

Leaf description

- **morphology:**
organisation: simple; **petiole:** leaves long-petiolate; **shape:** lamina usually > 100 mm long, shape often slender obovate to more rarely ovate, lobed; **leaf base:** base angle acute, base shape convex to concavo-convex at the transition to the petiole, sometimes asymmetrical, base often narrow; **leaf apex:** apex angle acute, apex shape straight to acuminate; **margin:** lobes more or less deeply incising the lamina (often termed teeth), curved upwards, basal side of lobes convex or straight, apical side convex, sometimes slightly concave or straight, sinus usually rounded, tooth apex acute to somewhat acuminate; **1°-vein framework:** pinnate; **2°-vein framework:** craspedodromous, midvein straight, secondaries not dense, in large leaves originating in up to 15 mm distances and angles of about 40–60°, alternately from the main vein, running slightly diverging among each other across the lamina, terminating in the lobe apices; **3°-vein framework:** percurrent, fourth order veins reticulate still distinct from the reticulate pattern of the higher order veins.
 - **cuticle:**
hypostomatic; adaxial and abaxial cuticle delicate; **adaxial cuticle:** anticlines straight, cell outlines isodiametric, 10–40 µm across; simple trichome bases with thickened anticlines, single, one-celled, filiform trichomes rarely attached; **abaxial cuticle:** stomatal complexes anomocytic to cyclocytic, stomata slender ovate to suborbicular, 15–21 µm long, 11–15 µm wide; front cavity narrow elliptic, with conspicuous ledges; three types of trichomes: (1) trichome bases as described for the adaxial cuticle, 8–12 µm in diameter, trichomes thin-walled, 40–60 µm long; (2) thick-walled bases with two to four unicellular, long trichomes attached (stellate trichomes), fused at the base only, trichomes 30–70 µm long; (3) trichome bases with unthickened anticlines, 5–10 µm in diameter, deriving from uniserial, pluricellular, glandular trichomes; trichome length about 25 µm.
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Paleecology

- **habitat:** alluvial and mesophytic forests
 - **vegetation type:** broad-leaved deciduous forests, mixed broad-leaved forests to sclerophyllous forests
 - **life form:** tree
 - **foliage persistence:** deciduous leaves
 - **flower ecology (pollination):** wind-pollinated (anemophilous)
 - **fruit ecology (dispersal):** animal-dispersed (zoochorous)
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Stratigraphy / Distribution

- **stratigraphy:** Lower Middle Miocene to Pliocene
 - **distribution:** *Quercus pseudocastanea* appears in eastern Europe (Ukraine) in the early middle Miocene and is abundant in Europe during the late Miocene and Pliocene.
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Miscellaneous

- **synonyms:** –

- **modern relationship:** The modern relationship within *Quercus* is not satisfyingly resolved. Likely is a close relationship within Section *Cerris*.
- **remarks:** In the descriptions of such leaves the lobes are often treated as teeth. The differentiation between teeth and lobes is to some degree subjective because it depends on the size of the incisions. Leaves with this type of lobation/dentation are often summarised as “roburoid” oaks because the resolution to the species-level is difficult (see Kvaček et al. 2002). Cuticle features may be helpful but often are not available. Cupules of *Q. microcerrisaecarpa* KOLAKOVSKY may stem from the same oak species (Walther & Zastawniak 1991).

20 macroscopic leaf traits are stored in *Digiphyll*

#	trait code	trait: charcters state
1	A-1.2	petiole: present
2	A-1.2.2	petiole, present: long
3	A-2.1	leaf organisation: simple
4	A-3.2	leaf shape: obovate
5	A-3.3	leaf shape: ovate
6	A-3.6	leaf shape: lobed
7	A-3.6.1	leaf shape, lobed: pinnately lobed
8	A-4.1	leaf base angle: acute
9	A-5.1	leaf base shape: without basal extension
10	A-5.1.4	leaf base shape, without basal extension: concavo-convex
11	A-6.1	leaf apex angle: acute
12	A-7.1	leaf apex shape: attenuate (straight)
13	A-7.2	leaf apex shape: acuminate
14	A-8.1	leaf margin: untoothed
15	B-1.1	primary vein framework: pinnate
16	B-2.1	secondary vein framework: 2°-veins reach margin
17	B-2.1.1	secondary vein framework, 2°-veins reach margin: craspedodromous
18	B-3.2	intramarginal vein: absent
19	B-4.2	intersecondaries: absent
20	B-5.1	tertiary vein framework: percurrent

For a detailed description of the leaf traits see menu *Manuals*.

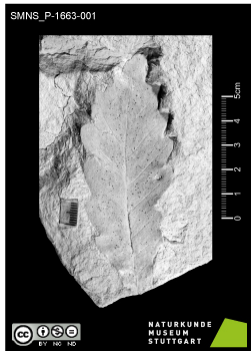
18 microscopic leaf traits are stored in *Digiphyll*

#	trait code	trait: charcters state
1	C-1.1	adaxial cuticle, thickness: delicate
2	C-3.1	adaxial cuticle, anticline-course: straight
3	C-6.2	adaxial cuticle, trichome: present
4	C-6.2.1	adaxial cuticle, trichome, present: single
5	C-6.2.3	adaxial cuticle, trichome, present: one-celled
6	C-10.1	adaxial cuticle, trichome base, foot: one-celled
7	E-1.1	abaxial cuticle, thickness: delicate
8	E-6.2	abaxial cuticle, trichome: present
9	E-6.2.1	abaxial cuticle, trichome, present: single
10	E-6.2.2	abaxial cuticle, trichome, present: in tufts

#	trait code	trait: charcters state
11	E-6.2.3	abaxial cuticle, trichome, present: one-celled
12	E-6.2.4	abaxial cuticle, trichome, present: pluri- or multicellular
13	E-8.2	abaxial cuticle, trichome base cells: modified
14	E-8.2.1	abaxial cuticle, trichome base cells, modified: thickened
15	E-14.1	abaxial cuticle, stomatal complex type: anomocytic
16	E-14.3	abaxial cuticle, stomatal complex type: cyclocytic
17	E-20.2	abaxial cuticle, stomatal ledges: conspicuous
18	E-21.2	abaxial cuticle, front cavity: elliptic

For a detailed description of the leaf traits see menu *Manuals*.

Fossil images



References

- **Kovar-Eder J. (1988):** Obermiozäne (Pannone) Floren aus der Molassezone Österreichs. – *Beiträge zur Paläontologie von Österreich*, 14: 19-121.
- **Kovar-Eder J., Kern A. & Sun G. (2015):** Fagaceae from the plant assemblage of Badaogou, Jilin Province, China (late Pliocene) indicate post-Pliocene diversification of oaks. – *Palaeontographica*, Abt. B, 293: 9-55.
- **Kvaček Z., Velitzelos D. & Velitzelos E. (2002):** Late Miocene flora of Vegora, Macedonia, N-Greece. – *Korali Athens*: 175 p.
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