



New Natural Hybrid, *Alpinia* × *ilanensis* (Zingiberaceae) in Taiwan

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ABSTRACT: The genus *Alpinia* in Taiwan was very impressed by its frequent hybridization. Four out of 6 indigenous species in Taiwan proper have been reported to be involved in a reticulate hybridization. This paper describes and illustrates a new natural hybrid *A. × ilanensis*, putatively derived from *A. japonica* and *A. pricei*, which is supported by morphological and ecogeographical evidences. Based on sparse distribution mode and serious fertility reduction in these hybrid individuals, we suppose that the hybridization events between *A. japonica* and *A. pricei* have been independently occurred multiple times in field. This newly discovered hybrid reveals that all 6 independent species in this island possess the ability to cross each other.

KEY WORDS: *Alpinia*, *Alpinia* × *ilanensis*, *Alpinia japonica*, *Alpinia pricei*, natural hybridization, new hybrid, Taiwan, Zingiberaceae.

INTRODUCTION

Alpinia Roxb., the largest genus in Zingiberaceae, consists of ca. 230 species (Smith, 1990; Wu and Larsen, 2000) with the diversity center in India and Malaysia (Larsen, 1996). In Taiwan, the genus has been successively studied by Moo (1973), Yang and Wang (1998; 2000), Kuo (2006) and got rather different results. Recently, a new species *A. nantoensis* was reported by Kuo et al. (2008). However, the status of this species is very doubtful because the diagnostic characters are erroneously indicated in their photos. Here we adopted the treatment of Flora of Taiwan 2nd edition (Yang and Wang, 2000) in which 10 species and 2 varieties were recognized in Taiwan proper excluding the cultivated *A. galanga* and *A. flabellate* found in Lanyu Islet. Besides taxonomic controversy, the prevalent inter-specific hybridization of Taiwanese *Alpinia* has also been intensively investigated (Yang and Wang, 1998; Liu et al., submitted). Yang and Wang (1998) firstly proposed a hypothesis of reticulate hybridization of *Alpinia* in which 4 natural hybrids (*A. formosana*, *A. kusshakuensis*, *A. mesanthera*, and *A. tonrokuensis*) were discerned by morphological, phenological, and ecological data. Subsequently, the relationship between these hybrids and their parental species was further verified by using both nuclear and chloroplast DNA markers. Not only the parentage but reciprocal and introgressive hybridization among these plants was disclosed (Liu et al., submitted). So far, four taxa, namely *A. intermedia*, *A. shimadai*, *A. uraiensis*, and *A. zerumbet*, out of six indigenous species in Taiwan proper have known to involve in hybridization events.

Both extrinsic and intrinsic reproductive isolations in Taiwanese *Alpinia* could be not so strong that natural hybridizations occur time after time. The reticulate

species pairing indicated that inter-specific hybridization in *Alpinia* is extensive and is not confined to particular species groups. The four parental species involved in the reticulate hybridization belong to three different subsections within section *Alpinia* according to the system of Smith (1990). Secondary contact could be the major cause for these inter-subsectional hybridization events. This feature suggests that almost all species within section even genus possess the ability to cross each other. Novel *Alpinia* found lately with intermediate morphology is reasonably speculated to be a natural hybrid.

Several unknown *Alpinia* plants resembling in appearance were sequentially found in northeastern Taiwan during the past years. Judging from the intermediate morphology, they are proposed to be the natural hybrids between *A. japonica* and *A. pricei*, both have never been mentioned to cross each other or with other taxa. This study aims to explicitly determine the parentage of these putative hybrids based on ecogeographical and morphological evidences. A good indicator for *Alpinia* hybrid, pollen fertility, represented by stainability, was also assessed by using 0.5% acetocarmine. A new natural hybrid *A. × ilanensis* is consequently described and illustrated as follows.

TAXONOMIC TREATMENT

Alpinia × *ilanensis* S.-C. Liu & J.-C. Wang *hyb. nov.*

TYPE: TAIWAN. Ilan County: Chiaohsi Township, Wufengchi, along a trail to Mt. Sheng-mu-feng (Mt. Madonna) (121°43'E, 24°51'N), 700-800 m alt., Apr. 22, 2006, S.-C. Liu 2631 (holotype: TNU; isotype: TAIF). 宜蘭月桃 Figs. 1 & 2

Hybrida naturalis e *Alpinia japonica* et *A. pricei*.
Folia chartaceus vel subcoriaceus margine sericeus