

双齿果蝇物种群 *Lordiphosa denticeps* group 的分类地位及四新种记述

(双翅目: 果蝇科)

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Okada (1967) 以 *Drosophila* (*Hirtodrosophila*) *denticeps* 和 *D.* (*Hirtodrosophila*) *tripartita* 建立双齿果蝇物种群 *denticeps* group, 隶毛果蝇亚属 *Hirtodrosophila* 之下。他最近 (1990) 又将该物种群归入拱背果蝇亚属 *Lordiphosa*, 为黑色拱背果蝇物种群 *nigricolor* group 的同物异名。Grimaldi (1990) 采用分支分类分析法对果蝇科各属间的系统发育关系进行分析, 据单源群原则及 7 个离征将拱背果蝇亚属恢复为属。本文采用 Basden 的分类单元, 即拱背果蝇属。作者对中国双齿果蝇物种群的标本进行研究, 发现雄性前足跗节具似性梳状的鬃, 肛板下缘具粗黑齿, 抱器具方向向上的簇鬃, 后阳基侧突屋脊状, 导卵器具许多散生的盘齿, 这些特征为双齿果蝇物种群所特有。而黑色拱背果蝇物种群则无这些综合特征, 即雄性前足跗节无似性梳状的鬃, 肛板下缘无粗黑齿, 导卵器不具许多散生的盘齿。本文认为双齿果蝇物种群有效, 应作为拱背果蝇属独立的物种群。

双齿拱背果蝇物种群的特征:

末跗节浅棕色, 3 对足均具亚端鬃, ♂ 前足基跗节与第 2 跗节具似性梳状的鬃, 一般弱, 黄色。生殖弓被微毛。肛板下缘尖或截形, 具 1 簇或 1 列粗黑鬃。抱器除齿列外, 具方向向上的簇鬃。阴茎简单, 包于屋脊状的后阳基侧突内, 端具或多或少的毛。前阳基侧突复杂, 分前侧突, 后侧突, 后侧突均因种不同, 分叉或饰变。导卵器大, 除缘齿外, 具许多散生的盘齿。

该物种群已记录 5 种, 本文记述 4 新种及 1 中国新记录种。模式标本均藏于中国科学院昆明动物研究所。

1. 双齿拱背果蝇 *Lordiphosa denticeps* (Okada et Sasakawa)

Drosophila (*Hirtodrosophila*) *denticeps* Okada et Sasakawa, 1965, *Akitu*, 5: 26.

Drosophila (*Lordiphosa*) *denticeps* Okada et Sasakawa, Okada, 1990, *Jpn. J. Ent.*, 58: 154.

3. *Dacus (Asiadacus) nadanus*, sp. nov. (fig. 3)

Holotype ♂, Hainan Island: Nada (Da Xian), 24-VIII-1984, Zhang Jun. This species has only a pair of thin lowest inferior fronto-orbitals and lacks anterior supra-alar and prescutellar bristles. Furthermore, it has a pair of vertical facial spots in the shape of a melon-seed, a pair of dark fuscous bands curving at right angle on 4th abdominal tergum, an unusually large dark brown spot at the apex of wing and three postsutural yellow vittae almost equal in width, etc. Therefore, it can be readily distinguished from the known congeners, although it appears to fit near *D. (Asiadacus) dianensis* Wang et Zhao from Province Yunnan, but differs in the following ways: 1) facial spots in the shape of a melon-seed, not elliptic; 2) medial postsutural vitta a little wider than lateral postsutural vittae, not about 2 times; 3) lateral postsutural vittae with posterior 1/2 tapering off to a point well before upper posterior supra-alar bristles, not parallel-sided and ending at upper posterior supra-alar bristles; 4) presutural spots present, not absent; 5) costal band slightly interrupted at the apex of vein R_{2+3} and at once expanded into a large spot extending to vein M_{1+2} , not largely interrupted and the apical spot extending midway in cell R_5 ; 6) 4th tergum on each side with a right angled fuscous, not hooked pattern.

Length: body 6.0 mm, wing 5.5 mm.

2. 拟双齿拱背果蝇 *Lordiphosa paracenticeps* (Okada)

Drosophila (*Hirtodrosophila*) *paracenticeps* Okada, 1971, *Bull. Biogeog. Soc. Jap.*, 26(5): 31.

Drosophila (*Lordiphosa*) *paracenticeps* Okada, Okada, 1990, *Jpn. J. Ent.*, 58: 154.

3. 黑川拱背果蝇 *Lordiphosa kurokawai* (Okada)

Drosophila (*Hirtodrosophila*) *kurokawai* Okada, 1971, *Bull. Biogeog. Soc. Jap.*, 26(5): 29.

Drosophila (*Lordiphosa*) *kurokawai* Okada, Okada, 1990, *Jpn. J. Ent.*, 58: 154.

4. 新黑川拱背果蝇 *Lordiphosa neokurokawai* (Singh et Gupta), New Record to China

Drosophila (*Hirtodrosophila*) *neokurokawai* Singh et Gupta, 1981, *Oriental Insects*, 15(2): 207.

Drosophila (*Lordiphosa*) *neokurokawai* Singh et Gupta, Okada, 1990, *Jpn. J. Ent.*, 58: 154.

鉴定标本: 3♂♂, 3♀♀, 云南昆明西山, 1987-Ⅱ-12, 户田正宪采; 1♂, 2♀♀, 云南昆明筇竹寺, 1987-X-21, 梁醒财采。

5. 三裂拱背果蝇 *Lordiphosa tripartita* (Okada)

Drosophila (*Hirtodrosophila*) *tripartita* Okada, 1966, *Bull. Brit. Mus. (Nat. Hist.) Entomol. Suppl.* 6: 78.

Drosophila (*Lordiphosa*) *tripartita* Okada, Okada, 1990, *Jpn. J. Ent.*, 58: 154.

6. 刀形拱背果蝇 *Lordiphosa cultrata*, 新种 (图 1-4)

雄: 体长约 3.0-3.5 mm, 翅长约 3.0-3.5 mm。

头部: 复眼红色, 具密集的微毛。触角第 2 节黄色, 具 2 根粗刚毛, 第 3 节灰黄色。触角芒背侧具 5 分枝毛, 腹侧 1 分枝毛, 端部分叉小。下颚须黄色, 顶端具 1 刚毛, 表面散生几根小毛。喙亦黄色。单眼三角区黄色, 单眼鬃长, 亦具几对小刚毛。额浅棕黄色。口上片亦浅棕黄色。侧额及额前具额毛。额为头宽的 $1/2$ 。颜黄色, 鼻瘤上部稍高, 下部低。颊黄色, 高为复眼最大直径的 $1/4$ 强。 orb_1 与后顶鬃相比更靠近 orb_3 ; orb_2 更近 orb_3 着生; orb_3 更靠内侧着生。 $orb_2/orb_1=1/3$, $orb_3/orb_1=2/3$ 。鬃粗长, 其余口缘鬃短小, $or_2/or_1=1/2$, 头孔上部的后头区域暗棕色。

胸部: 背板、侧板及小盾片均黄色。肩鬃 2 根, 几乎相等。正中刚毛 (*ac*) 6 列。前背中鬃/后背中鬃=? (缺), 前背中鬃与后背中鬃间的距离为两前背中鬃间距离的 $1/2$ 。小盾片前后鬃丢失。SI=0.6。足: 黄色, 中足具端鬃, 前中后 3 对足均具亚端鬃。♂前足基跗节与第 2 跗节具似性梳状的黄色鬃。基跗节长约为其余各跗节长之和。末跗节浅棕色。翅: 透明, 后横脉非烟色。 C_1 鬃 2 根, 几乎等长。 $C=3.8$, $4V=1.6$, $4C=0.62$, $AC=2.2$, $5X=1.4$, $C3F=3/5$ 。平衡棒黄白色。

腹部: 背板黄色, 第 2 节后缘黑横带断开, 以后各节横带不断开, 横带的中间区域前伸。围阳体 (图 1) 黄色, 生殖弓具长鬃约 17, 且被微毛。肛板具长鬃约 25, 亦被微毛, 下缘圆截形, 具约 8-10 粗黑齿。抱器 (图 2) 长, 亚端至亚中具 1 列细齿, 约 10

齿；端内侧具方向向上的散生簇鬃，约 40 根。阳体 (图 3, 4)：阳茎不与后阳基侧突相融合，短，端部具毛。前阳基侧突前侧突短，后侧突长，黄色，端部刀形。阳基内骨粗、黄棕色。后阳基侧突融合呈屋脊状，与生殖腹板相连的叶大，且向前突。

正模♂，云南昆明筇竹寺，1988-Ⅲ-1，梁醒财采。

鉴别特征：本新种相似于黑川拱背果蝇，但前阳基侧突后侧突端部为刀形，为该种所特有。

7. 德钦拱背果蝇 *Lordiphosa deqenensis*, 新种 (图 5-9)

雌雄：体长约 3.5 mm，翅长约 3.5 mm。黄色种。

头部：复眼红色，被密集的微毛。触角第 2 节黄色，具 2 根粗刚毛；第 3 节灰黄色。触角芒背侧 4 或 5 分枝毛，腹侧 2 分枝毛。端部分叉小。下颚须黄色，顶端具 1 刚毛，表面散生几根小毛。喙亦黄色。单眼三角区暗桔黄色，单眼鬃长，亦具几对小刚毛。额桔黄色，口上片黄色。侧额及额前具额毛，额为头宽的 1/2。颜黄色，鼻瘤低，颊黄色，高为复眼最大直径的 1/6。 orb_1 与后顶鬃相比更靠近 orb_3 ； orb_2 更近 orb_3 着生； orb_3 更靠内侧着生。 $orb_2/orb_1=1/3$ ， orb_3/orb_1 约 2/3。髭粗长， or_2 亦粗， $or_2/or_1=1/3$ ，其余口缘鬃短小。头孔上部的后头区域棕色。

胸部：背板、侧板、小盾片均黄色。肩鬃 2 根，几乎相等。正中刚毛 (ac)：背中鬃间 4 列，背中鬃前 6 列。前背中鬃/后背中鬃=3/5，前背中鬃与后背中鬃间的距离为两前背中鬃间距离的 1/2。小盾片前鬃平行或外伸，后鬃向内伸且交叉。SI=0.5。足：黄色，中足具端鬃，前中后 3 对足均具亚端鬃。跗节具似性梳状的黄色鬃。基跗节长约为其余各跗节长之和。末跗节浅棕色。翅：透明，后横脉非烟色。 C_1 鬃 2 根，几乎等长。 $C=3.1$ ， $4V=1.4$ ， $4C=0.68$ ， $AC=3.0$ ， $5X=1.0$ ， $C3F=1/2$ 。平衡棒黄白色。

腹部：背板黄色，每节具后缘黑横带，雌窄，雄宽，中间隐约断开。围阳体 (图 5)：黄色，生殖弓具长鬃约 24 根，被微毛。肛板亦具鬃毛及微毛，末端窄且尖，沿外下缘具 6-7 根粗鬃。抱器长，从亚上缘至亚中具 1 列齿，约 13-15 根。端内侧具方向向上的簇鬃，约 20-25 根。阳体 (图 7, 8)：阳茎不与后阳基侧突融和，细长，端部具毛，亚端具 1 裂孔。前阳基侧突后侧突细长，位于阳茎侧，顶端具 1 长感觉毛；前侧突黄色，特别长。后阳基侧突融合呈屋脊状，与生殖腹板相连，正面观窄，侧面观宽。导卵器 (图 9)：浅黄色，端部三角形。缘齿黑色，约 14-15。表面散生浅色盘齿约 70。

正模♂，云南德钦阿东山，1987-VII-8，梁醒财采。配模♀，同上。副模，1♀，同上。

鉴别特征：该新种似台湾种拟双齿拱背果蝇，肛板下缘尖，前阳基侧突后侧突端具感觉毛。但该种阳茎不与后阳基侧突融合，触角芒腹侧分枝 2 根。

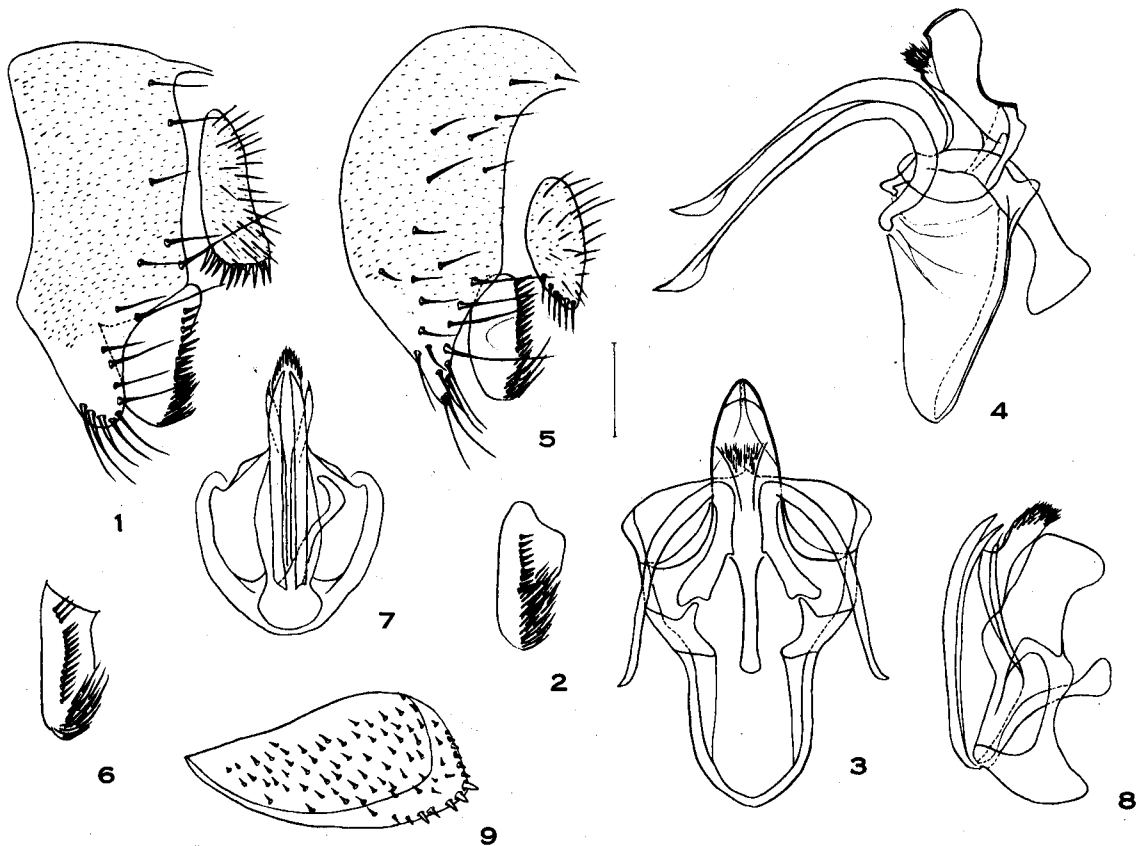


图 1-4 刀形拱背果蝇 *Lordiphosa cultrata* sp. nov.

图 5-9 德钦拱背果蝇 *Lordiphosa degenensis* sp. nov.

1, 5. 围阳体 (periphallitic organs, lateral view); 2, 6. 抱器 (surstylus, ventral view); 3, 7. 阳体 (phallic organs, dorsal view); 4, 8. 阳体 (same, lateral view); 9. 导卵器 (oviscaptus). (比例=0.1 mm)

8. 双叉拱背果蝇 *Lordiphosa ramula*, 新种 (图 10-15)

雌雄: 体长约 3.5 mm, 翅长约 3.5-4.0 mm。

头部: 复眼红色, 被密集的微毛。触角第 2 节黄色, 具 2 根粗刚毛; 第 3 节灰黄色。触角芒背侧 4 或 5 分枝毛, 端部分叉小。下颚须黄色, 顶端具 1 刚毛, 表面散生几根小毛。喙亦黄色。单眼三角区暗黄色, 具几对小刚毛, 单眼鬃长。额暗黄色。口上片浅棕色。侧额及额前具刚毛, 额为头宽的 $1/2$ 。颜黄色, 鼻瘤低, 颊黄色, 高为复眼最大直径的 $1/4-1/6$ 。 orb_1 与后顶鬃相比更靠近 orb_3 , orb_2 更近 orb_3 , 在 orb_1 与 orb_3 的内侧着生, $orb_2/orb_1=1/3$, $orb_3/orb_1=7/9$ 。髭粗长, $or_2/or_1=2/5$, 其余口缘鬃短小。后头黑色。

胸部: 背板具 4 条隐约可见的棕色纵带, 2 条位于背中鬃的内侧, 2 条位于背中鬃的外侧。小盾片浅棕色, 侧板暗黄色。肩鬃 2 根, 几乎相等。正中刚毛 (ac) 6 列。前背中鬃/后背中鬃 = $3/5$, 前背中鬃与后背中鬃间的距离为两前背中鬃间距离的 $1/2$ 。小盾片前鬃外伸, 后鬃内伸且交叉。SI = 0.4。足: 浅黄色, 中足具端鬃, 前中后 3 对足均具亚端鬃。♂ 前足基跗节及第 2、3 跗节具似性梳状的黄色鬃。基跗节长约为其余

各跗节之和，末跗节浅棕色。翅：透明，后横脉非烟色。 C_1 鬃 2 根，几乎相等。 $C=4.3$, $4V=1.5$, $4C=0.53$, $AC=2.0$, $5X=1.6$, $C3F=2/5-1/2$ 。平衡棒黄白色。

腹部：背板浅棕色，每节具隐约断开的后缘黑横带。围阳体 (图 10)：浅黄色，生殖弓具长鬃约 18-20 根，且被微毛。肛板 (图 12) 亦具鬃毛及微毛，长鬃多位于上部，约 13 根。下内缘具约 5-7 根粗鬃，端部具 2-3 根更长的粗鬃。抱器 (图 11) 长，从亚上缘至亚中具 1 列齿，约 15 根，端内侧具方向向上散生的簇鬃，约 20 根。阳体 (图 13, 14)：阳茎不与后阳基侧突融合，细，端部具小毛。前阳基侧突前侧突短，端部尖；后侧突黄色，长，亚端部具 1 叉突。阳基内骨透明，长。后阳基侧突融合呈屋脊状，与生殖腹板相连。导卵器 (图 15)：黄色，下部三角形，缘齿约 18，端 1/3 凹，许多盘齿散生在表面。

正模 ♂，云南昆明筇竹寺，1988-Ⅲ-11，梁醒财采。配模 ♀，同上。副模，2 ♂，同上。

鉴别特征：该种似日本种双齿拱背果蝇，尤其是围阳体和阳体的结构，但双齿拱背果蝇前阳基侧突后侧突顶叉短、小、等大。作者曾托日本果蝇分类学家户田正宪 (M. J. Toda) 从岗田丰日 (T. Okada) 实验室借双齿拱背果蝇的模式标本，进行对比分析。另该新种胸部背板具棕色条纹，而双齿拱背果蝇则无。

9. 拟双叉拱背果蝇 *Lordiphosa falsiramula*, 新种 (图 16-19)

雌雄：体长约 ♂ 3.0 mm, ♀ 3.5 mm, 翅长约 ♂ 3.0 mm, ♀ 3.5 mm。

头部：复眼红色，被密集的微毛。触角第 2 节黄色，具 3 根粗刚毛；第 3 节浅黄色。触角芒背侧 4 分枝毛，腹侧 1 分枝毛，端部分叉中等大。下颚须黄色，表面具 1 刚毛，表面散生小毛。单眼三角区暗黄色，具几对小刚毛，单眼鬃长，外伸。侧额暗黄色。额暗黄色，前面棕黄色。口上片棕黄色。额为头宽的 1/2，具几根额鬃。颜黄色，鼻瘤低、短，不达前缘。颊黄色，高为复眼最大直径的 1/7。 orb_1 与内顶鬃相比更靠近 orb_3 。 $orb_2/orb_1=1/3$, $orb_3/orb_1=4/5$ 。髭粗长、黑， or_2 细短， $or_2/or_1=1/3$ ，其余口缘鬃细小。后头中央黑色。

胸部：背板浅黄色，具 4 条隐约可见的条纹，背中鬃间 2 条，背中鬃外 2 条，雌体背中鬃后的条纹更清晰。小盾片黄色。侧板浅黄色。肩鬃 2 根，下面一根更长。正中刚毛 (ac) 6 列。前背中鬃/后背中鬃=0.7，前背中鬃与后背中鬃间的距离为两前背中鬃间距离的 1/2。小盾片前鬃外伸，后鬃内伸且交叉，前后鬃几乎等长。SI=0.4。足：黄色。中足具端鬃，前中后 3 对足均具亚端鬃。♂ 前足基跗节与第 2、3 跗节具似性梳状的黄色鬃。基跗节长等于其余各跗节长之和，末端 2 跗节浅棕色。翅：透明，横脉非烟色。 R_{2+3} 端稍弯向前缘脉。 R_{4+5} 与 M 平行。 C_1 鬃 2，上面一根更长。 $C=3.7$, $4C=0.7$, $4V=1.6$, $5X=1.7$, $AC=2.3$, $C3F=2/5-1/2$ 。平衡棒浅黄色。

腹部：背板黄色，具后缘黑横带。围阳体 (图 16)：生殖弓黄色，具长鬃约 18 根，被微毛。肛板亦具鬃及微毛，下端截形，具约 7 根黑粗鬃。抱器窄长，亚端至亚中具齿

列，约9齿。端内侧具方向向上的散生的簇鬃。阳体(图17, 18): 阳茎不与后阳基侧突相融合，细弱，端部具毛。前阳基侧突黄色。前侧突短、尖，后侧突长，端部为等长二分叉。后阳基侧突融合呈屋脊状。导卵器(图19): 黄色、窄，缘齿约8，盘齿散生于表面，约45齿。

正模♂，云南大理大波箐，1988-IX-19，梁醒财，渡部英昭采。配模♀，同上。

鉴别特征：该新种似双叉拱背果蝇，特别是体形，胸部背板的条纹及阳体的结构。但前阳基侧突后侧突末端分叉形式不同，该新种分叉等长，双叉拱背果蝇不等长；肛板下缘该种为截形，双叉拱背果蝇尖。

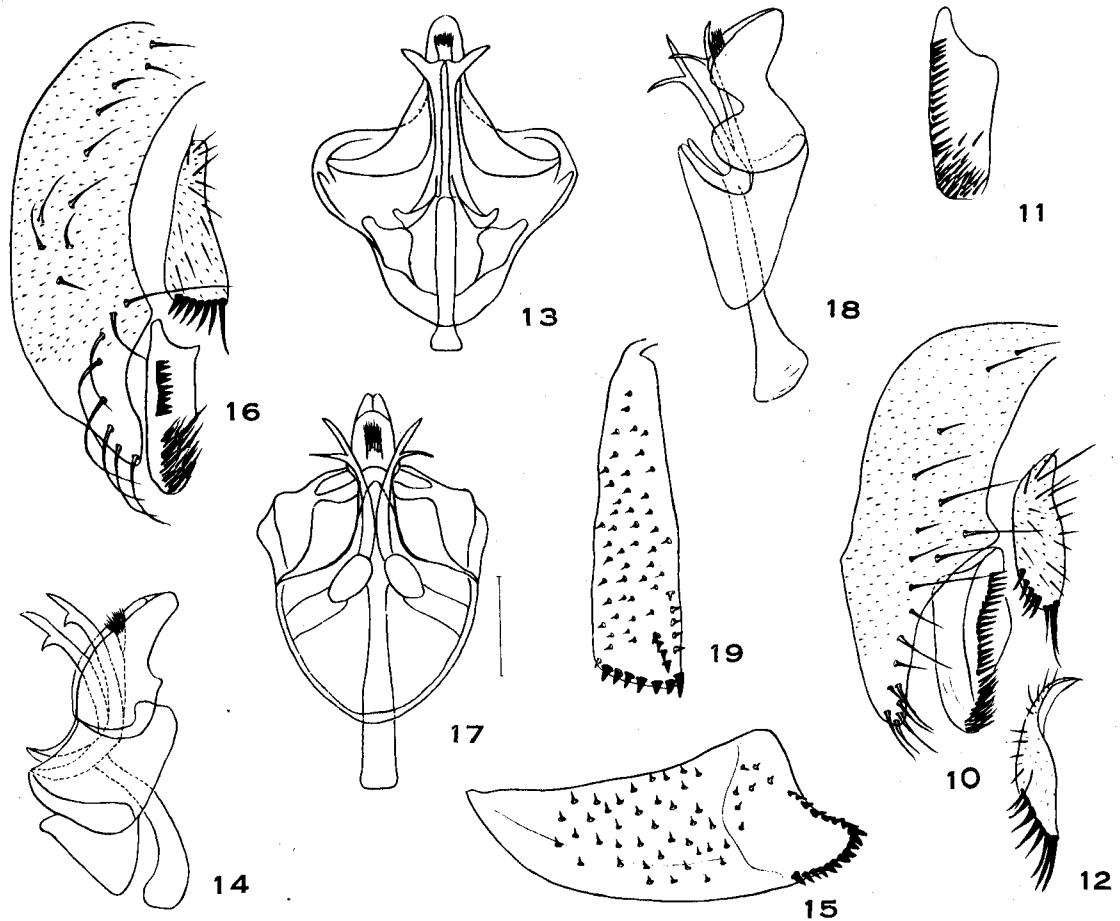


图10-15 双叉拱背果蝇 *Lordiphosa ramula* sp. nov.

图16-19 拟双叉拱背果蝇 *Lordiphosa falsiramula* sp. nov.

10, 16. 围阳体 (periphallallic organs, lateral view); 11. 抱器 (surstylus, ventral view); 12. 肛板 (cercus, ventral view); 13, 17. 阳体 (phallic organs, dorsal view); 14, 18. 阳体 (same, lateral view); 15, 19. 导卵器 (oviscapt). (比例=0.1 mm)

双叉拱背果蝇物种群检索表

1. 抱器齿列直，肛板下缘末端截形，阳茎末端的毛冠大，阳茎与后阳基侧突融合 2
- 不同时具备以上特征 3
2. 触角芒腹侧分枝毛 2 黑川拱背果蝇 *Lordiphosa kurokawai*

- 触角芒腹侧分枝毛 1 新黑川拱背果蝇 *Lordiphosa neokurokawai*
3. 前阳基侧突后侧突感觉毛存在, 肛板下缘末端尖 4
前阳基侧突后侧突感觉毛缺 5
4. 阳茎与前阳基侧突融合, 触角芒腹侧分枝毛 1 拟双齿拱背果蝇 *Lordiphosa paradenticeps*
阳茎与前阳基侧突分离, 触角芒腹侧分枝毛 2 德钦拱背果蝇 *Lordiphosa deqenensis* sp. nov.
5. 触角芒腹侧分枝毛 2, 阳基内骨比阳茎更短 三裂拱背果蝇 *Lordiphosa tripartita*
触角芒腹侧分枝毛 1, 阳基内骨比阳茎长 6
6. 胸部背板具棕色纵条纹 7
胸部背板无棕色纵条纹 8
7. 前阳基侧突后侧突末端分叉等大, 肛板下缘截形, 导卵器末端亦截形
..... 拟双叉拱背果蝇 *Lordiphosa falsiramula* sp. nov.
前阳基侧突后侧突末端分叉不等大, 肛板下缘尖, 导卵器末端圆形
..... 双叉拱背果蝇 *Lordiphosa ramula* sp. nov.
8. 前阳基侧突后侧突末端刀形, 肛板下缘截形 刀形拱背果蝇 *Lordiphosa cultrata* sp. nov.
前阳基侧突后侧突末端分叉, 短、小、等大。肛板下缘尖 双齿拱背果蝇 *Lordiphosa denticeps*

Okada (1971)曾推测该类群起源于东南亚大陆, 该假设的证据之一是亲缘关系相近的三裂拱背果蝇与双齿拱背果蝇分别分布在尼泊尔和日本, 且夏威夷地方性的 *Scaptoid* 种类可能与亚洲的双齿果蝇物种群有共同的祖先。Grimaldi (1990)确实发现拱背果蝇属与 *Scaptomyza* 属之间的同源性。4 新种及 1 新记录种在中国西南地区的发现强烈地支持 Okada 所假设的起源中心——中国西南地区。当考虑双齿果蝇物种群与夏威夷 *Scaptoid* 种类间的关系与进化历史时该地区是非常重要的。

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A REVIEW OF THE TAXONOMIC STATUS OF THE *LORDIPHOSA DENTICEPS* GROUP WITH DESCRIPTIONS OF FOUR NEW SPECIES (DIPTERA: DROSOPHILIDAE)

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Key words: Drosophilidae, *Lordiphosa denticeps* group, Taxonomic status, China (Yunnan)

Okada, T. (1967) built the *Drosophila denticeps* group of the subgenus *Hirtodrosophila* Duda, including *D. denticeps* and *D. tripartita*. Recently, He (1990) assigned this group as a synonym of the group *nigricolor* Lastovka et Maca of the subgenus *Lordiphosa* Basden of *Drosophila* Fallen. Grimaldi (1990) revised the phylogenetic relationship between the genera of Drosophilidae using cladistic analysis, removed the subgenus *Lordiphosa* from *Drosophila*, and elevated it to generic rank according to the rule of monophyly and 7 apomorphic characters. This paper follows Grimaldi's system, treating the taxon *Lordiphosa* as genus. After examining the specimens of the *denticeps* group in China, we found the characters that are unique to the *denticeps* group, such as presence of sex-comb-like bristles in fore tarsomere, large black setae on ventral margin of cercal plate, numerous recurved setae on caudoventral part of surstylus, fused roof-like gonopod, numerous scattered lateral ovisensilla on oviscapt. The author thinks that the *denticeps* group is valid. This paper deals with the *denticeps* group as an independent group of *Lordiphosa*.

Diagnosis of the *denticeps* group:

5th tarsomere brownish, all tibiae with preapical dorsal setae, ♂ 1st tarsomere and 2nd tarsomere of fore leg with yellow, weak sex-comb-like bristles. Epandrium pubescent, ventral margin of cercal plate tapering or truncate, with a cluster of large black setae. Surstylus with numerous recurved setae on caudoventral part except for primary prenisetae. Aedeagus simple, surrounded by roof-like gonopod, with more or less hairs at tip. Paramere complicated, divided into fore and hind branches, hind branch generally modified. Oviscapt with marginal ovisensilla and numerous lateral ovisensilla.

There are so far 9 valid species in the *denticeps* group: *denticeps*, *paradenticeps*, *kurokawai*, *neokurokawai*, *tripartita*, and the 4 new species that this paper describes and one newly recorded for China. The type specimens of the new species are deposited in Kunming Institute of Zoology, Academia Sinica, China. A key to the *denticeps* group is

included.

Okada (1971) deduced that the *denticeps* group has originated in the southeast Asiatic Continent. One of the evidences of this assumption is the occurrence of closely related species in Nepal (*tripartita*) and Japan (*denticeps*). And it is plausible that the Hawaiian endemic Scaptoid species have had a common ancestor with the Asiatic *denticeps* group. Grimaldi (1990) exactly found the homology of *Lordiphosa* and *Scaptomyza*, and the cladogram shows that these two genera have close relationship. The discovery of 4 new species and 1 new record from southwest China suggests that this area is the richest in this fauna, and strongly supports Okada's presumed center of origin as shown in the figure—southwest China. The information indicates that southwest China is a very important area with respect to the evolutionary history and relationship between the *denticeps* group and the Hawaiian Scaptoid species.

1. *Lordiphosa neokurokawai* (Singh et Gupta), new record

Drosophila (Hirtodrosophila) neokurokawai Singh et Gupta, 1981, *Oriental Insects*, 15(2): 207.

Specimens examined. 3 ♂♂, 3 ♀♀, West Mountain, Kunming, Yunnan Province, 21- II -1987, M. J. Toda collected. 1 ♂, 2 ♀♀, Bamboo Temple, Kunming, 21- X -1987, X. C. Liang collected.

2. *Lordiphosa cultrata*, sp. nov. (Figs. 1-4)

♂. Body *ca.* 3.0-3.5 mm, wing *ca.* 3.0-3.5 mm in length.

Gena about 1/4 as broad as the greatest diameter of eye, $or_2/or_1 = 1/2$. Scutum, mesopluron and scutellum yellow, C3F=3/5. Abdominal tergites yellow, 2nd tergite with medially interrupted caudal band, others with uninterrupted caudal black bands projecting anteriorly at middle. Periphallic organs (Fig. 1): yellow, epandrium pubescent, with *ca.* 17 setae. Cercal plate also pubescent, with *ca.* 25 setae. Ventral margin truncate with *ca.* 8-10 large black setae in a row. Surstylus (Fig. 2) with *ca.* 10 primary prensisetae, *ca.* 40 recurved setae on caudoventral part. Phallic organs (Figs. 3, 4): aedeagus hirsute, not fused with gonopod. Fore branch of paramere short, hind branch long, yellow, knife-shaped at tip. Aedeagal apodeme stout, brownish. Gonopod fused and roof-shaped, the part contiguous with hypandrium large. This species resembles *Lordiphosa kurokawai*, but its tip of hind branch of paramere is knife-shaped, which is unique in the *denticeps* group.

Holotype ♂, Bamboo Temple, Kunming, Yunnan Province, 1- III -1988, X. C. Liang collected.

3. *Lordiphosa degenensis*, sp. nov. (Figs. 5-9)

♀, ♂. Body *ca.* 3.5 mm, wing *ca.* 3.5 mm in length.

Gena about $1/6$ as broad as the greatest diameter of eye, $or_2/or_1=1/3$. Scutum, mesopluron and scutellum yellow. $C3F=1/2$. Abdominal tergites yellow, with obscurely interrupted caudal black bands, narrow in ♀, wide in ♂. Periphallic organs (Fig. 5) yellow, epandrium pubescent, with *ca.* 24 setae. Cercal plate pubescent and setigerous, ventral margin tapering, with *ca.* 6-7 black large setae in a row. Surstylus large, with *ca.* 13-15 primary prensisetae in a row, *ca.* 20-25 recurved setae on caudoventral part. Phallic organs (Figs. 7, 8): aedeagus not fused with gonopod, apically hirsute, with a subapical incision. Hind branch of paramere thin and long, with a long sensilla at tip, fore branch yellow, longer. Gonopod fused and roof-shaped and contiguous to hypandrium, narrow in ventral view, wide in lateral view. Oviscapt (Fig. 9) yellowish, triangular near tip, with *ca.* 14-15 black marginal ovisensilla and *ca.* 70 minute yellowish scattered lateral ovisensilla. This species is related to *Lordiphosa paradenticeps* in having tapering ventral margin of cercal plate and in the tip of hind branch of paramere with sensilla. But it differs from the latter in having aedeagus not fused, 2 ventral branches of arista and other detailed characters.

Holotype ♂, Adong Mountain, Deqen County, Yunnan Province, 8-VI-1987, X. C. Liang collected. Allotype ♀, ditto; Paratype; 1 ♀, ditto.

4. *Lordiphosa ramula*, sp. nov. (Figs. 10-15)

♀, ♂, Body *ca.* 3.5 mm, wing *ca.* 3.5-4.0 mm in length.

Gena *ca.* $1/4-1/6$ as broad as the greatest diameter of eye. $or_2/or_1=2/5$. Scutum with 4 obscurely brown longitudinal stripes, two inside dorsocentrals, two outside, mesopluron dark-yellow. $C3F=2/5-1/2$. Abdominal tergites brownish obscurely with slightly interrupted caudal black bands. Periphallic organs (Fig. 10) yellowish, epandrium pubescent, with *ca.* 18-20 setae. Cercal plate (Fig. 12) pubescent, with *ca.* 13 setae, ventral margin with *ca.* 5-7 stout setae on, and *ca.* 2-3 longer setae at tip. Surstylus (Fig. 11) long, with *ca.* 15 primary preansisetae in a row, *ca.* 20 recurved setae on caudoventral part. Phallic organs (Figs. 13-14): aedeagus thin, apically hirsute. Fore branch of paramere short, apically pointed, hind branch yellow, long, subapically with a process forming an unequal fork. Aedeagal apodeme transparent and long. Oviscapt (Fig. 15) yellow, triangular at tip, concave at apical $1/3$, with *ca.* 18 marginal ovisensilla and numerous scattered lateral ovisensilla. This species is related to *Lordiphosa denticeps*, especially in the structure of periphallic and phallic organs, but differs from *denticeps* in having an unequal fork (equal and smaller fork in *denticeps*) on paramere, scutum with 4 obscurely brown longitudinal stripes (no stripes in *denticeps*). The author has compared this new species with the holotype of *denticeps* kindly bor-

rowed from Prof. Okada's Laboratory by Dr. M. J. Toda.

Holotype ♂, Bamboo Temple, Kunming, Yunnan Province, 11- III - 1988; Allotype ♀, ditto; Paratypes: 2 ♂ ♂, ditto. X. C. Liang collected.

5. *Lordiphosa falsiramula*, sp. nov. (Figs. 16-19)

♀, ♂. Body *ca.* 3.0 mm in male, 3.5 mm in female; wing *ca.* 3.0 mm in male, 3.5 mm in female in length.

Gena *ca.* 1/7 as broad as the greatest diameter of eye, $or_2/or_1 = 1/3$. Scutum yellow, with 4 obscure longitudinal stripes, two inside dorsocentrals, two outside. The stripe behind dorsocentrals more clear in female. Scutellum yellow. Mesopleuron yellowish. C_1 setae 2, upper one longer. $C3F = 2/5 - 1/2$. Abdominal tergites yellow, with uninterrupted caudal bands. Periphallic organs (Fig. 16): epandrium yellow and pubescent, with *ca.* 18 setae. Cercal plate pubescent and setigerous, ventral margin truncate, with *ca.* 7 black stout setae in a row. Surstylus long, with *ca.* 9 primary prensisetae in a row and numerous recurved setae on caudoventral part. Phallic organs (Figs. 17, 18): aedeagus thin, apically hirsute. Paramere yellow, fore branch short, pointed apically, hind branch long, with an equal long fork at tip. Oviscapt (Fig. 19) yellow, narrow, truncate at tip, with 8 marginal ovisensilla and *ca.* 45 scattered lateral ovisensilla. This species is related to the foregoing species, *ramula*, especially in the pattern of body stripe on scutum and the structure of the phallic organs, but differs from it in having an equal long fork (unequal fork in *ramula*) of paramere, truncate (tapering in *ramula*) on ventral margin of cercal plate.

Holotype ♂, Daboqing, Dali, Yunnan Province, 19- IX - 1988, X. C. Liang and H. Watabe collected. Allotype ♀, ditto.