

A BRIEF ACCOUNT ON THE WILD *PIPER* (PIPERACEAE) OF THE CROCKER RANGE, SABAH

C.S. Tawan, I.B. Ipor, B.A. Fashihuddin and H. Sani¹

ABSTRACT

Seven species of wild Piper namely Piper caninum Bl., P. erecticaule C.DC, P. aff. longamentum C.DC, P. magnibaccum C.DC, P. poryphyrophyllum N.E. Br., P. umbellatum Linn., P. aff. ridleyi C.DC were collected from various localities of the Crocker Range, Sabah during the expedition held on the 15-24 October 1999. Most of the species were climbers except P. erecticaule P. aff. longamentum and P. umbellate which were erect shrubby herbs. Two other Piper spp. represented by sterile specimens were also collected. Most of these species prefer shady, moist habitats with moderate light penetrating through the forest gaps. They are often seen creeping on the forest floors, fallen trunks, rocks and up on the living trees. However, the collection of the Piper species from these areas were still far from complete and extensive collection should be done in the future.

INTRODUCTION

The *Piper* species were mostly woody perennial climbers and rarely shrub with dilated or swollen nodes and stipule. The leaves of various *Piper* species were typically aromatic or had a pungent smell. The flowers were very small, arranged in spikes and had no perianth. The genus *Piper* could also be recognized by its pulpy fruit, 2-6 stamens, ovary one-celled with orthotropus ovule. The genus *Peperomia* differed from *Piper* by possessing minute fruits, two stamens, without stipule and normally erect herbs. *Piper* species preferred moist habitat and existed as climbers or erect herbs on the forest floors of the virgin or disturbed forest.

There was an estimated total of 1200 species of *Piper* distributed in the pantropical and neotropical regions of the world and over 400 species were recorded from the Malesian region alone (de Waard & Anunciado, 1999) Revision work of Piperaceae for Peninsular Malaya was done by Ridley (1924) in which he documented a total of 75 species. Literatures on the wild *Piper* of Borneo were scarce till today. In Brunei, six species have been documented, namely *P. abbreviatum* Opiz, *P. caninum* Blume, *P. muricatum* Blume, *P. poryphyrophyllum* N.E.Br. and *P. vestitum* while several collections were still awaiting proper scientific identification (Coode *et al.* 1996). However, the enumeration and revision works of the Philippines wild Piperaceae were quite extensive. These included studies done by C. de Candolle (1910) where he recognized a total of 133 species of *Piper* and 26 species of *Peperomia* occurring in the Philippines. Later, Merrill (1923), in his enumeration of the Philippines flowering plants, only recognized 115 species of *Piper* and 25 species of *Peperomia* and one species of *Zippelia*. The systematic study of the Philippines Piperaceae was later done by Quisumbing (1930) and from his intensive study, documented 87 species of *Piper* and 21 species of *Peperomia*. He also recognized the

classification of the genus *Piper* into 6 sections namely *Heckeria*, *Eupiper*, *Sarcostemon* and *Muldera*, following the classification by C. de Candolle (1923) while sections *Penninervia* and *Zippelia* were newly proposed.

The uses of *Piper* from Peninsular Malaysia were documented by Burkill (1966) which obviously included the cultivated *Piper nigrum* L. (Lada) that became one of the primary source of spices worldwide: the white and black pepper. The leaves of *P. betle* (Sireh) were used for masticatory and also for relieving constipation in children and poulticing ulcerated noses. Leaves were often heated and applied to the chest to relieve cough and asthma. The decoction of *P. sarmentosum* Roxb. (Kadok) leaves were used as an embrocation to cure pains in bones and applied to the foreheads of children suffering from headaches. Other species used for medicinal purposes included *P. umbellatum* (Segumbar urat) for stomach-aches and its fruits were chewed with betel for coughs. The leaves were also eaten raw or cooked as a seasoning. *P. poryphyrophyllum* (Sireh harimau or Akar bugu), a pretty wild *Piper* with purple and speckled leaves were purportedly effective against leprosy, stomach-aches in children and a variety of skin diseases.

Volatile essential oils could be extracted from *Piper* species and had been marketed as perfumes. It was also known to contain terpenes and resins which was responsible for its biting taste. Phytochemical screening of *Piper* revealed the presence of a variety of natural products such mevalonic acid (monoterpenes and sesquiterpene), cinanamoyl amides and alkyl amides, aristolactams, flavone, dihydroflavone, dihydrochalcone and O-methylflavonoids (Parmar et. Al. 1997).

MATERIALS AND METHODS

The collections of the *Piper* species were made within the expedition sites which include Mahua, Crocker Range Headquarters, Telekom Station at Mile 16 of the Keningau Road and Gunung Alap. The vegetation types ranged from lowland forest, hill forest, disturbed and established secondary forests. Fertile specimens were collected and preserved as voucher herbarium specimens. Identification of some of the *Piper* species collected proved problematic and almost impossible in the absence of neither flowers nor fruits in some of the sterile specimens collected. Taxonomic identifications were done at Sarawak Herbarium Sarawak and based on references available from Ridley (1945). Some of the species were also collected for phytochemical screening. Botanical illustrations of each species collected were included in this report. Voucher specimens were deposited at Universiti Malaysia Sarawak Herbarium (HUMS), Kota Samarahan, and the duplicates at the Kinabalu Park Herbarium (SNP), Kota Kinabalu, Sabah.

RESULTS AND DISCUSSIONS

During the Sabah Park Crocker Range Expedition in 1999 we managed to collect and identify seven species of wild *Piper* from various localities of the Crocker Range. The species identified

were *Piper caninum* B1., *P. erecticaule* C.DC, *P. aff. longamentum* C.DC, *P. magnibaccum* C.DC, *P. poryphyrophyllum* N.E. Br., *P. umbellatum* Linn., *P. aff. ridleyi* C.DC. Two other specimens (sp. 1 and sp. 2) collected were not identified because both were only represented by sterile materials. The botanical description of the species were included below. The taxonomy and identification of the genus *Piper* was rather complex and difficult as materials collected in some cases were incomplete and the flowers were often too tiny to be observed with accuracy. Botanical documentation and reliable reference materials for the Malaysian *Piper* are still lacking. To date only few scientific documentation of Bornean *Piper* had appeared in the literature which included those by Pearce (1986) and Tawan & Ipor (1993) since the last revision of the genus by Ridley in 1924. Hence any attempt to further study *Piper* taxonomically would be most desirable. Detail studies on its genetic variability and molecular aspects would be particularly useful for genetic improvement of the cultivated *Piper nigrum*. Biodiversity prospecting of the wild *Piper* would be another interesting research possibility because of the medicinal values associated with many wild species of *Piper* as claimed by the many indigenous peoples of Borneo.

DESCRIPTIONS AND ILLUSTRATIONS OF THE COLLECTED SPECIES

Botanical name: *Piper caninum* Bl. (Figure 1)

Vernacular name: Cabai hutan, Lada hantu, Lada anjing, Akar kalong

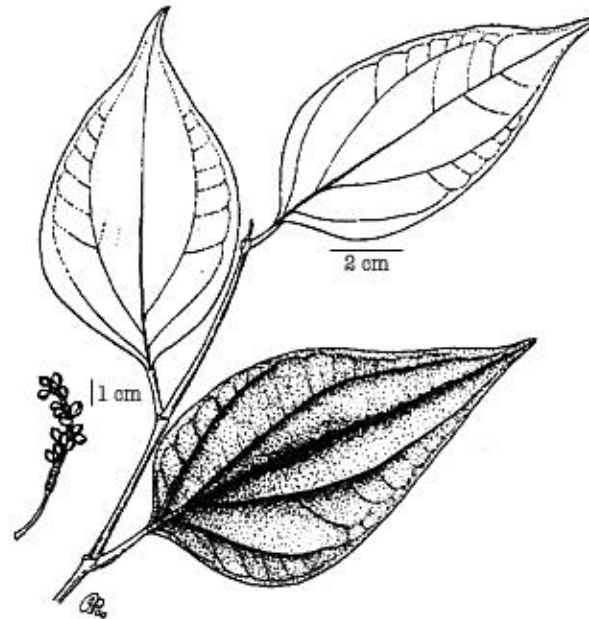


Figure 1: *Piper caninum* Bl. (Showing the fruting branch)

Climber, on a small tree. Leaves, chartaceous, . Leaves rather thin, chartaceous, undersurface glaucous, upper surface green when fresh, blackish when dry; lamina symmetrical 10.0-11.0cm x 5.0-5.6cm, shape ovate, apex acuminate, 1.0cm long, base rounded; petioles 1.0-1.2cm long; venation 1 pairs from the base and 1 pair from the midrib, glabrous, raise on both surfaces. Inflorescence axillary, opposite to the leaf at the node; spike 4cm long, peduncle 1.8-2cm long; drupes many, closely arranged with short pedicels c. 1mm long, globose, 1.5-2mm diameter, green, orange when ripe and black when dry.

Specimen collected: Sabah, Crocker Range Headquarters, Keningau, 900m altitude above sea level, 18 October 1999, Cheksun Tawan, Isa Ipor, Hamsawi Sani, Fasihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong, CST 1932 (HUMS & SNP).

Botanical name : *Piper erecticaule* C.DC (Figure 2)

Vernacular name: Lada hutan (Malay)

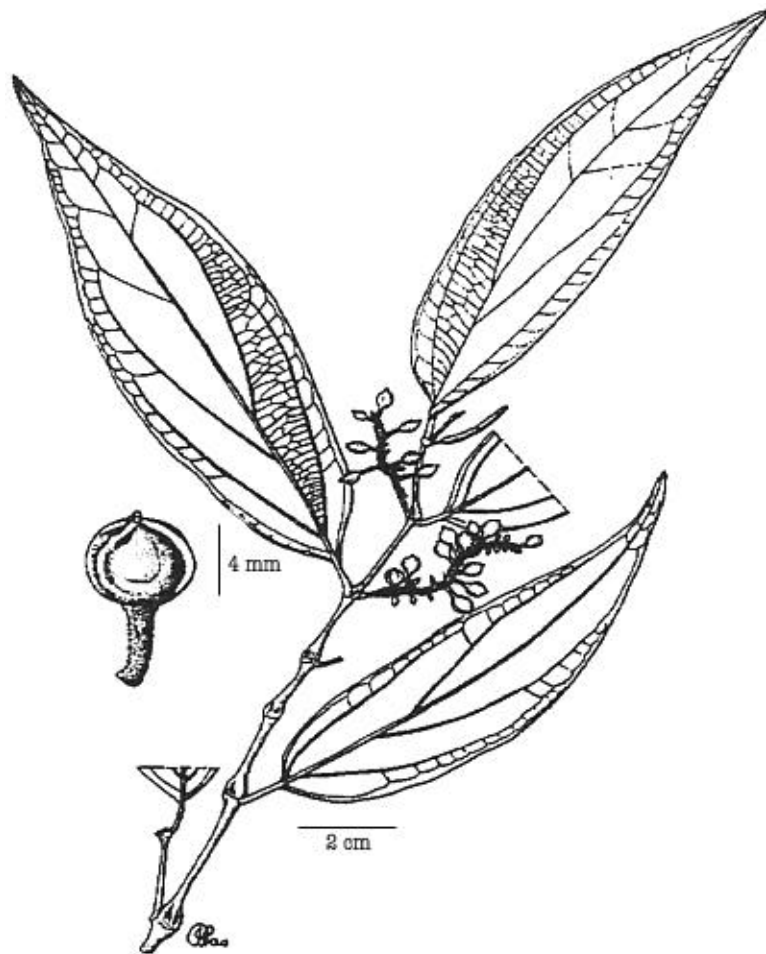


Figure 2: *Piper erecticaule* C.DC (Showing the fruiting branch)

Shrubby woody herb, main stem erect, about 60m from the ground, with 2-3 lateral branches at the upper most nodes which produces the inflorescence. Nodes of the lateral branches distinctly swollen, dark grey, internodes green when fresh. Leaves rather thin, chartaceous, undersurface glaucous, upper surface green when fresh, blackish when dry; lamina asymmetrical 13.7-17.0cm x 4.0-4.5cm, shape lanceolate, apex long acuminate, 2-2.5cm long, base cuneate; petioles 0.9-2.0cm long; venation 2 pairs from the base and 1 pair from the midrib, glabrous, raise on both surfaces. Inflorescence axillary, opposite to the leaf at the node; spike 2.5-4.5cm long, peduncle 0.3-0.5cm long; drupes many, less dense, with pedicels c. 4-5mm long, globose, 3- 4 mm diameter, green, orange when ripe and black when dry.

Specimens collected: Sabah, Crocker Range, Telekom Station, Mile 16 Keningau Road, 19 October 1999, Cheksum Tawan, Isa Ipor, Hamsawi Sani, Fashihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong, CST 1942 (HUMS & SNP). Sabah, Gunung Alap, 21 October 1999,

Cheksum Tawan, Isa Ipor, Hamsawi Sani, Hidir Marzuki & Sekudan Tedong, CST 1989 (HUMS & SNP).

Botanical name *Piper* aff. *longamentum* C. DC. (Figure 3)

Vernacular name Lada hutan (Malay)

Scandent woody herb, about 1 m tall, lateral branches arising from the upper nodes, stem c. 1.5cm diameter, grey-brown. Leaves rather thin, chartaceous, undersurface glaucous, upper surface green when fresh, blackish when dry, hairy; lamina asymmetrical 18-10.5cm x 5.7-7.0cm, shape oblong, apex acuminate, 1.3-2.0cm long, base oblique; petioles 1.0-1.5cm long; venation 9-13 pairs of secondary veins, hairy, raise on both surfaces. Inflorescence axillary, opposite to the leaf at the node; spike very long, 25-28cm long, peduncle 4.3-4.5cm long; drupes with short pedicels, globose with short break, 1.5-2mm diameter, green, orange when ripe and black when dry.



Figure 3: *Piper* aff. *longamentum* C.DC (Showing the fruiting branch)

Botanical name: *Piper magnibaccum* C.DC (Figure 4)

Vernacular name: Lada hutan (Malay)

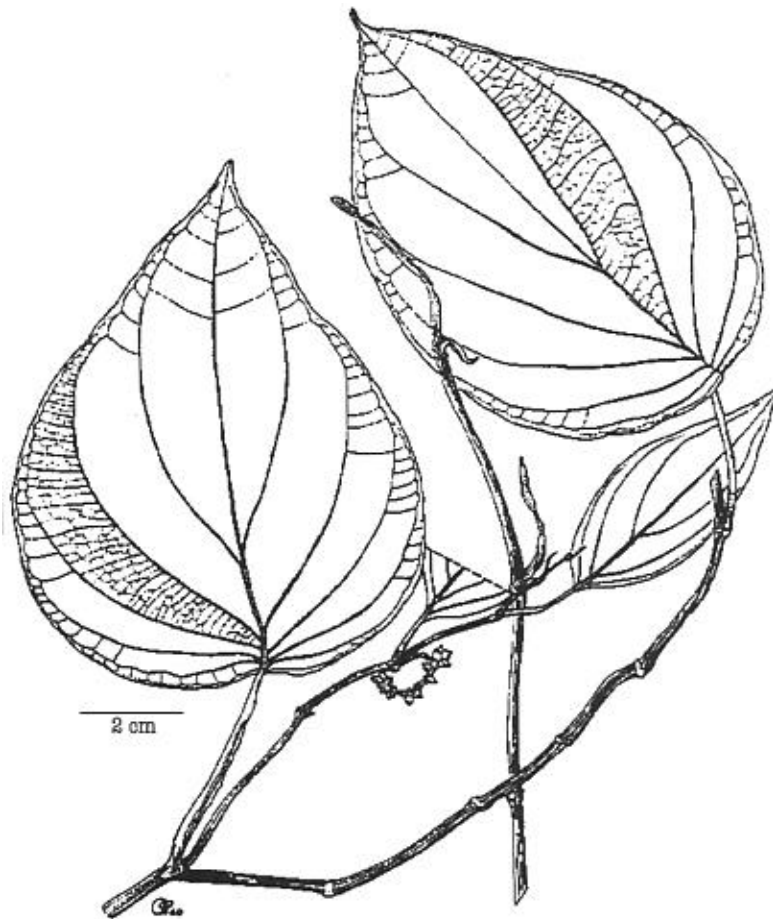


Figure 4: *Piper magnibaccum* C.DC (Showing the fruiting branch)

A robust vine/climber, reaching to 10m up on the tree trunk; stem rounded, 1-1.5cm diameter; fresh stem pale green with fine whitish stripes, produces brownish-yellowish, sticky exudate when cut.

Leaves thick, leathery, undersurface glaucous, large, lamina symmetrical, 18-24cm x 12-13cm, shape cordate, apex acuminate, c. 1cm long, base slightly cordate-rounded; petioles 6-7.4 cm long; leaves of the fertile branches smaller 6-15cm x 3.1-7.5cm; petioles 2.5-4.0cm long; venation 4 pairs of secondary veins arising from the base, 1 pair from the midrib, raise on both surfaces. Inflorescence axillary, opposite to the leaf at the node; spike short, 3-4cm long, peduncle 1-1.5cm long; drupes sessile, closed arranged, ovoid with short break, 1.5-2mm diameter, green when fresh, black when dry (immature).

Specimen collected: Sabah, Crocker Range Headquarter, Keningau, 18 October 1999, Cheksum Tawan, Isa Ipor, Hamsawi Sani, Fashihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong,

CST 1910 (HUMS & SNP). Specimen was collected from the established secondary hillforest.

Botanical name: *Piper umbellatum* (Willd) C.DC. (Figure 5)

Vernacular name: Sigumbar urat (Malay Peninsula Malaysia), Lemba (Moluccas), Bumbu, Dombo, Tombo, Ucheng-uncheng (Java)

Erect shrub, 50-80 cm tall, stem 1.0-2.0 cm diameter. Leaves, thin, chartaceous, undersurface glaucous, upper surface green when fresh, blackish-greyish when dry, large; lamina symmetrical 25-35cm x 4.0-5.0cm, shape cordate, apex cuspidate, c.2.0cm long, base cordate; petioles 2.0-4.0cm long; venation 2 pairs from the base and 2 pair from the midrib, glabrous, raise on both surfaces. Inflorescence axillary, umbellate, at the nodes opposite to the leaf; spike 10-16cm long, peduncle 1.5-4.0cm long. Specimen collected still at the early stage of flowering.

Specimen collected: Sabah, Mahua Basecamp, 16 October 1999, Cheksum Tawan, Isa Ipor, Hamsawi Sani, Fasihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong, CST 1870 (HUMS & SNP). Collected from the secondary forest, near a river.

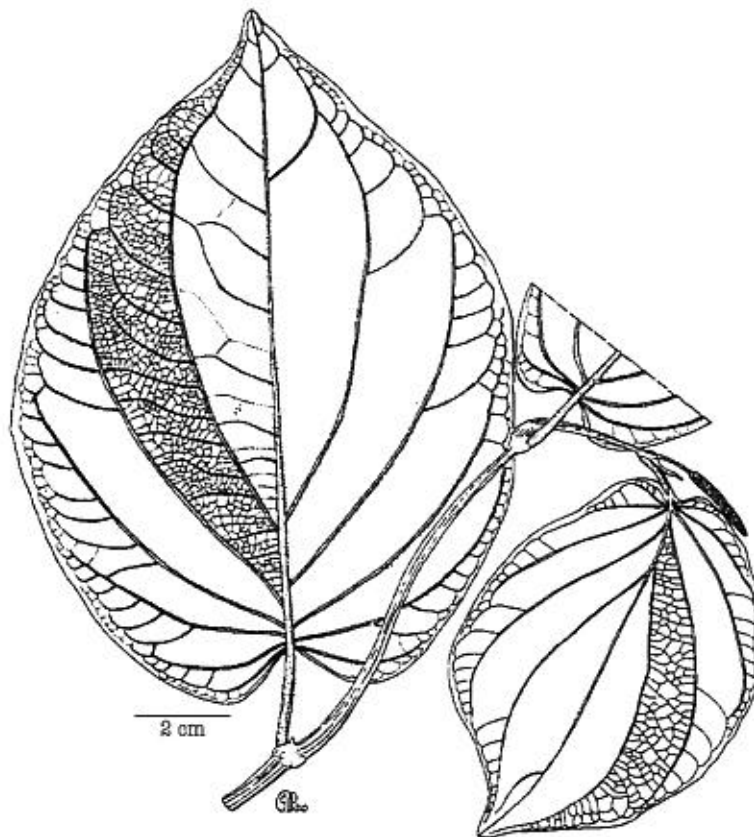


Figure 5: *Piper umbellatum* (Willid) C.DC. (Showing the flowering branch)

Botanical Name: *Piper* aff. *ridiayi* C.DC. (Figure 6)

Vernacular name: Kerubut paya (Malay)

Shrubby woody herb, 50cm tall, stem hairy. Leaves chartaceous, both surfaces blackish when dry; lamina slightly asymmetrical, 16-17.0cm x 3.0-7.0cm, shape oblong-lanceolate, apex acuminate, 2-2.5cm long, base cuneate; petioles 2.0-3.0cm long; venation, 2 pairs from the base and 1 pair from the midrib, tomentose, raise on both surfaces. Inflorescence axillary, opposite to the leaf at the node; spike 2.0cm, peduncle 5mm long, tomentose (still at early stage of development)

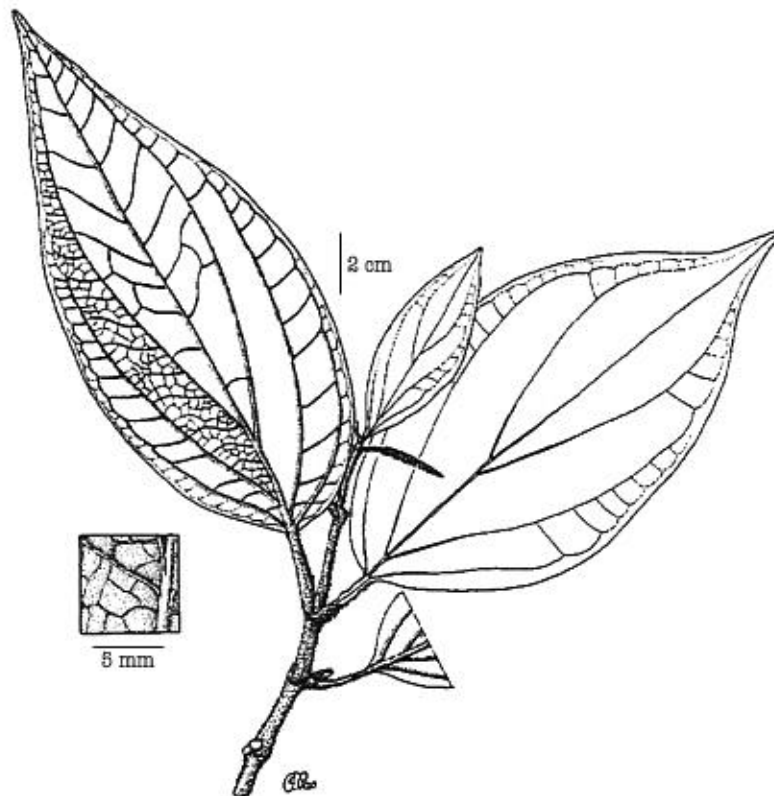


Figure 6: *Piper aff. ridleyi* C.DC (Showing the flowering branch)

Specimens collected: Sabah, Ulu Senaggang, Crocker Range, at 1050m altitude above sea level. 20 October 1999, Cheksum Tawan, Isa Ipor, Hamsawi Sani, Fasihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong, CST 1972 (HUMS & SNP)

Botanical name: *Piper porphyrophyllum* N.E. Br.

Vernacular name: Lada hutan, Sireh rimau, Kerakap rimau, Akar bugu (Malay)

A slender climber on trees, stem glabrous. Leaves opposite, 10-17 cm by 6-7 cm, oblong-ovate, apex acute, base cordate, colour distinct deep purple coloration speckled with white or pinkish patches. 5 veins arising from the base. Petioles 2-3 cm long. (Sterile material)

Botanical name: *Piper* sp. 1

Vernacular name: Tarantap (Dusun)

A robust climber on a tree, stem 1.0-1.5cm diameter, young stem hairy, rather branches numerous, growing away from the trunk, dropping, roots absent from the nodes of the lateral branches. Leaves, chartaceous, undersurface glaucous, upper surface rough with scales, green when fresh, blackish-greyish when dry, large; lamina asymmetrical 16-26cm x 9.2-13.0cm, shape mostly ovate sometimes obovate, apex acuminate, c. 1.0-2.0cm long, base oblique; petioles 0.9-1.2cm long, with fine hairs; venation 6 pairs of secondary veins, midrib, glabrous, raise on both surfaces. (Sterile specimen)

Specimen collected: Sabah, Crocker Range, Headquarter, 20 October 1999, Cheksum Tawan, Isa Ipor, Hamsawi Sani, Fasihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong, CST 1978 (HUMS & SNP). (Sterile specimen)

Botanical name : *Piper* sp. 2

Vernacular name: Sirih Hutan (Malay)

Climber, Leaves chartaceous, upper surface dark grey, lower surfaces grey slightly whitish; lamina symmetrical 17.5-19.0cm x 6.4- 7.0cm, shape oblong, apex acuminate, 1.0cm long, base cordate; petioles very long, 6-8cm long; venation, 2 pairs from the base and 1 pair from the midrib, puberulous, flattened on the upper surface, raised on both surfaces. (sterile specimen)

Specimen collected: Sabah, Mahua Basecainp, Crocker Range, 17 October 1999, Cheksum Tawan, Isa Ipor, Hainsawi Sani, Fasihuddin B. Ahmad, Hidir Marzuki & Sekudan Tedong, CST 1988 (HUMS & SNP). (Sterile specimen)

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Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan.

¹ Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan.