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EVALUATION OF THE DESCRIPTIVE CHARACTERISTICS OF CHESTNUT

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- Many cultivars have been developed with selection and hybridization studies conducted with different aims such as nut or timber quality, yield, resistance to different disease or pests.
- Registration of new cultivars based on their uniformity, unique traits and stability (DUS) still need to be proven.
- For this aim, morphological characteristics of the genetic material should be determined.

- There are many morphological characteristics that can be used for identifying cultivar candidates.
- However, only the most reliable characteristics should be used for this purpose.
- For this aim, generally International Union For The Protection Of New Varieties Of Plants (UPOV) criteria have been used.
- However, UPOV needs to update their criteria.
- In this presentation, I will talk about descriptive morphological characteristics of chestnut.

TREE AND SHOOT CHARACTERISTICS

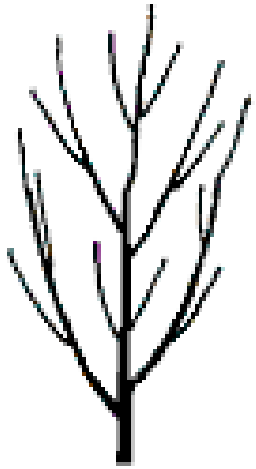
Observations should be made in the dormant season.

- Tree vigour (weak, medium, strong)

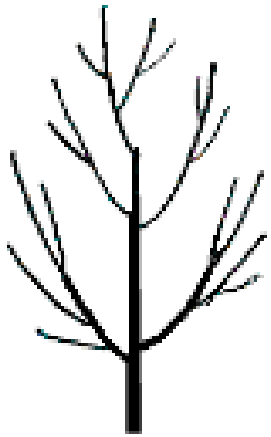
The vigor of the tree should be considered as the overall abundance of vegetative growth.

TREE AND SHOOT CHARACTERISTICS

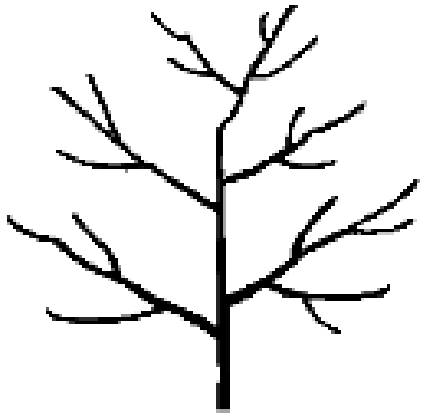
- Growth habit



upright



semi-upright



spreading

By observing the shape of whole tree, ratio of tree height to width, angle of branching and direction of shoot elongation after leaf fall.

TREE AND SHOOT CHARACTERISTICS

- Density of shoots

low

medium

high

TREE AND SHOOT CHARACTERISTICS

- Colour of shoots

grayish yellow, yellow, yellowish brown, light brown, brown, reddish brown

Average colour of sunny side of shoots is evaluated in winter.

TREE AND SHOOT CHARACTERISTICS

- Hairs on shoots

absent, sparse, dense

It is observed on current shoots in winter.

TREE AND SHOOT CHARACTERISTICS

- Thickness of lateral shoots (mm)

thin, medium, thick

Average diameter of lateral shoots with burrs is measured in the middle part .

TREE AND SHOOT CHARACTERISTICS

- Length of internodes of lateral shoots (mm)

short, medium, long

Average length of internodes at the middle part of lateral shoots with burrs are measured in the winter.

TREE AND SHOOT CHARACTERISTICS

- Lenticel density of lateral shoots (n° per cm^2)

sparse

medium

dense

- It is determined at a certain area on 3rd-5th internodes of well-developed lateral shoots without burrs in the winter.
- It is calculated based on number of lenticels per cm2.

TREE AND SHOOT CHARACTERISTICS

- Shape of mixed buds or (ratio of width to length of bud)

acute-conic

globuse-conic

broad

- It is determined based on the ratio of width to length of bud.
- Observing is made on the middle part of lateral shoots with burrs in the winter.

TREE AND SHOOT CHARACTERISTICS

- Colour of mixed buds

greenish-red, reddish-green, dark-green, green

It is determined on the middle part of sunny side of lateral shoots with burrs in the winter.

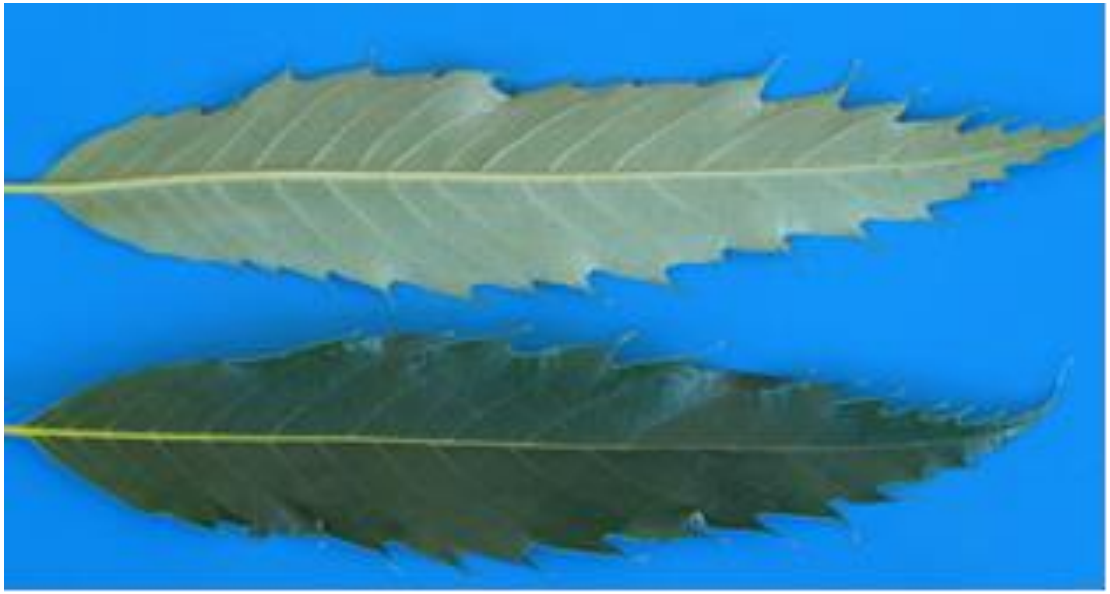
TREE AND SHOOT CHARACTERISTICS

Unreliable characteristics

- Length of lateral shoots

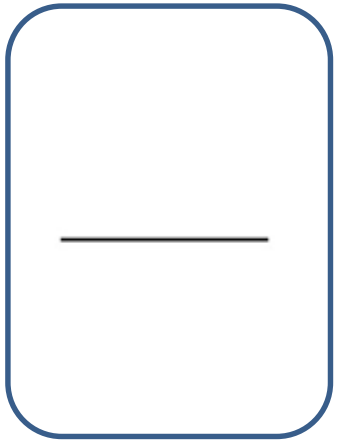
LEAF CHARACTERISTICS

- Observations should be made on fully developed leaves.
- Leaf samples should be taken from bearing shoots.

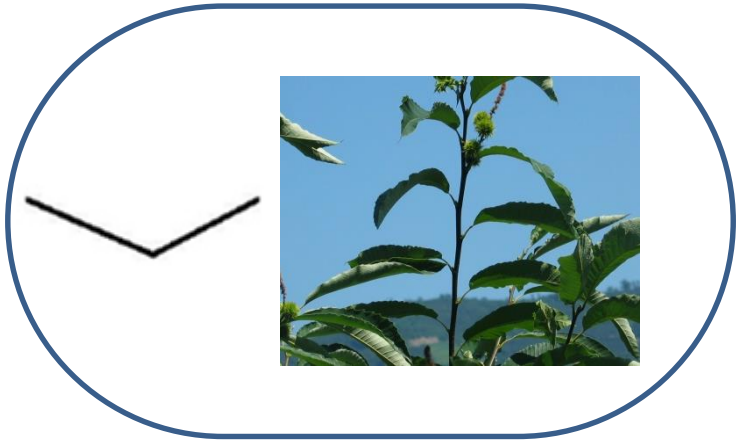


LEAF CHARACTERISTICS

- Leaf: profile in cross section



straight



slightly concave

strongly concave

LEAF CHARACTERISTICS

- Green colour of upper side at leaf lamina

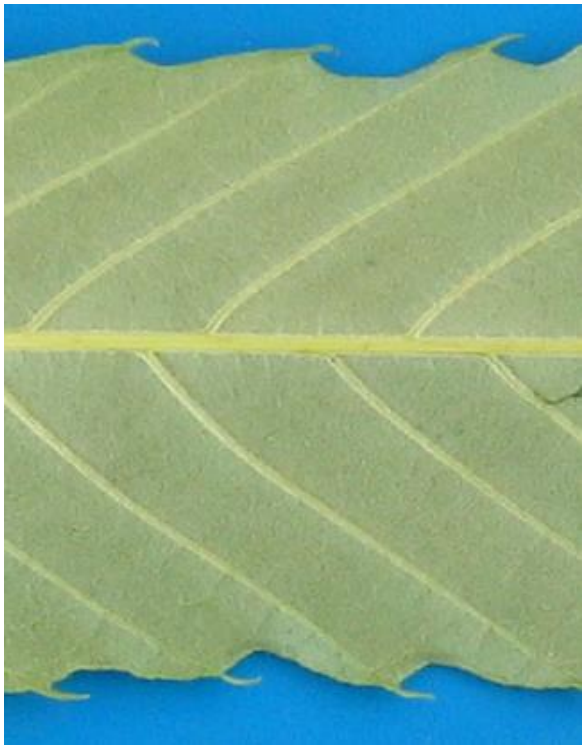
dark

medium

light

LEAF CHARACTERISTICS

- Leaf: color of lower side
- Hairs on lower part of leaves



whitish

light green

LEAF CHARACTERISTICS

- Leaf: shape of apex
- Shape of lamina tip

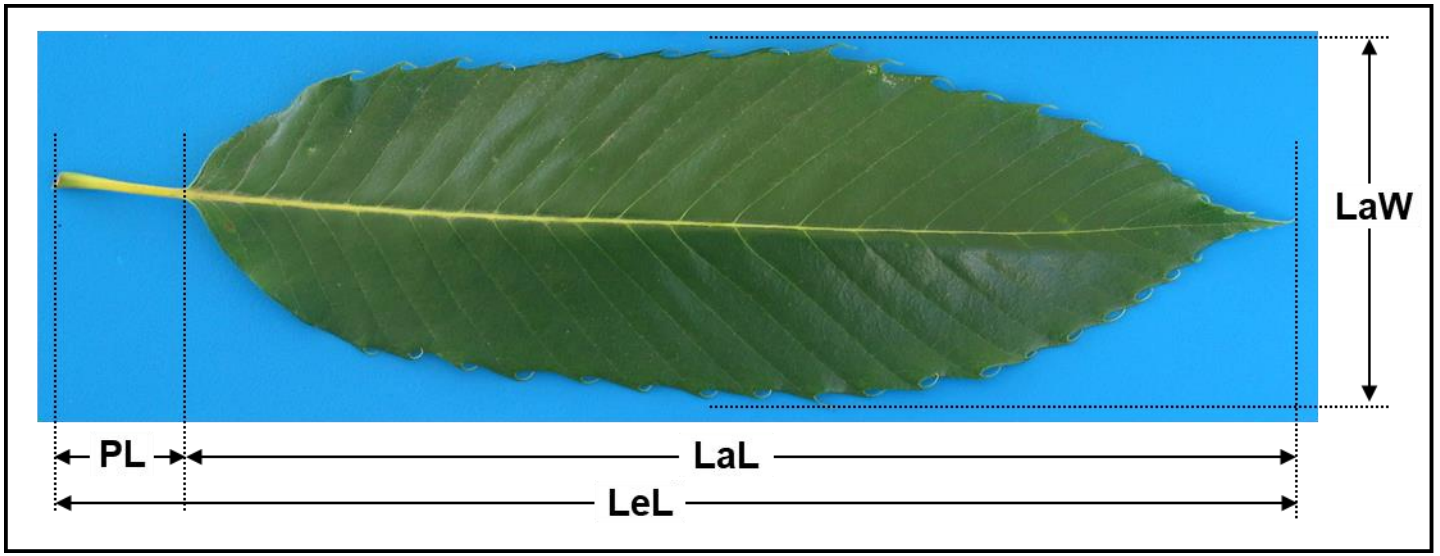
narrow acuminate

broad acuminate

acute

LEAF CHARACTERISTICS

- Leaf: size (small, medium, large)



- The lamina length (cm) is measured from the tip of the leaf to the point of petiole intersection.
- Leaf width is measured in the middle of the leaf lamina length.
- Leaf area is calculated according to leaf area (LA) estimation model of LA = 3.36 + 0.11L2- 0.26L2/W2+ 1.1W2(Serdar and Demirsoy, 2006). LA is the leaf area, W is the leaf width and L is the leaf blade length.

LEAF CHARACTERISTICS

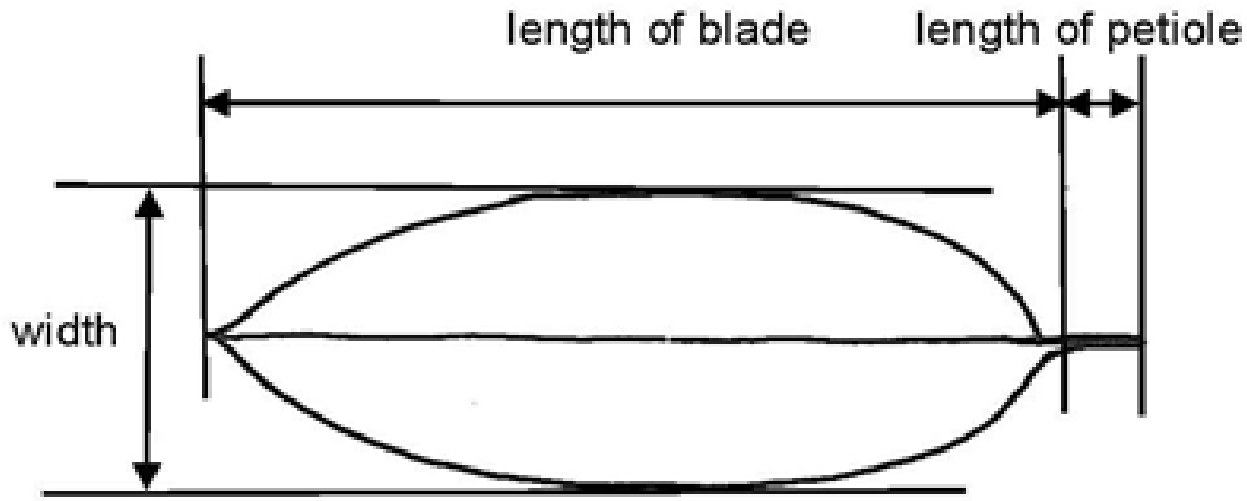
- Leaf: color of petiole

yellow

green

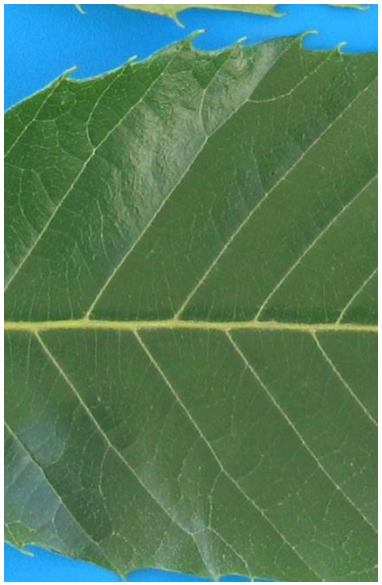
LEAF CHARACTERISTICS

- Leaf: ratio length of leaf blade/length of petiole
- Ratio of lamina width/leaf length
- Ratio of lamina length to petiole length



LEAF CHARACTERISTICS

- Brightness of leaf upper side



very bright

bright

absent

LEAF CHARACTERISTICS

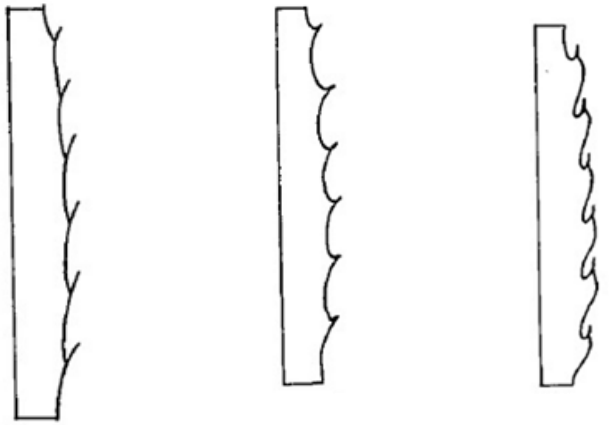
- Presence of leaf stipule at the end of August

absent

present

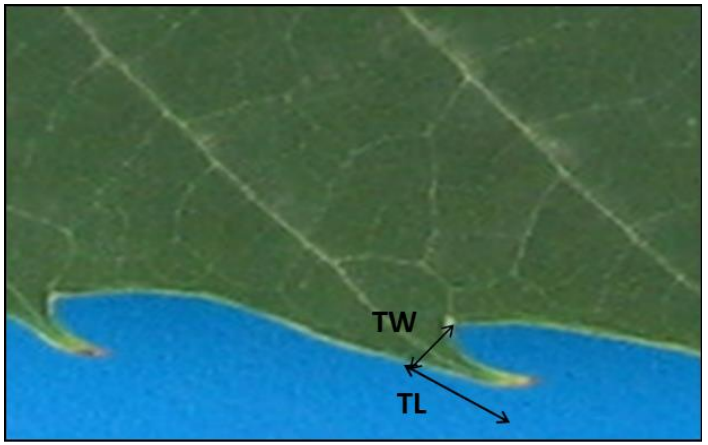
LEAF CHARACTERISTICS

- Shape of teeth



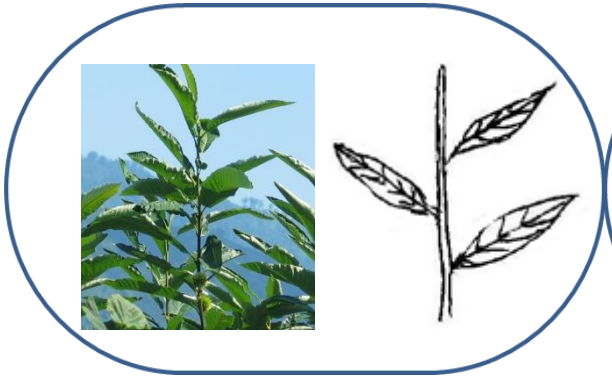
needle shape acute flare shape

- Ratio of width to length

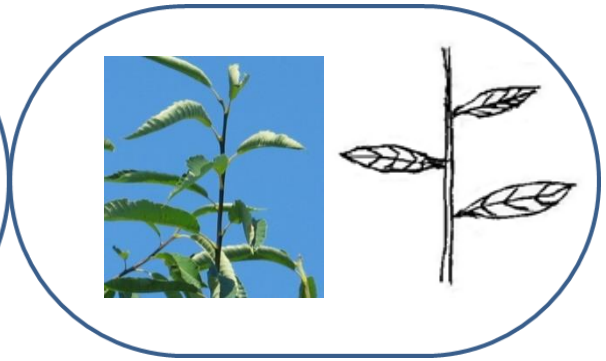


LEAF CHARACTERISTICS

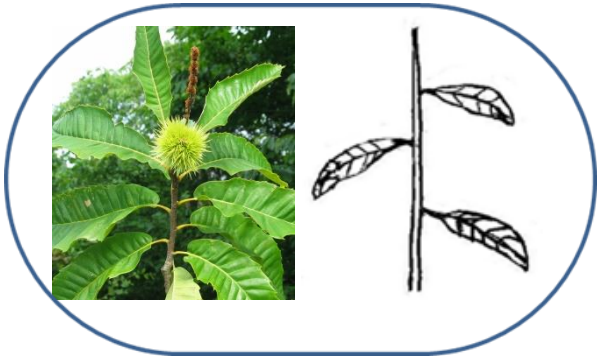
- Habit of leaf compared to shoot



upwards



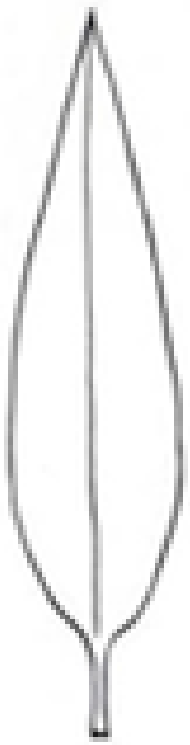
outwards



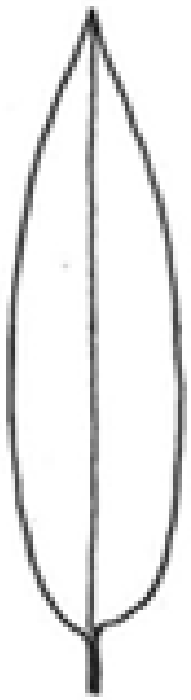
downwards

LEAF CHARACTERISTICS

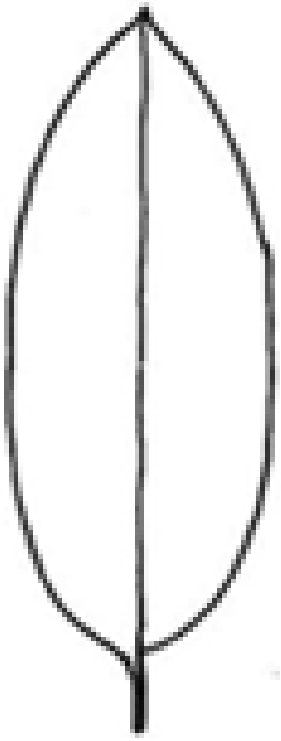
- Leaf: shape



lanceolate



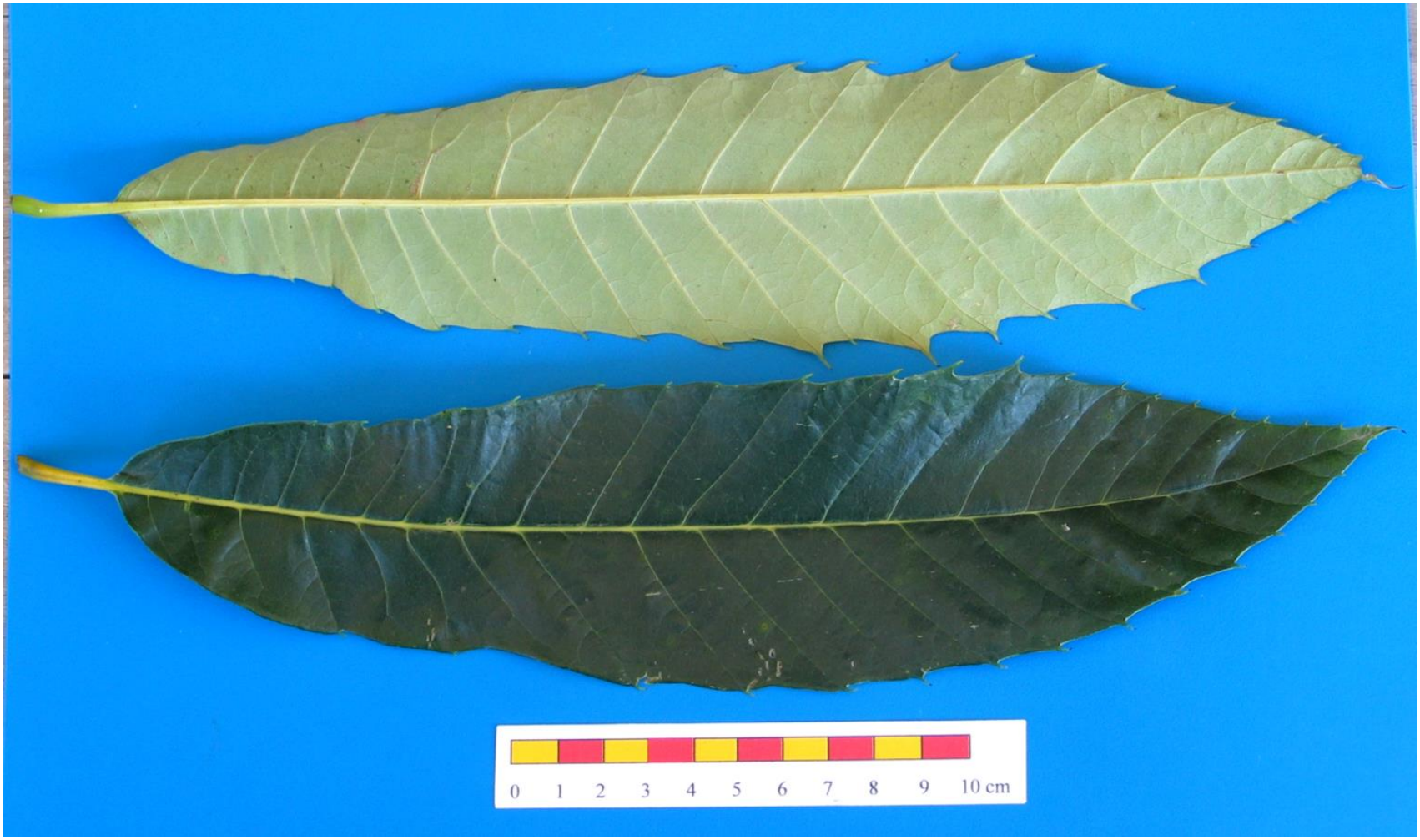
narrow elliptic



broad elliptic

LEAF CHARACTERISTICS

- Number of vein on left side of leaf



LEAF CHARACTERISTICS

- Phyllotaxis (arrangement of leaves on shoots)

1/2

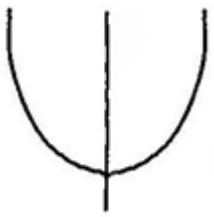
2/5

LEAF CHARACTERISTICS

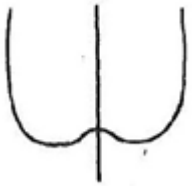
Unreliable characteristics

- Young leaf: bronze coloration
- Leaf: symmetry
- Petiole thickness
- Petiole length
- Symmetry of petiole
- Leaf: shape of base, shape of lamina base (acute, obtuse, cordate)

acute



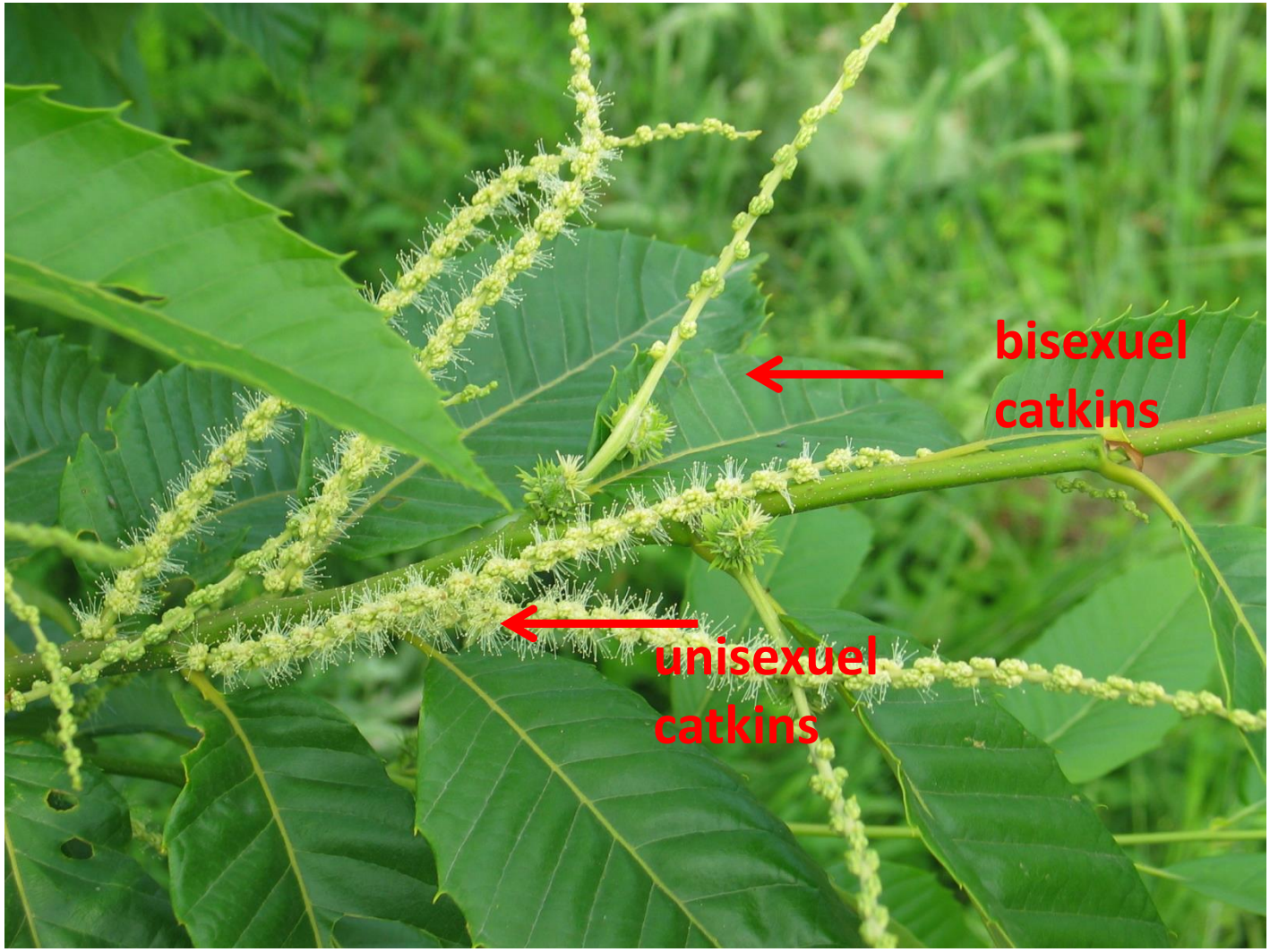
acute



cordate

FLOWER CHARACTERISTICS

Observations should be made at full flowering time.



FLOWER CHARACTERISTICS

- Habit of male catkin

upwards

outwards

ownwards

FLOWER CHARACTERISTICS

- Number of bisexual catkins per shoot.

few, medium, many

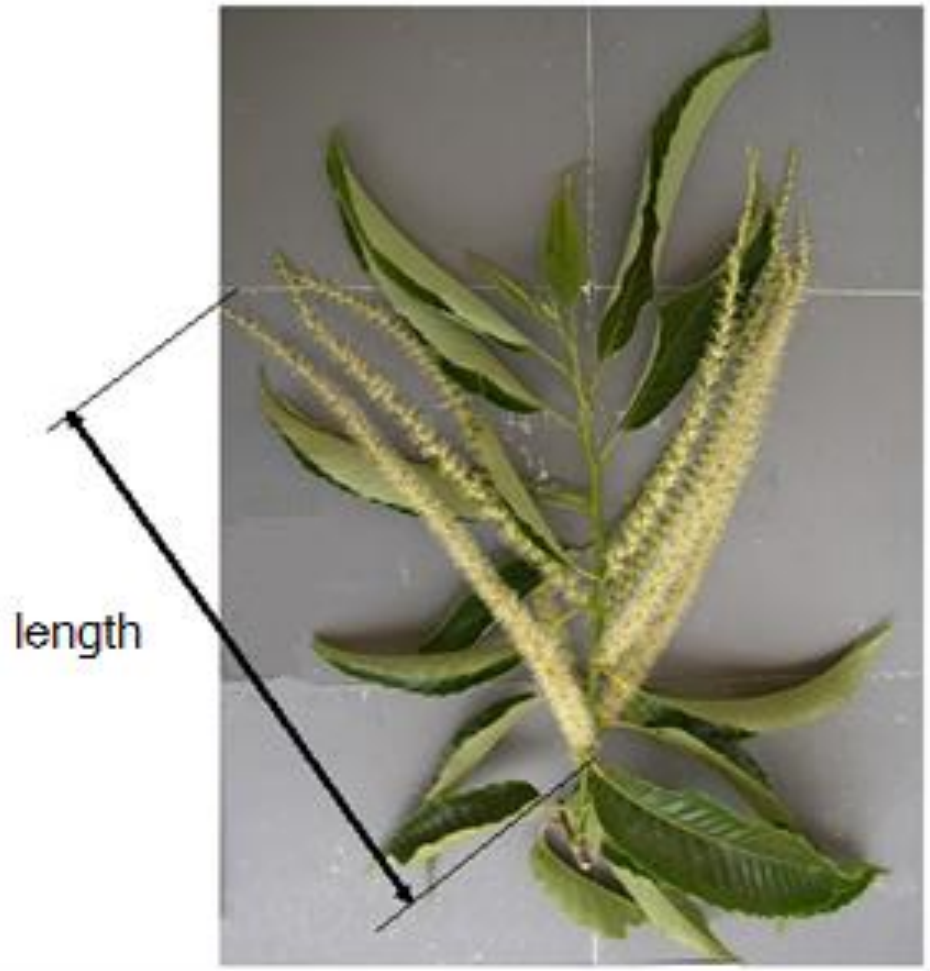
FLOWER CHARACTERISTICS

- Number of unisexual catkins per shoot.

UPOV doesn’t include this characteristics.

FLOWER CHARACTERISTICS

- Length of unisexual catkins



short

medium

long

FLOWER CHARACTERISTICS

- Length of bisexual catkins

short

medium

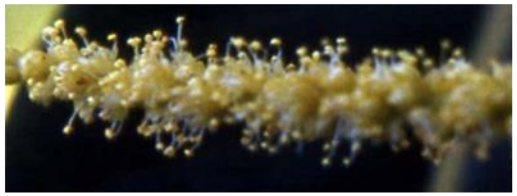
long

FLOWER CHARACTERISTICS

- Length of stamen filament in unisexuel catkins (mm)

Astamine (having no stamen)

Brachistamine
(having short stamens within the perigon) (1-3 mm)



Mesostamine
(having stamens as long as the perigon) (3-5 mm)

Longistamine
(having stamens longer than the perigon)
(5-7 mm)

Taken from Başak Müftüoğlu

BURR CHARACTERISTICS

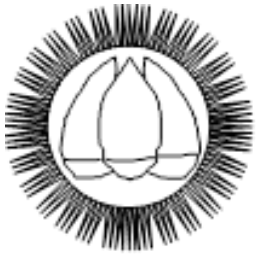
- Number of burrs per peduncle

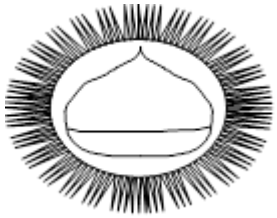
BURR CHARACTERISTICS

Burr: Observations on the burr should be made just before dehiscence.

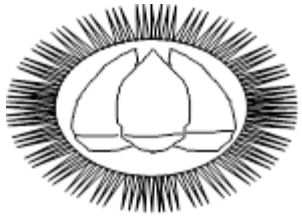
Burr: shape

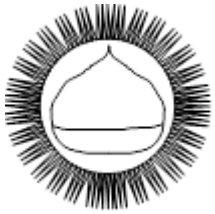
globose





obloid





transverse cylindric

BURR CHARACTERISTICS

- Length of burr peduncle
- Thickness of burr peduncle

BURR CHARACTERISTICS

- Density of spines (number. per cm^2)

Sampling is made at lateral sides of burs. Spine clusters are taken and counted. Data is converted to numbers of spines per cm2.

sparse (≤180), medium (181-242), dense (≥ 243)

BURR CHARACTERISTICS

- Spine length

NUT CHARACTERISTICS

- Observations on the nut should be made on nuts mature for consumption.
- In case of bur containing three nuts, the middle one should be disregarded.

NUT CHARACTERISTICS

- Number of nuts per burr

NUT CHARACTERISTICS

- Nut: embryony

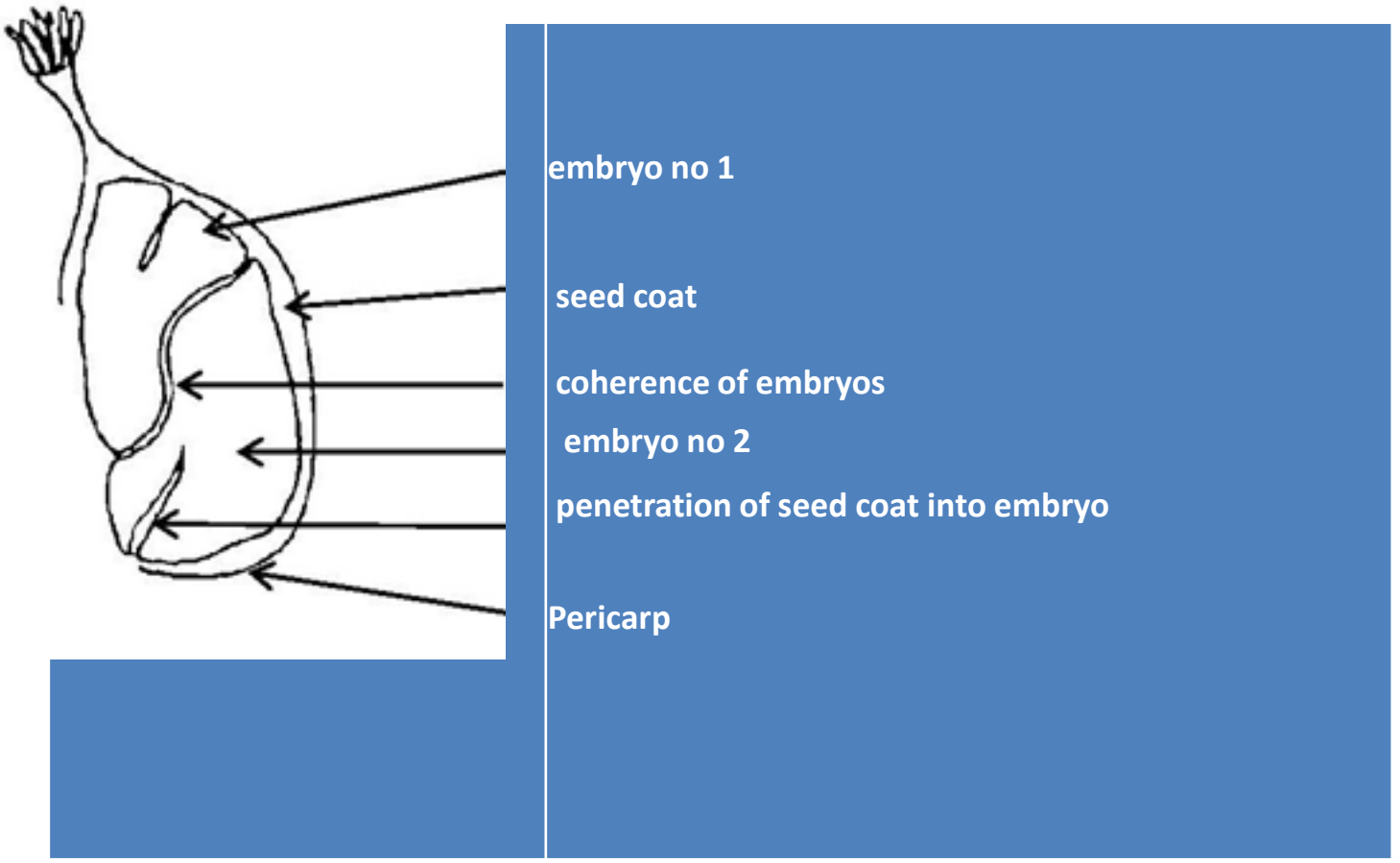
mono-embryonic

poly-embryonic

absent , low (1-4), intermediate (5-8), high (8-12), very high (≥ 12.1)

NUT CHARACTERISTICS

- Nut: degree of penetration of seed coat into embryo



NUT CHARACTERISTICS

- Nut: shape

globose

transverse ellipsoid

transverse broad ellipsoid

It is determined with calculating chestnut length/chestnut width x100.

- ovoid (<100),
- broad ovoid (101-109),
- globose (100),
- transverse ellipsoid (>120),
- transverse broad ellipsoid (110-120)

NUT CHARACTERISTICS

- Nut: area of hairs on upper part

low

medium

large

low (30 %), medium (30-50 %), large (50%)

NUT CHARACTERISTICS

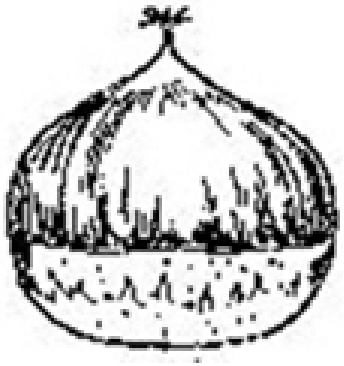
- The relative size of hilum in relation to nut

The relative size of hilum in relation to the hilum part of the fruit was determined by calculating the ratio of hilum length x hilum width to fruit length x fruit thickness.

small (≤ 0.59), intermediate (0.60-0.73), large (≥ 0.74)

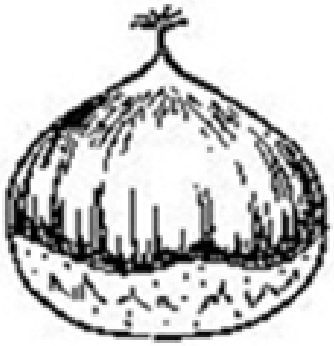
NUT CHARACTERISTICS

- Shape of border line of hilum



straight

curved



wavy

Attention to nuts!

The hilum shape is determined by dividing the hilum length to the hilum width.

elliptical broad (≤ 1.8), elliptical medium (1.9-2.1), elliptical long (≥ 2.2)

NUT CHARACTERISTICS

- Brightness of epicarp (immediately after opening of the bur)

NUT CHARACTERISTICS

- Colour of epicarp

It should be observed immediately after bur opening.

light brown

brown

dark brown

reddish brown

blackish brown

NUT CHARACTERISTICS

- Nut: size

- Size of the nut is determined based on average weight of the nut.
- It should be observed immediately after burr opening.
- It is calculated with dividing of fruit weight to 1000.

very small (≥121 nuts/kg), small (101-120 nuts/kg), medium (81-100 nuts/kg), big (61-80 nuts/kg), very big (≤ 60 nuts/kg)

NUT CHARACTERISTICS

- Peeling of testa

It should be observed after cold storage (at least two weeks) and on roasted nuts.

NUT CHARACTERISTICS

- Chestnuts with a split pericarp (%)

low (<15), medium (15-29.9), high (≥ 30)

NUT CHARACTERISTICS

- Nut stripes

absent

hard to see

easy to see

NUT CHARACTERISTICS

- Thickness of pericarp

thin, medium, thick

NUT CHARACTERISTICS

- Sweetness

poor, medium, good, tasteful

It should be observed after cold storage at least two weeks and roasted fruits.

NUT CHARACTERISTICS

- Colour of kernel:
  Outside ?
  Inside ?

white

whitish yellow

yellow

NUT CHARACTERISTICS

- Contrast of hilum to pericarp

I haven’t seen any cultivar whose hilum is not contrast to pericarp.

NUT CHARACTERISTICS

Unreliable characteristics

- Kernel inner cavity in mono-embryonic varieties.
- Coherence of embryos in poly-embryonic cultivars.

PHENOLOGICAL CHARACTERISTICS

- Time of leaf bud burst

very early
early
medium
late
very late

The time of leaf bud burst is when 20% of buds show green color at the top of the bud.

PHENOLOGICAL CHARACTERISTICS

- Time of blooming

very early
early
medium
late
very late

The time of male flowering is when 50% of the flowers are fully open.

PHENOLOGICAL CHARACTERISTICS

- Time of ripening

very early
early
medium
late
very late

The time of maturity for consumption is when 50% of the nuts are harvested.

Thank you for attentions…

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