

## Supplemental materials

Tropical families and genera dominated in the Yunnan-Burma-Laos border flora-subregion community, H, and flora mainly consisted of tropical southeastern Asian elements such as *Sapindaceae pometic*, *Sapindaceae litchii*, *Meliaceae chukrassia*, *Meliaceae dysoxylum*, *Annonaceae mitrephora*, *Annonaceae dasymascholon*, *Anacardiaceae mangifera* and *Anacardiaceae draconomelum*, pan-tropical elements such as *Combretaceae terminalia*, *Combretaceae combretum*, *Flacourtiaceae homalium* and *Sapotaceae pouteria*, tropical American-Asian elements, and tropical Asian-African elements. *Cenocentrum*, *Dalechampia*, *Phylacium*, *Ophiorrhizophyllum* and *Pauldopia* only occurred in subregional pool H in China. These phytogroups originated directly from the paleotropical region in the Tertiary period. However, although plant species still originated from the paleotropical region in Yunnan-Viet Nam border flora-subregion community J, there were richer endemic genera such as *Diplopanax*, *Annamocarya*, *Rhoiptela*, *Cleidiocarpon*, *Malania*, *Bretschneidera*, *Sargentodoxa*, *Zippelia* than in H, because the region was a refuge and evolutionary center for paleophytes. Among them were even some herbs, shrubs, lianas and parasitic plants. There were also some paleophytes, notably *Platanus kerri* and *Hamamelidaceae embolanther*, and all genera of Magnoliaceae, but needle plants could scarcely be seen in the community.

Plant species composition in flora-subregion communities F, G and I presented geographical substitutions for the flora of China-Japan in the east and center of China. For example, dominant species *Pinus yunnanensis*, *Keteleeria evelyniana* and *Cyclobalanopsis glaucoides* in subregions F, G and I, respectively, substituted for *P. massoniana*, *K. davidiana* and *C. glauca*. Many plant species with Mediterranean plant traits occurred in the valley or at the bottom of the mountain, and

constructed evergreen stiff-leaved and broadleaved forests. In these communities, there were rich endemic Chinese-Himalayan species such as *Lithocarpus dealbatus*, *Magnolia delavayi*, *Michelia yunnanensis*, *Machilus yunnanensis*, *M. yunnanensis* var. *duclouxii*, *Docynia delavayi*, *Celtis yunnanensis*, *Nothopanax delavayi*, *P. yunnanensis*, *K. evelyniana* and so on. In the dry-hot valley of these communities, the flora mainly consisted of tropical African elements and was more complex than in other parts. In addition, holarctic and paleotropical flora were marvelously mixed and penetrated each other's habitats, which occurred in different vegetations.

In subregion communities A, C, D and E, there were many valleys whose depth reached 1600-2000 m and mountains with heights of over 5000 m. The undulating landform brings about various climatic types. On the high mountains, various acrophytes and orophytes, many of them endemic, grew very well, and included nearly all of the Asia alpine families and genera. The flora of woody plants presented differences in the various habitats. In the dry-hot valley, savanna vegetation included rich Indian-African elements, whereas high-altitude habitats were dominated by some warm needleleaved forests consisting of *P. yunnannensis*, *Taiwania flousiana*, *P. armandii*, *P. densata*, *Tsuga dumosa*, *Abies georgei*, *Picea likiangensis* and *Larix potaninii* var. *macrocarpa*, as generally occurred in alpine and subalpine habitats. Dominant plant species in these habitats from low to high altitude showed the geographical substitution for China-Japan elements in the eastern region of China. Northern temperature or alpine elements were distributed further south along the ridges of the high mountains from north to south, whereas the tropical elements moved further north along the river from south to north due to the lengthwise arrangement of the Lancang, Jingsha, and Salven rivers in these subregions. In subregions B and K, the dominant species, such as *Castanopsis platyacantha*, *Lithocarpus cleistocarpus* and *Cyclobalanopsis myrsinaefolia* in evergreen broadleaf

forests in these two subregions were identical with those in eastern China. The deciduous elements, such as *Fagus engleriana*, *Acer olivirianum*, and *Acer sinensis* var. *concolor*, generally occurring in the eastern China forests, played a large role in ecosystem function in these two subregions.