

**Table S4: Morphological characters used to study the species of Microgastrine from Churchill, Manitoba, Canada; and its definition. Based on Mason, 1981 [1], Whitfield et al., 2002 [2], Smith et al., 2008 [3], Fernandez-Triana and Goulet, 2009 [4], Valerio and Whitfield, 2009 [5], and unpublished data from JFT.**

- 1- Head Height/Width:** Quantitative measurement. Height is measured from ocelli to base of mandibles; width is the widest point between outer edges of eyes.
- 2- Face Rostriformis:** Yes/No. "Rostriformis" refers to face elongation but needs to be defined yet to accurately depict the degree of variation in this character.
- 3- Head Width below Ocelli/Face Width at Tentorial Pits:** Quantitative measurement to show degree of convergence in eyes.
- 4- Eyes Height/Head Height:** Quantitative measurement. Head Height as in 1; eyes maximum height measured in the same position.
- 5- Ocello-ocular Distance/Posterior Ocelli Diameter:** Quantitative measurement from ocellus edge to the nearest edge of eye.
- 6- Distance between Ocelli/Ocelli Diameter:** Quantitative measurement. It refers to posterior ocelli.
- 7- Malar Space:** Shorter or about the same of mandible width at base/Larger than mandibular base.
- 8- Clypeus Width/Height:** Quantitative measurement.
- 9- Palpi Color:** Pale/Pale in basal segments-Dark apically/Dark. NOTE: Pale can be Yellow/White; Dark can be Brown/Black.
- 10- Glossa:** Truncate/Bilobed but short/Divaricate. NOTE: Sensu Whitfield et al. (2002)
- 11- Antenna Length/Body Length:** Antenna shorter than body/Antenna about the same length or larger than body. Body length measured from head to metasoma. NOTE: Some species have a very short antenna (shorter than length of head plus mesosoma) that may require further clarification.
- 12- Flagellar Segment 2 Length/Width:**  $>2.0X/1.5-2.0X/1.0-1.4X/<1.0X$ .
- 13- Flagellar Segment 14 Length/Width:**  $>2.0X/1.5-2.0X/1.0-1.4X/<1.0X$ .
- 14- Flagellar Segment 14 Length/Segment 2 Length:** Quantitative measurement.
- 15- Lateral Pronotal Grooves:** One/Two/Lower margin of pronotum excavated. NOTE: Sensu Whitfield et al. (2002).
- 16- Tegula Color:** Pale/Pale apically-Dark basally/Dark. NOTE: Pale can be Yellow/White/Translucent; Dark can be Orange-Brown/Brown/Black.
- 17- Mesoscutum Punctures:** Smooth/Shallow, sparse punctures/Closer, deeper punctures. NOTE: Sparse punctures are those separate for more than twice its maximum diameter; close punctures are separated by less than 2X its maximum diameter. Some genera with very deep, coarse and close punctures may require further definition, especially related to depth of punctures.
- 18- Notauli:** Complete and well defined/Partially defined, marked by shallow sulcus/Not defined at all.
- 19- Scutellum Punctures:** Mostly smooth/With a few punctures, mostly near the borders/Mostly or completely punctured.
- 20- Scutellum Length/Width:** Length measured from the distal border of scutellar suture (i.e. excluding the suture) to medioposterior band; width measured at base of scutellum.

- 21- Scutellum Lunules:** Transverse (<10% the maximum height of the lateral face of scutellum)/Semicircular (about 50 %)/Triangular (>70%).
- 22- Number of Costulae in Scutellar Suture:** Quantitative number.
- 23- Scutellar Suture:** Wide and deep, well defined/More or less wide but shallow/Narrow, almost obliterated, and usually superficial.
- 24- Medioposterior Band of Scutellum:** Smooth/Sculptured
- 25- Sublateral Hairs on Metanotum:** Sensu Mason (1981), but needs to be better defined.
- 26- Anterior Margin of Metanotum:** Appressed to scutellum/Excavated sublaterally, exposing phragma sublaterally/Sloping away, phragma well exposed.
- 27- Dorsal, Anterior, Horizontal portion of Propodeum:** Angled relative to posterior declivous portion at about mid-length of propodeum/Dorsal part greatly shortened/Dorsal part evenly and gently curved relative to posterior portion of propodeum.
- 28- Propodeum Background Sculpture:** Mostly smooth/Partially sculptured /Mostly sculptured (punctures, striation, etc)/Irregular carinae pattern covering most of the propodeum.
- 29- Propodeal Areola:** Present and complete/Incomplete (broadly open anteriorly)/Absent.
- 30- Medial Longitudinal Carina of Propodeum:** Present and complete/Present only anteriorly/Present only posteriorly/Absent. NOTE: Partial presence may be as divided (parallel) short carinae.
- 31- Transverse Carinae of Propodeum:** Present/Absent.
- 32- Stigma Color:** Dark/Pale at base/Pale with only borders dark/Fully pale, translucent. NOTE: Dark can be Black/Brown/Orange; Pale can be White/Light Yellow.
- 33- Veins Color:** Mostly dark (some basal veins may be unpigmented)/Partially pigmented (only a few veins are dark, mostly pale)/Mostly unpigmented (white color). NOTE: Dark can be Brown/Orange; Pale can be White/Light Yellow.
- 34- Length of Vein r/Length of Vein 2RS in Forewing:** >2.0 X/2.0-1.5X/<1.5-1.0X/<1
- 35- Veins r and 2RS Shape:** Evenly curved/Distinctly but not strongly angulated/Strongly angulated. NOTE: The presence of a stub needs to be defined and incorporated.
- 36- Second Submarginal Cell (Areolet) Shape:** Vein r-m meeting 3Rsa (areolet 4 sided and usually large)/Vein r-m meeting 2RS near its junction with r, or meeting the junction by itself (large 3 sided, triangular)/ Vein r-m meeting 2RS near its junction with M (small triangular, sometimes not well defined areolet)/Vein r-m absent (no areolet).
- 37- Second Submarginal Cell (Arolet) Height:** <0.3/0.3-0.5/>0.5 NOTE: The height of areolet compares to the distance between vein M and the point of stigma where vein r arises. NOTE: Sensu Fernandez-Triana and Goulet (2009).
- 38- Basal Vein (1M+1Rs) of Forewing:** Conspicuously angled (~90°) at junction of M and Rs/Not conspicuously angled.
- 39- Vein R1 Length/Stigma Length:** Quantitative measurement.
- 40- Stigma Length/Width:** Quantitative measurement.
- 41- Distance between Vein R1 and 3RS/Vein R1 Length:** Quantitative measurement.
- 42- Height/Width of First Discal Cell in Forewing:** Quantitative measurement.
- 43- Vannal Margin of Hindwing:** Distinctly convex beyond widest point/Distally flattened to concave beyond widest point.
- 44- Vannal Fringe of Hindwing:** Long, even, and dense beyond broadest point of clavum/Short, much sparser beyond broadest point/Absent beyond broadest point.
- 45- Tarsal Claws:** Simple/Pectinated/Single basal tooth. NOTE: Sensu Whitfield et al. (2002).
- 46- Female Distal Protarsomere 5:** Normal/Excavated ventrally with curved seta.

- 47- Coxa Color:** Dark/Pale; formula 1/2/3 refers to legs. NOTE: Dark can be Black/Dark brown, Pale can be Light Brown/Orange/Yellow.
- 48- Femur Color:** Dark/Pale; formula 1/2/3 refers to legs. NOTE: Dark can be Black/Dark brown, Pale can be Light Brown/Orange/Yellow.
- 49- Tibia Color:** Dark/Pale; formula 1/2/3 refers to legs. NOTE: Dark can be Black/Dark brown, Pale can be Light Brown/Orange/Yellow.
- 50- Tarsi Color:** Dark/Pale; formula 1/2/3 refers to legs. NOTE: Dark can be Black/Dark brown, Pale can be Light Brown/Orange/Yellow.
- 51- Metacoxa Size:** Shorter than T1/About the same size than T1, can be slightly larger/Reaching apex of T2/Surpassing apex of T2.
- 52- Metafemur Length/Width:** Quantitative measurement.
- 53- Metatibia Inner Spur Length/Outer Spur Length:** Quantitative measurement.
- 54- Metatibial Inner Spur Length/Basitarsus Length:** Quantitative measurement.
- 55- Medio Tergite 1 Shape:** Clearly widening at apex/Parallel sided or barrel shaped or slightly wide at apex or base/Clearly narrowing at apex.
- 56- Medio Tergite 1 Length/Width at Apex:** 2/1.5/1/<1. NOTE: The values provide an approximated value to define the classes; they should be rounded to the nearest range when measured.
- 57- Medio Tergite 1 Basal Excavation:** Present/Absent. NOTE: Senu Mason (1981).
- 58- Medio Tergite 1 Mediobasal Sharp Longitudinal Groove:** Present/Absent.
- 59- Medio Tergite 1 Apical Half:** Flat to gently arched, without excavation/With shallow medial longitudinal excavation.
- 60- Medio Tergite 2 Shape:** Rectangular and covering most of the dorsal surface of tergum/Broadly sub-triangular (rather trapezoidal) or transverse, much broader than medially long/Narrowly sub-triangular (trapezoidal)/Desclerotized anterolaterally and mediapically to form a slender, inverted Y shape. NOTE: Senu Whitfield et al. (2002).
- 61- Delineation between Medio Tergites 2 and 3:** Fine, distinct suture/Weak or absent/Broad crenulate or transcostate groove.
- 62- Hairs on Terga 3+:** Abundant and rather completely and evenly dispersed/Less numerous and grouped in various patterns or lateral clumps or transverse bands/Pointing in various directions to form patterns. NOTE: Senu Mason (1981).
- 63- Laterotergites and Sternites Color:** Pale/Dark. NOTE: Color may be different between basal and apical lateral tergites and sternites, and thus must be defined accordingly.
- 64- Hypopygium:** Evenly sclerotized, not medially folded/More or less evenly sclerotized but sharply folded medially/Medially strongly desclerotized and longitudinally folded into pleats.
- 65- Hypopygium Size:** Shorter than last sternites/About the same size/Larger than last sternites.
- 66- Hypopygial Tip Shape:** Angled/Evenly curved to point/Apically truncate.
- 67- Ovipositor Sheath Length/Metatibia Length:** <1/1/1.5/2/>2. NOTE: The values provide an approximated value to define the classes; they should be rounded to the nearest range when measured.
- 68- Ovipositor Shape and Length:** Long, evenly tapered or sinuate at apex/Short, thick basally with abrupt attenuation near or beyond the middle/Rather short, strongly curved downward through 90° or more.
- 69- Distribution of Hairs in the Ovipositor Sheath:** Uniformly distributed over apical half or more of its length/With some areas of sparse or absent hairs/Concentrated at the extreme apex.

**70- Apical Hairs in the Ovipositor Sheaths:** As large or larger than normal hairs in the rest of metasoma (especially last sternal segments)/Much smaller than hairs in the rest of metasoma/Modified to form dome-shaped sensilla or thick, apically truncated hairs.

**71- Body Length:** Quantitative measurement (mm). NOTE: Body length measured from head to metasoma, ie. excluding the ovipositor.

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