



# **XVII IBC 2005**

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# **ABSTRACTS**

sequences. Phylogenetic analyses were carried out using parsimony and Bayesian methods. A phylogenetic informative sites (MP RI=0.883) was produced and 1,000 replicate analyses were performed to confirm the tree strength on the basis of the nrDNA ITS region and plastid *matK* gene. Sect. *Helioscopiae* was the sister group of sect. *foei* and subsect. *Verticillatae*. And the taxa of sect. *foei* represent a monophyletic group. Even though the clades combination was found among sect. *foei*, the result demonstrate the monophyly of subgenus *foei* support previous RAPDs data.

#### Phylogenetic and Phylogeny of North-Asian spurges

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Phylogeny of spurges (*Euphorbia* L.) from Northern Asia using morphological, ecological geography and phylogenetic data is presented. The comparative analysis of the various constructions of general system of genus *Euphorbia* and concepts of subgenus, section and subsection is elaborated, sets of the most important diagnostic characters are described for each taxonomic level. A new variant of the "SYNAP" was improved: new procedure of characters is developed; reversion scale was used to clarify phylogenetic relations between 29 species of the genus from section *Esula*, 14 species from section *palustris* and six species of section *Holophyllum* were executed using different sets of elementary evolutionary characters. The received phylogenetic scheme is compared with ecological and geographical features of the genus. The work is supported by RFBR.

#### Histological studies on cyathia of some *Euphorbia* species

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Some species have a special inflorescence namely cyathia: it consists of a female flower surrounded by 5 male flowers, 4-5 bracts. We studied the histology of the cyathia, with special emphasis on the nectaries in some *Euphorbia* species. The histology of the nectary cuticle, epidermis and parenchyma. The xylem vessels have spiral secondary cell wall. The nectary cuticle of *E. amygdaloides* and *E. palustris* is thicker. Nectary of *E. palustris* has the largest number of cell rows (6-7) which varied from 1 to 4 in the other species. Glandular tissue are isodiametric in all species. Biggest cells of glandular tissue were found in the nectary of *E. virgata*. The histological structure of the cyathia is specific for the studied plant species.

#### Phylogenetic studies of the two Nigerian varieties of *Ricinus*

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*Ricinus* (*Euphorbiaceae*) is a monotypic genus represented by *R. communis* L. It comprises two distinct varieties which may occur in gregarious or solitary formations. The distinguishing characters are colour of vein, petiole and stem which may be brown, number of fruit prickles as well as shape and types of stomata, pollen grains and crystals which may be as raphides or localized crystals of calcium oxalate in the epidermal cell lumen. Epidermal wall pattern is wavy or undulate while cell shape varies from polygonal to oval. Stomata number per millimetre square ranges from 5-10 and stomata types are anisocytic, anomocytic. In the two varieties, polymerase chain reaction analysis with random amplified polymorphic DNA markers indicated similarities and differences at 0.59 and 0.10 levels respectively. *Ricinus communis* has both medicinal uses.

#### P1130. Distribution patterns of *Croton* (*Euphorbiaceae*) in Brazil

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*Croton* L. is the second largest genus of *Euphorbiaceae*, with over 1200 species, mostly found in tropical regions. Its main centres of diversity are in the Neotropics, with c. 300 species recorded for Brazil. To identify distribution patterns of the genus in Brazil, we analysed c. 2130 herbaria collections from the total range of 33 species that occur in the State of São Paulo. Natural populations of many species were also visited in order to better understand their lifeforms, habitats and morphological variability. The few endemic species found are trees from the southeastern Atlantic rainforest, one of them restricted to a small area in São Paulo. The other species were classified as mesothermic or megathermic. The latter show preference for tropical areas: among them are those widespread in the neotropics, those found all over South America, and those from central or northeastern Brazil, with their southern limits in São Paulo. The group of mesothermic species includes exclusively grassland herbs, with almost all populations below the Tropic of Capricorn, and northern limit in São Paulo State. The bearing of these data on neotropical biogeography is stressed.

#### P1131. A taxonomic revision on the genus of *Euphorbia* (*Euphorbiaceae*) in Iran

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*Euphorbiaceae* is the fifth great family of flowering plants and *Euphorbia* is one of the largest genus of flowering plants that based on Flora Iranica consists of over 100 species in Iranica region and more than 60 species in different parts of Iran. In this work plants belong to this genus were studied and in this order to all of the herbarium materials preserved in a few herbaria collected from different parts of Iran and specimens in the field were studied and determined and the following results are presented:

- There are 65 species of *Euphorbia* in different parts of Iran.
- The species *E. rosularis* A. THEOD. and *E. maculata* L. are recorded for the first time from Iranica area and the flora of Iran. These species in the flora of USSR, have been formerly known as an endemic of Turkmenistan and caucasus respectively.
- The species *E. franchetii* B. FEDTSCH., *E. grossheimii* PROKH., *E. consanguinea* SCHRENK and *E. kopetdaghi* PROKH. are reported for the first time for the Flora of Iran.
- *E. cheiroleptoides* RECH.f. is synonym with *E. grossheimii*.
- The species *E. aellenii* RECH.f. according to this study is synonym with *E. kopetdaghi* PROKH..

#### P1132. Character evolution of *Alnus* (*Betulaceae*) and fossil leaves and cones from the Tertiary of Northern Thailand

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*Alnus* Mill. (*Betulaceae*) today comprises approximately 35 species and is widespread in the temperate Northern Hemisphere, extending to Southeastern Asia and to the Andes. Tertiary macrofossils are widely distributed in North America, Europe, and Asia, usually as isolated leaves and infructescences. Recent leaves were surveyed to search for taxonomically important characters to allow placement of fossil leaves within subgenera or smaller subtaxa of *Alnus*. Semicraspedodromy was observed in some species of the subgenera *Alnus* and *Clethropsis*, but not in *Alnobetula*. Character evolution analysis using parsimony suggested that craspedodromy was plesiomorphic in the genus with independent evolution of semicraspedodromy in three subclades. Veins reaching the sinus before branching to the teeth is a derived character having evolved one or more times. Fossil leaves and seed cones were found in lacustrine deposits in early Miocene or late Oligocene basins in Northern Thailand. The venation pattern and teeth of the leaves are most similar to those of Recent *Alnus fernandi-coburgii* and *A. cremastogyne* (both subgenus *Alnus*) from China.

#### P1133. Cuticle micromorphology and anatomical structures of leaves of *Fagus* L. (*Fagaceae*) and its taxonomic implication

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# Character evolution of *Alnus* (Betulaceae) and fossil leaves and cones from the Tertiary of Northern Thailand

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## Abstract

*Alnus* Mill. (Betulaceae) today comprises approximately 35 species and is widespread in the temperate Northern Hemisphere, extending to Southeastern Asia and to the Andes. Tertiary macrofossils are widely distributed in North America, Europe, and Asia, usually as isolated leaves and microfossils. Recent leaves were surveyed to search for taxonomically important characters to allow placement of fossil leaves within subgenera or smaller subtaxa of *Alnus*. Spinescence was observed in some species of the subgenera *Alnus* and *Clathrospora*, but not in *Alnobetula*. Character evolution analysis using parsimony suggested that craspedodromy was plesiomorphic in the genus with independent evolution of schenocraspedodromy in five subclades. Veins reaching the sinus before branching to the tooth is a derived character having evolved once or more times. Fossil leaves and seed cones were found in lacustrine deposits in early Miocene to Late Oligocene basins in Northern Thailand. The venation pattern and tooth of the leaves are most similar to those of Recent *Alnus japonica* from Japan and *A. fernandi-ochotovi* and *A. eremastegma* from China (all subgenus *Alnus*).

## Introduction

The genus *Alnus* Mill. (Betulaceae) today consists of approximately 35 species and is widespread in the temperate Northern Hemisphere, extending to Southeastern Asia and to the Andes (Covarrubs and Frodin, 1996). Tertiary macrofossils are widely distributed in North America, Europe, and Asia, usually as isolated leaves and microfossils. Leaves, cones, and pollen of *Alnus* are known from Oligocene-Miocene deposits in Northern Thailand.

## Methods and results

Since fossil leaves are usually found as isolated organs, recent leaves were surveyed to search for taxonomically important characters to allow placement of fossil leaves within subgenera or smaller subtaxa of *Alnus*. Peltate glands and acrostomata were found in most or all modern species, but were not observed in fossil specimens. Leaf shape and size were variable within a species. Two characters rarely observed in fossils were the venation pattern of the secondary veins and whether the secondary or lowest lateral vein to extend to the margin entered a tooth directly or reached the sinus before branching to the tooth. Schenocraspedodromy was observed in some species of the subgenera *Alnus* and *Clathrospora*, but not in *Alnobetula*. Lateralisodromy was observed in *A. formosana*, and microplethorony occurred in basal secondary veins of *A. japonica* and *A. spida*. Character evolution analysis using parsimony (Maddison and Maddison, 2004) was conducted using a cladogram modified from that of Chen and Li (2001) who used sequences of nuclear ribosomal DNA ITS regions. This analysis suggests that craspedodromy is plesiomorphic in the genus *Alnus* with independent evolution of schenocraspedodromy in four subclades of subgenus *Alnus* and once in subgenus *Clathrospora*. Veins reaching the sinus before branching to the tooth is a derived character having evolved once or twice.

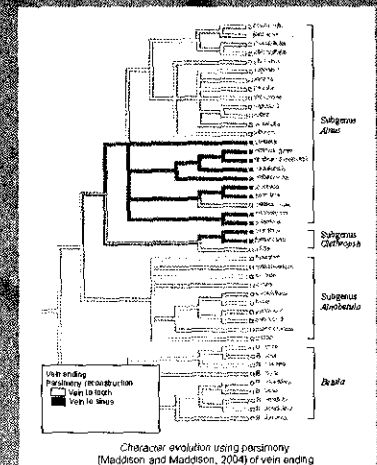
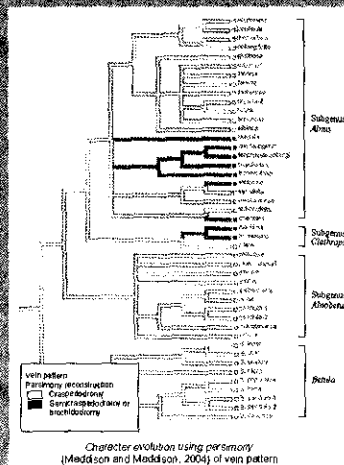
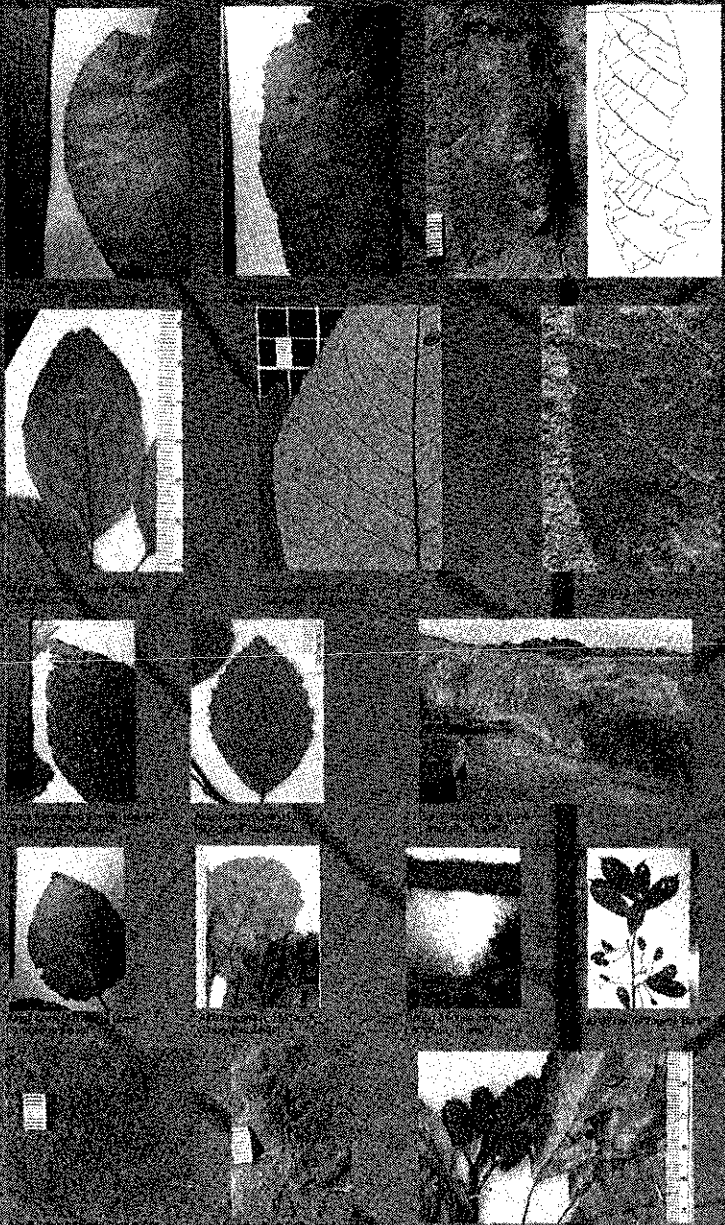
Fragmented fossil leaves as well as seed cones were collected from shale (lacustrine) deposits in Hanin mines in Lamphun province, Northern Thailand, Southeast Asia. The age is thought to be early Miocene or Oligocene based on pollen analysis (Sengkharn et al., 2004). The fossil leaves show a schenocraspedodromous venation pattern, a pattern found in some species of subgenera *Alnus* and *Clathrospora*. Tertiary veins enter the tooth directly, except for one vein that may possibly reach the sinus first. The venation pattern and tooth of the leaves are most similar to those of Recent *A. japonica* from Japan and *A. fernandi-ochotovi* and *A. eremastegma* from China (all subgenus *Alnus*). The seed cones co-occur in the same deposits as the leaves but have not been found attached. They are similar to *A. thuriana* cones described by Ertle (1964).

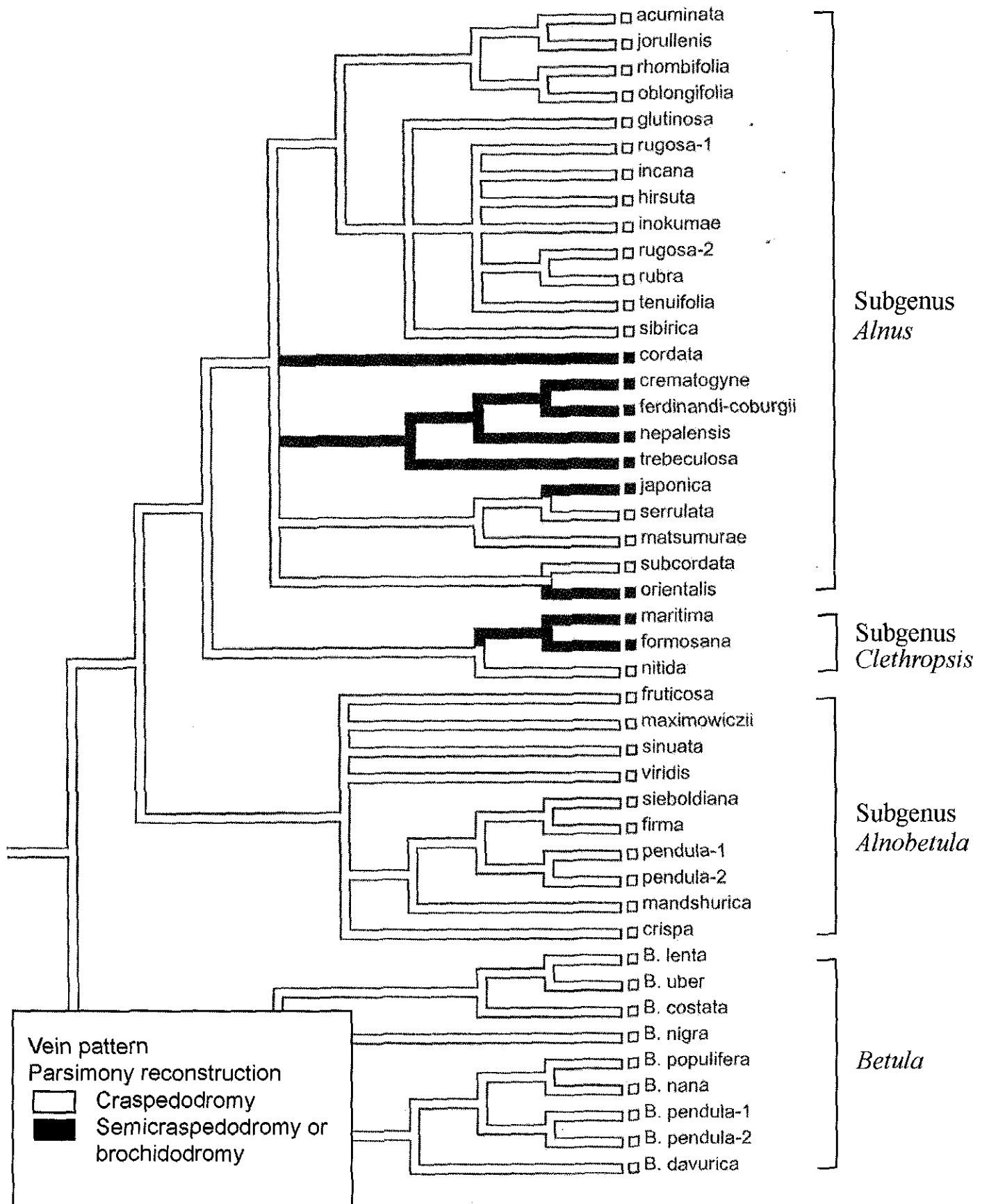
## Acknowledgments

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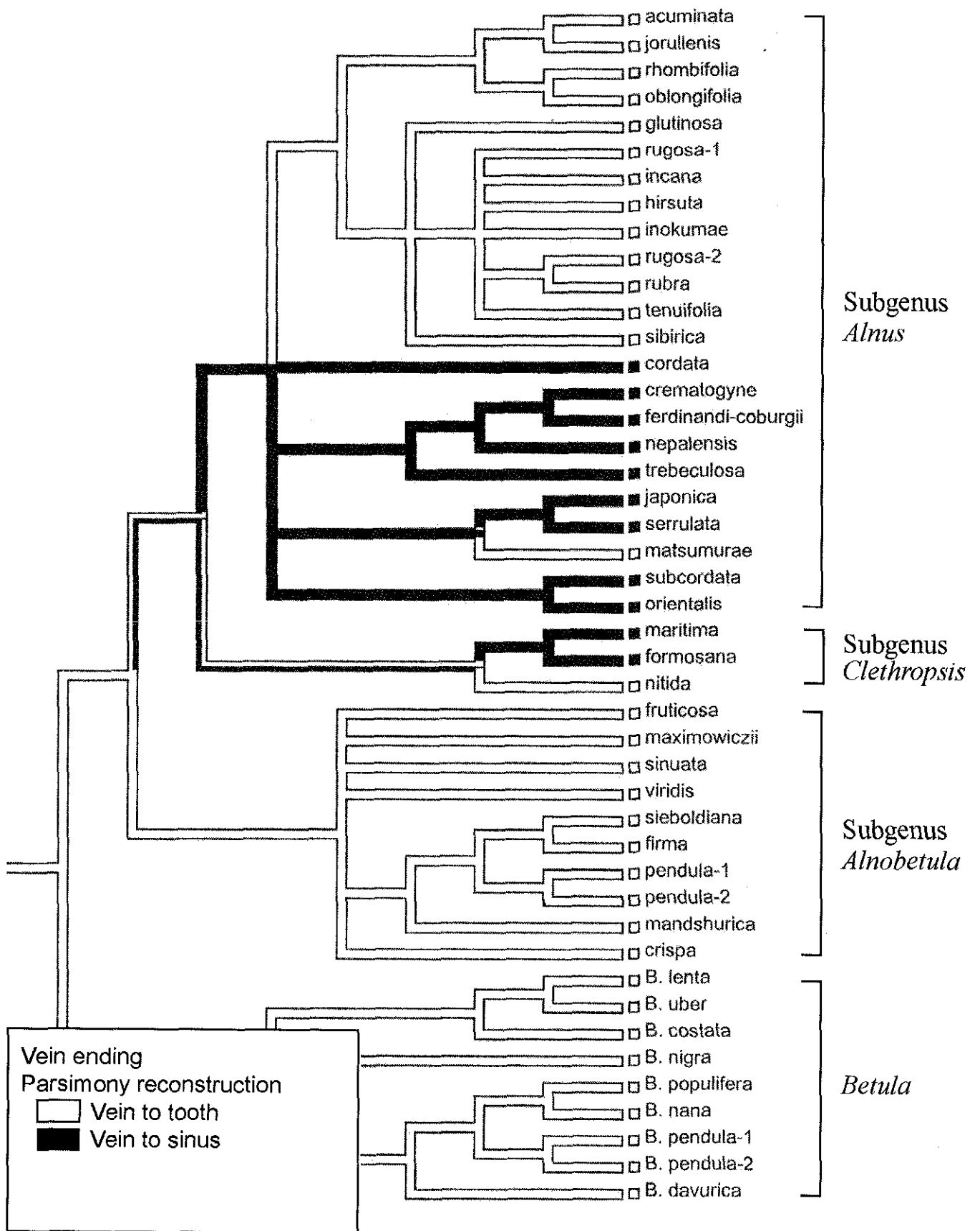
## References

Chen, Zhiqiang, and Ganhai Li. 2001. Phylogenetics and biogeography of *Alnus* (Betulaceae) inferred from sequences of nuclear ribosomal DNA ITS region. *International Journal of Plant Sciences* 165 (2): 327-343.  
 Ertle, Salde. 1964. Some older Tertiary plants from Northern Thailand. *Geology and Palaeontology of Southeastern Asia* Vol. 1:11A-11B, Plate X.  
 Covarrubs, Rafael, and David C. Frodin. 1996. *World checklist and bibliography of Fagales (Betulaceae, Corylaceae, Fagaceae and Theaceae)*. Royal Botanic Gardens, Kew, Great Britain.  
 Maddison W.P., & L.R. Maddison. 2004. Mesquite: A modular system for evolutionary analysis. Version 1.0.5. <http://mesquiteproject.org>  
 Sengkharn, Wichai, Benjawan Kanyasathien, Datta C. Mitterhaller, Samran Singharatwan, and Manara Kanchanasri. 2004. Oligocene-Miocene climatic changes in northern Thailand resulting from extratropical testates of Southeast Asian landmass. *Science Asia* 29: 221-233.





Character evolution using parsimony  
(Maddison and Maddison, 2004) of vein pattern



Character evolution using parsimony  
 (Maddison and Maddison, 2004) of vein ending