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## A taxonomical revision of *Ilex* (Aquifoliaceae) in the Pan-Himalaya and unraveling its distribution patterns

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### Abstract

All relevant specimens of the genus *Ilex* in 11 major herbaria: B, BM, CDBI, E, K, KUN, P, PE, SZ, W, WU, in addition to A (types), were critically examined. Field observations were conducted in E Himalaya (Bomi, Mêdog, and Zayü of Tibet) and the Hengduan Mountains (Tengchong, Yunnan). As a result of this taxonomic revision, 14 species and 12 varieties are reduced to synonyms and one species is reduced to a subspecies; one species, *I. shweliensis*, is restored with reservation; one new species, *I. gansuensis*, is described from SE Gansu, while records of five species supposedly present in the Pan-Himalaya are found to be due to misidentification or mislocation by previous authors. Thus 41 species are recognized in the Pan-Himalaya, not 60 species as reported in the literature. A key to these 41 species is presented. The types of six names are designated here. In addition, noteworthy disjunct distribution patterns are shown for four species.

**Key words:** character analysis, morphology, phytogeography, taxonomy, variation

### Introduction

According to the Editorial Committee of the *Flora of Pan-Himalaya*, the Pan-Himalaya covers the Himalaya, Hengduan Mts, Karakoram and NE Hindu-Kush, including the NE corner of Afghanistan (the Vakhan Corridor), N Pakistan, N India (Jammu & Kashmir, U Ganga & Indus, Sikkim & Darjiling), Nepal (W, C & E Nepal), Bhutan, Irrawaddy (NE Myanmar & W side of Gaoligong Shan in China), and China (S and SE Tibet, SE Qinghai, SE corner of Gansu, W Sichuan and NW Yunnan) (U, M & L Yarlung Zangbo, Tangut, N Hengduan, S Hengduan), and Yarlung Zangbo-Brahmaputra Region.

The genus *Ilex* Linnaeus (1753: 125) attracted my attention several years ago. The reason is the rapid increase in the number of species in this genus in China during the 1980's and 1990's. Before Hu (1949) worked on this genus, only 87 species were recorded in China. Hu (1949a, 1949b, 1950a, 1950b, 1950c, 1951) described 31 species of *Ilex* as new to science, making the total number of Chinese species 118. In the following nearly 30 years, up to 1980, five more new species were described from China (Tseng 1962; Chun 1963). The new period started when Zheng described *I. qingyuanensis* Zheng (1980: 73), and later another new species, *I. suichangensis* Zheng (1988: 81). Tseng (1981) described 32 new species and raised one taxon from the varietal to specific rank. He published further five new species in the later papers (Tseng 1984, 1989). Also in 1981, Y. R. Li (1981) described three new species from Tibet, and four years later she (Y. R. Li 1985) described 25 new species from Yunnan (14 based on herbarium names given by C. Y. Wu, seven on names by H. W. Li and 4 by others). Tan (1983) published four new species from Sichuan. Other authors (Y. K. Li 1986; Yao & Deng 1987; Dudley & Sun 1983; Dudley 1984, 1988) described four more new species. Thus, 73 new species were described from China in the 1980's, an "explosive period" for new species in *Ilex*. In the 1990s, 15 new species have been described from China. Chen and his co-authors (Chen & Feng 1999a, 1999b, 1999c; Feng *et al.* 1998) described 11 new species (8 based on herbarium names given by C. J. Tseng); Dudley (1991) described two new species and one subspecies; Wang & Chen (1995) and Lin & Qi (1999) each published one new species. After the 1990's, only two new species were described from China (Lin & Qi 2000; He & Chen 2001).

In total, 91 new species have been described after Hu's work. Hu named as many as 32 species, but she also reduced 28 species to synonyms or varieties, including her supervisor's (Merrill) five and her own five. On the contrary,