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A New Species of *Colocasiomyia* de Meijere (Diptera, Drosophilidae) from North Sulawesi, Indonesia

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Abstract. *Colocasiomyia micheliae* Yafuso et Sultana, sp. nov. is described, based on specimens collected from an inflorescence of *Michelia* sp., Magnoliaceae, in North Sulawesi, Indonesia. This is the second record of *Colocasiomyia* from inflorescence of Magnoliaceae. Its close relative, *C. crassipes* (de Meijere), was reported from Magnoliaceae in Java.

Key words: *Colocasiomyia*; new species; Drosophilidae; inflorescence; Magnoliaceae; North Sulawesi.

Introduction

A total of 21 species of the genus *Colocasiomyia* de Meijere (Diptera, Drosophilidae) have been reported in the world. Of them, 17 species visit inflorescences of Araceae and play important roles as species-specific pollinators for their host plant species (Carson & Okada, 1980; Kramadibrata & Hambali, 1983; Yafuso & Okada, 1990; Yafuso, 1993). Aside from Araceae, three species are known to visit inflorescences of Arecaceae, and *C. crassipes*, based only on the holotype male specimen, was collected from an inflorescence of Magnoliaceae (de Meijere, 1914).

This paper reports on the collection of one female and four male specimens of *Colocasiomyia* from an inflorescence of *Michelia* sp., Magnoliaceae. Examining precisely these specimens, we describe them as a new species closely related to *C. crassipes*.

Materials and Methods

We (M. Yafuso and T. Sasaki) found a large tree of *Michelia* sp. blooming in a forest near Tenpang Village, near Langowan, about 60 km W of Manado, North Sulawesi, Indonesia. We collected two inflorescences, covering each with a small, gauze net. One female and four male flies were obtained from only one of the inflorescences. The inflorescences were preserved individually in a plastic bag to check the emergence of flies, but none emerged.

External morphology was observed under a stereoscopic microscope and metric characters were measured with an ocular micrometer. To observe the detailed structures of the male and female terminalia, these organs were dissected and cleared in warm 10% KOH. From this solution, the male terminalia was placed in glycerol on a well slide. The female terminalia was sealed with euparal after staining in acetocarmine solution to observe under a compound light microscope.

Terminology mostly follows those of McAlpine (1981) and Grimaldi (1991), and wing indices those of Okada (1959).

Description

Colocasiomyia micheliae Yafuso et Sultana, **sp. nov.** (Figs. 1, 2)

Diagnosis. Body nearly pale brown, not hairy, unusually flattened dorsoventrally. Face protruded forward in lateral view (Fig. 1, C). Orbital setae short, stout; first pair (proclinates) as long as second pair (anterior 'reclinates'); second and third (posterior 'reclinates') pairs erect (Fig. 1, C). Anterior spiracle developed (Fig. 1, C). Aedeagus with large, laterally flattened, spur-like projection apicodorsally (Fig. 2, C). Oviscapt long, blade-shaped, with 5 peg-like ovisensilla on dorsal surface and 6 or 7 peg-like ones ventrally (Fig. 2, F, G).

Male (Figs. 1, 2)

Head (Fig. 1, A–C) triangle in lateral view, longer than high. Face broad and flat; anterior margin completely visible in dorsal view. Carina broad and flat. Eyes bare, reddish brown. Ocellar triangle dark, not protuberant. Antennae widely separated from each other by width of pedicel, recessed entirely in deep fovea. Scape small. Pedicel with 4 short setulae dorsally. Flagellomere I round, a little longer than pedicel. Arista pubescent dorsally, with minute branches apically. Oral cavity deeply and largely foveate, as long as wide in ventral view. Palpus brown, with prominent, long seta apically. Outer vertical setae absent. Ocellar setae parallel and decumbent anteriorly, slightly smaller than first pair of orbitals, with sockets outside of triangle made by ocelli. Postocellar setae as long as ocellars; cross distance of sockets shorter than that of posterior ocelli. Row of 5 minute setae along ptilinal suture on each side. Vibrissa dark brown, almost as long as inner vertical setae but much more slender.

Thorax (Fig. 1, A, B) brown, with only 5–6 long setae laterally and short, sparse, spine-like setae on dorsal surface. Postpronotal lobe well developed, with 2 long and 17–18 small, dark, stout setae. Mesonotum as wide as head, slightly longer than wide, nearly twice as wide as high, with 2 large notopleural setae subequal in size, 2 small supra-alars and 1 large post-alar along lateral margin. Acrostichal setulae black, stout, short, in irregular rows. Dorsocentral setae not distinctly differentiated from acrostichals or lost. Scutellum crescent-shaped in dorsal view, highly polished without pollinosity. Basal scutellar setae large; apical scutellars small, less than half length of basals. Anterior spiracle densely covered with white pollinosity.

Legs yellow, stout. All tarsomeres I–III bearing heavily sclerotized peg-like setae: 3 on fore tarsomere I, 2 on fore II and III and mid I–III, 1 on hind I–III; IV with 5–6 long, erect setae along apical margin; V thick, with 1 yellow, long, sharply curved seta at dorsocentral apex and 5 dark setae on each side of median seta; claws large, strongly sclerotized; pulvilli white, brush-like; empodium very weak, hair-like, hidden in pulvilli. Foreleg (Fig. 1, A, D, E): coxa

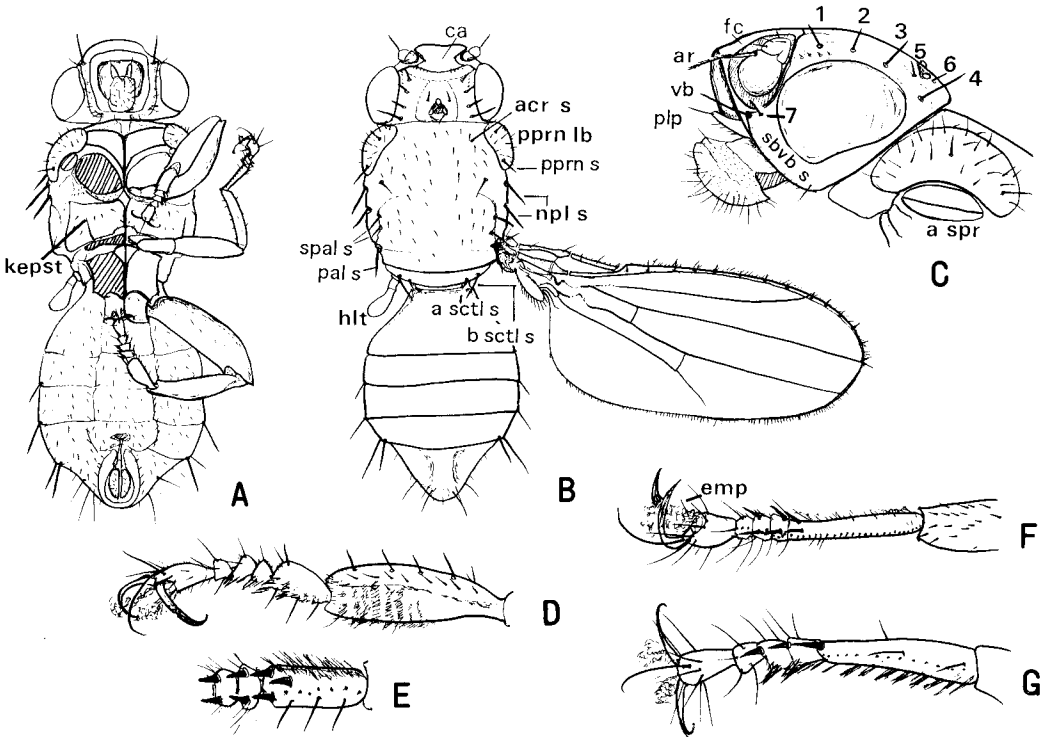

Fig. 1. *Colocasiomyia micheliae* sp. nov. ♂ (holotype).——A, ventral, and B, dorsal views; C, head (lateral view); D–G, right legs: D, foreleg (posteroventral view); E, fore tarsomeres I–III (lateroventral view); F, midleg (posteroventral view); G, hindleg (ventral view). Abbreviations: acr s, acrostichal setulae; ar, arista; a sctl s, apical scutellar seta; a spr, anterior spiracle; b sctl s, basal scutellar seta; ca, carina; emp, empodium; fc, face; hlt, halter; kepst, katepisternum; npl s, notopleural seta; pal s, postalar seta; plp, palpus; pprn lb, postpronotal lobe; pprns, postpronotal seta; sbvb s, subvibrissal setulae; spal s, supra-alar seta; vb, vibrissa. 1, proclinate orbital seta (1st orbital); 2, anterior 'reclinate' orbital seta (2nd orbital); 3, posterior 'reclinate' orbital seta (3rd orbital); 4, inner vertical seta; 5, ocellar seta; 6, postocellar seta; 7, seta posterior to vibrissa.

bulbous; femur ca. 2.5 times as long as wide; tibia bent inwards, slightly clavate toward apex, with 10 long, erect setae on dorsal surface and 7 transverse comb-like bands of setulae on ventral surface; tarsomere I laterally flattened, about twice as long as wide, with 3 erect, long, evenly spaced setae laterally, 6 transverse combs of setulae on ventral surface. Midleg (Fig. 1, A, F) smaller than foreleg; coxa very short, transverse; femur ca. 3.5 times as long as wide; tibia with 5 regular rows of small, black, stout setae on ventral surface; tarsomere I slender, ca. 5 times as long as wide; tarsomeres I–III with row of black, minute, evenly spaced, cuneiform setulae along lateral margin. Hindleg (Fig. 1, A, G): coxae touching each other throughout entire length, produced posteriorly; femur enlarged, widely splayed, ca. 2.6 times as long as wide; tibia somewhat sickle-shaped, with 6 rows of short, evenly but sparsely spaced setae on ventral surface; tarsomere I flattened ventrally, with 6–7 oblique combs of setulae on ventral surface.

Wing (Fig. 1, B) hyaline, broad and oblong because of rounded tip and well developed anal lobe, exceeding abdomen, ca. 2.4 times as long as mesothorax including scutellum. Wing base with 1 long and 1–2 short setae. Costal vein extending to apex of R_{4+5}, with row of 15 short, black, erect, spine-like, evenly spaced setae on dorsal surface. Costal fringe weak, with sparse, heavy setae. Humeral and subcostal breaks without special setae. Stem vein thickened at base of humeral vein. Both radial sector and basal part of medial vein weakened and bent at base, allowing wings to easily fold upon each other. Halter yellow; knob nearly twice as long as wide, ca. 2.2 times as long as stalk.

Abdomen (Fig. 1, A, B) brown. Tergites without setae on dorsal surface, except 1 or 2 long setae on lateral edges of tergites III–V and several long setae on last tergite (syntergite VI, cf. Grimaldi, 1991). Sternites pale brown, weakly sclerotized, with short, dark setae sparsely.

Male terminalia (Fig. 2, A–C): Epandrium pubescent except for anterolateral portion, with ca. 5 setae near upper to middle caudal margin, ca. 10 near lower caudal margin, and ca. 10 long, curved setae on ventral margin of somewhat tongue-shaped ventral lobe. Surstylus dorsally fused with epandrium, not deeply concave on distal margin; ca. 5 apically pointed prensisetae on mediodistal margin, decreasing downward in size; fine setulae on ventrodistal margin; several

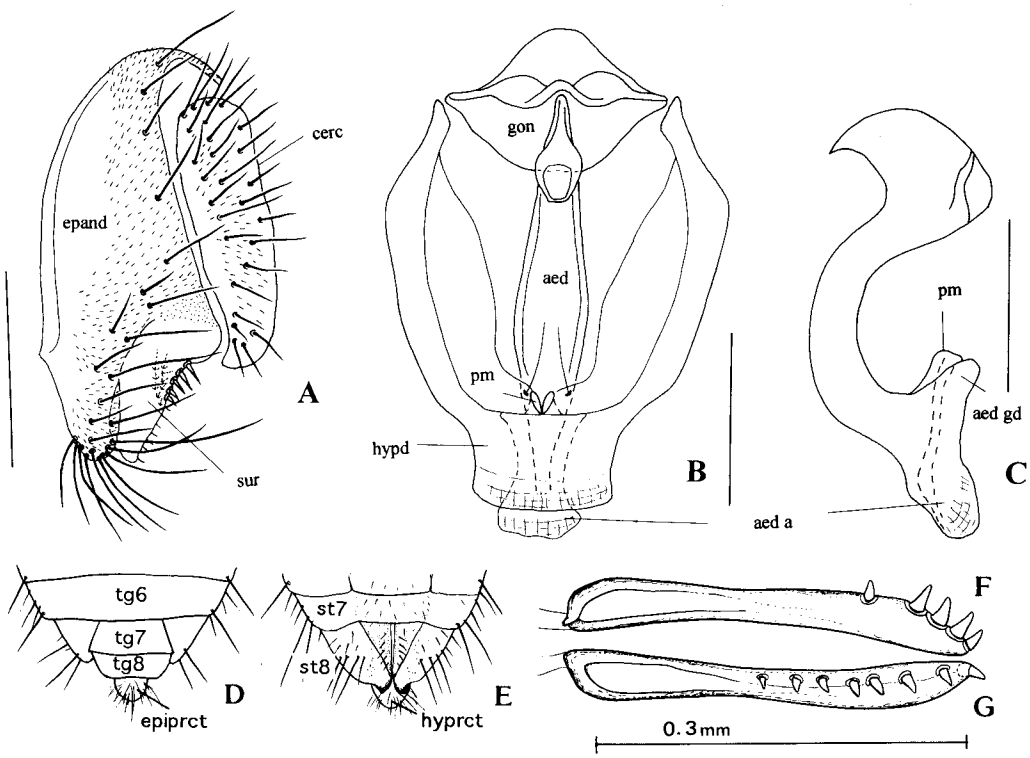

Fig. 2. *Colocasiomyia micheliae* sp. nov.——A–C, male terminalia (holotype, scale-line=0.1 mm): A, periphallic organs; B, phallic organs (ventral view); C, aedeagus (lateral view). D–G, female terminalia (paratype): D, dorsal, and E, ventral views; F, oviscapt (dorsal view); G, ditto (ventral view). Abbreviations: aed, aedeagus; aed a, aedeagal apodeme; aed gd, aedeagal guide; cerc, cercus; epand, epandrium; epiprct, epiproct; gon, gonopod; hypd, hypandrium; hyprct, hypoproct; pm, paramere; st, sternite; sur, surstylus; tg, tergit.

stout setae on inner surface. Cercus only medially pubescent, separated from epandrium, ventrally somewhat curved inwardly and slightly sclerotized, somewhat pointed at tip, clothed with ca. 27 setae. Hypandrium with apodeme flat on anterior margin and pair of paramedian setae near mediocaudal margin. Paramere very small, articulated with aedeagal guide, without sensilla. Gonopods fused each other to form large, posteromedian plate, laterally contiguous to posterior ends of hypandrium and anteroventral corners of epandrium. Aedeagus long, gently curved ventrad; aedeagal guide and apodeme broad; apodeme fused to and much shorter than aedeagus.

Female (Fig. 2, D-G)

Female resembles male in general morphological features but differs in abdomen and terminalia. Tergites II–VI ring segments; VII and VIII not ring segments but small plates. Epiproct covered with long setae, not separated from hypoproct in lateral view. Sternite VII upturned along bilateral margins; VIII separated into right and left plates medially, with some setae along midline. Oviscapt broad, marginally sclerotized, lying interiorly to terminal abdominal segments; 4 large, subapical, peg-like ovisensilla tightly arranged and 1 slightly smaller and isolated ovisensillum on posterodorsal margin; 6 or 7 peg-like ovisensilla evenly spaced on ventral margin.

Measurements: body length=2.39 mm in holotype (range in 3♂ and 1♀ paratypes: 1.95–2.25 mm, 2.18 mm); thorax length=0.86 mm (0.70–0.80 in ♂, 0.79 in ♀); thorax width=0.68 mm (0.61–0.68 in ♂, 0.76 in ♀); thorax height=0.45 mm (0.38–0.43 in ♂, 0.48 in ♀); wing length=1.78 mm (1.61–1.70 in ♂, 1.92 in ♀); wing width=0.70 mm (0.65–0.70 in ♂, 0.79 in ♀). Indices: carina greatest width/face width (distance between inner margins of eyes) at the same level=0.43 (0.42–0.46 in ♂, 0.37 in ♀); relative lengths of orbital setae, 1st : 2nd : 3rd : inner vertical=1 : 1 : 1.1 : 1.7 (1 : 1 : 1.2–1.3 : 1.6–1.9 in ♂, some orbital setae lost in female specimen); distance between 1st and 2nd orbital setae : 2nd and 3rd : 3rd and inner vertical=1 : 1.3 : 1.5 (1 : 1.3–1.4 : 1.5–1.8 in ♂, 1 : 1.3 : 1.8 in ♀); length of seta posterior to vibrissa/vibrissa=0.45 (0.35–0.45 in ♂, 0.40 in ♀); length of femur : tibia : tarsomere I : tarsomeres II–V, foreleg=3.5 : 3 : 1 : 1.5 (3.3–3.7 : 3.0–3.4 : 1 : 1.5–1.6 in ♂, 3.5 : 3.3 : 1 : 1.6 in ♀), midleg=2.6 : 2.2 : 1 : 0.9 (2.2–2.6 : 2.0–2.4 : 1 : 1.0–1.2 in ♂, 2.5 : 2.3 : 1 : 1.2 in ♀), hindleg=2.6 : 2.7 : 1 : 0.8 (2.4–2.5 : 2.4–2.5 : 1 : 0.8 in ♂, 2.7 : 2.6 : 1 : 1.1 in ♀); C (2nd costal section between subcostal break and R_{2+3}/3rd costal section between R_{2+3} and R_{4+5})=2.1 (2.1–2.3 in ♂, 2.4 in ♀); 4v (M_1 between dm-cu and wing margin/M_1 between r-m and dm-cu) =2.4 (2.5 in ♂, 2.4 in ♀); 5x (CuA_1 between dm-cu and wing margin/dm-cu between M_1 and CuA_1)=2.6 (2.9–3.7 in ♂, 2.8 in ♀).

Holotype: ♂, Tenpang, near Langowan, about 60 km W of Manado, North Sulawesi, Indonesia, 16. XI. 1995, ex inflorescence of *Michelia* sp., Magnoliaceae, Yafuso and Sasaki leg. (MZB: Museum Zoologicum Bogoriense, Bogor, Indonesia).

Paratypes: 3♂, 1♀, same data as the holotype (1♂, MZB; 1♂, 1♀, Faculty of Agriculture, University of the Ryukyus, Okinawa; 1♂, Entomological Institute, Hokkaido University, Sapporo, Japan).

Host plant species: *Michelia* sp., Magnoliaceae, is the probable host plant. Although adult flies were collected from an inflorescence of this plant, breeding on it has not yet been confirmed.

Distribution. Indonesia (North Sulawesi).

Etymology. The specific name is after its probable host plant.

Remarks. This species closely resembles *C. crassipes* in their unusual morphology compared to other drosophilids as pointed out by Grimaldi (1991). Both of these two species are known to come to *Michelia* flowers. However, their position in *Colocasiomyia* is uncertain. Okada (1990) subdivided this genus into the *cristata, baechlii*, and *arenga* species-groups, but the morphological features of the present new species and *C. crassipes* are not consistent with any diagnoses given by him for these species-groups. Grimaldi (1991) did not include *C. crassipes* in his cladistic analysis for *Colocasiomyia*. Thus, determining the precise position of the present new species and *C. crassipes* needs further phylogenetic studies with the inclusion of many new species recently discovered from Southeast Asia (Toda, unpub. data). Here we provide a key to these two species and the three species-groups established by Okada (1990).

1. Fore tarsus without stout, peg-like setae; epandrium with thin, curved hook on anteroventral corner; attracted to Arecaceae flowers. ..... *arenga* species-group
– Fore tarsus with stout, peg-like setae; epandrium without thin, curved hook on anteroventral corner. 2
2. Fore 1st to 3rd tarsomeres with stout, peg-like setae; body flattened; attracted to Magnoliaceae flowers. 3
– Only fore 2nd tarsomere with stout, peg-like setae; body not flattened; attracted to Araceae flowers. 4
3. Face protruded forward; postpronotal lobe with

many small setae; apical scutellar setae present; aedeagus apicodorsally with very large, spur-like projection. .....*C. micheliae* sp. nov.

– Face not protruded forward; postpronotal lobe with 3 larger setae and 2 smaller ones; apical scutellar setae lost; aedeagus spindle-shaped. .....*C. crassipes*

4. Arista plumose; ♂ 6th abdominal sternite without any processes. .....*baechlii* species-group

– Arista pubescent; ♂ 6th abdominal sternite with process(es). .....*cristata* species-group

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