

*Liquidambar europaea* A. Braun 1836 (Altingiaceae)

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**Leaf description**

- **morphology:**  
**organisation:** simple; **petiole:** present, very long; **shape:** palmately lobed, mainly 5 or 3 lobes; lobes long and especially the lateral ones often slender, main lobes occasionally with single small lateral lobes in the apical part of the lamina; **leaf base:** base angle very wide obtuse to 180°, base shape truncate to slightly cordate to widely rounded; **leaf apex:** apex angle odd-lobed acute; apex shape straight to acuminate; **margin:** toothed, dentate; leaf teeth dense, regularly spaced, small, tooth apex rounded, glanduliferous, tooth sinus acute; **1°-vein framework:** palmate, basal actinodromous, depending on the number of lobes 3–5 veins; **2°-vein framework:** weak brochidodromous to semicraspedodromous, intersecondaries occurring occasionally; **3°-vein framework:** regular polygonal reticulate.
  - **cuticle:**  
adaxial and abaxial cuticle delicate, hypostomatic; **adaxial cuticle:** anticlines rather straight forming polygonal cell outlines, about 20–50 µm across, glabrous; **abaxial cuticle:** a bit more delicate than the adaxial one, anticlines more faint, a bit rounded to distantly undulate; stomatal complexes brachyparacytic, shape rectangular oblong, subsidiary cells narrow, stomata elliptic, 12–32 µm long (average about 18–22 µm) laterally overlapped by the subsidiaries, thickened, prominent; front cavity narrow spindle-shaped to slender oval, not reaching the poles, porus short, narrow; trichome bases restricted to the junctions of stronger veins, otherwise glabrous.
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**Paleecology**

- **habitat:** alluvial forests, riparian to mesophytic forests
  - **vegetation type:** mainly in mixed mesophytic to deciduous forests
  - **life form:** large tree
  - **foliage persistence:** deciduous leaves
  - **flower ecology (pollination):** insect pollinated (zoophilous)
  - **fruit ecology (dispersal):** wind-dispersed (anemochorous)
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**Stratigraphy / Distribution**

- **stratigraphy:** Lower Oligocene to Pliocene
  - **distribution:** *L. europaea* was wide-spread in Europe.
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**miscellaneous**

- **synonyms:** *Liquidambar europaeum* A. BR.
- **modern relationship:** Today, *Liquidambar* is strongly disjunct with *L. styraciflua* L. in N-America, *L. orientalis* MILL. in the eastern Mediterranean and two species in China (*L. acalycina* H.T. CHANG, *L. formosana* HANCE). The stomata point towards closer relationship to *L. styraciflua* and possibly *L. orientalis*.
- **remarks:** Grossmorphologically *Liquidambar* leaves differ from other palmately lobed foliage as *Acer* and *Platanus* by the dense and regular dentation that starts near the base as well as the glanduliferous tooth apices.

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### 33 macroscopic leaf traits are stored in *Digiphyll*

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#	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-3.6	leaf shape: lobed
5	A-3.6.2	leaf shape, lobed: palmately lobed
6	A-4.2	leaf base angle: obtuse
7	A-5.1	leaf base shape: without basal extension
8	A-5.1.2	leaf base shape, without basal extension: rounded
9	A-5.1.3	leaf base shape, without basal extension: truncate
10	A-5.2	leaf base shape: with basal extension
11	A-5.2.1	leaf base shape, with basal extension: cordate
12	A-6.1	leaf apex angle: acute
13	A-7.1	leaf apex shape: attenuate (straight)
14	A-7.2	leaf apex shape: acuminate
15	A-8.2	leaf margin: toothed
16	A-8.2.2	leaf margin, toothed: dentate
17	A-9.1.1	leaf teeth, order number of teeth: simple order (first order)
18	A-9.2.1	leaf teeth, tooth density: dense
19	A-9.3.1	leaf teeth, tooth size: small
20	A-9.4.2	leaf teeth, tooth apex shape: rounded
21	A-9.4.3	leaf teeth, tooth apex shape: glandular
22	A-9.5.1	leaf teeth, tooth sinus shape: acute
23	B-1.2	primary vein framework: palmate
24	B-1.2.1	primary vein framework, palmate: actinodromous
25	B-1.2.1.1	primary vein framework, palmate, actinodromous: basal actinodromous
26	B-2.1	secondary vein framework: 2° veins reach margin
27	B-2.1.2	secondary vein framework, 2° veins reach margin: semicraspedodromous
28	B-2.3	secondary vein framework: 2° veins form loops and do not reach margin
29	B-2.3.2	secondary vein framework, 2° veins form loops and do not reach margin: weak
30	B-3.2	intramarginal vein: absent
31	B-4.1	intersecondaries: present
32	B-4.2	intersecondaries: absent
33	B-5.2	tertiary vein framework: reticulate

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

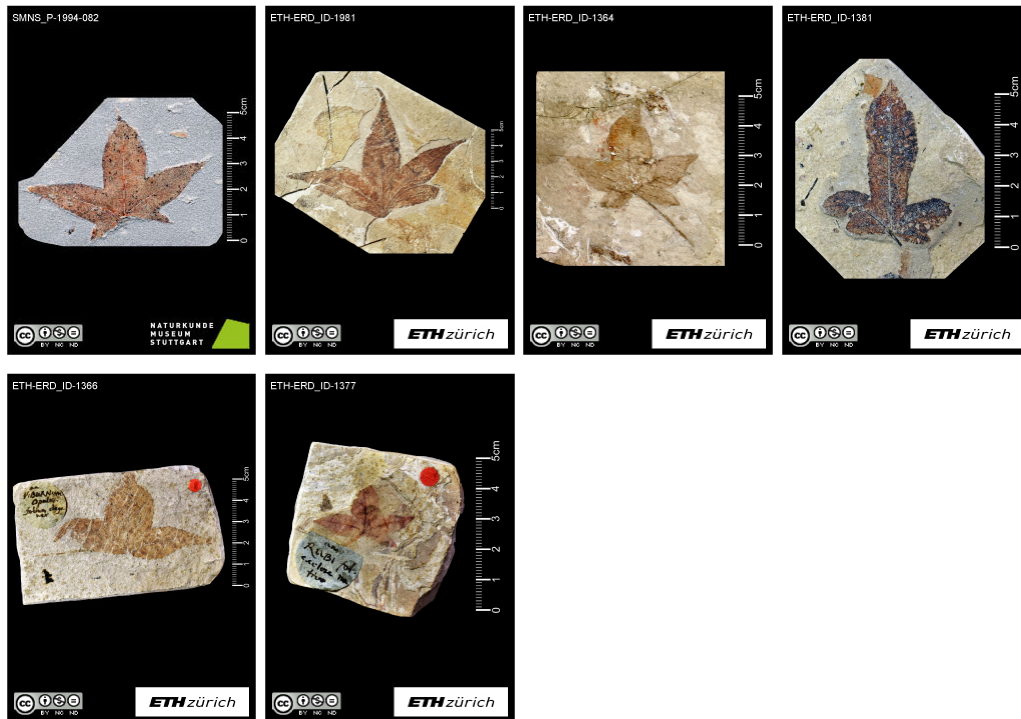
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### ? microscopic leaf traits are stored in *Digiphyll*

comming soon

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Fossil images




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