

Agromyzidae (Diptera) from Cambodia including one new species

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Agromyzidae (Diptera) from Cambodia including one new species. – Acta Mus. Siles. Sci. Natur., 72: 1–17, 2023.

Abstract: Thirteen species of the Agromyzidae are recorded from Cambodia for the first time. Of these one is here described as new and illustrated: *Agromyza cambodiae* sp. nov., the remaining twelve species are newly recorded from the country. With these additions a total of 16 species in 6 genera of Agromyzidae are currently known from the country.

Key words: Diptera, Agromyzidae, new species, new records, faunistics, biology, Cambodia.

Introduction

About 3,640 species of Diptera are reported from the Lower Mekong Subregion – 2.4 % of the total dipteran species in the world. Most reported species are from Myanmar, Thailand, and Vietnam, whereas Cambodia and Laos remain understudied (Lee & Duwal 2018). As with the Diptera as a whole, the Agromyzidae have are poorly known in Cambodia (Sasakawa 1977). Up to the present, only three species of two genera have been recorded and presented by Spencer (1973a), Nickel (1979), Chanthy *et al.* (2010) and Mujica *et al.* (2016). In this work sixteen species are represented, *Agromyza cambodiae* sp. nov. is described below as new to science and twelve new to the fauna of Cambodia.

Material and methods

This article is based on 60 specimens collected from one locality in Cambodia: Phnom Penh, 11°30'34"N 104°53'54"E, garden, Malaise trap and Pan traps, M. Petrýl leg. All studied material is deposited in the University of Life Sciences, Prague, Czech Republic.

External characters, including colouration, are described from dry-mounted specimens. The male genitalia were studied after the detachment, softening and maceration in hot 10 % KOH, washing in water and dissecting the whole abdomen in a droplet of glycerine under MBS 10-100 binocular microscope. After the examination, all dissected parts were placed into a droplet of "glycerin plus gum resin" medium on a card pinned below the pinned specimen. Abbreviations and morphological terms used in the description follow Papp & Černý (2015).

List of species

AGROMYZINAE

Agromyza cambodiae sp. nov.

(Figs 1–9)

Type material. Holotype: ♂, CAMBODIA: Phnom Penh, 11°30'34"N 104°53'54"E, 31.vii.–15.viii.2013, garden, Malaise trap and Pan traps, M. Petrtyl leg.

Paratypes: Identical data, but 1 ♂, 31.vii.–15.viii.2013, 1 ♂, 15.–25.viii.2013.

Description. Male. Head (Fig. 1) brown, ocellar triangle and the hind margin of eye black, shining, upper orbits and area adjoining ocellar triangle shining black. Area adjoining *ori* setae, parafacial, frontal vitta, gena and cheeks ochre brown, matt. Face shiny blackish. Antenna with scape and pedicel ochre brown, distal half of first flagellomere brown, darker brown on inside, basal half ochre brown, brownish on inside. Frons narrow, about as wide as 1.3 width of eye at level of anterior ocellus, only slightly projecting above eye in profile. Orbits about 0.16 times as wide as frons. Ocellar triangle longer than wide, nearly attaining level of lower *ors*. Two long *ors*, upper bent slightly outwards, two inclinate *ori*, the lower shorter. Orbital setulae short and sparse, reclinate. First flagellomere oval, slightly longer than deep, covered with distinct pubescence, one oval sense pit present on outer surface below base of arista. Palpus brown. Arista brown, with pubescence shorter than on first flagellomere. Gena in posterior part only 0.2 height of eye. Cheek (= parafacialium) forming a very narrow ring below eye. One short *vi*, 2–3 setulae in front or above *vi* and 7–9 *pm* setae present. **Thorax.** Scutum and scutellum black, slightly shiny, five postsutural *dc* setae present, decreasing in length anteriorly, 3rd, 4th and 5th small and fine, long as *acr* setae. Acrostichal setulae regularly in 6 rows anteriorly, posteriorly between 1st and 2nd *dc* irregularly in 4 rows. One shorter *ia* seta and numerous presutural and postsutural *ia* setulae in 3–4 rows present, as long as *acr* setulae. Very long *ipa* present, reaching 1.3 length of 1st *dc*, small and fine *epa* present. All usual setae present: 1 *oc*, 1 *pvt*, 1 *vte*, 1 *vti*, 1 *ppl*, 1 *hu*, 1 + 1 *npl*, 1 *anepst*, 1 *kepstl*, 1 *sa*, 1 *prs*, 1 *bs*, 1 *as*. **Wing** (Fig. 2) hyaline, veins ochre, base of wing, squamae including margin yellowish white, fringe brown. Halter whitish yellow. Costa ending at vein M_{1+2} , weakened between R_{4+5} and M_{1+2} , ratio of costal sections 2–4 = 3.4 : 1.5 : 1.0. Ultimate section of M_{3+4}

short, only 0.7 times the length of penultimate. Wing tip on M_{1+2} vein. **Legs** brownish, only fore knees bright yellow, tarsi slightly lighter. Mid tibia with 2 *pd* setae. **Abdomen** blackish brown, oval, 5th and 6th tergites of equal length. Stridulating mechanism consisting of weakly sclerotized minute scales of same shape and size. **Male genitalia** (Figs 3–9), epandrium indistinctly broader than deep. Inner surface of epandrium (Fig. 5) with 2–3 strong and long spines. Surstylus with one strong and long subapical spine. Cerci long with long setae. Phallus as on Figs 3–4, about 0.4 length of phallapodeme, with conspicuously short distiphallus. Hypandrium (Fig. 8–9) with long and narrow apodeme. Ejaculatory apodeme (Figs 6–7) Y-shaped with large broad blade.

Length. Body 2.5 mm, wing 1.95 mm.

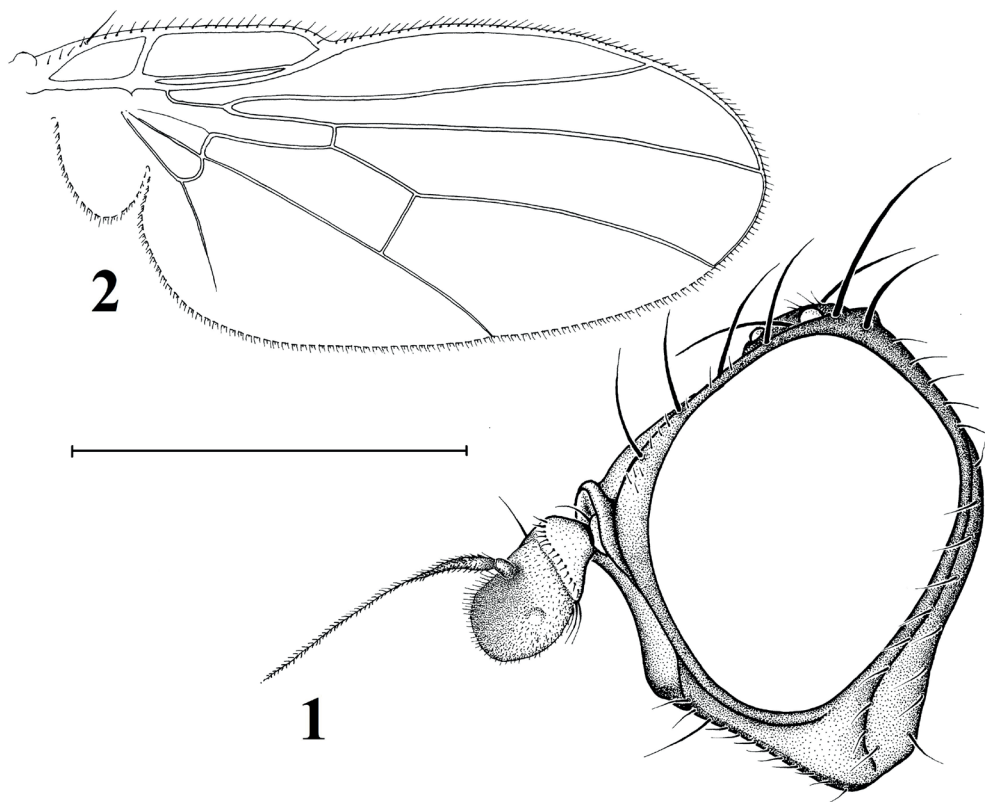
Variability. Compared with the holotype, the other specimens do not differ in the colour. Only the following characters are apparently variable: the body is 2.5–2.8 mm long, the wing is 1.95–2.2 mm long, costal sections 2–4 are in ratio of 3.2–3.3 : 1.3 : 1.0. Ultimate section of M_{3+4} is 0.8 times the length of penultimate.

Female and biology. Unknown.

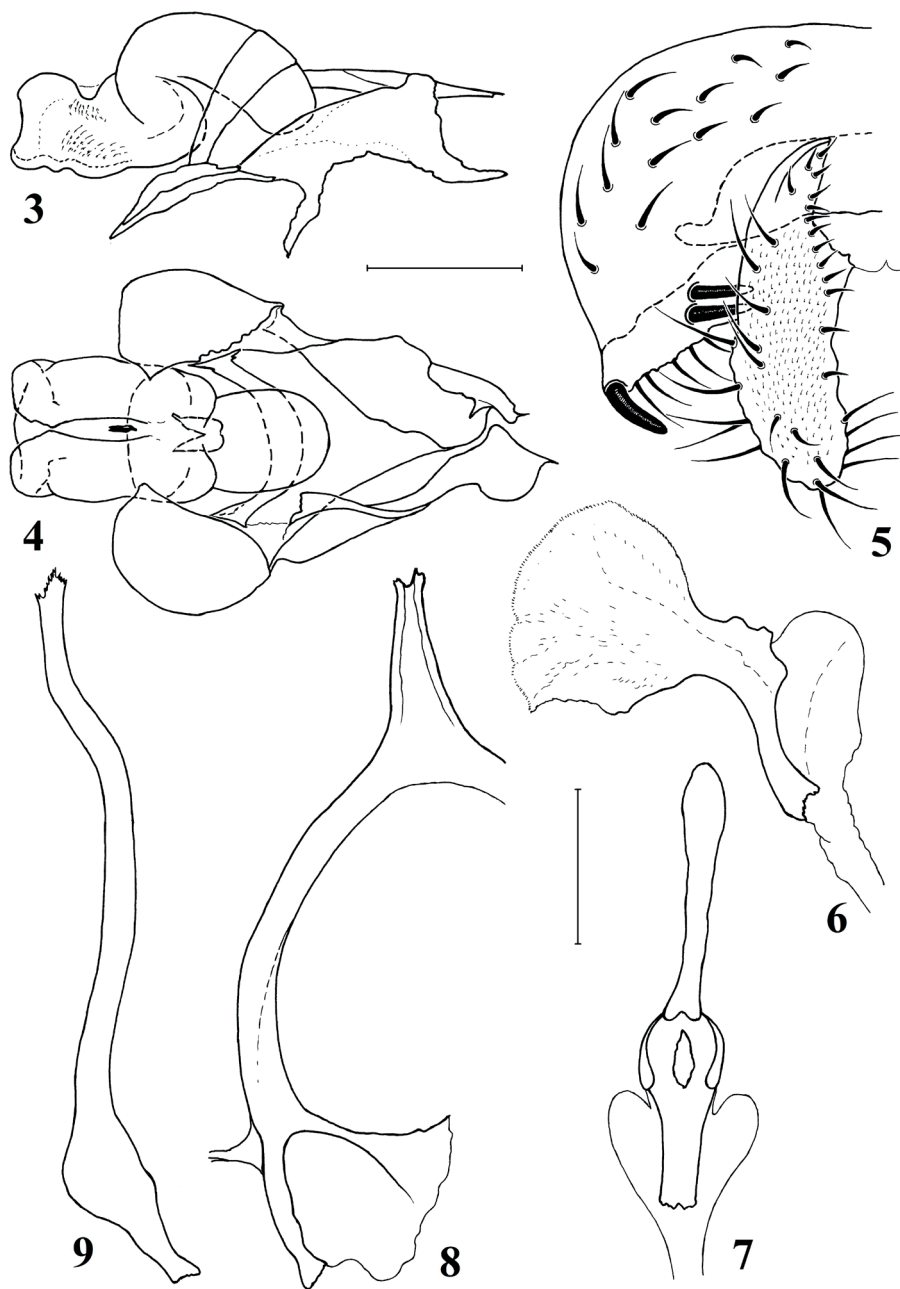
Differential diagnosis. The distinctive characters of *A. cambodiae* sp. nov. are the hind margin of eye and upper orbits shining black; distal half of first flagellomere brown, darker brown on inside, basal half ochre brown, brownish on inside; only two strong postsutural *dc* setae; squamae including margin yellowish white, fringe brown; only fore knee bright yellow. The male genitalia are typical of feeders on Gramineae, phallus with conspicuously short distiphallus, inner surface of epandrium with 2–3 strong spines, hypandrium with long and narrow apodeme. Short distiphalli are also present in *A. albipennis* Meigen, 1830, *A. alunulata* (Hendel, 1931), *A. anderssoni* Spencer, 1976, *A. burmensis* Spencer, 1962, *A. flavisquama* Malloch, 1914, *A. hockingi* Spencer, 1969, *A. latipennis* Malloch, 1914, *A. parvicornis* Loew, 1869, *A. penniseti* Spencer, 1959, *A. tacita* Spencer, 1969, and several others species.

Etymology. This new species is named after the country (Cambodia) where it was found.

Distribution. Cambodia. Currently known only from the type locality.



Figs 1–2: *Agromyza cambodiae* sp. nov., male (holotype). 1 – head, lateral view; 2 – wing. Scale lines: Fig. 1 = 0.5 mm, Fig. 2 = 1 mm.



Figs 3–9: *Agromyza cambodiae* sp. nov., holotype, male. 3 – phallus in lateral view; 4 – the same in ventral view; 5 – epandrium, surstylus and cercus in caudal view; 6 – ejaculatory apodeme in lateral view; 7 – the same in dorsal view; 8 – hypandrium in ventral view; 9 – the same in lateral view. Scale lines: 3–9 = 0.1 mm.

Melanagromyza cleomae Spencer, 1961

Melanagromyza cleomae Spencer, 1961: 70.

Melanagromyza austriraphani Sasakawa, 1981: 4; Spencer 1990: 397.

Material examined. CAMBODIA: Phnom Penh, 4 ♂♂, 31.vii.–15.viii.2013.

Distribution. Oriental species firstly described from Sri Lanka, Colombo, later recorded from Malaya, Singapore. First record from Cambodia.

Biology. Host plant genera are *Brassica*, *Cleome* (Benavent-Corai *et al.* 2005). The host plant *Cleome graveolens* was discovered by Spencer (1961a) in Singapore and Sri Lanka, and was subsequently recorded in Singapore as stems of *Brassica alboglabra* and "cabbage stems".

Melanagromyza conspicua Spencer, 1961

Melanagromyza conspicua Spencer, 1961: 71.

Ophiomyia conspicua (Spencer): Spencer 1977a: 349.

Combination rejected, see explanation below.

Melanagromyza joycei Sasakawa, 1963: 417; syn. Spencer 1966.

Melanagromyza latifrons Garg, 1971: 191; syn. Sasakawa 1977: 248.

Melanagromyza spiniphallata Garg, 1971: 198; syn. Sasakawa 1977: 248.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013.

Distribution. Species described from Singapore, later recorded from Thailand, Philippines, Taiwan, Indonesia (West Papua), India, Sri Lanka; Papua New Guinea (Bismarck Archipelago, New Britain), Australia, Vanuatu, New Caledonia; Japan (Ryukyu Isl.), China (Hong Kong). First record from Cambodia.

Note. Spencer (1961: 71) described this species on the basis of two males from Singapore and Sri Lanka, and classified it in the genus *Melanagromyza* based on external characters. But in his later paper (Spencer 1977a: 349), on the basis of the structure of genitalia, he transferred this species into the genus *Ophiomyia*. However, a further paper (Spencer 1977c: 234) points out a similarity of the phallus structure to that one of *Melanagromyza provecta* (de Meijere, 1910). Also Sasakawa (1977: 248), in "A Catalog of the Diptera of the Oriental Region", classified this species in the genus *Melanagromyza*. But Spencer (1990: 312) considered it again as *Ophiomyia*. After Lonsdale (2014: 507), only – "genitalic illustration does little to reveal its generic affinities" – and therefore I mention main the well known specific characters of *Melanagromyza conspicua* which are typical also for most other *Melanagromyza* species: clypeus narrow and

U-shaped, rounded anteromedially; gena angled anteriorly; one single vibrissa; mid tibia with 1–2 *pd* setae; distiphallus absolutely symmetrical in ventral view; short basiphallus symmetrical, U-shaped (see Spencer 1977b: Figs 89, 90).

Biology. The larva feeds on *Eclipta* and *Siegesbeckia* (Benavent-Corai *et al.* 2005, Spencer 1990).

Melanagromyza cuscutae Hering, 1958

Melanagromyza cuscutae Hering, 1958: 219.

Material examined. CAMBODIA: Phnom Penh, 3 ♂♂, 31.vii.–15.viii.2013.

Distribution. This Palaearctic and Oriental species was firstly described from Germany. In Europe known also from Czech Republic, Hungary, Italy, Poland (Piwowarczyk *et al.* 2020), Slovakia, Ukraine, also recorded from Japan (Sasakawa 1986) and Kazakhstan (Tjurebaev 1987). In Oriental region recorded from India, Nepal (Sasakawa 1979), Myanmar and Pakistan (Spencer 1962, Sehgal 1965). It was introduced in Barbados (Bennett & Alam 1985).

Biology. In Europe *M. cuscutae* is only known to feed in seed-heads of *Cuscuta europaea*, but in West Pakistan at Rawalpindi the larvae were found feeding exclusively in young stems of *C. reflexa* (Spencer 1962, 1973a). Elsewhere in the plains of West Pakistan, stems of other species of *Cuscuta* have been attacked, including *C. approximata*, *C. hyalina* and *C. planiflora* (Baloch *et al.* 1967). In India, it is known from stems and fruits of *C. reflexa* in Namkum, Ranchi and Bihar (Sehgal 1965). In Kazakhstan, it feeds in the stems and fruits of *C. europaea* and *C. lupuliformis* (Ivannikov 1969).

Melanagromyza pasiae Spencer, 1986

Melanagromyza pasiae Spencer, 1986: 492.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013.

Distribution. Species described from North Thailand, Pasia National Park. First record from Cambodia.

Biology. Host and early stages unknown.

***Melanagromyza specifica* Spencer, 1963**

Melanagromyza specifica Spencer, 1963a: 320.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013.

Distribution. Species described from Australia (Brisbane) and later recorded from Taiwan (Sasakawa 1972). First record from Cambodia.

Biology. Host and early stages unknown.

***Ophiomyia atralis* (Spencer, 1961)**

Melanagromyza atralis Spencer, 1961: 69.

Ophiomyia atralis (Spencer): Spencer 1962: 674.

Material examined. CAMBODIA: Phnom Penh, 2 ♂♂, 31.vii.–15.viii.2013.

Distribution. Species firstly described from Indonesia, Nusa Tenggara Islands: south of Flores Island, Poeloe Ende, also recorded from South Africa, India, Thailand, Philippines, New Caledonia, Micronesia, Sri Lanka, Solomon Isl., French Polynesia and Australia. First record from Cambodia.

Biology. The larva forms a long, external stem mine on host plant *Vernonia cinerea*.

***Ophiomyia centrosematis* (de Meijere, 1940)**

Melanagromyza centrosematis de Meijere, 1940: 128.

Ophiomyia centrosematis (de Meijere): Spencer 1966: 3.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013.

Distribution. Species first described from Indonesia (Java), also known from Oman, Yemen, Saudi Arabia; Ethiopia, Kenya, Tanzania, Uganda; India, Malaysia (Peninsula), Sri Lanka, Taiwan, Thailand; Japan (Ryukyu Isl.); Australia. First record from Cambodia.

Biology. The larva of this oligophagous species, which was described from *Centrosema pubescens* in Java, forms external stem mine and has been recorded in addition on *Calopogonium mucunoides*, *Crotalaria mucronata*, *Glycine*, *Phaseolus*, *Puraria* and *Vigna* and being most common on the latter genus (Benavent-Corai *et al.* 2005, Spencer 1990).

Ophiomyia phaseoli (Tryon, 1895)

Oscinis phaseoli Tryon, 1895: 4.

Oscinis fabae Tryon, 1897: 35. Unjustified replacement name.

Agromyza phaseoli Coquillett, 1899: 128; syn. Spencer 1959: 283.

Agromyza fabalis Jack, 1913: 545; syn. van der Goot 1930: 35 [Translation 1984]; Spencer 1959: 283.

Agromyza destructor Malloch, 1916: 93; syn. de Meijere 1922: 17.

Melanagromyza phaseoli Vanschuytbroeck, 1951: 167; Spencer 1959: 283.

Melanagromyza similis Vanschuytbroeck, 1951: 364.

Melanagromyza phaseoli (Tryon): Spencer 1959: 283.

Ophiomyia gangetica Garg, 1971: 188; Sasakawa 1977: 254.

Melanangromyza sanctuarii Singh & Ipe, 1973: 62.

Ophiomyia phaseoli (Tryon): Spencer 1973a: 61.

Literature: Nickel 1979, Chanthy *et al.* 2010.

Distribution. Species known from Afrotropical, Australian, Neotropic, Oriental and Palaearctic Regions. Recorded from Cambodia, cited by Nickel (1979) and Chanthy *et al.* (2010). In Oriental region recorded from Bangladesh, China, India, Indonesia (Java), Japan (Amami Isl., Okinawa Isl., Yaeama Isl., Minami-Daito Isl.), Malaysia (Peninsula), Myanmar, Philippines, Sri Lanka, Taiwan, Thailand (Sasakawa 2015).

Biology. *O. phaseoli* is highly oligophagous species, the larvae feed mainly in the lower stem and root of host plants in the genera *Cajanus*, *Canavalia*, *Crotalaria*, *Dolichos*, *Glycine*, *Phaseolus*, *Pueraria* and *Vigna* (Benavent-Corai *et al.* 2005, Spencer 1990). In the forthcoming database "World Agromyzidae online" of M. von Tschirnhaus 1,080 publications are combined with this taxon in the bibliography, and several more for all eight junior synonyms.

Ophiomyia rotata (Spencer, 1965)

Melanagromyza rotata Spencer, 1965: 4.

Ophiomyia rotata (Spencer): Spencer 1977b: 101.

Material examined. CAMBODIA: Phnom Penh, 13 ♂♂, 31.vii.–15.viii.2013.

Distribution. Species first described from Philippines (Mindanao, Spamoso Curuan Distr.) and also known from Sri Lanka, Thailand and Australia. First record from Cambodia.

Biology. Host plant and early stages unknown.

PHYTOMYZINAE

Calycomyza lantanae (Frick, 1956)

Phytobia (*Calycomyza*) *lantanae* Frick, 1956: 287.

Calycomyza lantanae (Frick, 1956): Spencer 1967: 9.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013.

Distribution. Species described from United States (Texas Weslaco), also recorded from Florida and Hawaii; Argentina, Bahamas, Barbados, Brazil, Colombia, Cuba, Grenada, Guadeloupe, Hawaii, Jamaica, Martinique Isl., Mexico, Peru, Puerto Rico, San Martin, Tobago, Trinidad, Venezuela; Ethiopia, Madagascar, Mozambique, South Africa; India, Iraq, China, Ecuador (Galapagos Islands), Guam, Malaysia, Micronesia, Papua New Guinea, Philippines, Saudi Arabia, Thailand and Australia. First record from Cambodia.

Biology. The larva forms large blotch mines on host plants namely *Duranta*, *Lantana*, *Lippia* and *Verbena* (Benavent-Corai *et al.* 2005, Spencer 1990).

Liriomyza brassicae (Riley, 1884)

Agromyza brassicae Riley, 1884: 332.

Liriomyza cruciferarum Hering, 1927: 461; syn. Frick 1952b: 402.

Liriomyza brassicae (Riley): Frick 1952b: 402.

Agromyza diminuata (Walker, 1858): Coquillett 1898: 78.

Phytomyza mitis Curran, 1931: 97; syn. Frick 1957: 68.

Liriomyza hawaiiensis Frick, 1952a: 513; syn. Spencer 1963b: 356.

Liriomyza bulnesiae Spencer, 1963: 360; syn. Spencer 1973b: 55.

Liriomyza ornephila Garg, 1971b: 241; syn. Sasakawa 1977: 260.

Literature: Spencer 1973a, Nickel 1979.

Distribution. Species with world-wide distribution, firstly described from United States (Missouri), as might be expected *Liriomyza brassicae* has been described a number of times under different names from different parts of the world. In Oriental region known from Cambodia, China (Yunnan), India, Japan (Ryukyu Islands), Philippines, Singapore, Sri Lanka, Taiwan and Thailand.

Biology. *Liriomyza brassicae* is normally limited to host plants in the Brassicaceae (*Brassica*, *Cakile*, *Cheiranthus*, *Hirschfeldia*, *Isatis*, *Lepidium*, *Matthiola*, *Moricandia*, *Raphanus*, *Sinapis*, *Sisymbrium*), but has been recorded from *Cleome* (Cleomaceae), *Pisum* (Fabaceae), *Reseda* (Resedaceae) and *Tropaeolum* (Tropaeolaceae) (Benavent-Corai *et al.* 2005, Spencer 1990).

***Liriomyza trifolii* (Burgess in Comstock, 1880)**

Oscinis trifolii Burgess in Comstock, 1880: 201.

Liriomyza trifolii (Burgess, 1879). de Meijere 1925: 283.

Agromyza phaseolunata Frost, 1943: 254; syn. Spencer & Steyskal 1986: 298.

Liriomyza trifolii (Burgess, 1880). Frick 1952b: 405.

Liriomyza alliovora Frick, 1955: 88; syn. Spencer 1973a: 226.

Literature: Mujica *et al.* 2016

Distribution. *L. trifolii* originated in North America and spread to other parts of the world in the 1960-1980s. It has been recorded in numerous countries around the world, presumably associated with the global trade of ornamental plants. In Oriental region known from Cambodia, China (Fujian, Guangdong, Hainan, Jiangsu), India, Laos, Malaysia, Taiwan, Thailand, Philippines and Vietnam.

Biology. *L. trifolii* is highly polyphagous species, it is known from more than 400 species of host plants in 28 families including both ornamental crops and vegetables. The main host families and species include: Apiaceae (*Apium graveolens*); Asteraceae (*Aster*, *Chrysanthemum*, *Gerbera*, *Dahlia*, *Ixeris stolonifera*, *Lactuca*, *Zinnia*); Brassicaceae (*Brassica*); Caryophyllaceae (*Gypsophila*); Chenopodiaceae (*Spinacia oleracea*, *Beta vulgaris*); Cucurbitaceae (*Cucumis*, *Cucurbita*); Fabaceae (*Glycine max*, *Medicago sativa*, *Phaseolus vulgaris*, *Pisum*, *Trifolium*, *Vicia faba*); Liliaceae (*Allium cepa*, *A. sativum*) and Solanaceae (*Capsicum annuum*, *C. frutescens*, *Petunia*, *Solanum lycopersicum*, *Solanum*) (see CABI 2021).

***Pseudonapomyza gujaratica* Shah, 1982**

Pseudonapomyza gujaratica Shah, 1980: 59; nomen nudum.

Pseudonapomyza gujaratica Shah, 1982: 69.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013.

Distribution. This species described from Gujarat State in India, known also from Sri Lanka. First record from Cambodia and first detection after the description.

Biology. *Zea mays* and *Sorghum vulgare* are the only known host plants.

***Pseudonapomyza malayensis* Spencer, 1973**

Pseudonapomyza malayensis Spencer, 1973a: 272.

Material examined. CAMBODIA: Phnom Penh, 1 ♂, 31.vii.–15.viii.2013, 1 ♂, 15–25.viii.2013.

Distribution. Known from Malaysia and China (Hong Kong). First record from Cambodia.

Biology. Host plant is *Cynodon dactylon* (Poaceae). This species may well also develop in cultivated cereals (Spencer 1990).

***Pseudonapomyza spicata* (Malloch, 1914)**

Phytomyza spicata Malloch, 1914: 335.

Pseudonapomyza spicata (Malloch): Hennig 1941: 173.

Material examined. CAMBODIA: Phnom Penh, 12 ♂♂, 31.vii.–15.viii.2013, 7 ♂♂, 15–25.viii.2013.

Distribution. Species described from Taiwan (Tainan, Takao), now widely recorded from Australasian, Oriental and Palaearctic Regions. First record from Cambodia.

Biology. Confirmed host plant genera are *Panicum*, *Saccharum*, *Triticum* and *Zea* (Benavent-Corai *et al.* 2005, Spencer 1990).

***Pseudonapomyza trilobata* Sasakawa, 1963**

Pseudonapomyza trilobata Sasakawa, 1963: 48.

Pseudonapomyza rampae Spencer, 1986: 504; syn. Sasakawa 2013: 35.

Material examined. CAMBODIA: Phnom Penh, 5 ♂♂, 31.vii.–15.viii.2013, 3 ♂♂, 15–25.viii.2013.

Distribution. Hitherto this species was known only as male holotype from Talipao, Jolo Isl., Sulu near Mindanao, Philippines. Sasakawa (2013) established *Ps. rampae* known from Thailand as new junior synonym of this species. First record from Cambodia.

Biology. Host and early stages unknown.

Conclusions

In this paper is presented a first overview of all Agromyzidae specimens so far collected and identified from Cambodia. A total of 16 species of Agromyzidae are currently known from Cambodia, which represents some 4 % of the known Oriental species of the family. Thirteen species (including the newly described one) represent additions to the fauna of Cambodia. Undoubtedly Cambodia is a very interesting country within the frame of the whole Oriental region, but very little is known about Diptera, and especially about the Agromyzidae.

I hope this first checklist for Cambodia will promote more collecting and research on Agromyzidae in the country and further fieldwork could certainly reveal additional species of this faunistically neglected family.

Acknowledgements

My special thanks are due to Miroslav Barták (Praha, Czech Republic) who provided his material of Agromyzidae for this study, Michael von Tschirnhaus (Bielefeld, Germany) for providing me with relevant literature, for valuable comments and assistance with the early draft of the manuscript, David Gibbs (Weston-super-Mare, Great Britain) for the language revision and other improvement of the manuscript.

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