



Liparis funingensis (Orchidaceae; Epidendroideae; Malaxidae), a new species from Yunnan, China: evidence from morphology and DNA

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Abstract

A new orchid species, *Liparis funingensis*, from Yunnan, China, is described and illustrated in this study based on morphological and molecular analyses. A detailed comparison between the newly discovered orchid and other members of *Liparis* was performed. This new plant is characterized by an obovate lip and is trilobed. The sidelobes are semiorbicular and fleshy, and the midlobe is short and bilobed with triangular lobes. The disc has a deeply bilobed basal callus and two longitudinal lamellae from the base extending to above the middle. There are four pollinia in two pairs, with each pair exhibiting long caudicles without a viscidium. The rostellum also has a bursa synovialis. These features distinguish this new orchid from all other known species of *Liparis*. A phylogenetic analysis was subsequently performed to determine the systematic position of this enigmatic species. A molecular study based on nuclear ribosomal ITS and plastid matK DNA sequence data indicates that *L. funingensis* is a member of *L. layardii* subclade.

Key words: bursa synovialis, caudicles, Chinese orchid flora, Malaxidae molecular systematics

Introduction

Liparis Richard (1817: 21; Orchidaceae, Malaxideae) consists of approximately 320 species that are well represented in tropical Asia, New Guinea, southwestern Pacific islands, and subtropical and tropical America. A single species is found in Europe and two species in North America, and 63 species are found in China, of which 20 species are endemic (Chen *et al.* 2009). *Liparis* species can be terrestrial, lithophytic or epiphytic, rhizomatous, and rarely mycotrophic, and leaves can be reduced to scales. Recently, a newly species, *Liparis pingxiangensis* Li & Yan (2013: e78112), was described based on a molecular phylogenetic analysis (Li & Yan 2013); it was unusual due to its two pollinia with two long and prominent caudicles, which were attached to a terminal viscidium. During a recent field trip, three terrestrial populations of another *Liparis* species were found in Yunnan, China. The habit of these plants was similar in appearance to *L. pingxiangensis*, but the floral structure was different with four pollinia in two pairs, with each pair exhibiting long caudicles without a viscidium. Moreover, the rostellum demonstrated a bursa synovialis, and its lip was trilobed with a notably short and deeply bilobed midlobe. Molecular phylogenetic analysis indicated that this plant represents an unknown species, which is described and illustrated here as a new species.

Materials & Methods

Morphological observations:—Gross morphological data were obtained during fieldwork, and specimens were deposited in the National Orchid Conservation Center (NOCC). The number of pollinia in the fully opened flowers of this new species was determined using a Guiguang XTL-500 microscope.

Materials:—A total of 73 species of seven genera were analyzed, where five genera belonged to Malaxideae, and two genera, *Bulbophyllum* and *Dendrobium*, were selected as outgroups. Table S1 provides detailed information regarding the assessment.

Distribution and habitat:—*Liparis funingensis* is terrestrial, forming scattered colonies on shady and wet areas on the slopes at elevations of 1000–1200 m in evergreen broad-leaved forests of Funing, Yunnan Province, China.

Conservation status:—The new species has been found in three populations, each of which has no more than 30 individuals. Using the World Conservation Union Red List Categories and Criteria (IUCN, 2001), *L. funingensis* should be treated as critically endangered.

Etymology:—The species epithet refers to the locality where this new species was first found.

Species recognition:—*Liparis funingensis* is distinct among species in the genus because it has flowers with an obovate trilobed lip with a notably small midlobe. This species has a disc with two lamellae, four pollinia in two pairs without a viscidium, and a bursa synovialis on the rostellum (Fig. 5). It is morphologically similar to *L. pingxiangensis*, but can be easily distinguished from the latter, which has a smaller flower with a broadly rhombic-elliptic lip and two pollinia with distinctly long and prominent caudicles that are attached to a thick viscidium. It is also morphologically similar to *L. nervosa* (Thunberg in Murray 1784: 814) Lindley (1830: 26), a widespread terrestrial species, but it can be easily distinguished from the latter, which has a column with column wings, a larger and unlobed, oblong-obovate lip, which forms the hypochile and epichile. There are four pollinia in two pairs, where each pair lacks a caudicle, and rostellum without a bursa synovialis.

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