

DESCRIPTIONS OF THREE NEW SPECIES OF THE GENUS *MICRODROSOPHILA* MALLOCH (DIPTERA, DROSOPHILIDAE) FROM CHINA

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Abstract Three new species of the genus *Microdrosophila* Malloch (Diptera, Drosophilidae), *M. (Oxystyloptera) basiprojecta* Zhang, sp. nov., *M. (O.) vara* Zhang, sp. nov. and *M. (Microdrosophila) triaina* Lu et Zhang, sp. nov. are described. *M. (M.) fuscata* is newly recorded from China.

Key words Drosophilidae, *Microdrosophila*, new species, new record, China.

The genus *Microdrosophila* Malloch is divided into two subgenera, *Microdrosophila* (MALLOCH) and *Oxystyloptera* (DUDA). Up to present, 60 species of the genus have been described (Zhang, 1989; Chen and Toda, 1994) from the world. Of them, 28 have been recorded from China (Zhang, 1989; Chen and Toda, 1994; Zhang, Chen and Peng, 1996). Three new species and one new record are added to *Microdrosophila* of China in this work. Type specimens of the new species are deposited in the Department of Cell Biology and Genetics, College of Life Sciences, Peking University, China. Terminology and indices followed McAlpine (1981) for morphological terminology and Zhang and Toda (1992) for definitions of measurements and indices.

Microdrosophila (Oxystyloptera) basiprojecta Zhang, sp. nov. (Figs. 1-5)

Diagnosis. Cercus separated from epandrium (Fig. 1). Elongated epandrium with two basal processes (Figs. 1-2). Acrostichal setulae in ca. 10 rows. Inside surface of trochanter with 3 outward black setae in a row on ♂ hind leg. Aedeagus elongated (Figs. 3-4).

♂, ♀ Head. Eye red, with thin pile. Ocellar triangle yellow, slightly convex, black just on inner margins of ocelli, with long ocellar setae and a few setulae. Frontal vitta yellow, without interfrontal setulae. Fronto-orbital plate yellow, slightly convex, anteriorly broadened, nearly reaching anterior margin of frontal vitta, with numerous setulae. Face yellow, convex only under antennae. Carina high, broad. Clypeus pale brown. Gena and postgena yellow. Vibrissa stout and

long, other genal setae minute. Occiput brown centrally. Pedicel yellow, darker outside, with 2 stout black setae; 1st flagellomere pale yellow, arista with moderate terminal bifurcation and setulae along axis. Palpus yellow, with 2 prominent setae apically and subapically and a few setulae.

Thorax. Scutum and scutellum yellow, slightly yellowish medially and along dorsocentrals. Mesopleuron dark yellow. Postpronotal lobe yellow, with 1 postpronotal seta. Acrostichal setulae in ca. 10 rows. Setulae just between anterior and posterior dorsocentral setae slightly longer than other setulae. Basal and apical scutellar setae divergent. Wing hyaline. Veins yellowish, r-m and dm-cu crossveins clear. R_{2+3} curved to costa at tip. R_{4+5} and M1 parallel. C_1 setae 2, lower one longer. Legs yellow except for darker ultimate two tarsomeres. Preapical setae on all tibiae; apicals on mid tibia. Claws and pulvilli all long, as long as ultimate tarsomere. Inside surface of trochanter with 3 outward stout black setae in a row on ♂ hind leg. First tarsomere as long as 3 succeeding tarsomeres together in fore leg, slightly longer than 3 succeeding together in mid one, as long as the rest together in hind leg. Abdomen: tergites with broad, brown bands, in ♂, 2nd and 3rd each with band slightly interrupted medially and 6th with band separated medially, and broadened laterally; in ♀, only 2nd with band slightly interrupted medially.

Male terminalia (Figs. 1-4). Epandrium (Fig. 1) nearly bare, ventral lobe elongated, finger-like, with several setae on anterior margin, 2 small setae apically and 2 small projections basally (Fig. 2). Surstylus ab-

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sent. Cerci separated from epandrium, pubescent and setigerous, narrow ventrally. Aedeagus (Figs.3-4) elongated, fused with parameres, with a few sensilla medially. Aedeagal apodeme (Figs.3-4) narrow, curved ventrad in lateral view. Hypandrium triangular in ventral half, with 1 pair of arms in dorsal half. Female terminalia: Oviscapt (Fig.5) less sclerotized, yellow, with 2 long ovisensilla apically.

Measurements. ♂: BL = 2.30 (2.10-2.55) mm, ThL = 1.00 (0.95-1.03), WL = 2.32 (2.10-2.45) mm, WW = 0.98 (0.90-1.00) mm; ♀ BL = 2.54 (2.30-2.70) mm; ThL = 1.10 (1.05-1.13), WL = 2.48 (2.30-2.60) mm, WW = 1.07 (1.03-1.10) mm.

Indices. arb = 4-6/2, FW/HW = 0.52 (0.48-0.55), ch/o = 0.27 (0.19-0.31), prorb = 0.50 (0.44-0.61), rcorb = 0.17 (0.14-0.19), del = 0.75 (0.70-0.82), sctl = 0.84 (0.78-0.89) in ♂, 0.93 (0.83-1.00) in ♀, sterno = 0.58 (0.50-0.76), orbito = 0.49 (0.33-0.50), dcp = 0.79 (0.71-0.86), sctlp = 1.25 (1.09-1.40), c = 1.47 (1.36-1.62) in ♂, 1.54 (1.45-1.67) in ♀, 4c = 2.40 (2.07-2.64) in ♂, 2.35 (2.21-2.46) in ♀, 4v = 4.17 (3.71-4.58), 5x = 5.06 (4.40-5.88) in ♂, 4.59 (4.30-5.75) in ♀, ac = 3.65 (3.22-4.00), M = 1.67 (1.43-1.92), C3F = 1.00.

Holotype ♂, Kangding County (30° 02' N, 101° 57' E), Sichuan Province, alt. 2 850 m, 19 Aug. 1993, collected by ZHANG Wen-Xia. Paratypes, 9 ♂, 6 ♀, same data as holotype; 1 ♂, Dandang Park, Gongshan County, Yunnan Province, alt. 750 m, 22 June 1993, collected by ZHANG Wen-Xia.

Distribution. China (Sichuan, Yunnan).

Relationship. This species is related to *Microdrosophila (Oxystyloptera) conica* Okada, 1985, but can be distinguishable from it by the diagnostic characters.

Etymology. Referring to the basal projections on ventral lobe of epandrium.

***Microdrosophila (Oxystyloptera) vara* Zhang, sp. nov.** (Figs.6-10)

Diagnosis. Surstylus absent. ♂ hind leg with 1 stout black seta on inner surface of trochanter. Paramere (Figs.8-9) ca. 1/2 length of aedeagus, located ventrolaterally to aedeagus, with a few sensilla. Epandrium (Figs.6-7) folded inward ventrally, pubescent, but without setae.

Some characters commonly seen in the forgoing species *Microdrosophila (Oxystyloptera) basiprojecta* are not referred to in the following description.

♂, ♀ Head. Occiput brown. Thorax. Mesopleuron yellow, darker only under wing base. Acrostichal setulae in 8 rows. Wing. C3-fringe ends just before R₄₊₅, nearly on entire length. Legs. Fore 1st tarsomere slightly longer than 3 succeeding tarsomeres together, mid 1st tarsomere shorter than or as long as 3 succeeding together, hind 1st tarsomere as long as the rest together. Abdomen. Tergites nearly entirely dark brown. Sternites brown.

Male terminalia (Figs.6-9). Epandrium (Figs.6-7) narrow dorsally; apodeme broad. Cerci pubescent and setigerous, narrow and truncate ventrally. Aedeagus (Figs.8, 9) curved ventrad, pointed apically. Aedeagal apodeme short. Hypandrium triangular. Female terminalia. Oviscapt (Fig.10) yellow, less sclerotized, with 3 long ovisensilla apically.

Measurements. ♂: BL = 2.12 (2.00-2.25) mm, ThL = 0.84 (0.80-0.90) mm, WL = 2.20 (2.08-2.30) mm, WW = 0.98 (0.90-1.00) mm; ♀: BL = 2.34 (2.15-2.50) mm, ThL = 1.01 (0.95-1.05) mm, WL = 2.55 (2.40-2.65) mm, WW = 1.09 mm (1.05-1.20) mm.

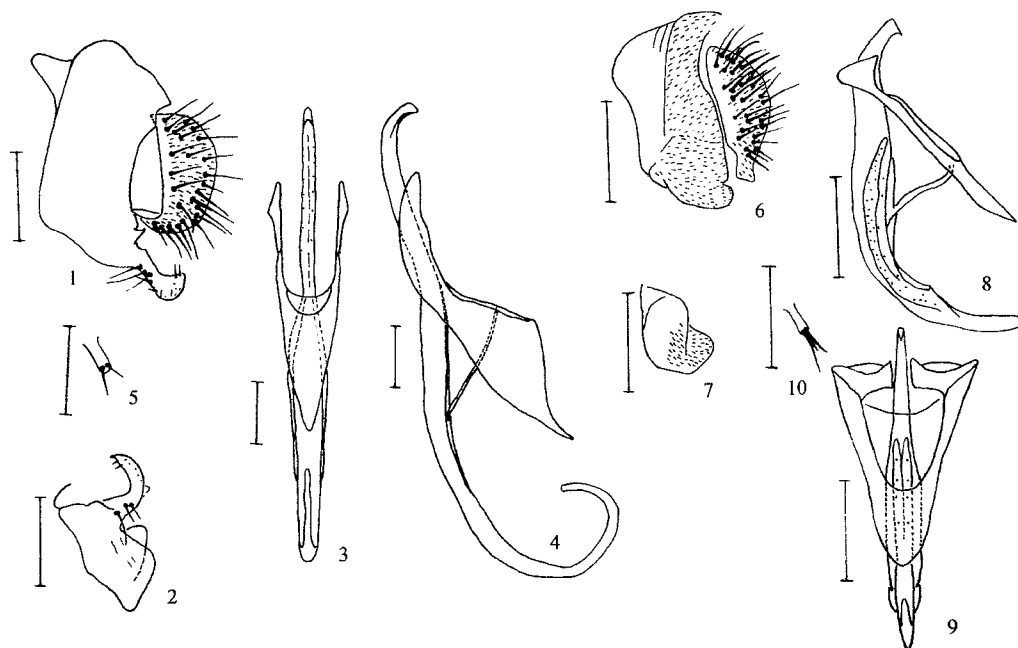
Indices. arb = 4-6/2, FW/HW = 0.54 (0.53-0.56), ch/o = 0.29 (0.25-0.33), prorb = 0.55 (0.44-0.67), rcorb = 0.12 (0.11-0.13) in ♂, 0.16 (0.14-0.17) in ♀; del = 0.71 (0.63-0.81), sctl = 0.65 (0.58-0.72), sterno = 0.58 (0.42-0.78), orbito = 0.50, dcp = 0.76 (0.70-0.82) in ♂, 0.83 (0.69-0.92) in ♀, C = 1.51 (1.39-1.56) in ♂, 1.55 (1.49-1.63) in ♀, 4c = 2.31 (2.17-2.50), 4v = 4.03 (3.71-4.40), 5x = 5.14 (4.75-5.75) in ♂, 4.85 (4.50-5.33) in ♀, ac = 4.00 (3.63-4.43) in ♂, 4.21 (4.00-4.38) in ♀, M = 1.58 (1.43-1.76) in ♂, 1.60 (1.50-1.71) in ♀, C3F = 1.00

Holotype ♂, Kangding County (30° 02' N, 101° 57' E), Sichuan Province, alt. 2 850 m, 19 Aug. 1993, collected by ZHANG Wen-Xia. Paratypes, 6 ♂, 7 ♀, same data as holotype.

Distribution. China (Sichuan).

Relationship. This species is related to *Microdrosophila (Oxystyloptera) fuscata* Okada, 1960 in the morphology of ♂ terminalia, but differs from it in having no surstylus and other diagnostic characters.

Etymology. Referring to the epandrium ventrally folded inward.



Figs. 1-5. *Microdrsoiphila* (*Oxystyloptera*) *basiprojecta* Zhang, sp. nov. 6-10. *Microdrsoiphila* (*Oxystyloptera*) *vara* Zhang, sp. nov. 1, 6. Epandrium and cercus (lateral view). 2, 7. Part of epandrium (ventral view). 3, 9. Aedeagus, aedeagal apodeme, paramere and hypandrium (ventral view). 4, 8. Aedeagus, aedeagal apodeme, paramere and hypandrium (lateral view). 5, 10. Oviscapt. Scale bar = 0.1 mm.

***Microdrsoiphila* (*Oxystyloptera*) *falciformis* Chen & Toda**

Microdrsoiphila (*Oxystyloptera*) *falciformis* Chen & Toda, 1994.

Specimen examined. 10 ♂♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 27 July 2001, collected by ZHANG Wen-Xia.

Distribution. China: Jiangxi (new loc.), Zhejiang.

***Microdrsoiphila* (*Oxystyloptera*) *fuscata* Okada
New record to China**

Microdrsoiphila (*Oxystyloptera*) *fuscata* Okada, 1960.

Specimen examined. 3 ♂♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 27 July 2001, collected by QUAN Lu-Jun. 1 ♂, Meichi, Litingwu, Zhejiang Province, China, 14-18 May 1991, collected by CHEN Hua-Zhong.

Distribution. China (new record): Jiangxi, Zhejiang; Japan.

***Microdrsoiphila* (*Oxystyloptera*) *distincta* Wheeler and Takada**

Microdrsoiphila (*Oxystyloptera*) *distincta* Wheeler and Takada, 1964.

Specimen examined. 1 ♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 28 July 2001, collected by ZHANG Wen-Xia.

Distribution. China: Yunnan, Jiangxi (new loc.); Micronesia.

***Microdrsoiphila* (*Oxystyloptera*) *honoghensis* Zhang**

Microdrsoiphila (*Oxystyloptera*) *honoghensis* Zhang, 1989.

Specimen examined. 3 ♂♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 28 July 2001, collected by QUAN Lu-Jun.

Distribution. China: Yunnan, Jiangxi (new loc.).

***Microdrsoiphila* (*Oxystyloptera*) *latifrons* Okada**

Microdrsoiphila (*Oxystyloptera*) *latifrons* Okada, 1965.

Specimen examined. 1 ♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 27 July 2001, collected by ZHANG Wen-Xia.

Distribution. China: Yunnan, Jiangxi (new loc.); Korea; Japan.

***Microdrsoiphila* (*Oxystyloptera*) *nigrispina* Okada**

Microdrsoiphila (*Oxystyloptera*) *nigrispina* Okada, 1985.

Specimen examined. 5 ♂♂. Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 27 July 2001, collected by CHENG Chang-De.

Distribution. China: Yunnan, Jiangxi (new loc.); Sri Lanka.

***Microdrosophila (Microdrosophila) triaina*, Lu et Zhang, sp. nov.** (Figs.11-16)

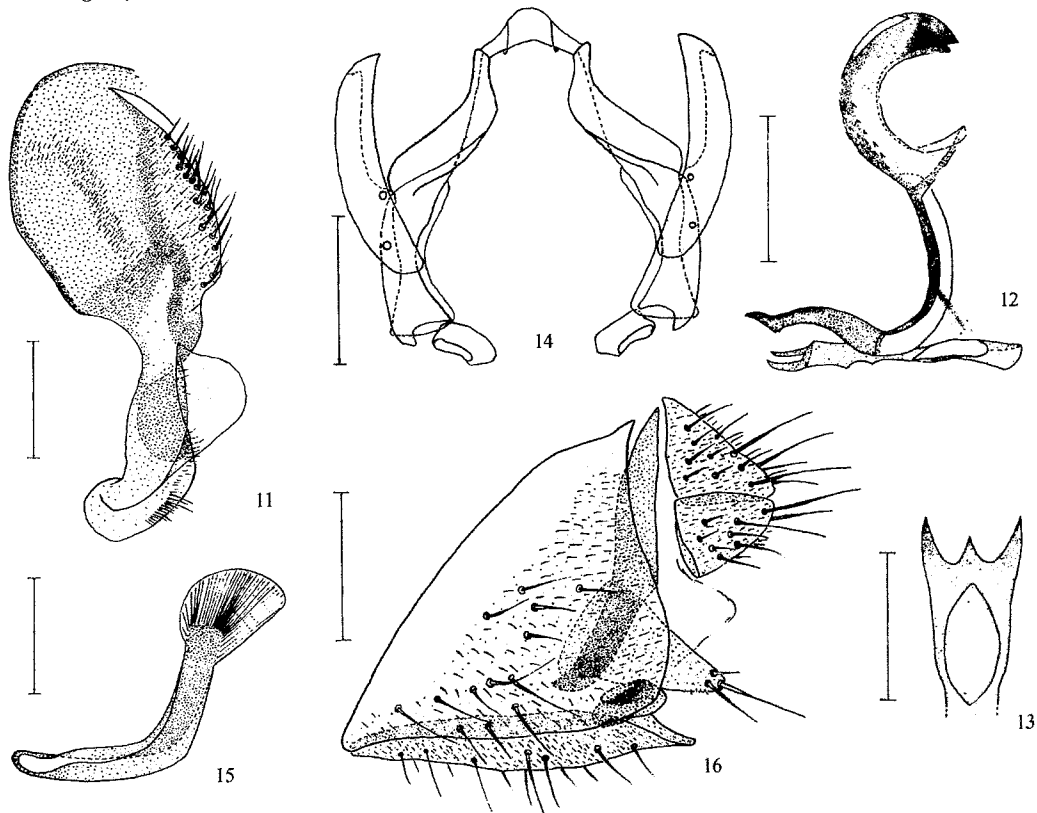
Diagnosis. Aedeagus (Figs.12-13) with three apical acute processes, mid one shorter; ventral recurved process latero-subapically with two small processes; aedeagal guide with two apical curved inwardly processes (Fig.12).

♂, ♀ Head. Eye dark brown, with thin pile. Ocellar triangle large, brown; ocelli yellow; ocellar setae long. Frontal vitta brown. Fronto-orbital plate brown, but paler than frontal vitta. Face brown; carina high, not reaching buccal margin. Clypeus dark brown. Gena brown. Occiput brown. Pedicel brown, with 2 stout setae and some thin hairs; 1st flagellomere, paler than pedicel; terminal bifurcation of arista moderate. Palpus brownish, with 2 long, terminal setae.

Thorax. Scutum and scutellum pale brown. Mesopleuron yellow, with brown, broad stripe above katepisternum. Postpronotal lobe slightly paler than mesopleural stripe. Acrostichal setulae in 8 rows. Basal scutellar setae slightly convergent; apicals parallel or

convergent. Wing. Vein brownish; C1 setae 2, subequal. Halter yellow. Legs pale brown. Fore femur with row of ca. 3 stout, ctenidial spines. Fore 1st tarsomere shorter than the rest succeeding tarsomeres together; mid 1st tarsomere as long as the rest together; hind 1st tarsomere longer than the rest together in ♂, but as long as the rest together in ♀. Abdomen. Abdominal tergites uniformly brown, sternites and pleural membrane yellow.

Male terminalia (Figs.11-15). Epandrium (Fig.11) dark brown, partly pubescent, dorsal narrowly connected; ventral two-fifth part narrow, folded inward on caudal margin, with crescent-shaped flap on lateral surface, caudo-subapically with small bristles in a row. Surstylus absent. Cercus (Fig.11) fused with epandrium, setigerous and pubescent. Aedeagus (Figs.12-13) brown, rod-shaped in ventral view, distal one-second crescent in lateral view, apically shaped into three acute processes of which mid one shorter, submedially with many small warts on ventral surface, ventro-subapically with elliptical incision, basally much narrowing to continue to dark brown, apically



Figs.11-16. *Microdrosophila (Microdrosophila) triaina* Lu et Zhang, sp. nov. 11. Epandrium (lateral view). 12. Aedeagus, aedeagal apodeme, aedeagal guide (lateral view). 13. A apical part of aedeagus (anterior view). 14. Hypandrium and parameter (ventral view). 15. Ejaculatory apodeme (lateral view). 16. 8th tergite, oviscapt, epiproct and hypoproct of female (lateral view). Scale bar = 0.1 mm.

round, ventral recurved process, bearing 2 small processes latero-subapically; aedeagal guide (previously named as vertical rod) apically shaped into 2 processes curved inward; apodeme (Fig.12) roundly dilated in ventral view. Paramere (Fig.14) elongates, tip pointed with 2 sensillae, basally contiguous with looped ventral fragma. Ejaculatory apodeme (Fig.15) very large, foot-shaped, with plate long, oval, black, thin and paler at middle part; stem brown, basally widened like fishtail, as long as plate. Female terminalia: Oviscapt (Fig.16) simply lobe-shaped, unsclerotized, with 1 long and 2 short trichoid ovisensilla; 8th tergite mid-dorsally separated, narrow, shaped like willow leaf; epiproct and hypoproct pubescent.

Measurements. ♂ BL=2.2 (2.0-2.4) mm, ThL=0.9 (0.9-1.0) mm, WL=2.0 (1.9-2.2) mm, WW=0.9 (0.8-1.0) mm; ♀ BL=2.6 (2.4-2.7) mm, ThL=1.0 (0.9-1.1) mm, WL=2.1 (1.9-2.2) mm, WW=1.0 (0.9-1.0) mm.

Indices. arb = 7/3, FW/HW = 0.55 (0.53-0.58), ch/o = 0.10 (0.06-0.12), prorb = 0.61 (0.57-0.68), rcorb = 0.20 (0.16-0.26), vb = 0.34 (0.27-0.51), dcl = 0.74 (0.72-0.78), sctl = 0.41 (0.33-0.46), sterno = 0.51 (0.45-0.64), orbito = 0.36 (0.28-0.48), dcp = 0.72 (0.66-0.75), sctlp = 0.56 (0.47-0.66), C = 1.23 (1.10-1.30), 4c = 2.72 (2.50-3.00), 4v = 3.97 (3.56-4.29), 5x = 3.67 (2.66-5.01), ac = 3.98 (3.59-4.62), M = 1.57 (1.37-1.88), C3F = 0.86 (0.78-0.93).

Holotype ♂, Wuyishan Nature Reserve (27° 51' N, 117° 43' E), Yanshan County, Jiangxi Province, alt. 905 m, 28 July 2001, collected on piles of branches and leaves of bamboo by CHENG Chang-De. Paratypes: 9 ♂♂, 10 ♀♀ same data as holotype.

Distribution. China (Jiangxi Province).

Relationship. This species is related to *Microdrosophila* (*Microdrosophila*) *curvula* Zhang, 1989, in having finger-like process of hypandrium and aedeagus with warts ventro-submedially. But this species can be distinguishable from the latter by the diagnostic characters.

Etymology. Referring to the three apical acute processes of aedeagus.

***Microdrosophila* (*Microdrosophila*) *elongata* Okada**
Microdrosophila (*Microdrosophila*) *elongata* Okada, 1965.

Specimen examined. 2 ♂♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 27 July 2001, collected by CHENG Chang-De.

Distribution. China: Anhui, Taiwan, Guang-

dong, Yunnan, Jiangxi (new loc.); Japan; Philippines; India; Sri Lanka.

***Microdrosophila* (*Microdrosophila*) *maculata* Okada**
Microdrosophila (*Microdrosophila*) *maculata* Okada, 1960.

Specimens examined. 2 ♂♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi, China, 27 July 2001, collected by ZHANG Wen-Xia. 1 ♂, Mangshan, Hunan Province, China, 20 July 2001, collected by CHENG Chang-De.

Distribution. China: Anhui, Guangdong, Yunnan, Jiangxi (new loc.), Hunan (new loc.); Japan.

***Microdrosophila* (*Microdrosophila*) *pseudopleurolineata* Okada**

Microdrosophila (*Microdrosophila*) *pseudopleurolineata* Okada, 1968.

Specimen examined. 3 ♂♂. Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 27 July 2001, collected by QUAN Lu-Jun. 3 ♂♂, 2 ♀♀, Mangshan, Hunan Province, China, 20 July 2001, collected by CHENG Chang-De. 1 ♂, 4 ♀♀, Huangshan, Anhui, 29-30 Aug. 1991, collected by CHEN Hua-Zhong.

Distribution. China, Jiangxi (new loc.), Hunan (new loc.), Anhui (new loc.), Taiwan; Japan, Thailand, Java.

***Microdrosophila* (*Microdrosophila*) *spiciferipennis* Zhang**

Microdrosophila (*Microdrosophila*) *spiciferipennis* Zhang, 1989.

Specimen examined. 2 ♂♂, Wuyishan Nature Reserve, Yanshan County, Jiangxi Province, China, 28 July 2001, collected by LU Rui-Feng.

Distribution. China: Yunnan, Jiangxi (new loc.).

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微果蝇属 (双翅目, 果蝇科) 三新种记述

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摘要 记述了分布在中国的双翅目果蝇科 Drosophilidae 微果蝇属 *Microdrosophila* 3 新种, 基突微果蝇 *M. (Oxystyloptera) basiprojecta* Zhang, sp. nov.、内折微果蝇 *M. (O.)*

vara Zhang, sp. nov.、三叉微果蝇 *M. (Microdrosophila) triaina* Lu et Zhang, sp. nov. 和中国 1 新纪录种 *M. (M.) fuscata*。

关键词 果蝇科, 微果蝇属, 新种, 新纪录, 中国.

中图分类号 Q969.462.2