

A checklist of the family Drosophilidae (Diptera, Ephydroidea) of Vietnam

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We reviewed the available drosophilid literature and listed any drosophilid species with Vietnamese records. Vietnamese drosophilid flies belong to two subfamilies. In this paper, we provided a taxonomic checklist of 68 nominal species. However, this checklist is based on information of diverse literature, and we have not confirmed identification of each species. In total, the number of drosophilid species in Vietnam amounted to 68 species belong to 16 genera. Drosophilinae consists of 12 genera and 51 species, while Steganinae includes four genera and 17 species. This checklist will be the fundamental base for comprehensive taxonomic research of drosophilid fauna in Vietnam.

Keywords: checklist, Drosophilidae, Drosophilinae, Steganinae, Vietnam

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INTRODUCTION

Drosophilidae is an acalyptrate family in the superfamily Ephydroidea (McAlpine, 1989). There are more than 4,000 described species with 119 genera worldwide (Brake and Bächli, 2008). Adults of most species of Drosophilidae are attracted to and feed on a variety of fermenting substances, hence the common name, vinegar, pomace, or fruit flies (Evenhuis and Okada, 1989).

There has been some major taxonomic research about drosophilid fauna in Vietnam. Duda (1922) recorded four new species of the genus *Liodrosophila*. Sidorenko (1996) recorded nine species belong to five genera for new records to Vietnam. Sidorenko (1997a) described three new species and single new record of the genus *Stegana*. Sidorenko (1998a) reported six species under two genera for new records. Sidorenko (1998b) described two new species and two new records of the genus *Stegana*.

Based on world catalogue of Drosophilidae (Brake and Bächli, 2008), 11 genera and 35 species have specific Vietnamese records, excluding cosmopolitan species. The database on Taxonomy of Drosophilidae (TaxoDros, compiled by Dr. Gerhard Bächli) provides detailed regional records in Vietnam. We could check 62 species of Vietnamese drosophilids using TaxoDros (last update: 10-January-2024).

This checklist aims at reviewing the drosophilid literatures and listing any drosophilid species with specific

Vietnamese records. However, this checklist is based on diverse literature, and we do not confirm the identification of each species. As a result of our literature survey, we could confirm the recorded species in Vietnam. The number of previously recorded drosophilid species is 68 species belong to 16 genera under two subfamilies in total. Drosophilinae consists of 12 genera and 51 species, while Steganinae includes four genera and 17 species. This diversity might be a small part of entire drosophilid diversity in Vietnam. Based on our collecting experience, we are sure about the high diversity in Vietnam. We will discover drosophilid diversity as many as possible in Vietnam. This checklist will be the fundamental base for comprehensive taxonomic research of drosophilid fauna in Vietnam.

SYSTEMATIC ACCOUNTS

Family Drosophilidae

Drosophilina Rondani, 1856: 27, 133.

Drosophilidae Loew, 1861: 89. Mssp. Drosophilidae

Drosophilidae Loew, 1862: 45.

Subfamily Drosophilinae

Genus *Colocasiomyia* de Meijere

Colocasiomyia de Meijere, 1914: 272. Type species: *Colocasiomyia cristata* de Meijere.

1. *Colocasiomyia alocasiae* (Okada, 1975: 358 (*Drosophilella*)). TL: Japan, Ryukyu, Okinawa Prefecture, Yaeyama Is., Ishigaki I., Yonehara.

Vietnamese record: *Colocasiomyia alocasiae*; Brake and Bächli (2008, p. 29, world catalogue).

Distribution: China (Taiwan), Japan (Ryukyu Islands), Vietnam.

2. *Colocasiomyia colocasiae* (Duda, 1924b: 252 (*Drosophila*)). TL: Indonesia, Java, Nongkodjadar.

Vietnamese record: *Colocasiomyia colocasiae*; Brake and Bächli (2008, p. 29, world catalogue).

Distribution: Borneo, Indonesia (Java), Myanmar, Vietnam.

3. *Colocasiomyia diconica* (Toda and Okada, 1983: 172 (*Drosophilella*)). TL: Myanmar, Rangoon, Inya Lake.

Vietnamese record: *Colocasiomyia diconica*; Brake and Bächli (2008, p. 29, world catalogue).

Distribution: Borneo, Indonesia (Java, Sumatra), Myanmar, Vietnam.

4. *Colocasiomyia erythrocephala* Sultana and Yafuso in Sultana *et al.* (2002: 311). TL: Vietnam, Cuc Phuong National Park.

Vietnamese records: *Colocasiomyia erythrocephala*; Sultana *et al.* (2002, p. 311, type specimen information); Sultana *et al.* (2006, p. 697, collecting locality and host plant information); Brake and Bächli (2008, p. 30, world catalogue); Shi *et al.* (2019, p. 351, diagnosis, redescription, distribution, remarks, photo of habitus).

Distribution: Vietnam.

5. *Colocasiomyia grandis* Toda in Takano *et al.* (2021: 24). TL: China, Yunnan, Xishuangbanna, Menglun.

Vietnamese record: *Colocasiomyia grandis*; Takano *et al.* (2021, p. 24, specimen information, distribution).

Distribution: China (Yunnan), Vietnam.

6. *Colocasiomyia vietii* Toda in Takano *et al.* (2021: 27). TL: Vietnam, Nho Quan District, Cuc Phuong National Park.

Vietnamese record: *Colocasiomyia vietii*; Takano *et al.* (2021, p. 27, type specimen information, distribution).

Distribution: Vietnam.

7. *Colocasiomyia xenalocasiae* (Okada, 1980: 218 (*Drosophilella*)). TL: Japan, Ryukyu, Okinawa Prefecture, Ishigaki I., Yonehara.

Vietnamese records: *Colocasiomyia xenalocasiae*; Brake and Bächli (2008, p. 31, world catalogue); Xiao *et al.* (2022, p. 14, collecting data).

Distribution: China (Taiwan), Japan (Ryukyu Islands), Vietnam.

Genus *Dettopsomyia* Lamb

Dettopsomyia Lamb, 1914: 349. Type species: *Dettopsomyia formosa* Lamb.

8. *Dettopsomyia fruhstorferi* (Duda, 1924a: 194 (*Styloptera*)). TL: Vietnam, “Mittel-Annam”.

Vietnamese records: *Styloptera fruhstorferi*; Duda (1924a, p. 194, key to species).

Dettopsomyia fruhstorferi; Okada (1977a, p. 353, oriental catalogue); Okada (1982, p. 272, diagnosis, distribution); Brake and Bächli (2008, p. 31, world catalogue); Wang *et al.* (2021, p. 81, key to species).

Distribution: Vietnam.

9. *Dettopsomyia pictipes* (de Meijere, 1911: 411 (*Drosophila*)). TL: Indonesia, Java, Wonosobo.

Vietnamese records: *Dettopsomyia pictipes*; Okada (1977a, p. 353, oriental catalogue); Bächli (1988, p. 143, specimen information).

Distribution: Australia, Indonesia (Java, Sumatra), Japan, Philippines, USA (Hawaii), Vietnam.

Genus *Drosophila* Fallén

Subgenus *Dorsilopha* Sturtevant

Dorsilopha Sturtevant, 1942: 28. Type species: *Drosophila busckii* Coquillett.

10. *Drosophila (Dorsilopha) neobusckii* Toda (1986a: 285). TL: Myanmar, Mandalay.

Vietnamese records: *Drosophila (Dorsilopha) neobusckii*; Sidorenko (1998a, p. 6, new to Vietnam); Brake and Bächli (2008, p. 40, world catalogue).

Distribution: China, Myanmar, Vietnam.

Subgenus *Drosophila* Fallén

Drosophila Fallén, 1823: 4. Type species: *Musca funebris* Fabricius.

11. *Drosophila (Drosophila) albomicans* (Duda, 1924b: 245 (*Spinulophila*)). TL: China, Taiwan, Paroe, Koshun, Chip-Chip, Taihorin, Polisha; Papua New Guinea, Tamara.

Vietnamese record: *Drosophila (Drosophila) albomicans*; Satomura and Tamura (2015, supplementary material online, collection locality).

Distribution: China (Hainan, Mainland, Taiwan), India, Japan, Malaysia, New Guinea, Thailand, Vietnam.

12. *Drosophila (Drosophila) barutani* Watabe and Liang in Watabe *et al.* (1990: 463). TL: China, Yunnan, Dali District, Dabochin.

Vietnamese record: *Drosophila (Drosophila) barutani*; Suwito *et al.* (2013, p. 73, collecting locality, new to Viet-

nam).

Distribution: China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Shaanxi, Taiwan, Yunnan), Vietnam.

13. *Drosophila (Drosophila) beppui* Toda and Peng (1989: 158). TL: China, Guangdong, Nankunshan.

Vietnamese record: *Drosophila (Drosophila) beppui*; Suwito *et al.* (2013, p. 72, new to Vietnam).

Distribution: China (Guangdong, Guangxi, Taiwan, Yunnan), Indonesia (Java, Sumatra), Vietnam.

14. *Drosophila (Drosophila) denruoi* Suwito and Watabe in Suwito *et al.* (2014: 78). TL: Vietnam, Ba Vi National Park.

Vietnamese record: *Drosophila (Drosophila) denruoi*; Suwito *et al.* (2014, p. 78, chromosomes, diagnosis, description, distribution, figures of habitus).

Distribution: Vietnam.

15. *Drosophila (Drosophila) immigrans* Sturtevant (1921: 83). TL: USA, New York, White Plains.

Vietnamese records: *Drosophila (Drosophila) immigrans*; Aotsuka *et al.* (1994, p. 30, collecting information); Chang *et al.* (1994, p. 289, collecting information).

Distribution: Cosmopolitan.

16. *Drosophila (Drosophila) nullilineata* Zhang and Toda (1988: 1101). TL: China, Yunnan, Mengla County, Shang-yong.

Vietnamese records: *Drosophila (Drosophila) nullilineata*; Sidorenko (1998a, p. 6, new to Vietnam); Brake and Bächli (2008, p. 74, world catalogue).

Distribution: China (Yunnan), Vietnam.

17. *Drosophila (Drosophila) pilosa* Watabe and Peng (1991: 152). TL: China, Guangdong, Babaoshan.

Vietnamese record: *Drosophila (Drosophila) pilosa*; Suwito *et al.* (2013, p. 70, collecting locality, new to Vietnam).

Distribution: China (Guangdong, Guangxi, Jiangxi, Taiwan), Vietnam.

18. *Drosophila (Drosophila) potamophila* Toda and Peng (1989: 159). TL: China, Guangdong, Dinghushan.

Vietnamese record: *Drosophila (Drosophila) potamophila*; Suwito *et al.* (2013, p. 74, collecting locality, new to Vietnam).

Distribution: China (Guangdong, Guangxi, Yunnan), Indonesia (Sumatra), Vietnam.

19. *Drosophila (Drosophila) quadrilineata* de Meijere (1911: 396). TL: Indonesia, Java, Semarang.

Vietnamese records: *Drosophila (Drosophila) quadri-*

lineata; Okada (1976b, p. 4, distribution); Okada (1977a, p. 359, oriental catalogue); Toda (1986b, p. 651, description, distribution).

Drosophila (Chaetodrosophilella) quadrilineata; Angus (1967, p. 33, collecting information, new species group); Okada (1968, p. 339, description, distribution).

Drosophila quadrilineata; Bächli (1988, p. 144, specimen information).

Distribution: Borneo, China (Taiwan), India, Indonesia (Java, Sumatra), Japan (Ryukyu Islands), Malaysia, Mariana Islands, Micronesia, Myanmar, Philippines, Singapore, Sri Lanka, Solomon Islands, Thailand, USA (Admiralty Island, Guam), Vietnam.

20. *Drosophila (Drosophila) ruberrima* de Meijere (1911: 403). TL: Indonesia, Java, Depok.

Vietnamese records: *Drosophila (Drosophila) ruberrima*; Sidorenko (1998a, p. 6, new to Vietnam); Brake and Bächli (2008, p. 84, world catalogue).

Distribution: China (Hainan, Taiwan), Indonesia (Java, Sumatra), Japan (Ryukyu Islands), Myanmar, Thailand, Vietnam.

21. *Drosophila (Drosophila) sulfurigaster* (Duda, 1923: 48 (*Spinulophila*)). TL: Papua New Guinea, Madang.

Vietnamese records: *Drosophila (Drosophila) sulfurigaster* ssp. *albostrigata*; Sidorenko (1998a, p. 6, new to Vietnam).

Drosophila (Drosophila) sulfurigaster; McEvey (2009, p. 36, key to species).

Distribution: Cosmopolitan.

Subgenus *Dudaica* Strand

Dudaica Strand, 1943: 212. Type species: *Drosophila senilis* Duda.

22. *Drosophila (Dudaica) senilis* Duda (1926: 91). TL: Indonesia, Sumatra, Bukittinggi [= Fort de Kock].

Vietnamese records: *Drosophila (Dudaica) senilis*; Sidorenko (1996, p. 97, new to Vietnam); Brake and Bächli (2008, p. 94, world catalogue); Katoh *et al.* (2018, p. 29, key to species).

Distribution: Bhutan, China (Hainan), India, Indonesia (Java, Sumatra), Philippines, Vietnam.

Subgenus *Sophophora* Sturtevant

Sophophora Sturtevant, 1939: 139. Type species: *Drosophila melanogaster* Meigen.

23. *Drosophila (Sophophora) ananassae* Doleschall (1858: 128). TL: Indonesia, Maluku, Ambon.

Vietnamese records: *Drosophila (Sophophora) ananassae*; Okada (1964a, p. 449, examined specimen information, distribution); Okada (1976a, p. 344, distribution);

Okada (1977a, p. 368, oriental catalogue).

Distribution: Cosmopolitan.

24. *Drosophila (Sophophora) kikkawai* Burla (1954: 47).

TL: Brazil, Rio de Janeiro; Japan.

Vietnamese records: *Drosophila (Sophophora) kikkawai*; Okada (1964a, p. 457, examined specimens information, distribution); Okada (1966, p. 92, distribution); Okada (1976a, p. 344, distribution); Okada (1976b, p. 5, distribution); Okada (1977a, p. 371, oriental catalogue); Okada (1988, p. 139, distribution); Gupta and De (1996, p. 178, distribution); Brake and Bächli (2008, p. 105, world catalogue).

Drosophila kikkawai; Bock and Wheeler (1972, p. 57, distribution); Tsacas and David (1978, p. 676, redescription, figures of terminalia, distribution).

Drosophila montium [var.] *atropyga*; Duda (1924a, p. 215, distribution).

Drosophila montium [var.] *xanthopyga*; Duda (1924a, p. 215, distribution).

Distribution: Cosmopolitan.

25. *Drosophila (Sophophora) kurseongensis* Gupta and Singh (1978: 74). TL: India, West Bengal, Darjeeling District, St. Mary's Hill, Kurseong.

Vietnamese record: Setoguchi *et al.* (2014, p. 92, material information, photo of habitus, phylogenetic relationship).

Distribution: China, India, Vietnam.

26. *Drosophila (Sophophora) malerkotliana* Parshad and Paika (1965: 235). TL: India, Chandigarh, Pinjore, Punjab, Maler Kotla.

Vietnamese record: *Drosophila (Sophophora) malerkotliana malerkotliana*; Sidorenko (1998a, p. 6, new to Vietnam).

Distribution: Cosmopolitan.

27. *Drosophila (Sophophora) melanogaster* Meigen (1830: 85). TL: Germany, Schleswig-Holstein, Kiel, Hamburg; Austria.

Vietnamese records: *Drosophila melanogaster*; Bock and Wheeler (1972, p. 9, distribution); Singh and Coulthart (1982, p. 440, genic variation); Singh *et al.* (1982, p. 237, material information); Cohan (1984, p. 57, material information); Hale and Singh (1987, p. 623, material information); Singh and Rhomberg (1987, p. 315, genic variation); David and Capy (1988, p. 109, variability of morphological characteristics); Hale and Singh (1991, p. 104, material information); Singh (1992, p. 110, material information); Capy *et al.* (1993, p. 521, analysis of morphological traits).

Drosophila (Sophophora) melanogaster; Okada (1976a, p. 344, distribution); Okada (1977a, p. 372, oriental cata-

logue); Brake and Bächli (2008, p. 108, world catalogue).

Drosophila nigriventris; Bigot (1892, p. 231, distribution); Macquart (1843, 416, distribution); van der Wulp (1896, p. 203, distribution); Tsacas (1967, p. 158, examined material information); Okada (1977a, p. 372, oriental catalogue).

Distribution: Cosmopolitan.

28. *Drosophila (Sophophora) prolongata* Singh and Gupta (1978: 31). TL: India, Meghalaya, Shillong District, Khasi Hills, Motinagar Forest.

Vietnamese records: *Drosophila (Sophophora) prolongata*; Brake and Bächli (2008, p. 113, world catalogue); Setoguchi *et al.* (2014, p. 92, material information, photo of habitus, phylogenetic relationship); Gompel and Kopp (2018, p. 508, distribution).

Drosophila prolongata; Kudo *et al.* (2015, p. 222, material information); Kudo (2021, p. 331, material information).

Distribution: China, India, Myanmar, Vietnam.

29. *Drosophila (Sophophora) rhopaloa* Bock and Wheeler (1972: 69). TL: Thailand, Uthai Thani, Khao Yai.

Vietnamese records: *Drosophila (Sophophora) rhopaloa*; Chen *et al.* (2014, supplement, p. 11, material information); Setoguchi *et al.* (2014, p. 92, material information, photo of habitus, phylogenetic relationship); Gompel and Kopp (2018, p. 508, previous records, photo of habitus, photo of male and female terminalia).

Distribution: India (Madras, Meghalaya), Indonesia (Java), Malaysia (Borneo), Papua New Guinea, Sri Lanka, Thailand, Vietnam.

30. *Drosophila (Sophophora) trapezifrons* Okada (1966: 93). TL: Nepal, Taplejung District, Sangu.

Vietnamese record: *Drosophila trapezifrons*; Conner *et al.* (2021, supplemental data, material information).

Distribution: China (Hainan, Taiwan), India, Nepal, Vietnam.

Genus *Hypselothyrea* de Meijere

Subgenus *Hypselothyrea* de Meijere

Hypselothyrea de Meijere, 1906: 193. Type species: *Hypselothyrea dimidiata* de Meijere.

31. *Hypselothyrea (Hypselothyrea) deficiens* Papp (2004: 275). TL: Thailand, Chiang Mai Province, Doi Suthep-Pui National Park, Wat Phra That.

Vietnamese record: *Hypselothyrea (Hypselothyrea) deficiens*; Papp (2009, p. 41, collecting locality, new to Vietnam).

Distribution: Thailand, Vietnam.

32. *Hypselothyrea (Hypselothyrea) guttata* Duda (1926: 56). TL: Indonesia, Sumatra, Bukittinggi; China, Taiwan, Chip Chip, Kosempo and Polisha.

Vietnamese records: *Hypselothyrea (Hypselothyrea) guttata*; Sidorenko (1996, p. 97, new to Vietnam); Papp (2004, p. 279, figures of terminalia, distribution); Brake and Bächli (2008, p. 139, world catalogue).

Distribution: Bhutan, China (Hainan, Taiwan), India, Indonesia (Java, Sumatra), Myanmar, Nepal, Vietnam.

33. *Hypselothyrea (Hypselothyrea) paratenis* Papp (2004: 285). TL: Vietnam, Ninh Binh, Cuc Phuong National Park.

Vietnamese records: *Hypselothyrea (Hypselothyrea) paratenis*; Papp (2004, p. 285, type specimen information, distribution); Brake and Bächli (2008, p. 140, world catalogue).

Distribution: Thailand, Vietnam.

Genus *Liodrosophila* Duda

Liodrosophila Duda, 1922: 153. Type species: *Camilla coeruleifrons* de Meijere.

34. *Liodrosophila dimidiata* Duda (1922: 158). TL: Vietnam, "Mittel-Annam".

Vietnamese records: *Liodrosophila dimidiata*; Duda (1922, p. 158, type specimen information); Okada (1974, p. 47, male genitalia figures, description, diagnosis, distribution); Okada (1977a, p. 378, oriental catalogue); Bächli (1984, p. 237, type specimen information); Bächli (1988, p. 135, type specimen information); Brake and Bächli (2008, p. 164, world catalogue).

Distribution: Borneo, China (Hong Kong, Taiwan), Indonesia (Sumatra), Malaysia, Singapore, Vietnam.

35. *Liodrosophila marginifrons* Duda (1922: 157). TL: Vietnam, "Mittel-Annam".

Vietnamese records: *Liodrosophila marginifrons*; Duda (1922, p. 157, type specimen information); Okada (1974, p. 44, male genitalia figures, description, diagnosis, distribution); Takada and Momma (1975, p. 28, figures of terminalia, description, distribution); Okada (1977a, p. 379, oriental catalogue); Bächli (1984, p. 245, type specimen information); Bächli (1988, p. 140, type specimen information); Brake and Bächli (2008, p. 165, world catalogue).

Liodrosophila nitida var. *marginifrons*; Okada (1964a, p. 440, description, distribution, wing and male genitalia figure, remarks).

Distribution: Borneo, China (Taiwan), Indonesia (Java, Sumatra), Malaysia, Vietnam.

36. *Liodrosophila nitida* Duda (1922: 157). TL: Vietnam, "Mittel-Annam".

Vietnamese records: *Liodrosophila nitida*; Duda (1922, p. 157, type specimen information); Okada (1966, p. 54, figures of habitus and male genitalia, description, distribution); Rohlfien and Ewald (1972, p. 452, specimen information); Okada (1974, p. 39, male genitalia figures, description, diagnosis, distribution); Okada (1977a, p. 379, oriental catalogue); Bächli (1982, p. 297, Lectotype designation); Bächli (1984, p. 248, type specimen information); Bächli and Rocha Pite (1984, p. 211, palaeartic catalogue); Bächli (1988, p. 141, type specimen information); Evenhuis and Okada (1989, p. 629, Australasian and Oceanian catalog); Brake and Bächli (2008, p. 166, world catalogue).

Distribution: Australia, Borneo, China (Hong Kong, Taiwan), Indonesia (Java, Sumatra), Japan (Ryukyu Islands), Malaysia, Nepal, Singapore, Thailand, Vietnam.

37. *Liodrosophila pusilla* (de Meijere, 1911: 423 (*Camilla*)). TL: Indonesia, Java, Djakarta [= Batavia] and Semarang.

Vietnamese record: *Liodrosophila pusilla*; Okada (1974, p. 55, distribution).

Distribution: Indonesia (Java), Malaysia Peninsula, Singapore, Vietnam.

38. *Liodrosophila varians* Duda (1922: 158). TL: Vietnam, "Mittel-Annam".

Vietnamese records: *Liodrosophila varians*; Duda (1922, p. 158, type specimen information); Okada (1974, p. 50, male genitalia figures, description, diagnosis, distribution); Okada (1976b, p. 6, distribution); Okada (1977a, p. 379, oriental catalogue); Bächli (1988, p. 147, type specimen information); Okada (1988, p. 129, distribution); Brake and Bächli (2008, p. 167, world catalogue).

Distribution: Borneo, China (Hong Kong), Indonesia (Lombok, Java, Sumatra), Malaysia, Philippines, Singapore, Sri Lanka, Vietnam.

Genus *Microdrosophila* Malloch

Subgenus *Incisurifrons* Duda

Incisurifrons Duda, 1923: 40. Type species: *Drosophila congesta* Zetterstedt.

39. *Microdrosophila (Incisurifrons) tectifrons* (de Meijere, 1914: 263). TL: Indonesia, Java, Semarang.

Vietnamese record: *Microdrosophila tectifrons*; Bächli (1988, p. 146, specimen information).

Distribution: China (Southwestern regions, Taiwan), Indonesia (Java), Philippines, Myanmar, New Guinea, Vietnam.

Subgenus *Microdrosophila* Malloch

Microdrosophila Malloch, 1921: 312. Type species: *Dro-*

sophila quadrata Sturtevant.

40. *Microdrosophila (Microdrosophila) congesta* (Zetterstedt, 1847: 2558). TL: Sweden, Östergötland, Lärketorp.

Vietnamese record: *Microdrosophila (Microdrosophila) congesta*; Bächli (1988, p. 135, collecting locality, remark).

Distribution: Europe, Vietnam.

Genus *Mycodrosophila* Oldenberg

Subgenus *Mycodrosophila* Oldenberg

Mycodrosophila Oldenberg, 1914: 4. Type species: *Amiota poecilogastra* Loew.

41. *Mycodrosophila (Mycodrosophila) malayana* Okada (1986: 113). TL: Malaysia, Kuala Lumpur.

Vietnamese record: *Mycodrosophila (Mycodrosophila) malayana*; Sidorenko (1999, p. 123, new to Vietnam).

Distribution: Malaysia Peninsula, Vietnam.

42. *Mycodrosophila (Mycodrosophila) parallelinervis* Duda (1926: 57). TL: Indonesia, Sumatra, Bukittinggi [= Fort de Kock].

Vietnamese record: *Mycodrosophila (Mycodrosophila) parallelinervis*; Sidorenko (1999, p. 123, new to Vietnam).

Distribution: India, Indonesia (Sumatra), Malaysia, New Guinea, Singapore, Sri Lanka, Thailand, Vietnam.

43. *Mycodrosophila (Mycodrosophila) rika* Sidorenko (1999: 123). TL: Vietnam, Ha Son Binh, Ky Son, Cao Phong.

Vietnamese records: *Mycodrosophila (Mycodrosophila) rika*; Sidorenko (1999, p. 123, type specimen information); Brake and Bächli (2008, p. 184, world catalogue).

Distribution: Vietnam.

Genus *Scaptodrosophila* Duda

Scaptodrosophila Duda, 1923: 37. Type species: *Scaptodrosophila scaptomyzoidea* Duda.

44. *Scaptodrosophila dorsata* (Duda, 1924b: 248 (*Drosophila*)). TL: China, Taiwan, Tai-pei [= Taihoku], Paroe; Vietnam, "Mittel-Annam".

Vietnamese records: *Scaptodrosophila dorsata*; Bock and Parsons (1978, p. 93, distribution); Brake and Bächli (2008, p. 199, world catalogue).

Drosophila dorsata; Duda (1924a, p. 207, distribution); Duda (1924b, p. 248, type specimen information); Rohlfien and Ewald (1972, p. 450, type specimen information); Bächli (1984, p. 238, type specimen information); Bächli

(1988, p. 136, type specimen information).

Drosophila (Paradrosophila) dorsata; Okada (1964b, p. 109, distribution, remarks).

Drosophila (Scaptodrosophila) dorsata; Okada (1977a, p. 366, oriental catalogue).

Distribution: China (Taiwan), Japan (Ryukyu Islands), Vietnam.

Genus *Scaptomyza* Hardy

Subgenus *Parascaptomyza* Duda

Parascaptomyza Duda, 1924b: 248. Type species: *Drosophila graminum* Fallén.

45. *Scaptomyza (Parascaptomyza) elmoi* Takada (1970: 144). TL: China, Taiwan, Chito.

Vietnamese record: *Scaptomyza (Parascaptomyza) elmoi*; Sidorenko (1998a, p. 7, new to Vietnam).

Distribution: Australia, China (Taiwan), India, Japan, Korea, New Zealand, Sri Lanka, USA (Hawaii), Vietnam.

46. *Scaptomyza (Parascaptomyza) pallida* (Zetterstedt, 1847: 2571 (*Drosophila*)). TL: Sweden, Kristianstad, Äsperöd [= Esperöd].

Vietnamese records: *Scaptomyza (Parascaptomyza) pallida*; Okada (1966, p. 59, distribution); Brake and Bächli (2008, p. 226, world catalogue).

Distribution: Cosmopolitan.

Genus *Sphaerogastrella* Duda

Sphaerogastrella Duda, 1922: 159. Type species: *Camilla javana* de Meijere.

47. *Sphaerogastrella javana* (de Meijere, 1911: 422 (*Camilla*)). TL: Indonesia, Java, Djakarta [= Batavia] and Semarang.

Vietnamese records: *Sphaerogastrella javana*; Okada (1974, p. 30, male genitalia figures, description, diagnosis, distribution); Okada (1977a, p. 386, oriental catalogue); McEvey (1982, p. 916, distribution); Bock (1982, p. 145, description, distribution); Okada and Carson (1983, p. 367, distribution); Bächli (1988, p. 139, collecting locality); Okada (1988, p. 129, distribution); Evenhuis and Okada (1989, p. 637, Australasian and Oceanian catalog).

Distribution: Australia, China, Indonesia, Malaysia, Myanmar, New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Thailand, Vietnam.

Genus *Zaprionus* Coquillett

Subgenus *Anaprionus* Okada

Anaprionus Okada, 1990: 154. Type species: *Notiphila lineosa* Walker.

48. *Zaprionus (Anaprionus) bogoriensis* (Mainx, 1958: 126 (*Drosophila*)). TL: Indonesia, Java, Bogor.

Vietnamese record: *Zaprionus (Anaprionus) bogoriensis*; Sidorenko (1996, p. 97, new to Vietnam).

Distribution: Australia, Borneo, India, Indonesia (Java, Sulawesi), Japan (Ryukyu Islands), Malaysia, Myanmar, New Guinea, Philippines, Thailand, Vietnam.

49. *Zaprionus (Anaprionus) grandis* (Kikkawa and Peng, 1938: 543 (*Drosophila*)). TL: Japan, Kohu and Kinki, Kyoto.

Vietnamese record: *Zaprionus (Anaprionus) grandis*; Sidorenko (1996, p. 97, new to Vietnam).

Distribution: China, India, Japan, Korea, Myanmar, Vietnam.

Genus *Zygothrica* Wiedemann

Zygothrica Wiedemann, 1830: 12. Type species: *Achias dispar* Wiedemann.

50. *Zygothrica flavofinira* Takada (1976: 70). TL: Malaysia, Kuala Lumpur, Gombak near Kuala Lumpur.

Vietnamese records: *Zygothrica flavofinira*; Brake and Bächli (2008, p. 242, world catalogue).

Zygothrica vietnamensis; Grimaldi (1990, p. 15, diagnosis, description, figures of male and female terminalia); Prigent and Toda (2006, p. 198, Syn. Nov. of *Zygothrica flavofinira*).

Distribution: Borneo, China (Hainan, Southwestern areas), Indonesia (Java), Malaysia Peninsula, Thailand, Vietnam.

51. *Zygothrica pimacula* Prigent and Toda (2006: 212). TL: China, Taiwan, Nan-tou, Chi-tou.

Vietnamese records: *Zygothrica pimacula*; Prigent and Toda (2006, p. 212, type specimen information); Brake and Bächli (2008, p. 245, world catalogue).

Distribution: China (Hainan, Taiwan), Philippines, Vietnam.

Subfamily Steganinae

Genus *Leucophenga* Mik

Leucophenga Mik, 1886: 317. Type species: *Drosophila maculata* Dufour.

52. *Leucophenga angusta* Okada (1956: 28). TL: Japan, Kanto, Tokyo Metropolis, Meguro.

Vietnamese records: *Leucophenga angusta*; Okada (1976b, p. 2, distribution); Okada (1977a, p. 346, oriental catalogue); Bock (1979, p. 30, distribution); Gupta and Panigrahy (1987, p. 62, description, distribution); Okada (1988, p. 121, distribution); Okada (1989, p. 807, diagnosis, distribution); Fartyal *et al.* (2005, p. 411, distribution);

Zhou and Chen (2015, p. 49, diagnosis, photo of habitus, description, male genitalia figures).

Distribution: Australia, China (Chongqing, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Taiwan, Xizang, Yunnan, Zhejiang), Fiji, India (Orissa, Uttaranchal), Indonesia (Java, Sumatra), Japan (Honshu, Kyushu, Okinawa), Korea, Malaysia, Micronesia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Vietnam.

53. *Leucophenga interrupta* Duda (1924b: 237). TL: China, Taiwan, Paroe.

Vietnamese record: *Leucophenga interrupta*; Sidorenko (1996, p. 97, new to Vietnam).

Distribution: China (Hainan, Taiwan), Japan (Ryukyu Islands), Nepal, Vietnam.

54. *Leucophenga ornata* Wheeler (1959: 184). TL: Indonesia, Java, Nongkodjadjar.

Vietnamese records: *Leucophenga ornata*; Sidorenko (1996, p. 97, new to Vietnam); Fartyal *et al.* (2005, p. 414, distribution); Brake and Bächli (2008, p. 275, world catalogue).

Distribution: Australia, China (Taiwan), India (Uttaranchal), Indonesia (Java), Japan, Korea, Nepal, New Caledonia, New Guinea, Philippines, Vietnam.

55. *Leucophenga subpollinosa* (de Meijere, 1914: 263 (*Drosophila*)). TL: Indonesia, Java, Semarang.

Vietnamese records: *Leucophenga subpollinosa*; Okada (1956, p. 30, figures of egg, wing, digestive organs and female reproductive organs, description, distribution); Okada (1965, p. 327, distribution); Okada (1966, p. 21, male genitalia figures, distribution); Gupta (1974a, p. 16, distribution); Gupta (1974b, p. 212, description, distribution); Singh and Gupta (1974, p. 24, distribution); Okada (1976b, p. 3, distribution); Okada (1977a, p. 349, oriental catalogue); Okada (1987, p. 678, diagnosis, distribution); Bächli (1988, p. 145, specimen information); Okada (1988, p. 122, distribution); Fartyal *et al.* (2005, p. 416, distribution); Huang *et al.* (2017, p. 223, diagnosis, description, distribution, photo of habitus, abdomen figure).

Distribution: Australia (New South Wales, Northern Territory, Queensland), Borneo, China (Taiwan), Eritrea, India, Indonesia (Java, Sumatra), Japan (Honshu, Kyushu, Ryukyu Islands), Malaysia, Micronesia (Caroline Is.), Nepal (Birganj), Palau, Philippines (Luzon), Singapore, Sudan, Thailand (Saraburi), Uganda, Vietnam.

Genus *Phortica* Schiner

Subgenus *Phortica* Schiner

Phortica Schiner, 1862: 433. Type species: *Drosophila variegata* Fallén.

56. *Phortica (Phortica) cardua* (Okada, 1977b: 24 (*Amiota*)). TL: China, Taiwan, Tai-pei, Wu-lai.

Vietnamese records: *Amiota (Phortica) cardua*; Sidorenko (1996, p. 97, new to Vietnam).

Phortica (Phortica) cardua; Brake and Bächli (2008, p. 283, world catalogue); Huang *et al.* (2019, p. 25, diagnosis, remarks, distribution, male genitalia figures).

Distribution: China (Anhui, Beijing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Taiwan, Xizang, Yunnan, Zhejiang), India (Meghalaya), Vietnam.

57. *Phortica (Phortica) eugamma* (Toda and Peng, 1990: 46 (*Amiota*)). TL: China, Guangdong, Dinghushan.

Vietnamese records: *Amiota (Phortica) eugamma*; Sidorenko (1996, p. 97, new to Vietnam).

Phortica (Phortica) eugamma; Brake and Bächli (2008, p. 284, world catalogue).

Distribution: China (Guangdong, Yunnan), Vietnam.

58. *Phortica (Phortica) pseudotau* (Toda and Peng, 1990: 49 (*Amiota*)). TL: China, Guangdong, Nankunshan.

Vietnamese records: *Amiota (Phortica) pseudotau*; Sidorenko (1996, p. 97, new to Vietnam).

Phortica (Phortica) pseudotau; Brake and Bächli (2008, p. 286, world catalogue).

Distribution: China (Guangdong, Sichuan, Yunnan), India, Vietnam.

Genus *Pseudostegana* Okada

Pseudostegana Okada, 1978: 392. Type species: *Stegana grandipalpus* Takada and Momma.

59. *Pseudostegana fleximediata* (Takada, Momma and Shima, 1973: 74 (*Stegana*)). TL: Malaysia, Sabah, Mt. Kinabalu, Silau Silau Trail.

Vietnamese record: *Stegana (Pseudostegana) fleximediata*; Sidorenko (1997b, p. 166, redescription, new to Vietnam).

Distribution: Malaysia (Borneo), Vietnam.

60. *Pseudostegana latifasciata* Chen and Toda in Chen *et al.* (2005: 439). TL: Vietnam, Vinh Phu, Tam Dao.

Vietnamese records: *Pseudostegana latifasciata*; Chen *et al.* (2005, p. 439, diagnosis, male genitalia figures); Brake and Bächli (2008, p. 290, world catalogue).

Distribution: Vietnam.

Genus *Stegana* Meigen

Subgenus *Oxyphortica* Duda

Oxyphortica Duda, 1923: 34. Type species: *Drosophila convergens* de Meijere.

61. *Stegana (Oxyphortica) adentata* Toda and Peng (1992: 210). TL: China, Guangdong, Conghua.

Vietnamese records: *Stegana (Oxyphortica) adentata*; Sidorenko (1998b, p. 296, new to Vietnam); Brake and Bächli (2008, p. 293, world catalogue).

Distribution: China (Guangdong, Guangxi, Hainan, Yunnan), Vietnam.

62. *Stegana (Oxyphortica) belokobylskiji* Sidorenko (1997a: 66). TL: Vietnam, Vinh Phu, Tam Dao.

Vietnamese records: *Stegana (Oxyphortica) belokobylskiji*; Sidorenko (1997a, p. 66, diagnosis, description, male genitalia figures); Brake and Bächli (2008, p. 293, world catalogue); Cao and Chen (2008, p. 29, key to species, diagnosis); Wang *et al.* (2023, p. 43, diagnosis, distribution, male and female genitalia figures).

Distribution: China (Guangxi, Yunnan), Vietnam.

63. *Stegana (Oxyphortica) convergens* (de Meijere, 1911: 400 (*Drosophila*)). TL: Indonesia, Java, Semarang.

Vietnamese records: *Stegana (Oxyphortica) convergens*; Sidorenko (1998b, p. 296, new to Vietnam); Brake and Bächli (2008, p. 293, world catalogue); Cheng *et al.* (2010, p. 58, diagnosis, distribution).

Distribution: Borneo, China (Taiwan), Indonesia (Java), Malaysia (Sabah, Sarawak), New Guinea, Vietnam.

64. *Stegana (Oxyphortica) enigma* Sidorenko (1998b: 287). TL: Vietnam, Ha Son Binh, Ky Son, Cao Phong.

Vietnamese records: *Stegana (Oxyphortica) enigma*; Sidorenko (1998b, p. 287, diagnosis, description, male terminalia figures); Brake and Bächli (2008, p. 294, world catalogue); Wang *et al.* (2010, p. 570, key to species).

Distribution: Vietnam.

65. *Stegana (Oxyphortica) maichouensis* Sidorenko (1998b: 289). TL: Vietnam, Ha Son Binh, Mai Chou.

Vietnamese records: *Stegana (Oxyphortica) maichouensis*; Sidorenko (1998b, p. 289, diagnosis, description, male terminalia figures); Brake and Bächli (2008, p. 294, world catalogue).

Distribution: China (Yunnan), Vietnam.

Subgenus *Stegana* Meigen

Stegana Meigen, 1830: 79. Type species: *Stegana nigra* Meigen.

66. *Stegana (Stegana) antlia* Okada in Sidorenko and Okada (1991: 658). TL: China, Taiwan, Kuang-tulin, Tainan Hsien.

Vietnamese records: *Stegana (Stegana) antlia*; Sidorenko (1997a, p. 78, new to Vietnam); Brake and Bächli (2008, p. 295, world catalogue).

Distribution: China (Taiwan), Vietnam.

67. *Stegana (Stegana) nartshukae* Sidorenko (1997a: 77). TL: Vietnam, Ha Son Binh, Da Bac.

Vietnamese records: *Stegana (Stegana) nartshukae*; Sidorenko (1997a, p. 77, diagnosis, description, male genitalia figures); Brake and Bächli (2008, p. 295, world catalogue).

Distribution: Vietnam.

Subgenus *Steganina* Wheeler

Steganina Wheeler, 1960: 110. Type species: *Musca coleoprata* Scopoli.

68. *Stegana (Steganina) vietnamensis* Sidorenko (1997a: 67). TL: Vietnam, Hanoi, 70 km NW Hanoi, Ba Vi, meadow forest.

Vietnamese records: *Stegana (Oxyphortica) vietnamensis*; Sidorenko (1997a, p. 67, diagnosis, description, male genitalia figures); Brake and Bächli (2008, p. 294, world catalogue).

Stegana (Steganina) vietnamensis; Cheng *et al.* (2009, p. 39, diagnosis, distribution, key to species of male).

Distribution: Vietnam.

CONFLICTS OF INTEREST

The author of this paper has no affiliation with any interests and is solely responsible for the paper.

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REFERENCES

- Angus, D. 1967. Additions to the *Drosophila* Fauna of New Guinea. Univ. Qld. Pap., Dep. Zool. 3:31-42.
- Aotsuka, T., H.Y. Chang, M. Aruga, F.J. Lin and O. Kitagawa. 1994. Mitochondrial DNA Variation in Natural Populations of *Drosophila immigrans*. Zool. Studies 33:29-33.
- Bächli, G. 1982. On the type material of Palearctic species of Drosophilidae (Diptera). Beitr. Ent. 32:289-301.
- Bächli, G. 1984. Die Drosophiliden-Typen der Dipterensammlung des Zoologischen Museums in Berlin. Mitt. Zool. Mus. Berl. 60:229-261.
- Bächli, G. 1988. Die Drosophiliden-Arten (Diptera) in der Sammlung des Naturhistorischen Museums Wien. Ann. Naturh. Mus. Wien. 90(b):131-148.
- Bächli, G. 2024. TaxoDros: Database on the Taxonomy of Drosophilidae [online]. [Available form: <https://www.taxodros.uzh.ch/>, accessed on 10 January 2024].
- Bächli, G. and M.T. Rocha Pite. 1984. Family Drosophilidae. In: A. Soos and L. Papp (eds.), Catalogue of Palearctic Diptera (Vol. 10), Akademiai Kiado, Budapest. pp. 186-220.
- Bigot, J.M.F. 1892. Catalogue of the Diptera of the Oriental region. Part III. J. Asiat. Soc. Beng 61(Pt.2):178-236.
- Bock, I.R. 1979. Drosophilidae of Australia III. *Leucophenga* (Insecta: Diptera). Aust. J. Zool. 71(Suppl.Ser.):1-56.
- Bock, I.R. 1982. Drosophilidae of Australia V. Remaining Genera and Synopsis (Insecta: Diptera). Aust. J. of Zool. 89(Suppl.Ser.):1-164.
- Bock, I.R. and M.R. Wheeler. 1972. The *Drosophila melanogaster* Species Group. Univ. Texas Publ. 7213:1-102.
- Bock, I.R. and P.A. Parsons. 1978. The subgenus *Scaptodrosophila* (Diptera: Drosophilidae). Syst. Ent. 3:91-102.
- Brake, I. and G. Bächli. 2008. Drosophilidae (Diptera). World Catalogue of Insect, vol. 9. Apollo Books, Stenstrup.
- Burla, H. 1954. Distinction between four species of the “*melanogaster*” group, “*Drosophila seguyi*”, “*D. montium*”, “*D. kikkawai*” sp. n. and “*D. auraria*” (Drosophilidae, Diptera). Revta Bras. Biol. 14:41-54.
- Cao, H.Z. and H.W. Chen. 2008. Revision of the *Stegana nigrolimbata* species group (Diptera: Drosophilidae) from the Oriental Region. Zootaxa 1848:27-36. <https://doi.org/10.11646/zootaxa.1848.1.3>
- Capy, P., E. Pla and J.R. David. 1993. Phenotypic and genetic variability of morphometrical traits in natural populations of *Drosophila melanogaster* and *D. simulans*. I. Geographic variations. Genet. Sel. Evol. 25:517-536.
- Chang, H., C.T. Ting and F.J. Lin. 1994. On the Low Genetic Variability in *Drosophila immigrans* and *D. formosana*. Zool. Studies 33:287-295.
- Chen, H.W., M.J. Toda and B.C. Wang. 2005. A taxonomic revision of the genus *Pseudostegana* Okada, 1978 (Diptera, Drosophilidae). Insect System. Evol. 36:407-442.
- Chen, Z.X., D. Sturgill, J. Qu, H. Jiang, S. Park, N. Boley, A.M. Suzuki, A.R. Fletcher, D.C. Plachetzki, P.C. Fitzgerald, C.G. Artieri, J. Atallah, O. Barmina, J.B. Brown, K.P. Blankenburg, E. Clough, A. Dasgupta, S. Gubbala, Y. Han, J.C. Jayaseelan, D. Kalra, Y.A. Kim, C.L. Kovar, S.L. Lee, M. Li, J.D. Malley, J.H. Malone, T. Mathew, N.R. Mattiuzzo, M. Munidasa, D.M. Muzny, F. Ongerri, L. Perales, T.M. Przytycka, L.L. Pu, G. Robinson, R.L. Thornton, N. Saada, S.E. Scherer, H.E. Smith, C. Vinson, C.B. Warner, K.C. Worley, Y.Q. Wu, X. Zou, P. Cherbas, M. Kellis, M.B. Eisen, F. Piano, K. Kionte, D.H. Fitch, P.W. Sternberg, A.D. Cutter, M.O. Duff, R.A. Hoskins, B.R. Graveley, R.A. Gibbs, P.J. Bickel, A. Kopp, P. Carn-

- inci, S.E. Celniker, B. Oliver and S. Richards. 2014. Comparative validation of the *D. melanogaster* modENCODE transcriptome annotation. *Genome Res.* 24(7):1209-1223. <https://doi.org/10.1101/gr.159384.113>
- Cheng, Y., J.J. Gao and H.W. Chen. 2009. *Stegana ornatipes* species group from the Oriental Region (Diptera: Drosophilidae). *Zootaxa* 2216:37-48. <https://doi.org/10.11646/zootaxa.2216.1.3>
- Cheng, Y., M. Xu and H.W. Chen. 2010. The *Stegana (Oxyphortica) convergens* species group from the Oriental region (Diptera: Drosophilidae). *Zootaxa* 2531:57-63. <https://doi.org/10.11646/zootaxa.2531.1.6>
- Cohan, F.M. 1984. Genetic divergence under uniform selection. I. Similarity among populations of *Drosophila melanogaster* in their responses to artificial selection for modifiers of cid. *Evolution* 38:55-71.
- Conner, W.R., E.K. Delaney, M.J. Bronski, P.S. Ginsberg, T.B. Wheeler, K.M. Richardson, B. Peckenpaugh, K.J. Kim, M. Watada, A.A. Hoffmann, M.B. Eisen, A. Kopp, B.S. Cooper and M. Turelli. 2021. A phylogeny for the *Drosophila montium* species group: A model clade for comparative analyses. *Molec. Phylog. Evol.* 158(107061):1-14. <https://doi.org/10.1016/j.ympev.2020.107061>
- David, J.R. and P. Capy. 1988. Genetic variation of *Drosophila melanogaster* natural populations. *Trends Genet.* 4:106-111.
- de Meijere, J.C.H. 1906. Über einige indo-australische Dipteren des Ungarischen National-Museums, bez. des Naturhistorischen Museums zu Genua. *Annls Hist.-Nat. Mus. Natn. Hung.* 4:165-196.
- de Meijere, J.C.H. 1911. Studien über südostasiatische Dipteren. VI. Plates 18-22. *Tijd. Ent.* 54:258-432.
- de Meijere, J.C.H. 1914. Studien über südostasiatische Dipteren IX. Plates 5-7. *Tijd. Ent.* 57:137-275.
- Doleschall, C.L. 1858. Derde bijdrage tot de kennis der dipteren fauna van Nederlandsch Indië. *Natuurk. Tijd. Ned.-Indië* 17:73-128.
- Duda, O. 1922. *Liodrosophila* und *Sphaerogastrella*, zwei neue, zu den Drosophiliden und nicht zu den Camilliden gehörige Dipteren-Gattungen aus Shdostasien. *Arch. Naturgesch.* 88(A)4:150-160.
- Duda, O. 1923. Die orientalischen und australischen Drosophiliden-Arten (Dipteren) des Ungarischen National-Museums zu Budapest. *Annls Hist.-Nat. Mus. Natn. Hung.* 20:24-59.
- Duda, O. 1924a. Beitrag zur Systematik der Drosophiliden unter besonderer Berücksichtigung der paläarktischen u. orientalischen Arten (Dipteren). *Arch. Naturgesch.* 90(A)3:172-234.
- Duda, O. 1924b. Die Drosophiliden (Dipteren) des Deutschen Entomologischen Institutes d. Kaiser Wilhelm-Gesellschaft (früheres Deutsches Entomologisches Museum) aus H. Sauter's Formosa-Ausbeute nebst Beschreibung zehn neuer südostasiatischer Drosophiliden des Amsterdamer Museums und des Wiener Staatsmuseums. *Arch. Naturgesch.* 90(A)3:235-259.
- Duda, O. 1926. Fauna Sumatrensis: Drosophilidae (Dipt.). *Suppla Ent.* 14:42-116.
- Evenhuis, N.L. and T. Okada. 1989. Family Drosophilidae. In: N.L. Evenhuis (ed.), *Catalog of the Diptera of the Australasian and Oceanian Regions*, Bishop Museum Press. pp. 609-638.
- Fallén, C.F. 1823. *Diptera sveciae*. Geomyzides. Berling.
- Fartyal, R.S., B.K. Singh and M.J. Toda. 2005. Review of the genus *Leucophenga* Mik (Diptera: Drosophilidae) in India, with descriptions of five new species from northern India. *Ent. Sci.* 8:405-417.
- Gompel, N. and A. Kopp. 2018. *Drosophila (Sophophora) carrolli* n. sp., a new species from Brunei, closely related to *Drosophila (Sophophora) rhopaloa* Bock & Wheeler, 1972 (Diptera: Drosophilidae). *Zootaxa* 4434(3):502-510. <https://doi.org/10.11646/zootaxa.4434.3.6>
- Grimaldi, D.A. 1990. Revision of *Zygothrica* (Diptera: Drosophilidae), Part II. The First African Species, Two New Indo-Pacific Groups, and the *bilineata* and *samoensis* Species Groups. *Am. Mus. Novit.* 2964:1-31.
- Gupta, J.P. 1974a. The family Drosophilidae in India. *Indian Biologist* 5:7-30.
- Gupta, J.P. 1974b. Indian species of Drosophilidae, exclusive of the genus *Drosophila*. *J. Ent.* 43(Ser.b):209-215.
- Gupta, J.P. and A. De. 1996. Records of Drosophilidae with Description of Two New Species from Bhutan (Insecta: Diptera). *Entomon* 21:177-186.
- Gupta, J.P. and B.K. Singh. 1978. Two new and two unrecorded Indian species of *Drosophila* (Dipt.) from Kurseong, Darjeeling. *Ent. Mon. Mag.* 113(1977):71-78.
- Gupta, J.P. and K.K. Panigrahy. 1987. Some further additions to the list of Indian fauna of Drosophilidae. *Proc. Zool. Soc., Calcutta* 36(1983):57-66.
- Hale, L.R. and R.S. Singh. 1987. Mitochondrial DNA Variation and Genetic Structure in Populations of *Drosophila melanogaster*. *Molec. Biol. Evol.* 4:622-637.
- Hale, L.R. and R.S. Singh. 1991. A Comprehensive Study of Genic Variation in Natural Populations of *Drosophila melanogaster*. IV. Mitochondrial DNA Variation and the Role of History vs. Selection in the Genetic Structure of Geographic Populations. *Genetics* 129:103-117.
- Huang, J., L. Gong, S.C. Tsaur, L. Zhu, K. An and H. Chen. 2019. Revision of the subgenus *Phortica* (sensu stricto) (Diptera, Drosophilidae) from East Asia, with assessment of species delimitation using DNA barcodes. *Zootaxa* 4678(1):1-75. <https://doi.org/10.11646/zootaxa.4678.1.1>
- Huang, J., Y. Su and H. Chen. 2017. The genus *Leucophenga* (Diptera, Drosophilidae), part VII: the *subpollinosa* species group from China, with morphological and molecular evidence. *Zootaxa* 4247(3):201-245. <https://doi.org/10.11646/zootaxa.4247.3.1>
- Katoh, T.K., G. Zhang, M.J. Toda, A. Suwito and J.J. Gao. 2018. A revision of the subgenus *Dudaica* Strand of the genus *Drosophila* Fallén, with descriptions of six new

- species (Diptera, Drosophilidae). ZooKeys 781:19-50. <https://doi.org/10.3897/zookeys.781.27354>
- Kikkawa, H. and F.T. Peng. 1938. *Drosophila* Species of Japan and Adjacent Localities. Jpn J. Zool. 7:507-552.
- Kudo, A. 2021. Intraspecific variation in longevity of *Drosophila prolongata* (Diptera: Drosophilidae) under solitary and group conditions. Ent. Sci. 24(3):330-337. <https://doi.org/10.1111/ens.12484>
- Kudo, A., H. Takamori, H. Watabe, Y. Ishikawa and T. Matsuo. 2015. Variation in morphological and behavioral traits among isofemale strains of *Drosophila prolongata* (Diptera: Drosophilidae). Ent. Sci. 18(2):221-229.
- Lamb, C.G. 1914. The Percy Sladen Trust expedition to the Indian Ocean in 1905. XV. Diptera: Heteroneuridae, Ortalidae, Trypetidae, Sepsidae, Micropezidae, Drosophilidae, Geomyzidae, Milichidae. Trans. Linn. Soc. Lond. Zool. 16:307-372.
- Loew, H. 1861. Ueber die Dipterenfauna des Bernsteins. Ber. Vers. dtsch. Naturf. Aerzte 1860:88-98.
- Loew, H. 1862. Monographs of the Diptera of North America. Part 1. Smithson. misc. Collns 6(1):1-221.
- Macquart, J. 1843. Diptères exotiques nouveaux ou peu connus. Tome 2, part 3. de Roret.
- Mainx, F. 1958. *Zaprionus bogoriensis* spec. nov., eine neue Drosophilide aus Java. Zool. Anz. 161:126-130.
- Malloch, J.R. 1921. Some Notes on Drosophilidae (Diptera). Ent. News 32:311-312.
- McAlpine, J.F. 1989. Phylogeny and classification of the Muscomorpha. In: J.F. McAlpine *et al.* (eds.), Manual of Nearctic Diptera (vol. 3), Research Branch, Agriculture Canada. pp. 1397-1518.
- McEvey, S.F. 1982. Drosophilidae (Insecta: Diptera) of Three Torres Strait Islands, with Description of a New Species of *Drosophila*. Aust. J. Zool. 29(1981):907-919.
- McEvey, S.F. 2009. Taxonomic Review of the Australian *Drosophila setifemur* Species Group, a New Name for the *D. dispar* Species Group (Diptera: Drosophilidae). Rec. Aust. Mus. 61:31-38. <https://doi.org/10.3853/j.0067-1975.61.2009.1517>
- Meigen, J.W. 1830. Systematische Beschreibung der bekannten europäischen zweifl. geligen Insekten. 6. Theil. Schulze.
- Mik, J. 1886. Dipterologische Miscellen. III. Wien. Ent. Ztg 5:317-318.
- Okada, T. 1956. Systematic Study of Drosophilidae and Allied Families of Japan. Gihodo.
- Okada, T. 1964a. Drosophilidae (Diptera) of Southeast Asia collected by the Thai-Japanese Biological Expedition 1961-62. In: T. Kira and T. Umesao (eds.), Nature and Life in Southeast Asia (vol. 3), Fauna and Flora Research Society, Kyoto University. pp. 439-466.
- Okada, T. 1964b. New and unrecorded species of Drosophilidae in the Amami Islands, Japan. Kontyu 32:105-115.
- Okada, T. 1965. Drosophilidae of the Okinawa Islands. Kontyu 33:327-350.
- Okada, T. 1966. Diptera of Nepal. Cryptochaetidae, Diastatidae and Drosophilidae. Bull. Br. Mus. nat. Hist. 6(Entomology, Suppl.):1-129.
- Okada, T. 1968. Addition to the fauna of the family Drosophilidae of Japan and adjacent countries (Diptera). II. Genera *Paramycodrosophila*, *Mycodrosophila*, *Liodrosophila*, and *Drosophila*, including a new subgenus *Psilodorha*. Kontyu 36(4):324-340.
- Okada, T. 1974. A revision and taxometric analysis of the genera *Sphaerogastrella* Duda and *Liodrosophilla* Duda of the world (Diptera, Drosophilidae). Mushi 48(5):29-63.
- Okada, T. 1975. The Oriental Drosophilids Breeding in Flowers. Kontyu 43(3):356-363.
- Okada, T. 1976a. Drosophilidae (Diptera) of Sabah, Borneo, of Dr. G. Imadate's collection in 1968. In: T. Kira and T. Umesao (eds.), Nature and Life in Southeast Asia (vol. 7), Fauna and Flora Research Society. pp. 343-346.
- Okada, T. 1976b. New distribution records of the drosophilids in the Oriental Region. Makunagi 8:1-8.
- Okada, T. 1977a. Family Drosophilidae. In: M.D. Delfinado and D.E. Hardy (eds.), A Catalog of the Diptera of the Oriental Region. Vol. III. Suborder Cyclorrhapha (excluding division Aschiza), University Press of Hawaii, Honolulu. pp. 342-387.
- Okada, T. 1977b. The subgenus *Phortica* Schiner of the genus *Amiota* Loew of Japan and the Oriental Region, with reference to anti-Burla's rule (Diptera, Drosophilidae). Bull. Biogeog. Soc. Japan 32(3):17-31.
- Okada, T. 1978. *Pseudostegana*, a New Subgenus of the genus *Stegana* Meigen (Diptera, Drosophilidae). Kontyu 46(3):392-399.
- Okada, T. 1980. Synhospitalic Evolution of the Genus *Drosophilella* Duda (Diptera, Drosophilidae), with Description of a New Species from Okinawa and Taiwan. Kontyu 48(2):218-225.
- Okada, T. 1982. A Revision of the Genera *Dettopsomyia* Lamb and *Styloptera* Duda (Diptera, Drosophilidae). Kontyu, Tokyo 50(2):270-282.
- Okada, T. 1986. The genus *Mycodrosophila* Oldenberg (Diptera, Drosophilidae) of Southeast Asia and New Guinea I. Typical species. Kontyu 54:112-123.
- Okada, T. 1987. The *Leucophenga subpollinosa* Species Group of Japan and Southeast Asia (Diptera, Drosophilidae). Kontyu 55(4):676-683.
- Okada, T. 1988. Family Drosophilidae (Diptera) from the Lund University Ceylon Expedition in 1962 and Borneo collections in 1978-1979. Ent. Scand. 30(Suppl.):109-149.
- Okada, T. 1989. A Revision of the *Leucophenga mutabilis* Species-group (Diptera, Drosophilidae) of the Oriental and Adjacent Regions. Jpn J. Ent. 57(4):803-813.
- Okada, T. 1990. New Taxonomic Changes in the Family Drosophilidae (Diptera). Jpn J. Ent. 58:154.
- Okada, T. and H.L. Carson. 1983. The Genus *Sphaerogastrella* Duda (Diptera, Drosophilidae) of Papua New Guinea. Kontyu 51(3):367-375.
- Oldenberg, L. 1914. Beitrag zur Kenntnis der europäischen

- Drosophiliden (Dipt.). Arch. Naturgesch. 80(A)2:1-42.
- Papp, L. 2004. New species and records of *Hypselothyrea* de Meijere (Diptera, Drosophilidae). Acta Zool. Acad. Sci. hung. 49(2003):271-294.
- Papp, L. 2009. Additional new species of *Hypselothyrea* de Meijere with description of a new subgenus (Diptera, Drosophilidae). Mitt. Schweiz. Ent. Ges. 82:39-59.
- Parshad, R. and I.J. Paika. 1965. Drosophilid survey of India II. Taxonomy and cytology of the subgenus *Sophophora* (*Drosophila*). Res. Bull. Panjab Univ., Science 15(1964): 225-252.
- Prigent, S.R. and M.J. Toda. 2006. A revision of the *Zygothrica samoensis* species group (Diptera: Drosophilidae), with division into three species subgroups and description of five new species. Ent. Sci. 9(2):191-215.
- Rohlfien, K. and B. Ewald. 1972. Katalog der in den Sammlungen des ehemaligen Deutschen Entomologischen Institutes aufbewahrten Typen - VIII. (Diptera: Cyclorrhapha: Schizophora: Acalypterae). Beitr. Ent. 22:407-469.
- Rondani, C. 1856. Dipterologiae italicae Prodromus. Vol. I. Genera italica ordinis Dipterorum ordinatim disposita et distincta et in familias et stirpes aggregata. Stoschi, Parma.
- Satomura, K. and K. Tamura. 2015. Ancient Male Recombination Shaped Genetic Diversity of Neo-Y Chromosome in *Drosophila albomicans*. Molec. Biol. Evol. 33:367-374. <https://doi.org/10.1093/molbev/msv221>
- Schiner, I.R. 1862. Vorläufiger Commentar zum dipterologischen Theile der "Fauna austriaca." V. Wien. ent. Monatschr. 6:428-436.
- Setoguchi, S., H. Takamori, T. Aotsuka, J. Sese, Y. Ishikawa and T. Matsuo. 2014. Sexual dimorphism and courtship behavior in *Drosophila prolongata*. J. Ethol. 32:91-102. <https://doi.org/10.1007/s10164-014-0399-z>
- Shi, T., M.J. Toda, K.T. Takano, M. Yafuso, A. Suwito, S.Y. Wong, S.Q. Shang and J.J. Gao. 2019. A review of taxonomy and flower-breeding ecology of the *Colocasiomyia toshiokai* species group (Diptera: Drosophilidae), with description of a new species from Indonesia. Europ. J. Ent. 116:341-361. <https://doi.org/10.14411/eje.2019.037>
- Sidorenko, V.S. 1996. Some unrecorded species of Drosophilidae from Viet Nam. DIS 77:97-98.
- Sidorenko, V.S. 1997a. New Asian species and new records of the genus *Stegana* Meigen (Diptera: Drosophilidae). I. Subgenera *Oxyphortica* Duda and *Stegana* s.str. Annls Soc. Ent. Fr. 33(N.Ser.):65-79.
- Sidorenko, V.S. 1997b. New Asian species and new records of the genus *Stegana* Meigen (Diptera: Drosophilidae). II. Subgenera *Pseudostegana* Okada and *Steganina* Wheeler. Annls Soc. Ent. Fr. 33(N.Ser.):165-172.
- Sidorenko, V.S. 1998a. New data on Asian Drosophilid flies (Diptera, Drosophilidae). Part 3. Far East. Entomol. 56: 1-8.
- Sidorenko, V.S. 1998b. New Asian species and new records of the genus *Stegana* Meigen (Diptera: Drosophilidae). III. Descriptions, taxonomic remarks and key to the Asian species. Annls Soc. Ent. Fr. 34(N.Ser.):85-300.
- Sidorenko, V.S. 1999. New and unrecorded species of the genus *Mycodrosophila* (Diptera, Drosophilidae) from Vietnam. Zool. Zh. 78:123-125.
- Sidorenko, V.S. and T. Okada. 1991. Descriptions of Three New Species of *Stegana* (*Stegana*) Meigen (Diptera, Drosophilidae) from Sichuan Province, China, and Formosa, with Taximetical Analyses of the Subgenus. Jpn J. Ent. 59(3):655-662.
- Singh, B.K. and J.P. Gupta. 1974. The Genus *Leucophenga* (Diptera: Drosophilidae) in India. Indian J. Zootomy 15: 23-26.
- Singh, B.K. and J.P. Gupta. 1978. Two new and two unrecorded species of the genus *Drosophila* Fallen (Diptera: Drosophilidae) from Shillong, Meghalaya, India. Proc. zool. Soc., Calcutta 30(1977):31-38.
- Singh, R.S. 1992. A comprehensive study of genic variation in natural populations of *Drosophila melanogaster*. V. Structural-functional constraints on protein molecules and enzymes and the levels and patterns of variation among genes. Genome 35:109-119.
- Singh, R.S. and M.B. Coulthart. 1982. Genic variation in abundant soluble proteins of *Drosophila melanogaster* and *Drosophila pseudoobscura*. Genetics 102:437-453.
- Singh, R.S. and L.R. Rhomberg. 1987. A Comprehensive Study of Genic Variation in Natural Populations of *Drosophila melanogaster*. I. Estimates of Gene Flow from Rare Alleles. Genetics 115:313-322.
- Singh, R.S., D.A. Hickey and J. David. 1982. Genetic differentiation between geographically distant populations of *Drosophila melanogaster*. Genetics 101:235-256.
- Strand, E. 1943. Miscellanea nomenclatorica zoologica et palaeontologica XII. Folia Zool. Hydrobiol. 12:211-216.
- Sturtevant, A.H. 1921. The North American species of *Drosophila*. Pubs Carnegie Instn. 301(4):1-150.
- Sturtevant, A.H. 1939. On the subdivision of the genus *Drosophila*. PNAS 25:137-141.
- Sturtevant, A.H. 1942. The classification of the genus *Drosophila*, with descriptions of nine new species. Univ. Texas Pubs 4213:5-51.
- Sultana, F., M.J. Toda, M. Yafuso, M.B. Lakim, M.B. Mohamed and N.M. Cuong. 2002. A New Species-group of the Genus *Colocasiomyia* de Meijere (Diptera: Drosophilidae), with Descriptions of Two New Species from Eastern Malaysia and Vietnam. Ent. Sci. 5(3):305-315.
- Sultana, F., Y.G. Hu, M.J. Toda, K. Takenaka and M. Yafuso. 2006. Phylogeny and classification of *Colocasiomyia* (Diptera, Drosophilidae), and its evolution of pollination mutualism with aroid plants. Syst. Ent. 31:684-702.
- Suwito, A., H. Watabe and M.J. Toda. 2013. Review of the *Drosophila* (*Drosophila*) *quadrisetata* species group (Diptera: Drosophilidae), with descriptions of three new species from the Oriental Region. Ent. Sci. 16:66-82.
- Suwito, A., M.J. Toda, H. Takamori, K. Harada and H. Watabe. 2014. Revision of Asian species of the *Drosophila mel-*

- anica* species group (Diptera: Drosophilidae), with a description of a new species from Vietnam. Ent. Sci. 17:75-85. <https://doi.org/10.1111/ens.12028>
- Takada, H. 1970. *Scaptomyza* (*Parascaptomyza*) *pallida* (Zetterstedt) and two related new species, *S. (P.) elmoi* n. sp. and *S. (P.) himalayana* n. sp. (Diptera: Drosophilidae). Annotes Zool. Jpn. 43:142-147.
- Takada, H. 1976. Distribution and Population Constitution of *Drosophila* in Southeast Asia and Oceania III. The Genus *Zygothrica* with Description of Three New Species. Kontyu 44:65-72.
- Takada, H. and E. Momma. 1975. Distribution and Population Constitution of *Drosophila* in South East Asia and Oceania. II. Drosophilidae in the Suburbs of Kuala Lumpur, West Malaysia. J. Fac. Sci. Hokkaido Univ. 20(Ser. 6, Zool.):9-48.
- Takada, H., E. Momma and H. Shima. 1973. Distribution and Population Constitution of *Drosophila* in South East Asia and Oceania I. Drosophilidae at Mt. Kinabalu, East Malaysia. J. Fac. Sci. Hokkaido Univ. 19(Ser. 6, Zool.):73-94.
- Takano, K.T., J.J. Gao, Y.G. Hu, N.N. Li, M. Yafuso, A. Suwito, R. Repin, R.A.S. Pungga, P.A. Meleng, C.H. Kiang, L. Chong and M.J. Toda. 2021. Phylogeny, taxonomy and flower-breeding ecology of the *Colocasiomyia cristata* species group (Diptera: Drosophilidae), with descriptions of ten new species. Zootaxa 5079(1):1-70.
- Toda, M.J. 1986a. Drosophilidae (Diptera) in Burma I. The Subgenus *Dorsilopha* Sturtevant of the Genus *Drosophila*, with Descriptions of Two New Species. Kontyu 54(2): 282-290.
- Toda, M.J. 1986b. Drosophilidae (Diptera) in Burma II. The *Drosophila immigrans* Species-group of the Subgenus *Drosophila*. Kontyu 54(4):634-653.
- Toda, M.J. and T. Okada. 1983. Ecological Studies of Floricolous *Drosophilella* in Burma with Descriptions of Three New Species from Burma and the Philippines (Diptera, Drosophilidae). Kontyu 51(2):169-184.
- Toda, M.J. and T.X. Peng. 1989. Eight Species of the Subgenus *Drosophila* (Diptera: Drosophilidae) from Guangdong Province, Southern China. Zool. Sci., Tokyo 6:155-166.
- Toda, M.J. and T.X. Peng. 1990. Eight new species of the subgenus *Phortica* (Diptera: Drosophilidae, *Amiota*) from Guangdong province, Southern China. Entomotaxonomia 12:41-55.
- Toda, M.J. and T.X. Peng. 1992. Some species of the subfamily Steganinae (Diptera: Drosophilidae) from Guangdong province, Southern China. Anns Soc. Ent. Fr. 28 (N.Ser.):201-213.
- Tsacas, L. 1967. *Drosophila nigriventris* Macquart, 1843, nouveau synonyme de *D. melanogaster* Meigen, 1830 (Dipt. Drosophilidae). Bull. Mus. Hist. Nat. Paris 39:158-159.
- Tsacas, L. and J. David. 1978. Systematics and biogeography of the *Drosophila kikkawai*-complex, with descriptions of new species (Diptera, Drosophilidae). Anns Soc. Ent. Fr. 13(N. Ser., 1977):675-693.
- van der Wulp, F.M. 1896. Catalogue of the described Diptera from South Asia. Nijhoff.
- Wang, J., J. Gao and H. Chen. 2010. Five New Species of the Subgenus *Oxyphortica* from the Oriental Region (Diptera: Drosophilidae: *Stegana*). Anns Zool., Warsz. 60(4):565-571.
- Wang, Y.L., B.X. Li, M.D. Cui, Y. Zhang, L. Wang, C.H. Zhang, S.C. Tsaur, H.W. Chen and J. Huang. 2023. Revision of the subgenus *Stegana* (*Steganina*) from China, with assessment of species delimitation using DNA barcodes (Diptera, Drosophilidae). Zootaxa 5250(1):1-109. <https://doi.org/10.11646/zootaxa.5250.1.1>
- Wang, Y.L., Q. Li, M.J. Toda and J.J. Gao. 2021. The genus *Dettopsomyia* Lamb, 1914 (Diptera, Drosophilidae) from southern China. ZooKeys 1056:73-94. <https://doi.org/10.3897/zookeys.1056.56996>
- Watabe, H.-a. and T.X. Peng. 1991. The *Drosophila virilis* Section (Diptera: Drosophilidae) from Guangdong Province, Southern China. Zool. Sci., Tokyo 8:147-156.
- Watabe, H.-a., X.C. Liang and W.X. Zhang. 1990. The *Drosophila polychaeta* and the *D. quadrisetata* Species-Groups (Diptera: Drosophilidae) from Yunnan Province, Southern China. Zool. Sci., Tokyo 7:459-467.
- Wheeler, M.R. 1959. A nomenclatural study of the genus *Drosophila*. Univ. Texas Pubs 5914:181-205.
- Wheeler, M.R. 1960. A new subgenus and species of *Stegana* Meigen (Diptera, Drosophilidae). Proc. Ent. Soc. Wash. 62:109-111.
- Wiedemann, C.R.G. 1830. *Achias* Dipteroorum genus a Fabricio conditum; illustratum novisque speciebus auctum et conventui physicorum germanorum oblatum. Mohr, Kiliae.
- Xiao, L., N.N. Li, L.K. Yang, J.L. Li and J.J. Gao. 2022. Evolution of the *Colocasiomyia gigantea* Species Group (Diptera: Drosophilidae): Phylogeny, Biogeography and Shift of Host Use. Insects 13(647):1-16. <https://doi.org/10.3390/insects13070647>
- Zetterstedt, J.W. 1847. Diptera Scandinaviae disposita et descripta. Tomus sextus. Lundberg, Lund.
- Zhang, W.X. and M.J. Toda. 1988. The *Drosophila immigrans* Species-group of the Subgenus *Drosophila* (Diptera: Drosophilidae) in Yunnan, China. Zool. Sci., Tokyo 5:1095-1103.
- Zhou, L. and H.W. Chen. 2015. The genus *Leucophenga* (Diptera, Drosophilidae), part V: the mutabilis species group from East Asia, with morphological and molecular evidence. Zootaxa 4006(1):40-58. <https://doi.org/10.11646/zootaxa.4006.1.2>

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