



Variation in Bornean *Musa campestris* Beccari

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Borneo, the third largest island in the world, is comprised of three countries: Malaysia (Sarawak and Sabah), Indonesia (Kalimantan) and Brunei. It is located on the equator, and has a hot, rainy climate. In prehistoric times, Borneo had a land connection to the Asian continent. Due to the large variety of plant species that has developed as a result of isolation from the continent, Borneo is considered to be a center of biodiversity in Tropical Asia.

Borneo is also part of the center of diversity for bananas (*Musa* sp.), and has a large number of wild bananas. Before the end of the 19th century, the island was covered with dense rain forests. Since bananas are pioneer plants and need light gaps to grow, they were confined to many small, isolated areas, and have developed very large genetic variation among populations. Since that time, human activities, such as agriculture and logging, have permitted bananas to expand their growing area tremendously.

Wild *Musa* species are usually grouped into four sections: Australimusa ($n = 10$ chromosomes), Callimusa ($n = 10$ chromosomes), Eumusa ($n = 11$ chromosomes), and Rhodochlamys ($n = 11$ chromosomes). *Musa campestris* is in the Callimusa section (Cheesman, 1947). *Campestris* is a Latin word which refers to plains or flat areas.

Italian botanist Odoardo Beccari worked in Borneo from 1865-1868, and was the first to describe *Musa campestris* and

three other wild bananas in his book "Nelle Foreste di Borneo" (Beccari, 1902). After Beccari's explorations in Sarawak, the study of wild bananas in Borneo was neglected until the Japanese botanist Mitsuru Hotta made a series of Bornean expeditions in 1963-1964, 1968-1969, and 1976, concentrating on Brunei and western Sabah (Hotta, 1967, 1987). Both of these botanists worked in limited areas, and did not observe the entire diversity of the species.



Musa campestris var. *campestris*

During 2002 and 2004, the author conducted an exhaustive study of the section Callimusa in Sarawak, Brunei and Sabah. *Musa campestris* is found in at least six separate areas of Borneo. The northern

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Dates to Remember

- HSPR Meeting, 10:00 am, Sunday, December 12, 2004. Home of Raymond and Migdalia Jerome, Canóvanas, PR.

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population is in the western region of Sabah, where it grows in large areas. There are three partially overlapping populations in northern Sarawak and Brunei. The most isolated population is south of Kuching in southern Sarawak, and this has spread to form small isolated populations in West Kalimantan also.

Six distinct varieties of *Musa campestris* were identified, and are described as follows:

Musa campestris* var. *campestris

Clump small (3-4 stems) to big (10 to 12 stems), pseudostem 0.8-2 m high, green to ivory colored, with blackish purple blotches. Leaf blade 1.4-2.4 m long, 30-50 cm wide, with or without wax. Inflorescence erect, peduncle pubescent or glabrous and green, bracts pink-purple. Fruits 8-14 cm long and 2-2.5 cm in diameter. Peel light green, with abundant red-purple blotches. Fruits persistent when ripe.

Musa campestris* var. *lawasensis

Big clump up to 5 stems, pseudostem short, slender, less than 1 m high, shiny, with purple-brown blotching on a light green background. Leaf blade 160 cm long, 30 cm wide, lamina shiny on both faces. Inflorescence erect, peduncle hairless and pale green, bracts pink-purple. Fruit bunch with 4 hands and 2-3 fruits per hand, fruits 11 cm long and 2 cm in diameter. Peel light green, becoming cream yellow with brown spots at maturity. Fruits deciduous when ripe.



Musa campestris* var. *lawasensis

Musa campestris* var. *limbangensis

Big clump up to 12 stems, pseudostem 1 m high, dull and

waxy, with very little purple-brown blotching on a light green background. Leaf blade 180 cm long, 45 cm wide, lamina dull on both faces. Inflorescence erect, peduncle slightly pubescent and pale green, bracts pink-purple. Fruit bunch with 4 hands and 2-3 fruits per hand, fruits 11 cm long and 2 cm in diameter. Peel light green, heavily blotched with red-purple. Fruits deciduous when ripe.



Musa campestris* var. *limbangensis

Musa campestris* var. *miriensis

Small clump up to 4 stems, pseudostem 1.5 m high, shiny, with black-purple blotching on a light green background. Leaf blade 180 cm long, 40 cm wide, lamina shiny on both faces. Inflorescence erect, peduncle very pubescent and rusty green, bracts pink-red. Fruit bunch with 8 hands and 3-4 fruits per hand, fruits 10 cm long and 2 cm in diameter. Peel light green, becoming cream yellow. Fruits deciduous when ripe.

Musa campestris* var. *sabahensis

Big clump to 8 stems, pseudostem 1.5 m high, shiny, with purple blotching on a pink-purple background. Leaf blade 170 cm long, 50 cm wide, lamina moderately waxy on both faces. Inflorescence erect, peduncle slightly pubescent and light green, bracts purple. Fruit bunch with 4-5 hands and 2-3 fruits per hand, fruits 10 cm long and 3 cm in diameter. Peel light green with large black-purplish blotches. Fruits persistent when ripe.

Musa campestris* var. *sarawakensis

Big clump to 8 stems, pseudostem 1.2 m high, shiny, with

Variation in Bornean *Musa campestris* Beccari (continued)

purple-brown stripes on a yellow-red-purple background. Leaf blade 240 cm long, 50 cm wide, lamina dull on both faces. Inflorescence erect, peduncle very pubescent and light green, bracts purple. Fruit bunch with 9-10 hands and 5-7 fruits per hand, fruits 11 cm long and 3 cm in diameter. Peel light green, turning yellow. Fruits persistent when ripe.



Musa campestris var. *miriensis*



Musa campestris var. *sabahensis*



Musa campestris var. *sarawakensis*

This study has revealed that *Musa campestris* is a lowland species which has evolved into several different varieties due to isolation of relatively small populations. It does not occur in most lowland areas of northern Borneo, being replaced by another small Callimusa species, *Musa hirta*. The reason for the mutually exclusive regions of growth of these two banana species, as well as the intermediate area where neither species grows, are topics which merit further research. Eventually, it is expected that all six varieties of *Musa campestris* will hybridize into one homogeneous population due to their fast expansion. When that happens, the genetic variation that has developed since prehistoric times will be lost forever, unless they are stored in a gene bank.

References

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