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Musa itinerans var. *chiumei* (Musaceae), A New Addition to the Taiwan Flora

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ABSTRACT: Another new variety of *Musa itinerans* Cheesman in Taiwan is described. The morphological characteristics of the variety are otherwise similar to those of var. *formosana* (Warb. *ex* Schum.) Häkkinen & C.-L.Yeh. The principal distinction is based on the length and bending of inflorescence, and the compactness of fruit hands. The inflorescence rachis of the new variety is longer than the other two varieties, and first upwardly slanting, then curving downwards, finally pendent in the male flower regions. The fruit hands grow very compactly and apex of fruit remains distinguished floral relicts. These characteristics are stable at their habitat and Taiwan Agricultural Research Institute (TARI) repository over study periods. This population is herein segregated as the new variety, *M. itinerans* var. *chiumei* H.-L. Chiu, C.-T. Shii & T.-Y.A. Yang. Photos for the varietal taxon as well as the key to all variation of *Musa itinerans* and Taiwanese wild bananas are provided.

KEY WORDS: IUCN Red List, *Musa itinerans* var. *chiumei*; Native banana; Taiwan.

INTRODUCTION

Musa itinerans Cheesman (Musaceae) is found across continental Southeast Asia. Several varieties can be observed and are subjected for future taxonomical studies. These varieties include var. *itinerans* Cheesman, var. *annamica* (R. V. Valmayor, L. D. Danh & Häkkinen) Häkkinen, var. *chinensis* Häkkinen, var. *guangdongensis* Häkkinen, var. *lechangensis* Häkkinen, var. *formosana* (Warb. *ex* Schum.) Häkkinen & C.-L.Yeh, var. *hainanensis* Häkkinen & X.-J. Ge, and var. *kavalanesis* H.-L. Chiu, C.-T. Shii & T.-Y.A. Yang (Chiu et al., 2011; Häkkinen et al., 2008, 2010). Among them, three varieties are native in Taiwan, including var. *formosana* (Warb. *ex* Schum.) Häkkinen & C.-L.Yeh, var. *kavalanensis* H.-L. Chiu, C.-T. Shii & T.-Y.A. Yang, and var. *chinensis* Häkkinen (Chiu et al., 2011). Recently another new variety was found and is described here and treated as *Musa itinerans* Cheesman var. *chiumei* H.-L. Chiu, C.-T. Shii & T.-Y.A. Yang.

MATERIALS AND METHODS

Fresh materials (clones) of this new variety were collected from northern Taiwan and conserved at Taiwan Agricultural Research Institute (TARI), Taichung, Taiwan. Over 15 living individuals in their native habitat and at the conserved repository were recorded according to the Revised List for Banana Descriptors (IBPGR, 1984; IPGRI-INIBAP/CIRAD, 1996).

TAXONOMIC TREATMENT

Musa itinerans Cheesman, Kew Bull. **4(1)**: 23. 1949.

Type: **BURMA**[**MYANMAR**]: Myitkyina Distr., Tagwin Chaung, evergreen forests, 400 ft, 24 Nov. 1928, *C.E. Parkinson 1761*.

Musa itinerans var. ***chiumei*** H.-L. Chiu, C.-T. Shii & T.-Y.A. Yang, ***var. nov.*** 泰雅芭蕉 Fig. 1.

Types: **TAIWAN**: Taoyuan County, Fuhsing Township, Jashih, Taoyuan Co. #119 Hwy 2–2.5 Km, 20 May 2013, *H.L. Chiu 17* (holotype, TNM; isotypes, BM, G, K, L, KUN, TAI, TI, TNM), 23 Apr. 2014, *H.L. Chiu 18* (paratypes: KYO, PE, TAIF, TNM).

Diagnosis: Close to var. *formosana* (Warb. *ex* Schum.) Häkkinen & C.-L.Yeh but differs in having longer and bending inflorescence, and with more compactness of fruit hands, and with distinguished floral relicts at apex of individual fruit. Much longer inflorescence rachis, *ca*. 40–120 cm long, first upwardly slanting, then curving downwards, finally pendent in the male flower region. Fruit bunches very compact and apex of fruits remain distinguished floral relicts. These characteristics are stable at their habitat and TARI repository over study periods.

Plants stooling freely, developing long rhizomes to 15 cm long and more away from the parent pseudostem, position vertical; pseudostems 2.3 m to 3.5 m tall, 34-40 cm in diam. at base, green with varying development of reddish-brown pigmentation according to age and exposure; covering with varying amounts of dead brown leaf sheaths, underlying color light green with large reddish-brown blotches, shiny, sap watery; leaf-sheaths and petioles devoid of wax. Petioles 36–52

Figure1. A–E. *Musa itinerans* var. *chiumei*. A. Plants in the field, from Jashih, Taoyuan Co., the type locality. B. Plant with inflorescence in field. C. Plant with inflorescence under conservation at TARI. D. Fruit hands grow compactly. E. Holotype of *Musa itinerans* var. *chiumei* H.-L. Chiu, C.-T. Shii & T.-Y.A. Yang. 1A–1D photos were taken by H.L.Chiu. 1E photo was taken by T.-Y.A. Yang

cm long, usually green, canal wide, margins narrow, membranous and erect, not clasping the psudostem. Leaf blades on the fourth, fully unfolded leaf counting down from the top of the plant, 175–230 x 42–57 cm, base obtusely rounded to oblique, entire, apex obtuse, lateral veins parallel, midrib usually prominent, often tearing between pinnate veins; yellowish-green to green on both surfaces, glabrous. Inflorescence rachis 40–120 cm long, first upwardly slanting, then curving downwards, finally pendent in the male flower region; robust, pale green with pinkish-red streaking, densely puberulent with short hairs, white or rusty brown; sterile bracts 2, bracts deciduous at opening of the first female flowers; basal flowers hands female, the upper hands male. Spathe long lingulate, 30.5 x 11.2 cm wide at center, apex convolute, yellowish-green with pinkish-red streaking bracts revolute and lifting one at a time after flowering, the next first to second bracts revolute, lifting before the older bract is deciduous; scare prominent. Female flowers 9 to 11 per bract, biseriate, ovary inferior, pale green, glabrous, *ca.* 4.3 cm long, markedly 5-angled, loculi 3, ovules disposed in 4 rows; compound tepals *ca.* 4.8 cm long, with 2 prominent thickened keels, ribbed at the dorsal angles, with 5-lobed, apex pale yellow, free tepals translucent white, *ca.* 3.0 cm long, oblong acuminate, smooth; stamens 5 with sterile pollens, *ca.* 4.8 cm long, filaments white, anther pale yellow; style straight, *ca.* 4.2 cm long, creamy white, stigma capitate, grayish-black after pollination. Male buds lanceolate, 14.3 x 6.4 cm, pendulous, outer bracts yellowish-green with variegated pinkish-red streaking, inner bracts yellowish-green, convolute at the tip; bract lifting as one bract at a time, revolute, then the next 1 to 2 bracts lifting and revolute before the oldest bract dehisces; scars of bracts prominent. Male flowers 13 to 16 per bract, in 2 rows, falling with the bract, compound tepals usually 5-lobed, *ca.* 4.4 cm, pale yellow, central lobes smaller than the outer lobes; free tepals translucent white, *ca.* 2.3 cm long, oblong acuminate, stamens 5, filaments white, *ca.* 4.7 cm long, anthers and style inserted; style straight, stigma cream, *ca.* 4.2 cm long, ovary arched, pale green, glabrous, 1.2 cm long. Fruit bunches nearly curved, very compact, 6 to 11 hands per bunch. Individual fruit usually negatively geotropic, 8.1–9.8 cm×6.4–8.4 cm in diam., 18.1–32.0 g in weight, straight with slightly ridged, obscurely 5-angled at maturity, blunt at the apex with relictual floral remain; fruit pedicels 1.0–1.9 cm long, pale green, minutely puberulent; pericarp pale green with pinkish-red streaking, minutely puberulent, dull yellow at full ripeness, not strongly aromatic, sweet with sour taste. Seeds small, dark brown, warty, 5.7 mm across, *ca.* 3.0 mm high, irregularly angulate-depressed, 100 seeds weight 1.7–5.0g.

Etymology: This variety was named in honor of the first author's mother, Tsai Chiu-mei, for her contribution to encourage our studies.

Distribution and habitat: *Musa itinerans* var. *chiumei* mainly occurs in the mountainous area at elevations about 460 m, along the gentle slope and roadside of County Road 119 Highway (Fuhsing village), Taoyuan County, which is located in northern Taiwan. No individual or population of variety *chiumei* has been found within the distributional areas of *M. itinerans* var. *formosana*, var. *kavalanesis* or var. *chinensis*.

IUCN Red List category: *Musa itinerans* var. *chiumei* have been studied by the authors in Taiwan from 2000 to 2014. For its conservation assessment, IUCN Red List categories were applied (IUCN, 2001). The native banana populations only occur in open places around the mountainous areas at Jashih, Taoyuan County, at elevations about 460 m. Some 30–40 individual plants were found and have decreased gradually. Both observed and conserved materials of *M. itinerans* var. *chiumei* and var. *formosana* were occasionally seen as growing sympatrically. However, no obvious hybrids were observed in those populations. This taxon is of conservation concern and should be considered Vulnerable (VU).

Key to the species of *Musa* in Taiwan and all varieties of *M. itinerans* in the world

1a Sucker rhizomatous ……..…..….2 (***Musa itinerans***)
1b Sucker not rhizomatous…….……..…11
2a Male flowers in one row……..……3
2b Male flowers in two rows……..……..4
3a Basal flowers hermaphordite…….……
…….……..... ***M. itinerans*** var. ***xishuangbannensis***
3b Basal flowers female……...…..…. ***M. itinerans*** var. ***annamica***
4a Peduncle glabrous…..……....… ***M. itinerans*** var. ***lechangensis***
4b Peduncle puberulent with short or long hairs……..5
5a Pericarps dull dark..... ***M. itinerans*** var. ***hainanensis***
5b Pericarps pale green or variegated with purplish-red streak towards apex……..……6
6a Pericarps pale green only ……7
6b Pericarps pale green variegated with purplish-red streak towards apex……..……9
7a Male bracts dark purple with yellow margin ……..…….
….……. ***M. itinerans*** var. ***itinerans***
7b Male bracts yellowish-green or variegated with purplish-red streak towards apex ……8
8a Male bracts yellowish-green only .....
……..……..…….***M. itinerans*** var. ***kavanlanensis***
8b Male bracts yellowish-green variegated with purplish-red streak towards apex……. ***M. itinerans*** var. ***chinensis***
9a Male bracts dark red-purple with paler purplish lines…….…….
….....…..... ***M. itinerans*** var. ***guangdongensis***
9b Male bracts yellowish-green variegated with purplish-red streak towards apex ……..……10
10a Inflorescence at first semi-erect to horizontal and then falling vertically downward……....……*M. itinerans* var. *formosana*
10b Inflorescence at first upwardly slanting, then curving downwards, finally pendent in the male flower regions…….
…….……..……..……***M. itinerans*** var. ***chiumei***
11a Bracts dark purplish-red outside ……..…***Musa insularimontana***
11b Bracts yellowish-green outside ….……..….***Musa yamienesis***

LITERATURE CITED

Cheesman, E. E. 1949. The classification of the bananas. III. Critical notes on species. Kew Bull. **4**: 23–28.

Chiu, H.-L., C.-T. Shii, and T.-Y.A. Yang. 2011. A new variety of *Musa itinerans* (Musaceae) in Taiwan. Novon **21**: 405–412.

Häkkinen, M., H. Wang & X. J. Ge. 2008. *Musa itinerans* (Musaceae) and its intraspecific taxa in China. Novon **18**:50–60.

Häkkinen, M., C. L. Yeh, and X. J. Ge. 2010. A new combination and variety of *Musa itinerans* (Musaceae). Acta Phytotax. Gebot. **61**: 41–48.

International Board for Plant Genetic Resources [IBPGR]. 1984. Revised Banana Descriptors. International Board for Plant Genetic Resources Press, Rome.

International Plant Genetic Resources Institute- International Network for the Improvement of Banana and Plantain/ Centre de Coopération internationale en recherche agronomique pour le développement [IBPGR-INNIBAP/CIRAD]. 1996. Description for Banana (*Musa* spp.). Int. Network for the Improvement of Banana and Plantain, Montpellier, France/ Centre de coopération int. en recherche agronomique pour le dével., Montpellier, France. Int. Plant Gen. Resour. Inst. Press, Rome.

IUCN. 2001. IUCN Red List Categories and Criteria, Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland, and Cambridge, United Kingdom.