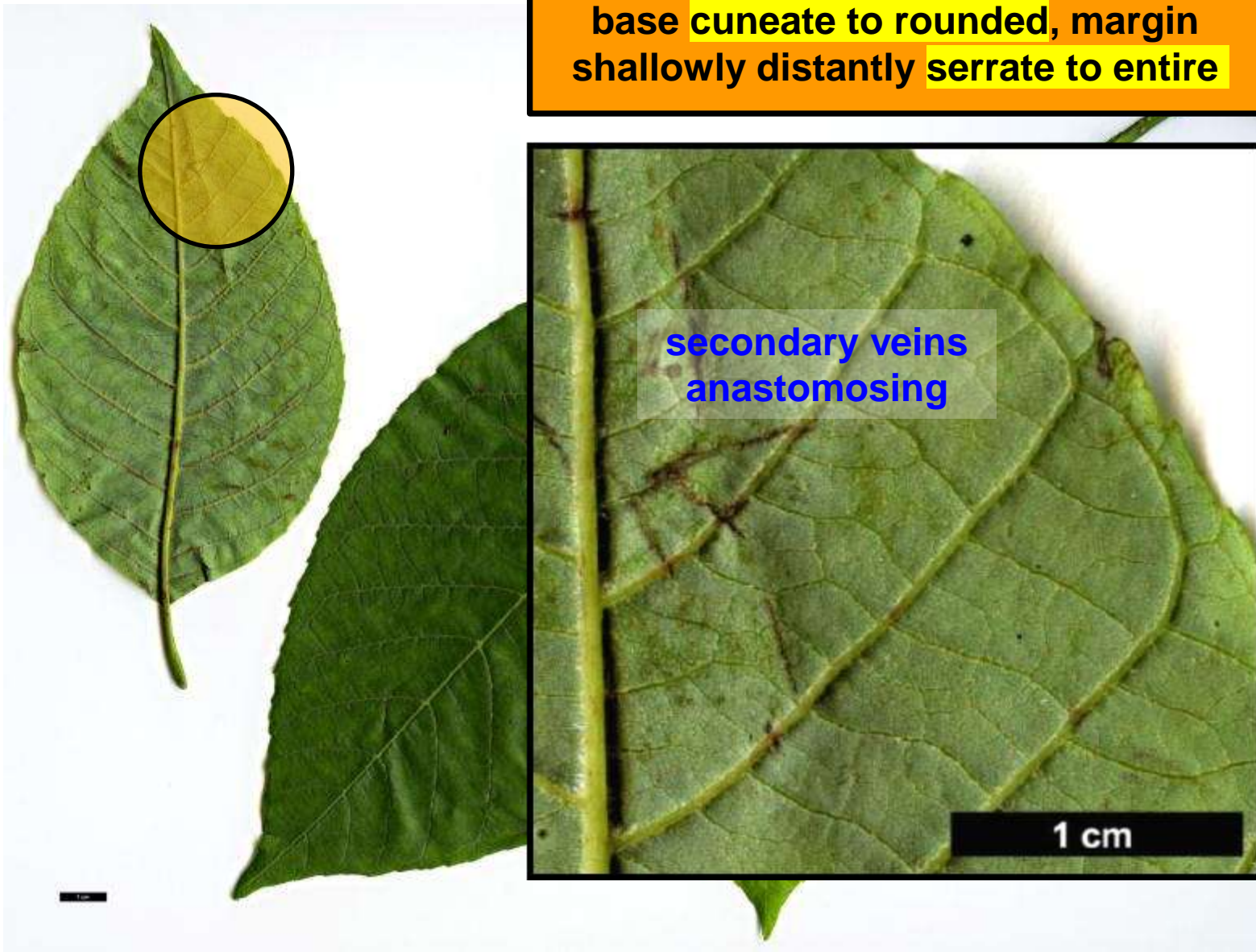
10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

secondary veins
anastomosing

1 cm



Himalaya to SC China

A. nitida

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate



Himalaya to SC China

A. nitida

Group C

base cuneate to rounded, margin shallowly distantly serrate to entire



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

Himalaya to SC China

A. nitida

Group C

base cuneate to rounded, margin shallowly distantly serrate to entire



10-15
veins/side

apex
acute to
acuminate
or caudate

secondary veins
ending in teeth

lamina
margin
not
lobulate



A. acuminata

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

Mexico to N Argentina

A. acuminata

Group C

base cuneate to rounded
margin finely serrate to dentate

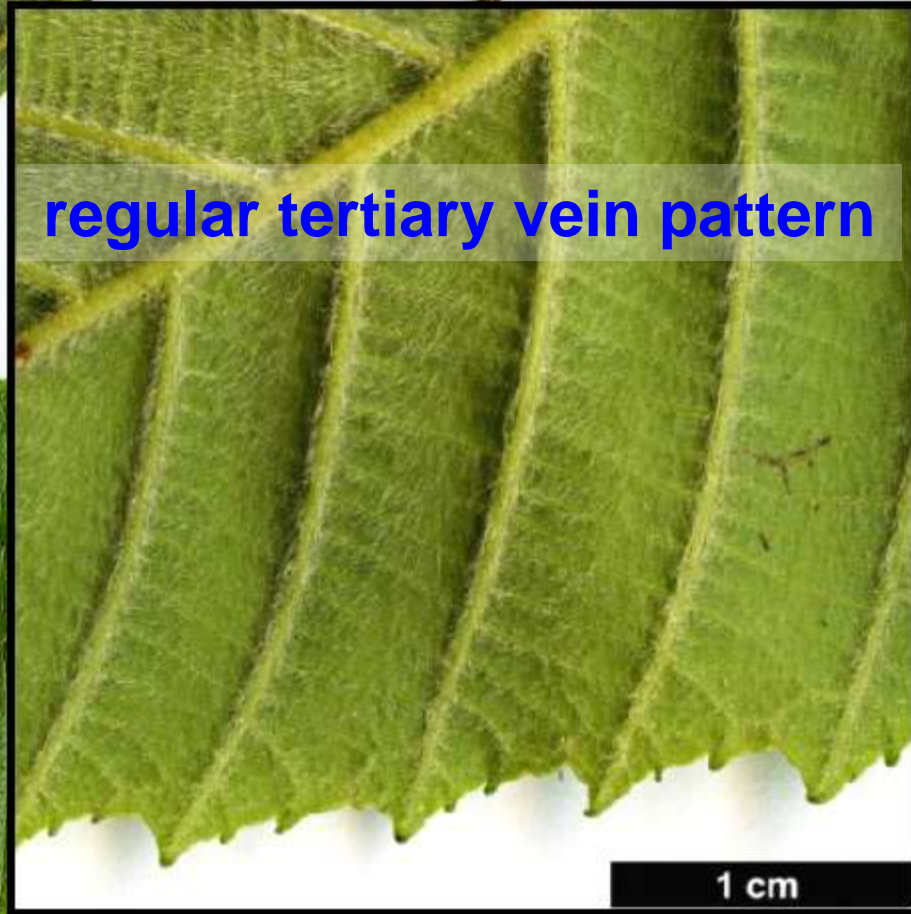


regular tertiary vein pattern

10-15
veins/side

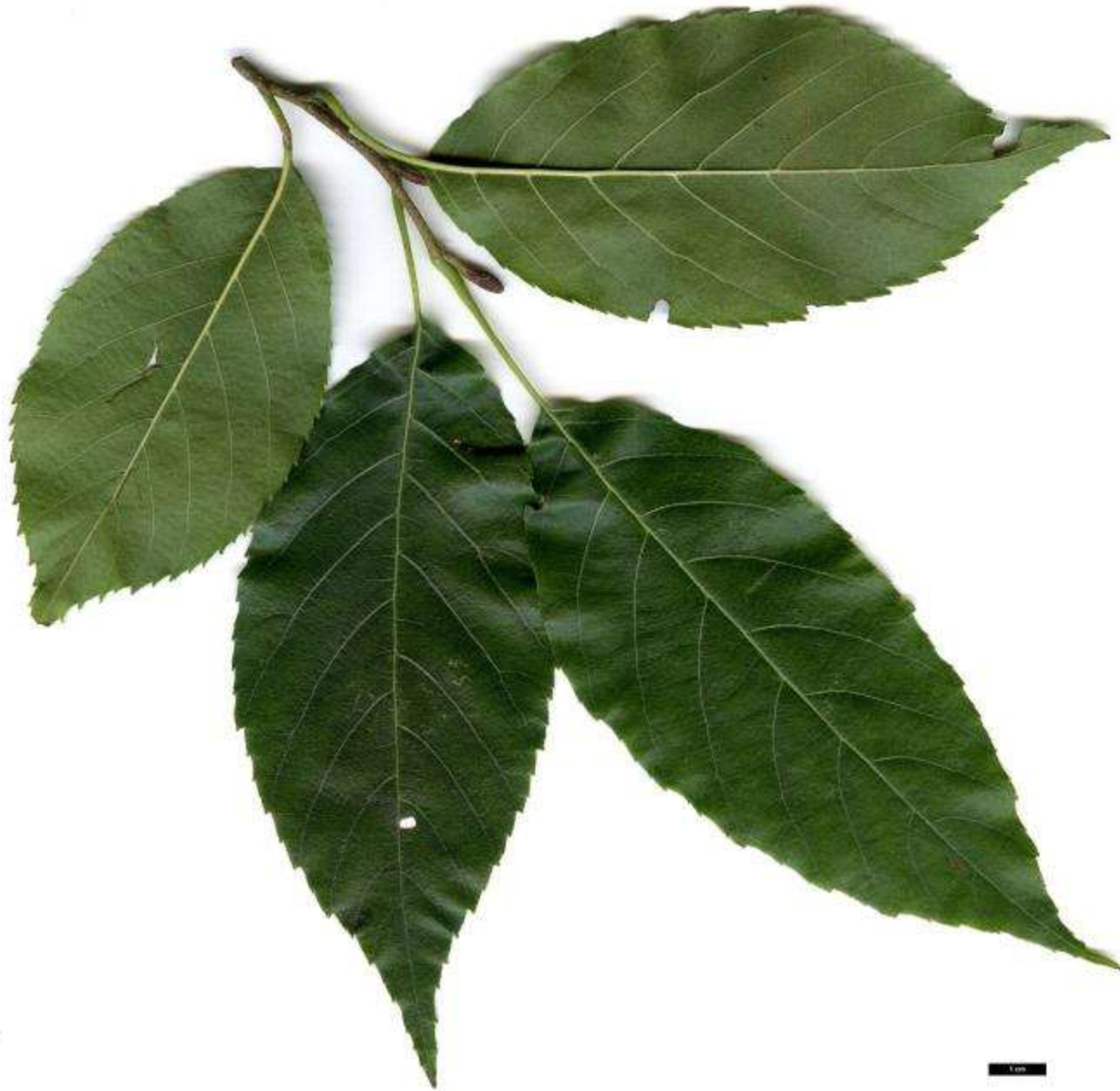
apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate



Mexico to N Argentina

A. × spaethii (*A. japonica* × *A. subcordata*)



Group C



**10-15
veins/side**

**apex
acute to
acuminate
or caudate**

**lamina
margin
not
lobulate**

(Späth, Berlin)

A. × spaethii (*A. japonica* × *A. subcordata*)

Group C

base cuneate to rounded
margin finely serrate to dentate



irregular tertiary vein pattern
lamina 12-30 × 5-10 cm

10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

A. trabeculosa

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate



China, Japan (Honshu)

A. trabeculosa

Group C

base cuneate to rounded
margin finely serrate to dentate

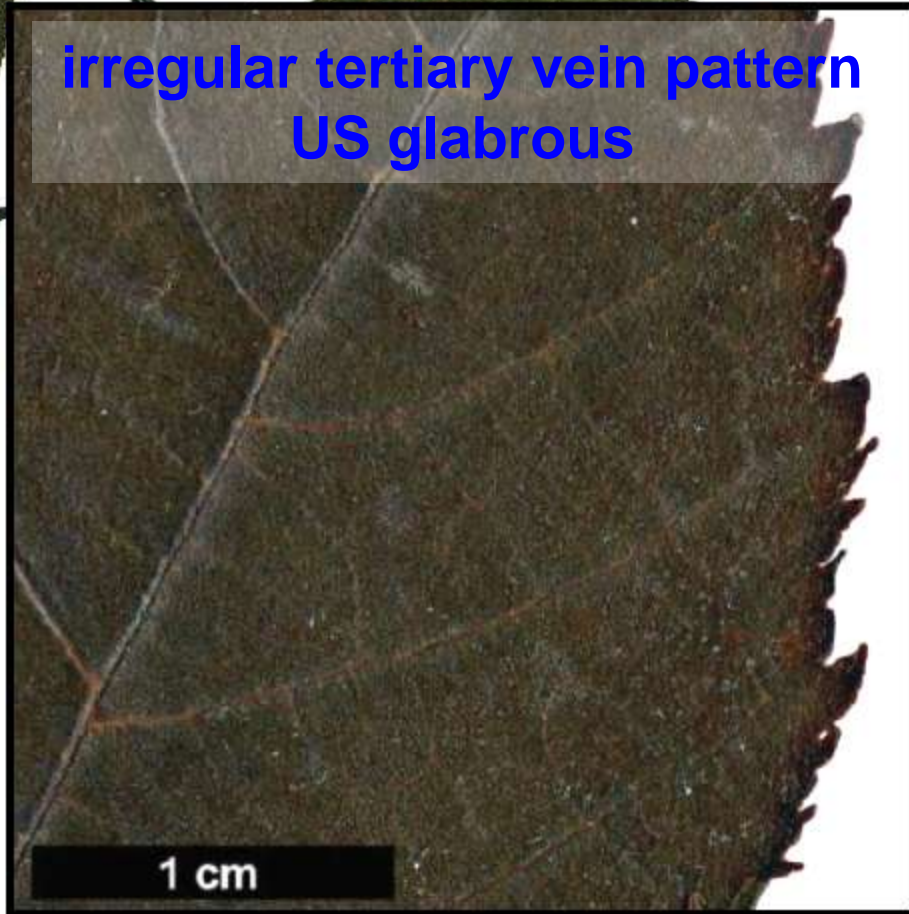


irregular tertiary vein pattern
US glabrous

10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate



China, Japan (Honshu)

A. ×mayrii (*A. hirsuta* × *A. japonica*)

Group C



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

Russian Far East to Korea, Japan

A. × mayrii (*A. hirsuta* × *A. japonica*)

Group C

base cuneate to rounded
margin finely serrate to dentate

1 cm

irregular tertiary vein pattern
US pubescent



10-15
veins/side

apex
acute to
acuminate
or caudate

lamina
margin
not
lobulate

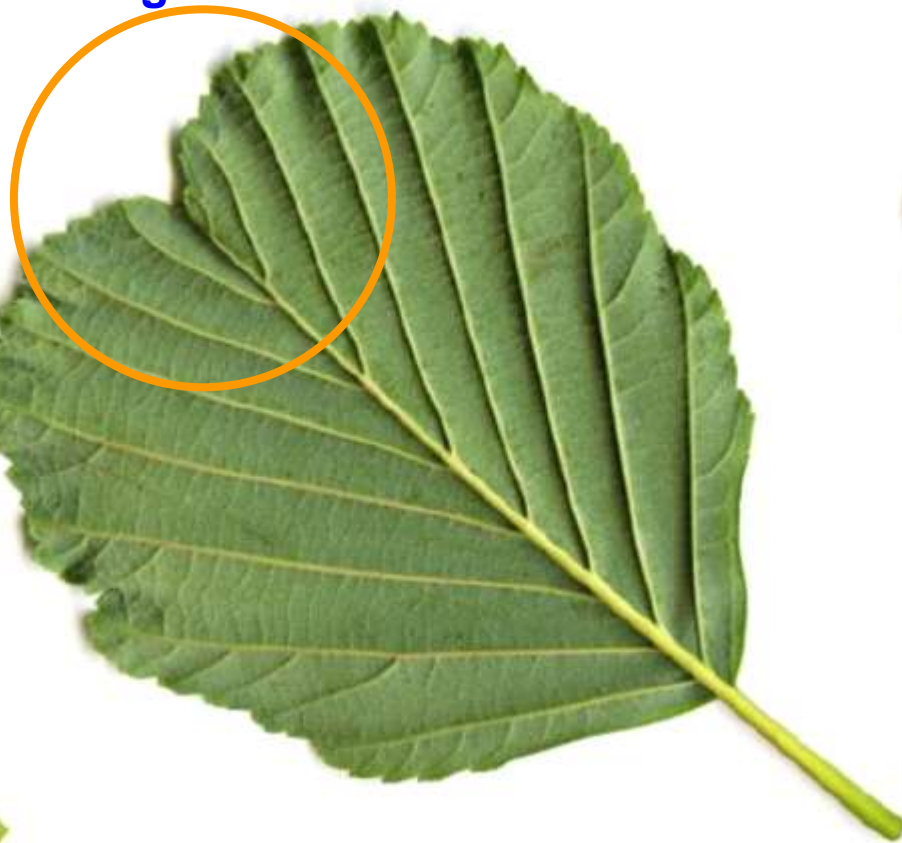


Russian Far East to Korea, Japan

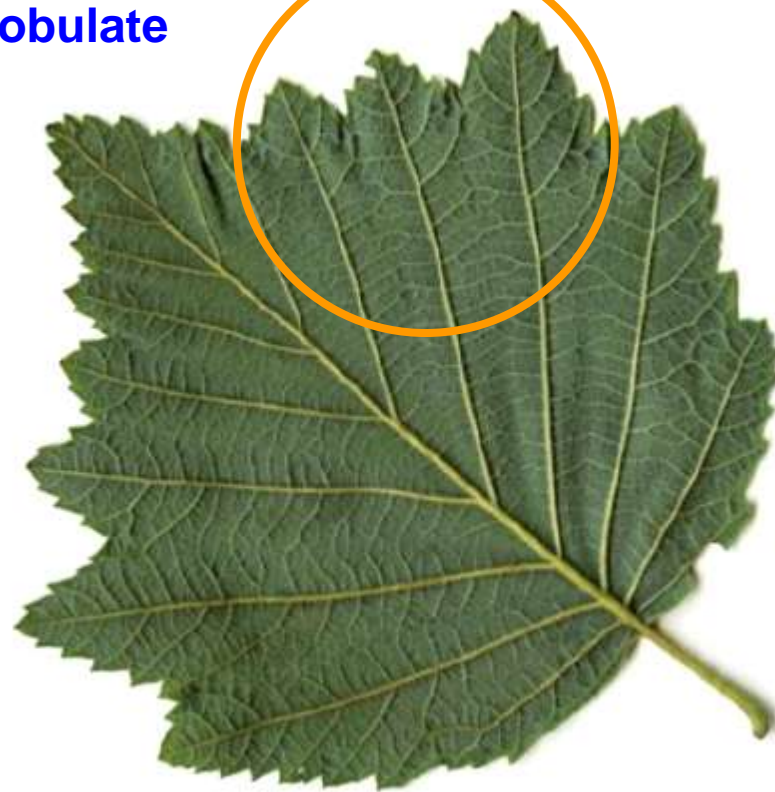
GROUP D

Lamina secondary veins predominantly 5-10/side.
Lamina apex +/- emarginate, OR margin lobulate.

emarginate



lobulate



A. matsumurae

Group D



5-10
veins/side

apex
emarginate

Japan (N & C Honshu)

A. matsumurae

Group D

lamina LS vein axils glabrous
surface greyish glaucous green



5-10
veins/side

apex
emarginate



1 cm

Japan (N & C Honshu)

A. fauriei

Group D



5-10
veins/side

apex
emarginate



Japan (N & C Honshu)

A. fauriei

Group D

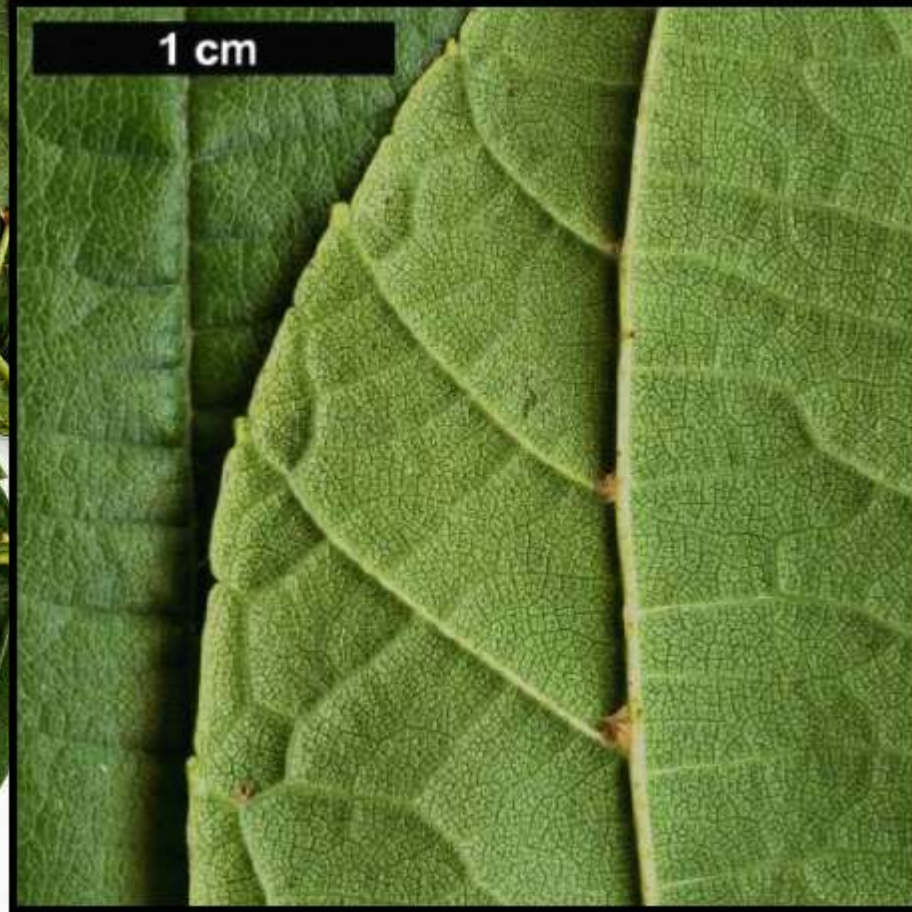
lamina LS vein axils pubescent
surface (pale) green



1 cm

5-10
veins/side

apex
emarginate



Japan (N & C Honshu)

A. fauriei

Group D



5-10
veins/side

apex
emarginate



Japan (N & C Honshu)

A. fauriei

Group D

stipules
long
persistent



5-10
veins/side

apex
emarginate

1 cm



Japan (N & C Honshu)

A. glutinosa

Group D



**5-10
veins/side**

**apex
emarginate**



Europe to W Siberia and Iran

A. glutinosa

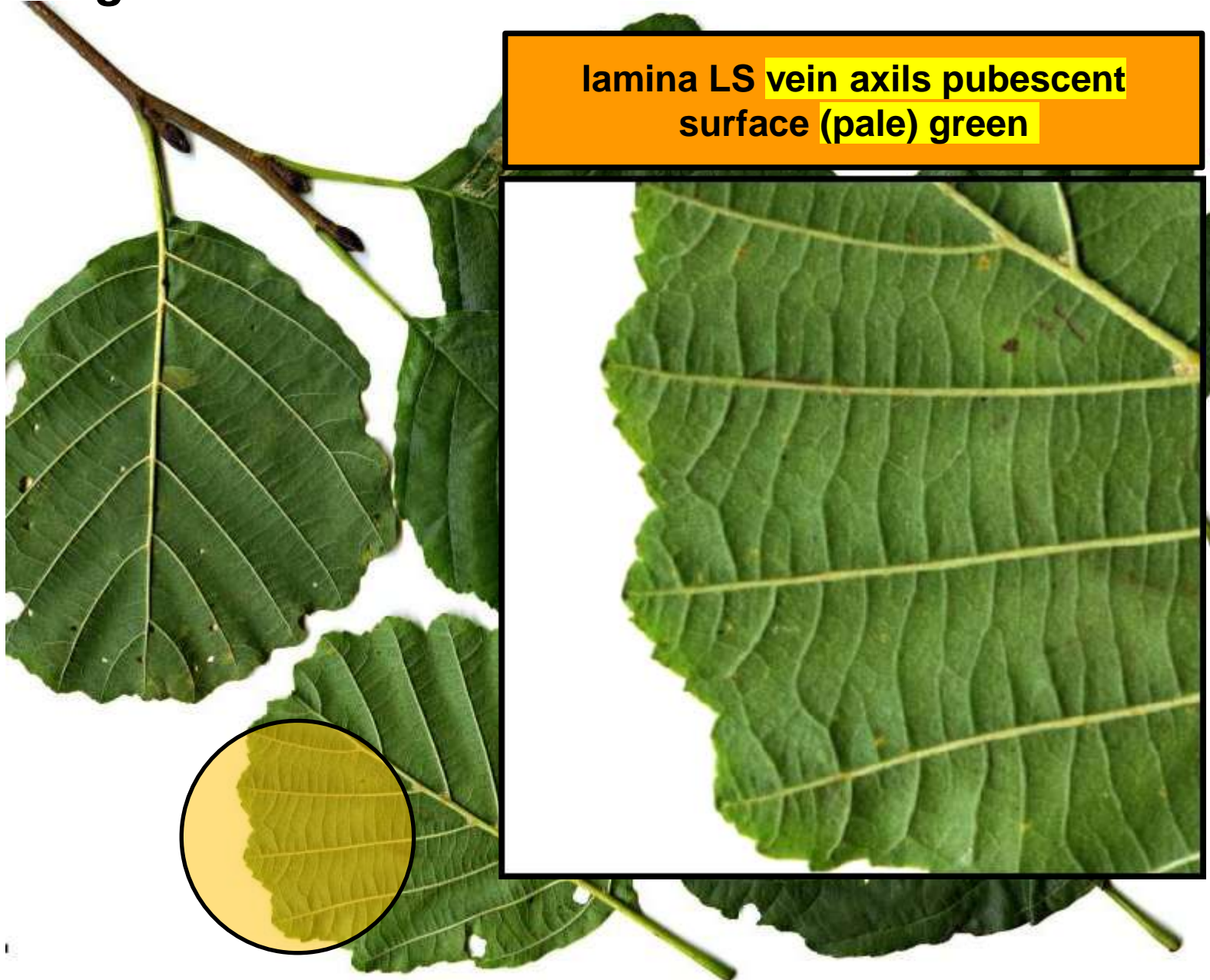
Group D

lamina LS vein axils pubescent
surface (pale) green



5-10
veins/side

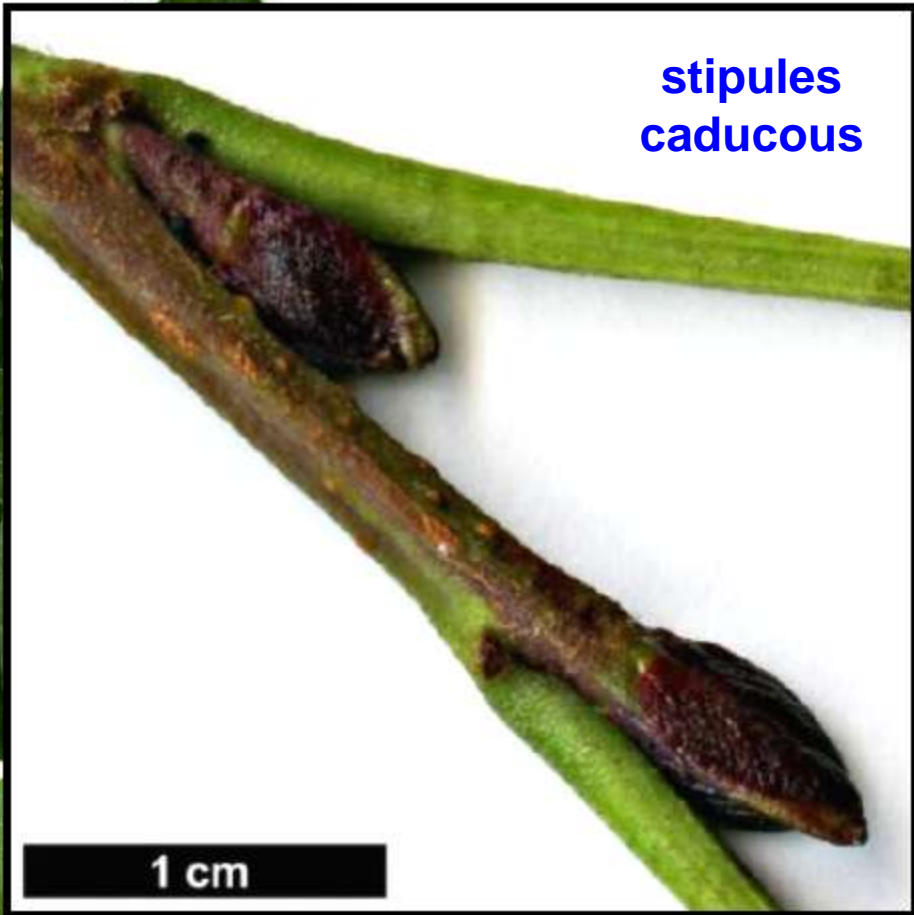
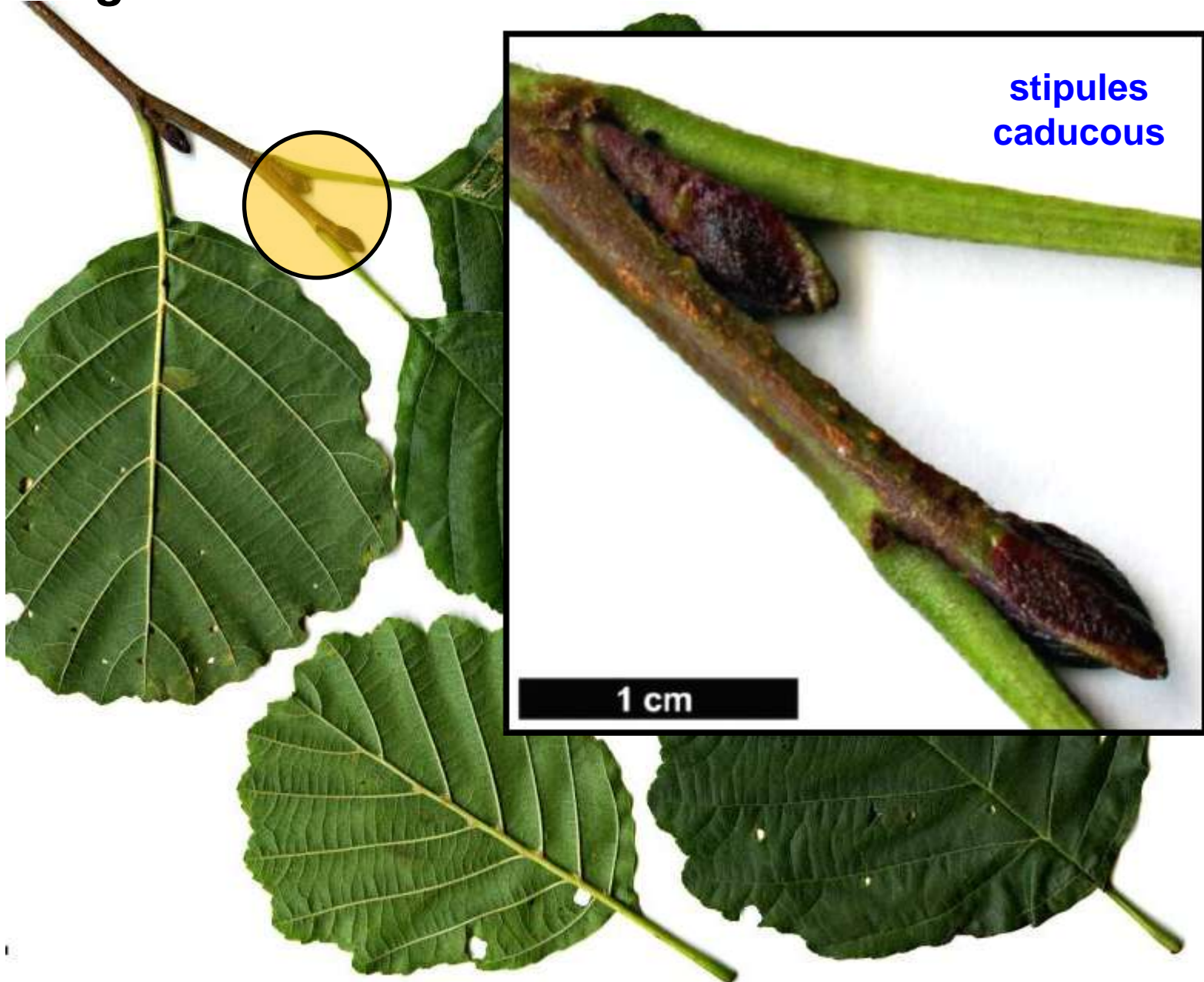
apex
emarginate



Europe to W Siberia and Iran

A. glutinosa

Group D



stipules
caducous



5-10
veins/side

apex
emarginate

Europe to W Siberia and Iran

A. inokumae

Group D



5-10
veins/side

apex
obtuse
to
acute

L/W
often
+/- 1/1

Japan (Hokkaido, N Honshu)

A. inokumae

Group D

midvein length ≤ 7 cm
lobes acute



5-10
veins/side

apex
obtuse
to
acute

L/W
often
+/- 1/1

Japan (Hokkaido, N Honshu)

A. hirsuta

Group D



5-10
veins/side

apex
obtuse
to
acute

L/W
often
+/- 1/1



Japan (Hokkaido, N Honshu)

A. hirsuta

midvein length **>7 cm**
lobes **obtuse to acute**

Group D



**5-10
veins/side**

**apex
obtuse
to
acute**

**L/W
often
+/- 1/1**



1 cm

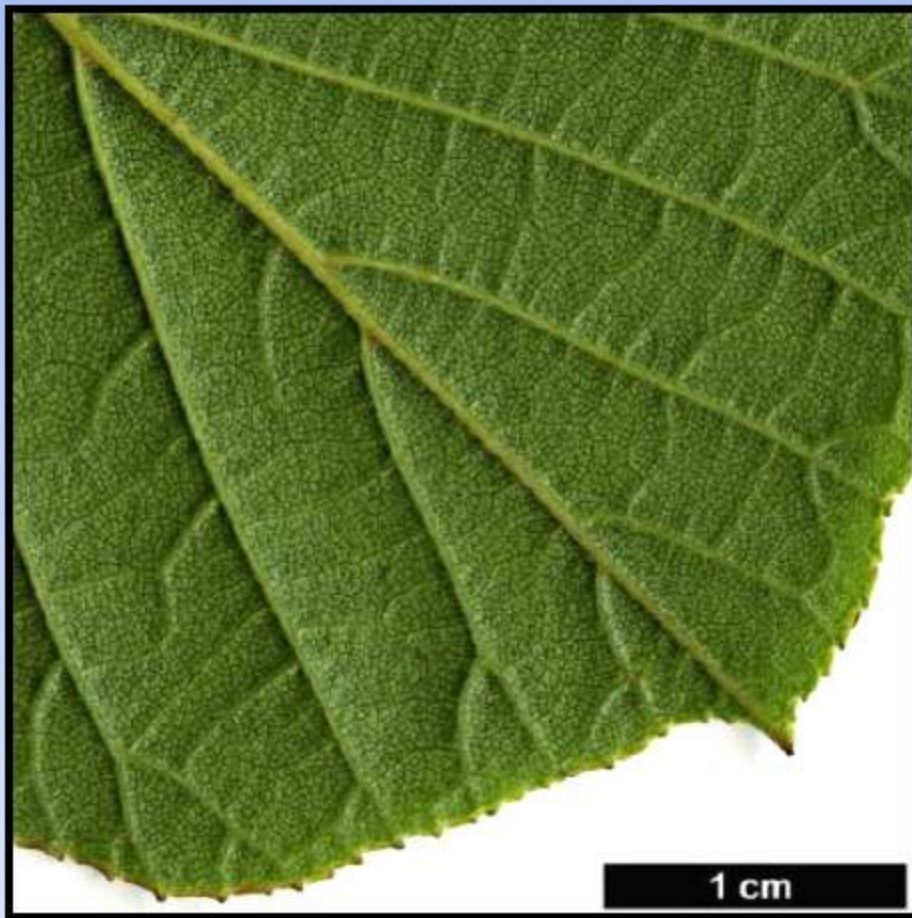
Japan (Hokkaido, N Honshu)

GROUP E

Lamina secondary veins predominantly 5-10/side.
Apex obtuse to acuminate, AND margin serrulate to dentate.

apex obtuse to acuminate

margin serrulate to dentate



A. cordata

Group E



**5-10
veins/side**

**apex
obtuse
to
acuminate**

**lamina
base
cordate**



NE Corse, S Italy

A. cordata

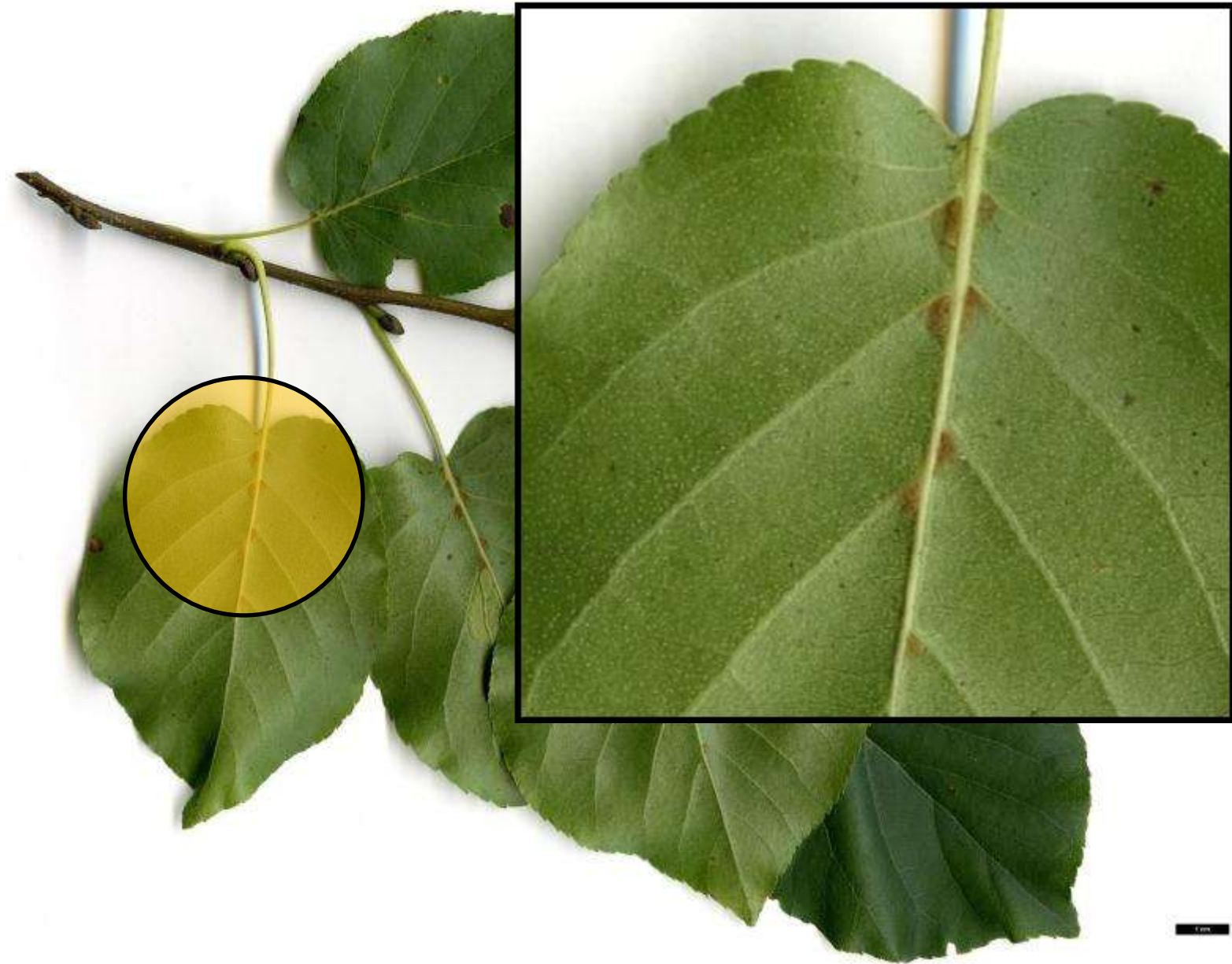
Group E



5-10
veins/side

apex
obtuse
to
acuminate

lamina
base
cordate



NE Corse, S Italy

A. formosana

Group E



5-10
veins/side

apex acute
or acute
to
acuminate

lamina
base
cuneate
to rounded



Taiwan

A. formosana

Group E

only one with vein pattern often
semicraspedodromous



5-10
veins/side

apex acute
or acute
to
acuminate

lamina
base
cuneate
to rounded

A. serrulata

Group E



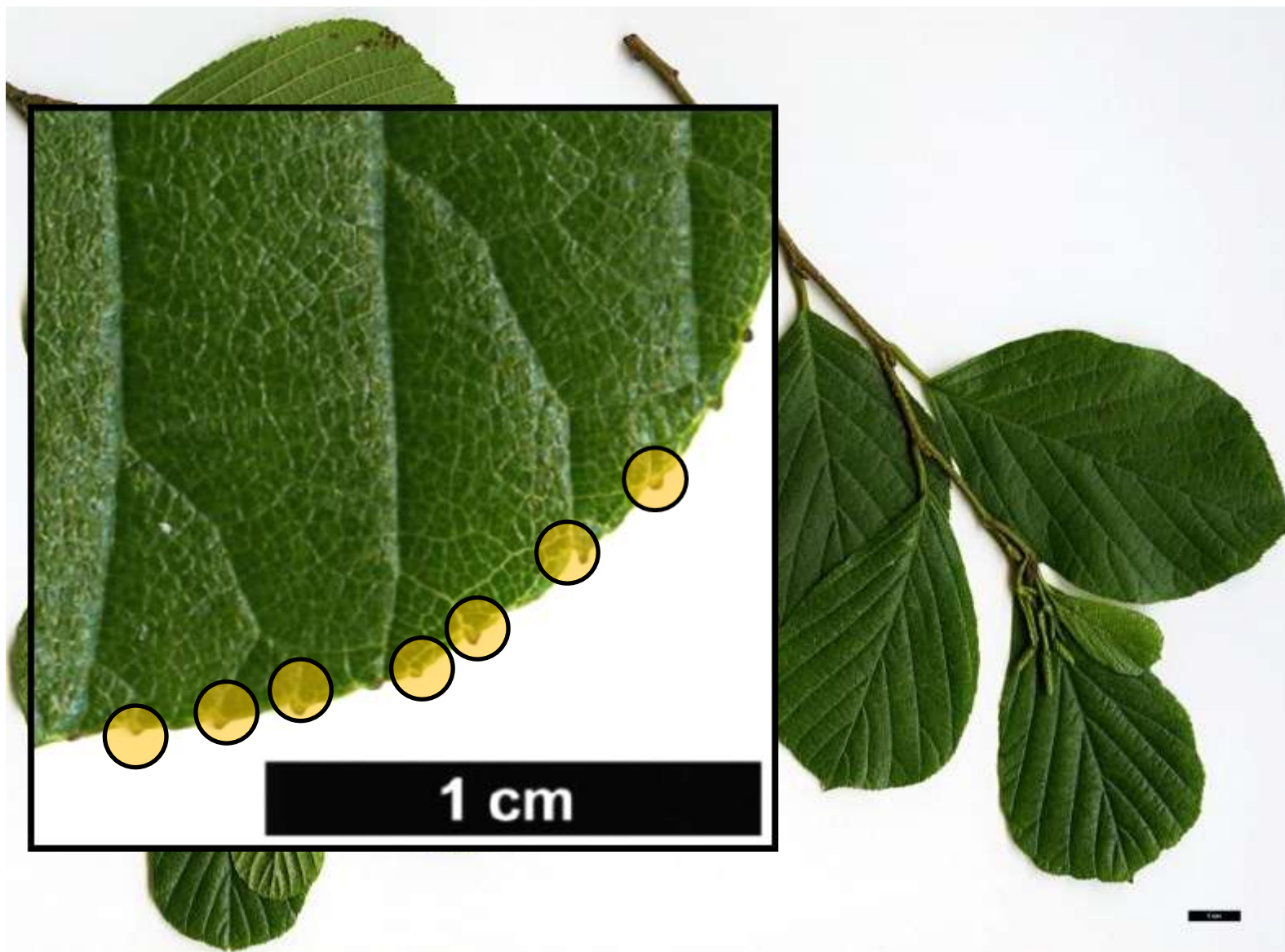
5-10
veins/side

apex
obtuse
to
acute

E Canada to C & E USA

A. serrulata

Group E



**5-10
veins/side**

**apex
obtuse
to
acute**

**apical half
1-5
secondary
teeth**

E Canada to C & E USA

A. serrulata

Group E

lamina elliptic to obovate



5-10
veins/side

apex
obtuse
to
acute

apical half
1-5
secondary
teeth



E Canada to C & E USA

A. serrulatoides

Group E



5-10
veins/side

apex
obtuse
to
acute

apical half
1-5
secondary
teeth



Japan (S. Honshu, Shikoku)

A. serrulatooides

Group E

similar but stipules long persistent



5-10
veins/side

apex
obtuse
to
acute

apical half
1-5
secondary
teeth



Japan (S. Honshu, Shikoku)

A. orientalis

Group E



5-10
veins/side

apex
obtuse
to
acute

apical half
0-1(-2)
secondary
teeth

Cyprus, SE Turkey to Israel, N Iran

A. orientalis

Group E

vein axils
pubescent



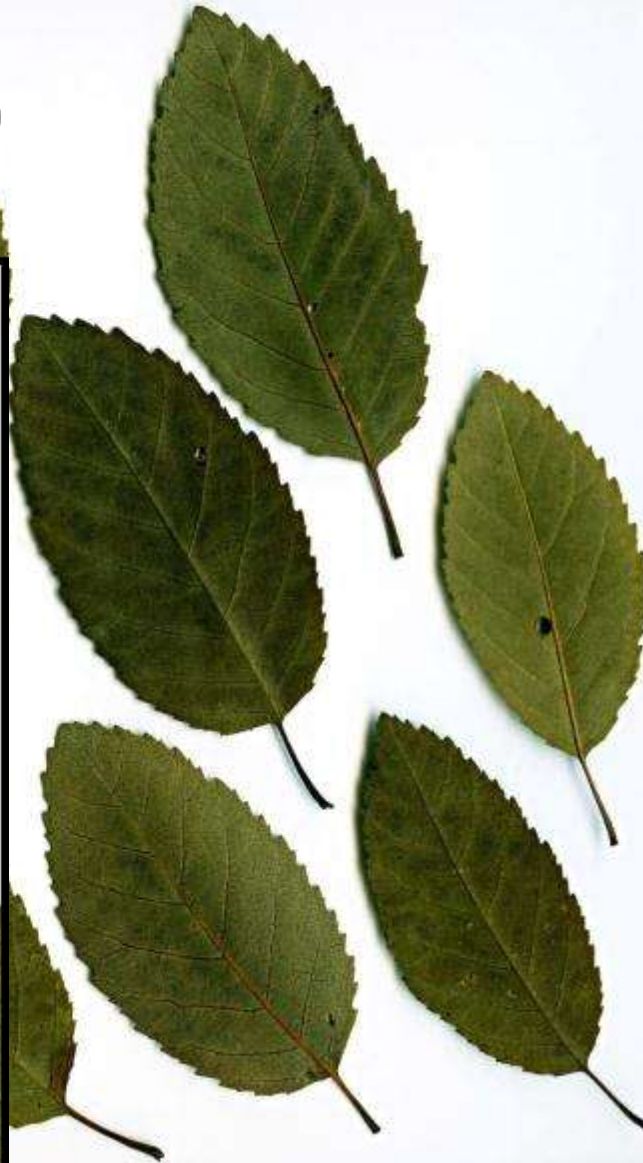
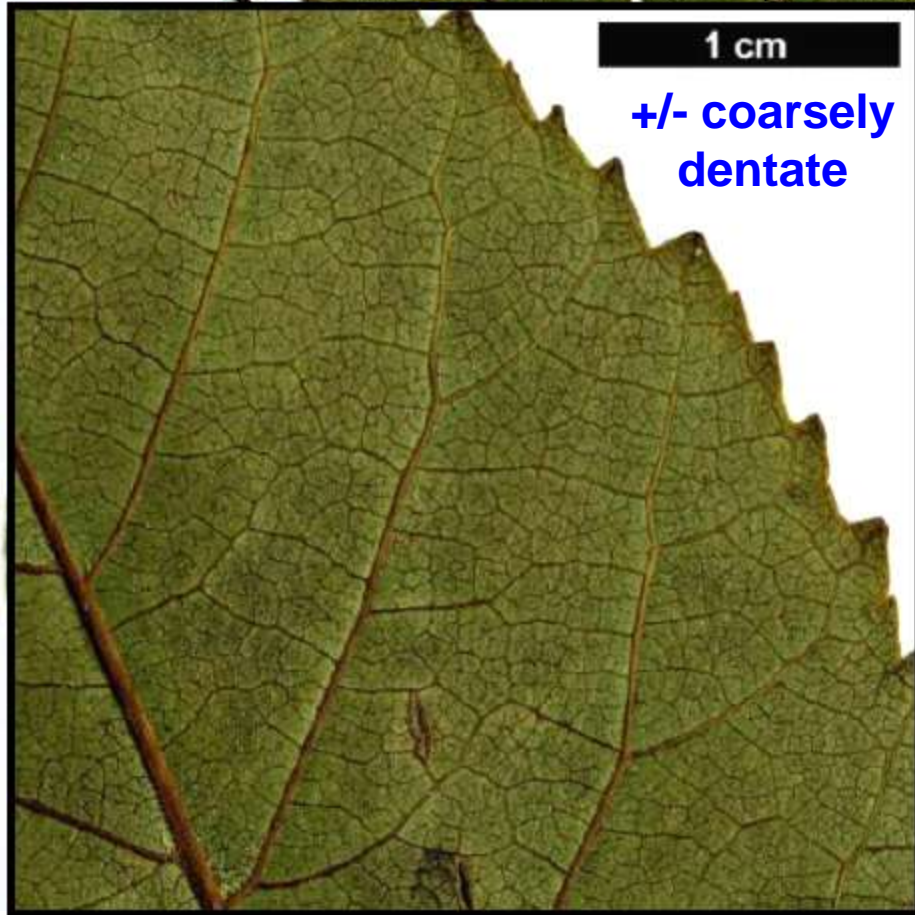
1 cm

+/- coarsely
dentate

5-10
veins/side

apex
obtuse
to
acute

apical half
0-1(-2)
secondary
teeth



Cyprus, SE Turkey to Israel, N Iran

A. maritima

Group E



5-10
veins/side

apex
obtuse
to
acute

apical half
0-1(-2)
secondary
teeth

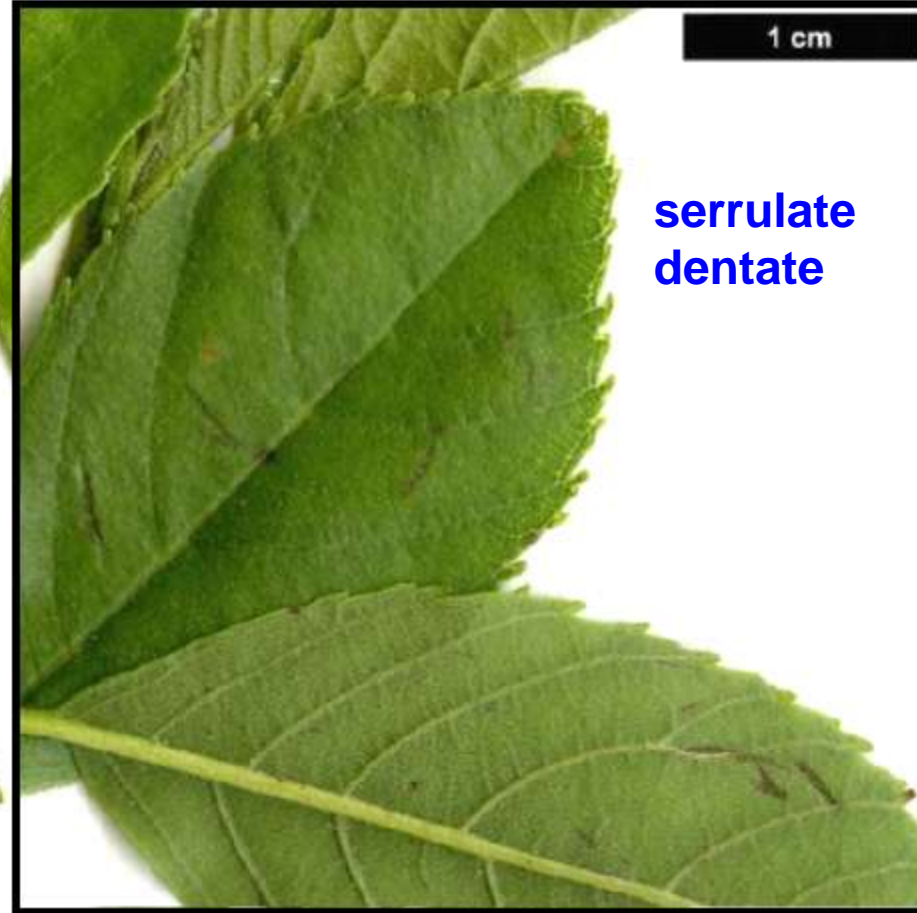
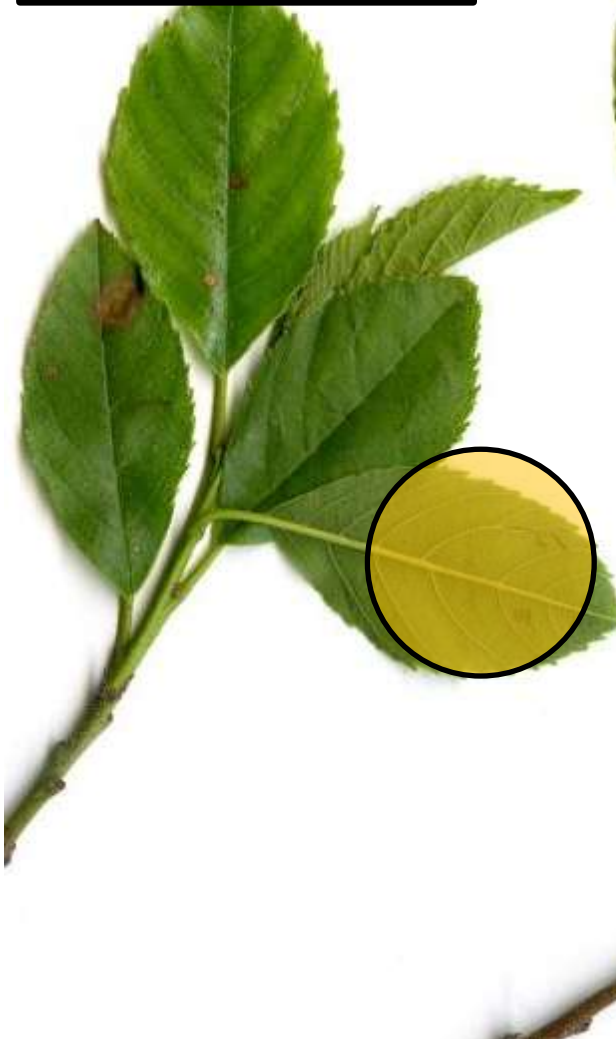


USA (Oklahoma, Georgia, Delaware, Maryland)

A. maritima

Group E

vein axils
glabrous



serrulate
dentate



5-10
veins/side

apex
obtuse
to
acute

apical half
0-1(-2)
secondary
teeth

USA (Oklahoma, Georgia, Delaware, Maryland)

A. jorullensis

Group E



5-10
veins/side

apex acute
or acute
to
acuminate

apical half
0-1(-2)
secondary
teeth

Mexico to Honduras

A. jorullensis

Group E

dentate to lobulate

1 cm

1 cm

5-10
veins/side

apex acute
or acute
to
acuminate

apical half
0-1(-2)
secondary
teeth

Mexico to Honduras

A. japonica

Group E



5-10
veins/side

apex acute
or acute
to
acuminate

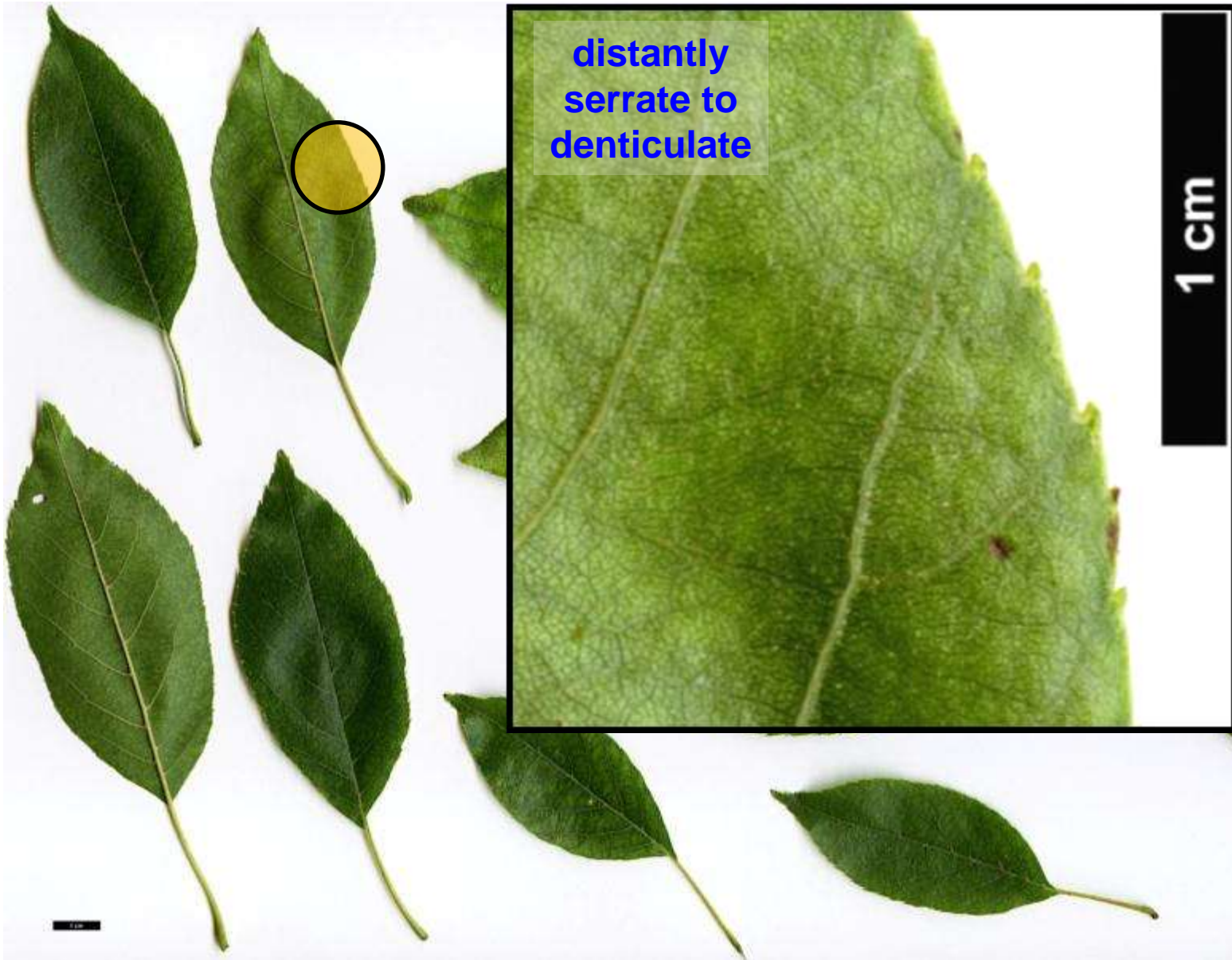
apical half
0-1(-2)
secondary
teeth



S Russian Far East to E China, Korea, Japan, Taiwan

A. japonica

Group E



distantly
serrate to
denticulate

1 cm



5-10
veins/side

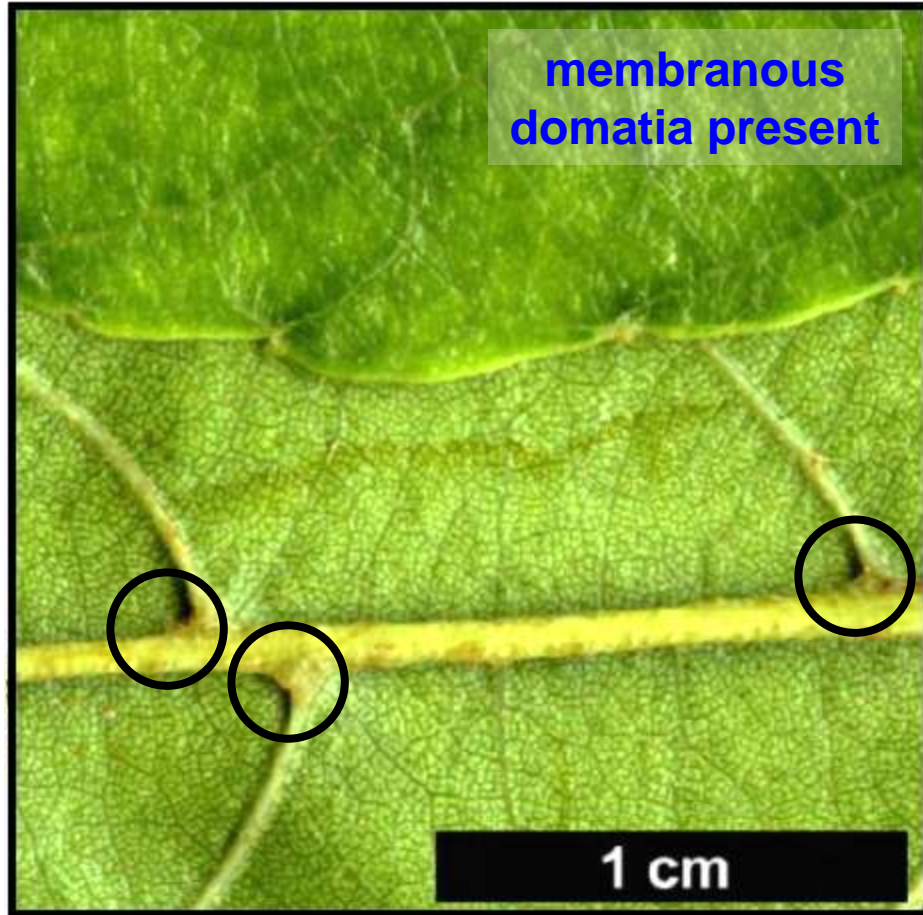
apex acute
or acute
to
acuminate

apical half
0-1(-2)
secondary
teeth

S Russian Far East to E China, Korea, Japan, Taiwan

A. japonica

Group E



5-10
veins/side

apex acute
or acute
to
acuminate

apical half
0-1(-2)
secondary
teeth



S Russian Far East to E China, Korea, Japan, Taiwan

A. henryi



Group E



5-10
veins/side

apex acute
or acute
to
acuminate

apical half
0-1(-2)
secondary
teeth

Taiwan

A. henryi

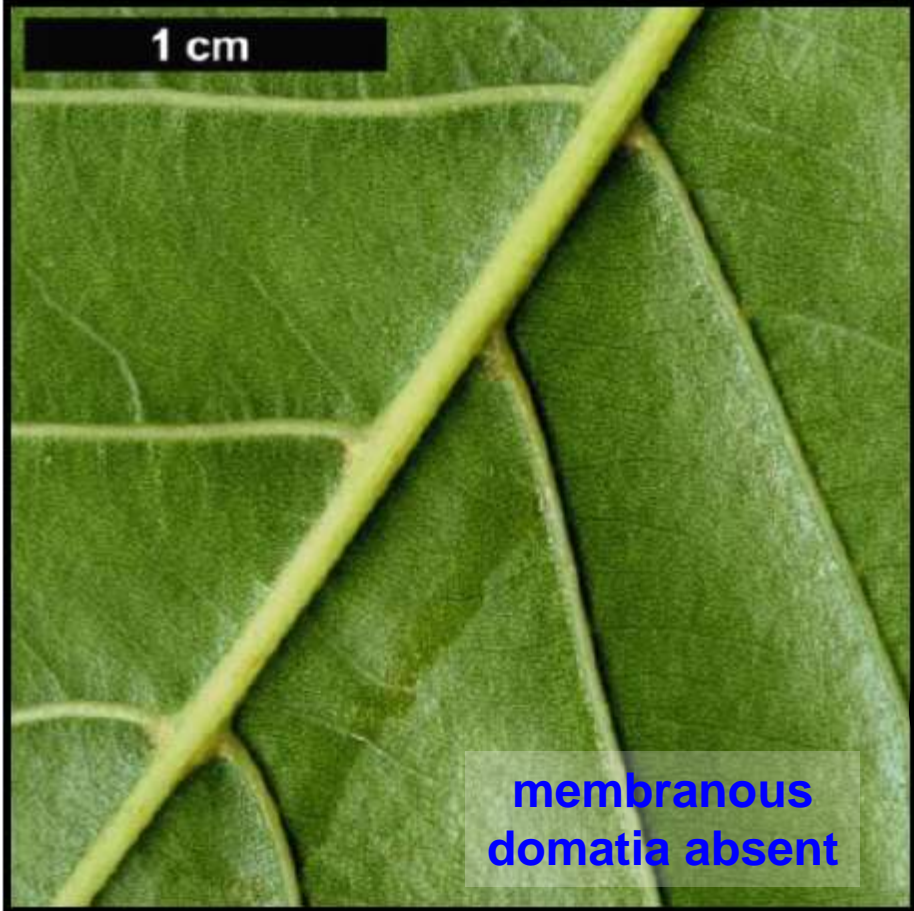
Group E



5-10
veins/side

apex acute
or acute
to
acuminate

apical half
0-1(-2)
secondary
teeth



membranous
domatia absent



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**Arboretum Wespelaar
Ghent University Botanical Garden**

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