

Deliverable on D5.2.1

Harmonized protocol for evaluation of plus trees of keystone riparian tree species in the field (Oak, Ash, Alder, Poplar, Elm)

Selection priorities of keystone riparian tree species:

- Conservation
- Economic value
- Resistance/tolerance

Species	Conservation	Economic value	Resistance/tolerance
<i>Quercus robur</i> L.	2	1	
<i>Fraxinus angustifolia</i> Vahl.			1
<i>Populus nigra</i> L.	1	2	3
<i>Ulmus minor</i> Mill.	2	3	1
<i>Alnus glutinosa</i> Gaertn.	3	1	2
<i>Ulmus leavis</i> Pall.	2	3	1
<i>Fraxinus excelsior</i> L.			1

Legend:

1 – most important priority

2 – important priority

3 – less important priority

* there is no need to define species with all three priorities

Quercus robur L. – Pedunculate oak

Forest stands:

- ➔ older
- ➔ most productive

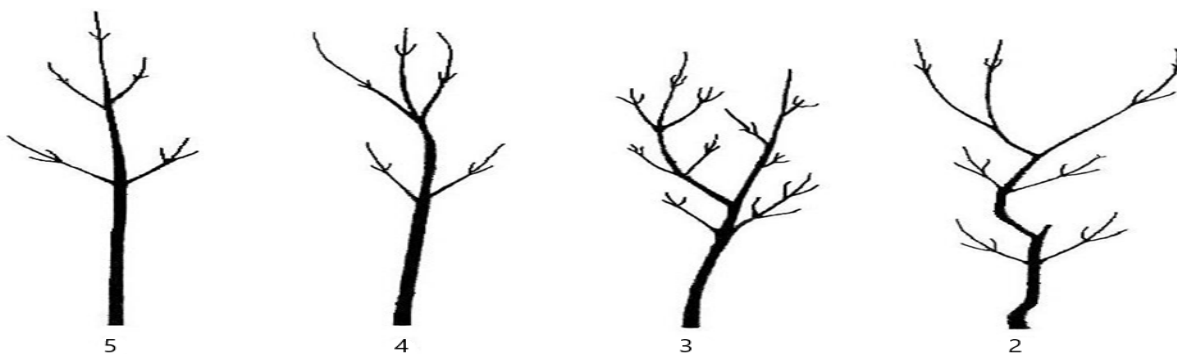
Comparative trees – used for objective comparison with candidates

- 4-6 neighboring **dominant** trees

Target phenotypic traits:

1. Stem form
2. Crown form
3. Stem taper
4. Grain straightness
5. Health condition

Stem form quality (2-5)



Grade	Description
5	Excellent. Straight stem, apical domination, without strong competitive branches in the top.
4	Good. Weaker apical domination and/or single curved stem.
3	Less good. Bad apical domination and/or more than one stem curve. Fork in upper 2/3 of the tree height.
2	Bad. Very weak apical domination, more than two curves. Low fork (below 2/3 of the tree height) or multiple forks.

Crown form quality (2-5)

Grade	Description
5	Excellent. Relatively thin branches with flat insertion angle ($>60^\circ$). Fairly symmetrical crown.
4	Good. No more than one thick branch and/or smaller insertion angle ($45-60^\circ$); Less fairly symmetrical.
3	Less good. More than one thick branches. Acute insertion angle ($<45^\circ$). Asymmetrical and/or not properly developed.
2	Bad. Multiple forks, acute branch insertion angle. Weakly developed and/or extremely asymmetrical

Stem taper

Grade	Description
5	Excellent. Very low degree of taper. (very small decrease of diameter as a function of stem height)
3	Good. Moderate degree of taper.
1	Bad. High degree of taper.

Grain spiraling

Grade	Description
5	No bark twisting.
1	Visible bark twisting.

Health condition

Grade	Description
5	Completely healthy tree without any visible symptoms.
1	Unhealthy. Visible symptoms such as cankers, many epicormics, stem cracks, less foliage etc.

Low grades for health condition and grain spiraling are eliminatory!!!

Fraxinus angustifolia Vahl. – Narrow-leaved ash

- Healthy tree/Resistant tree
- Defoliation under 30%



e.g. Pictures of defoliation on *Fraxinus excelsior* L. (During project pictures of *Fraxinus angustifolia* Vahl. will be made)

Source: Sanasilva Tree Crown Photos with percentage of foliage loss; Swiss Federal Institute for Forest, Snow and Landscape Research CH-8903 Birmensdorf; 2nd Revised and extended; Edition 1990

- Phenotypic traits are additional (see for *Q. robur* L.)

Populus nigra L. – black poplar

- Older than 70 years (approx.)

Additional:

- Straight
- Wood production quality
- Health condition

Alnus glutiosa Gaertn. – black alder

Forest stands:

- ➔ older
- ➔ most productive

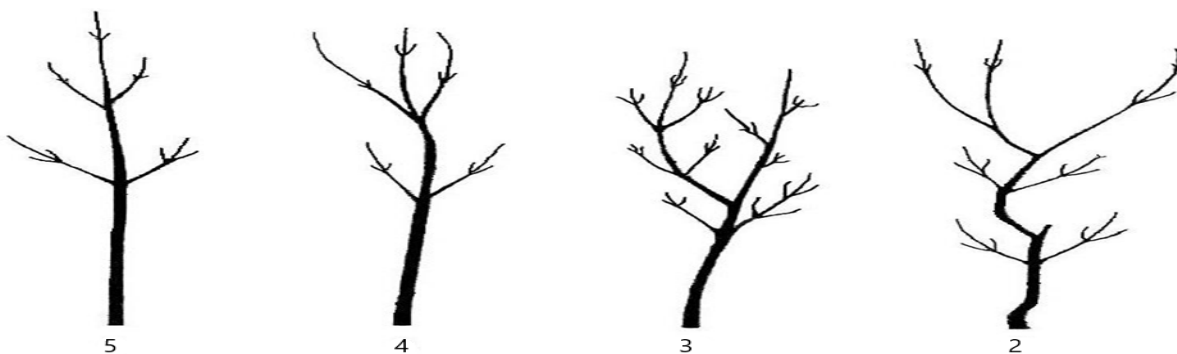
Comparative trees – used for objective comparison with candidates

- 4-6 neighboring **dominant** trees

Target phenotypic traits:

1. Stem form
2. Crown form
3. Grain straightness
4. Health condition

Stem form quality (2-5)



Grade	Description
5	Excellent. Straight stem, apical domination, without strong competitive branches in the top.
4	Good. Weaker apical domination and/or single curved stem.
3	Less good. Bad apical domination and/or more than one stem curve. Fork in upper 2/3 of the tree height.
2	Bad. Very weak apical domination, more than two curves. Low fork (below 2/3 of the tree height) or multiple forks.

Crown form quality (2-5)

Grade	Description
5	Excellent. Relatively thin branches with flat insertion angle ($>60^\circ$). Fairly symmetrical crown.
4	Good. No more than one thick branch and/or smaller insertion angle ($45-60^\circ$); Less fairly symmetrical.
3	Less good. More than one thick branches. Acute insertion angle ($<45^\circ$). Asymmetrical and/or not properly developed.
2	Bad. Multiple forks, acute branch insertion angle. Weakly developed and/or extremely asymmetrical

Grain spiraling

Grade	Description
5	No bark twisting.
1	Visible bark twisting.

Health condition

Grade	Description
5	Completely healthy tree without any visible symptoms.
1	Unhealthy. Visible symptoms such as cankers, many epicormics, stem cracks, less foliage etc

Low grades for health condition and grain spiraling are eliminatory!!!

Additional:

- Genotype representative

Ulmus minor L. – field elm

- Healthy tree/Resistant tree
- Old tree